

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°



ACCESSORIES

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QS18

- Eight sensing modes for solving most applications: opposed, retroreflective, convergent, diffuse, plastic and glass fiber optic, and adjustable field and fixed field
- High-power infrared or visible red sensing beam
- Models for dc or ac/dc operation



QS18 Laser

- Opposed, diffuse, retroreflective and adjustable-field models
- High-performance sensing with visible Class 1 and 2 lasers
- Long sensing ranges
- Ideal for confined areas
- Narrow effective beam for small object detection and precise position control
- Emitter models available with five beam shapes



QS18 Adjustable-Field

- Background suppression models for detection of objects when the background condition is not fixed
- Foreground suppression models for detection when background is fixed and object varies in color or shape
- Visible red LED or laser sensing beam
- Long-range models for reliable sensing up to 300 mm
- Models with crosstalk avoidance circuitry for reliable sensing



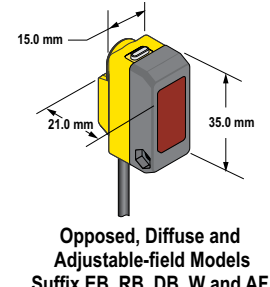
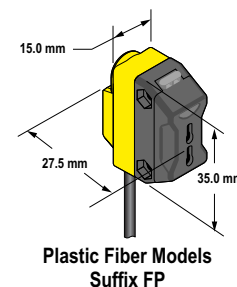
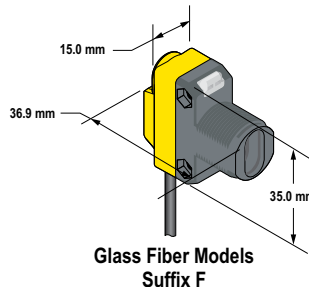
QS18 Expert™

- Single push-button programming of advanced sensing options
- Five sensor configuration options
- Diffuse, convergent, retroreflective and plastic fiber optic modes
- Reliable detection of reflective objects

WORLD-BEAM® QS18 DC Series

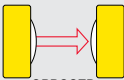
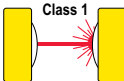



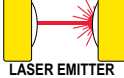



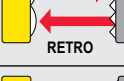
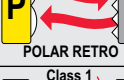


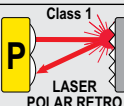


Opposed, Retroreflective,
Laser Retroreflective, Convergent,
Diffuse, Laser Diffuse and Fixed-field Models
Suffix E, R, LV, LP, LLP, CV15,
CV45, D, LD, LE and FF



WORLD-BEAM® QS18, 10-30V dc

 Infrared LED
  Visible Red LED
  Visible Red Laser

Sensing Mode/LED	Range	Connection	Models* NPN	Models* PNP	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	QS18VN6R	QS18VP6R		
		4-pin Euro QD	QS18VN6RQ8	QS18VP6RQ8		
	3 m	2 m	QS186EB Emitter		EGC-2 (p. 97)	BP-2 (p. 99)
		4-pin Euro QD	QS186EBQ8 Emitter			
		2 m	QS18VN6RB	QS18VP6RB		
		4-pin Euro QD	QS18VN6RBQ8	QS18VP6RBQ8		
 LASER EMITTER	15 m (4500 X excess gain)	2 m	QS186LE**		See Data sheet for more information.	
		4-pin Euro QD	QS186LEQ8**			
 LASER SPOT	See Data sheet for more information.	2 m	QS186LE10			
		4-pin Euro QD	QS186LE10Q8			
 LASER SPOT		2 m	QS186LE11			
		4-pin Euro QD	QS186LE11Q8			
 LASER SPOT		2 m	QS186LE12			
		4-pin Euro QD	QS186LE12Q8			
 LASER SPOT		2 m	QS186LE14			
		4-pin Euro QD	QS186LE14Q8			
 LASER EMITTER	15 m (7000 X excess gain)	2 m	QS186LE2**		See Data sheet for more information.	
		4-pin Euro QD	QS186LE2Q8**			
 LASER SPOT	See Data sheet for more information.	2 m	QS186LE210			
		4-pin Euro QD	QS186LE210Q8			
 LASER SPOT		2 m	QS186LE211			
		4-pin Euro QD	QS186LE211Q8			
 LASER SPOT		2 m	QS186LE212			
		4-pin Euro QD	QS186LE212Q8			
 LASER SPOT		2 m	QS186LE214			
		4-pin Euro QD	QS186LE214Q8			
 RETRO	6.5 m†	2 m	QS18VN6LV	QS18VP6LV	EGC-3 (p. 97)	BP-3 (p. 99)
		4-pin Euro QD	QS18VN6LVQ8	QS18VP6LVQ8		
 POLAR RETRO	3.5 m†	2 m	QS18VN6LP	QS18VP6LP	EGC-4 (p. 97)	BP-4 (p. 99)
		4-pin Euro QD	QS18VN6LPQ8	QS18VP6LPQ8		
 LASER POLAR RETRO	0.1-10 m††	2 m	QS18VN6LLP	QS18VP6LLP	EGC-5 (p. 97)	—
		4-pin Euro QD	QS18VN6LLPQ8	QS18VP6LLPQ8		

Photoelectrics
Sensors

Fiber Optic

Sensors
Special Purpose
SensorsMeasurement &
Inspection Sensors

Vision

Wireless

Lighting &
IndicatorsSafety
Light ScreensSafety
Laser ScannersFiber Optic
Safety SystemsSafety Controllers &
ModulesSafety Two-Hand
Control ModulesSafety Interlock
SwitchesEmergency Stop &
Stop Control

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MINIATURE

COMPACT

WORLD-BEAM QS18

WORLD-BEAM Q20

MINI-BEAM

S18/M18

T18

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MIDSIZE

FULLSIZE



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 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, **QS18VN6LV W30**).**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, **QS18VN6LVQ8**).• For 4-pin integral Pico-style QD, add suffix **Q7** (example, **QS18VN6LVQ7**).• For 4-pin 150 mm Euro-style pigtail QD, add suffix **Q5** (example, **QS18VN6LVQ5**).• For 4-pin 150 mm Pico-style pigtail QD, add suffix **Q** (example, **QS18VN6LVQ**).

Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.




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

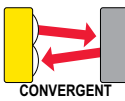
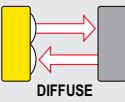
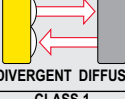

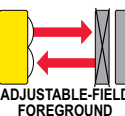
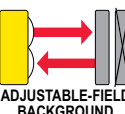
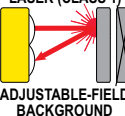
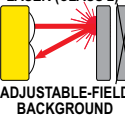
†† Retroreflective range is specified using one model BRT-51X51BM or BRT-TVHG-2X2 retroreflector.

* 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.

