

Collision Avoidance & Vehicle Detection Solutions with R-GAGE Radar Sensors



Collision Avoidance

Harbor cranes, such as STS, RTG, RMG are a large investment and if damaged, require costly repair or replacement. Banner Engineering's R-GAGE radar-based sensor is the perfect rugged solution for crane-to-crane, or crane-to-obstacle collision avoidance applications. Radar sensors can operate in harsh outdoor conditions. Sensing functions are unaffected by wind, rain or snow, fog, sunlight, humidity and fluctuating air temperatures. Every day, in ports all around the world, terminal operators, carriers, bulk cargo handlers and shippers benefit from adding our advanced solutions to their machinery.



Crane-to-crane Proximity Detection



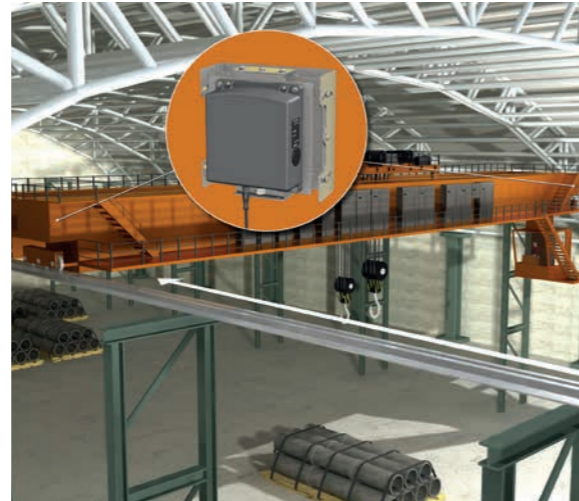
Challenge

When multiple cranes are moving in tight spaces, it's imperative to reliably detect the presence of another crane or obstacle and activate stop or warning signals to the operator.

Solution

- The Q240R radar sensor is ideal for monitoring a specific area without detecting adjacent objects, featuring a very narrow 11° by 13° beam pattern
- With two independent adjustable sensing zones, the sensor provides far and near proximity warning signs with the capability to detect objects up to 100 m away
- Extremely robust; provides reliable detection capabilities, ideal for outdoor applications

(Indoor) Overhead Crane in Dusty or Harsh Environments



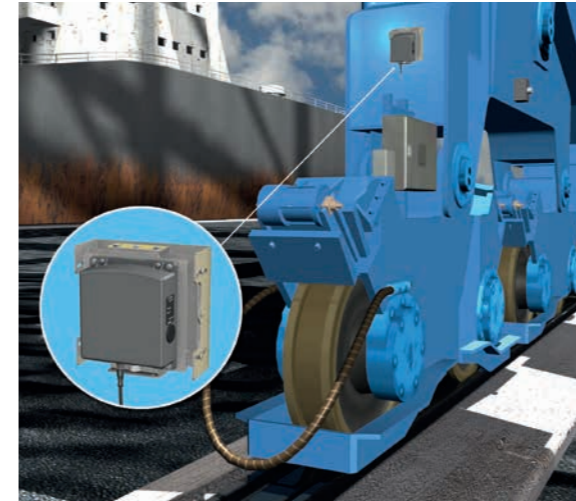
Challenge

Detection from cranes to prevent collision during operation can be extra challenging in dusty or harsh environments.

Solution

- The Q240R radar sensor features a rugged IP67 housing to withstand harsh environments
- It has no moving parts and a rugged design that resists high-shock and vibration conditions
- Combined with its robust outdoor performance, the Q240R is a more reliable solution with lower costs for purchase and maintenance than traditional laser scanner solutions

STS Collision Avoidance



Challenge

Large cranes are typically made of very heavy-duty material and work in close proximity to one another. Collision among the cranes would require costly repairs and replacements and needs to be avoided.

Solution

- The Q240R radar sensor has dual detection zones with a range up to 100 m that allows to slow down or stop cranes on rails
- Radar technology is not affected by changes in weather, air condition, or light and is therefore ideal for outdoor environment with unpredictable weather

RTG Collision Avoidance

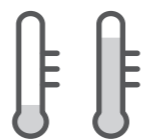


Challenge

Rubber tire gantry cranes (RTG) are used in port and mobile equipment industries to transport heavy and cumbersome loads. Since RTG cranes are hauling such large loads, it is vital to ensure they move safely throughout the port area to avoid collisions.

