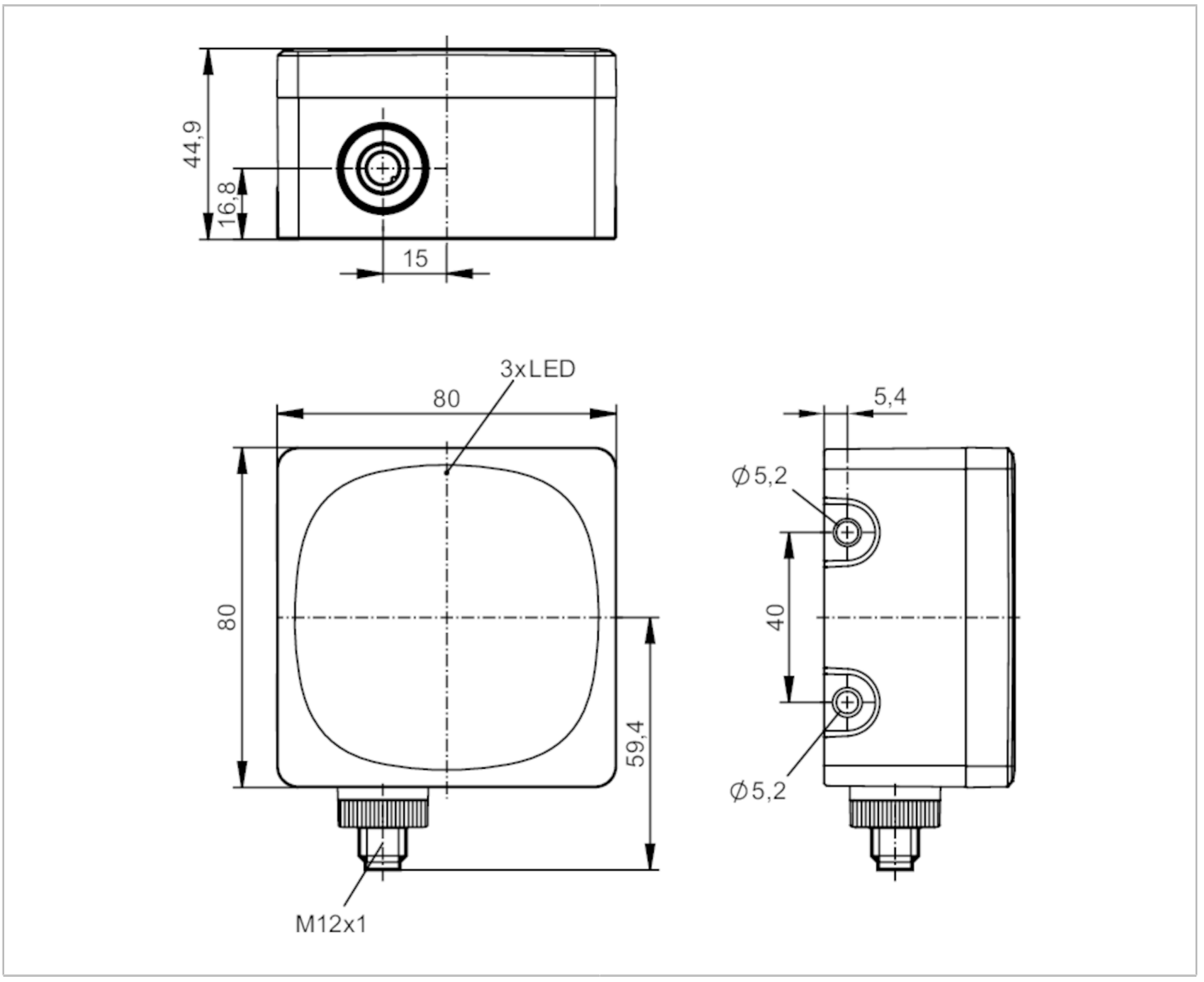
R1D102

Radar distance sensor

R1DADF6KG/US/IO-Link



Product characteristics		
Communication interface		IO-Link
Housing		rectangular
Dimensions	[mm]	80 x 80 x 45
Digital		
Electrical design		PNP/NPN; (configurable)
Output function		normally open / closed; (configurable)
Application		
Radio approval for		USA; Canada; Chile; Brazil
Electrical data		
Operating voltage	[V]	10...30 DC; (to SELV/PELV ; energy-limited circuits according to IEC/UL 61010-1 3rd ed. cl. 9.4)
Current consumption	[mA]	< 300; (mean value: 150 mA)
Power consumption	[W]	21; (maximum)