WORLD-BEAM® QS18, 10-30V dc (cont'd)

 Infrared LED
  Visible Red LED
  Visible Red Laser

Sensing Mode/LED	Range	Connection	Models* NPN	Models* PNP	Excess Gain	Beam Pattern
 CONVERGENT	16 mm	2 m	QS18VN6CV15	QS18VP6CV15	EGC-17 (p. 98)	BP-16 (p. 100)
		4-pin Euro QD	QS18VN6CV15Q8	QS18VP6CV15Q8		
	43 mm	2 m	QS18VN6CV45	QS18VP6CV45	EGC-18 (p. 98)	BP-17 (p. 100)
		4-pin Euro QD	QS18VN6CV45Q8	QS18VP6CV45Q8		
 DIFFUSE	450 mm	2 m	QS18VN6D	QS18VP6D	EGC-7 (p. 97)	BP-6 (p. 99)
		4-pin Euro QD	QS18VN6DQ8	QS18VP6DQ8		
		2 m	QS18VN6DB	QS18VP6DB	EGC-8 (p. 97)	BP-7 (p. 99)
		4-pin Euro QD	QS18VN6DBQ8	QS18VP6DBQ8		
 DIVERGENT DIFFUSE	100 mm	2 m	QS18VN6W	QS18VP6W	EGC-9 (p. 97)	BP-8 (p. 99)
		4-pin Euro QD	QS18VN6WQ8	QS18VP6WQ8		
 CLASS 1 DIFFUSE LASER	300 mm	2 m	QS18VN6LD	QS18VP6LD	EGC-10 (p. 97)	BP-9 (p. 100)
		4-pin Euro QD	QS18VN6LDQ8	QS18VP6LDQ8		
 ADJUSTABLE-FIELD FOREGROUND	Adjustable between 30-200 mm	2 m	QS18VN6AFF200	QS18VP6AFF200	EGC-24 (p. 98) Min Separation Distance MSD-2 (p. 101)	—
			QS18AB6AFF200 (Bipolar NPN/PNP)			
		4-pin Euro Pigtail QD	QS18VN6AFF200Q5	QS18VP6AFF200Q5		
	QS18AB6AFF200Q5 (Bipolar NPN/PNP)					
	Adjustable between 15-40 mm	2 m	QS18VN6AFF40	QS18VP6AFF40	EGC-22 (p. 98) Min Separation Distance MSD-4 (p. 101)	—
			QS18AB6AFF40 (Bipolar NPN/PNP)			
4-pin Euro Pigtail QD		QS18VN6AFF40Q5	QS18VP6AFF40Q5			
		QS18AB6AFF40Q5 (Bipolar NPN/PNP)				
 ADJUSTABLE-FIELD BACKGROUND SUPPRESSION	Adjustable between 30-300 mm	2 m	QS18VN6AF300	QS18VP6AF300	EGC-23 (p. 98) Min Separation Distance MSD-1 (p. 101)	—
			QS18AB6AF300 (Bipolar NPN/PNP)			
		4-pin Euro Pigtail QD	QS18VN6AF300Q5	QS18VP6AF300Q5		
	QS18AB6AF300Q5 (Bipolar NPN/PNP)					
	Adjustable between 15-40 mm	2 m	QS18VN6AF40	QS18VP6AF40	EGC-21 (p. 98) Min Separation Distance MSD-3 (p. 101)	—
			QS18AB6AF40 (Bipolar NPN/PNP)			
		4-pin Euro Pigtail QD	QS18VN6AF40Q5	QS18VP6AF40Q5		
			QS18AB6AF40Q5 (Bipolar NPN/PNP)			
	1 mm to cutoff point (adjustable between 20-100 mm)	2 m	QS18VN6AF100	QS18VP6AF100	EGC-25 (p. 98) Cutoff Point Deviation Curve CPDC-1 (p. 102)	—
		4-pin Euro Pigtail QD	QS18VN6AF100Q5	QS18VP6AF100Q5		
 LASER (CLASS 1) ADJUSTABLE-FIELD BACKGROUND SUPPRESSION	1 mm to cutoff point (adjustable between 30-150 mm)	2 m	QS18VN6LAF	QS18VP6LAF	EGC-26 (p. 98) Cutoff Point Deviation Curve CPDC-2 (p. 102)	—
		4-pin Euro Pigtail QD	QS18VN6LAFQ5	QS18VP6LAFQ5		
 LASER (CLASS 2) ADJUSTABLE-FIELD BACKGROUND SUPPRESSION	20 mm to cutoff point (adjustable between 50-250 mm)	2 m	QS18VN6LAF250	QS18VP6LAF250	EGC-27 (p. 98) Cutoff Point Deviation Curve CPDC-3 (p. 102)	—
		4-pin Euro Pigtail QD	QS18VN6LAF250Q5	QS18VP6LAF250Q5		

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, **QS18VN6D W/30**).

QD models (except Adjustable-Field):

• For 4-pin integral Euro-style QD, add suffix **Q8** (example, **QS18VN6LVQ8**).

• For 4-pin integral Pico-style QD, add suffix **Q7** (example, **QS18VN6LVQ7**).

QD models (Adjustable-Field only):

• For 4-pin 150 mm Pico-style QD, add suffix **Q** (example, **QS18VP6AF100Q**).

• For 4-pin 150 mm Euro-style pigtail QD, add suffix **Q5** (example, **QS18VN6LVQ5**).

• For 4-pin 150 mm Pico-style pigtail QD, add suffix **Q** (example, **QS18VN6LVQ**).

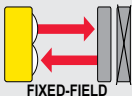
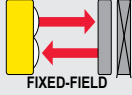
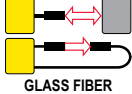
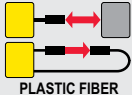
• For 4-pin 150 mm Euro-style pigtail QD, add suffix **Q5** (example, **QS18VP6AF100Q5**).

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

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WORLD-BEAM® QS18, 10-30V dc (cont'd)

 Infrared LED
  Visible Red LED

Sensing Mode/LED	Range	Connection	Models* NPN	Models* PNP	Excess Gain	Beam Pattern
 FIXED-FIELD	0-50 mm Cutoff	2 m	QS18VN6FF50	QS18VP6FF50	EGC-28 (p. 98)	—
		4-pin Euro QD	QS18VN6FF50Q8	QS18VP6FF50Q8		
 FIXED-FIELD	0-100 mm Cutoff	2 m	QS18VN6FF100	QS18VP6FF100	EGC-29 (p. 98)	—
		4-pin Euro QD	QS18VN6FF100Q8	QS18VP6FF100Q8		
 GLASS FIBER	Range varies by sensing mode and fiber optics used	2 m	QS18VN6F	QS18VP6F	EGC-30 & EGC-31 (p. 98)	BP-20 & BP-21 (p. 100)
		4-pin Euro QD	QS18VN6FQ8	QS18VP6FQ8		
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m	QS18VN6FP	QS18VP6FP	EGC-32 & EGC-33 (p. 98)	BP-22 & BP-23 (p. 100)
		4-pin Euro QD	QS18VN6FPQ8	QS18VP6FPQ8		

Photoelectronics
SensorsFiber Optic
SensorsSpecial Purpose
SensorsMeasurement &
Inspection Sensors

Vision

Wireless

Lighting &
IndicatorsSafety
Light ScreensSafety
Laser ScannersFiber Optic
Safety SystemsSafety Controllers &
ModulesSafety Two-Hand
Control ModulesSafety Interlock
SwitchesEmergency Stop &
Stop Control

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COMPACT

WORLD-BEAM QS18

WORLD-BEAM Q20

MINI-BEAM

S18/M18

T18

TM18

Q25

MIDSIZE

FULLSIZE


WORLD-BEAM® QS18 DC Specifications

Supply Voltage and Current	Retroreflective, 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
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 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), Retroreflective, 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), Retroreflective, 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 1.5V @ 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 Retroreflective 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), Retroreflective, 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 models.

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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 All others, 2 LED indicators: Green: Power ON Yellow: Light sensed See data sheet for detailed information.			
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	Lasers Temperature: -10° to +50° C Relative humidity: 95% @ 50° C (non-condensing)	Adjustable-field LED (100 mm) 0° to +55° C	Adjustable-field LED (40, 200 & 300 mm) -20° to +55° C	All others -20° to +70° C
Laser Classification (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				
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)

* Does not apply to laser emitter models.

