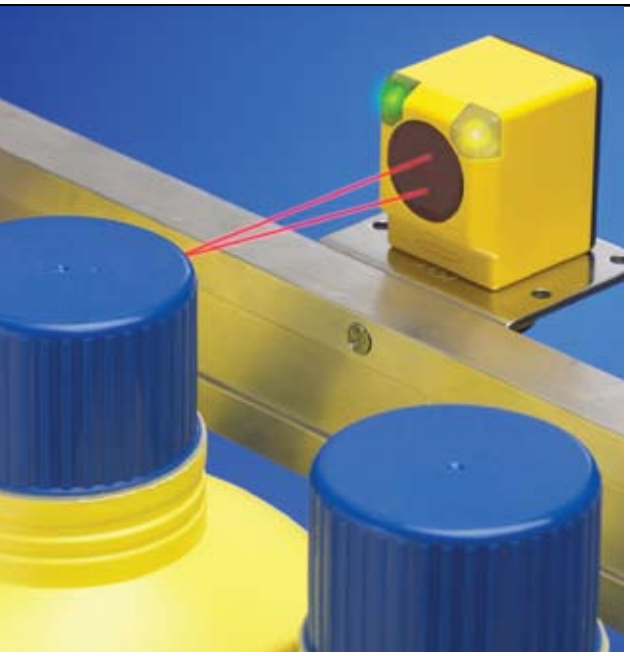


Q40
Right-Angle Base-Mount Rectangular Sensors

- Features EZ-BEAM® technology, with specially designed optics and electronics for reliable sensing without adjustments
- Features rectangular 40 mm plastic housing with 30 mm threaded mounting base in opposed, retroreflective and fixed-field modes
- Completely epoxy-encapsulated to provide superior durability, even in harsh sensing environments; rated to IP69K
- Uses an innovative dual-indicator system to take the guesswork out of monitoring sensor performance
- Available in models for ac or dc power
- Uses advanced diagnostics to warn of marginal sensing conditions or output overload (dc models)

ACCESSORIES page 177

ONLINE
AUTOCAD, STEP, IGES & PDF

Opposed, Polarized Retroreflective and Fixed-field Models Suffix E, R, LP and FF

Q40, 10-30V dc

Infrared LED Visible Red LED

Sensing Mode/LED	Range	Connection	Models NPN	Models PNP	Excess Gain	Beam Pattern
OPPOSED	60 m	2 m	Q406E Emitter		EGC-1 (p. 178)	BP-1 (p. 178)
		4-Pin Euro QD	Q406EQ Emitter			
		2 m	Q40SN6R	Q40SP6R		
		4-Pin Euro QD	Q40SN6RQ	Q40SP6RQ		
POLAR RETRO	6 m†	2 m	Q40SN6LP	Q40SP6LP	EGC-2 (p. 178)	BP-2 (p. 178)
		4-Pin Euro QD	Q40SN6LPQ	Q40SP6LPQ		
FIXED-FIELD	0 - 200 mm Cutoff	2 m	Q40SN6FF200	Q40SP6FF200	EGC-3 (p. 178)	—
		4-Pin Euro QD	Q40SN6FF200Q	Q40SP6FF200Q		
	0 - 400 mm Cutoff	2 m	Q40SN6FF400	Q40SP6FF400	EGC-4 (p. 178)	—
		4-Pin Euro QD	Q40SN6FF400Q	Q40SP6FF400Q		
	0 - 600 mm Cutoff	2 m	Q40SN6FF600	Q40SP6FF600	EGC-5 (p. 178)	—
		4-Pin Euro QD	Q40SN6FF600Q	Q40SP6FF600Q		

More on next page

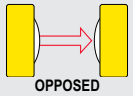
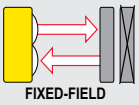
Connection options: A model with a QD requires a mating cordset (see page 177).

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **Q40SN6R W/30**).

