

42KD Miniature Sensor Installation Instructions

Original instructions in English



Allen-Bradley

IMPORTANT SAVE THESE INSTRUCTIONS FOR FUTURE USE.

Description

The 42KD Miniature sensor provides a solution for applications in very small confined spaces. The 42KD sensor is the smallest sensor in the Photoelectric sensor portfolio. It offers various sensing modes, sensing distances, auto PNP/NPN, push button/remote teach, and push button lock options. Although miniature in size the features and performance on this sensor are reliable and competitive.

The 42KD is available in visible red LED models in polarized retroreflective and fixed/adjustable background suppression sensing modes. The teach button simplifies the setup process and even provides the option to remote teach the sensor. The sensor also has the option of light operate (L.O.) or dark operate (D.O.). All 42KD sensors have a unique "auto PNP/NPN" output which reduces stocking cost and simplifies selection, installation, and maintenance.

The 42KD is an excellent solution to a broad range of applications including industries such as automotive, packaging, and material handling. These features make the 42KD sensor easy to apply in challenging applications, especially where space is a limitation.

Features

- Smallest sensor in the Rockwell Automation portfolio
- Auto NPN/PNP output
- Easy setup of switch points using teach button
- External teach capability
- IP67 enclosure
- Self-contained sensor
- Mounting accessory included with product

Specifications

Certifications	CE Marked for all applicable directives
Enclosure Type Rating	IP67
Operating Temperature [C(F)]	-20...+50° (-4...+122°)
Storage Temperature [C(F)]	-20...+80° (-4...+176°)
Vibration	10...55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2
Shock	30 g with 11 ms pulse duration, meets or exceeds IEC 60947-5-2

Optical

Indicator LEDs	Green: Operating voltage on; Yellow: Object detected/switching output active
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Electrical

Operating Voltage	10...30V DC
No Load Supply Current	LED models: ≤30 mA
Protection Type	Short circuit and reverse polarity

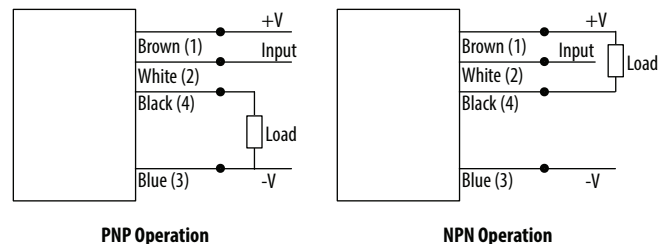
Outputs

Response Time	500 μs
Output Type	Auto PNP/NPN
Output Function	Complimentary light and dark operate via push button and remote teach fixed background suppression models; Complimentary light and dark operate via remote teach
Output Current	≤50 mA
Switching Frequency	1000 Hz

