



QMT42 Series 400 mm Adjustable Field Sensors

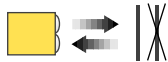
Sensing Cutoff Point is Adjustable from 125 to 400 mm (5 to 16 in)



Features

- Adjustable field technology allows direct detection of objects within a defined sensing field, while completely ignoring reflective objects located beyond the sensing field cutoff point
- Reliable *electronic* adjustment* of sensing field cutoff point from 125 to 400 mm; no mechanical adjustments to worry about
- Compact, rugged, low cost self-contained sensors in metal die cast housings
- Epoxy-encapsulated circuitry; leakproof IP67 (NEMA 6) construction for reliable sensing in harsh environments
- Outstanding electrical noise immunity
- Dual LED system indicates sensor performance
- Choice of integral cable or quick disconnect connector

* Patent Pending



Visible Red, 680 nm



QMT42 Adjustable Field Mode

Models	Range	Cutoff Point	Cable	Supply Voltage	Output Type	Cutoff Point Deviation
QMT42VN6AFV400 QMT42VN6AFV400Q	25 mm (1 in) to Cutoff point	125 to 400 mm (5 to 16 in)	2 m (6.5 ft)	10-30V dc	NPN	
4-pin Euro QD			2 m (6.5 ft)			
QMT42VP6AFV400 QMT42VP6AFV400Q	4-pin Euro QD					

Interpretation of Performance Curves

The percentage of deviation indicates a change in the cutoff point for either 18% gray or 6% black targets, relative to the cutoff point set for a 90% reflective white test card.

As an example, the cutoff point decreases 10% for a 6% reflectance black target when the cutoff point is adjusted for 400 millimeters (16 inches) using a 90% reflectance white test card. In other words, the cutoff point for the black target is 360 millimeters (14 inches) for this setting.

QMT42 Series 400 mm Adjustable Field Sensors

Adjustable Field Sensing - Theory of Operation

The receiver element of an adjustable field sensor produces two currents: I_1 and I_2 . The *ratio* of these two currents changes as the received light signal moves along the length of the receiver element (see Figure 1). The sensing cutoff distance relates directly to this ratio, which can be adjusted using the sensor's multi-turn potentiometer.

The cutoff distance for model QMT42...AFV400 sensors is adjustable from 125 to 400 millimeters (5 to 16 inches). Objects lying beyond the cutoff distance are ignored, even if they are highly-reflective.

However, it is possible to falsely detect a background object, if it is positioned as shown in Figure 3, or if it moves past the face of the sensor in a direction which is perpendicular to the sensing axis (Figures 2 and 3). To solve this problem, rotate the sensor 90 degrees, as shown in Figure 4.

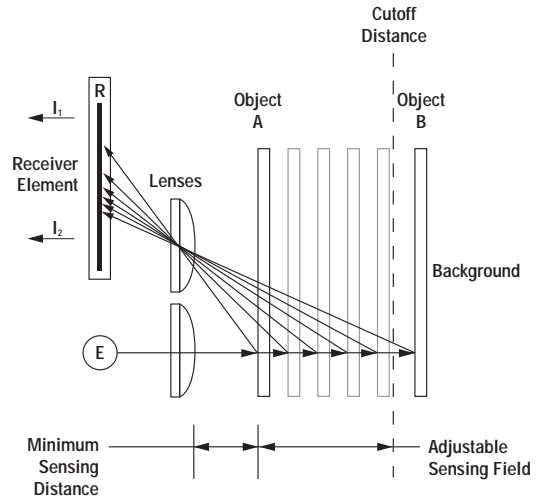
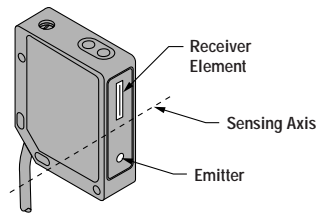
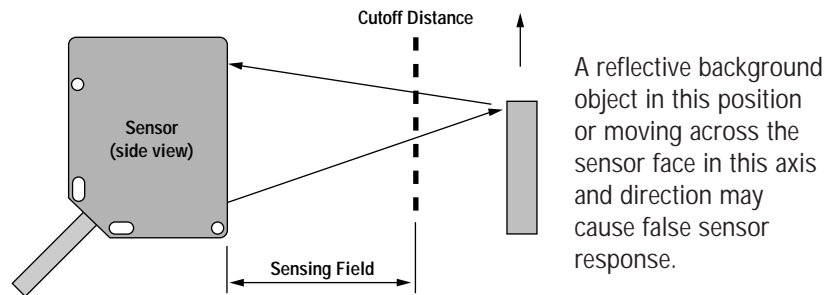


Figure 1: Adjustable Field Sensing Concept



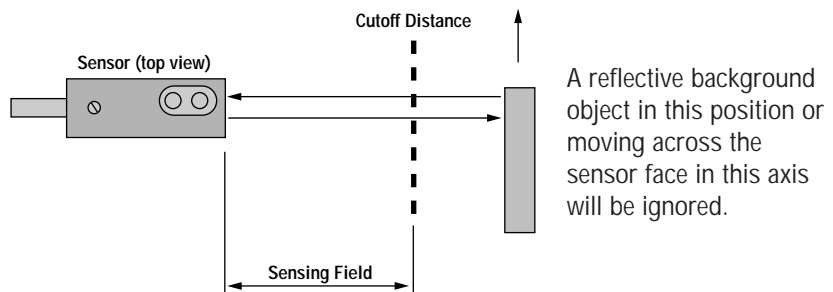
As a general rule, the most reliable sensing of an object which approaches from the side occurs when the line of approach is parallel to the sensing axis.

Figure 2: Sensing Axis



A reflective background object in this position or moving across the sensor face in this axis and direction may cause false sensor response.


Figure 3: Object Beyond Cutoff Distance - Problem



A reflective background object in this position or moving across the sensor face in this axis will be ignored.

Figure 4: Object Beyond Cutoff Distance - Solution

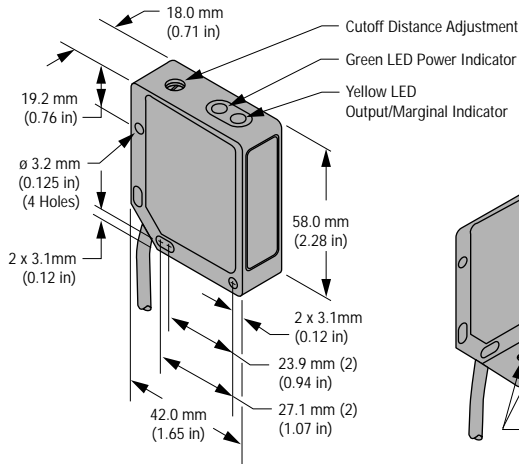
QMT42 Series 400 mm Adjustable Field Sensors

Product Specifications	
Sensing Beam	Visible Red, 680 nm
Supply Voltage and Current	10 to 30V dc (10% maximum ripple) at less than 50 milliamps
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	SPDT (complementary) solid-state dc switch; Choose NPN (current sinking) or PNP (current sourcing) models. <i>Light operate:</i> N.O. output conducts when the sensor sees its own (or the emitter's) modulated light <i>Dark operate:</i> N.C. output conducts when the sensor sees dark
Output Rating	100 mA maximum (each output) Off-state leakage current: <5 microamps at 30V dc; On-state saturation voltage: <1V at 10 mA dc; <1.5V at 100 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs Overload trip point ≥ 150 mA, typical, at 20°C
Output Response Time	1 millisecond on and off NOTE: 100 millisecond delay on power-up; outputs are non-conducting during this time
Repeatability of Response	250 microseconds
Sensing Hysteresis	Less than 7% of set cutoff distance
Adjustments	All models have a 15-turn slotted brass cutoff distance adjustment potentiometer (clutched at both ends of travel)
Indicators	Two LEDs: Green and Yellow GREEN glowing steadily = power to sensor is "on" GREEN flashing = output is overloaded YELLOW glowing steadily = light is sensed; normally open output "on" YELLOW flashing = marginal excess gain (1-1.5x) in light condition
Construction	Housings are die-cast zinc alloy with black acrylic polyurethane finish; lenses are acrylic
Environmental Rating	IP67; NEMA 6
Connections	2 m (6-1/2 ft) or 9 m (30-ft) attached cable, or 4-pin euro-style quick-disconnect fitting; Cables for QD models are purchased separately
Operating Temperature	-20° to +55°C (-7° to 130°F); Maximum relative humidity 90% at 50°C (non-condensing)
Certifications	

