

Quick Start Guide

Radar-based sensors for detecting and measuring moving and stationary targets

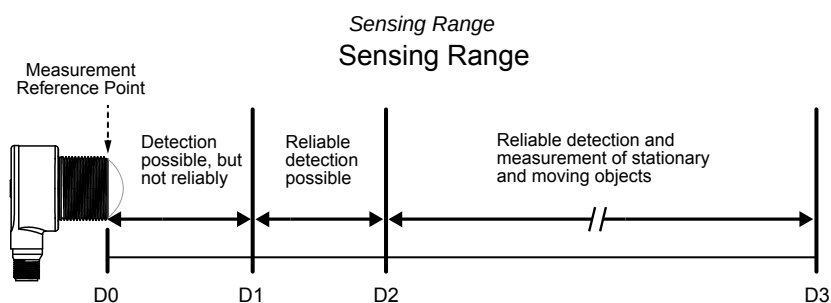
This guide is designed to help you set up and install the R-GAGE T30R sensor. For complete information on programming, performance, troubleshooting, dimensions, and accessories, please refer to the Instruction Manual at www.bannerengineering.com. Search for part number 217048 to view the Instruction 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.

T30R Overview



Model	D0 (m)	D1 (m)	D2 (m)	D3 (m)
T30R-1515 Models	0	0.15	0.20	15
T30R-1515-C Models	0	0.10	0.10	6
T30R-1515-L Models	0	0.15	0.20	25
T30R-4545 Models	0	0.30	0.30	10

T30R Features and Indicators



	LED	Color	Description
1	Power	Green	Power ON
2	Signal Strength	Red	Flashes in proportion to the signal strength
3	Output 1	Amber	Target is within the taught analog span or discrete output status
4	Output 2	Amber	Discrete output status
5	NO/NC	Amber	Normally open/normally closed status of discrete output. Dual discrete models have two LEDs.
6	n/a	n/a	Output Teach buttons



Installation Instructions

Install the Software

Operating System

Microsoft® Windows® operating system version 10 or 11⁽¹⁾

Hard Drive Space

500 MB

⁽¹⁾ Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries.

Third-Party Software

.NET

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.
6. See the Instruction Manual for instructions on using the Banner Radar Configuration software.

Mount the Device Using the Threaded Barrel

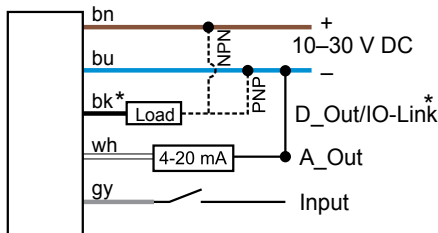
1. If your device came with a lock washer, place the lock washer on the barrel of the device.
2. Insert the barrel of the device through a hole or a bracket.
 - If desired and available, insert the device through an appropriately sized hole in the machine or equipment at the desired location.
 - If a bracket is needed, insert the device into the bracket.
3. Thread the mounting nut onto the barrel of the device, finger tight.
4. If using a bracket, mount the device and the bracket to the machine or equipment at the desired location. Do not tighten the mounting screws at this time.
5. Check the device alignment, aiming it near parallel to, or down towards, the ground.

If aiming at a target, alignment and signal strength can be checked via the red Signal Strength LED or the Banner Radar Configuration Software.
6. Tighten the nut.
7. If using a bracket, tighten the mounting screws to secure the device and the bracket in the aligned position.

T30R Wiring

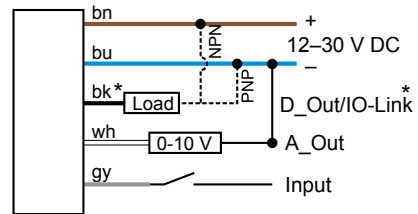
Quick disconnect wiring diagrams are functionally identical.

Push-pull Output and Analog Current Output



* Push-Pull output. User-configurable PNP/NPN setting.

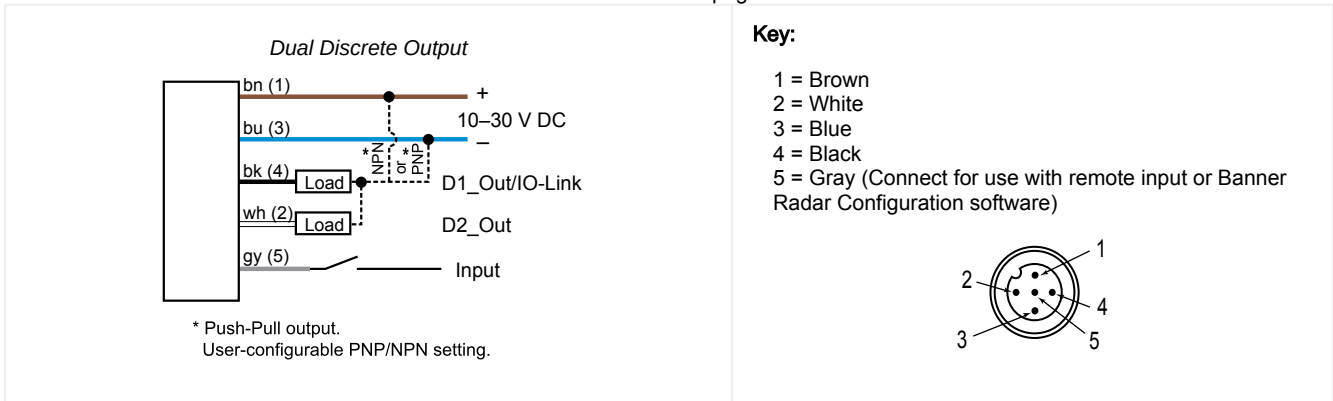
Push-pull Output and Analog Voltage Output