Mechanical

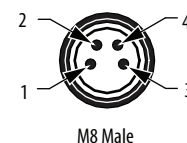
Housing Material	PUR
Lens Material	PMMA

Wiring Diagrams

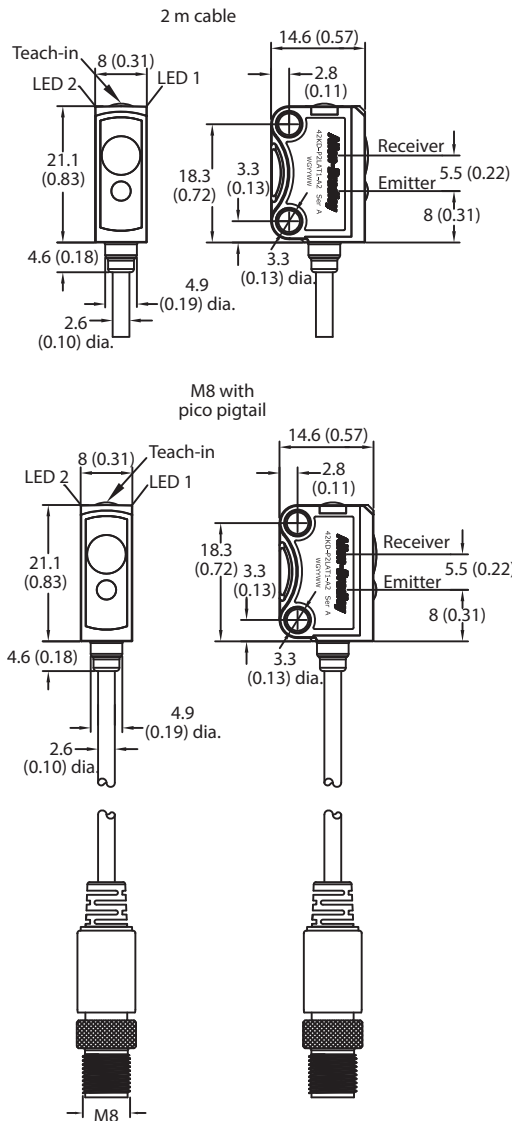


Pinouts

The quick-disconnect is shown below. The pin numbers correspond to male connectors on the sensor.



Dimensions [mm (in.)]



Teach Interface

Default Settings:

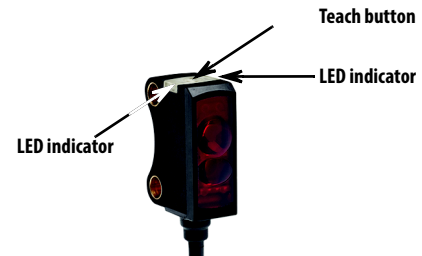
The factory default settings are as follows:

Sensing Range: Maximum Setting

Output Type: Auto PNP/NPN. In Auto PNP/NPN mode, the sensor continuously monitors the load connection and automatically configures the output to PNP or NPN.

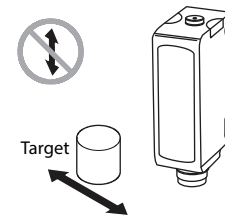
Sensor User Interface

Familiarize yourself with the LED indicators.



Mounting the Sensor

Securely mount the sensor on a firm, stable surface or support. An application subject to excessive vibration or shifting may cause intermittent operation. For installation convenience, Rockwell Automation offers a wide range of mounting brackets (see Accessories section for more detail).



Note: Due to the detection method, targets travelling horizontally to the sensor's optics are detected. Targets travelling vertically may not be accurately detected. For reliable background suppression, a minimum separation distance is recommended between the target and the background.

42KD Miniature Sensor Configuration

Polarized Retroreflective and Adjustable Background Suppression

The 42KD is configured using the push button or Remote Teach, and the LED indicators on the sensor. Four features can be configured:

- Standard or precision teach for sensitivity/sensing range
- Light operate (LO) or dark operate (DO) output
- Auto PNP/NPN, dedicated NPN or dedicated PNP
- Push button lock/unlock

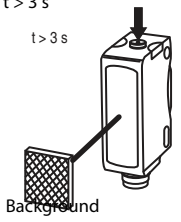
The sensor output is disabled during Teach.

Teach Sensitivity/Sensing Range

The default setting is the maximum sensitivity/range.

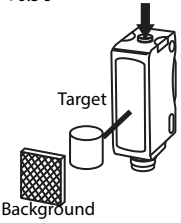
Teaching the sensitivity/sensing range is a two-step process: teach the background (first condition) and teach "target" (second condition). Switching threshold for output ON vs. OFF is set in between the two conditions.

Standard Teach:**1. To teach the background (first condition):**

<p>$t > 3 \text{ s}$</p> <p>$t > 3 \text{ s}$</p> 	<p>Align the sensor to the background. Press and hold button for three seconds until yellow LED starts flashing. Release the button. The first condition has now been taught.</p>
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2. Teach "target" (second condition):**IMPORTANT**

In the case of multiple reflectivity targets, choose the darkest/least reflective target placed in its farthest position for set up.

<p>$t < 0.5 \text{ s}$</p> 	<p>Insert the target between the sensor and the background. Press and release the button. The teach process is complete.</p> <p>If the push button is not pressed within 30 seconds, the sensor exits teach mode and returns to RUN mode without learning the new setting.</p>
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If there's no background surface in the field of view in Step 1, the switching threshold will be set between the distance to the target and the maximum sensing range. **The sensor can also be taught by teaching the target as the first condition and background as the second condition.**

Precision Teach: For a more precise setting with a smaller hysteresis, teach the sensor to the target in step 1 and keep the target present in step 2).