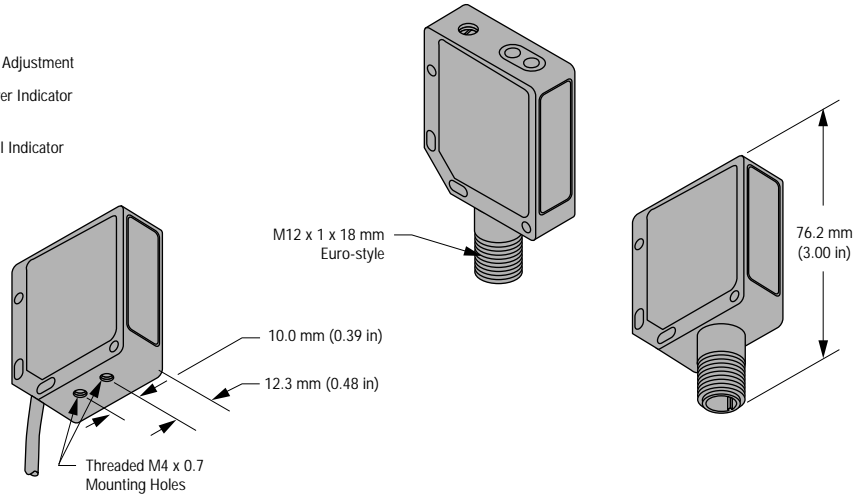
QMT42 Series 400 mm Adjustable Field Sensors

Dimensions

Cabled models



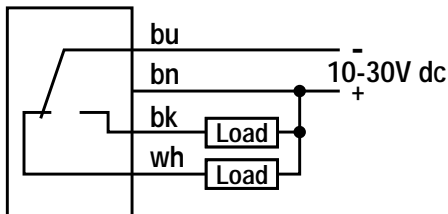
Quick-disconnect models



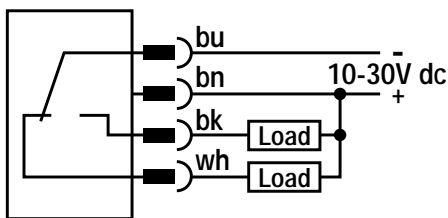
Hookup Diagrams

Sensors with NPN (Sinking) Outputs

Cabled Models

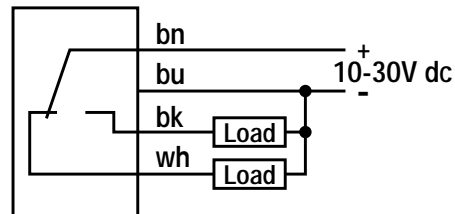


Quick Disconnect Models

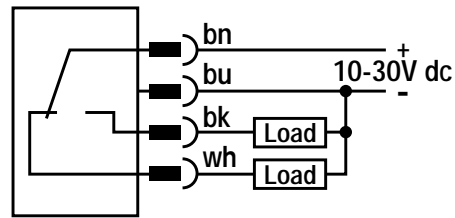


Sensors with PNP (Sourcing) Outputs

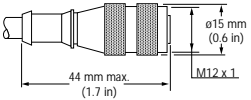
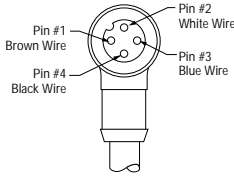
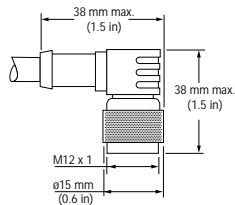
Cabled Models

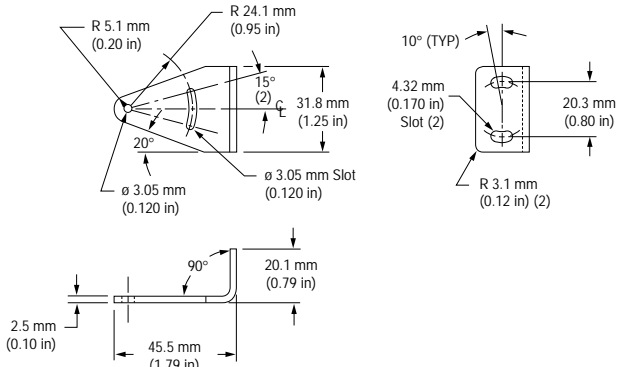
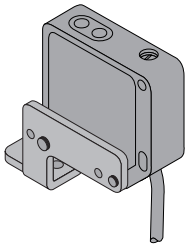
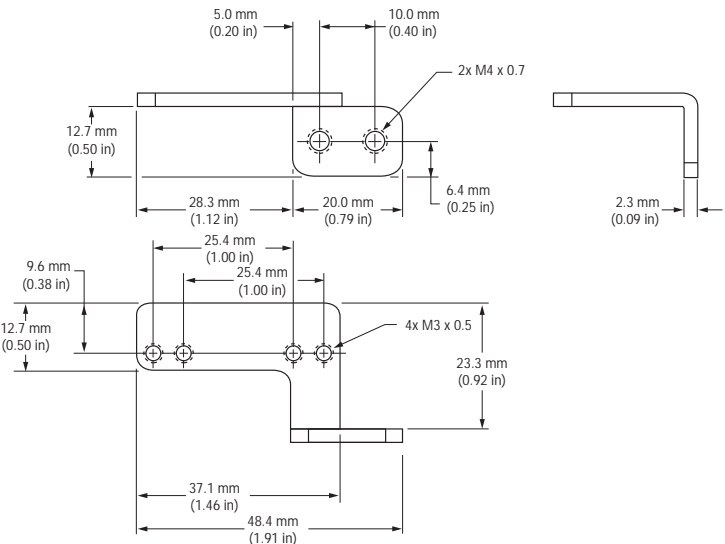


Quick Disconnect Models

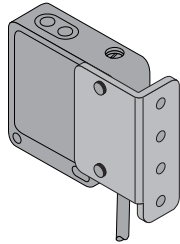
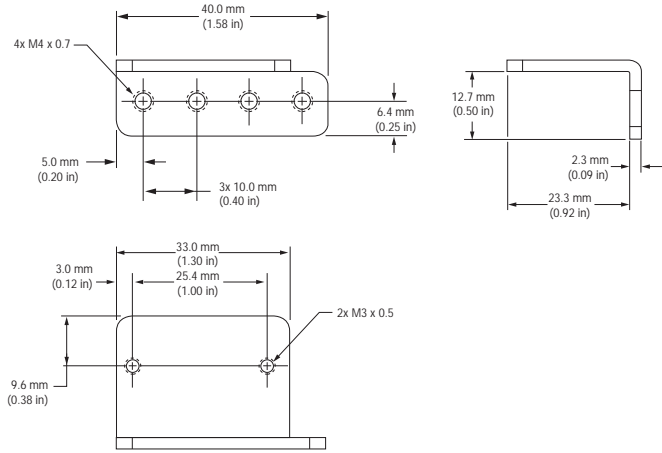
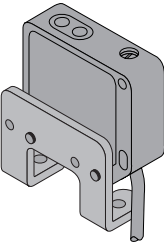
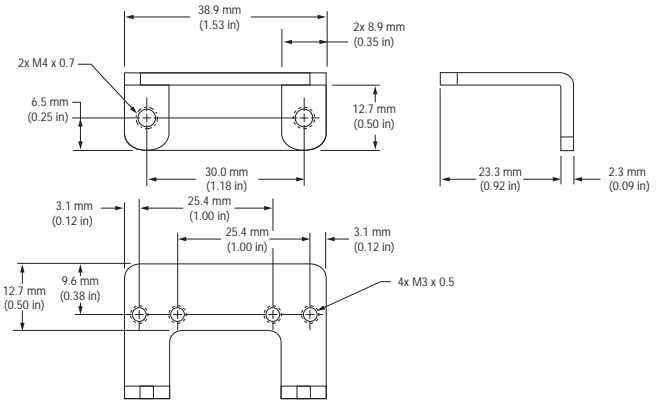


QMT42 Series 400 mm Adjustable Field Sensors

Quick Disconnect (QD) Cables					
The following is the selection of cables available for the QMT42 QD models					
Style	Model	Length	For use with	Dimensions	Pinout
4-pin Euro Style straight	MQDC-406 MQDC-415 MQDC-430	2 m (6.5 ft) 5 m (15 ft) 9 m (30 ft)	All QMT42 sensors with quick-disconnect fitting		
4-pin Euro Style right-angle	MQDC-406RA MQDC-415RA MQDC-430RA	2 m (6.5 ft) 5 m (15 ft) 9 m (30 ft)			

Mounting Brackets	
Model	Description
SMB19	<p>Right-angle, stainless steel, mounting bracket (M3 mounting hardware is supplied)</p> 
SMB42F	<ul style="list-style-type: none"> • 13 gauge stainless steel • Hardware included  

QMT42 Series 400 mm Adjustable Field Sensors

Mounting Brackets		
Model	Description	Description
<p>SMB42L</p>	<ul style="list-style-type: none"> • 13 gauge stainless steel • Hardware included 	
<p>SMB42U</p>	<ul style="list-style-type: none"> • 13 gauge stainless steel • Hardware included 	

WARRANTY: Banner Engineering Corporation warrants its products to be free from defects for one year. Banner Engineering Corporation will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.



