

QM42..AFV150 Adjustable Field Series Sensor



Datasheet



- Adjustable field technology directly detects objects within a defined sensing field and ignores 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
- 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



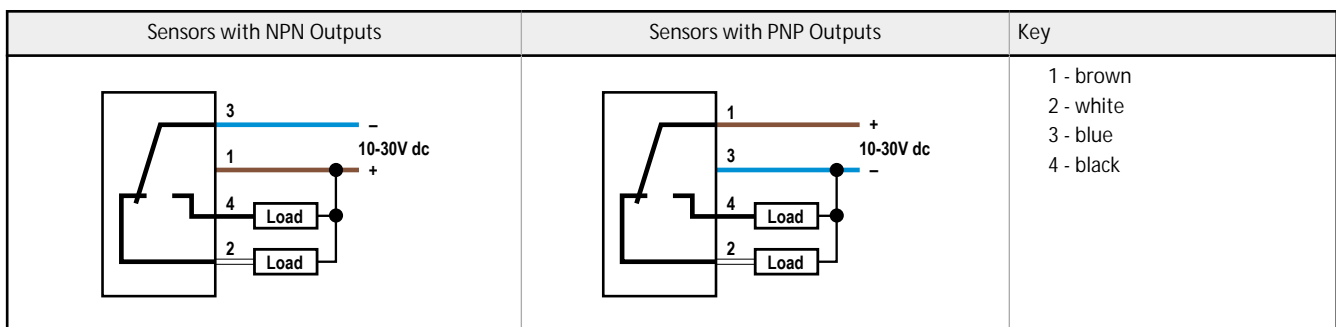
WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel **protection**. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

Models

| Models | Range | Cutoff Point | Cable | Output Type |
|----------------|-------------------------------|--------------------------|-------------------------|-------------|
| QM42VN6AFV150 | 5 mm (0.2 in) to Cutoff point | 50 to 150 mm (2 to 6 in) | 2 m (6.5 ft) | NPN |
| QM42VN6AFV150Q | | | 4-pin M12/Euro-style QD | |
| QM42VP6AFV150 | | | 2 m (6.5 ft) | PNP |
| QM42VP6AFV150Q | | | 4-pin M12/Euro-style QD | |

Wiring Diagrams



Cabled models are shown. Quick disconnect (QD) wiring diagrams are functionally identical.

Adjustable Field Sensing – Theory of Operation

The receiver element of an adjustable field sensor produces two currents: I1 and I2. The ratio of these two currents changes as the received light signal moves along the length of the receiver element. See [Figure 1](#) on page 2. 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 mm (2 to 6 in) Objects lying beyond the cutoff distance are usually 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).

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.



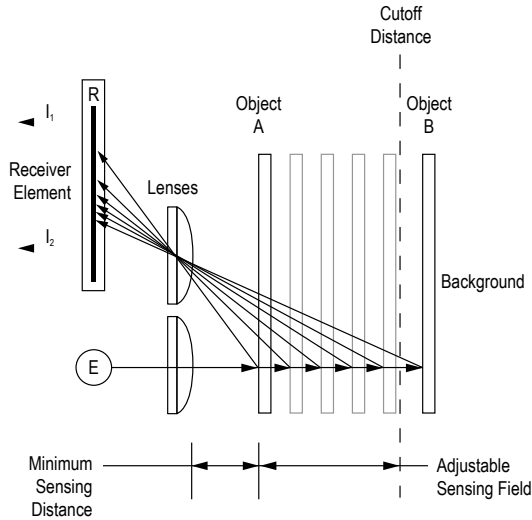


Figure 1. Adjustable Field Sensing Concept

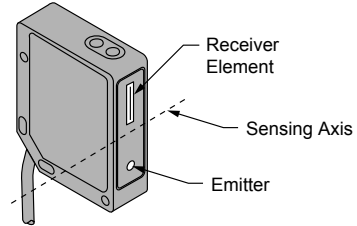
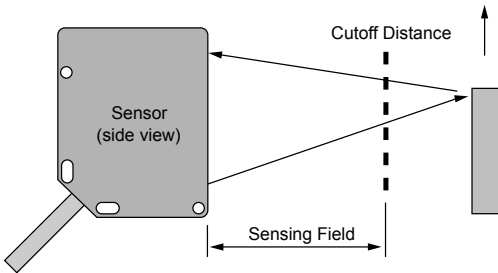


Figure 2. Fixed-Field Sensing Axis

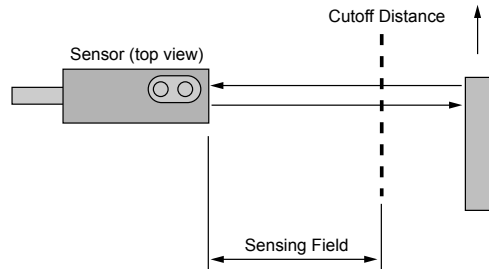
Placement

An object beyond the cutoff distance, either stationary (and when positioned as shown in [Figure 3](#) on page 2), 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 4](#) on page 2). 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.



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

Figure 3. Object Beyond Cutoff - Problem



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

Figure 4. Object Beyond Cutoff - Solution

Specifications

Supply Voltage and Current

10 to 30 V 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.

Light operate: N.O. output conducts when the sensor sees its own (or the emitter's) 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 30 V dc

On-state saturation voltage: <1 V at 10 mA dc; <1.5 V 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

Sensing Beam

Visible red, 680 nm

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 Amber

Green on: power to sensor is on

Green flashing: output is overloaded

Amber on: light is sensed; normally open output on

Amber 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

Accessories

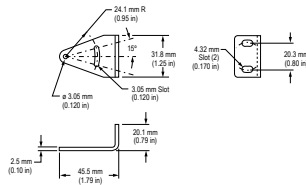
4-Pin Euro-Style Cordsets

| 4-Pin Threaded M12/Euro-Style Cordsets | | | | |
|--|----------------|-------------|------------|---|
| Model | Length | Style | Dimensions | Pinout (Female) |
| MQDC-406 | 1.83 m (6 ft) | Straight | | <p>1 = Brown 2 = White 3 = Blue 4 = Black</p> |
| MQDC-415 | 4.57 m (15 ft) | | | |
| MQDC-430 | 9.14 m (30 ft) | | | |
| MQDC-450 | 15.2 m (50 ft) | | | |
| MQDC-406RA | 1.83 m (6 ft) | Right-Angle | | |
| MQDC-415RA | 4.57 m (15 ft) | | | |
| MQDC-430RA | 9.14 m (30 ft) | | | |
| MQDC-450RA | 15.2 m (50 ft) | | | |

Brackets

SMB19

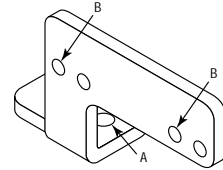
- Right-angle mounting bracket with a curved slot for versatile orientation



SMB42F

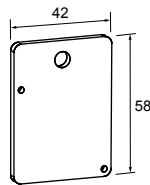
- 13-ga. stainless steel
- Hardware included

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



SMB42FL

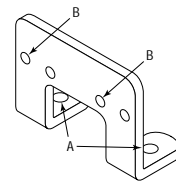
- Stainless steel
- 1/4"-28 screw mount



SMB42U

- 13-ga. stainless steel
- Hardware included

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



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