

Parking Lot Sensor | PLS

User manual 1.0.2



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1 General description and intended use

The Parking Lot Sensor PLS with TPS110 EU sensor core is designed for detecting parked vehicles in parking lots. The Parking Lot Sensor PLS with TPS110 EU sensor core is not designed for use in life-sustaining applications, safety-critical applications or applications for which a malfunction could lead to bodily harm, death or severe property damage. Only use the Parking Lot Sensor with components approved by BCDS. This user manual is valid for the Parking Lot Sensor PLS with TPS110 EU sensor core by BCDS.

2 Assembly and commissioning

2.1 Installation requirements

The Customer must comply with all applicable laws and regulations for the installation and operation of the Product, and if necessary, obtain necessary approvals. The Customer must take appropriate measures to avoid injury of third parties, for example, by them tripping over the Product. Therefore, the product should, for instance, not be installed on the sidewalk.

Before installing the sensors, make sure that the necessary infrastructure is working properly - make sure the gateways are switched on, that a stable Internet connection has been established, and that there is a backend connection. The backend, as well as the associated management software, must be functional. Make sure that all of the required components (see Fig. 1 Parking Lot Sensor PLS with TPS110 EU sensor core), as well as the tools, are ready.



Figure 1 Parking Lot Sensor PLS with TPS110 EU sensor core

2.2 Installing the sensor base

The sensor base is attached to the substrate (e.g., concrete, asphalt). To do this, we recommend a two-component adhesive. We have already had good experience with the following adhesive: DELO®-PUR 9692 (universal 2-component polyurethane adhesive available in 50 ml and 200 ml cartridges). We will be happy to support you with procurement. We recommend attaching several sensor bases first and only then installing the sensors.

Required material for installing the parking lot sensor

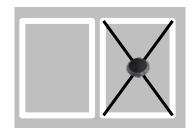


Figure 2 Material for attachment

- 1 Disposable gloves (protection against contact with adhesive)
- 2 Two-component adhesive
- **3** Adhesive press (these differ, depending on the cartridge size)
- 4 Mixing tip
- 5 Tape rule
- 6 Sensor base
- **7** Sensor core (sensor)
- 8 T20 screw
- 9 Sensor cap (sensor sealing cap)

Preparation of the parking space

The parking space must be free of dirt, dust, oil, water and other contaminants. For this purpose, at least one swept area should be prepared. However, it is recommended to clean the surface to remove contamination using a high-pressure cleaner and a burner. The installation must take place in the center of the parking space (intersection of the two diagonals, see Fig. 3) in order to ensure optimum sensor accuracy.



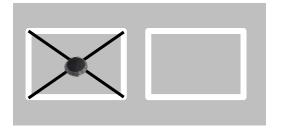




Figure 3 Determination of the center of the parking space



INFORMATION:

For the bonding procedure, please follow the instructions of the adhesive manufacturer (e.g., temperature, safety information and work instructions).

A parking space cleaning should be clarified in advance with the parking lot operator so that the treatment does not result in removal of existing coatings.



Figure 4 Available parking space for sensor installation

To provide the adhesive with a closed substrate, the surface intended for the installation of the sensor base should be free of any gaps or misalignment (see Figure 4 Available parking space for sensor installation). This is crucial for the contact surface and the adhesive effect of the sensor.





Figure 5 Substrate example (continuous)

Figure 6 Substrate example (gap)

Installation of the sensor base

Insert the adhesive cartridge into the glue gun/adhesive press (Fig. 7 Inserting the adhesive cartridge; in the case of DELO®-PUR 9692, the mixing ratio is 1:1, so you do not have to pay attention to the orientation of the cartridge). Then attach the mixing tip on the cartridge by removing the cartridge cap (Fig. 8 Sealing cap adhesive cartridge) and attaching the mixing tube (Fig. 9 Mixing tube on adhesive cartridge; here, bayonet fitting).