WARNING These photoelectric presence sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can result in either an energized or a de-energized sensor output condition.

Never use these products as sensing devices for personnel protection. Their use as a safety device may create an unsafe condition which could lead to serious injury or death.

Only MINI-SCREEN®, MULTI-SCREEN®, MICRO-SCREEN™, MACHINE-GUARD™ and PERIMETER-GUARD™ Systems, and other systems so designated, are designed to meet OSHA and ANSI machine safety standards for point-of-operation guarding devices. No other Banner sensors or controls are designed to meet these standards, and they must NOT be used as sensing devices for personnel protection.



QM42 Series

Self-contained dc photoelectric sensors in metal housings



Features

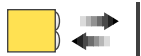
- Compact, rugged, low cost self-contained sensors in metal die cast housings
- Epoxy-encapsulated circuitry; leakproof IP67 (NEMA 6) construction for harsh sensing environments
- Outstanding electrical noise immunity
- Dual LED system indicates sensor performance
- Choice of integral cable or quick disconnect connector



Infrared, 880 nm

QM42 Opposed Mode Emitter (E) and Receiver (R)

Models	Range	Cable	Supply Voltage	Output Type	Excess Gain	Beam Pattern Effective Beam: 8 mm
QM426E QM426EQ	10 m (33 ft)	2 m (6.5 ft) 4-pin Euro QD	10-30V dc	—		
QM42VN6R QM42VN6RQ		2 m (6.5 ft) 4-pin Euro QD		NPN		
QM42VP6R QM42VP6RQ		2 m (6.5 ft) 4-pin Euro QD		PNP		



Infrared, 880 nm

QM42 Diffuse Mode

Models	Range	Cable	Supply Voltage	Output Type	Excess Gain	Beam Pattern
					Performance based on 90% reflectance white test card	
QM42VN6D QM42VN6DQ	400 mm (16 in)	2 m (6.5 ft) 4-pin Euro QD	10-30V dc	NPN		
QM42VP6D QM42VP6DQ		2 m (6.5 ft) 4-pin Euro QD		PNP		

QM42 Series



Visible red, 660 nm

QM42 Polarized Retroreflective Mode						
Models	Range	Cable	Supply Voltage	Output Type	Excess Gain	Beam Pattern
QM42VN6LP QM42VN6LPQ	3 m (10 ft)	2 m (6.5 ft) 4-pin Euro QD	10-30V dc	NPN		
QM42VP6LP QM42VP6LPQ		2 m (6.5 ft) 4-pin Euro QD		PNP		



Visible red, 660 nm

QM42 Plastic Fiber Optic Mode						
Models	Range	Cable	Supply Voltage	Output Type	Excess Gain	Beam Pattern
					Diffuse Mode Performance Based on 90% Reflectance White Test Card	
QM42VN6FP QM42VN6FPQ	40 mm (1.5 in)	2 m (6.5 ft) 4-pin Euro QD	10-30V dc	NPN		
QM42VP6FP QM42VP6FPQ		2 m (6.5 ft) 4-pin Euro QD		PNP		

Notes:

- 1) 9 m (30 ft) cables are available by adding suffix "W/30" to the model number of any cabled sensor (e.g. QM42VN6D W/30).
- 2) A model with a QD connector requires an optional mating cable.

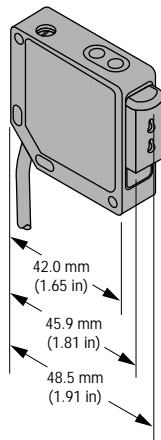
DC Product Specifications	
Sensing Beam	Infrared, 880 nm for opposed and diffuse; Visible red, 660 nm for fiber optic and retroreflective modes
Supply Voltage and Current	10 to 30V dc (10% maximum ripple) at less than: Diffuse and retroreflective models: 20 milliamps Opposed mode: 30 milliamps (emitter), 10 milliamps (receiver) Fiber optic models: 30 milliamps
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	SPDT (complementary) solid-state dc switch; Choose NPN (current sinking) or PNP (current sourcing) models. <i>Light operate:</i> N.O. output conducts when the sensor sees its own (or the emitter's) modulated light <i>Dark operate:</i> N.C. output conducts when the sensor sees dark
Output Rating	100 mA maximum (each output) Off-state leakage current: <5 microamps at 30V dc; On-state saturation voltage: <1V at 10 mA dc; <1.5V at 100 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs Overload trip point ≥ 150 mA, typical, at 20°C
Output Response Time	Diffuse and retroreflective modes: 1 millisecond on and off Opposed mode: 1 millisecond on, 0.5 millisecond off Fiber optic mode: 0.25 millisecond on and off
Repeatability	Diffuse and retroreflective modes: 250 microseconds Opposed Mode: 120 microseconds Fiber optic mode: 60 microseconds
Adjustments	All models except emitters: 15-turn slotted brass GAIN (sensitivity) adjustment potentiometer (clutched at both ends of travel)
Indicators	Two LEDs: Green and Yellow GREEN glowing steadily = power to sensor is "on" Opposed emitters: Green power "on" GREEN flashing = output is overloaded YELLOW glowing steadily = light is sensed; normally open output "on" YELLOW flashing = marginal excess gain (1-1.5x) in light condition
Construction	Housings are die-cast zinc alloy with black epoxy powder paint finish; lenses are acrylic
Environmental Rating	IP67; NEMA 6
Connections	2 m (6-1/2 ft) or 9 m (30-ft) attached cable, or 4-pin euro-style quick-disconnect fitting; Cables for QD models are purchased separately
Operating Temperature	-20° to +70°C (-7° to 158°F); Maximum relative humidity 90% at 50°C (non-condensing)

QM42 Series

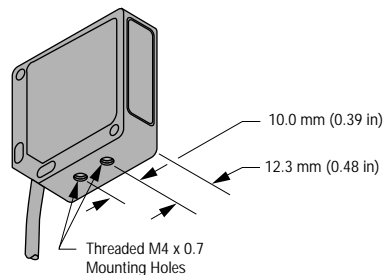
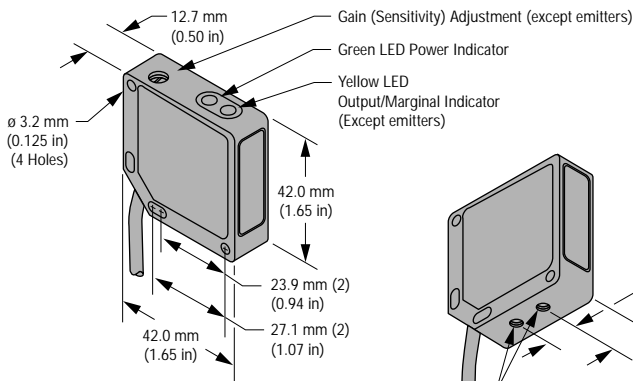
Dimensions