* Push-Pull output. User-configurable PNP/NPN setting.

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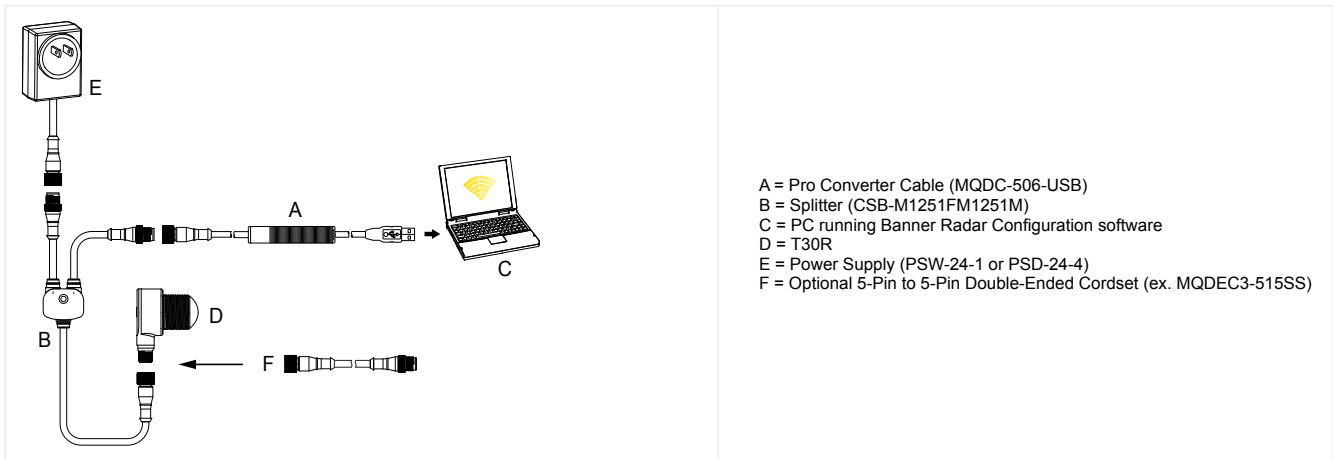
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Getting Started

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

Connect to the Sensor



1. Connect the sensor to the splitter cable from the PRO-KIT.
2. Connect the external power and Pro Converter cable to the splitter cable.
3. Connect the Pro Converter cable to the PC.
4. Open the Banner Radar Configuration Software.
5. Go to **Sensor > Connect** on the **Navigation** toolbar. The **Connection** screen displays.
6. Select the correct **Sensor Model** and **Com Port** for the sensor.
7. Click **Connect**. The **Connection** screen closes and the sensor data displays.

T30R Specifications

Range

The sensor can detect an object at the following ranges, depending on the material of the target:

T30R-1515 models:

Detection Range: 0.15 m to 15 m (0.5 ft to 49.2 ft)
 Measurement Range: 0.2 m to 15 m (0.7 ft to 49.2 ft)

T30R-1515-C models:

Detection Range: 0.1 m to 6 m (0.33 ft to 19.7 ft)
 Measurement Range: 0.1 m to 6 m (0.33 ft to 19.7 ft)

T30R-1515-L models:

Detection Range: 0.15 m to 25 m (0.5 ft to 82 ft)
 Measurement Range: 0.2 m to 25 m (0.7 ft to 82 ft)

T30R-4545 models:

Detection Range: 0.3 m to 10 m (1.0 ft to 32.8 ft)
 Measurement Range: 0.3 m to 10 m (1.0 ft to 32.8 ft)

Operating Principle

Frequency modulated continuous-wave (FMCW) radar

Operating Frequency

122 GHz

Frequency Range

T30R-1515 and T30R-4545: 122 GHz to 123 GHz
 T30R-1515-C: 120.5 GHz to 123 GHz

Supply Voltage (Vcc)

