



## LBR SicWave

SIMPLY BRILLIANT – LEVEL MEASUREMENT IN BULK MATERIALS  
WITH 80 GHZ RADAR

Level sensors

**SICK**  
Sensor Intelligence.

# SIMPLY BRILLIANT - LEVEL MEASUREMENT IN BULK MATERIALS WITH 80 GHZ RADAR



## Product description

The LBR SicWave free-space radar makes continuous level measurements and works with all solids. It is highly resistant to external interference, dust or deposits. Thanks to its non-contact 80 GHz radar technology, the LBR SicWave can be put into operation easily and is maintenance-free. A wide range

of options for antenna design, process connections and housing ensure ideal connection to any application. HART communication and WPAN connection simplify service and diagnostics on the device and prepare it optimally for Industry 4.0 applications.

## At a glance

- 80 GHz free-space radar with various antennas
- Measuring range: up to 120 m
- Process temperature: -40 °C ... +200 °C
- Process pressure: -1 bar ... 20 bar
- Process connection: thread, flange, special brackets
- Housing: plastic (IP66 / IP67) or aluminum (IP66 / IP68)
- With or without display and WPAN
- Certificates: Ex d, Ex ia, Ex ta

## Your benefits

- One device for all continuous level measurements in solids, simplifies spare part logistics
- Increased system availability due to non-contact, continuous level measurement
- Quick to commission, saving time and costs
- Low costs and time expenditure as it is maintenance-free
- Resistant to external interference for high system availability
- Insensitive to foam and dust, preventing unexpected system downtime
- Ex-certificates available
- Simplified service and diagnostic via HART or WPAN



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→ [www.sick.com/LBR\\_SicWave](http://www.sick.com/LBR_SicWave)

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



## Detailed technical data

## Features

Medium	Solids
Measurement	Continuous
Probe type	Plastic horn antenna Thread with integrated horn antenna Metal-clad lens antenna with flushing connection / PEEK (depending on type)
Frequency band	W-band (within 75 ... 85 GHz)
Measuring range	Up to 120 m (393.7 ft), recommended measuring range in thread version with integrated horn antenna up to 20 m (65.62 ft)
Angle of dispersion	3.5° <sup>1)</sup> 7° <sup>1)</sup> 4° <sup>1)</sup> (depending on type)
Process pressure	-1 bar 2 bar (-100 kPa ... 200 kPa / -14.5 psig ... 29.1 psig) -1 bar 20 bar (-100 kPa ... 2,000 kPa / -14.5 psig ... 290.1 psig) -1 bar 3 bar (-100 kPa ... 300 kPa / -14.5 psig ... 43.5 psig) (depending on type)
Process temperature	-40 °C ... +200 °C (depending on type)
ATEX approval	ATEX II 1G, 1/2G, 2G Ex ia IIC T6 IEC Ex ia IIC T6 Ga, Ga/Gb, Gb ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + II 1D, 1/2D, 1/3D, 2D Ex ta IIIC T*; IEC Ex ia IIC T6 Ga, Ga/Gb, Gb + Ex ta IIIC T* Da, Da/Db, Da/Dc, Db ATEX II 1/2G, 2G Ex db IIC T6 IEC Ex db IIC T6 Ga, Ga/Gb, Gb ATEX II 1/2G, 2G Ex db IIC T6 + II 1D, 1/2D, 1/3D, 2D Ex ta IIIC T*; IEC Ex db IIC T6 Ga, Ga/Gb, Gb + Ex ta IIIC T* Da, Da/Db, Da/Dc, Db (depending on type)
RoHS certificate	✓
HART	✓
Indication	Without Installed (depending on type)
Control element	Bluetooth Magnet pin operation Key operation

<sup>1)</sup> Outside the specified aperture angle, the level of the radar signal energy is lowered by 50% (-3 dB).

