QMT42FF Fixed-Field Series Sensor

Features

Sensing cutoff point at 500, 750, 1000, 1500, or 2000 millimeters (20, 30, 39, 59, or 79 inches)



- Fixed-field technology allows direct detection of objects within a defined sensing-field, while completely ignoring objects located beyond the sensing-field cutoff point
- Low-cost, compact, rugged sensors in metal die-cast housings
- Leakproof IP67 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

WARNING:

- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

Models

Models	Sensing Cutoff Point	Cable	Output Type
QMT42VN6FF500Q	500 mm (20 in)	4-pin M12 QD	NPN
QMT42VP6FF500		2 m (6.5 ft)	PNP
QMT42VP6FF500Q		4-pin M12 QD	
QMT42VN6FF750Q	750 mm (30 in)	4-pin M12 QD	NPN
QMT42VP6FF750Q		4-pin M12 QD	PNP
QMT42VN6FF1000Q	1000 mm (39 in)	4-pin M12 QD	NPN
QMT42VP6FF1000		2 m (6.5 ft)	PNP
QMT42VP6FF1000Q		4-pin M12 QD	
QMT42VN6FF1500Q	1500 mm (59 in)	4-pin M12 QD	NPN
QMT42VP6FF1500		2 m (6.5 ft)	PNP
QMT42VP6FF1500Q		4-pin M12 QD	
QMT42VN6FF2000Q	2000 mm (79 in)	4-pin M12 QD	NPN
QMT42VP6FF2000		2 m (6.5 ft)	PNP
QMT42VP6FF2000Q		4-pin M12 QD	

For a list of discontinued models, see Discontinued Models.

Wiring

Cabled wiring diagrams are shown. Quick disconnect wiring diagrams are functionally identical.

Original Instructions
13-May-26

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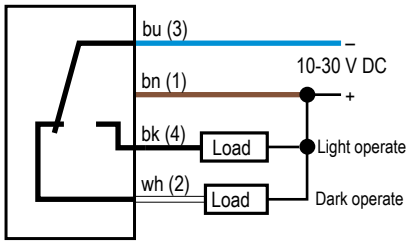
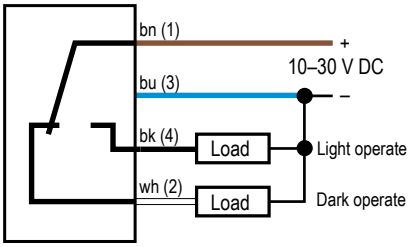
50756
p/n: 50756 Rev C

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

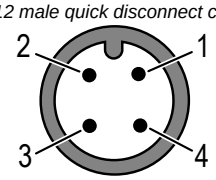
Sensors with NPN outputs



Sensors with PNP outputs



4-pin M12 male quick disconnect connector

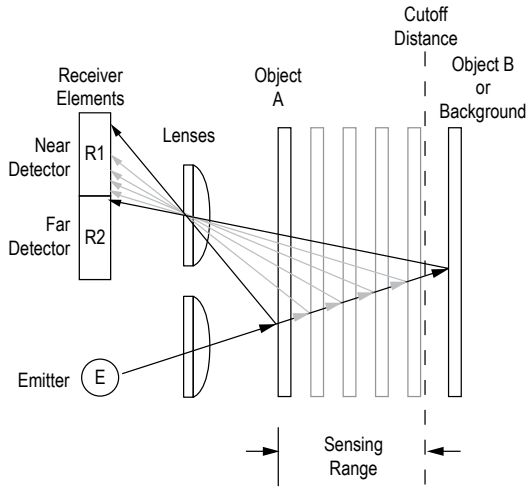


Fixed-Field Sensing – Theory of Operation

The QMT42FF compares the reflections of its emitted light beam (E) from an object back to the sensor's two differently aimed detectors, R1 and R2. See "Figure: Fixed-Field Concept" on page 2. If the near detector's (R1) light signal is stronger than the far detector's (R2) light signal (see object A in the Figure below, closer than the cutoff distance), the sensor responds to the object. If the far detector's (R2) light signal is stronger than the near detector's (R1) light signal (see object B in the Figure below, beyond the cutoff distance), the sensor ignores the object.

