

Quick Start Guide

Radar-Based Sensors for Detection of Moving and Stationary Targets

This guide is designed to help you set up and install the Q130RA. For complete information on programming, performance, troubleshooting, dimensions, and accessories, please refer to the Instruction Manual at www.bannerengineering.com. Search for p/n 208831 to view the Instruction Manual. Use of this document assumes familiarity with pertinent industry standards and practices.



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.

Features and Indicators

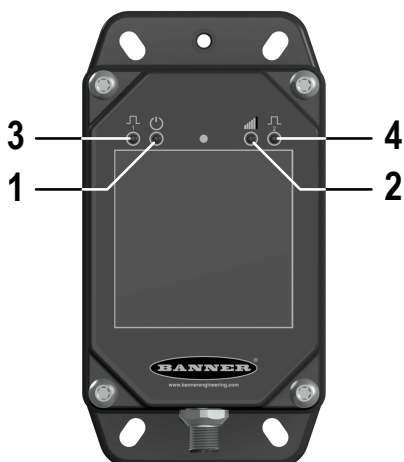


Figure 1. R-GAGE Features

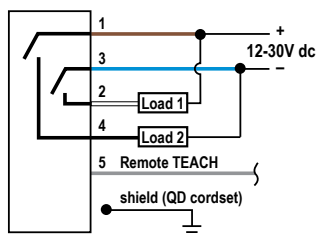
| | LED | Color | Description |
|---|-----------------|-------|--|
| 1 | Power | Green | Power ON |
| 2 | Signal Strength | Red | Flashes in proportion to the signal strength |
| 3 | Output 1 | Amber | Output energized |
| 4 | Output 2 | Amber | Output energized |

Installation Instructions

Mount the Device

1. If a bracket is needed, mount the device onto the bracket.
2. Mount the device (or the device and the bracket) to the machine or equipment at the desired location. Do not tighten the mounting screws at this time.
3. Check the device alignment.
This is done via the red Signal Strength LED or the Banner Radar Configuration Software.
4. Tighten the mounting screws to secure the device (or the device and the bracket) in the aligned position.

Wiring



Key:

- 1 = Brown
- 2 = White
- 3 = Blue
- 4 = Black
- 5 = Gray (Connect for use with remote input)



Note: Banner recommends that the shield wire (quick-disconnect cordsets only) be connected to earth ground or dc common. Shielded cordsets are recommended for all quick-disconnect models.



Install the Software

Operating System

Microsoft® Windows® operating system version 10¹

Hard Drive Space

130MB

Third-Party Software

.NET version 4.6.2 or higher

USB Port

Available USB port



Important: Administrative rights are required to install the Banner Radar Configuration software.

1. Download the latest version of the software from www.bannerengineering.com/us/en/products/sensors/software/radar-configuration.html.
2. Navigate to and open the downloaded file.
3. Click **Install** to begin the installation process.
4. Depending on your system settings, a popup window may appear prompting to allow Banner Radar Configuration to make changes to your computer. Click **Yes**.
5. Click **Close** to exit the installer.

Getting Started

Power up the sensor, and verify that the power LED is ON green.

Connect to the Sensor

1. Connect the sensor to the Pro Converter Cable.
2. Connect the Pro Converter Cable to the PC.
3. Open the Banner Radar Configuration Software.
4. Go to **Sensor > Connect** on the **Navigation** toolbar.
The **Connection** screen displays.
5. Select the correct **Sensor Model** and **Com Port** for the sensor.
6. Click **Connect**.
A message displays confirming the connection to the sensor.
7. Click **OK**.
The **Connection** screen closes and the sensor data displays.

Specifications

Range

The sensor is able to detect a proper object (see Detectable Objects) at the following ranges, depending on the target:

9076 models: 1 m to 24 m (3.3 ft to 78.7 ft)

2450 models: 1 m to 40 m (3.3 ft to 131.2 ft)

Detectable Objects

Objects containing metal, water, or similar high-dielectric materials

Operating Principle

Frequency modulated continuous-wave (FMCW) radar

Operating Frequency

24.050-24.250 GHz, ISM Band

Maximum Output Power

ERP: 3.3 mW, 5 dBm
EIRP: 100 mW, 20 dBm

Supply Voltage (Vcc)

12 V dc to 30 V dc

Power and Current Consumption, exclusive of load

Normal Run Mode: 1.2 W, Current consumption < 50 mA at 24 V dc

Supply Protection Circuitry

Protected against reverse polarity and transient overvoltages

Delay at Power-up

< 3 seconds

Output Configuration

Bipolar NPN/PNP output
Load 1 on pin 2 (white wire) = NPN
Load 2 on pin 4 (black wire) = PNP

Output Ratings

50 mA maximum capability each output
Saturation: < 3.5 V at 50 mA
Off-state leakage current:

| Outputs specifications per configuration | | |
|--|-------------|---|
| PNP | Output High | $\geq V_{\text{supply}} - 2.5 \text{ V}$ |
| | Output Low | $\leq 2.5 \text{ V (loads } \leq 70 \text{ k}\Omega)$ |
| NPN | Output High | $\geq V_{\text{supply}} - 2.5 \text{ V (loads } \leq 70 \text{ k}\Omega)$ |
| | Output Low | $\leq 2.5 \text{ V}$ |

Output Protection

Protected against short circuit conditions

Response Time

Software selectable:

50 ms ON/50 ms OFF
100 ms ON/100 ms OFF
50 ms ON/500 ms OFF
50 ms ON/1000 ms OFF

Indicators

Power LED: Green (power ON)

Signal Strength LED: Red, flashes in proportion to signal strength. Steady on at 4x excess gain.