## Performance

Accuracy of sensor element	≤ 5 mm <sup>1)</sup>
Non-repeatability	≤ 1 mm
Digital measurement resolution	< 1 mm
Analog measurement resolution	0.3 µA
Digital output temperature drift	≤ 3 mm / 10 K, max. 10 mm
Current output temperature drift	≤ 0.03% / 10 K relating to the 16 mA span or ≤ 0.3%
Deviation on current output due to digital-analog conversion	< 15 µA
Measurement cycle time	Approx. 700 ms
Step response time	≤ 3 s <sup>2)</sup>

<sup>1)</sup> Measurement distance > 0.25 m / 0.8202 ft.

<sup>2)</sup> Time span after abrupt change to the measurement distance by max. 2 m for bulk material applications until the output signal has assumed 90% of its steady-state value for the first time (IEC 61298-2).

## Mechanics

<b>Process connection</b>	Without process connection Mounting clamp, length: 170 mm / 316L Mounting clamp, length: 300 mm / 316L Thread G 1 ½ PN20, DIN3852-A / 316L Thread 1 ½" NPT PN20, ASME B1.20.1 / 316L Swivel holder with flange DN150, PN16, form B, DIN / 316/316L Swivel holder with flange DN100, PN16, form B, DIN / 316/316L Swivel holder with flange 4" 150 lb / 316/316L Flange DN 80 PN 16 form B, DIN 316 / 316L Flange DN 100 PN 16 form B, DIN 316 / 316L Flange DN 150 PN 16 form B, DIN 316 / 316L (depending on type)
<b>Housing material</b>	Plastic PBT (polyester) / Aluminum die cast AlSi10Mg, powder-coated (base: polyester) (depending on type)
<b>Housing design</b>	Single-chamber housing
<b>Sealing material</b>	PP PTFE FKM (SHS FPM 70C3 GLT) (depending on type)
<b>Antenna material</b>	PP PEEK (depending on type)

## Electronics

<b>Supply voltage</b>	9 V DC ... 30 V DC <sup>1)</sup>
<b>Protection class</b>	I (IEC 61010-1)
<b>Connection type</b>	M20 x 1.5 / plug connector M12 x 1 pin assignment B M20 x 1.5 / cable gland PA (ø 5 mm - 9 mm) ½" NPT / cable gland PA (ø 5 mm - 9 mm) M20 x 1.5 / cable gland nickel-plated brass (ø5 mm - 9 mm) ½" NPT / cable gland nickel-plated brass (ø 6 mm - 12 mm) M20 x 1.5 / cable gland nickel-plated brass (ø 6 mm - 12 mm) (depending on type)
<b>Output signal</b>	4 mA ... 20 mA / HART <sup>2)</sup>
<b>Contamination rating</b>	4
<b>Enclosure rating</b>	IP67 / IP67 / IP66 / IP68 (depending on type)
<b>EMC</b>	EN 61326-1
<b>Start-up current</b>	< 3.6 mA
<b>Overtoltage category</b>	III (IEC 61010-1)
<b>Short-circuit protection</b>	✓
<b>Isolation</b>	✓

<sup>1)</sup> All connections are polarity protected. All outputs are overload and short-circuit protected.

