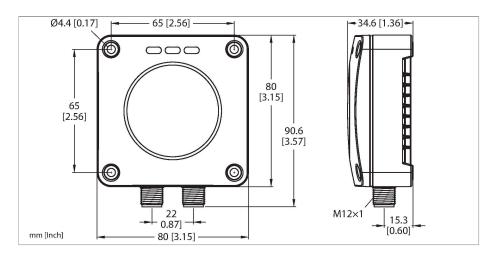


MR15-Q80-IOLCJ-H1141 Radar Sensor – Scanner for Object and Position Detection





Technical data

Туре	MR15-Q80-IOLCJ-H1141		
ID	100041054		
Radar data			
Function	Radar scanner		
Frequency range	60–64 GHz		
Range	35015000 mm		
Resolution	1 mm		
Minimum switching range	50 mm		
Linearity error	≤ ± 0.3 %		
Edge lengths of the nominal actuator	100 mm		
Output power ERP	10 dBm		
Output power EIRP	20 dBm		
Cone angle	120 °		
Repeatability	4 mm		
Electrical data			
Operating voltage U _B	933 VDC		
Residual ripple	< 10 % U _{ss}		
DC rated operating current I _e	≤ 250 mA		
No-load current	≤ 400 mA		
Short-circuit protection	yes/Cyclic		
Reverse polarity protection	yes		
Communication protocol	IO-Link SAE J1939		
Output function	NO/NC programmable, PNP/NPN		
Output 2	Switching output		
Voltage drop at I _e	≤ 2 V		
Switching frequency	≤ 10 Hz		

Features

■Blind zone: 35 cm

Range: 15 m

■ Distance accuracy: ± 2 mm

■Angular accuracy: ±5°

■3D sensing range: Adjustable max. 120°

■Information about distance, angle, and ob-

ject speed

Radius and zone evaluation

■ Data visualization via Turck Radar Monitor

Approved acc. to ETSI 305550-2

■ Approved acc. to FCC/CFR 47 Part 15.