Output LEDs: Amber (output energized)

See [Figure 1](#) on page 1

Construction

Housing: ABS/polycarbonate
QD Connector: Stainless steel
Mounting Threads: Stainless steel

Vibration

All models meet IEC 60947-5-2 (Vibration: 10 Hz to 55 Hz; 1 mm peak-to-peak amplitude; 5 minute duration; 30 minutes in each of the three axes at resonant frequency or at 55 Hz)

Shock

All models meet IEC 60947-5-2 (Shock: 30G peak acceleration, 11 ms pulse duration, half sine wave pulse shape)

Operating Temperature

-40 °C to +65 °C (-40 °F to +149 °F)

Environmental Rating

IEC IP67

Connections

Integral 5-pin M12/Euro-style quick disconnect. Models with a quick disconnect require a mating cordset

Certifications



IND. CONT. EQ.
E224071
UL LISTED
UL Environmental Rating: Type 1

ETSI/EN 300 440
FCC ID: UE3RGAGE1XX
for others, contact Banner Engineering
Country of Origin: USA

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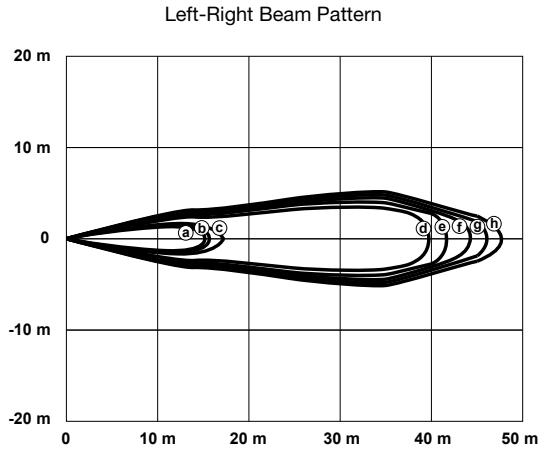
Beam Patterns



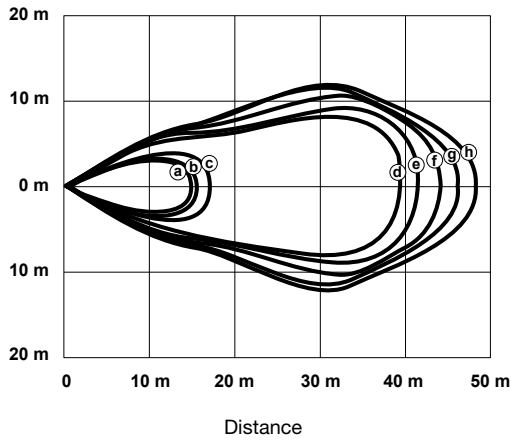
Note: The effective beam pattern depends on the signal strength threshold and the properties of the target.

Model -2450

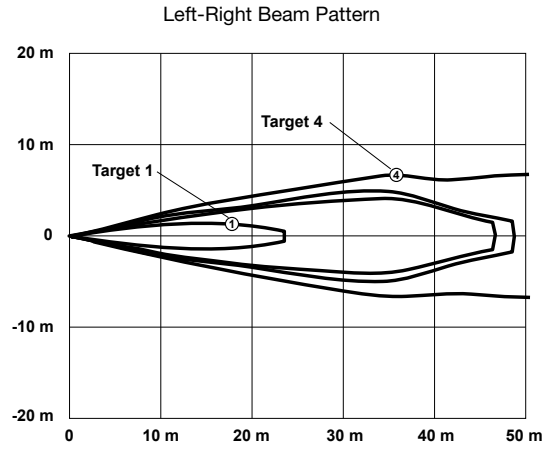
Typical Beam Pattern (with BRTR-CC20E Radar Target, Radar Cross Section = 50 m²)