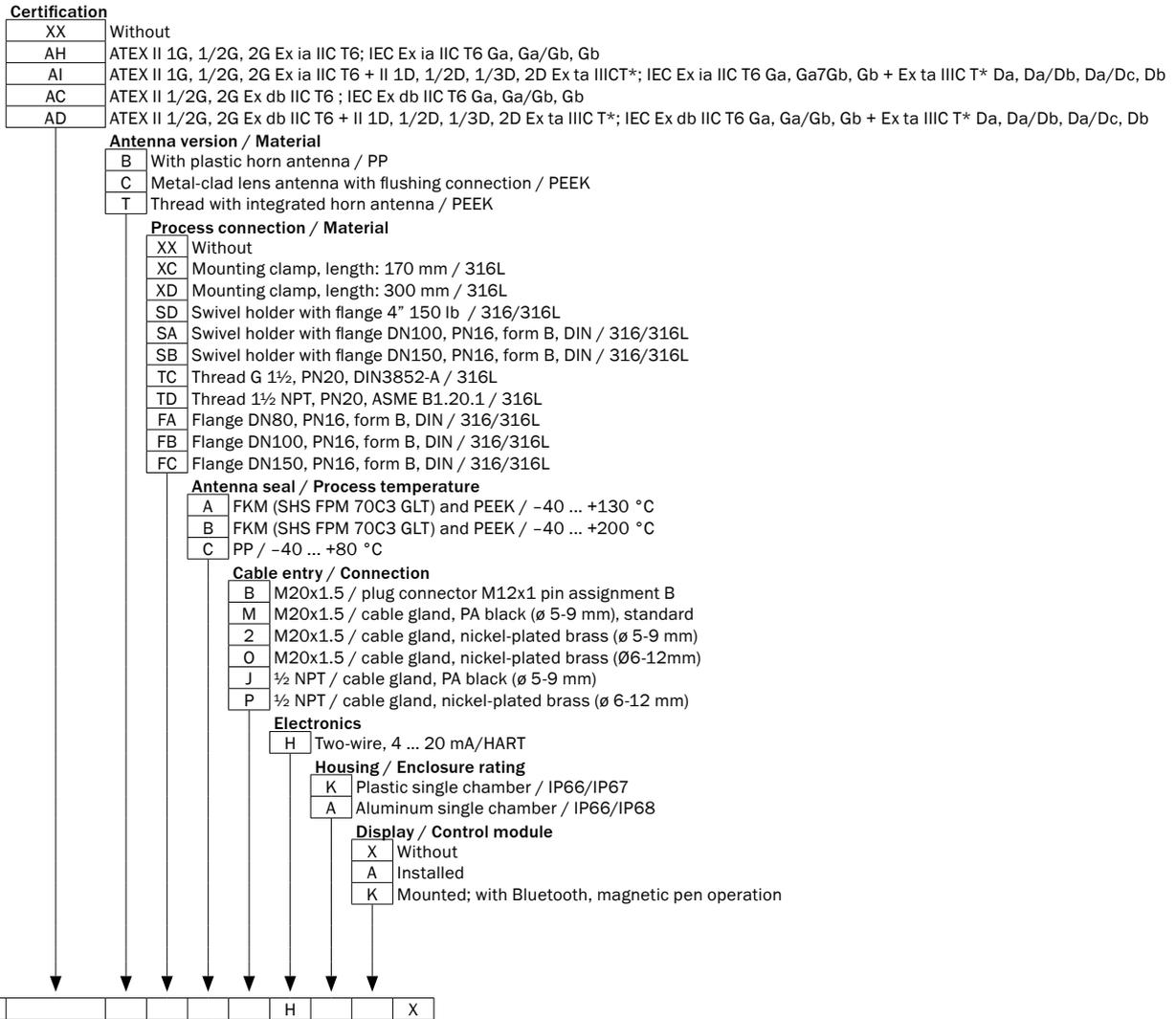
<sup>2)</sup> Range of the output signal: 3.8 mA ... 20.5 mA / HART (factory setting); fault current < 3.6 mA or 22 mA.

## Ambient data

<b>Ambient operating temperature</b>	-40 °C ... +80 °C
<b>Ambient storage temperature</b>	-40 °C ... +80 °C

Type code

Type code



Not all variants of the type code can be combined!

Ordering information

Enclosure rating	Process connection	Process temperature	Process pressure	Housing material	Housing design	Electrical connection	ATEX	Type	Part no.
IP66 / IP68	Swivel holder with flange 4" 150 lb / 316/316L	-40 °C ... +200 °C	-1 bar ... 3 bar, (-100 kPa ... 300 kPa / -14.5 psig ... 43.5 psig)	Aluminum die cast AlSi10Mg, powder-coated (base: polyester)	Single-chamber housing	½" NPT / cable gland nickel-plated brass (ø 6 mm - 12 mm)	✓	LBR-ACCSDDBPHAAX	6072187