Solution

- The Q120R radar sensor has a narrow beam pattern, high sensitivity, and long range detection to view obstacles in the way of the crane
- The sensor has no moving parts and a rugged design that resists high-shock and vibration conditions



Radar Sensors are unaffected by snow, fog, heavy rain or humidity and strong wind; they are sunlight immune and operate reliable even under extreme temperature fluctuations.



Q240R Series – Dual Sensing Zone Radar Sensors
For detailed product information, see page 8.



Q120R Series – Narrow Beam Radar Sensors
For detailed product information, see page 9.

Traffic Monitoring

Radar sensors use Frequency Modulated Continuous Wave (FMCW) technology to reliably detect moving or stationary targets, including cranes, cars, trains, trucks and cargo in extreme weather conditions. They operate at 24 GHz in the Industrial, Scientific and Medical (ISM) telecommunication band.

Enhance the performance of your moving assets and ensure operator and equipment safety. You can depend on products and solutions from Banner to solve your most challenging applications.



Boats on Waterways, Locks and Dams; Shipyard Logistics



Challenge

To establish and maintain an efficient operating routine, all vessel traffic must be monitored as it enters and exits ports. Ship detection can be difficult because of local wind and wave conditions, ship size/type and close range noise. Sensing solutions must accurately detect a ship's arrival.

Solution

- The Q120R radar sensor functions are unaffected by wind, rain, fog, light, humidity and air temperature, making it ideal for outdoor harbor conditions
- The radar sensor detects objects up to a specified distance, ignoring objects and backgrounds beyond the set point, allowing for accurate ship detection



Easy to install: no PC required.

Train Detection Including Flatbeds



Challenge

Railways present many difficulties for sensing equipment. The harsh and dirty environment is extra challenging. Passing trains create high winds and kick up dirt. Proper identification of the content on cargo trains is essential. Radar sensors detect container trains to activate RFID antennas.

Solution

- The Q120R radar sensor is an effective alternative to ultrasonic or photoelectric sensors
- Radar technology is unaffected by wind or by dust and dirt build-up on the sensor



Q120R Series – Narrow Beam Radar Sensors
For detailed product information, see page 9.

Activation of Gamma Ray Gates



Challenge

Cargo trains are inspected with gamma rays to ensure the cargo matches the expected load.

Solution

- The QT50R radar sensor uses one or two independent, adjustable sensing zones for most reliable detection
- It can detect moving or stationary objects up to 24 m away
- The rugged IP67 housing withstands harsh environments



Maintenance free and vibration resistant.

Activation of Cameras



Challenge

Trucks pass the inspection zone, where radar sensors activate cameras to verify the cargo matches the corresponding customs declaration information.

Solution

- The QT50R radar sensor is installed to sense large vehicles
- The adjustable sensing field allows to ignore objects beyond the setpoint
- The rugged IP67 housing and radar technology is immune to weather and light changes



QT50R Series – Wide Beam Radar Sensors with QT50RCK Weather deflector
For detailed product information, see pages 10 and 11.

Detection of Stationary and Moving Vehicles

The ability to reliably detect vehicles offers significant advantages for asset management, resource allocation, site safety, traffic control, loading dock management. Application needs and deployment requirements can be diverse, ranging from indoor, outdoor and partially protected deployments to in-ground, above-ground, and on-the-vehicle installations. Vehicle detection solutions from Banner Engineering utilize a range of sensing technologies to overcome these challenges. These solutions help to enhance mobility and alleviate parking concerns, as well as enabling the monitoring of tollways and access and exit control systems.



Loading Dock Monitoring, Vehicle Counting



Challenge

For an efficient flow of products in and out of a truck, it is important that operators are immediately notified of a truck's arrival. In order to accurately detect the presence of vehicles at a loading dock, a reliable sensor is needed to withstand extreme weather conditions.

Solution

- The QT50R radar sensor can sense trucks up to 12 meters away, for quick and easy detection to alert operators
- Status monitoring with the radar sensor is simple with highly bright, visible LED indicators

Cars in Turn Lanes, Entry/Exit Gates, Parking Ramps



Challenge

Parking lots see a lot of traffic and properly managing the entrance can keep efficiency high. Typically, parking lot entrances are exposed to various weather conditions and potential impact from vehicles.

