R-GAGE™ QT50R Series Sensor

Radar-Based Vehicle Detection Sensor

Features

- Reliably detects vehicles and trains based on frequency-modulated continuous-wave (FMCW) radar technology
- Detects objects up to 5 m (16') away using a fixed background reference target up to 8 m (26') away
- Detection is unaffected by wind or changing air temperatures
- Easy to set up using sealed push button or remote wire
- Operates in Industrial, Scientific, and Medical (ISM) telecommunication band; no special license required
- Rugged IP65 housing for harsh environments

Models

Models*	Sensing Range	Cable	Supply Voltage	Output
QT50R	**Objects:** 0.5 to 5 m (1.6' to 16')	5-wire, 2m (6.5') cable	15 to 30V dc	Bipolar NPN and PNP
QT50RQ	**Background:** up to 8 m (26')	5-pin Euro-Style integral QD		

* For 9 m cable, add suffix "**W/30**" to the model number of the cabled sensor (i.e., **QT50R W/30**). A QD model requires a mating cable. See page 6.

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.

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Overview

The R-GAGE sensor emits high-frequency radio waves from an internal antenna, which forms a well-defined beam. Some of this emitted energy is reflected back to the receiving antenna. Signal processing electronics determine the distance from the sensor to the vehicle based on the time delay of the return signal. The sensor can be configured to operate like a retroreflective photoelectric sensor if used with a fixed background target. See Figure 2.

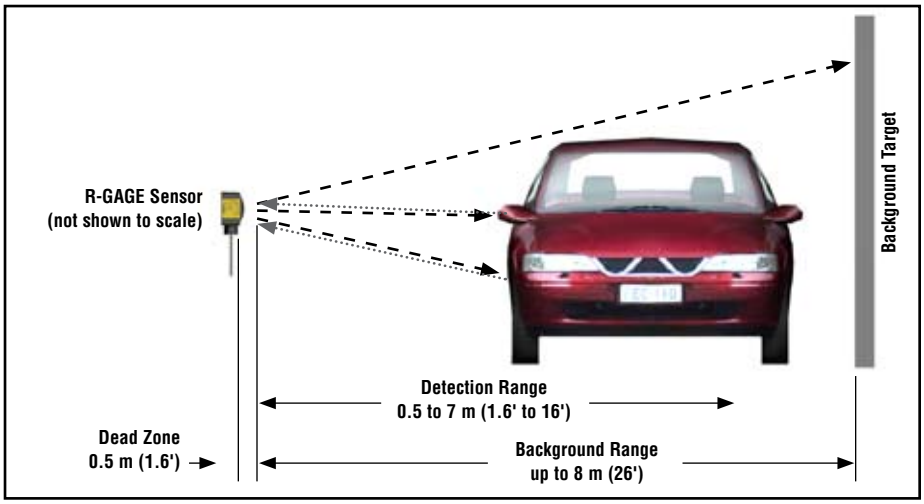
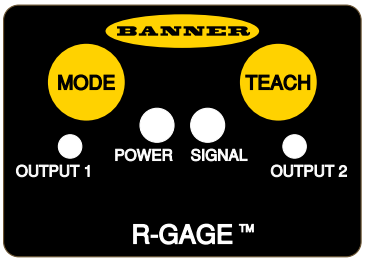


Figure 2. Setup for vehicle detection



NOTE: The MODE button on this model is not functional.

Figure 1. R-GAGE features

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Sensor Programming

1. Mount the sensor securely. Align the sensor with the background target, making the face of the Sensor as parallel as possible to the background target.

   The red Signal LED will flash faster as the alignment improves. If the red Signal LED does not flash, then the background target is not sufficient and a different target must be used, such as a metal plate or a corner cube reflector.

2. Verify that the area between the sensor and the background is clear, and follow the programming procedure in the table below.

	Procedure		Result
	Push Button	**Remote Line** **0.02 sec. < T < 0.8 sec.**	
Programming Mode	• Push and hold TEACH push button until Output LEDs turn ON Red 	• No action required; sensor is ready for programming	**Output LEDs:** ON Red
TEACH Background Reference Target	• Press and release TEACH push button 	• Pulse the remote line 	**Output LEDs:** OFF
Verify TEACH	• Block the front of the sensor		**Teach Accepted** **Output LEDs:** ON Yellow **Teach Not Accepted** **Output LEDs:** OFF

Setup Procedure for Tunnel Train Detection

1. Mount the sensor approximately 1.7 m (5.6') above the rails, and align the sensor so the center of the beam strikes the corner of the tunnel beyond the far rail, as shown in Figure 3. The red Signal LED will flash faster as the alignment improves.
2. Make sure the area between the sensor and the background is clear, and press the TEACH button until the Output LEDs turn ON red.
3. Press the TEACH button again. The Output LEDs turn OFF.
4. Verify proper setup by blocking the beam. The Output LEDs should turn ON yellow.