† Retroreflective range is specified using a BRT-3 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Q40, 20-250V ac (cont'd)

Infrared LED Visible Red LED

Sensing Mode/LED	Range	Connection	Models LO	Models DO	Excess Gain	Beam Pattern
 OPPOSED	60 m	2 m	Q403E Emitter		EGC-1 (p. 178)	BP-1 (p. 178)
		4-Pin Micro QD	Q403EQ1 Emitter			
		2 m	Q40AW3R	Q40RW3R		
		4-Pin Micro QD	Q40AW3RQ1	Q40RW3RQ1		
 POLAR RETRO	6 m†	2 m	Q40AW3LP	Q40RW3LP	EGC-2 (p. 178)	BP-2 (p. 178)
		4-Pin Micro QD	Q40AW3LPQ1	Q40RW3LPQ1		
 FIXED-FIELD	0 - 200 mm Cutoff	2 m	Q40AW3FF200	Q40RW3FF200	EGC-3 (p. 178)	—
		4-Pin Micro QD	Q40AW3FF200Q1	Q40RW3FF200Q1		
	0 - 400 mm Cutoff	2 m	Q40AW3FF400	Q40RW3FF400	EGC-4 (p. 178)	—
		4-Pin Micro QD	Q40AW3FF400Q1	Q40RW3FF400Q1		
	0 - 600 mm Cutoff	2 m	Q40AW3FF600	Q40RW3FF600	EGC-5 (p. 178)	—
		4-Pin Micro QD	Q40AW3FF600Q1	Q40RW3FF600Q1		

ACCESSORIES page 177

Connection options: A model with a QD requires a mating cordset (see page 177).

For 9 m cable, add suffix **W/30** to the 2 m model number (example, **Q40AW3FF200 W/30**).

† Retroreflective range is specified using a BRT-3 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

Q40 DC Specifications

Supply Voltage and Current	10 to 30V dc (10% max. ripple); Supply current (exclusive of load current): **Opposed Emitters:** 25 mA **Opposed Receivers:** 20 mA **Polarized Retroreflective:** 30 mA **Fixed-field:** 35 mA
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Solid-state complementary; choose NPN (current sinking) or PNP (current sourcing) models. The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply.
Output Rating	150 mA max. (each) in standard hookup; When wired for alarm output, the total load may not exceed 150 mA **OFF-state leakage current:** less than 1 µA at 30V dc **ON-state saturation voltage:** less than 1V at 10 mA dc; less than 1.5V at 150 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short circuit of outputs
Output Response Time	**Opposed:** 3 milliseconds ON; 1.5 milliseconds OFF **Polarized Retroreflective and Fixed-field:** 3 milliseconds ON/OFF
Delay at Power-up	100 milliseconds; outputs are non-conducting during this time
Repeatability	**Opposed**: 375 microseconds **Polarized Retroreflective and Fixed-field:** 750 microseconds. Repeatability and response are independent of signal strength.
Indicators	**Two LEDs:** Green and Yellow **Green:** Power ON **Yellow:** Light Operate (LO) output energized See data sheet for detailed information.
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 177.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE UL LISTED CSA®
Hookup Diagrams	**Emitters:** DC02 (p. 744) **NPN Models:** DC05 (p. 751) **PNP Models:** DC06 (p. 751)