Cabled models

QM42FP Models

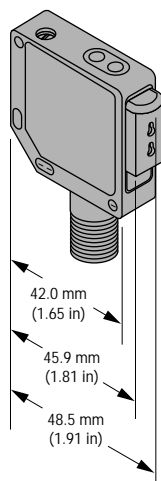


All Other Models

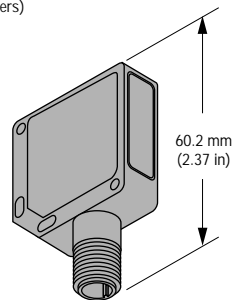
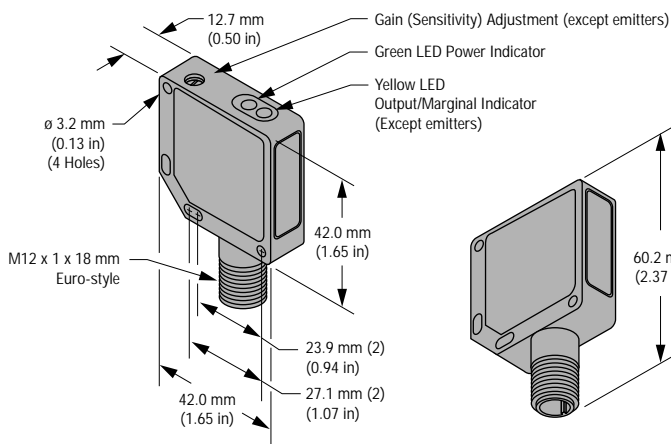


Quick-disconnect models

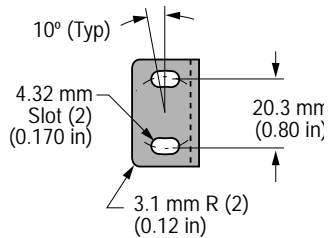
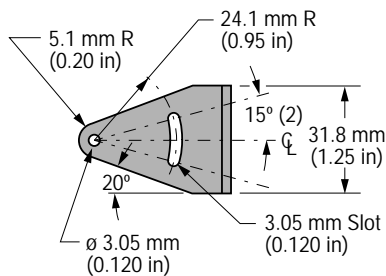
QM42FP Models



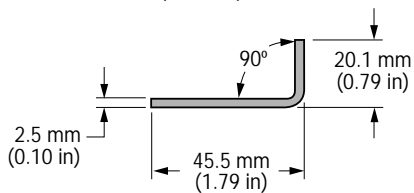
All Other Models



Accessory Mounting Bracket SMB19

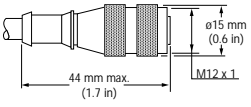
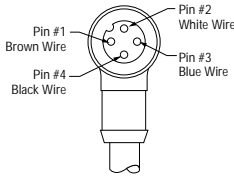
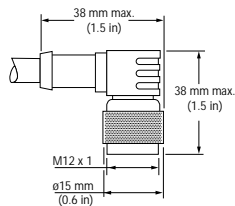


Supplied with hardware



Quick Disconnect (QD) Cables

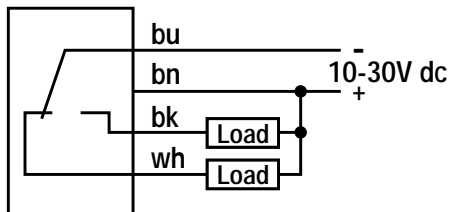
The following is the selection of cables available for the QM42 QD models

Style	Model	Length	For use with	Dimensions	Pinout
4-pin Euro Style straight	MQDC-406 MQDC-415 MQDC-430	2 m (6.5 ft) 5 m (15 ft) 9 m (30 ft)	All QM42 sensors with quick-disconnect fitting		
4-pin Euro Style right-angle	MQDC-406RA MQDC-415RA MQDC-430RA	2 m (6.5 ft) 5 m (15 ft) 9 m (30 ft)			

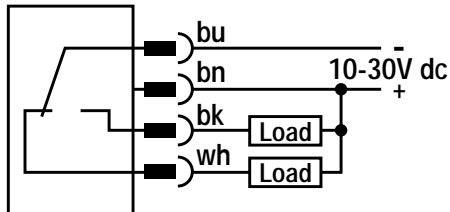
Hookup Diagrams

Sensors with NPN (Sinking) Outputs

Cabled Models

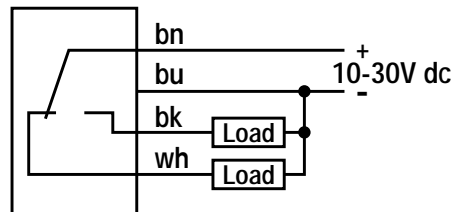


Quick Disconnect Models

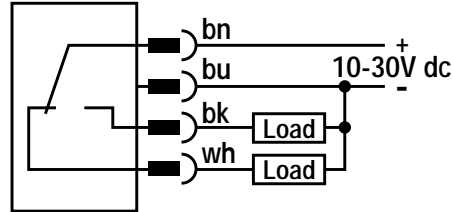


Sensors with PNP (Sourcing) Outputs

Cabled Models

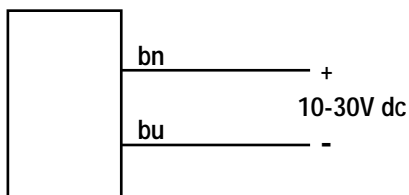


Quick Disconnect Models

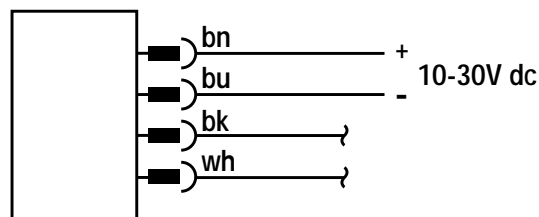


DC Emitters

Cabled Models



Quick Disconnect Models





QM42 Series 150 Adjustable Field Sensors

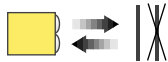
Sensing Cutoff Point is Adjustable from 50 to 150 mm (2 to 6 in)



Features

- Adjustable field technology allows direct detection of objects within a defined sensing field, while completely ignoring reflective objects located beyond the sensing field cutoff point
- Reliable *electronic* adjustment* of sensing field cutoff point from 50 to 150 mm; no mechanical adjustments to worry about
- Compact, rugged, low cost self-contained sensors in metal die cast housings
- Epoxy-encapsulated circuitry; leakproof IP67 (NEMA 6) construction for reliable sensing in harsh environments
- Outstanding electrical noise immunity
- Dual LED system indicates sensor performance
- Choice of integral cable or quick disconnect connector

* Patent Pending



Visible Red, 680 nm

QM42 150mm Adjustable Field Mode

Models	Range	Cutoff Point	Cable	Supply Voltage	Output Type	Cutoff Point Deviation
QM42VN6AFV150 QM42VN6AFV150Q	5 mm (0.2 in) to Cutoff point	50 to 150 mm (2 to 6 in)	2 m (6.5 ft)	10-30V dc	NPN	
4-pin Euro QD						
QM42VP6AFV150 QM42VP6AFV150Q	2 m (6.5 ft)	PNP				
4-pin Euro QD						

Interpretation of Performance Curves

The percentage of deviation indicates a change in the cutoff point for either 18% gray or 6% black targets, relative to the cutoff point set for a 90% reflective white test card.

As an example, the cutoff point decreases 10% for a 6% reflectance black target when the cutoff point is adjusted for 150 millimeters (6 inches) using a 90% reflectance white test card. In other words, the cutoff point for the black target is 135 millimeters (5.3 inches) for this setting.

QM42 Series 150 mm Adjustable Field Sensors

Adjustable Field Sensing - Theory of Operation

The receiver element of an adjustable field sensor produces two currents: I_1 and I_2 . The *ratio* of these two currents changes as the received light signal moves along the length of the receiver element (see Figure 1). The sensing cutoff distance relates directly to this ratio, which can be adjusted using the sensor's multi-turn potentiometer.

The cutoff distance for model QM42...AFV150 sensors is adjustable from 50 to 150 millimeters (2 to 6 inches). Objects lying beyond the cutoff distance are ignored, even if they are highly-reflective.

However, it is possible to falsely detect a background object, if it is positioned as shown in Figure 3, or if it moves past the face of the sensor in a direction which is perpendicular to the sensing axis (Figures 2 and 3). To solve this problem, rotate the sensor 90 degrees, as shown in Figure 4.

