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- Error Proofing
- Pick-to-Light & Call for Parts
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- Operator Guidance
- Andon Indication
- Pilot & Stack Light Replacement
- Visual Management

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- Factory Automation
- Commercial & Consumer Monitoring
- Agriculture & Water Management
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- Safety Modules & Controllers
- Emergency Stop Devices
- Safety Interlocks
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Q60
Long-Range, Adjustable-Field Sensors

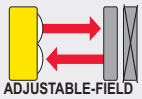
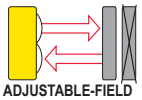
The Q60 is a long-range sensor with a sharp cut off and extremely high gain to detect dark targets, and a laser model to detect thin targets at maximum range.

- Output timing ON/OFF
- Detects objects with a defined sensing field, ignoring objects located beyond the sensing point
- Features two-turn, logarithmic adjustment of sensing field cutoff point from 0.2 to 2 m
- Easy push-button or remote programming of output timing
- Cordsets and brackets see page 106

Pallet Shrink-Wrapping
Sensor can see targets up to 2 m away with a sharp cutoff, detects the presence of the package, and stops the shrink-wrapping function when it no longer "sees" the top of the pallet

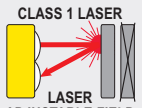
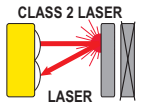
Adjustable-Field Q60, 10-30 V DC

⇨ Infrared LED ➡ Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
	**Min.**: 65 - 130 mm† **Cutoff:** 200 - 1000 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	**Q60BB6AFV1000** **Q60BB6AFV1000Q**
	**Min.:** 50 - 125 mm† **Cutoff:** 200 - 2000 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	**Q60BB6AF2000** **Q60BB6AF2000Q**

Laser Adjustable-Field Q60, 10-30 V DC

➡ Visible Red Laser

Sensing Mode	Range	Connection	Output Type	Models
	**Min.:** 100 - 260 mm† **Cutoff:** 200 - 1400 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	**Q60BB6LAF1400** **Q60BB6LAF1400Q**
	**Min.:** 75 - 240 mm† **Cutoff:** 200 - 2000 mm	2 m 5-Pin Euro QD	Bipolar NPN/PNP	**Q60BB6LAF2000** **Q60BB6LAF2000Q**

For more specifications see page 107.

Connection options: A model with a QD requires a mating cordset (see page 106).

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **Q60BB6AF2000 W/30**).
† Minimum range varies by established cutoff point (see excess gain curves, page 108 and cutoff point deviation curves, page 109).

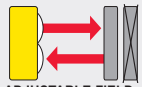
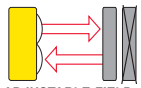
Q60 Universal Voltage
Operates on AC or DC Voltage

The Q60 Universal Voltage Sensor detects objects within a defined sensing range and operates on either ac or dc voltage for use in many locations, regardless of power supply.

- Powerful infrared sensing beam
- Features two-turn, logarithmic adjustment of sensing field cutoff point from 0.2 to 2 m
- Easy push-button or remote programming of output timing
- Integral cable or quick-disconnect options
- Cordsets and brackets see page 106

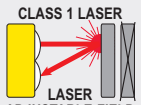
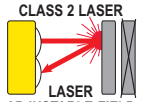
Q60 Universal Voltage, 12-250 V DC or 24-250 V AC

Infrared LED | Visible Red LED

Sensing Mode	Range	Connection	Output Type	Models
 ADJUSTABLE-FIELD	**Min.:** 65 - 130 mm† **Cutoff:** 200 - 1000 mm	2 m	SPDT e/m Relay	**Q60VR3AFV1000**
		4-Pin Micro QD	SPST e/m Relay	**Q60VR3AFV1000Q1**
 ADJUSTABLE-FIELD	**Min.:** 50 - 125 mm† **Cutoff:** 200 - 2000 mm	2 m	SPDT e/m Relay	**Q60VR3AF2000**
		4-Pin Micro QD	SPST e/m Relay	**Q60VR3AF2000Q1**