Q40 AC Specifications

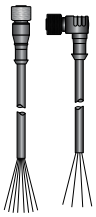
Supply Voltage and Current	20 to 250V ac (50/60 Hz) **Average current:** 20 mA **Peak current:** 200 mA at 20V ac, 500 mA at 120V ac, 750 mA at 250V ac
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	Solid-state ac switch; three-wire hookup; choose light operate (LO) or dark operate (DO) models **Light operate:** Output conducts when the sensor sees its own (or the emitter's) modulated light **Dark operate:** Output conducts when sensor sees dark
Output Rating	300 mA max. (continuous) **Fixed-field:** derate 5 mA/° C above +50° C **Inrush capability:** 1 amp for 20 milliseconds, non-repetitive **OFF-state leakage current:** less than 100 µA **ON-state voltage drop:** 3V at 300 mA ac; 2V at 15 mA ac
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	**Opposed**: 16 milliseconds ON; 8 milliseconds OFF **Polarized Retroreflective and Fixed-field:** 16 milliseconds ON/OFF
Delay at Power-up	100 milliseconds
Repeatability	**Opposed:** 2 milliseconds **Polarized Retroreflective and Fixed-field:** 4 milliseconds Repeatability and response are independent of signal strength.
Indicators	**Two LEDs:** **Green**: Power ON **Yellow:** Light sensed See data sheet for detailed information.
Construction	Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; one jam nut included.
Environmental Rating	Leakproof design rated NEMA 6P, IP67. QD models rated IP69K per DIN 40050-9.
Connections	2 m or 9 m attached cable, or 4-pin Micro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 177.
Operating Conditions	**Temperature:** -40° to +70° C **Relative humidity:** 90% at 50° C (non-condensing)
Vibration and Mechanical Shock	All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max, double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)
Certifications	CE, UL LISTED, CSA®
Hookup Diagrams	**Cabled Emitters:** AC03 (p. 750) **Cabled Models:** AC05 (p. 751) **QD Emitters:** AC07 (p. 751) **QD Models:** AC06 (p. 751)

Cordsets

Euro QD to Flying Leads

See page 682

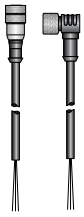
Length	Threaded 4-Pin Straight	Threaded 4-Pin Right-Angle
1.83 m	MQDC-406	MQDC-406RA
4.57 m	MQDC-415	MQDC-415RA
9.14 m	MQDC-430	MQDC-430RA



Micro QD

See page 698

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



Additional cordset information available. See page 679.

REFLECTORS
PAGE 710

Brackets

Q40

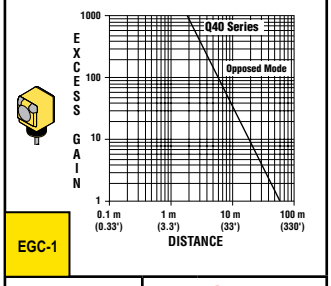
pg. 639	pg. 640	pg. 641	pg. 648
SMB30A	SMB30FA..	SMB30SC	SMBAMS30P

Additional brackets and information available. See page 620.

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

○ = Infrared LED P = Visible Red LED Polarized

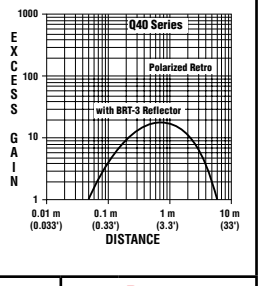
Opposed Mode Q40



EGC-1

Range: 60 m **LED:** ○

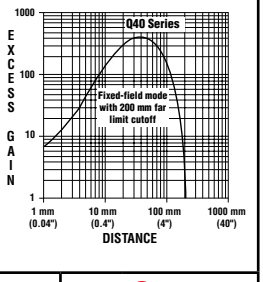
Polarized Retroreflective Q40



EGC-2

Range: 6 m **LED:** P

Fixed-Field Mode Q40



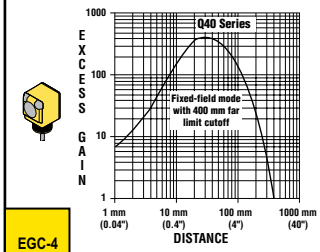
EGC-3

Cutoff: 200 mm **LED:** ○

Ø 16 mm spot size @ 35 mm focus
Ø 20 mm spot size @ 200 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 Q40



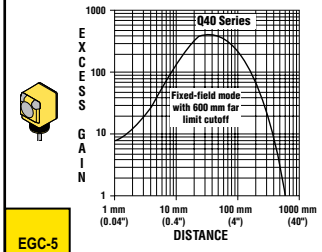
EGC-4

Cutoff: 400 mm **LED:** ○

Ø 17 mm spot size @ 35 mm focus
Ø 25 mm spot size @ 400 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 Q40



