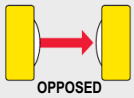
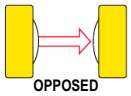
Q20
Industry Standard Global Housing

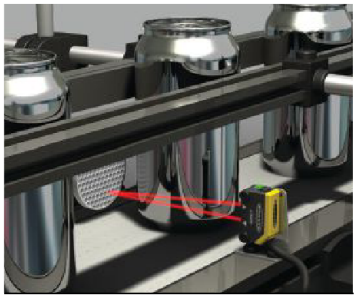
The Q20 is a versatile sensor with universal rectangular housing and multiple mounting options, making it ideal for global manufacturing.

- Rated to 1200 psi for use in washdown environments
- Enhanced design for noise immunity and crosstalk avoidance
- Visible red beam for easy alignment on most models
- Cordsets and brackets see page 76

Opposed Q20, 10-30 V DC

⇨ Infrared LED ➡ Visible Red LED

Sensing Mode	Range	Connection	Models NPN*	Models PNP*
 OPPOSED	12 m	2 m	Q20E Emitter	
		4-pin Euro Pigtail QD	Q20EQ5 Emitter	
		2 m	Q20NR	Q20PR
		4-pin Euro Pigtail QD	Q20NRQ5	Q20PRQ5
 OPPOSED	20 m	2 m	Q20EL Emitter	
		4-pin Euro Pigtail QD	Q20ELQ5 Emitter	
		2 m	Q20NRL	Q20PRL
		4-pin Euro Pigtail QD	Q20NRLQ5	Q20PRLQ5

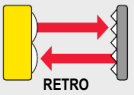


Unfinished Can Detection Using Polar Retro Sensors

When the unfinished cans pass between the sensor and the retroreflector, the light reflected off the cans has a different polarization than the light returned by the retroreflector. As a result, the beam will be blocked by the cans and the output will be triggered.

Retro & Polar Retro Q20, 10-30 V DC

➡ Visible Red LED

Sensing Mode	Range	Connection	Models NPN*	Models PNP*
 RETRO	6 m†	2 m	Q20NLV	Q20PLV
		4-pin Euro Pigtail QD	Q20NLVQ5	Q20PLVQ5
POLAR RETRO	4 m†	2 m	Q20NLP	Q20PLP
		4-pin Euro Pigtail QD	Q20NLPQ5	Q20PLPQ5

For more specifications see page 77.

Connection options: A model with a QD requires a mating cordset (see page 76).

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **Q20E W/30**).

QD models:

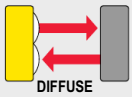
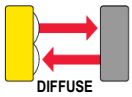
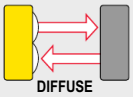
- For a 4-pin 150 mm Pico-style pigtail QD, add suffix **Q** (example, **Q20NDQ**).
- For a 4-pin integral Pico-style QD, add suffix **Q7** (example, **Q20EQ7**).

* Available with health or alarm mode output; contact factory at 1-888-373-6767 for details.

† 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 section for more information.

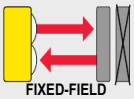
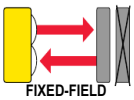
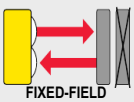
Diffuse Q20, 10-30 V DC

Infrared LED Visible Red LED

Sensing Mode	Range	Connection	Models NPN*	Models PNP*
 DIFFUSE	250 mm	2 m	Q20ND	Q20PD
		4-pin Euro Pigtail QD	Q20NDQ5	Q20PDQ5
 DIFFUSE	800 mm	2 m	Q20NDL	Q20PDL
		4-pin Euro Pigtail QD	Q20NDLQ5	Q20PDLQ5
 DIFFUSE	1500 mm	2 m	Q20NDXL	Q20PDXL
		4-pin Euro Pigtail QD	Q20NDXLQ5	Q20PDXLQ5

Fixed-Field Q20, 10-30 V DC

Visible Red LED

Sensing Mode	Range	Connection	Models NPN*	Models PNP*
 FIXED-FIELD	0-50 mm Cutoff	2 m	Q20NFF50	Q20PFF50
		4-pin Euro Pigtail QD	Q20NFF50Q5	Q20PFF50Q5
 FIXED-FIELD	0-100 mm Cutoff	2 m	Q20NFF100	Q20PFF100
		4-pin Euro Pigtail QD	Q20NFF100Q5	Q20PFF100Q5
 FIXED-FIELD	0-150 mm Cutoff	2 m	Q20NFF150	Q20PFF150
		4-pin Euro Pigtail QD	Q20NFF150Q5	Q20PFF150Q5

For more specifications see page 77.

Connection options: A model with a QD requires a mating cordset (see page 76).

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **Q20ND W/30**).