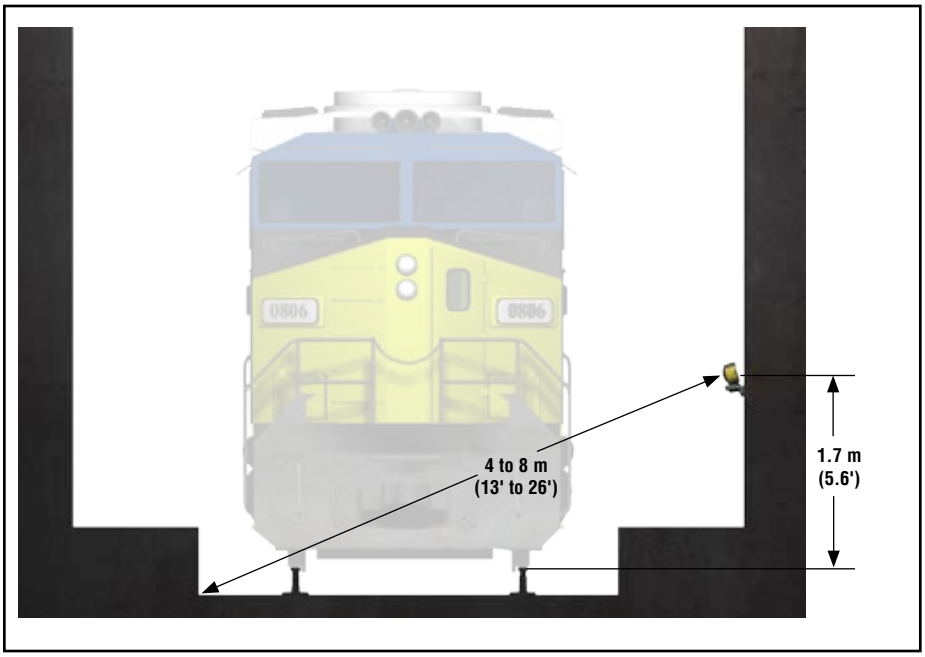

Figure 3. Setup for tunnel train detection

Status Indicators

Power LED	Indicates
OFF	Power is OFF.
ON Green	Power is ON.

Signal LED	Indicates
OFF	Background target is not sufficient; use a different target.
ON Red (flashing)	Frequency of flash indicates alignment; LED flashes faster as the alignment improves.

Output LEDs	Indicate
ON Red	In TEACH mode; background reference target has been taught.
ON Yellow	In sensing mode; target is sensed and outputs are conducting.

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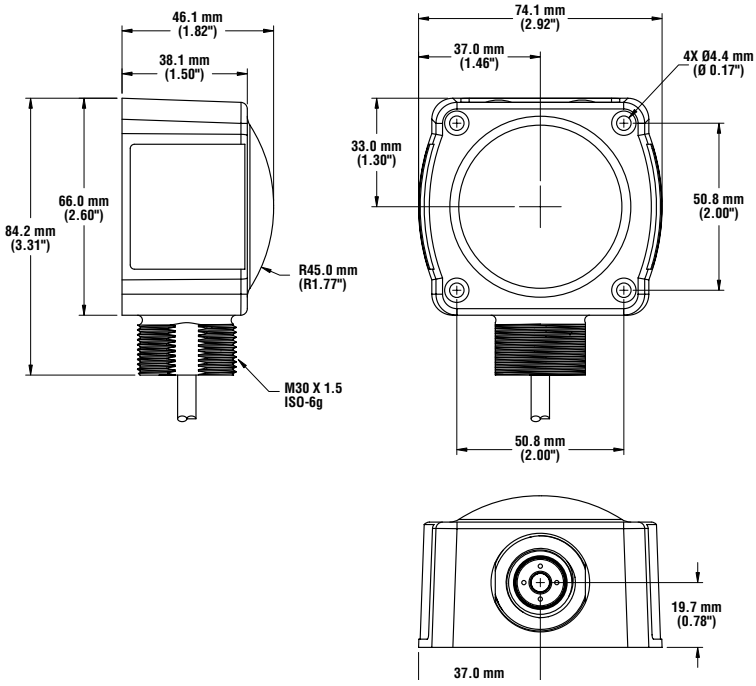
Specifications

Specifications are subject to change without notice.

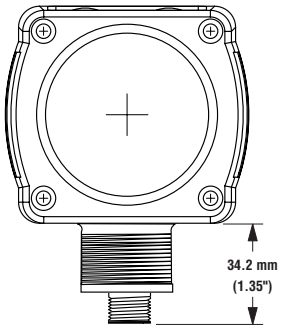
Range	Sensor will detect a 1 m x 1 m metal plate at a distance of up to 5 m (16') when set up with a suitable background target.
Detectable Objects	Objects containing metal or other high-dielectric material
Operating Principle	Frequency-modulated continuous-wave (FMCW) radar
Operating Frequency	24.05 to 24.25 GHz, ISM Band
Supply Voltage	15 to 30V dc
Supply Protection Circuitry	Protected against reverse polarity and transient overvoltages
Delay at Power-up	Less than 1.5 seconds
Output Configuration	Bipolar NPN and PNP outputs, 150 mA
Output Protection	Protected against short circuit conditions
Indicators	**Power LED:** Green **Signal Strength LED:** Red **Output LEDs:** Yellow/Red See "Status Indicators" on page 4.
Adjustments	TEACH programming button for setting background reference
Operating Temperature	-20 to 55° C (-4 to 131° F)
Environmental Rating	IP65
Connections	2 m (6.5') or 9 m (30') 5-conductor, shielded, PVC-jacketed attached cable or integral 5-pin Euro-style QD
Certifications	CE and ETSI/EN 300 440 (additional certifications pending)