■2 × M12 × 1, 1 × 4-pin, 1 × 5-pin

■ Operating voltage 9...33 VDC

■ Switching output switchable between PNP/

NPN

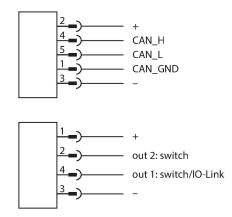
■IO-Link, SSP 4

■SAE J1939

Rectangular 80 × 80

■ Housing material PBT, AlSi10Mg

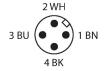
Wiring diagram





Technical data

Response time typical < 70 ms IO-Link IO-Link specification V 1.1 IO-Link port type Class A Communication mode COM 3 (230.4 kBaud) Process data width 128 bit Measured value information 17 bit Frame type 2.2 Minimum cycle time 3 ms Function pin 4 IO-Link Function Pin 2 DI Maximum cable length Profile support Mechanical data Design Rectangular, Q80 Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Electrical connection Connector, M12 x 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP69K Not assessed by UL Power-on indication LED, Green Switching state Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1 Approvals CCM 3 (230.4 kBaud) V1.1 IO-Link COM 3 (230.4 kBaud) V1.1 IO-Link Poit Battic COM 50 To Hill Com 70 To Hil	Readiness delay	≤ 300 ms		
O-Link specification	Response time typical	< 70 ms		
Colink port type	IO-Link			
Communication mode COM 3 (230.4 kBaud) Process data width 128 bit Measured value information 17 bit Frame type 2.2 Minimum cycle time 3 ms Function pin 4 IO-Link Function Pin 2 DI Maximum cable length 20 m Profile support Smart Sensor Profile Mechanical data Design Design Rectangular, Q80 Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Electrical connection Connector, M12 x 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP69K IP69 IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	IO-Link specification	V 1.1		
Process data width 128 bit Measured value information 128 bit Switchpoint information 17 bit Frame type 2.2 Minimum cycle time 3 ms Function pin 4 IO-Link Function Pin 2 DI Maximum cable length 20 m Profile support Smart Sensor Profile Mechanical data Design Design Rectangular, Q80 Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Die-cast aluminum alloy Electrical connection Connector, M12 x 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP69K Not assessed by UL LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	IO-Link port type	Class A		
Measured value information 128 bit Switchpoint information 17 bit Frame type 2.2 Minimum cycle time 3 ms Function pin 4 IO-Link Function Pin 2 DI Maximum cable length 20 m Profile support Smart Sensor Profile Mechanical data Design Design Rectangular, Q80 Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Die-cast aluminum alloy Electrical connection Connector, M12 x 1 Ambient temperature -40+85 °C -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP68 IP69 IP69 IP69 IP69 IP69 IP69 IP69 IP69	Communication mode	COM 3 (230.4 kBaud)		
Switchpoint information 17 bit Frame type 2.2 Minimum cycle time 3 ms Function pin 4 IO-Link Function Pin 2 DI Maximum cable length 20 m Profile support Smart Sensor Profile Mechanical data Design Design Rectangular, Q80 Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Electrical connection Connector, M12 x 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP68 IP69K Not assessed by UL LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Process data width	128 bit		
Minimum cycle time 3 ms	Measured value information	128 bit		
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Function pin 4 IO-Link Function Pin 2 DI Maximum cable length 20 m Profile support Smart Sensor Profile Mechanical data Design Rectangular, Q80 Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Electrical connection Connector, M12 × 1 Ambient temperature -40+85 °C Protection class IP67 IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Frame type	2.2		
Function Pin 2 DI Maximum cable length 20 m Profile support Smart Sensor Profile Mechanical data	Minimum cycle time	3 ms		
Maximum cable length Profile support Smart Sensor Profile Mechanical data Design Rectangular, Q80 Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Electrical connection Connector, M12 x 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Function pin 4	IO-Link		
Profile support Mechanical data Design Rectangular, Q80 Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Electrical connection Connector, M12 x 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Function Pin 2	DI		
Mechanical data Design Rectangular, Q80 Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Electrical connection Connector, M12 x 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Maximum cable length	20 m		
Design Rectangular, Q80 Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Electrical connection Connector, M12 x 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Profile support	Smart Sensor Profile		
Dimensions 90.6 x 80 x 34.6 mm Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Electrical connection Connector, M12 x 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Mechanical data			
Housing material Plastic, PBT-GF20 Die-cast aluminum alloy Electrical connection Connector, M12 × 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Design	Rectangular, Q80		
Die-cast aluminum alloy Electrical connection Connector, M12 × 1 Ambient temperature -40+85 °C Storage temperature -40+85 °C Protection class IP67 IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Dimensions	90.6 x 80 x 34.6 mm		
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Storage temperature -40+85 °C Protection class IP67 IP68 IP69K Not assessed by UL Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Electrical connection	Connector, M12 × 1		
Protection class IP67 IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Ambient temperature	-40+85 °C		
IP68 IP69K Not assessed by UL Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Storage temperature	-40+85 °C		
Power-on indication LED, Green Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Protection class	IP68		
Switching state 3-color LED, Yellow Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1		Not assessed by UL		
Vibration resistance 20 g (102000 Hz), EN 60068-2-6 Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Power-on indication	LED, Green		
Shock test EN 60068-2-27 Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Switching state	3-color LED, Yellow		
Shock resistance 100 g (11 ms) EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Vibration resistance	20 g (102000 Hz), EN 60068-2-6		
EMV EN 61000-6-2:2019 ETSI EN 301489-3 v.1.6.1	Shock test	EN 60068-2-27		
ETSI EN 301489-3 v.1.6.1	Shock resistance	100 g (11 ms)		
Approvals CE, ETSI, FCC, UL	EMV			
	Approvals	CE, ETSI, FCC, UL		



Functional principle

FMCW radar stands for frequency modulated continuous wave radar. FMCW is the English abbreviation for Frequency Modulated Continuous Wave. Non-modulated continuous wave radars have the disadvantage that they cannot measure distances due to lack of time reference. Such a time reference for distance measurement of stationary objects can be generated by means of frequency modulation.
Using this method, a signal is emitted which continually changes the frequency. A periodic, linear frequency which varies upwards and downwards is used to limit the frequency range and to simplify the signal evaluation. The factor for the rate of change df/dt remains constant. If an echo signal is received, then this has a runtime delay as with the pulse radar, and thus a different frequency that is proportional to the distance.

Accessories

Dimension drawing	Туре	ID	
	TBEN-S2-4IOL	6814024	Compact multiprotocol I/O module, 4 IO-Link Master 1.1 Class A, 4 universal PNP digital channels 0.5 A
	RR-6	100047726	Stainless steel radar reflector, optimized detection performance of an object, cathetus length: 60 mm, RadarCrossSection: 10 m² (cf.



Dimension drawing	Туре	ID	
			automobile), reliable object detection up to 6.5 m
	RR-12	100047727	Stainless steel radar reflector, optimized detection performance of an object, cathetus length: 120 mm, RadarCrossSection: 250 m² (cf. HGV), reliable object detection up to 15 m
	RR-20	100047728	Stainless steel radar reflector, optimized detection performance of an object, cathetus length: 200 mm, RadarCrossSection: 1115 m² (cf. ship), reliable object detection up to 25 m