R-GAGE® T30RW Sensor

Quick Start Guide

IP69K rated radar sensors designed for use in car washes and other harsh environments

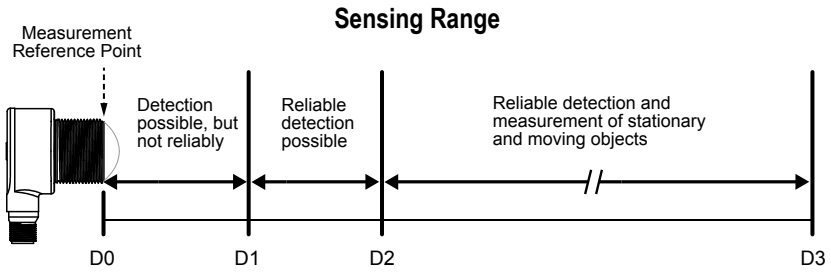
This guide is designed to help you set up and install the R-GAGE T30RW sensor. For complete information on programming, performance, troubleshooting, dimensions, and accessories, please refer to the Instruction Manual at www.bannerengineering.com. Search for p/n 232729 to view the Instruction Manual. 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.

Overview

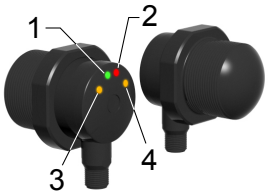
Figure 1. Sensing Range



Model	D0 (m)	D1 (m)	D2 (m)	D3 (m)
T30RW-1515 Models	0	0.15	0.20	15

Features and Indicators

Figure 2. T30RW Features



	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

Installation Instructions

Install the Software

Operating System
Microsoft® Windows® operating system version 10 [1]

Hard Drive Space
500 MB

Third-Party Software
.NET

USB Port
Available USB port

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

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

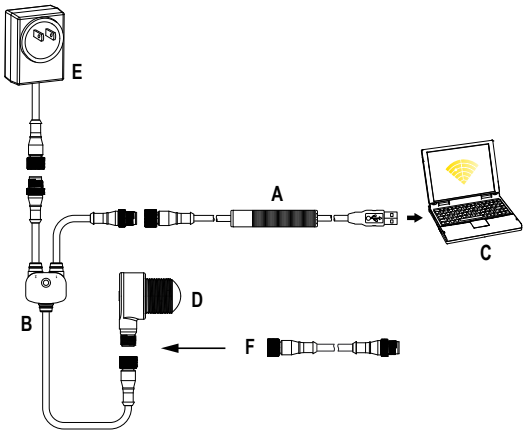
1. Download the latest version of the software from www.bannerengineering.com/us/en/products/sensors/software/radar-configuration.html.
2. Navigate to and open the downloaded file.
3. Click **Install** to begin the installation process.
4. Depending on your system settings, a popup window may appear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

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 though 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.

Connect to the Sensor

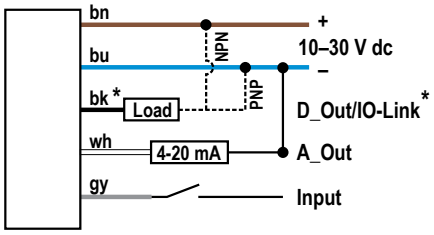


A = Pro Converter Cable (MQDC-506-USB)
B = Splitter (CSB-M1251FM1251M)
C = PC running Banner Radar Configuration software
D = T30RW
E = Power Supply (PSW-24-1 or PSD-24-4)
F = Optional 5-Pin to 5-Pin Double-Ended Cordset (ex. MQDEC3-515SS)

Wiring

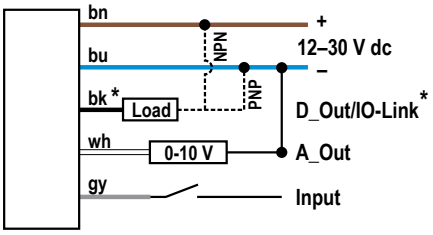
Quick disconnect wiring diagrams are functionally identical.

Push-pull Output and Analog Current Output



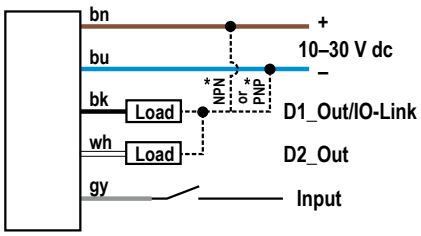
* Push-Pull output. User-configurable PNP/NPN setting.

Push-pull Output and Analog Voltage Output



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

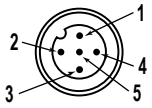
Dual Discrete Output



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

Key:

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray (Connect for use with remote input or Banner Radar Configuration software)



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.

