

Object detection and collision avoidance

RAD51C

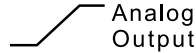
Analog + 3 switching outputs



Simple. Robust. Flexible.

The compact RAD51C radar sensor is suitable for the tightest installation situations and the harshest environmental conditions. With an opening angle of $\pm 8^\circ$ (16°), the sensor offers maximum reliability for object detection.

Thanks to a measuring rate of 100 Hz and measuring ranges between 0.15 m ... 20 m or 0.3 ... 30 m, countless applications can be realized with the latest radar technology. Simple tools not only help with implementation, but also create transparency during operation.



Features and benefits

- **Wide measuring range**
 - Measuring range 0.15 m to 20 m or 0.30 m to 30 m
 - Small blind area of only 0.15 or 0.3 m
- **Fast and precise**
 - Measurement rate up to 100 Hz
 - Repeatability up to ± 2 mm
- **Wide range of applications for collision avoidance, obstacle detection, object detection and positioning**
 - Wide opening angle $\pm 8^\circ$ (16°) for reliable object detection
 - Different data output options: In addition to the analog output of 4 ... 20 mA, 3 switching outputs are available for a wide range of applications.
 - For flexible and reliable monitoring of safety areas, up to 4 sensor zones can be set via the switching outputs
- **Compact and easy to install**
 - 92,65 mm total length incl. M12 connector
 - Standardized mounting due to M30 mounting thread
 - Matching mounting accessories for easy mounting and alignment on the application
- **Maximum robustness**
 - Latest radar technology for reliable measurement even under the most adverse environmental conditions such as dust, fog, rain, smoke, wind or unfavorable light conditions.
- **Simple commissioning and setting of parameters**
 - Connection of the radar sensor to the PC using a configuration box (ConfigBox). Communication via the RS485 interface
 - "See what the sensor sees" through real-time visualization of the echo curve using appropriate software tools. This also enables simple and intuitive commissioning, as the measurement can be tracked live during installation.
 - Numerous setting options, such as setting the measuring range, setting switching points, filters or other features, to customize the sensor system to the respective application requirements.

Order code

RAD51C . XXX . 11111 . 1118

Type

a



Opening angle : $\pm 8^\circ$ (16°)
 Linearity : up to ± 10 mm
 Interface : 4 ... 20 mA + 3 x switching output PNP/NPN
 RS485 as communication interface


a Measuring range
 020 = 0.15 m ... 20 m
 030 = 0.30 m ... 30 m


Stock types
 RAD51C.020.11111.1118
 RAD51C.030.11111.1118

Object detection and collision avoidance	RAD51C	Analog + 3 switching outputs
---	---------------	-------------------------------------

Accessories	Order no.
-------------	-----------

M30 - Mounting bracket	<p>For easy mounting and correct alignment of the RAD5x sensors on the measurement object.</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Material: galvanized steel 1.4301</p> <p>Weight: 81 g</p> <p>Dimensions: 60 x 55 x 42 mm</p> </div> <div style="width: 45%;"> <p>for vertical adjustment ±30°</p> </div> </div>	8.0000.7000.0083 ¹⁾
	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Material: galvanized steel 1.4301</p> <p>Weight: 223 g</p> <p>Dimensions: 70 x 65 x 65 mm</p> </div> <div style="width: 45%;"> <p>for vertical adjustment ±30° and horizontal adjustment ±15°</p> </div> </div>	8.0000.7000.0084 ¹⁾
		

Corner Cube	<ul style="list-style-type: none"> Increasing the signal strength received from a target. Increasing the possible angle between sensor and target. Increasing the measurement accuracy by increasing the signal strength. 	
	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Material: 1.401</p> <p>Weight: 120 g</p> <p>Dimensions: 104 x 82 x 91 mm</p> </div> <div style="width: 45%;"> <p>side length 100 mm</p> </div> </div>	8.0000.7000.0081 ¹⁾
	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Material: 1.401</p> <p>Weight: 690 g</p> <p>Dimensions: 254 x 170 x 221 mm</p> </div> <div style="width: 45%;"> <p>side length 250 mm</p> </div> </div>	8.0000.7000.0082 ¹⁾