R1D102

Radar distance sensor

R1DADF6KG/US/IO-Link

Protection class			III
Reverse polarity protection			yes
Max. power-on delay time	[ms]		1000
Operating frequency [GHz]			60...64
Radiated peak power EIRP [dBm]			10
Inputs / outputs			
Total number of inputs and outputs			3
Inputs			
Inputs		IN1	activation/deactivation of the radar
Outputs			
Total number of outputs			2
Output signal		OUT1	switching signal; IO-Link
		OUT2	switching signal; analog signal
Short-circuit protection			yes
Type of short-circuit protection			yes (non-latching)
Overload protection			yes
Analog			
Analog current output	[mA]		4...20, invertible; (scalable)
Max. load	[Ω]		500; (< 250 Ω: Ub 16...30 V DC; 250...500 Ω: Ub 18...30 V DC)
Analog voltage output	[V]		0...10, invertible; (scalable)
Min. load	[Ω]		2000
Digital			
Electrical design			PNP/NPN; (configurable)
Output function			normally open / closed; (configurable)
Max. voltage drop switching output DC	[V]		2.5
Permanent current rating of switching output DC	[mA]		200
Monitoring range			
Range	[m]		0.1...35; (referred to a 10 cm corner reflector)
Angle of aperture cylindrical	[°]	Horizontal	40
		vertical	30
Measuring/setting range			
Measuring range	[m]		0.1...35; (see diagram:)
Sampling rate	[Hz]		20...100
Accuracy / deviations			
Hysteresis	[mm]		5; (configurable)
Temperature coefficient analog output	[% of the span / 10 K]		± 0,1
Repeatability analog output [% of the span]			< 0,1
Linearity error of analog output [% of the span]			± 0,15

R1D102

Radar distance sensor

R1DADF6KG/US/IO-Link

Precision analog output [% of the span]		± 0,2 (in addition to the accuracy specifications in the further data section)	
Software / programming			
Parameter setting options		only via IO-Link	
Interfaces			
Communication interface		IO-Link	
Transmission type		COM3 (230,4 kBaud)	
IO-Link revision		1.1	
SDCI standard		IEC 61131-9	
Profiles		BLOB	Binary Large Object transfer
		Common - I&D	Identification and Diagnosis
		Function	Locator
		Function	ProductURI
SIO mode		yes	
Required master port class		A	
Min. process cycle time	[ms]	3.2	
IO-Link process data (cyclical)		**Function**	**bit length**
		Distance	32
		speed	32
		Power	8
		RCS	8
		sensor inclination	1
		device status	4
		binary switching information	4
IO-Link functions (acyclical)		application specific tag; operating hours counter; number of trigger events; internal temperature; ROI setting	
Supported DeviceIDs		**Type of operation**	**DeviceID**
		default	1518
Operating conditions			
Ambient temperature	[°C]	-40...80	
Note on ambient temperature		without using the analog output: -40...85 °C	
Storage temperature	[°C]	-40...85	
Protection		IP 65; IP 66; IP 67; IP 69K; (with mounted connectors or protective caps)	
Tests / approvals			
EMC		DIN EN 61000-4-2 ESD	4 kV CD / 8 kV AD
		DIN EN 61000-4-3 HF radiated	10 V/m
		DIN EN 61000-4-4 Burst	2 kV
		DIN EN 61000-4-6 HF conducted	10 V
		DIN EN 61000-6-2	noise immunity / industrial environments
		EN 55032 emission	class A
Impact resistance		IEC 62262	IK06 (1J)
Vibration resistance		DIN EN 60068-2-6 Fc	10 g 10 frequency cycles, 1 octave/minute, in 3 axes
Shock resistance		DIN EN 60068-2-27 Ea	50 g 11 ms half-sine; 10 shocks each in every direction along the 3 coordinate axes
Continuous shock resistance		DIN EN 60068-2-29 Eb	40 g 6 ms half-sine; 4,000 shocks each in every direction along the 3 coordinate axes