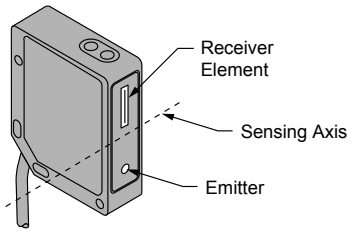
The cutoff distance for model QMT42FF sensors is fixed at 500, 750, 1000, 1500, or 2000 mm (20, 30, 39, 59, or 79 in) Objects lying beyond the cutoff distance are ignored, even if they are highly reflective. However, under certain conditions, it is possible to falsely detect a background object (see "Placement" on page 2).

Fixed-Field Concept



Object is sensed if amount of light at R1 is greater than the amount of light at R2

Fixed-Field Sensing Axis



In the drawings and information provided in this document, the letters E, R1, and R2 identify how the sensor's three optical elements (Emitter "E", Near Detector "R1", and Far Detector "R2") line up across the face of the sensor. The location of these elements defines the sensing axis, see "Figure: Fixed-Field Sensing Axis" on page 2. The sensing axis becomes important in certain situations, such as those illustrated in "Figure: Object Beyond Cutoff - Problem" on page 3 and "Figure: Object Beyond Cutoff - Solution" on page 3.

Placement

An object beyond the cutoff distance, either stationary (and when positioned as shown in "Figure: Object Beyond Cutoff - Problem" on page 3), or moving past the face of the sensor in a direction perpendicular to the sensing axis, may cause unwanted triggering of the sensor if more light is reflected to the near detector than to the far detector. Correct the problem by rotating the sensor 90° ("Figure: Object Beyond Cutoff - Solution" on page 3). The object then reflects the R1 and R2 fields equally, resulting in no false triggering. A better solution, if possible, may be to reposition the object or the sensor.

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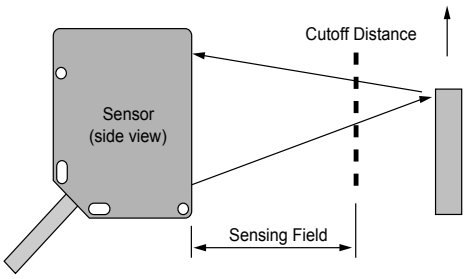
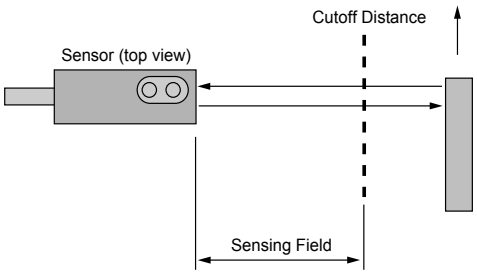
Object Beyond Cutoff - Problem



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

Object Beyond Cutoff - Solution



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

Specifications

Sensing Beam
Infrared, 880 nm

Supply Voltage and Current
10 V DC to 30 V DC (10% max. ripple) at less than 40 mA

Supply Protection Circuitry
Protected against reverse polarity and transient voltages

Output Configuration
SPDT (complementary) solid-state dc switch; choose NPN or PNP models

Light operate: Normally open (N.O.) output conducts when the sensor sees its own modulated light

Dark operate: Normally closed (N.C.) output conducts when the sensor sees dark

Output Rating
100 mA maximum (each output)

OFF-state leakage current: < 5 microamps at 30 V DC

ON-state saturation voltage: < 1 V at 10 mA DC; < 1.5 V at 100 mA DC

Construction
Housings are die-cast zinc alloy with black acrylic polyurethane finish; lenses are acrylic

Environmental Rating
IP67

Connections
2 m (6.5 ft) or 9 m (30 ft) attached cable, or 4-pin M12 quick-disconnect fitting; cables for QD models are purchased separately

Operating Conditions
–20 °C to +55 °C (–4 °F to +131°F)

90% at +50 °C maximum relative humidity (non-condensing)

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 ºC

Output Response Time
1 millisecond on and off

> **NOTE:** 100 millisecond delay on power-up; outputs are non-conducting during this time

Range
50 mm (2.0 in) to cutoff point

10 mm (0.4 in) to 6 m (20 ft)

Indicators
Two LEDs: Green and Amber

Green on steady = power to the sensor is ON

Green flashing = output is overloaded

Amber on steady = light is sensed; normally open output ON

Amber flashing = marginal excess gain (1-1.5x) in light condition

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
±10% of the nominal cutoff distance

Certifications

Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM

Turck Banner LTD Blenheim House
Blenheim Court
Wickford, Essex SS11 8YT
GREAT BRITAIN

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Required Overcurrent Protection

WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.