Dimensions

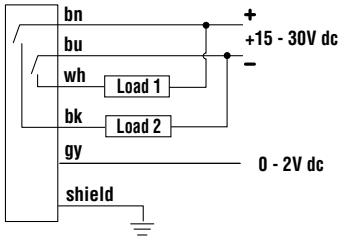
Cabled Models



QD Models



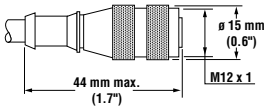
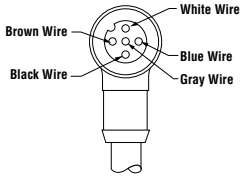
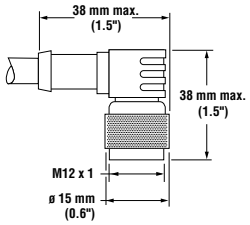
Hookup



NOTES:

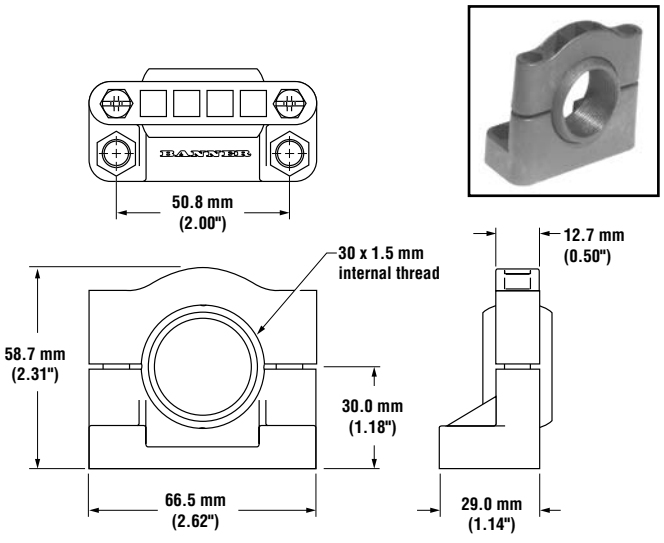
- **Cable and QD hookups are functionally identical.**
- **It is recommended that the shield wire be connected to earth ground or dc common. Shielded cordsets are recommended for all QD models.**

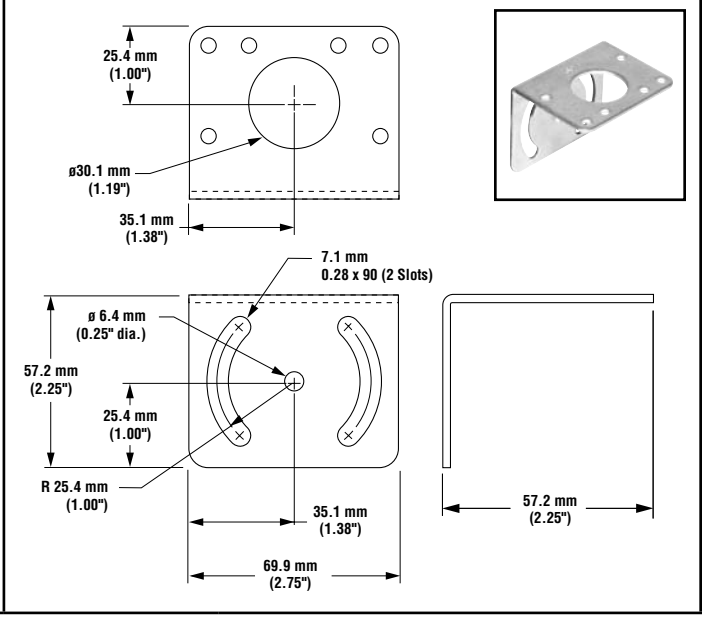
Quick-Disconnect (QD) Cables

Style	Model	Length	Dimensions	Pinout
5-Pin Euro-style Straight with shield	**MQDEC2-506** **MQDEC2-515** **MQDEC2-530**	2 m (6.5') 5 m (15') 9 m (30')		
5-Pin Euro Right-angle with shield	**MQDEC2-506RA** **MQDEC2-515RA** **MQDEC2-530RA**	2 m (6.5') 5 m (15') 9 m (30')		

Mounting Brackets

SMB30SC	• 30 mm split clamp with swivel, black reinforced thermoplastic polyester • Stainless steel hardware included	**SMB30MM**	• 30 mm, 11-gauge, stainless steel bracket with curved mounting slots for versatility and orientation • Clearance for M6 (1/4") hardware





R-GAGE™ QT50R Series Sensors

more sensors, more solutions

WARRANTY: Banner Engineering Corp. warrants its products to be free from defects for one year. Banner Engineering Corp. 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.

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