R1D102

Radar distance sensor

R1DADF6KG/US/IO-Link

Fast temperature changes		DIN EN 60068-2-14 Na	TA = -40°C; TB = 85°C; t1 = 30 min; t2 = < 30 s; 300 cycles
Salt spray test		DIN EN 60068-2-11 Ka	8 test cycles
Electrical safety		DIN EN 61010-2-201	electric shock / electrical supply only via SELV/PELV circuits
MTTF	[years]	53	
UL approval		Ta	-40...65 °C
		File number UL	E205959

Mechanical data

Weight	[g]	413.5
Housing		rectangular
Mounting		flush mountable
Dimensions	[mm]	80 x 80 x 45
Material		housing: PA; radome: PEI; sealing: HNBR

Displays / operating elements

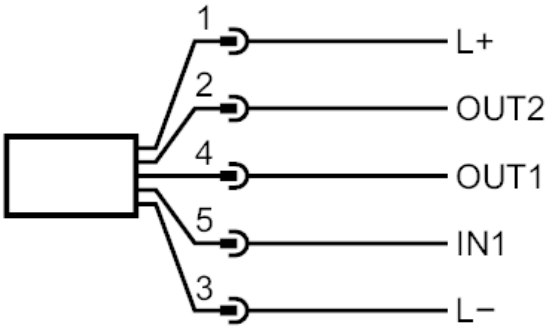
Display	Switching status	2x LED, yellow
	Power	1x LED, green
	errors	1x LED, red

Remarks

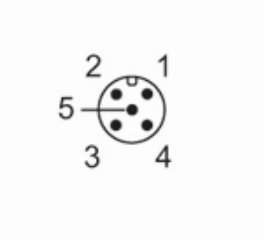
Pack quantity	1 pcs.

Electrical connection

Connection



Connector: 1 x M12; coding: A



1	L+
2	OUT2 Switching output analog output
4	OUT1 Switching output IO-Link
5	IN1 activation/deactivation of the radar
3	L-

R1D102

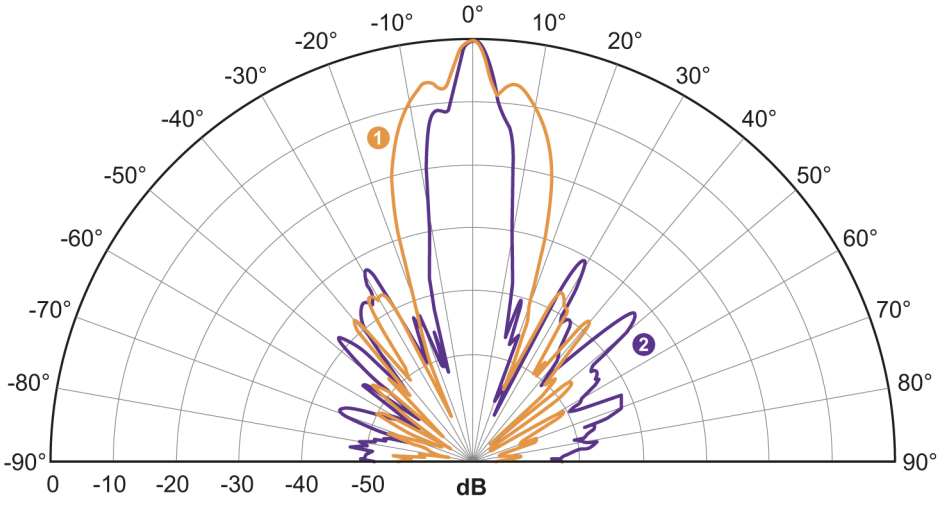
Radar distance sensor

R1DADF6KG/US/IO-Link

Other data			
Operating mode	standard	Long range, high velocity	high measuring frequency
max. distance	0.1...20 m	0.25...35 m	0.1...20 m
distance resolution	100 mm	370 mm	100 mm
distance accuracy	± 5 mm	± 15 mm	± 5 mm
max. velocity	± 6 m/s	± 15 m/s	± 20 m/s
velocity resolution	± 0.15 m/s	± 0.38 m/s	
speed accuracy	± 0.01 m/s	± 0.04 m/s	± 0.25 m/s
Sampling rate	20 Hz	20 Hz	100 Hz
Distance		referred to a 10 cm corner reflector	
Resolution		for the detection of two objects of the same size	
Accuracy		for a strong, point-shaped target	

Diagrams and graphs

Monitoring range



1: azimuth

2: elevation

conditions

Reflector: 4.3“ Trihedral Corner Reflector (SAJ043-S1)

RCS: 8 dBm²

Distance: 5 m

operating frequency: 62 GHz