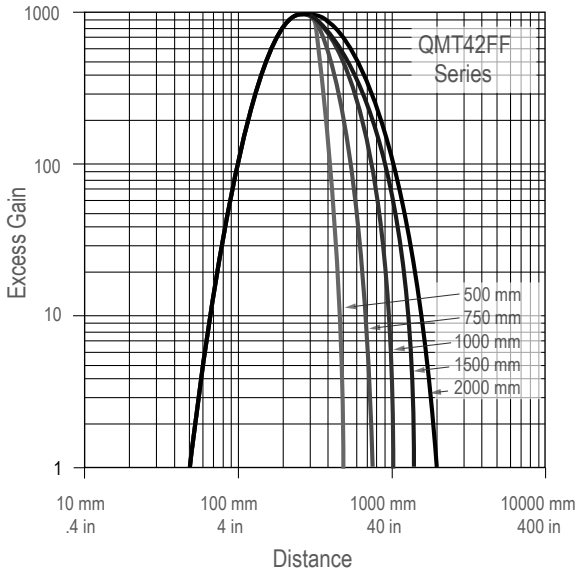
Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to www.bannerengineering.com.

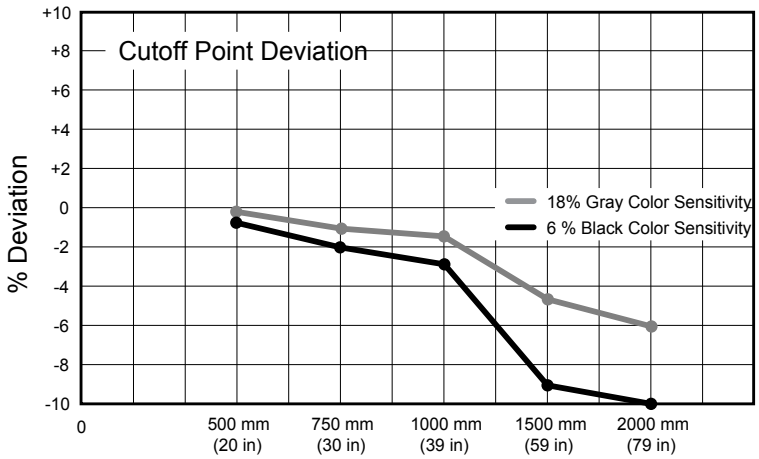
Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	2.0	30	0.5

Performance Curves



Cutoff Point Deviation

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 mm (79 in) using a 90% reflectance white test card. In other words, the cutoff point for the black target is 1800 mm (71 in).



Cutoff Point Variation Relative to 90% Reflectance White Test Card

Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.

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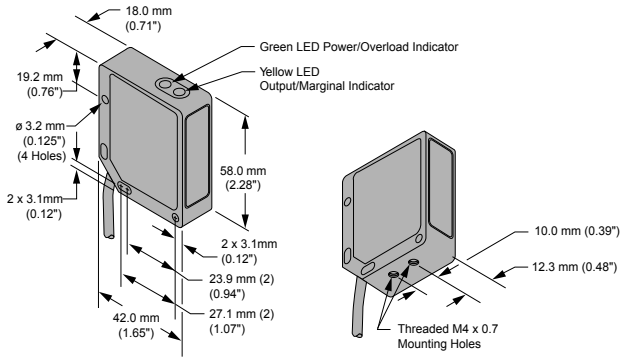
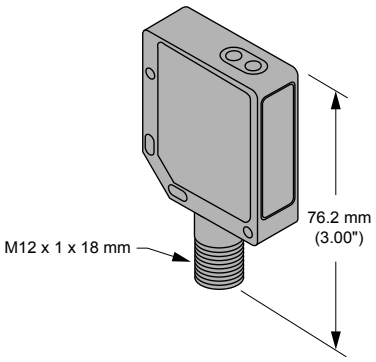
Cabled Models

