

Robust Millimeter Wave Distance Measurement Sensor for Industrial Applications

LPR®-1DHP-291

The LPR®-1DHP-291 radar system performs 1D distance measurements for short, medium and long ranges with highest accuracy. By means of primary, secondary and diversity radar measurements, the LPR®-1DHP-291 detects the position and speed (for example, of cranes and rail-bound transport systems) in real-time and makes the data available via built-in interfaces.

The sensors are easy to install and put into operation with the aid of a web-based interface. A directional antenna is integrated into the robust housing. LPR®-1DHP-291 - an evolution of the well-proven 60 GHz technology - comes with the same compact and light form factor as its predecessor LPR®-1DHP-290. The device features the latest mmWave technology, allowing it to perform high-precision measurements with accuracy in the millimeter range.

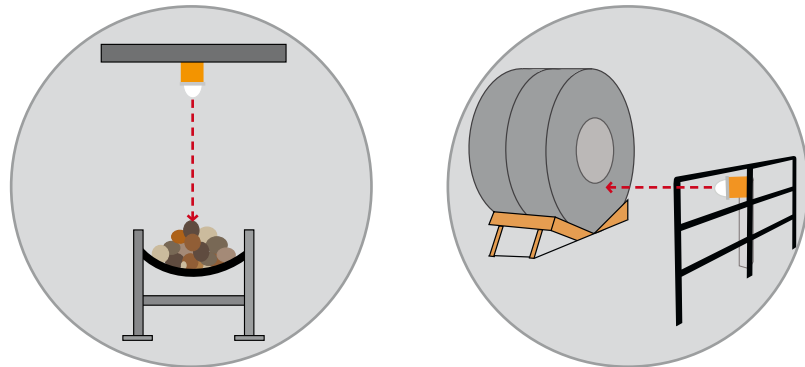
The sensor can be optimally configured for the required accuracy and range by selecting individual measurement modes. Even under the harshest weather and environmental conditions such as rain, fog, snow, dust, smoke or vibrations, the maintenance- and wear-and-tear-free wireless technology operates reliably and with a high degree of availability - indoors and outdoors.

- **Contactless distance measurements via radio waves**
- **Millimeter wave technology for measurements with mm accuracy**
- **Compact and robust housing**
- **Impervious to dirt, harsh weather and vibrations**
- **Ideal for semi-automatic and full automated crane systems**
- **Maintenance- and wear-free**
- **Easy installation**

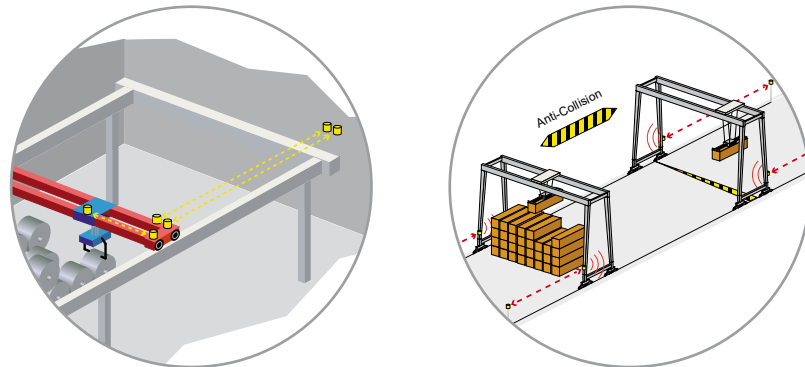
Typical Applications LPR®-1DHP-291

- Crane positioning
- Collision avoidance
- Goods tracking
- Process monitoring
- Process control
- Process automation
- Presence check
- Level probing
- Object detection
- Radar barriers