Enclosure rating	Process connection	Process temperature	Process pressure	Housing material	Housing design	Electrical connection	ATEX	Type	Part no.
IP66 / IP68	Flange DN 80 PN 16 form B, DIN 316 / 316L	-40 °C ... +200 °C	-1 bar ... 3 bar, (-100 kPa ... 300 kPa / -14.5 psig ... 43.5 psig)	Aluminum die cast Al-Si10Mg, powder-coated (base: polyester)	Single-chamber housing	M20 x 1.5 / cable gland nickel-plated brass (ø 6 mm - 12 mm)	✓	LBR-ADCFABOHAAX	6072188
	Flange DN 100 PN 16 form B, DIN 316 / 316L	-40 °C ... +200 °C			Single-chamber housing		✓	LBR-ADCFBBOHAAX	6072189
	Flange DN 150 PN 16 form B, DIN 316 / 316L	-40 °C ... +200 °C			Single-chamber housing		✓	LBR-ADCFBOHAAX	6072190

Enclosure rating	Process connection	Process temperature	Process pressure	Housing material	Housing design	Electrical connection	ATEX	Type	Part no.
IP67 / IP67	Thread G 1 ½ PN20, DIN3852-A / 316L	-40 °C ... +130 °C	-1 bar ... 20 bar, (-100 kPa ... 2,000 kPa / -14.5 psig ... 290.1 psig)	Plastic PBT (polyester)	Single-chamber housing	M20 x 1.5 / cable gland PA (ø 5 mm - 9 mm)	✓	LBR-AHTTCAMH-KAX	6072181
		-40 °C ... +200 °C		Plastic PBT (polyester)	Single-chamber housing		✓	LBR-AHTTCBMH-KAX	6072182

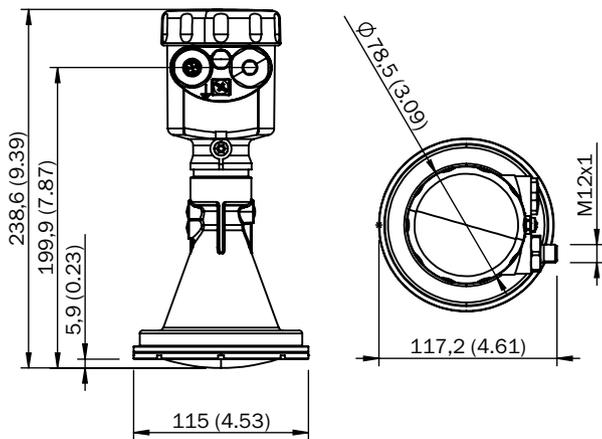
Enclosure rating	Process connection	Process temperature	Process pressure	Housing material	Housing design	Electrical connection	ATEX	Type	Part no.
IP67 / IP67	Thread 1 ½" NPT PN20, ASME B1.20.1 / 316L	-40 °C ... +130 °C	-1 bar ... 20 bar, (-100 kPa ... 2,000 kPa / -14.5 psig ... 290.1 psig)	Plastic PBT (polyester)	Single-chamber housing	½" NPT / cable gland PA (ø 5 mm - 9 mm)	✓	LBR-AHTTDAJHKAX	6072184
		-40 °C ... +200 °C		Plastic PBT (polyester)	Single-chamber housing	½" NPT / cable gland PA (ø 5 mm - 9 mm)	✓	LBR-AHTTDBJHKAX	6072183

Enclosure rating	Process connection	Process temperature	Process pressure	Housing material	Housing design	Electrical connection	ATEX	Type	Part no.
IP66 / IP68	Swivel holder with flange DN100, PN16, form B, DIN / 316/316L	-40 °C ... +130 °C	-1 bar ... 3 bar, (-100 kPa ... 300 kPa / -14.5 psig ... 43.5 psig)	Aluminum die cast AlSi10Mg, powder-coated (base: polyester)	Single-chamber housing	M20 x 1.5 / cable gland nickel-plated brass (ø5 mm - 9 mm)	✓	LBR-AICSAA2HAAX	6072185
	Swivel holder with flange DN150, PN16, form B, DIN / 316/316L	-40 °C ... +130 °C			Single-chamber housing		✓	LBR-AICSA2HAAX	6072186

