

## 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](http://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

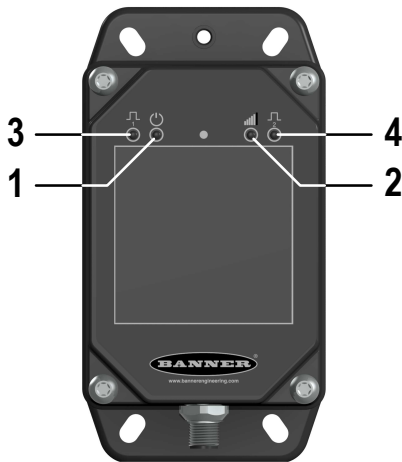


Figure 1. R-GAGE Features

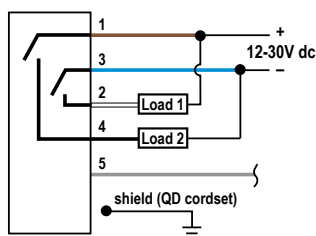
	LED	Color	Description
1	Power	Green	Power ON
2	Signal Strength	Red	Flashes in proportion to the signal strength
3	Output 1	Amber	Output energized
4	Output 2	Amber	Output energized

## 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.
4. Tighten the mounting screws to secure the device (or the device and the bracket) in the aligned position.

### Wiring



#### **Wiring Key:**

- 1 = Brown
- 2 = White
- 3 = Blue
- 4 = Black
- 5 = Gray (Do not connect)



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



## Install the Software

### Operating System

Microsoft® Windows® operating system version 10<sup>1</sup>

### 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](http://www.bannerengineering.com).
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**.  
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

### 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. Only indicates signal amplitude, not target distance.

**Output LEDs:** Amber (output energized)

See [Figure 1](#) on page 1

### Construction

**Housing:** ABS/polycarbonate

**QD Connector:** Stainless steel

**Mounting Threads:** Stainless steel

### 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



ETSI/EN 300 440

FCC part 15

for others, contact Banner Engineering

Country of Origin: USA

FCC ID: UE3RGAGE1XX—This device complies with Part 15 of the FCC Rules. 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.