Configuration box	<p>For transferring the sensor data to a PC/laptop</p> <p>Scope of delivery:</p> <ul style="list-style-type: none"> - Configuration box „ConfigBox“ - Connection cable M12, 8-pin with plug and socket - Connection element - LAN cable for connection to the PC - Power connection 	8.0010.9000.0023 ¹⁾
		

Cables and connectors	Order no.
-----------------------	-----------

Preassembled cables	<p>M12 female connector with coupling nut, 8-pin, A coded, straight single ended 2 m [6.56'] PVC cable</p>	05.00.6041.8211.002M
	<p>M12 female connector with coupling nut, 8-pin, A coded, straight single ended 2 m [6.56'] PUR cable</p>	05.00.6051.8211.002M

Connectors	<p>M12 female connector with coupling nut, 8-pin, A coded, straight (metal)</p>	05.CMB 8181-0
-------------------	---	----------------------

Further Kübler accessories can be found at: kuebler.com/accessories
 Further Kübler cables and connectors can be found at: kuebler.com/connection-technology

1) Stock types.

Radar sensors

Object detection and collision avoidance	RAD51C	Analog + 3 switching outputs
---	---------------	-------------------------------------

Technical data

General data	
Radar frequency (FMCW)	122.25 - 123 GHz
Radiation power	EIRP < 100 mW
MTTF	> 125 years
Measuring range	0.15 m ... 20 m 0.30 m ... 30 m
Opening angle	±8° (16°)
Measurement rate	100 Hz 300 Hz on request
Linearity	up to ±10 mm
Repeatability	±2 mm

Electrical characteristics	
Power supply	12 ... 30 V DC
Current consumption	80 mA (at 24 V DC)
Power consumption	2.4 W
Reverse polarity protection	yes
Communication	RS485 (half-duplex mode)
Analog output	4 ... 20 mA
Switching outputs	3 x PNP/NPN

Mechanical characteristics		
Material	housing	stainless steel 1.4404
	lens	PTFE
Weight		205 g (170 g sensor / 35 g M30 nuts)
Protection acc. to EN 60529		IP67 / IP69k
Working temperature range		-40 °C ... +70 °C [-40 °F ... +158 °F]
Storage temperature range		-40 °C ... +85 °C [-40 °F ... +185 °F]
Shock resistance (EN 60068-2-27)		100 g; 11 ms
Electrical connection		M12 connector, 8-pin, A-coded
Dimensions		l = 92,65 mm [3.65"] ø = 30 mm [1.18"]

Approvals		
CE compliant in accordance with		
	EMC Directive	2014/30/EU
	RoHS Directive	2011/65/EU

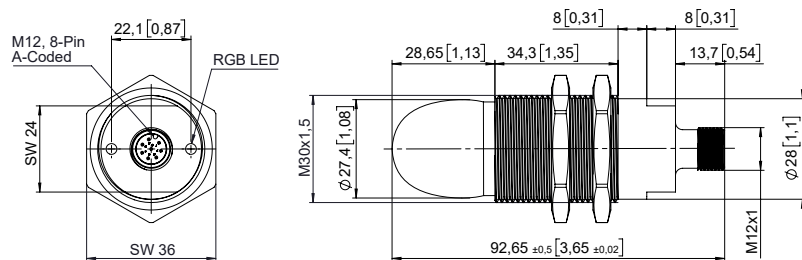
Terminal assignment

Function	M12 connector, 8-pin, A-coded										
Power supply	Signal:	A	+V	CL	OUT 2	OUT 1	B	0 V	OUT 3	⊥	
Analog output	Pin:	1	2	3	4	5	6	7	8	PH	
Switching outputs											

- +V: supply voltage sensor +V DC
- 0 V: Ground sensor GND (0V)
- A, B: RS485 Communication
- CL: analog output (4 ... 20 mA)
- OUT 1, 2, 3: switching outputs
- PH ⊥: connector housing (Shield)

Dimensions

Dimensions in mm [inch]