Q60 Universal Voltage, 12-250 V DC or 24-250 V AC

Visible Red Laser

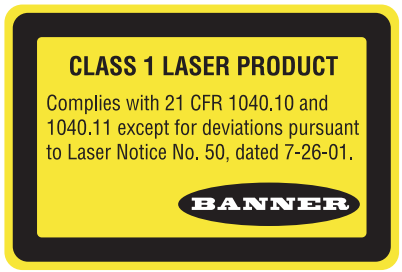
Sensing Mode	Range	Connection	Output Type	Models
 CLASS 1 LASER LASER ADJUSTABLE-FIELD	**Min.:** 100 - 260 mm† **Cutoff:** 200 - 1400 mm	2 m	SPDT e/m Relay	**Q60VR3LAF1400**
		4-Pin Micro QD	SPST e/m Relay	**Q60VR3LAF1400Q1**
 CLASS 2 LASER LASER ADJUSTABLE-FIELD	**Min.:** 75 - 240 mm† **Cutoff:** 200 - 2000 mm	2 m	SPDT e/m Relay	**Q60VR3LAF2000**
		4-Pin Micro QD	SPST e/m Relay	**Q60VR3LAF2000Q1**

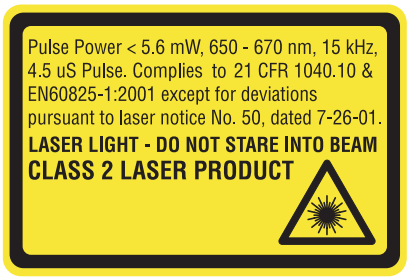
For more specifications see page 107.

Connection options: A model with a QD requires a mating cordset (see page 106).

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **Q60VR3AFV1000 W/30**).

† Minimum range varies by established cutoff point (see excess gain curves, page 108 and cutoff point deviation curves, page 109).





Class 1 Lasers

Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference 60825-1 Amend. 2 © IEC:2001(E), section 8.2.

For safe laser use:

- 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
- Locate open laser beam paths either above or below eye level, where practical

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 60825-1 Amend. 2 © IEC:2001(E), section 8.2.

For safe laser use:

- 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
- Locate open laser beam paths either above or below eye level, where practical

Cordsets

Euro QD (for Q models)

See page 912

Length	Threaded 5-Pin Straight	Threaded 5-Pin Right-Angle
1.83 m	MQDC1-506	MQDC1-506RA
4.57 m	MQDC1-515	MQDC1-515RA
9.14 m	MQDC1-530	MQDC1-530RA

Additional cordset information available. See page 904.

Micro QD (for Q1 models)

See page 925

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

Brackets

Q60

See page 873	See page 873	See page 874
SMBAMSQ60IP	SMBAMSQ60P	SMBQ60

Additional bracket information available. See page 846.