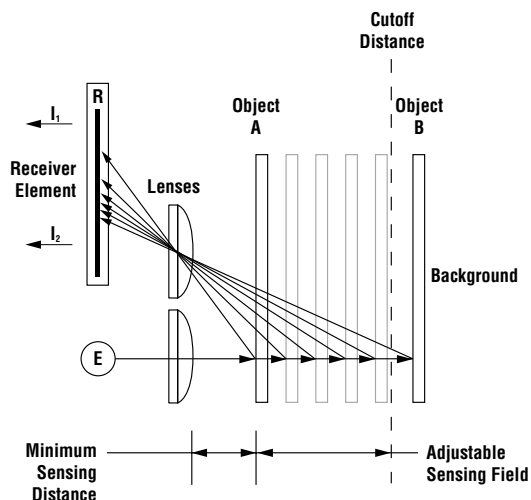
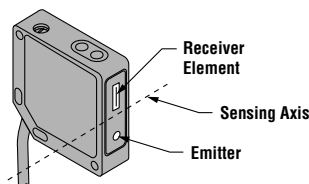


Figure 1: Adjustable Field Sensing Concept



As a general rule, the most reliable sensing of an object which approaches from the side occurs when the line of approach is parallel to the sensing axis.

Figure 2: Sensing Axis

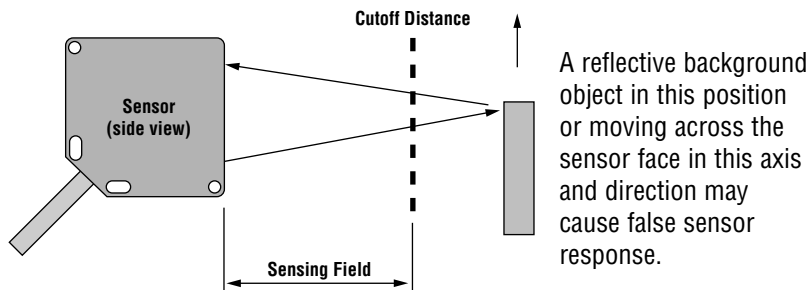


Figure 3: Object Beyond Cutoff Distance - Problem

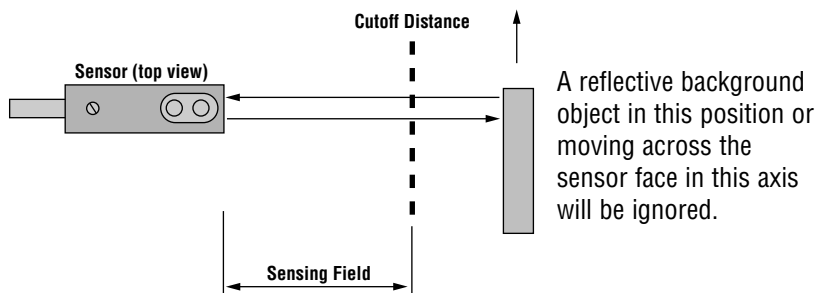



Figure 4: Object Beyond Cutoff Distance - Solution

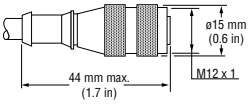
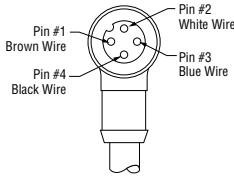
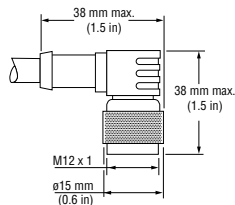
QM42 Series 150 mm Adjustable Field Sensors

Product Specifications	
Sensing Beam	Visible Red, 680 nm
Supply Voltage and Current	10 to 30V dc (10% maximum ripple) at less than 50 milliamps
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	SPDT (complementary) solid-state dc switch; Choose NPN (current sinking) or PNP (current sourcing) models. <i>Light operate:</i> N.O. output conducts when the sensor sees its own (or the emitter's) modulated light <i>Dark operate:</i> N.C. output conducts when the sensor sees dark
Output Rating	100 mA maximum (each output) Off-state leakage current: <5 microamps at 30V dc; On-state saturation voltage: <1V at 10 mA dc; <1.5V at 100 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs Overload trip point ≥ 150 mA, typical, at 20°C
Output Response Time	1 millisecond on and off
Repeatability of Response	250 microseconds
Sensing Hysteresis	Less than 7% of set cutoff distance
Adjustments	All models except emitters: 12-turn slotted brass cutoff distance adjustment potentiometer (clutched at both ends of travel)
Indicators	Two LEDs: Green and Yellow GREEN glowing steadily = power to sensor is "on" GREEN flashing = output is overloaded YELLOW glowing steadily = light is sensed; normally open output "on" YELLOW flashing = marginal excess gain (1-1.5x) in light condition
Construction	Housings are die-cast zinc alloy with black acrylic polyurethane paint finish; lenses are acrylic
Environmental Rating	IP67; NEMA 6
Connections	2 m (6-1/2 ft) or 9 m (30-ft) attached cable, or 4-pin euro-style quick-disconnect fitting; Cables for QD models are purchased separately
Operating Temperature	-20° to +55°C (-7° to 130°F); Maximum relative humidity 90% at 50°C (non-condensing)
Certifications	

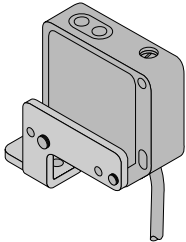
QM42 Series 150 mm Adjustable Field Sensors

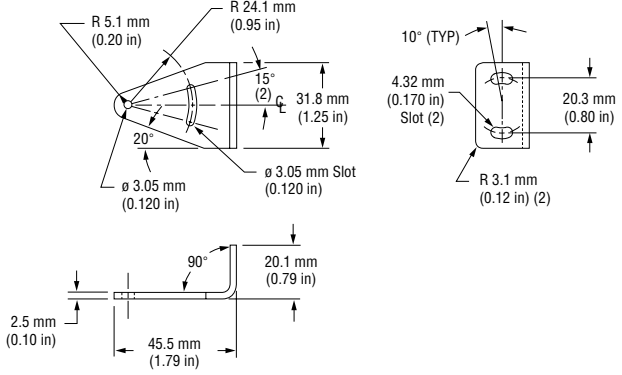
Quick Disconnect (QD) Cables

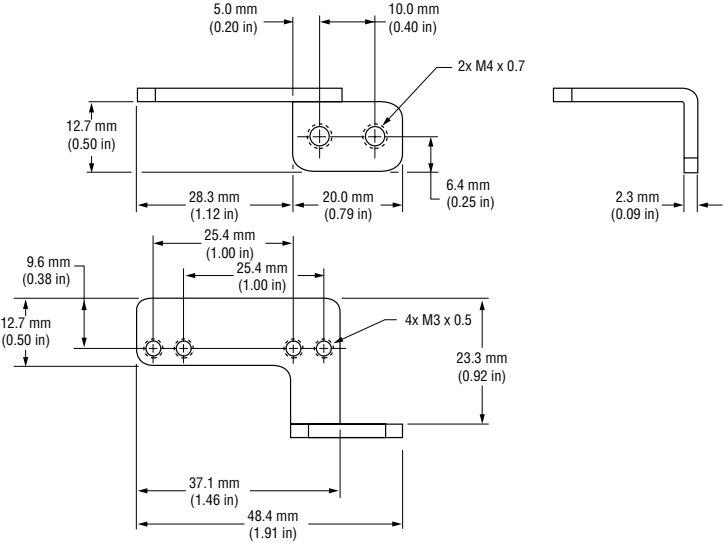
The following is the selection of cables available for the QM42 QD models

Style	Model	Length	For use with	Dimensions	Pinout
4-pin Euro Style straight	MQDC-406 MQDC-415 MQDC-430	2 m (6.5 ft) 5 m (15 ft) 9 m (30 ft)	All QM42 sensors with quick-disconnect fitting		
4-pin Euro Style right-angle	MQDC-406RA MQDC-415RA MQDC-430RA	2 m (6.5 ft) 5 m (15 ft) 9 m (30 ft)			