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.

CLASS 1 LASER PRODUCT

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated 7-26-01.

BANNER

Pulse Power < 5.6 mW, 650 - 670 nm, 15 kHz, 4.5 µs Pulse. Complies to 21 CFR 1040.10 & EN60825-1:2001 except for deviations pursuant to laser notice No. 50, dated 7-26-01.

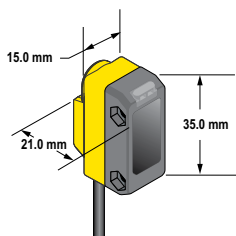
CLASS 2 LASER PRODUCT



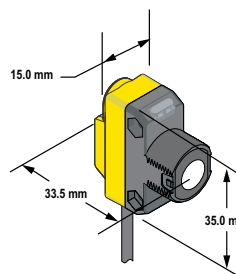
WORLD-BEAM® QS18 Expert™ and Ultrasonic Sensors



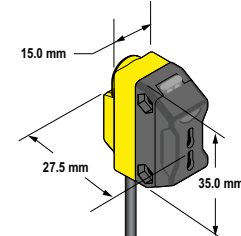
Retroreflective, Convergent and Diffuse Models
Suffix LP, CV15, CV45, D and DV



Diffuse Models
Suffix DB and W



Ultrasonic Models
Suffix NA and PA



Plastic Fiber Models
Suffix FP

Photoelectrics Sensors

Fiber Optic

Sensors

Special Purpose

Sensors

Measurement &

Inspection Sensors

Vision

Wireless

Lighting &

Indicators

Safety

Light Screens

Safety

Laser Scanners

Fiber Optic

Safety Systems

Safety Controllers &

Modules

Safety Two-Hand

Control Modules

Safety Interlock

Switches

Emergency Stop &

Stop Control

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WORLD-BEAM® QS18, 10-30V dc

⇒ Infrared LED → Visible Red LED

Sensing Mode/LED	Range	Connection	Models NPN	Models PNP	Excess Gain	Beam Pattern
 POLAR RETRO	3.5 m†	2 m	QS18EN6LP	QS18EP6LP	EGC-6 (p. 97)	BP-5 (p. 99)
		4-pin Euro QD	QS18EN6LPQ8	QS18EP6LPQ8		
 CONVERGENT	16 mm	2 m	QS18EN6CV15	QS18EP6CV15	EGC-19 (p. 98)	BP-18 (p. 100)
		4-pin Euro QD	QS18EN6CV15Q8	QS18EP6CV15Q8		
	43 mm	2 m	QS18EN6CV45	QS18EP6CV45	EGC-20 (p. 98)	BP-19 (p. 100)
		4-pin Euro QD	QS18EN6CV45Q8	QS18EP6CV45Q8		
 DIFFUSE	800 mm	2 m	QS18EN6D	QS18EP6D	EGC-13 (p. 97)	BP-12 (p. 100)
		4-pin Euro QD	QS18EN6DQ8	QS18EP6DQ8		
	500 mm	2 m	QS18EN6DB	QS18EP6DB	EGC-14 (p. 97)	BP-13 (p. 100)
		4-pin Euro QD	QS18EN6DBQ8	QS18EP6DBQ8		
 DIVERGENT DIFFUSE	300 mm	2 m	QS18EN6W	QS18EP6W	EGC-15 (p. 97)	BP-14 (p. 100)
		4-pin Euro QD	QS18EN6WQ8	QS18EP6WQ8		
 DIFFUSE	600 mm	2 m	QS18EN6DV	QS18EP6DV	EGC-16 (p. 97)	BP-15 (p. 100)
		4-pin Euro QD	QS18EN6DVQ8	QS18EP6DVQ8		
 PLASTIC FIBER	Range varies by sensing mode and fiber optics used	2 m	QS18EN6FP	QS18EP6FP	EGC-34 & EGC-35 (p. 99)	BP-24 & BP-25 (p. 100)
		4-pin Euro QD	QS18EN6FPQ8	QS18EP6FPQ8		

MINIATURE

COMPACT

WORLD-BEAM QS18

WORLD-BEAM Q20

MINI-BEAM

S18/M18

T18

TM18

Q25

MIDSIZE

FULLSIZE

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).

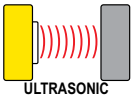
• For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS18EN6LPQ5).


• For 4-pin 150 mm 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

Sensing Mode/LED	Range	Connection	Models [†] NPN	Models [†] PNP	Excess Gain	Beam Pattern
 ULTRASONIC	50 - 500 mm	2 m	QS18UNA	QS18UPA	—	—
		4-pin Euro QD	QS18UNAQ8	QS18UPAQ8		
		2 m	QS18UNAE ^{††}	QS18UPAE ^{††}		
		4-pin Euro QD	QS18UNAEQ8 ^{††}	QS18UPAEQ8 ^{††}		

 **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 4-pin 150 mm Euro-style pigtail QD, add suffix **Q5** (example, **QS18UNAQ5**).
- For 4-pin 150 mm Pico-style pigtail QD, add suffix **Q** (example, **QS18UNAQ**).

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

^{††} Models are epoxy-encapsulated, IP68; NEMA 6P with remote TEACH programming.

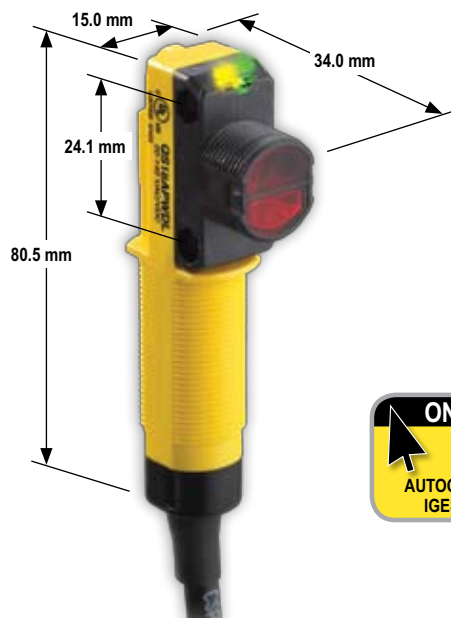
WORLD-BEAM® QS18 *Expert*™ Specifications

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	<ul style="list-style-type: none"> • Thresholds: Push-button/remote-wire configurable • Five <i>Expert</i>™-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.
Operating Conditions	Temperature: -20° to +70° C Relative humidity: 95% @ 50° C (non-condensing)
Certifications	 
Hookup Diagrams	DC07 (p. 745)

WORLD-BEAM® QS18 Ultrasonic Specifications

See page 317

WORLD-BEAM® QS18 Universal Voltage Sensors



Photoelectrics Sensors

Fiber Optic Sensors
Special Purpose Sensors
Measurement & Inspection Sensors
Vision

Wireless

Lighting & Indicators

Safety Light Screens

Safety Laser Scanners

Fiber Optic Safety Systems

Safety Controllers & Modules

Safety Two-Hand Control Modules

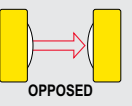

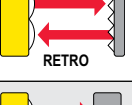
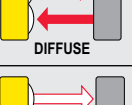
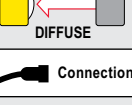
Safety Interlock Switches

Emergency Stop & Stop Control

ACCESSORIES

page 96

WORLD-BEAM® QS18 Universal Voltage, 20-140V ac/dc or 20-270V ac/dc Infrared LED Visible Red LED