Figure 7 Inserting the cartridge

Figure 8 Sealing cap

Figure 9 Mixing tube

To avoid contamination and to get the maximum use out of the plasma cleaning process, open the sensor base package just before applying the adhesive. In the case of DELO® PUR 9692, you apply about 40 ml of the adhesive in the middle (see Fig. 10 Applying adhesive, and Fig. 11 Amount of adhesive); if you use a 50 ml cartridge, you can empty it completely. Apply the adhesive in the form of a bubble in the center of the sensor base (no screws or even surface).



INFORMATION:

The use of the mixing tube is important for mixing the two components of the adhesive and for the resulting adhesive effect.





Figure 10 Adhesive application

Figure 11 Adhesive amount

Please note that, as soon as the two components are mixed, the adhesive cures within a few minutes.



INFORMATION:

Once the adhesive in the mixing tube has cured, it cannot be used again. At room temperature, a typical processing time for the adhesive is about 5 minutes.

Now you can mount the sensor in the center of the parking space by applying light pressure on the sensor base (see Fig. 12 Sensor base attachment). Make sure that the sensor is centered in the parking space and that the Bosch logo on the sensor base points towards the access road (see Figure 13 Sensor base installed). Subsequent twisting of the sensor base is not possible.



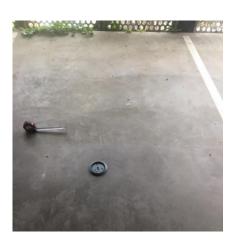


Figure 12 Sensor base attachment

Figure 13 Sensor base installed

Allow the two-component adhesive > 12 h to cure (hand-tight at room temperature after 30 min) before you screw in the sensor. Keep the parking space closed off until the sensor is installed to prevent damage (such as breaking the dome) to the sensor base.

2.3 Installing the sensor





Defective seals can cause water to get into the sensor and damage it. The functionality of the parking lot sensor is not guaranteed if it is installed incorrectly.

- ⇒ Make sure that the sealing rings on the cap and sensor are seated correctly!
- \Rightarrow Do not install the sensors when it is raining.
- ⇒ Do not use damaged components!
- ⇒ Do not open the sensor housing!
- ⇒ Only use original replacement parts!





Risk of explosion

Extreme heat can damage the battery and the sensor.

- ⇒ Do not expose the sensor to temperatures above 85 °C!
- ⇒ Do not expose the sensor to open flames!

When using a gas burner (for example, when removing weeds), keep a distance of at least 1.50 m between the flame and the sensor!

The sensor can be screwed into the base after the adhesive has cured. To simplify insertion, the arrow on the bottom of the sensor points towards the Bosch logo (see Figure 14 Installing/screwing in the sensor). After inserting the sensor, it will take approx. 2 minutes until the first measurements are carried out. During this time, the sensor should be completely screwed in to ensure optimum teaching of the sensor. To tighten it, use the T20 screw and a T20 screwdriver and tightening torque with at least 1.4 Nm up to a maximum of 1.8 Nm. And then close the opening with the sensor sealing cap.



Figure 14 Installing/screwing in the sensor

After the installation of the sensor, the sensor learns about parking changes, which happens in its vicinity. After approx. 10 parking changes, the sensor is in its taught-in state.



INFORMATION:

During operation, a continuous automatic calibration of the parking lot sensor takes place through "parking" and "exiting parking space" events.

2.4 Replacing/removing the BOSCH Parking Lot Sensor

To replace the parking lot sensor, only the sensor needs to be replaced. To do this, remove the sensor cap and loosen the T20 screw; then remove the sensor from the sensor base.



INFORMATION:

A battery replacement is not intended; instead, the sensor must be replaced.

To completely remove the sensor base from the parking space, it is necessary to use a hammer and chisel to destroy the adhesive effect by chiseling the sensor base parallel to the parking space surface. As a result, there is no permanent damage to the parking space.

2.5 Setup and operation of the parking lot sensor in the backend

In order to set up the sensor in the LoRaWAN backend, the following information is required, which will be provided to you by BCDS GmbH:

devEUI (for example, FCD6BD0000190001) appKey (for example, AABBCCDDEEFFGGHHIIJJKKLLMMNNOOPP) appEUI (FCD6BD0000190000)

Additional information on operating the parking lot sensor can be found on our website at https://www.bosch-connectivity.com/parking-lot-sensor/downloads/.