Adjustable-Field Models
Suffix AF, AFV and LAF

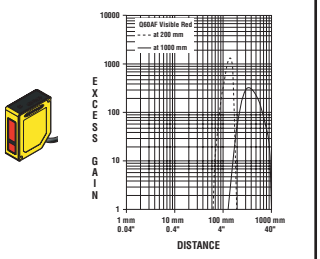
Q60 Specifications

Supply Voltage and Current	**Q60BB6AF and Q60BB6AFV models:** 10 to 30 V dc (10% max. ripple) at less than 50 mA exclusive of load **Q60BB6LAF models:** 10 to 30 V dc (10% max. ripple) at less than 35 mA exclusive of load **Q60VR3LAF and Q60VR3AFV Universal models:** 12 to 250 V dc or 24 to 250 V ac, 50/60 Hz Input power 1.5 W max.
Supply Protection Circuitry	Protected against reverse polarity and transient voltages (Q60VR3 model's dc hookup is without regard to polarity)
Output Configuration	**Q60BB6AF, Q60BB6AFV and Q60BB6LAF models:** Bipolar: one NPN (current sinking) and one PNP (current sourcing) open-collector transistor **Q60VR3AF, Q60VR3LAF and Q60VR3AFV cabled models:** E/M Relay (SPDT), normally closed and normally open contacts **Q60VR3AFQ1, Q60VR3AFVQ1 and Q60VR3LAFQ1 (QD) models:** E/M Relay (SPST), normally open contact
Output Rating	**DC models:**150 mA max. each output @ 25 °C **OFF-state leakage current:** less than 5 µA @ 30 V dc **Output saturation NPN:** less than 200 mV @ 10 mA; less than 1 V @ 150 mA **Output saturation PNP:** less than 1 V at 10 mA; less than 1.5 V at 150 mA **Universal Voltage models:** **Min. voltage and current:** 5 V dc, 10 mA **Mechanical life of relay:** 50,000,000 operations **Electrical life of relay at full resistive load:** 100,000 operations **Max. switching power (resistive load): Cabled models:** 1250 VA, 150 W **QD models:** 750 VA, 90 W **Max. switching voltage (resistive load): Cabled models:** 250 V ac, 125 V dc **QD models:** 250 V ac, 125 V dc **Max. switching current (resistive load):** **Cabled models:** 5 A @ 250 V ac, 5 A @ 30 V dc derated to 200 mA @ 125 V dc **QD models:** 3 A @ 250 V ac, 3 A @ 30 V dc derated to 200 mA @ 125 V dc
Output Protection Circuitry	**Q60BB6AF, Q60BB6LAF and Q60BB6AFV models:** Protected against continuous overload or short circuit of outputs **All models:** Protected against false pulse on power-up
Output Response Time	**Q60BB6AF, Q60BB6LAF and Q60BB6AFV models:** 2 milliseconds ON/OFF **Q60VR3AF, Q60VR3LAF and Q60VR3AFV Universal models:** 15 milliseconds ON/OFF
Delay at Power-up	150 milliseconds (Q60BB6LAF has 1 second max.); outputs do not conduct during this time
Repeatability	500 microseconds
Sensing Hysteresis	See charts on page 108 **2000 mm cutoff** - less than 3% of set cutoff distance **800 mm cutoff** - less than 0.5% of set cutoff distance **1600 mm cutoff** - less than 2.25% of set cutoff distance **400 mm cutoff** - less than 0.25% of set cutoff distance **1200 mm cutoff** - less than 1.30% of set cutoff distance
Adjustments	2 momentary push buttons: ON-delay and OFF-delay **ON Delay select:** 8 milliseconds to 16 seconds **LO/DO select** **OFF Delay select:** 8 milliseconds to 16 seconds **Push-button lockout:** for security Slotted, geared, 2-turn, cutoff range adjustment screw (mechanical stops on both ends of travel)
Indicators **NOTE: Outputs are active during on/off timing selection mode.**	**Q60AF, Q60AFV and Q60LAF models:** **ON-Delay** **Green ON Steady:** Run mode, ON-delay is active **Green Flashing:** ON-delay Selection mode is active **OFF-Delay** **Green ON Steady:** Run mode, OFF-delay is active **Green Flashing:** OFF-delay Selection mode is active **5-Segment Light Bar*:** Indicates relative delay time during ON/OFF-delay Selection modes **Output** **Amber ON Steady:** Outputs are conducting **Green ON Steady:** During ON/OFF-delay Selection modes **Dark Operate** **Green ON Steady:** Dark Operate is selected **Lockout** **Green ON Steady:** Buttons are locked out **Light Operate** **Green ON Steady:** Light Operate is selected **Signal** **Green ON Steady:** Sensor is receiving signal **Green Flashing:** Marginal signal (1.0 to 2.25 excess gain) *Output, Dark Operate, Lockout, Light Operate and Signal indicators function as 5-Segment Light Bar during ON/OFF-delay Selection modes
Laser Characteristics	**Spot Size:** approximately 4 x 2 mm throughout range (collimated beam) **Angle of Divergence:** 5 milliradians NOTE: Contact factory for custom laser spot size.
Construction	**Housing:** ABS polycarbonate blend **Lens:** acrylic **Cover:** Clear ABS
Environmental Rating	IEC IP67; NEMA 6
Connections	2 m or 9 m integral cable. DC models offer a 5-pin Euro-style QD fitting. AC models offer 4-pin Micro-style QD fitting. QD cordsets are ordered separately. See page 106.
Operating Conditions	**Temperature: Q60BB6LAF (DC) models:** -10° to +50° C **Q60VR3LAF Universal models:** -10° to +45° C **All others:** -20° to +55° C **Relative humidity:** 90% at 50° C (non-condensing)
Certifications	CE cULus
Hookup Diagrams	**DC:** DC08 (p. 975) **Universal Cabled:** UN01 (p. 984) **Universal QD:** UN08 (p. 985)

Excess Gain (Performance based on 90% reflectance white card)

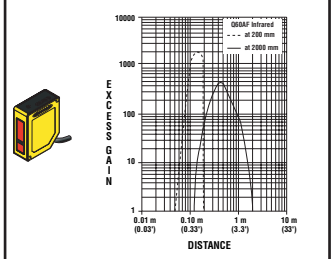
○ = Infrared LED ● = Visible Red LED ✸ = Visible Red Laser