Sensing Mode/LED	Range	Output ^{††}	Models LO	Models DO	Excess Gain	Beam Pattern
 OPPOSED	20 m	—	QS18WE Emitter		EGC-1 (p. 97)	BP-1 (p. 99)
		N-MOSFET (Sinking)	QS18ANWR	QS18RNWR		
		P-MOSFET (Sourcing)	QS18APWR	QS18RPWR		
 POLAR RETRO	3.5 m [†]	N-MOSFET (Sinking)	QS18ANWLP	QS18RNWLP	EGC-4 (p. 97)	BP-4 (p. 99)
		P-MOSFET (Sourcing)	QS18APWLP	QS18RPWLP		
 RETRO	6.5 m [†]	N-MOSFET (Sinking)	QS18ANWLTV	QS18RNWLTV	EGC-3 (p. 97)	BP-3 (p. 99)
		P-MOSFET (Sourcing)	QS18APWLTV	QS18RPWLTV		
 DIFFUSE	450 mm	N-MOSFET (Sinking)	QS18ANWDL	QS18RNWDL	EGC-11 (p. 97)	BP-10 (p. 100)
		P-MOSFET (Sourcing)	QS18APWDL	QS18RPWDL		
 DIFFUSE	1 m	N-MOSFET (Sinking)	QS18ANWDXL	QS18RNWDXL	EGC-12 (p. 97)	BP-11 (p. 100)
		P-MOSFET (Sourcing)	QS18APWDXL	QS18RPWDXL		

MINIATURE

COMPACT

WORLD-BEAM QS18

WORLD-BEAM Q20

MINI-BEAM

S18/M18

T18

TM18

Q25

MIDSIZE

FULLSIZE

 **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, **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.

Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.


^{††} MOSFET: Metal oxide semiconductor field-effect transistor.

WORLD-BEAM® QS18 Universal Voltage Specifications

Supply Voltage	P-MOSFET Models: 20 to 140V ac/dc @ < 10 mA, exclusive of load N-MOSFET Models: 20 to 270V ac/dc @ < 10 mA, exclusive of load
Supply Protection Circuitry	Protected against reverse polarity and transient over-voltages

More on next page

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		
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





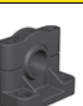


Euro QD			Euro QD (with Shield)			Pico QD			Pico QD (with Shield)			Micro QD	
See page 682			See page 683			See page 680			See page 681			See page 698	
Threaded 4-Pin			Threaded 4-Pin			Snap-on 4-Pin			Snap-on 4-Pin			Threaded 4-Pin	
Length	Straight	Right-Angle	Length	Straight	Right-Angle	Length	Straight	Right-Angle	Length	Straight	Right-Angle	Length	Straight
1.83 m	MQDC-406	MQDC-406RA	1.83 m	MQDEC2-406	MQDEC2-406RA	2.00 m	PKG4-2	PKW4Z-2	2.00 m	PKG4S-2	PKW4ZS-2	1.83 m	MQAC-406
4.57 m	MQDC-415	MQDC-415RA	4.57 m	MQDEC2-415	MQDEC2-415RA							4.57 m	MQAC-415
9.14 m	MQDC-430	MQDC-430RA	9.14 m	MQDEC2-430	MQDEC2-430RA							9.14 m	MQAC-430



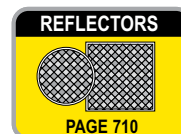
Additional cordset information available.
See page 679.

Brackets

QS18				
				
pg. 637 SMB18A	pg. 638 SMB18FA..	pg. 669 SMBQS18A	pg. 670 SMBQS18AF	pg. 638 SMB18SF



Additional brackets and information available.
See page 620.



Excess Gain Curves (Diffuse mode performance based on 90% reflectance white test card)

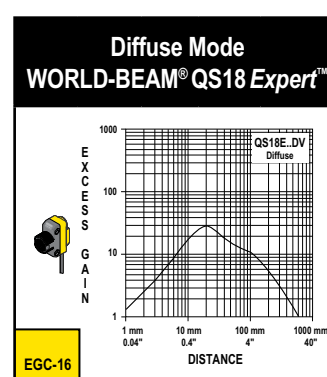
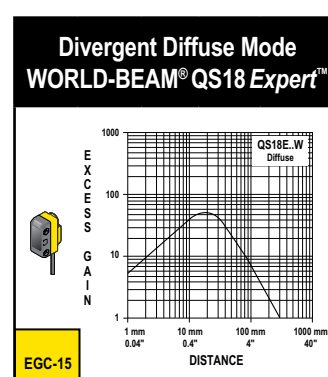
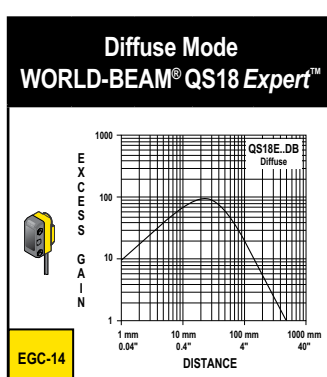
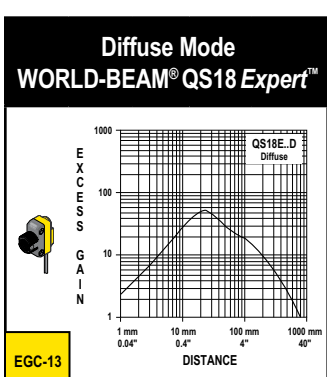
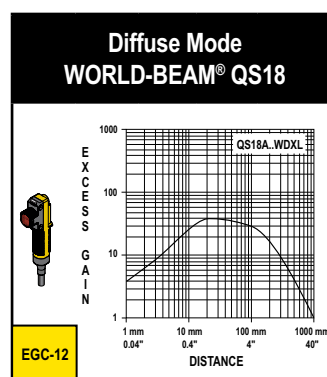
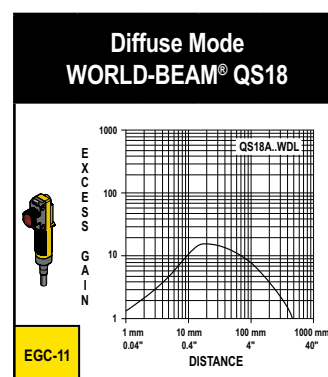
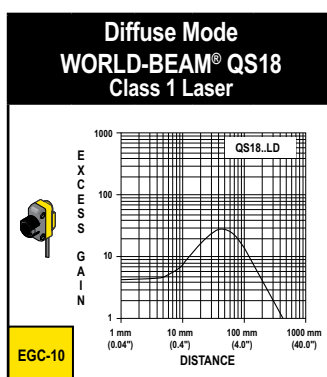
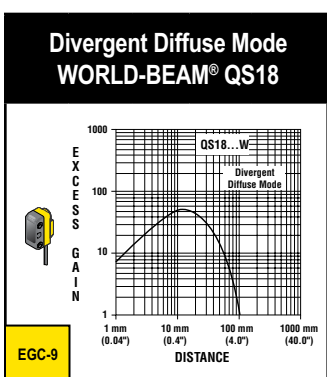
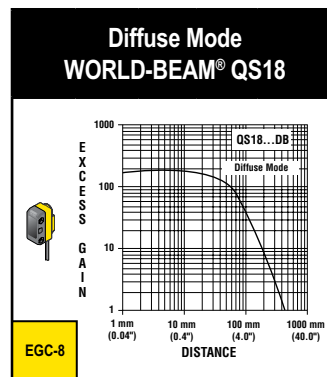
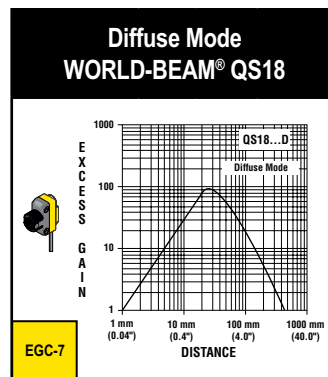
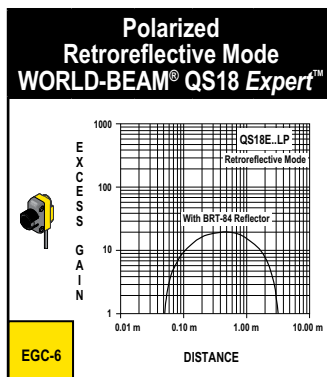
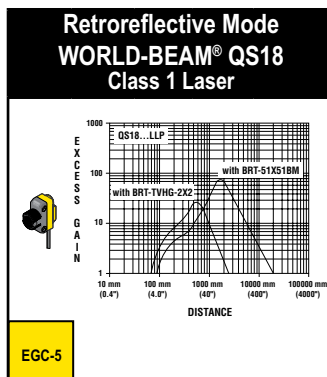
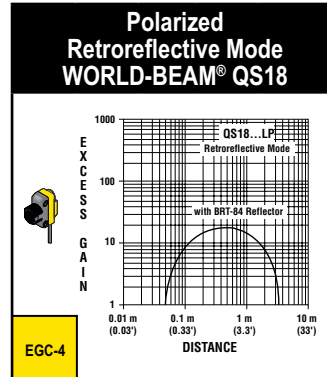
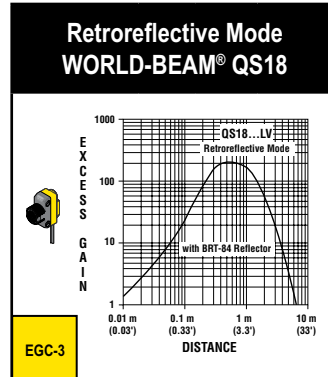
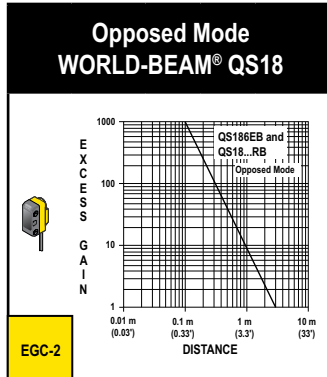
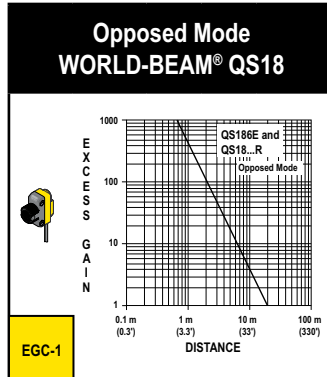
○ = Infrared LED