EGC-5

Cutoff: 600 mm **LED:** ○

Ø 17 mm spot size @ 35 mm focus
Ø 30 mm spot size @ 600 mm cutoff

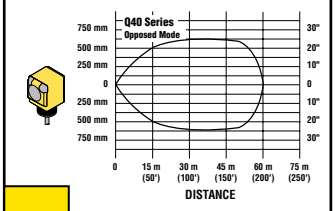
Using 18% gray test card: Cutoff distance will be 85% of value shown.
Using 6% black test card: Cutoff distance will be 75% of value shown.

Beam Patterns

○ = Infrared LED P = Visible Red LED Polarized

Opposed Mode Q40

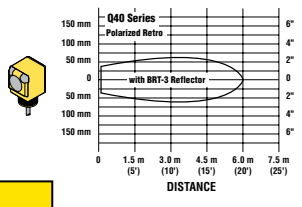
Effective Beam: 23 mm



BP-1

Range: 60 mm **LED:** ○

Polarized Retroreflective Mode Q40

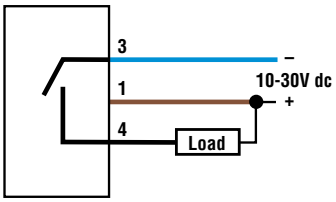


BP-2

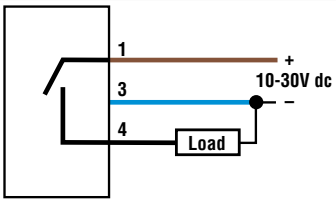
Range: 6 m **LED:** P

DC Hookups

DC01 Current Sinking (NPN)



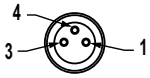
Current Sourcing (PNP)



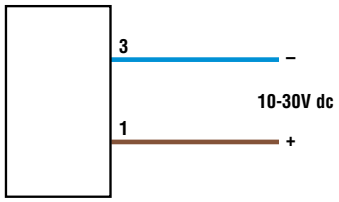
Key

1 = Brown
3 = Blue
4 = Black

3-Pin Pico



DC02 Emitter

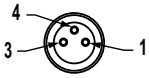


Key

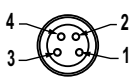
1 = Brown
2 = White†
3 = Blue
4 = Black†

† Not Used

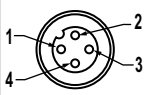
3-Pin Pico



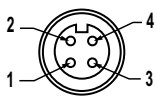
4-Pin Pico



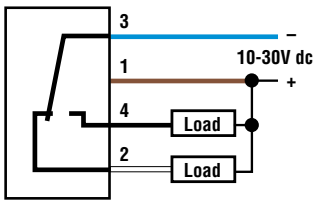
4-Pin Euro



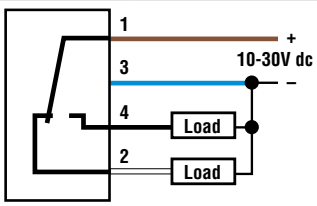
4-Pin Mini



DC03 Complementary Current Sinking (NPN)



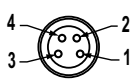
Complementary Current Sourcing (PNP)



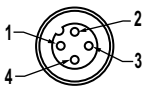
Key

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

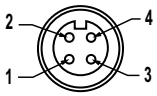
4-Pin Pico



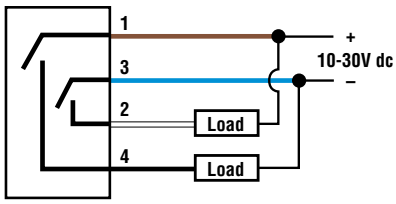
4-Pin Euro



4-Pin Mini



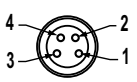
DC04 Bipolar (NPN + PNP)