Technology in detail

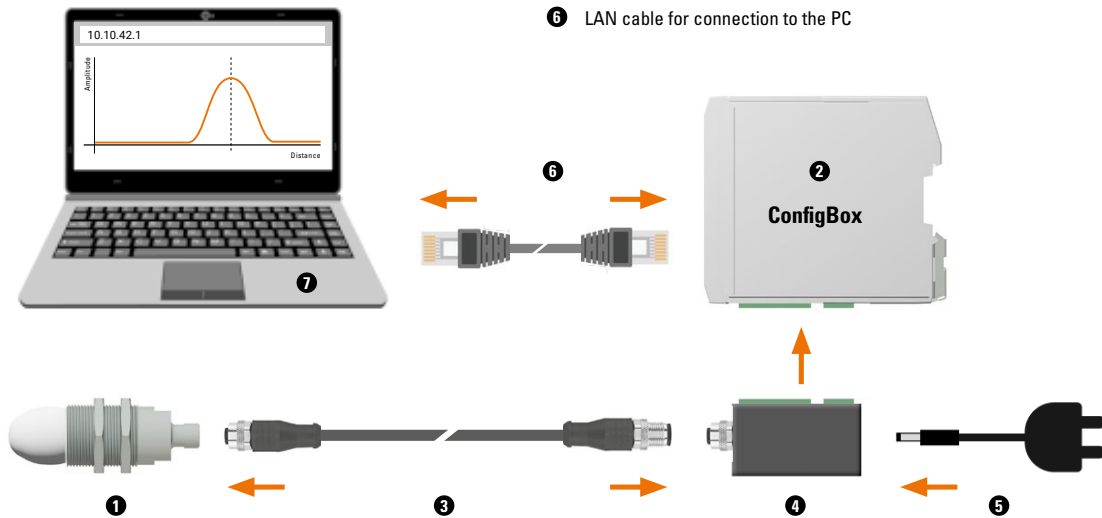
Individual setting options via the configuration box and configuration software

Connection

The radar sensor **1** is first connected to the PC **7** via the configuration box **2**.

All necessary connecting elements are included in the scope of delivery of the configuration box **2**:

- 3** M12 connecting cable, 8-pin with male and female contacts
- 4** Connection module
- 5** Power connection
- 6** LAN cable for connection to the PC



Commissioning / diagnosis

After connection, as shown above, the configuration software is opened via the browser - URL = 10.10.42.1 (no "www").

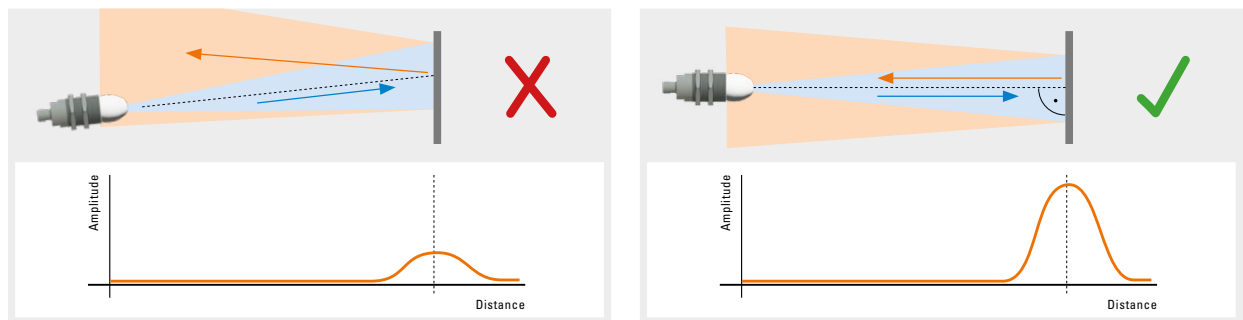
The software can be used to configure the sensor to the respective application requirements or to check its status during operation.

In addition to the visualization of the echo curve (radar signal), the following settings can be configured, for example:

- Configuration of the analog interface
- Setting the switching points for the switching outputs
- Setting the measuring range
- Setting the signal threshold value
- Selecting the desired signal for multiple peaks
- and much more

Simple start-up and analysis

Optimal alignment of the sensor to the measurement object by visualizing the measurement result during installation



Radar sensors

Object detection and collision avoidance	RAD51C	Analog + 3 switching outputs
---	---------------	-------------------------------------

Technology in detail