QD models:

- For a 4-pin 150 mm Euro-style pigtail QD, add suffix **Q5** (example, **Q20NDQ5**).
- For a 4-pin 150 mm Pico-style pigtail QD, add suffix **Q** (example, **Q20NDQ**).
- For a 4-pin integral Pico-style QD, add suffix **Q7** (example, **Q20NDQ7**).

* Available with health or alarm mode output; contact factory at 1-888-373-6767 for details.

Cordsets

Euro QD (for Q5 models)

See page 906

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA

Pico QD (for Q models)

See page 904

Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
2.00 m	PKG4M-2	PKW4M-2
5.00 m	PKG4M-5	PKW4M-5
9.00 m	PKG4M-9	PKW4M-9

Pico QD (for Q7 models)

See page 904

Length	Snap-on 4-Pin Straight	Snap-on 4-Pin Right-Angle
2.00 m	PKG4-2	PKW4Z-2

Additional cordset information available. See page 902.

Brackets

Q20

See page 870	See page 871	See page 871	See page 871
SMBQ20H	SMBQ20L	SMBQ20LV	SMBQ20U

Additional bracket information available. See page 852.

Other Accessories

Reflectors	Apertures
See page 932	See page 958

Opposed, Retroreflective, Fixed-Field and Diffuse Models
Suffix E, EL, R, RL, LP, LV, D, DL, DXL and FF

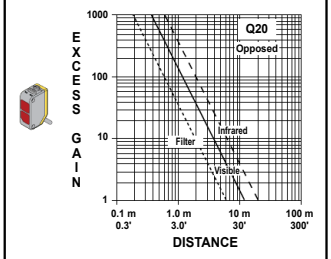
Q20 Specifications

Supply Voltage and Current	**Fixed-field:** 10 to 30 V dc (10% maximum ripple) at less than 25 mA, exclusive of load **All others:** 10 to 30 V dc (10% maximum ripple) at less than 18 mA, exclusive of load
Supply Protection Circuity	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary; PNP (sourcing) or NPN (sinking), depending on model
Output Rating	100 mA with short circuit protection **OFF-state leakage current:** **NPN:** less than 200 µA sinking **PNP:** less than 10 µA sourcing **ON-state saturation voltage:** **NPN:** less than 1.6 V @ 100 mA **PNP:** less than 3.0 V @ 100 mA
Output Response Time	**Opposed:** 1 ms ON/600 ms OFF **Fixed-field:** 3 ms ON/1.5 ms OFF **All others:** 800 ms ON/OFF
Delay at Power-up	100 milliseconds; outputs do not conduct during this time
Repeatability	**Opposed:** 140 microseconds **Fixed-field:** 182 microseconds **All others:** 155 microseconds
Adjustments	**Diffuse, Retroreflective and Polarized Retroreflective:** single-turn sensitivity (Gain) adjustment potentiometer
Indicators	**Emitters:** Green power ON only **All others: Two LED Indicators: Green:** Power ON **Yellow:** Black (LO) wire conducting
Construction	**Housing:** ABS **Lenses:** PMMA **Gain Adjuster(retro and diffuse models only):** PBT
Connections	2 m or 9 m 4-wire PVC cable, 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**), depending on model. QD cordsets are ordered separately. See pages 76.
Operating Conditions	**Temperature:** –20° to +60° C **Relative humidity:** 95% @ 50° C (non-condensing)
Enviromental Rating	IEC IP67; NEMA 6 and 1200 psi washdown NEMA ICS 5, Annex F-2002
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2: 30G 11 ms duration, half sine wave
Application Note	1. Opposed mode sensor spacing can be reduced by alternating emitters and receivers or by applying crosstalk filters (visible red models only). 2. NPN OFF-state leakage current is < 200 µA for load resistances > 3 kΩ or optically isolated loads. For load currents of 100 mA, leakage is < 1% of load current.
Certification	CE

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

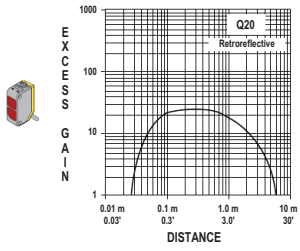
○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized

Opposed Mode WORLD-BEAM® Q20



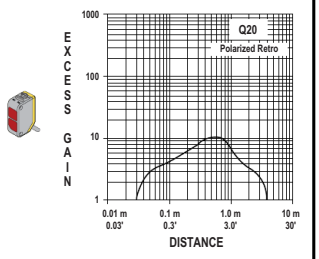
Range: 20 m | **LED:** ● ○

Retroreflective Mode WORLD-BEAM® Q20



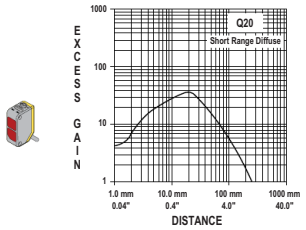
Range: 6 m | **LED:** ●

Polarized Retroreflective Mode WORLD-BEAM® Q20



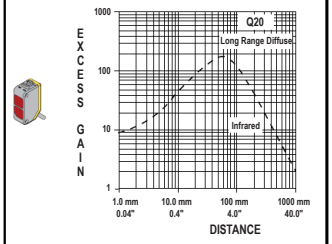
Range: 4 m | **LED:** P

Diffuse Mode WORLD-BEAM® Q20



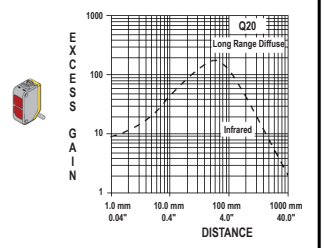
Range: 250 mm | **LED:** ●

Diffuse Mode WORLD-BEAM® Q20



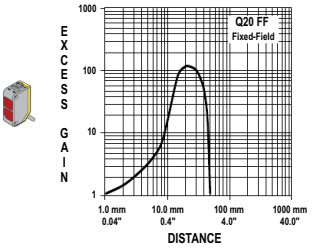
Range: 800 mm | **LED:** ●

Diffuse Mode WORLD-BEAM® Q20



Range: 1500 mm | **LED:** ○

Fixed-Field Mode Q20

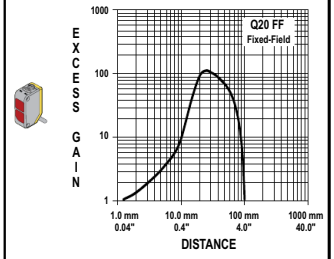


Cutoff: 50 mm | **LED:** ●

Ø 6 mm spot size @ 25 mm focus
Ø 6 mm spot size @ 50 mm cutoff

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

Fixed-Field Mode Q20

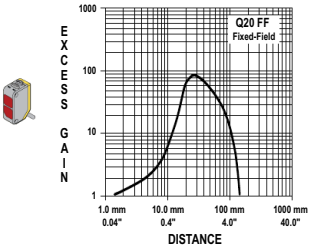


Cutoff: 100 mm | **LED:** ●

Ø 6 mm spot size @ 50 mm focus
Ø 6 mm spot size @ 100 mm cutoff

† Using 18% gray test card:
Cutoff distance will be 90% of value shown.
† Using 6% black test card:
Cutoff distance will be 85% of value shown.

Fixed-Field Mode Q20



Cutoff: 150 mm | **LED:** ●

Ø 6 mm spot size @ 75 mm focus
Ø 9 mm spot size @ 150 mm cutoff

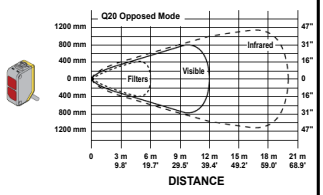
† Using 18% gray test card:
Cutoff distance will be 80% of value shown.
† Using 6% black test card:
Cutoff distance will be 70% of value shown.

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

○ = Infrared LED ● = Visible Red LED P = Visible Red LED Polarized

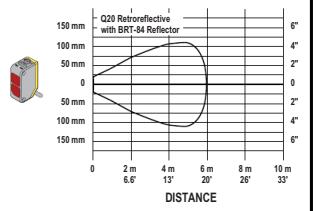
Opposed Mode WORLD-BEAM® Q20

Effective Beam: 10 mm



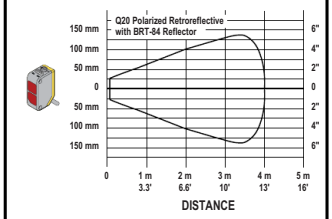
Range: 20 m **LED:** ● ○

Retroreflective Mode WORLD-BEAM® Q20



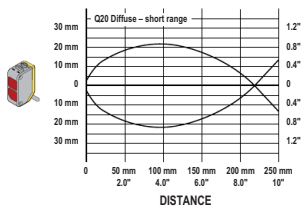
Range: 6 m **LED:** ●

Polarized Retroreflective Mode WORLD-BEAM® Q20



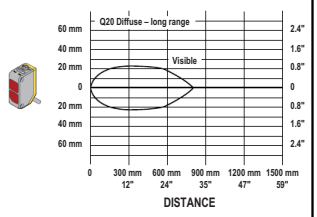
Range: 4 m **LED:** P

Diffuse Mode WORLD-BEAM® Q20



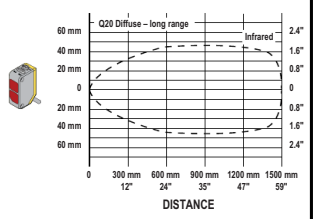
Range: 250 mm **LED:** ●

Diffuse Mode WORLD-BEAM® Q20



Range: 800 mm **LED:** ●

Diffuse Mode WORLD-BEAM® Q20



Range: 1500 mm **LED:** ○