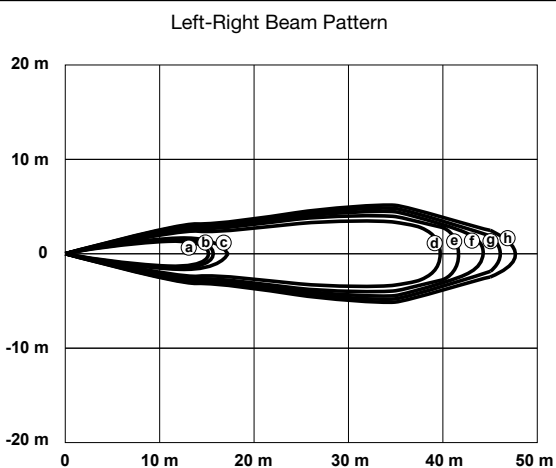
## Beam Patterns



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

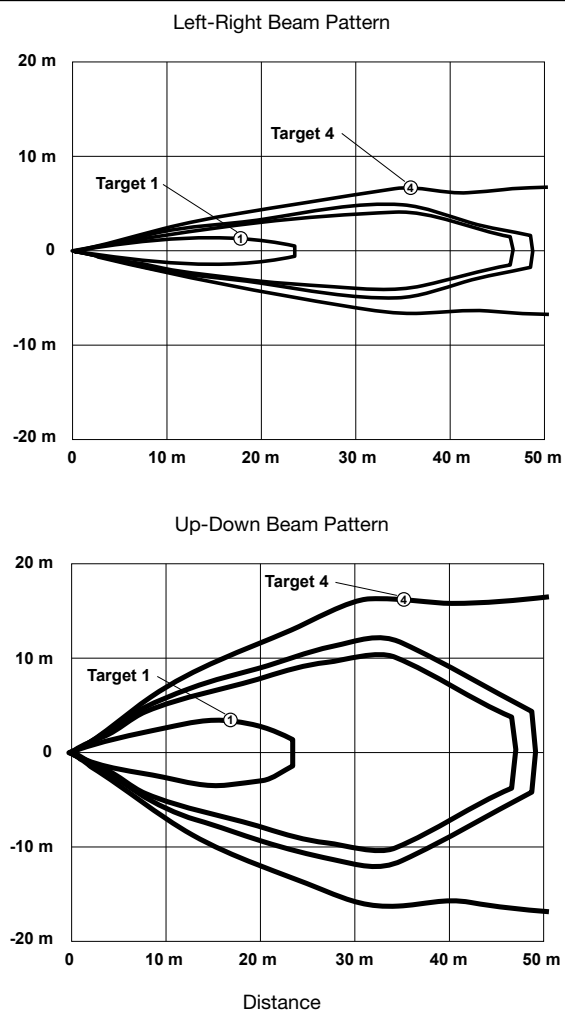
<sup>1</sup> Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries.

## Model -2450

Typical Beam Pattern (with BRTR-CC20E Radar Target, Radar Cross Section = 50 m<sup>2</sup>)

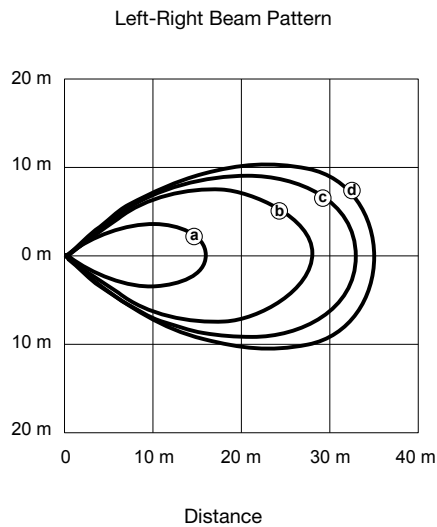
Beam Pattern	Signal Strength Threshold
a	7.50
b	6.50
c	5.00
d	2.00
e	1.50
f	1.25
g	1.13
h	1.00

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



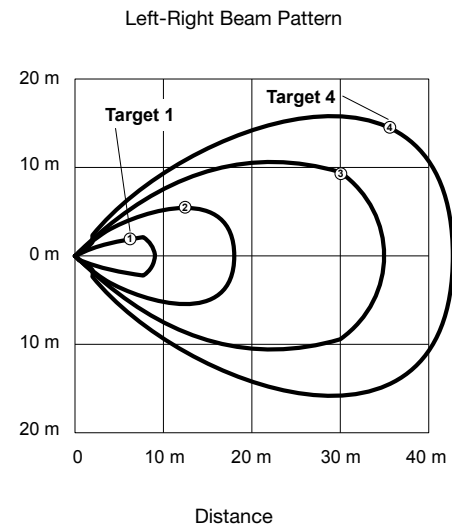
- 1: Weak Object (Radar cross section = 0.25 m<sup>2</sup>)  
 2: Car (Radar cross section = 3 m<sup>2</sup>)  
 3: Large Truck (Radar cross section = 50 m<sup>2</sup>)  
 4: Passenger Train (Radar cross section = 300 m<sup>2</sup>)

## Model -9076

Typical Beam Pattern (with BRTR-CC20E Radar Target, Radar Cross Section = 50 m<sup>2</sup>)

Beam Pattern	Signal Strength Threshold
a	4.50
b	1.75
c	1.25
d	1.00

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



- 1: Weak Object (Radar cross section = 0.25 m<sup>2</sup>)  
 2: Car (Radar cross section = 3 m<sup>2</sup>)  
 3: Large Truck (Radar cross section = 50 m<sup>2</sup>)  
 4: Passenger Train (Radar cross section = 300 m<sup>2</sup>)

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