Analog Voltage models: 12 V DC to 30 V DC

Analog Current and Dual Discrete models: 10 V DC to 30 V DC

Use only with a suitable Class 2 power supply (UL) or Limited Power Supply (CE)

Power and Current Consumption, exclusive of load

Power consumption: < 2.4 W

Current consumption: < 100 mA at 24 V DC

Delay at Power-up

< 300 ms

Supply Protection Circuitry

Protected against reverse polarity and transient overvoltages

Linearity⁽¹⁾

T30R-1515 and T30R-4545

<± 20 mm at < 500 mm

<± 4 mm at > 500 mm

T30R-1515-C: < ± 4 mm

Maximum Torque

2.3 N·m (20 in-lbs)

Repeatability⁽²⁾

< 1 mm

Maximum Output Power

EIRP: 100 mW, 20 dBm

Output Protection

Protected against output short-circuit

Remote Input

Allowable Input Voltage Range: 0 to Vsupply

Active High (internal weak pull-down): High state > (Vsupply - 2.25 V) at 2 mA maximum

Active Low (internal weak pull-up): Low state < 2.25 V at 2 mA maximum

Response Time

Analog update rate: 2 ms

Discrete output response: 6 ms

Speeds given for fast mode. See the Instruction Manual for additional details.

Indicators

Power LED: Green, power on

Signal Strength LED:

Red Flash: weak signal

Red Solid: 4× threshold

Output LEDs: Amber, target within taught analog span/ discrete output status

NO/NC LED: Amber, normally open/normally closed status of discrete output

See "[T30R Features](#)" on page 1

Construction

Housing: PBT

Window: COP

⁽¹⁾ Reference target with RCS = 1m².

⁽²⁾ Repeatability < 10 mm at Excess Gain < 10×.

Output Configuration

Analog Outputs:

•Current models

Discrete Output (Black Wire): IO-Link, push/pull output, configurable PNP or NPN output

Analog output (White Wire): 4 mA to 20 mA

•Voltage models

Discrete Output (Black Wire): IO-Link, push/pull output, configurable PNP or NPN output

Analog output (White Wire): Configurable 0 V to 10 V or 0.5 V to 4.5 V

•Dual Discrete models

Discrete Output 1 (Black Wire): IO-Link, push/pull output, configurable PNP or NPN output

Discrete Output 2 (White Wire): Configurable PNP or NPN, or Pulse Frequency Modulated (PFM) output

Advanced Capabilities



Available only in dual discrete models

Connections

Integral M12 quick disconnect (as listed in the models table) or 150 mm (6 in) PUR-jacketed cable with an M12 quick disconnect

Models with a quick disconnect require a mating cordset

Vibration and Mechanical Shock

All models meet MIL-STD-202F, Method 201A (Vibration: 10 Hz to 60 Hz maximum, 0.06 inch (1.52 mm) double amplitude, 10G acceleration) requirements. Method 213B conditions H&I.Shock: 75G with device operating; 100G for non-operation

Operating Temperature

-40 °C to +65 °C (-40 °F to +149 °F)

Temperature Effect

< ± 10 mm from -40 °C to +65 °C (-40 °F to +149 °F)

Environmental Rating

IP67

Output Ratings

Analog Outputs:

- **Current Output (T30R....-I.. models):** 1 kΩ maximum load resistance at 24 V; maximum load resistance = $[(V_{cc} - 4.5)/0.02 \Omega]$
- **Voltage Output (T30R....-U.. models):** 2.5 kΩ minimum load resistance

Discrete Outputs:

- **Current rating = 50 mA maximum each**

Black wire specifications per configuration		
IO-Link Push/Pull	Output High	$\geq V_{supply} - 2.5 V$
	Output Low	$\leq 2.5V$
PNP	Output High	$\geq V_{supply} - 2.5 V$

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Black wire specifications per configuration		
NPN	Output Low	$\leq 1V$ (loads $\leq 1 \text{ Meg}\Omega$)
	Output High	$\geq V_{supply} - 2.5 V$
	Output Low	$\leq 2.5 V$

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

Certifications

Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM



Turck Banner LTD Blenheim House
Blenheim Court
Wickford, Essex SS11 8YT
GREAT BRITAIN



IND. CONT. EQ.
E224071

UL Environmental Rating: Type 1

ETSI EN 305 550-1 V.1.2.1

ETSI EN 305 550-2 V.1.2.1

FCC Part 15, §15.258

FCC ID: UE3-T30R

IC ID: 7044A-T30R

for others, contact Banner Engineering

Country of Origin: USA

Operation of the T30R sensor on board an aircraft or a satellite shall be prohibited.

FCC Part 15 Class A for Intentional Radiators

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Industry Canada Statement for Intentional Radiators

This device contains licence-exempt transmitters(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient des émetteurs/récepteurs exemptés de licence conformes à la norme Innovation, Sciences, et Développement économique Canada. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage.
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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