Solution

- The QT50R radar sensor detects objects up to a specified distance, ignoring objects and backgrounds beyond the set point
- In addition to vehicle detection, the radar sensor is also able to count the number of cars passing through

Parked Cars on City Streets



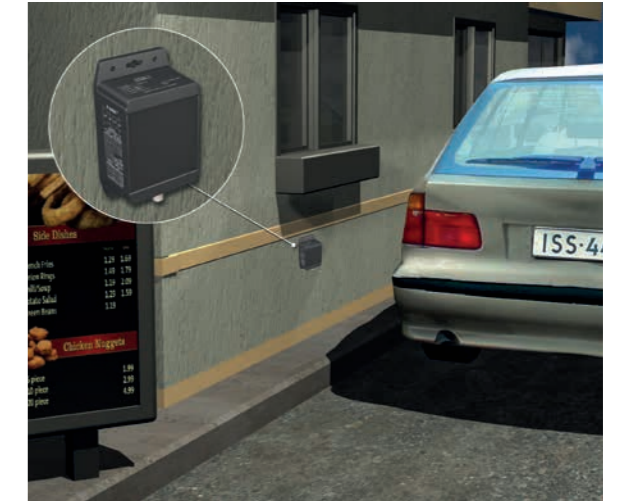
Challenge

To detect and count parked vehicles and prevent parking at non-permitted areas, a system is required to identify unauthorized vehicles and alert officers to their presence. Because the charging station is located in public areas, the system must not be vulnerable to vandalism.

Solution

- The QT50R radar sensor detects objects up to a specified distance, ignoring objects beyond the set point
- The radar sensor can be embedded in the charging station, preventing vandalism

Gates and Drive Thru



Challenge

Employees working at drive-up windows must be aware when a vehicle is present in order to optimize customer service. A reliable detection method that can sense the presence of large moving or stationary objects is required. The sensor must also be able to withstand outdoor environments.

Solution

- The Q120R radar sensor was designed to detect the presence of large moving or stationary objects, regardless of shape or color
- With its robust, dirt-resilient IP67 housing and weather immunity, the sensor is able to withstand harsh winds and other environmental elements



R-GAGE sensors allow for easy configuration by using DIP switches; there is no PC required for setup nor installation.



QT50R Series – Wide Beam Radar Sensors
For detailed product information, see pages 10 and 11.



Q120R Series – Narrow Beam Radar Sensors
For detailed product information, see page 9.

Q240RA Series

Sensors use two independent, adjustable sensing zones to reliably detect moving or stationary objects within a narrow beam pattern up to 100 meters away.

Narrowest Beam, Longest Range Sensor

- Narrow 11° x 13° beam pattern (± 5.5/6.5)
- Two independent adjustable sensing zones
- Range: up to 100 meters
- 187 x 160 x 55 mm rectangular housing
- Rugged IP67 housing withstands harsh environments



12 to 30 V dc – Dip-Switch Selectable Outputs NPN or PNP; N.O. or N.C. – 5-pin M12 QD

Model	Range	Telecom Approval	Output
Q240RA-US-AF2Q	40 m	US, Canada and Brazil	2x Selectable Dual NPN/PNP
Q240RA-EU-AF2Q	40 m	Europe, UK, Australia, New Zealand	2x Selectable Dual NPN/PNP
Q240RA-CN-AF2Q	40 m	China	2x Selectable Dual NPN/PNP
Q240RA-US-AF2LQ	100 m	US and Canada	2x Selectable Dual NPN/PNP
Q240RA-EU-AF2LQ	100 m	Europe, UK, Australia, New Zealand	2x Selectable Dual NPN/PNP
Q240RA-CN-AF2LQ	100 m	China	2x Selectable Dual NPN/PNP
Q240RA-US-ULQ	100 m	US and Canada	1x 0-10 V Analog and 1x Selectable NPN/PNP
Q240RA-EU-ULQ	100 m	Europe, UK, Australia, New Zealand	1x 0-10 V Analog and 1x Selectable NPN/PNP
Q240RA-CN-ULQ	100 m	China	1x 0-10 V Analog and 1x Selectable NPN/PNP
Q240RA-US-ILQ	100 m	US and Canada	1x 4-20 mA Analog and 1x Selectable NPN/PNP
Q240RA-EU-ILQ	100 m	Europe, UK, Australia, New Zealand	1x 4-20 mA Analog and 1x Selectable NPN/PNP
Q240RA-CN-ILQ	100 m	China	1x 4-20 mA Analog and 1x Selectable NPN/PNP