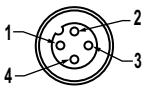
Key

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

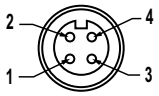
4-Pin Pico



4-Pin Euro



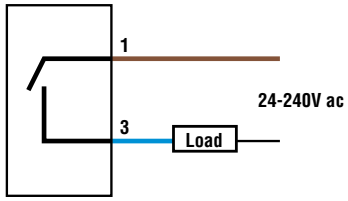
4-Pin Mini



More on next page

AC Hookups

AC01 2-wire AC

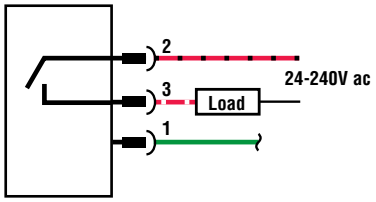


NOTE: Wire a load in series before powering up sensor.

Key

1 = Brown
3 = Blue

AC02 2-wire AC with Quick-Disconnect Cable



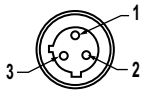
NOTE: Wire a load in series before powering up sensor.

Key

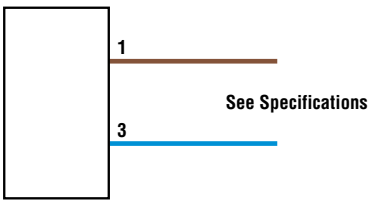
1 = Green†
2 = Red/Black
3 = Red/White

† Not Used

3-Pin Micro



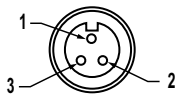
AC03 Emitters



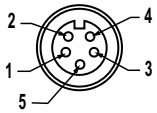
Key

1 = Brown
3 = Blue

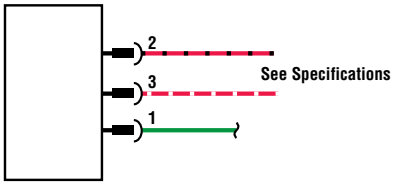
3-Pin Mini



5-Pin Mini



AC04 Emitters with Quick-Disconnect Cable

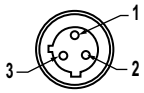


Key

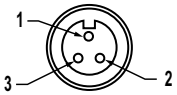
1 = Green†
2 = Red/Black
3 = Red/White

† Not Used

3-Pin Micro



3-Pin Mini



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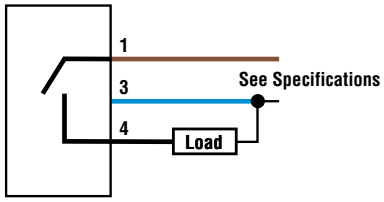
AC Hookups

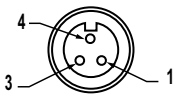
AC05 3-wire AC



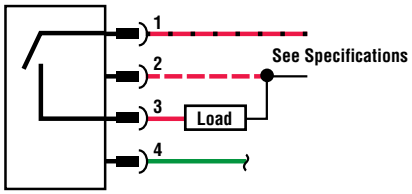
Key

1 = Brown
3 = Blue
4 = Black

3-Pin Mini



AC06 3-wire AC with Quick-Disconnect Cable

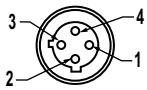


Key

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

† Not Used

4-Pin Micro



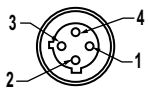
AC07 Emitters with Quick-Disconnect Cable

Key

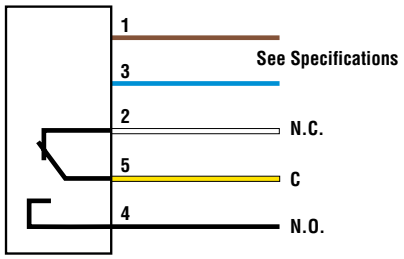
1 = Red/Black
2 = Red/White
3 = Red†
4 = Green†

† Not Used

4-Pin Micro



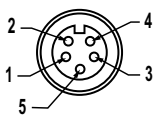
AC08 SPDT Electromechanical Relay Output



Key

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

5-Pin Mini



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