● = Visible Red LED

P = Visible Red LED Polarized

LP = Visible Red Laser Polarized

★ = Visible Red Laser



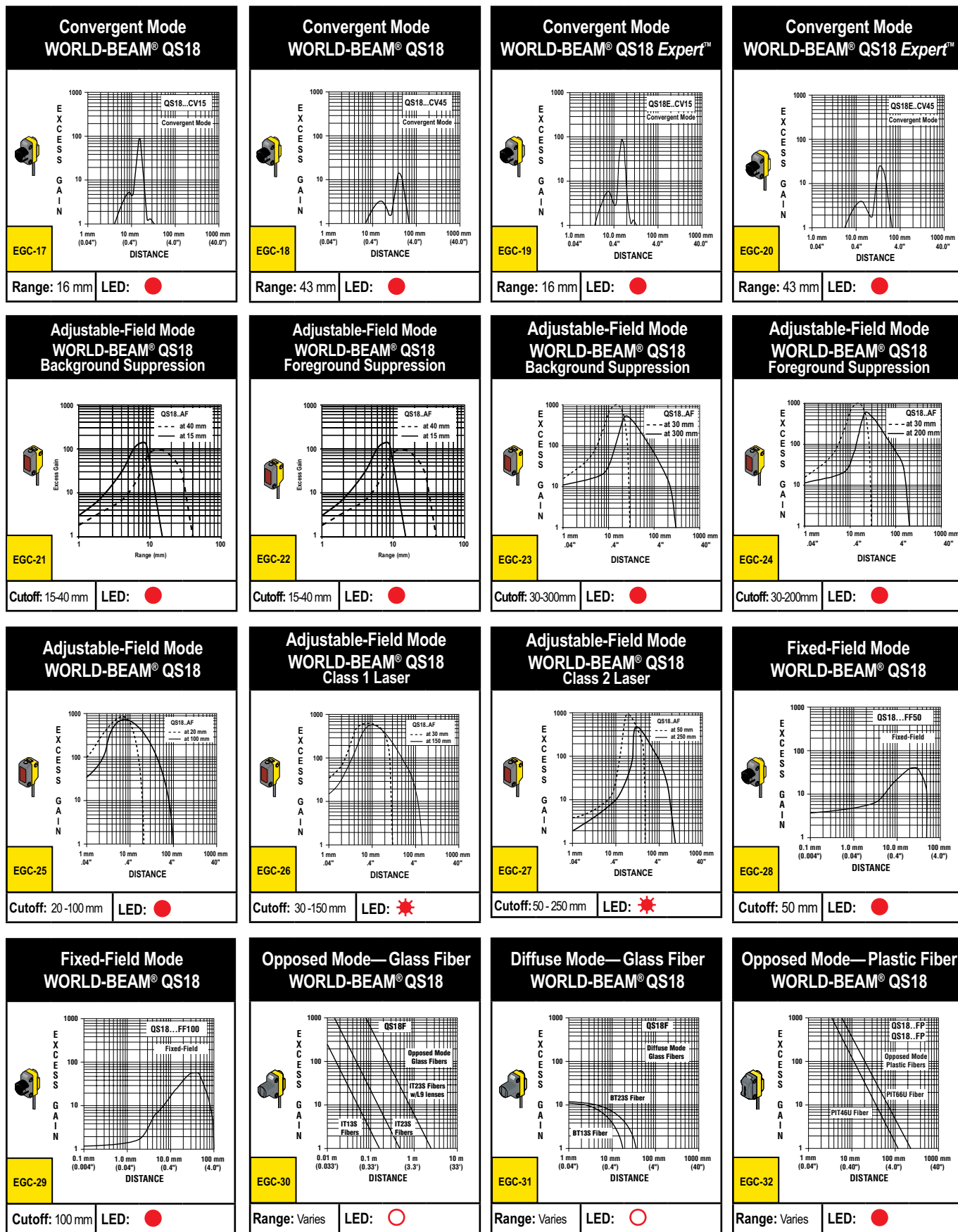
Photoelectronics Sensors
Fiber Optic Sensors
Special Purpose Sensors
Measurement & Inspection Sensors
Vision
Wireless
Lighting & Indicators
Safety Light Screens
Safety Laser Scanners
Fiber Optic Safety Systems
Safety Controllers & Modules
Safety Two-Hand Control Modules
Safety Interlock Switches
Emergency Stop & Stop Control

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T18
TM18
Q25
MIDSIZE
FULLSIZE