Primary Radar Mode



Secondary and Diversity Radar Mode

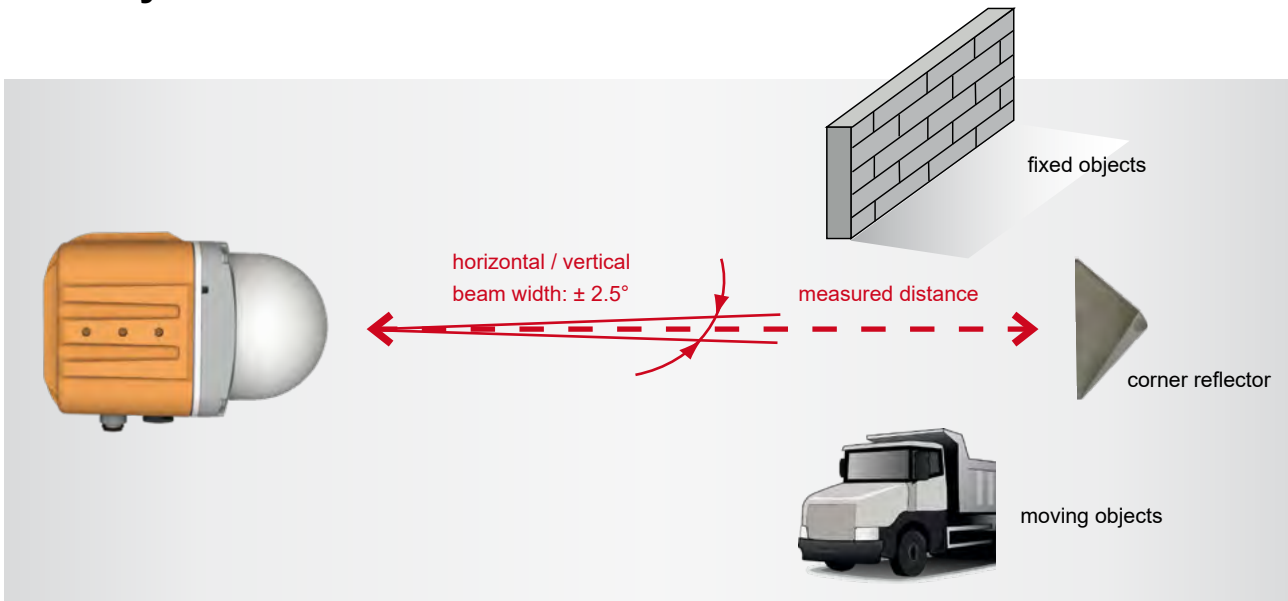


Technical Data: LPR®-1DHP-291

Model number	BSW200291
Radar measuring mode	Primary, secondary, diversity radar
Frequency range	57.0 - 64.0 GHz
Supply voltage	11 - 36 V DC
Power consumption	6 W
Ambient temperature	-40°C to +75°C
Protection class housing	IP67
Vibration	20 cycles, each 4:25 h, x-y-z, 5 g, 5 Hz - 500 Hz, 15 mm (acc. to DIN EN 60068-2-6:2008)
Shock	200 cycles, x-y-z, 40 g, 6 ms (acc. to DIN EN 60068-2-27:2010)
Housing dimensions (LxWxH); weight	95 x 110 x 150 mm; 940 g
Transmission power (EIRP)	Up to 20 dBm EIRP
Interfaces	Ethernet (TCP / IP, Profinet)
Response time	<11 ms ¹⁾
MTBF	367 469 h / 41.9 a
External connector	Ethernet (M12 D-coded), supply voltage (M12 T-coded)
Antenna	Integrated, field of view = ± 2.5°
Compliance	CE, FCC, KCC (IC coming soon, others on request)

1) Preliminary value

Primary Radar Mode



In primary radar mode a single LPR®-1DHP-291 measures the distance and speed to a reflective object, typically a metal corner reflector. The range is typically 50 m but depends on the radar cross section (RCS) of the used target. The primary radar mode features very high update rates and enables a cost effective installation. Typical applications are positioning of cranes and heavy machinery, presence check, level probing and detection of objects.