Enclosure rating	Process connection	Process temperature	Process pressure	Housing material	Housing design	Electrical connection	Type	Part no.
IP67 / IP67	Mounting clamp, length: 170 mm / 316L	-40 °C ... +80 °C	-1 bar ... 2 bar, (-100 kPa ... 200 kPa / -14.5 psig ... 29.1 psig)	Plastic PBT (polyester)	Single-chamber housing	M20 x 1.5 / plug connector M12 x 1 pin assignment B	LBR-XXBXCCHKXX	6072113
	Mounting clamp, length: 300 mm / 316L	-40 °C ... +80 °C		Plastic PBT (polyester)	Single-chamber housing		LBR-XXBXDCBHKXX	6072114
	Without process connection	-40 °C ... +80 °C		Plastic PBT (polyester)	Single-chamber housing		LBR-XXBXXCBHKXX	6072664
							LBR-XXBXXCBHKXX	6072112

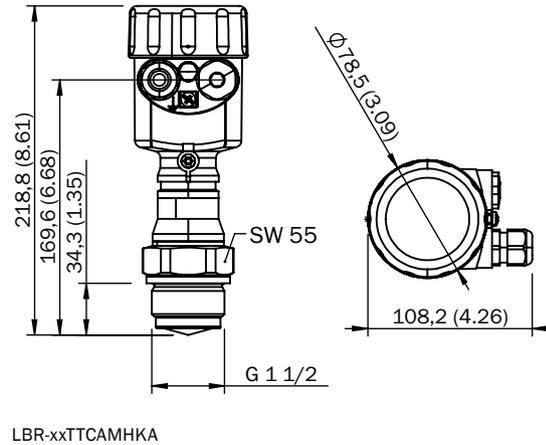
**Dimensional drawing**

Unit: mm (inch), decimal separator: period



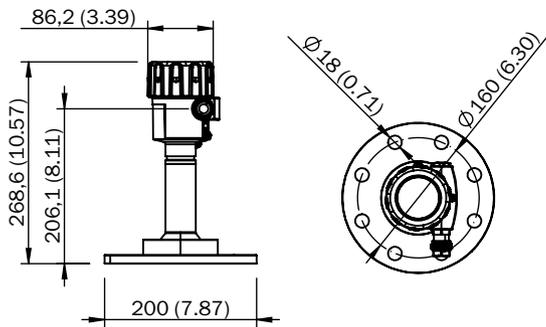
LBR-xxBXXCBHKXX

Unit: mm (inch), decimal separator: period



LBR-xxTTCAMHKA

Unit: mm (inch), decimal separator: period



LBR-xxCFABOHAA

Accessories

Connection systems

Plug connectors and cables

Connecting cables

	Brief description	Length of cable	Type	Part no.
	Head A: female connector, M12, 4-pin, straight Head B: Flying leads Cable: PP, unshielded, 4.6 mm <sup>1)</sup>	2 m	DOL-1204-G02MRN	6058291
		5 m	DOL-1204-G05MRN	6058476
		10 m	DOL-1204-G10MRN	6058478
		15 m	DOL-1204-G15MRN	2092884
		25 m	DOL-1204-G25MRN	6058480
	Head A: female connector, M12, 4-pin, angled with LED Head B: Flying leads Cable: PP, unshielded, 4.6 mm <sup>1)</sup>	2 m	DOL-1204-L02MRN	6058482
		5 m	DOL-1204-L05MRN	6058483
		10 m	DOL-1204-L10MRN	6058484
		25 m	DOL-1204-L25MRN	6058485
	Head A: female connector, M12, 4-pin, angled Head B: Flying leads Cable: PVC, unshielded, 5 mm <sup>2) 3)</sup>	2 m	DOL-1204-W02MNI	6052614
	Head A: female connector, M12, 4-pin, angled Head B: Flying leads Cable: PP, unshielded, 4.6 mm <sup>1)</sup>	2 m	DOL-1204-W02MRN	6058474
	Head A: female connector, M12, 4-pin, angled Head B: Flying leads Cable: PVC, unshielded, 5 mm <sup>2) 3)</sup>	5 m	DOL-1204-W05MNI	6052616
	Head A: female connector, M12, 4-pin, angled Head B: Flying leads Cable: PP, unshielded, 4.6 mm <sup>1)</sup>	5 m	DOL-1204-W05MRN	6058477
	Head A: female connector, M12, 4-pin, angled Head B: Flying leads Cable: PVC, unshielded, 5 mm <sup>2) 3)</sup>	10 m	DOL-1204-W10MNI	6052618