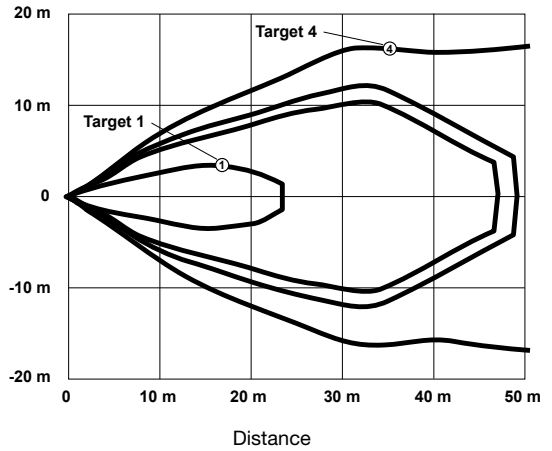
Up-Down Beam Pattern



Typical Beam Pattern (with 4 different targets) with Signal Strength Threshold = 1



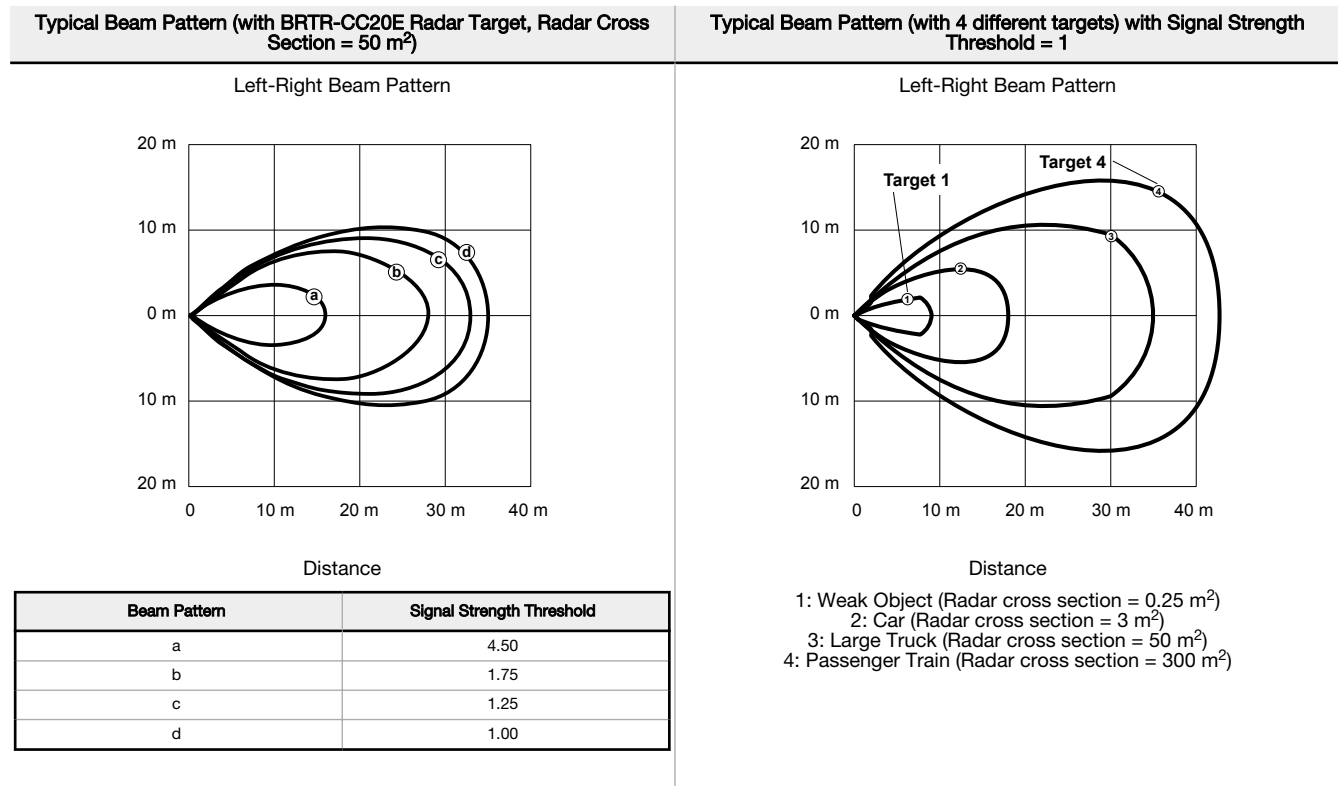
Up-Down Beam Pattern



| Beam Pattern | Signal Strength Threshold |
|--------------|---------------------------|
| a | 7.50 |
| b | 6.50 |
| c | 5.00 |
| d | 2.00 |
| e | 1.50 |
| f | 1.25 |
| g | 1.13 |
| h | 1.00 |

- 1: Weak Object (Radar cross section = 0,25 m²)
- 2: Car (Radar cross section = 3 m²)
- 3: Large Truck (Radar cross section = 50 m²)
- 4: Passenger Train (Radar cross section = 300 m²)

Model -9076



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For patent information, see www.bannerengineering.com/patents.

FCC Part 15 and CAN ICES-3 (B)/NMB-3(B)

This device complies with part 15 of the FCC Rules and CAN ICES-3 (B)/NMB-3(B). Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules and CAN ICES-3 (B)/NMB-3(B). These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the manufacturer.