General Technical Data		
Bandwidth Mode ¹⁾	0.5 GHz	2 GHz
Measurement accuracy ²⁾	up to ± 10 mm	up to ± 5 mm
Repeatability ²⁾	up to ± 6 mm	up to ± 3 mm
Measurement rate	up to 350 Hz	up to 350 Hz

ETSI Specific Technical Data		
Bandwidth Mode ¹⁾	0.5 GHz	2 GHz
Measuring range ³⁾	2 m to 50 m	1 m to 50 m

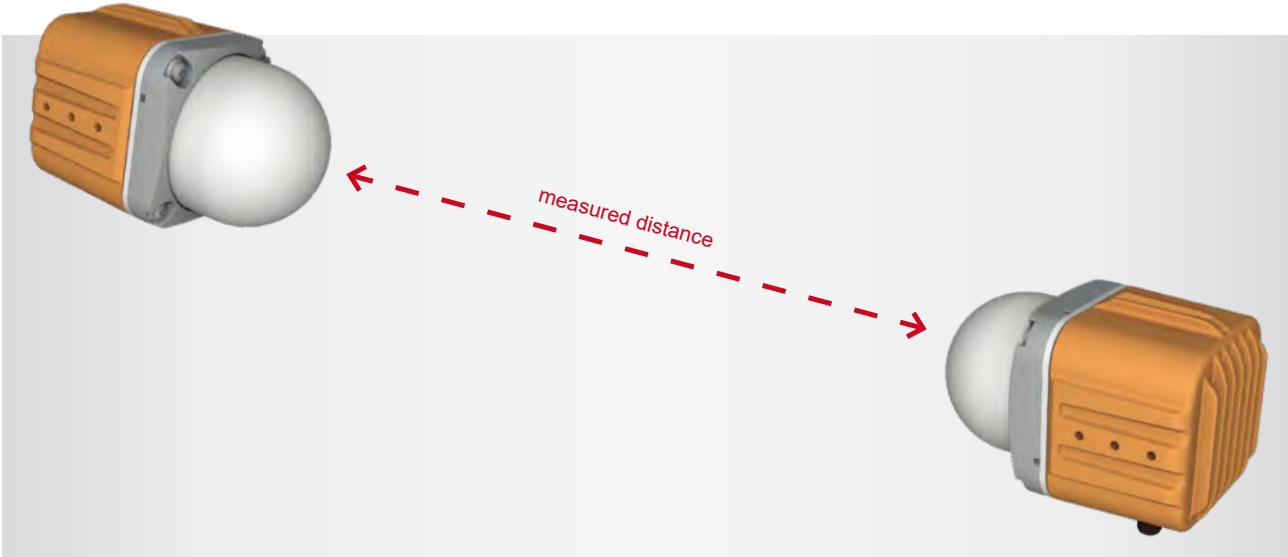
FCC Specific Technical Data		
Bandwidth Mode ¹⁾	0.5 GHz	2 GHz
Measuring range ³⁾	2 m to 50 m	1 m to 20 m

1) Multiple bandwidth modes can be selected in the device settings. The selection is limited by regional radio regulations.

2) Error under consistent ambient conditions. Depending on the measurement distance.

3) Depending on the environment, the selected bandwidth mode and the backscatter quality of the target.

Secondary Radar Mode



In secondary radar mode two LPR®-1DHP-291 measure the distance and speed between each other. The secondary radar mode features high ranges of up to 300 m and high update rates and ensures that the measurement is taken only to the partner unit. Typical applications are positioning of cranes and heavy machinery, process automation and collision avoidance.