Optional Accessories and Mounting Brackets

Q240WS	Rain cover for Q240RA (sensor face must be kept free of heavy water and ice build-up)
SMBQ240SS1	2-piece bracket, provides ±20° of tilt on one axis
SMBQ240SS2	Can be used with SMBQ240SS1 for ± 20° tilt on second
SMBQ240SS3	Full bracket assembly, ±20° of tilt in all directions (SS1 + SS2)



Q240WS



SMBQ240SS1



SMBQ240SS2



SMBQ240SS3

Q120RA Series

Sensors use one or two independent, adjustable sensing zones to reliably detection moving or stationary objects up to 40+ meters away.

Highest Sensitivity, Long Range, Narrow Beam Sensor

- Narrow total beam pattern: horizontal: 24° (± 12), vertical: 50° (± 25)
- One or two independent adjustable sensing zones
- Range: up to 40+ meters
- 90.8 x 159.5 mm rectangular housing
- Rugged IP67 housing withstands harsh environments



12 to 30 V dc – Dip-Switch Selectable Outputs NPN or PNP; N.O. or N.C. – 5-pin M12 QD

Model	Range	Telecom Approval	Output
Q120RA-US-AFQ	12 m	US, Canada and Brazil	Bipolar NPN/PNP
Q120RA-EU-AFQ	12 m	Europe, UK, Australia, New Zealand, Japan and China	Bipolar NPN/PNP
Q120RA-KR-AFQ	12 m	South Korea*	Bipolar NPN/PNP
Q120RA-US-AF2WQ	26 m	US and Canada	2x Selectable Dual NPN/PNP
Q120RA-EU-AF2WQ	26 m	Europe, UK, Australia, New Zealand, Japan and China	2x Selectable Dual NPN/PNP
Q120RA-KR-AF2WQ	26 m	South Korea*	2x Selectable Dual NPN/PNP
Q120RA-US-AF2Q	40 m	US, Canada and Brazil	2x Selectable Dual NPN/PNP
Q120RA-EU-AF2Q	40 m	Europe, UK, Australia, New Zealand, Japan and China	2x Selectable Dual NPN/PNP
Q120RA-KR-AF2Q	40 m	South Korea*	2x Selectable Dual NPN/PNP

For 5-wire 2 m integral cable versions, remove suffix Q from the model number (e.g. Q120RA-EU-AF).

* Models for South Korea: 12 to 24 V dc

Optional Accessories and Mounting Brackets

SMBWSQ120	Heavy-duty, rear-mount protective rain cover for Q120RA (sensor face must be kept free of heavy water and ice build-up)
SMBQ240SS1	2-piece bracket, provides ±20° of tilt on one axis
SMBQ240SS2	Can be used with SMBQ240SS1 for ± 20° tilt on second
SMBQ240SS3	Full bracket assembly, ±20° of tilt in all directions (SS1 + SS2)
BWA-AH864	Polycarbonate Enclosure with Opaque Cover 8" x 6" x 4"
BWA-AH864C	Polycarbonate Enclosure with Clear Cover 8" x 6" x 4"
BWA-AH864HC	Polycarbonate Enclosure with Opaque Cover 8" x 6" x 4" – Hydrophobic Coated
BWA-BP86A	Sensor mounting plate for inside enclosure
MQDEC2-506	2 m cordset (other lengths available)

More enclosure boxes with different dimensions are available, please contact Banner Engineering.



SMBWSQ120



SMBQ240SS1



SMBQ240SS2



SMBQ240SS3



BWA-AH864



BWA-AH864C

QT50R-AF Series

Sensors use one or two independent, adjustable sensing zones to reliably detection moving or stationary objects up to 24 meters away.