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

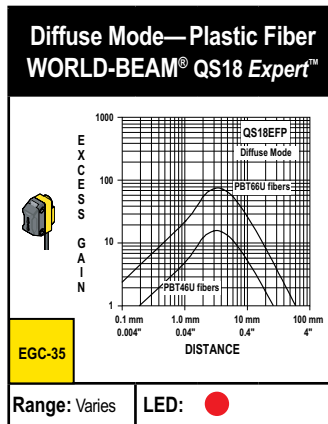
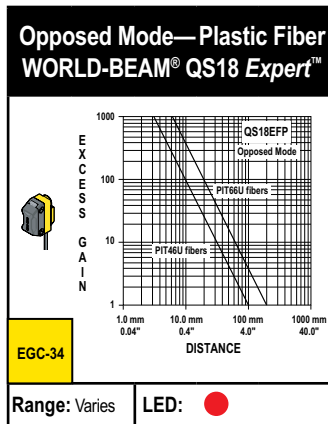
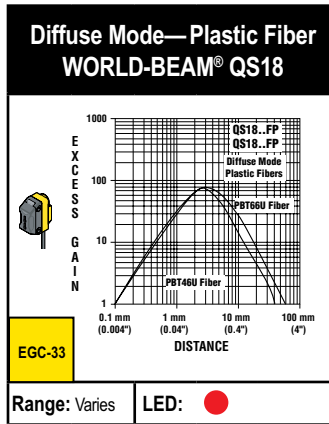
○ = Infrared LED ● = Visible Red LED ✱ = Visible Red Laser



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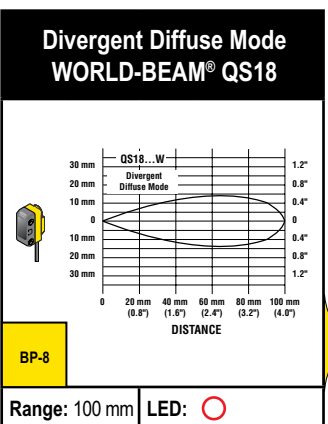
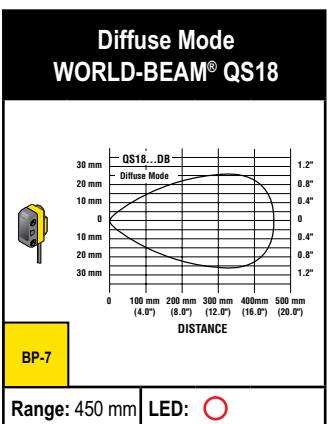
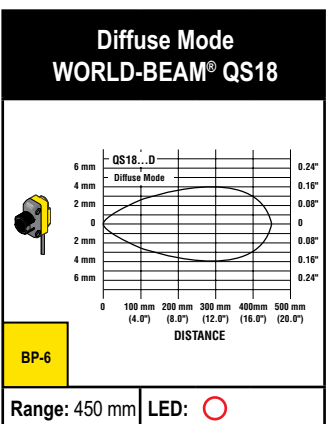
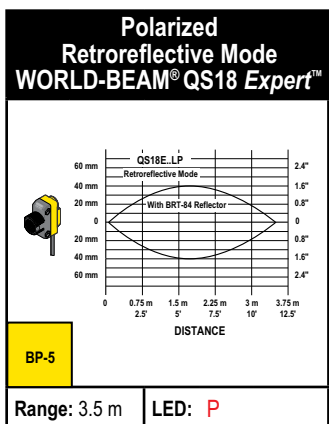
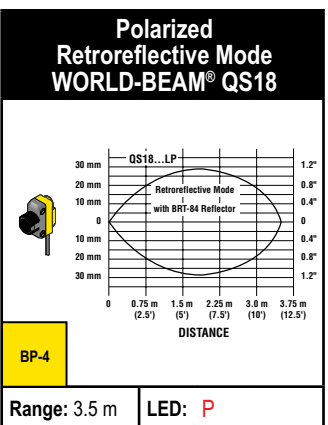
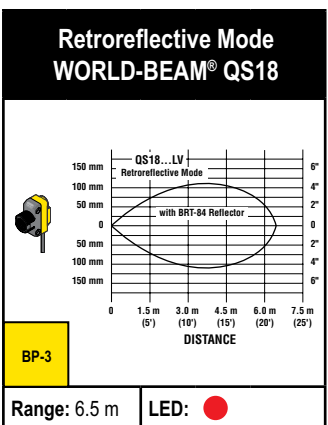
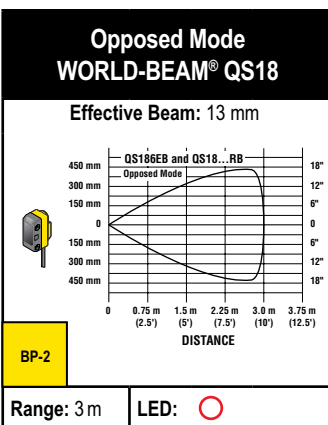
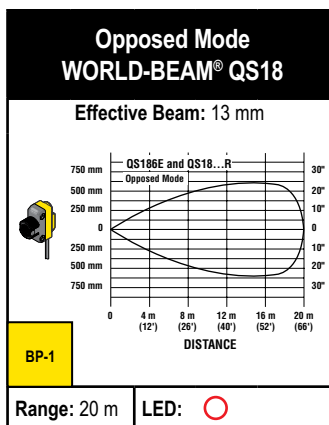
Excess Gain Curves (Diffuse mode performance based on 90% reflectance white test card)

● = 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



Photoelectronics Sensors
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Measurement & Inspection Sensors
Vision
Wireless
Lighting & Indicators
Safety Light Screens
Safety Laser Scanners
Fiber Optic Safety Systems
Safety Controllers & Modules
Safety Two-Hand Control Modules
Safety Interlock Switches
Emergency Stop & Stop Control