Specifications

Range
The sensor can detect an object at the following ranges, depending on the material of the target:
T30RW-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)

Operating Principle
Frequency modulated continuous-wave (FMCW) radar

Operating Frequency
122 GHz

Frequency Range
T30RW-1515: 122 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

Supply Protection Circuitry
Protected against reverse polarity and transient overvoltages

Linearity [2]
T30RW-1515:
<± 20 mm at < 500 mm
<± 4 mm at > 500 mm

Delay at Power-up
< 300 ms

Maximum Torque
2.3 N·m (20 in-lbs)

Repeatability [3]
< 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

Construction
Housing: PBT
Barrel Cover: Polypropylene

[2] Reference target with RCS = 1m².
[3] 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

Connections

Integral 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 per IEC60529

IEC IP69K per BS/ISO 20653:2013

Output Ratings

Analog Outputs:

· **Current Output (T30R….-.I.. models):** 1 kΩ maximum load resistance at 24 V; maximum load resistance = [(Vcc - 4.5)/0.02 Ω]

· **Voltage Output (T30R….-.U.. models):** 2.5 kΩminimum load resistance

Discrete Outputs:

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

Black wire specifications per configuration		
IO-Link Push/Pull	Output High	≥ Vsupply - 2.5 V
	Output Low	≤ 2.5V
PNP	Output High	≥ Vsupply - 2.5 V
	Output Low	≤ 1V (loads ≤ 1 MegΩ)
NPN	Output High	≥ Vsupply - 2.5 V
	Output Low	≤ 2.5 V

White wire specifications per configuration		
PNP	Output High	≥ Vsupply - 2.5 V
	Output Low	≤ 2.5 V (loads ≤ 70 kΩ)
NPN	Output High	≥ Vsupply - 2.5 V
	Output Low	≤ 2.5 V

Certifications

IND. CONT. EQ. E224071 LISTED

UL Environmental Rating: Type 1

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

ETSI EN 305 550-1 V.1.2.1

ETSI EN 305 550-2 V.1.2.1

FCC/CFR-47 part 18; This device complies with part 18 of the FCC Rules.

for others, contact Banner Engineering

Country of Origin: USA

Advanced Capabilities

PULSE® PRO I/O

Available only in dual discrete models

Banner Engineering Corp. Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

THIS LIMITED WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED (INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE), AND WHETHER ARISING UNDER COURSE OF PERFORMANCE, COURSE OF DEALING OR TRADE USAGE.

This Warranty is exclusive and limited to repair or, at the discretion of Banner Engineering Corp., replacement. **IN NO EVENT SHALL BANNER ENGINEERING CORP. BE LIABLE TO BUYER OR ANY OTHER PERSON OR ENTITY FOR ANY EXTRA COSTS, EXPENSES, LOSSES, LOSS OF PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM ANY PRODUCT DEFECT OR FROM THE USE OR INABILITY TO USE THE PRODUCT, WHETHER ARISING IN CONTRACT OR WARRANTY, STATUTE, TORT, STRICT LIABILITY, NEGLIGENCE, OR OTHERWISE.**

Banner Engineering Corp. reserves the right to change, modify or improve the design of the product without assuming any obligations or liabilities relating to any product previously manufactured by Banner Engineering Corp. Any misuse, abuse, or improper application or installation of this product or use of the product for personal protection applications when the product is identified as not intended for such purposes will void the product warranty. Any modifications to this product without prior express approval by Banner Engineering Corp will void the product warranties. All specifications published in this document are subject to change; Banner reserves the right to modify product specifications or update documentation at any time. Specifications and product information in English supersede that which is provided in any other language. For the most recent version of any documentation, refer to: www.bannerengineering.com.

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

Banner Engineering Corp. Software Copyright Notice

https://www.bannerengineering.com/us/en/company/terms-and-conditions.html

Disclaimer of Warranties. This software is provided "AS-IS." To the maximum extent permitted by applicable law, Banner, it affiliates, and its channel partners disclaim all warranties, expressed or implied, including any warranty that the software is fit for a particular purpose, title, merchantability, data loss, non-interference with or non-infringement of any intellectual property rights, or the accuracy, reliability, quality or content in or linked to the services. Banner and its affiliates and channel partners do not warrant that the services are secure, free from bugs, viruses, interruption, errors, theft or destruction. If the exclusions for implied warranties do not apply to you, any implied warranties are limited to 60 days from the date of first use of this software.

Limitation of Liability and Indemnity. Banner, its affiliates and channel partners are not liable for indirect, special, incidental, punitive or consequential damages, damages relating to corruption, security, loss or theft of data, viruses, spyware, loss of business, revenue, profits, or investment, or use of software or hardware that does not meet Banner minimum systems requirements. The above limitations apply even if Banner and its affiliates and channel partners have been advised of the possibility of such damages. This Agreement sets forth the entire liability of Banner, its affiliates and your exclusive remedy with respect to the software use.