Adjustable-Field Mode Q60 Visible Red



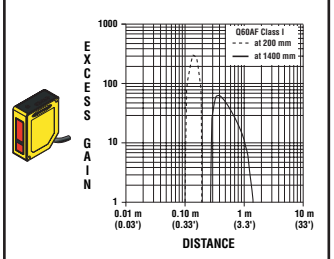
Cutoff: 200-1000 mm **LED:** ●

Adjustable-Field Mode Q60 Infrared



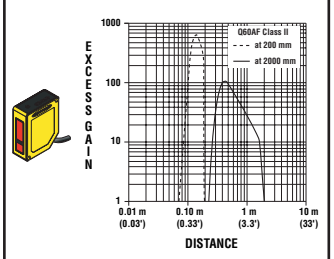
Cutoff: 200-2000 mm **LED:** ○

Adjustable-Field Mode Q60 Class 1 Laser



Cutoff: 200-1400 mm **LED:** ✸

Adjustable-Field Mode Q60 Class 2 Laser

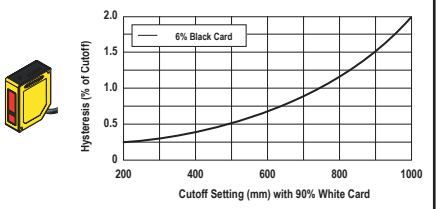


Cutoff: 200-2000 mm **LED:** ✸

Hysteresis Curves

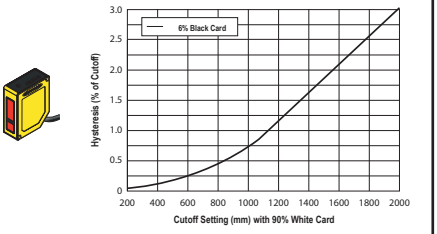
○ = Infrared LED ● = Visible Red LED ✸ = Visible Red Laser

Adjustable-Field Mode Q60 Visible Red



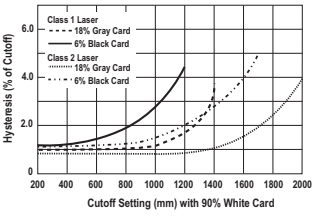
Cutoff: 1000 mm **LED:** ●

Adjustable-Field Mode Q60 Infrared



Cutoff: 2000 mm **LED:** ○

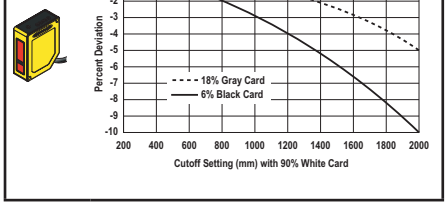
Adjustable-Field Mode Q60 Lasers



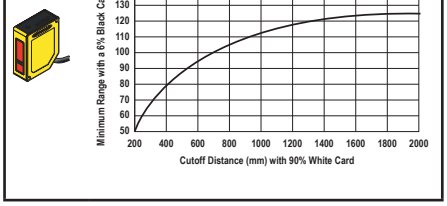
Cutoff: Class 1: 1400 mm
Class 2: 2000 mm
LED: ✸

Cuttoff Point Deviation Curves

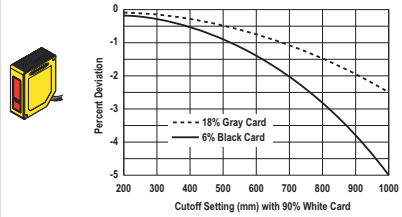
Adjustable-Field Mode Q60 Infrared LED



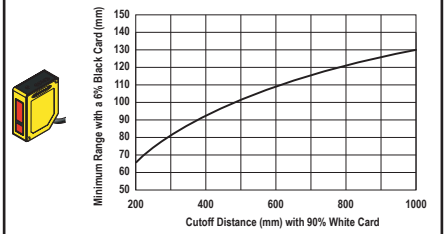
Adjustable-Field Mode Q60 Infrared LED



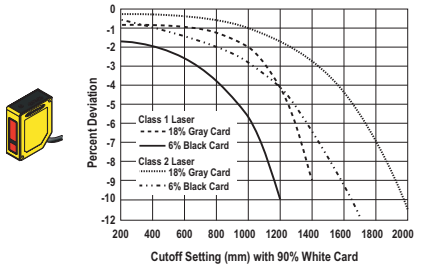
Adjustable-Field Mode Q60 Visible Red



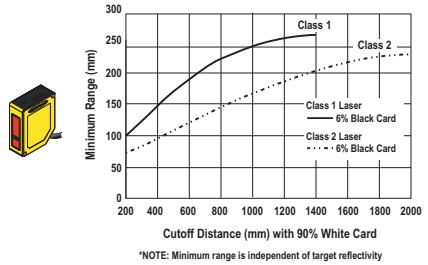
Adjustable-Field Mode Q60 Visible Red LED



Adjustable-Field Mode Q60 Lasers



Adjustable-Field Mode Q60 Lasers



See data sheet for detailed deviation information.