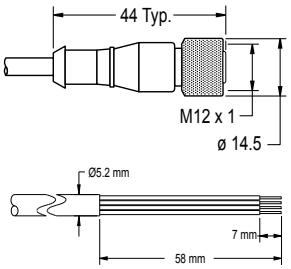
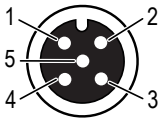
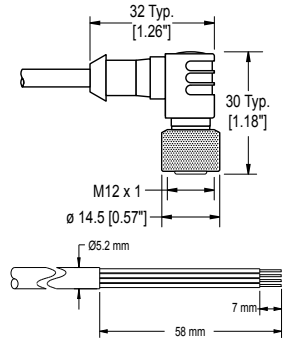
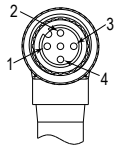


Quick-Disconnect Models



Accessories

Quick-Disconnect (QD) Cables

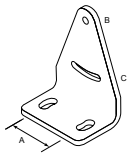
4-Pin Single-Ended M12 Female Cordsets					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
MQDC-406	2 m (6.56 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Not used c UL us
MQDC-415	5 m (16.4 ft)				
MQDC-430	9 m (29.5 ft)				
MQDC-450	15 m (49.2 ft)				
MQDC-406RA	2 m (6.56 ft)	Right-Angle			
MQDC-415RA	5 m (16.4 ft)				
MQDC-430RA	9 m (29.5 ft)				
MQDC-450RA	15 m (49.2 ft)				

Mounting Brackets

SMB42T

- Stainless steel 2-axis side-mounting bracket
- Nut strap included for replacing two M3 mounting nuts
- CAD Files: DXF, PDF, IGS, STP

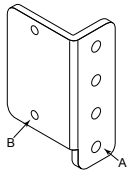
Hole center spacing: A = 20.3, B to C = 24.1
Hole size: A = ø 4.3 × 20°, B = ø 3.0, C = ø 3.0 × 30°



SMB42L

- 13-ga. stainless steel
- Hardware included
- CAD Files: DXF, PDF, IGS, STP

Hole center spacing: A = 10.0, B = 25.4
Hole size: A = ø 3.4, B = ø 2.5



Continued on page 6

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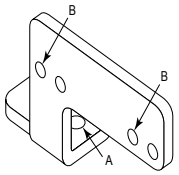
Continued from page 5

SMB42F

- 13-ga. stainless steel
- Hardware included
- CAD Files: DXF, PDF, IGS, STP

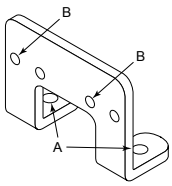
Hole center spacing: A = 10.0, B = 25.4
Hole size: A = ø 3.4, B = ø 2.5



SMB42U

- 13-ga. stainless steel
- Hardware included
- CAD Files: DXF, PDF, IGS, STP

Hole center spacing: A = 30.0, B = 25.4
Hole size: A = ø 3.4, B = ø 2.5



Product Support and Maintenance

Discontinued Models

The following models are no longer available for order but are still covered by the information in this document.

Models	Sensing Cutoff Point	Cable	Output Type
QMT42VN6FF500	500 mm (20 in)	2 m (6.5 ft)	NPN
QMT42VN6FF750	750 mm (30 in)	2 m (6.5 ft)	NPN
QMT42VP6FF750		2 m (6.5 ft)	PNP
QMT42VN6FF1000	1000 mm (39 in)	2 m (6.5 ft)	NPN
QMT42VN6FF1500	1500 mm (59 in)	2 m (6.5 ft)	NPN
QMT42VN6FF2000	2000 mm (79 in)	2 m (6.5 ft)	NPN

Contact Us

Banner Engineering Corp. | 9714 Tenth Avenue North | Plymouth, MN 55441, USA | Phone: + 1 888 373 6767

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