Widest Beam, Smallest Sensor

- Detects objects up to 24 m
- One or two independent adjustable sensing zones
- Total beam angle 90° (± 45) x 76° (± 38)
- Rugged IP67 housing withstands harsh environments



12 to 30 V dc – Bipolar 1x NPN, 1x PNP; Dip-Switch Selectable Outputs N.O. or N.C. – 5-pin M12 QD

Model	Range	Telecom Approval	Output
QT50R-US-AFHQ	24 m	US, Canada and Brazil	Bipolar NPN/PNP
QT50R-EU-AFHQ	24 m	Europe, UK, Australia, New Zealand, Japan and China	Bipolar NPN/PNP
QT50R-KR-AFHQ	24 m	South Korea*	Bipolar NPN/PNP
QT50R-TW-AFHQ	24 m	Taiwan	Bipolar NPN/PNP
QT50R-SG-AFHQ	24 m	Singapore	Bipolar NPN/PNP
QT50R-US-AF2Q	24 m	US, Canada and Brazil	2x Selectable NPN/PNP
QT50R-EU-AF2Q	24 m	Europe, UK, Australia, New Zealand, Japan and China	2x Selectable NPN/PNP
QT50R-KR-AF2Q	24 m	South Korea*	2x Selectable NPN/PNP
QT50R-TW-AF2Q	24 m	Taiwan	2x Selectable NPN/PNP
QT50R-EU-AFSQ	3.75 m	Europe, UK, Australia, New Zealand, Japan and China	Bipolar NPN/PNP
QT50R-KR-AFSQ	3.75 m	South Korea*	Bipolar NPN/PNP

For 5-wire 2 m integral cable versions, remove suffix Q from the model number (e.g. QT50R-EU-AFH).

* Models for South Korea: 12 to 24 V dc

Optional Accessories and Mounting Brackets

QT50RCK	Weather deflector, includes mounting hardware (sensor face must be kept free of heavy water and ice build-up)
SMB30SC	Split clamp with swivel bracket with 30 mm mounting hole for sensor, black reinforced thermoplastic polyester. Stainless steel mounting hardware included.
SMB30MM	12-gauge stainless steel bracket with curved mounting slots for versatile orientation. Mounting hole for 30 mm sensor.
BWA-AH664	Polycarbonate Enclosure with Opaque Cover 6" x 6" x 4"
BWA-AH664C	Polycarbonate Enclosure with Clear Cover 6" x 6" x 4"
BWA-BP66A	Mounting plate for inside enclosure
MQDEC2-506	2 m cordset (other lengths available)

More enclosure boxes with different dimensions are available, please contact Banner Engineering.



QT50RCK



SMB30SC



SMB30MM



BWA-AH664



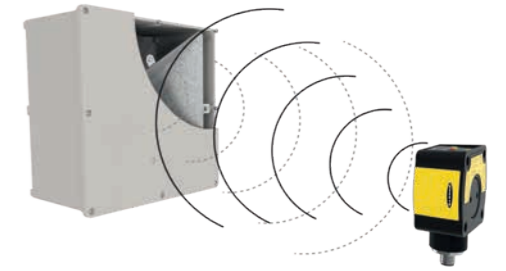
BWA-AH664C

QT50R-RH Series

Retro-wave sensor – use of a reference signal (retroreflective target) enables reliable detection of weak targets in the foreground or for loss of detection of the retroreflective target.

Robust Retroreflective Sensing Mode

- Detects objects up to 12 m
- Effective beam angle equals size of retro target
- Ignores objects in the background beyond the retroreflective target
- Rugged IP67 housing withstands harsh environments



12 to 30 V dc – Bipolar NPN/PNP, Dip-Switch Selectable Outputs N.O. or N.C. – 5-pin M12 QD

Model	Range	Telecom Approval	Output
QT50R-US-RHQ	0 to 12 m	US, Canada and Brazil	Bipolar NPN/PNP
QT50R-EU-RHQ	0 to 12 m	Europe, UK, Australia, New Zealand, Japan and China	Bipolar NPN/PNP
QT50R-KR-RHQ	0 to 12 m	South Korea*	Bipolar NPN/PNP
QT50R-TW-RHQ	0 to 12 m	Taiwan	Bipolar NPN/PNP

For 5-wire 2 m integral cable versions, remove suffix Q from the model number (e.g. QT50R-EU-RH).