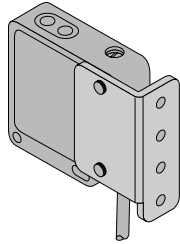
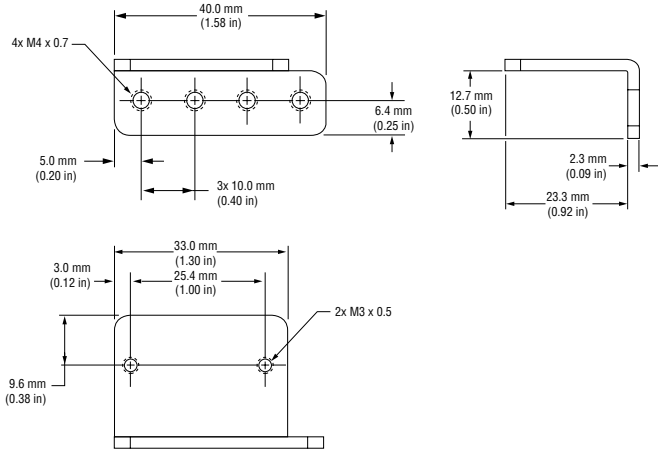
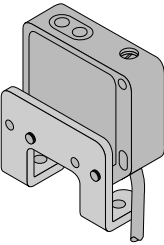
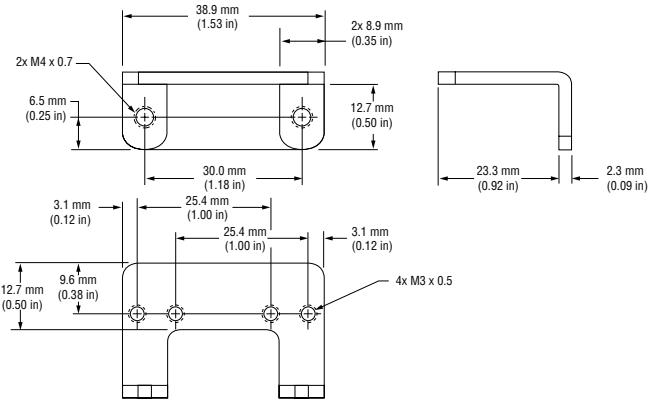
Mounting Brackets

Model	Description
SMB19	Right-angle, stainless steel, mounting bracket (M3 mounting hardware is supplied)
SMB42F	<ul style="list-style-type: none"> • 13 gauge stainless steel • Hardware included 





QM42 Series 150 mm Adjustable Field Sensors

Mounting Brackets		
Model	Description	
SMB42L  <ul style="list-style-type: none"> • 13 gauge stainless steel • Hardware included 		
SMB42U  <ul style="list-style-type: none"> • 13 gauge stainless steel • Hardware included 		

WARRANTY: Banner Engineering Corporation warrants its products to be free from defects for one year. Banner Engineering Corporation will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.



WARNING These photoelectric presence sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can result in either an energized or a de-energized sensor output condition.

Never use these products as sensing devices for personnel protection. Their use as a safety device may create an unsafe condition which could lead to serious injury or death.

Only MINI-SCREEN®, MULTI-SCREEN®, MICRO-SCREEN™, MACHINE-GUARD™ and PERIMETER-GUARD™ Systems, and other systems so designated, are designed to meet OSHA and ANSI machine safety standards for point-of-operation guarding devices. No other Banner sensors or controls are designed to meet these standards, and they must NOT be used as sensing devices for personnel protection.



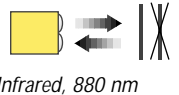
QMT42 Series Fixed-Field Sensors

Sensing Cutoff Point at 500, 750, 1000, 1500, or 2000 mm (20", 30", 39", 59" or 79")



QMT42 Series Fixed-Field Features

- Fixed-field technology allows direct detection of objects within a defined sensing field, while completely ignoring objects located beyond the sensing field cutoff point
- Compact, rugged, low cost self-contained sensors in metal die-cast housings
- Leakproof IP67 (NEMA 6) construction for reliable sensing in harsh environments
- Outstanding electrical noise immunity
- Dual LED system indicates sensor performance
- Choice of unterminated cable or quick-disconnect connector



QMT42 Series Fixed-Field Mode

Models	Range	Cutoff Point	Cable	Supply Voltage	Output Type	Performance Curves
QMT42VN6FF500 QMT42VN6FF500Q	50 mm (2.0") to Cutoff point	500 mm (20")	2 m (6.5') 4-pin Euro QD	10-30V dc	NPN	
QMT42VP6FF500 QMT42VP6FF500Q		500 mm (20")	2 m (6.5') 4-pin Euro QD		PNP	
QMT42VN6FF750 QMT42VN6FF750Q		750 mm (30")	2 m (6.5') 4-pin Euro QD		NPN	
QMT42VP6FF750 QMT42VP6FF750Q		750 mm (30")	2 m (6.5') 4-pin Euro QD		PNP	
QMT42VN6FF1000 QMT42VN6FF1000Q		1000 mm (39")	2 m (6.5') 4-pin Euro QD		NPN	
QMT42VP6FF1000 QMT42VP6FF1000Q		1000 mm (39")	2 m (6.5') 4-pin Euro QD		PNP	
QMT42VN6FF1500 QMT42VN6FF1500Q		1500 mm (59")	2 m (6.5') 4-pin Euro QD		NPN	
QMT42VP6FF1500 QMT42VP6FF1500Q		1500 mm (59")	2 m (6.5') 4-pin Euro QD		PNP	
QMT42VN6FF2000 QMT42VN6FF2000Q		2000 mm (79")	2 m (6.5') 4-pin Euro QD		NPN	
QMT42VP6FF2000 QMT42VP6FF2000Q		2000 mm (79")	2 m (6.5') 4-pin Euro QD		PNP	

QMT42 Series Fixed-Field Sensors

Fixed-Field Sensing, Theory of Operation

A fixed-field sensor compares the reflections of its emitted light beam (E) from a target object back to the sensor's two differently-aimed detectors (R1 and R2; see Figure 1). If the near detector (R1) light signal is stronger than the far detector (R2) light signal (object A is closer than the cutoff distance), the sensor responds to the object. If the far detector (R2) light signal is stronger than the near detector (R1) light signal (object B is beyond the cutoff distance), the sensor ignores the object. At the cutoff distance (dashed line), the signals from the two detectors are equal. Objects lying beyond the cutoff distance are ignored, even if they are highly reflective, (see below).

However, it is possible to falsely detect a background object, if it is positioned as shown in Figure 3, or if it moves past the face of the sensor in a direction perpendicular to the sensing axis (and especially if it has a reflective surface; see Figures 2 and 3). To solve this problem, rotate the sensor 90°, as shown in Figure 4.

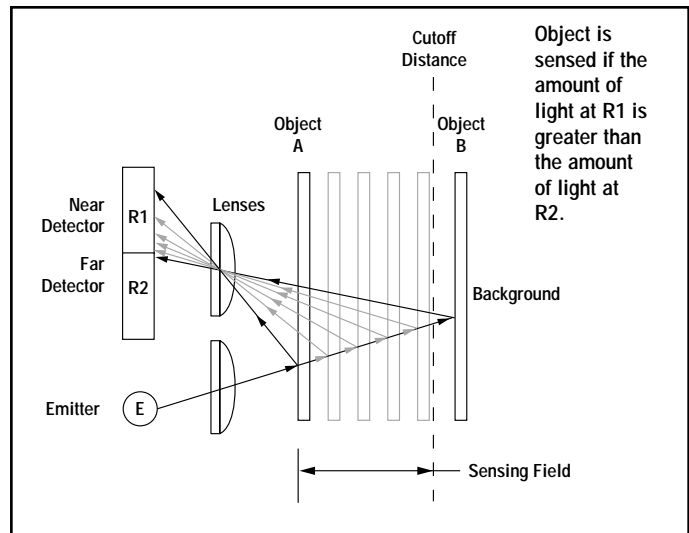


Figure 1. Fixed-field sensing, theory of operation

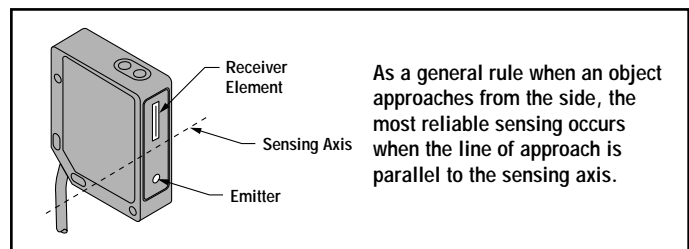


Figure 2. Sensing axis

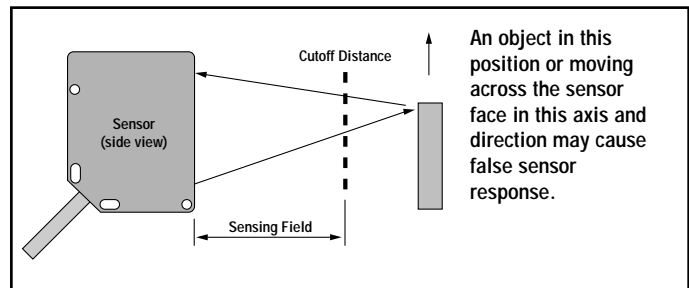


Figure 3. Object beyond cutoff distance (problem)