3 Technical specifications

Table 1 Device specifications - Parking Lot Sensor PLS with TPS110 EU sensor core

Properties	VALUES
Temperature range	-30 °C to 65 °C
Humidity	0 – 97%
Protection class	IP67/IPx9K
Dimensions	Ø: 145.4 mm H: 30.5 mm
Battery life	Up to 5 years
LoRa frequencies	863-865/868-868.6/869.4-869.65 MHz Transmitting power max. 14 dBm ERP
Radar frequency	2.4–2.4835 GHz Transmission power max28 dBm EIRP
Mass	191 g

Additional information can be found in the datasheet on the website at https://www.bosch-connectivity.com/parking-lot-sensor/downloads/.

4 Legal information

4.1 Disposal note in accordance with ElektroG and WEEE Directive 2012/19/EU



The sensor, as well as all the individual parts, must not be disposed of with household waste or industrial waste. You are obliged to dispose of the device at the end of its service life in accordance with the requirements of ElektroG in order to protect the environment and to reduce waste through recycling.

For additional information and how to carry out disposal, please contact the certified disposal service providers.

The sensors contain a Li battery, which must be disposed of separately.

4.2 EU Declaration of Conformity

Manufacturer: Bosch Connected Devices and Solutions GmbH

Ludwig-Erhard-Straße 2

72760 Reutlingen

Germany

Product type: Parking lot sensor Designation: TPS110 EU

Bosch Connected Devices and Solutions GmbH hereby declares that the "Parking Lot Sensor TPS110 EU" radio system type is in compliance with Directive 2014/53/EU (Radio Equipment Directive) and Directive 2011/65/EU (RoHS Directive).

The full text of the EU Declaration of Conformity is available at the following web address:

https://www.bosch-connectivity.com/parking-lot-sensor/downloads/.

4.3 Note for transport

The TPS110 EU contains a lithium metal battery and is classified as UN 3091 (lithium metal batteries packed in equipment, including lithium alloy batteries).

The lithium metal battery for the TPS110 EU complies with the requirements of the UN Manual of Tests and Criteria, Part III, Subsection 38.3. The battery contains less than 2 g of lithium. Packages with up to 2 TPS110 EU and a maximum of 2 packages per shipment should not be affected by special transport regulations. For your safety, however, check with your transport service provider. Packages with more than 2 TPS110 EU (for example, also for returns to BCDS) must carry a lithium battery handling label specified in the appendix.



- UN 3091
- ** Telephone +49 7121 35-36941

The following requirements must be met:

The lithium metal batteries are included in the TPS110 EU.

The TPS110 EU and the included batteries are not damaged.

The TPS110 EU contains the original supplied lithium metal batteries. Replacement of used batteries is not permitted.

The TPS110 EU is protected by sturdy packaging.

No additional separate batteries may be added to the packaging.

Shipping documents must include a note stating that the shipment contains "Lithium metal batteries in compliance with Section II of Packing Instruction PI 970" for air freight, or "Exempted lithium batteries under Special Provision 188" for road transport.

Packaging with the TPS110 EU, in accordance with the above-mentioned regulations, may be consolidated in outer packaging that is marked with the lithium battery label and is designated as "outer packaging."

Note that this document cannot contain complete and up-to-date information on all the requirements to be observed. The consignor is responsible for fulfilling all the requirements for the transport of lithium batteries themselves. The International Air Transportation Association (IATA) has issued further regulations on the transport of lithium batteries IATA (International Air Transport Association) Lithium Battery Guidance Document, which must be observed for air transport. The IATA regulations for transport by air freight are the most restrictive and thus also provide assistance for road and sea transport.

However, the customer or consignor should inquire about national requirements as well as any requirements from their transport service provider.

4.4 OSS note

The parking lot sensor firmware includes free open source software ("FOSS") components subject to certain FOSS license terms

The customer must observe the resulting obligations. The detailed FOSS license terms are available at the following web address: https://www.bosch-connectivity.com/parking-lot-sensor/downloads/



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