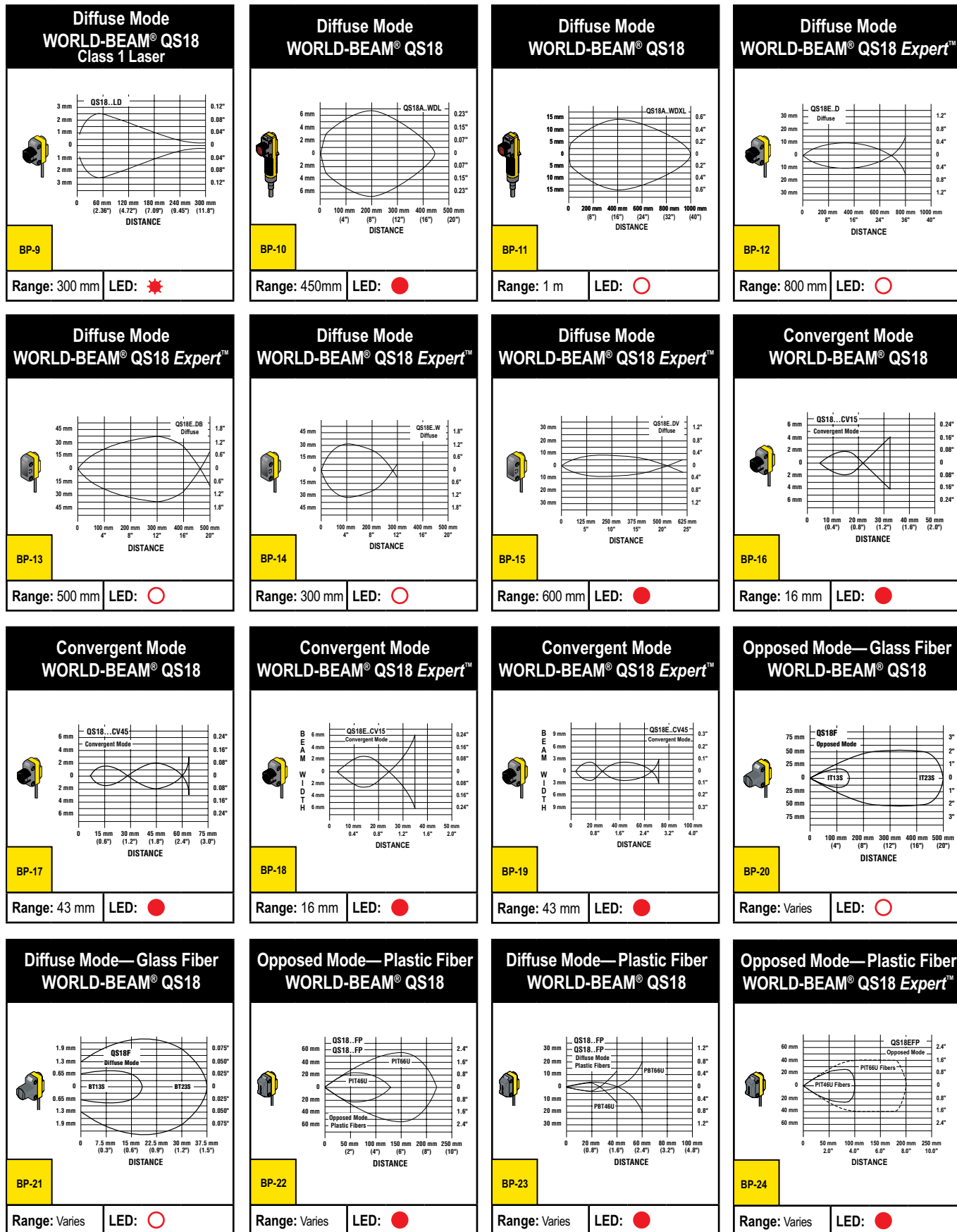
MINIATURE
COMPACT
WORLD-BEAM QS18
WORLD-BEAM Q20
MINI-BEAM
S18/M18
T18
TM18
Q25
MIDSIZE
FULLSIZE

More on next page

Beam Patterns

(Diffuse and Convergent mode performance based on 90% reflectance white test card)

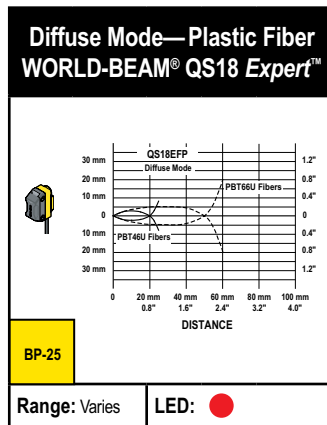
○ = Infrared LED ● = Visible Red LED ✱ = Visible Red Laser



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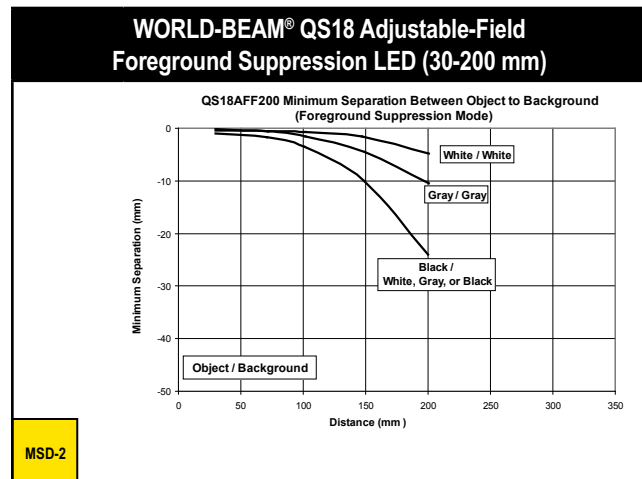
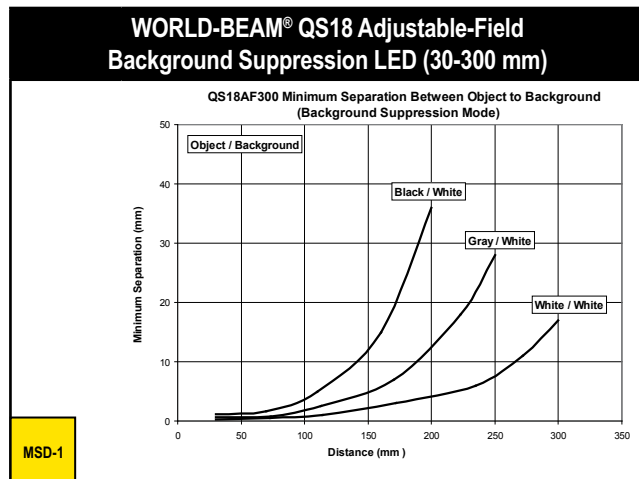
Beam Patterns (Diffuse mode performance based on 90% reflectance white test card)

● = Visible Red LED

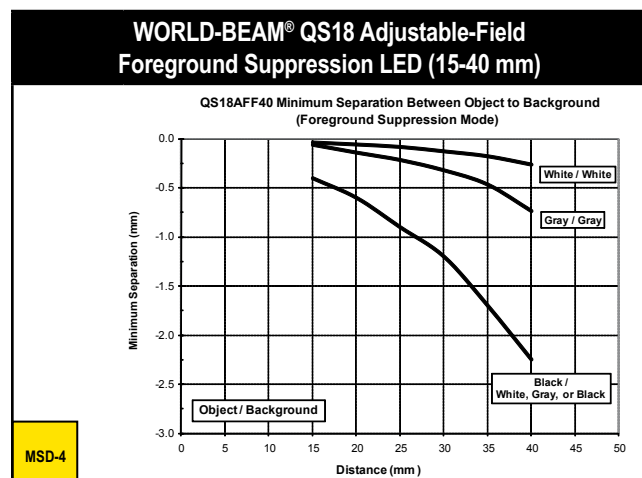
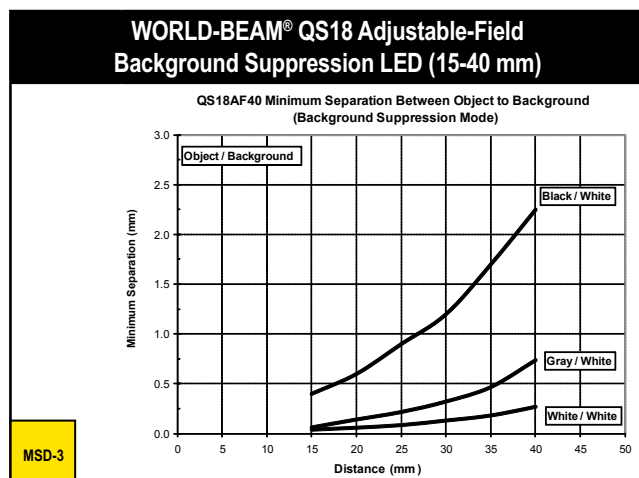