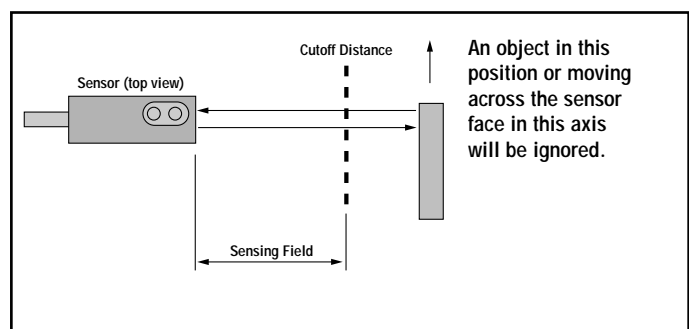

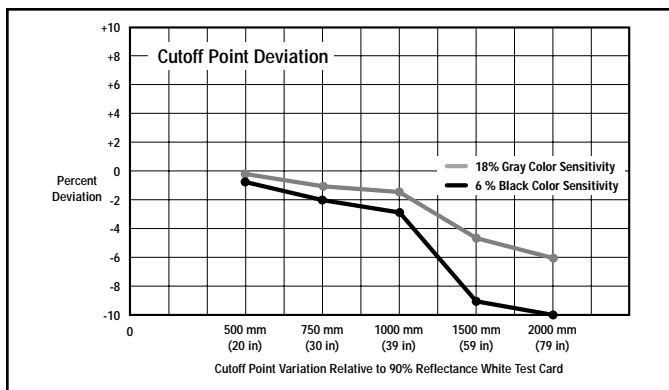


Figure 4. Object beyond cutoff distance (solution)

QMT42 Series Fixed-Field Sensors

QMT42 Series Fixed-Field Mode Specification

Sensing Beam	Infrared, 880 nm
Supply Voltage and Current	10 to 30V dc (10% maximum ripple) at less than 40 milliamps
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	SPDT (complementary) solid-state dc switch; choose NPN (current sinking) or PNP (current sourcing) models. Light operate: N.O. output conducts when the sensor sees its own modulated light Dark operate: N.C. output conducts when the sensor sees dark
Output Rating	100 mA maximum (each output) OFF-state leakage current: < 5 microamps at 30V dc ON-state saturation voltage: < 1V at 10 mA dc; < 1.5V at 100 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs Overload trip point \geq 150mA, typical, at 20°C
Output Response Time	1 millisecond on and off NOTE: 100 millisecond delay on power-up; outputs are non-conducting during this time
Repeatability of Response	250 microseconds
Sensing Hysteresis	Less than 5% of cutoff distance - 2000 mm models Less than 4% of cutoff distance - 1500 mm models Less than 3% of cutoff distance - 1000 mm models Less than 2% of cutoff distance - 750 mm models Less than 1% of cutoff distance - 500 mm models
Cutoff Point Tolerance	\pm 10% of nominal cutoff distance
Indicators	Two LEDs: Green and Yellow GREEN glowing steadily = power to sensor is ON GREEN flashing = output is overloaded YELLOW glowing steadily = light is sensed; normally open output ON YELLOW flashing = marginal excess gain (1-1.5x) in light condition
Construction	Housings are die-cast zinc alloy with black acrylic polyurethane finish; lenses are acrylic
Environmental Rating	IP67; NEMA 6
Connections	2 m (6.5') or 9 m (30') attached cable, or 4-pin Euro-style quick-disconnect fitting; cables for QD models are purchased separately
Operating Conditions	Temperature: -20° to +55°C (-4° to 131°F) Maximum relative humidity: 90% at 50°C (non-condensing)
Certifications	



Interpretation of Cutoff Point Deviation Curve

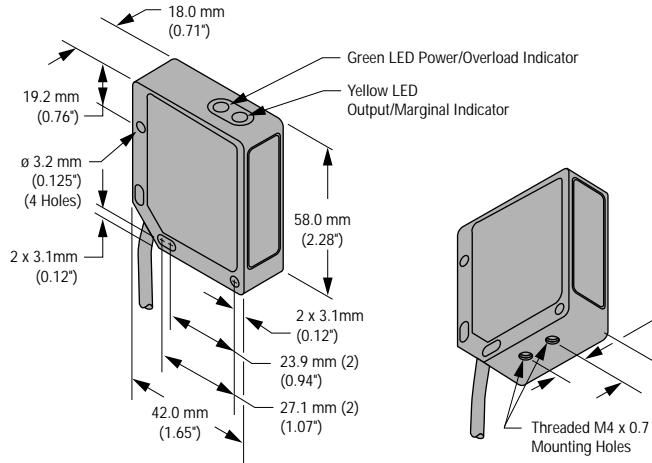
The percentage of deviation indicates a change in the cutoff point for either 18% gray or 6% black targets, relative to the cutoff point for a 90% reflective white test card.

As an example, the cutoff point decreases 10% for a 6% reflectance black target when the cutoff point is 2000 millimeters (79") using a 90% reflectance white test card. In other words, the cutoff point for the black target is 1800 millimeters (71").

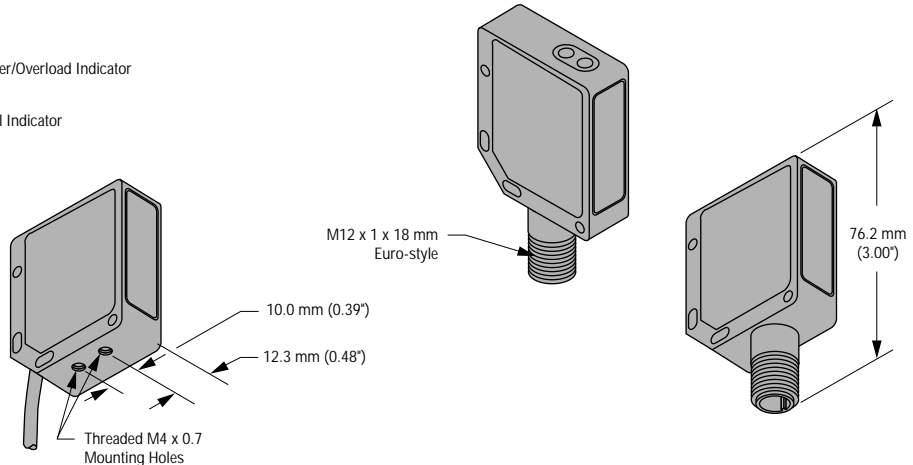
QMT42 Series Fixed-Field Sensors

QMT42 Series Dimensions

Cabled Models



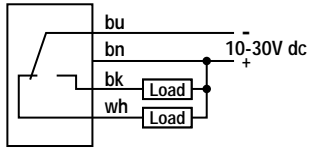
Quick-Disconnect models



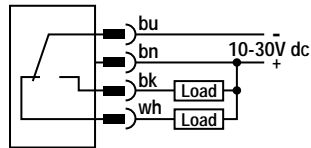
QMT42 Series Hookup Diagrams

Sensors with NPN (Sinking) Outputs

Cabled Models

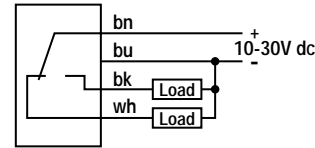


Quick-Disconnect Models

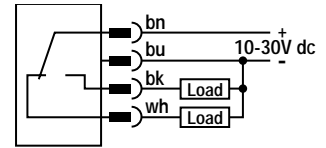


Sensors with PNP (Sourcing) Outputs

Cabled Models



Quick-Disconnect Models



Accessories

Quick-Disconnect (QD) Cables

Style	Model	Length	Dimensions	Pinout
4-pin Euro-style straight	MQDC-406 MQDC-415 MQDC-430	2 m (6.5') 5 m (15') 9 m (30')		
4-pin Euro-style right-angle	MQDC-406RA MQDC-415RA MQDC-430RA	2 m (6.5') 5 m (15') 9 m (30')		