General Technical Data		
Bandwidth Mode ¹⁾	0.5 GHz	2 GHz
Measurement accuracy ²⁾	up to ± 10 mm	up to ± 5 mm
Repeatability ²⁾	up to ± 6 mm	up to ± 3 mm
Measurement rate	up to 110 Hz	up to 110 Hz

ETSI Specific Technical Data		
Bandwidth Mode ¹⁾	0.5 GHz	2 GHz
Measuring range ³⁾	2 m to 300 m	0.5 m to 300 m

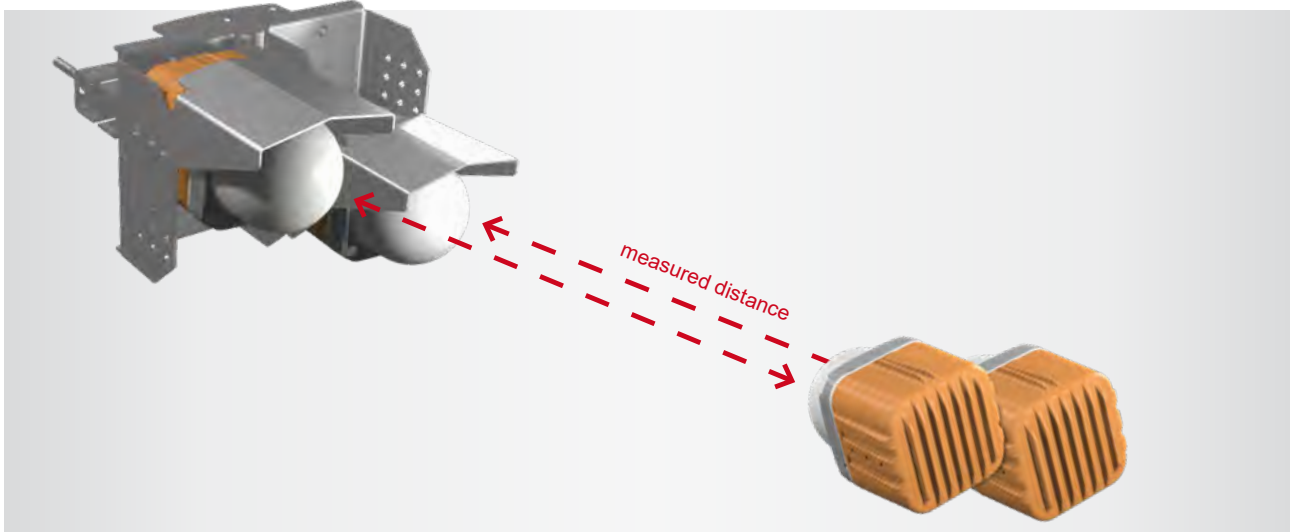
FCC Specific Technical Data		
Bandwidth Mode ¹⁾	0.5 GHz	2 GHz
Measuring range ³⁾	2 m to 300 m	0.5 m to 225 m

1) Multiple bandwidth modes can be selected in the device settings. The selection is limited by regional radio regulations.

2) Error under consistent ambient conditions.

3) Depending on the environment and the selected bandwidth mode.

Diversity Radar Mode



In diversity radar mode four LPR®-1DHP-291 are grouped into two measurement pairs mounted side by side. The diversity radar mode features very high ranges of up to 500 m, high update rates and enables operation with highest reliability under harshest conditions.

General Technical Data		
Bandwidth Mode ¹⁾	0.5 GHz	2 GHz
Measurement accuracy ²⁾	up to ± 10 mm	up to ± 5 mm
Repeatability ²⁾	up to ± 6 mm	up to ± 3 mm
Measurement rate	up to 110 Hz	up to 110 Hz

ETSI Specific Technical Data		
Bandwidth Mode ¹⁾	0.5 GHz	2 GHz
Measuring range ³⁾	2 m to 500 m	0.5 m to 500 m

FCC Specific Technical Data		
Bandwidth Mode ¹⁾	0.5 GHz	2 GHz
Measuring range ³⁾	2 m to 500 m	0.5 m to 225 m

1) Multiple bandwidth modes can be selected in the device settings. The selection is limited by regional radio regulations.

2) Error under consistent ambient conditions.

3) Depending on the environment and the selected bandwidth mode.