Photoelectronics Sensors
Fiber Optic Sensors
Special Purpose Sensors
Measurement & Inspection Sensors
Vision
Wireless
Lighting & Indicators
Safety Light Screens
Safety Laser Scanners
Fiber Optic Safety Systems
Safety Controllers & Modules
Safety Two-Hand Control Modules
Safety Interlock Switches
Emergency Stop & Stop Control

Minimum Separation Distance

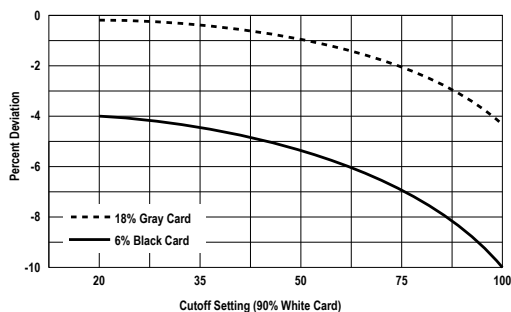


MINIATURE
COMPACT
WORLD-BEAM QS18
WORLD-BEAM Q20
MINI-BEAM
S18/M18
T18
TM18
Q25
MIDSIZE
FULLSIZE



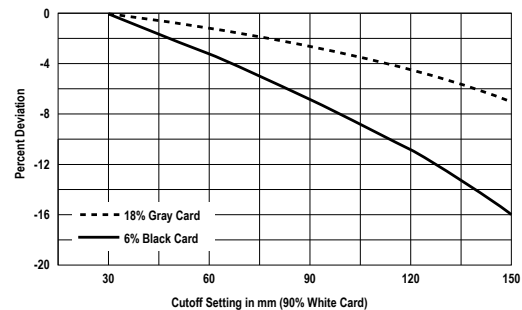
Cutoff Point Deviation

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



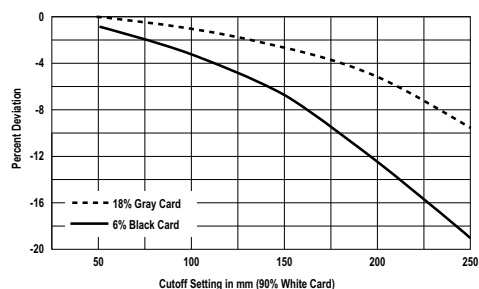
CPDC-1

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



CPDC-2

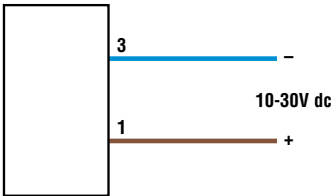



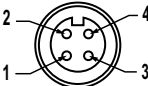
**WORLD-BEAM® QS18 Adjustable-Field
Background Suppression Class 2 Laser (50-250 mm)**



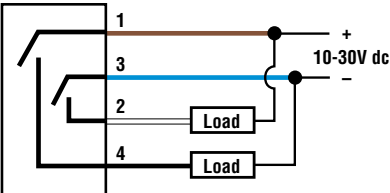

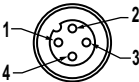
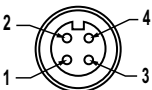
CPDC-3

DC Hookups

DC01		Current Sinking (NPN)	
		Key	
		1 = Brown	
		3 = Blue	
		4 = Black	
Current Sourcing (PNP)			
3-Pin Pico			

DC02		Emitter	
		Key	
		1 = Brown 2 = White [†] 3 = Blue 4 = Black [†] [†] Not Used	
3-Pin Pico		4-Pin Pico	
			

DC03		Complementary Current Sinking (NPN)	
		Key 1 = Brown 2 = White 3 = Blue 4 = Black	
Complementary Current Sourcing (PNP)			
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

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DC05 Complementary Current Sinking (NPN) Standard Hookup		
	Key 1 = Brown 2 = White 3 = Blue 4 = Black	
Current Sinking (NPN) Plus Current Sinking Alarm		
4-Pin Pico	4-Pin Euro	

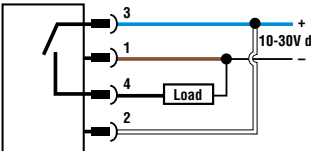
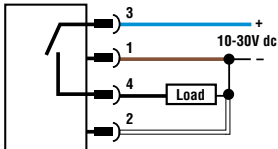
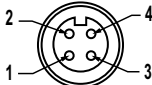
DC06 Complementary Current Sourcing (PNP) Standard Hookup		
	Key 1 = Brown 2 = White 3 = Blue 4 = Black	
Current Sourcing (PNP) Plus Current Sourcing Alarm		
4-Pin Pico	4-Pin Euro	

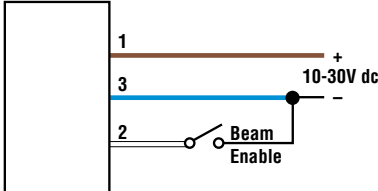

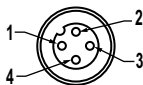
DC07 Current Sinking (NPN)		
	Key 1 = Brown 2 = White 3 = Blue 4 = Black	
Current Sourcing (PNP)		
4-Pin Pico	4-Pin Euro	

DC08 Bipolar (NPN + PNP)		
	Key 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray 6 = Pink † † Not Used	
<p>*NOTE: For some QS30 models, gray wire is used for LO/DO Select. See data sheet.</p> <p>** Bussable Power models are 12-30V dc</p>		
6-Pin Pico		5-Pin Euro



DC Hookups

DC21	SM30 DC Receivers (PNP) Light Operate	Key
		1 = Brown 2 = White 3 = Blue 4 = Black
SM30 DC Receivers (PNP) Dark Operate		
		
4-Pin Mini		
		

DC22	Laser Emitter	
	Key	
	<div>1 = Brown</div> <div>2 = White</div> <div>3 = Blue</div> <div>4 = Black†</div> <div>† Not Used</div>	
4-Pin Pico	4-Pin Euro	
		

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UN01

SPDT Electromechanical Relay Output

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

5-Pin Mini
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Yellow*

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

Key

5-Pin Euro
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray†

5-Pin Mini
1 = Brown
2 = White
3 = Blue
4 = Black
5 = Yellow*

5-Pin Euro

5-Pin Mini

UN02

Emitters

1 = Brown
2 = Blue
3 = Black†

† Not Used

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

Key

1 = Brown
2 = Blue
3 = Black†

† Not Used

3-Pin Mini

4-Pin Mini

UN03

Emitters with Attached Cable

1 = Brown
3 = Blue
4 = Black†

† No Connection

Key

1 = Brown
3 = Blue
4 = Black†

† No Connection

UN04

Emitters with Quick-Disconnect Cable

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

† No Connection

Key

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

† No Connection

4-Pin Micro



Universal AC/DC Hookups

UN05	P-MOSFET (Sourcing) Receiver—Cabled	Key
		1 = Brown 3 = Blue 4 = Black
N-MOSFET (Sinking) Receiver—Cabled		

UN06	P-MOSFET (Sourcing) Receiver—Quick-Disconnect	Key
		1 = Red/Black 2 = Red/White 3 = Red 4 = Green † No Connection
N-MOSFET (Sinking) Receiver—Quick-Disconnect		
4-Pin Micro		

UN07	SPST Solid-State Relay Output	Key
		1 = Brown 2 = White 3 = Blue 4 = Black
<p>*NOTE: Connection of dc power is without regard to polarity.</p>		
4-Pin Mini		

UN08	SPST Electromechanical Relay Output	Key
		1 = Red/Black 2 = Red/White 3 = Red 4 = Green
<p>*NOTE: Connection of dc power is without regard to polarity.</p>		
4-Pin Micro		