	Head A: female connector, M12, 4-pin, angled Head B: Flying leads Cable: PP, unshielded, 4.6 mm <sup>1)</sup>	10 m	DOL-1204-W10MRN	6058479
	Head A: female connector, M12, 4-pin, straight Head B: Flying leads Cable: PUR, halogen-free, unshielded, 5.9 mm	2 m	DOL-1204G02MC75KM0	2079290
		5 m	DOL-1204G05MC75KM0	2079291
		10 m	DOL-1204G10MC75KM0	2079292
		20 m	DOL-1204G20MC75KM0	2089703
	Head A: female connector, M12, 4-pin, angled Head B: Flying leads Cable: PUR, halogen-free, unshielded, 5.9 mm	2 m	DOL-1204W02MC75KM0	2079293
		5 m	DOL-1204W05MC75KM0	2079294
		10 m	DOL-1204W10MC75KM0	2079295
		20 m	DOL-1204W20MC75KM0	2089704

<sup>1)</sup> Tested detergent: P3-topactive DES, P3-topactive 200, P3-topax 52, P3-topax 66 und P3-topax 91.

<sup>2)</sup> Tested detergent: P3-topactive DES, P3-topax 19, P3-topax 56, P3-topax 66 and P3-topax 99; Insulating material group: Cat I.

<sup>3)</sup> Insulating material group: Cat I.

	Brief description	Length of cable	Type	Part no.
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 0.34 mm <sup>2</sup> , 4.5 mm	2 m	YF2A14-020UB3X-LEAX	2095607
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PVC, unshielded, 0.34 mm <sup>2</sup> , 5 mm	2 m	YF2A14-020VB3X-LEAX	2096234
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 0.34 mm <sup>2</sup> , 4.5 mm	5 m	YF2A14-050UB3X-LEAX	2095608
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PVC, unshielded, 0.34 mm <sup>2</sup> , 5 mm	5 m	YF2A14-050VB3X-LEAX	2096235
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PUR, halogen-free, unshielded, 0.34 mm <sup>2</sup> , 4.5 mm	10 m	YF2A14-100UB3X-LEAX	2095609
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PVC, unshielded, 0.34 mm <sup>2</sup> , 5 mm	10 m	YF2A14-100VB3X-LEAX	2096236
	Head A: female connector, M12, 4-pin, angled, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PVC, unshielded, 0.34 mm <sup>2</sup> , 5 mm	2 m	YG2A14-020VB3X-LEAX	2095895
		5 m	YG2A14-050VB3X-LEAX	2095897
		10 m	YG2A14-100VB3X-LEAX	2095898
		15 m	YG2A14-150VB3X-LEAX	2096213
		20 m	YG2A14-200VB3X-LEAX	2096214

<sup>1)</sup> Tested detergent: P3-topactive DES, P3-topactive 200, P3-topax 52, P3-topax 66 und P3-topax 91.

<sup>2)</sup> Tested detergent: P3-topactive DES, P3-topax 19, P3-topax 56, P3-topax 66 and P3-topax 99; Insulating material group: Cat I.

<sup>3)</sup> Insulating material group: Cat I.



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