* Models for South Korea: 12 to 24 V dc

Optional Accessories and Mounting Brackets

BRTR-CC20E	Retroreflective target for use with QT50R retroreflective model (required accessory). Large corner-cube reflector in protective plastic enclosure.
QT50RCK	Weather deflector, includes mounting hardware (sensor face must be kept free of heavy water and ice build-up)
SMB30SC	Split clamp with swivel bracket with 30 mm mounting hole for sensor, black reinforced thermoplastic polyester. Stainless steel mounting hardware included.
SMB30MM	12-gauge stainless steel bracket with curved mounting slots for versatile orientation. Mounting hole for 30 mm sensor.
BWA-AH664	Polycarbonate Enclosure with Opaque Cover 6" x 6" x 4"
BWA-AH664C	Polycarbonate Enclosure with Clear Cover 6" x 6" x 4"
BWA-BP66A	Mounting plate for inside enclosure
MQDEC2-506	2 m cordset (other lengths available)

More enclosure boxes with different dimensions are available, please contact Banner Engineering.



BRTR-CC20E



QT50RCK



SMB30SC



SMB30MM



BWA-AH664



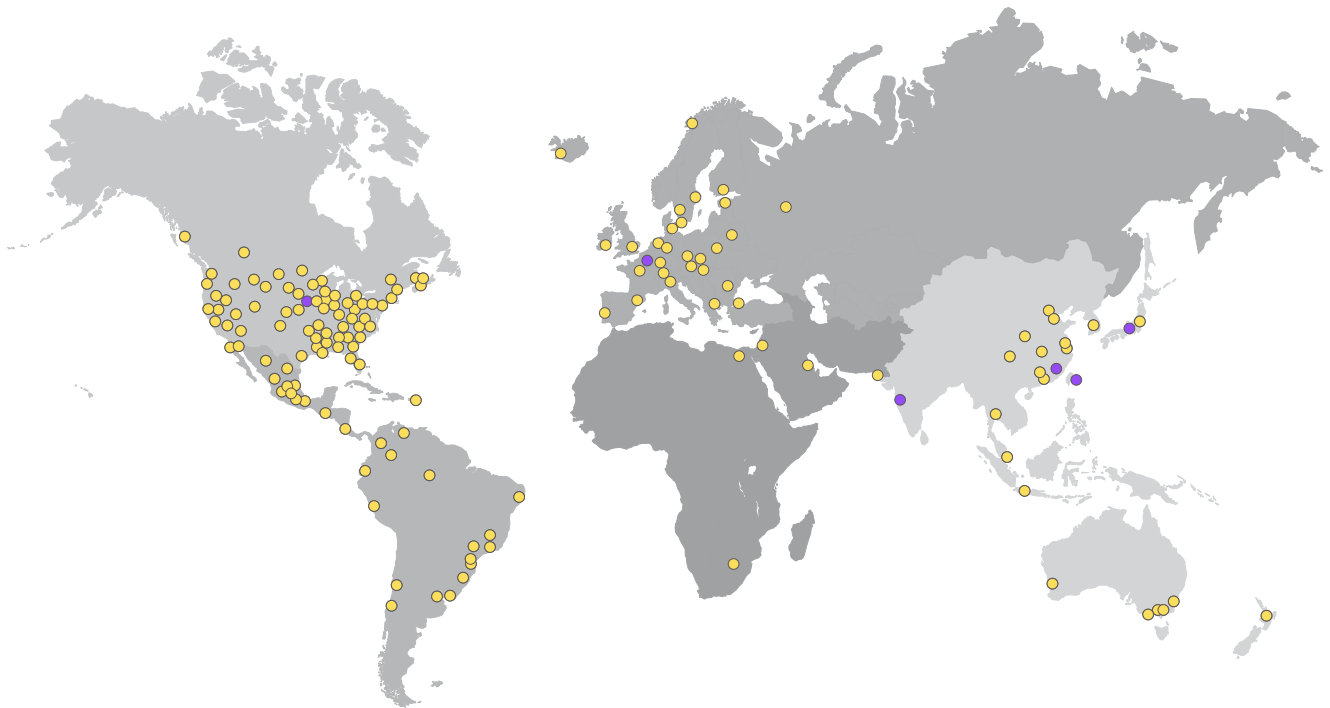
BWA-AH664C

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