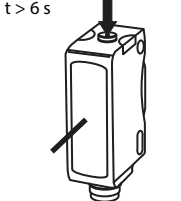
Restore to factory default setting of maximum range: Perform steps 1 and 2 with "no target" in the sensor's field of view and nothing in the background.

Teach Light Operate (L.O.) or Dark Operate (D.O.)

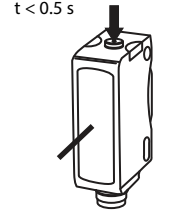
The default setting of the output is dark operate (D.O.)

L.O. setting means that output turns ON when the target is detected. If the application requires the output to turn OFF when the target is detected, the setting may be changed to dark operate (D.O.).

1. To access the teach output mode setting:

<p>$t > 6 \text{ s}$</p> 	<p>Press and hold button for six seconds until the green LED starts flashing. Release the button. The current setting is indicated by the yellow LED: L.O.: Yellow LED ON D.O.: Yellow LED OFF</p>
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2. To change the sensor output mode setting:

<p>$t < 0.5 \text{ s}$</p> 	<p>Press and release the button within ten seconds to toggle from L.O. to D.O., the selection indicated by the yellow LED.</p> <p>The sensor retains the setting per the last button depression and returns to the RUN mode ten seconds after the last button is depressed.</p>
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Output Type Selection: Auto PNP/NPN, Dedicated NPN, Dedicated PNP

The default setting is Auto PNP/NPN. The sensor monitors the load connection and automatically configures for proper operation, i.e. PNP or NPN. If no load is connected, the sensor defaults to PNP. The following applications are covered with dedicated PNP or dedicated NPN selection:

- Parallel wiring of multiple sensor outputs: select dedicated PNP or dedicated NPN setting, as needed.
- If the load is connected for NPN configuration but to a power supply other than that to the sensor or via a load enabling contact (e.g. a relay contact in series with the load), select dedicated NPN.

Selection can be made as follows:

- To access output type:** Press and hold the push button for nine seconds (until both LEDs start flashing synchronously). Upon button release, the current setting of output type is indicated by the slow flashing of the LED(s) as follows:
 - Auto PNP/NPN: both LEDs flashing
 - Dedicated NPN: green LED flashing
 - Dedicated PNP: yellow LED flashing
- To change output type:** Press and release the push button within 10 seconds to select desired type. Each button activation cycles to the next output setting. The type selected is indicated by the LEDs. The sensor retains the setting per the last button depression and returns to the RUN mode 10 seconds after the last button is pressed.

Push Button Lock/Unlock

The push button or remote teach (RT) can be used to prevent unauthorized users from changing teach settings.

To lock the push button: press and release the button three times within three seconds. Both LEDs flash synchronously for three seconds indicating that the push button is now locked.

To unlock the push button: press and release the button three times within three seconds. Both LEDs flash asynchronously for three seconds indicating that the push button is now unlocked.

Permanent Lock: The push button may be permanently locked by connecting the white wire (pin 2) to -V.

Remote Teach (RT)

The sensor can be taught remotely via the white wire (pin 2). Connection to +V acts the same as the button being pressed and no connection is the same as the button not being pressed. The sensor can be taught by following the same teach/timing sequence as used in the push button teach (e.g., connect to the +V for more than three seconds to teach the "target," disconnect from the +V; remove the

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target and connect to the +V for less than one second to teach the “no target” condition. All push button functions can also be carried out via RT.

42KD Miniature Sensor with Fixed Range Background Suppression—Visible Red Emitter Models

Understanding How the Sensor Operates

Familiarize yourself with the LED indicators. This sensor does not have a teach button since it is a fixed range sensor.

The sensor is available in 15 mm (0.59 in.), 30 mm (1.18 in.), and 50 mm (1.97 in.) dependent on the catalog number.

Select L.O/D.O.

Connect white wire (pin 2) to “-” for light operate.

Connect white wire (pin 2) to “+” for dark operate.

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Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

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