QMT42 Series Fixed-Field Sensors

QMT42FF Series Mounting Brackets

SMB42T	<ul style="list-style-type: none"> • Right-angle mounting bracket, stainless steel • M3 hardware included 	SMB42L	<ul style="list-style-type: none"> • 13 gauge stainless steel • Hardware included



QMT42 Series Long-Range Diffuse Sensors

Adjustable Sensing Distance of up to 6 m (20')



Features

- Powerful, collimated infrared light source and special lensing allows reliable long-range detection of even the darkest objects
- Compact, rugged, low cost self-contained sensors in metal die cast housings
- Leakproof IP67 (NEMA 6) construction for reliable sensing in harsh environments
- Outstanding electrical noise immunity
- Dual LED system indicates sensor performance
- Choice of integral cable or quick disconnect connector



QMT42 Long-Range Diffuse Mode

Models	Range	Cable	Supply Voltage	Output Type	Excess Gain	Beam Pattern
					Performance based on 90% reflectance white test card	
QMT42VN6DX QMT42VN6DXQ	10 mm (0.4") to 6 m (20')	2 m (6.5') 4-pin Euro QD	10-30V dc	NPN		
QMT42VP6DX QMT42VP6DXQ		2 m (6.5') 4-pin Euro QD		PNP		



WARNING . . . Not To Be Used for Personnel Protection

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.

These sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.

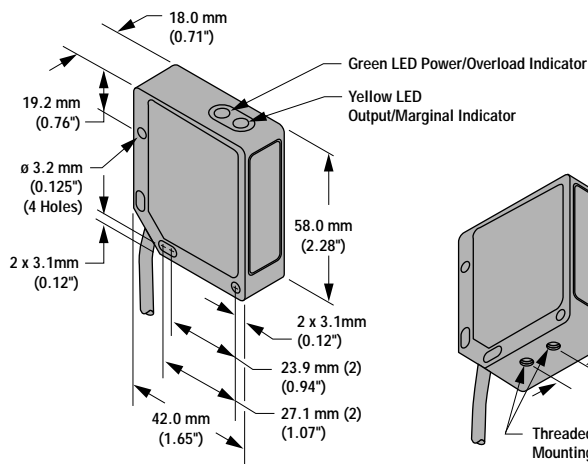
QMT42 Series Long-Range Diffuse Sensors

QMT42DX Specifications

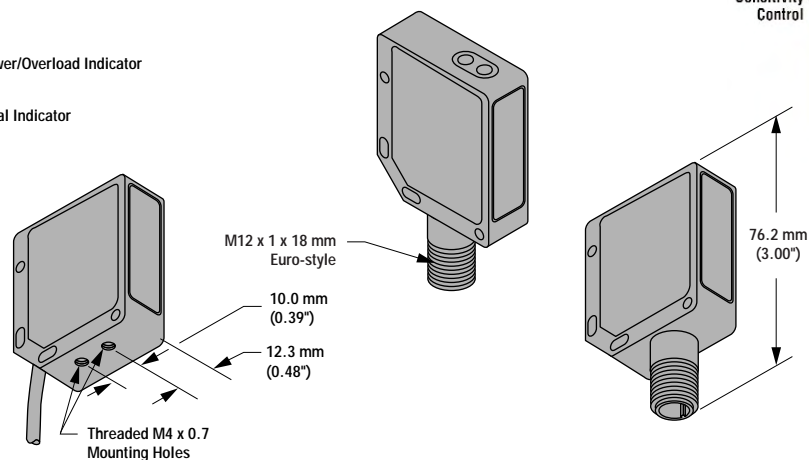
Sensing Beam	Infrared, 880 nm
Supply Voltage and Current	10 to 30V dc (10% maximum ripple) at less than 40 milliamps
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	SPDT (complementary) solid-state dc switch; Choose NPN (current sinking) or PNP (current sourcing) models. <i>Light operate:</i> N.O. output conducts when the sensor sees its own modulated light <i>Dark operate:</i> N.C. output conducts when the sensor sees dark
Output Rating	100 mA maximum (each output) Off-state leakage current: <5 microamps at 30V dc; On-state saturation voltage: <1V at 10 mA dc; <1.5V at 100 mA dc
Output Protection Circuitry	Protected against false pulse on power-up and continuous overload or short-circuit of outputs Overload trip point ≥ 130 mA, typical, at 20°C
Output Response Time	1 millisecond on and off NOTE: 100 millisecond delay on power-up; outputs are non-conducting during this time
Repeatability of Response	250 microseconds
Sensing Hysteresis	Less than 20% of set sensing distance
Adjustments	4-turn slotted Gain (sensitivity) adjustment potentiometer (clutched at both ends of travel)
Indicators	Two LEDs: Green and Yellow GREEN glowing steadily = power to sensor is ON GREEN flashing = output is overloaded YELLOW glowing steadily = light is sensed; normally open output ON YELLOW flashing = marginal excess gain (1-1.5x) in light condition
Construction	Housings are die-cast zinc alloy with black acrylic polyurethane finish; lenses are acrylic
Environmental Rating	IP67; NEMA 6
Connections	2 m (6.5') or 9 m (30') attached cable, or 4-pin Euro-style quick-disconnect fitting; Cables for QD models are purchased separately
Operating Temperature	-20° to +55°C (-4° to +131°F); Maximum relative humidity 90% at 50°C (non-condensing)
Certifications	Approvals in process

QMT42DX Dimensions

Cabled models



Quick-Disconnect models

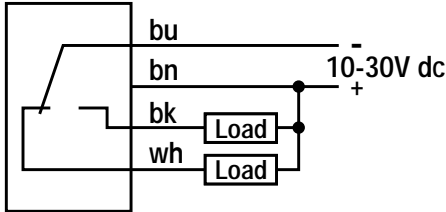


QMT42 Series Long-Range Diffuse Sensors

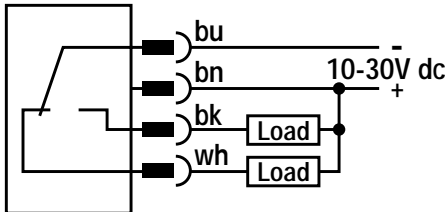
QMT42DX Hookups

Sensors with NPN (Sinking) Outputs

Cabled Models

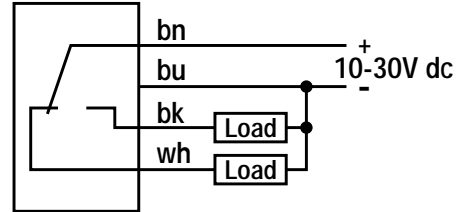


Quick Disconnect Models

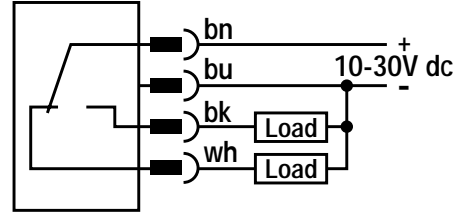


Sensors with PNP (Sourcing) Outputs

Cabled Models



Quick Disconnect Models



Quick-Disconnect (QD) Cables

The following is the selection of cables available for the QMT42 QD models

Style	Model	Length	For use with	Dimensions	Pinout
4-pin Euro-Style straight	MQDC-406 MQDC-415 MQDC-430	2 m (6.5') 5 m (15') 9 m (30')	All QMT42 sensors with quick-disconnect fitting		
4-pin Euro-Style right-angle	MQDC-406RA MQDC-415RA MQDC-430RA	2 m (6.5') 5 m (15') 9 m (30')			

QMT42 Series Long-Range Diffuse Sensors

QMT42 Mounting Brackets

<p>SMB42T</p> <ul style="list-style-type: none"> • Right-angle • Stainless steel 	<p>SMB42F</p> <ul style="list-style-type: none"> • 13 gauge • Stainless steel
<p>SMB42L</p> <ul style="list-style-type: none"> • 13 gauge • Stainless steel 	<p>SMB42U</p> <ul style="list-style-type: none"> • 13 gauge • Stainless steel
<p>SMB30SK</p> <ul style="list-style-type: none"> • 13 gauge • Stainless steel and PBT polyester 	<div data-bbox="933 1480 1315 1596" data-label="Image"> </div> <p>WARRANTY: Banner Engineering Corporation warrants its products to be free from defects for one year. Banner Engineering Corporation will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.</p>