

BODAS Ultra Sonic Sensor USS



- ▶ Robust ultrasonic sensor for distance determination in the BODAS Ultra Sonic System

Features

- ▶ Distance measurement of up to 5.5 m with high accuracy
- ▶ Direct connection to the BODAS USS ECU
- ▶ Available with two connector orientations
- ▶ High IP protection class
- ▶ Compact design

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Ordering code

The BODAS USS sensor is available with two different hardware versions:

Designation	Order number
axial	F037.000.136
radial	F037.000.137

This only refers to the orientation of the connector.
The functions of both versions are identical.

Optional accessories

BODAS-service software

The windows-based BODAS-service PC software (data sheet 95086) is used for configuration and setting of sensors and filters of functions etc. via a PC.

BODAS USS ECU

The BODAS USS ECU enables optimum evaluation and compilation of the sensor information. Additionally, the ECU serves as supply voltage for the sensors.

Description

The BODAS Ultra Sonic Sensor is an ultrasonic sensor for distance determination of objects. It is ideally tailored to the BODAS Ultra Sonic System ECU. The sensors are connected to the ECU via a three-pin proprietary directional interface. Up to 12 sensors can be used with the same system. With an accuracy of approx. 2% and a measuring range of 0.15 to 5.5m, this sensor is suitable for numerous mobile applications. By means of a special app in BODAS-service 4, the sensors within the system can be individually adjusted and specific filters be applied. The sensors are designed for mobile application on mobile machines and can be easily installed in existing body components thanks to their robust and compact design.

Technical data

Type	USS		
Nominal voltage			
Operating voltage	V	8 to 16 (12 nominal)	
Current consumption			
in idle	mA	<17	
maximum (peak)	mA	<570	
Distance measurement			
Measuring range	mm	150...5500	
Accuracy		<1 m: 15mm...20mm >1 m: 2%	
Measuring frequency	Hz	43...60	
Interface	proprietary interface to ECU		
Permissible operating temperature	°C	-40 to +85	
Type of protection	IPX9K		
Weight	g	14	
Dimensions			
Outer diameter	mm	23	
Sensor body	mm	26 x 28 (D x W)	
Mating connector	3-pin Hirschmann		

Qualification tests

Temperature test	High temperature storage and low temperature storage according to DIN EN 60068-2
Salt spray test	DIN EN 60068-2-11
Chemical resistance test	according to ISO 16750-5
Protection class tests	according to ISO 20653 IP6KX, IPX6K, IPX8, IPX9K
Mechanical tests	Vibration according to IEC 60068-2-64 Mechanical shock according to IEC 60068-2-27
EMC interference immunity tests	according to ISO 13766-1,2:2018 Interference immunity according to IEC 61000-6-2,4
EMC emission tests	UN ECE R10 Rev. 6 broadband/narrowband interference emission EN 13309 (CISPR 25) electromagnetic compatibility of machines with internal electrical system Interference emission according to EN IEC 61000-6-4
Electrostatic discharge test (ESD)	according to ISO 10605:2008
Transient tests	ISO 7637-2:2011 Test Puls 1,1b,2a,2b,3a,3b ISO 7637-3:2016 Test Puls a,b
General electrical test	Electrical loadings according to ISO 16750-2:2012

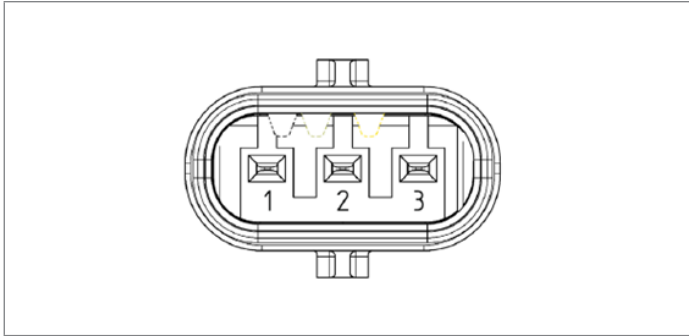
Electrical connection

Connector

The following connectors are compatible:

- ▶ Hirschmann 805-121-523 (coding C)
- ▶ Hirschmann 805-121-525 (coding Z/no-coding)

Pin assignment



Pin	Port	Description
1	V_SE	Supply voltage
2	Signal	Signal line
3	GND	Ground

The mating connector is not included in the scope of delivery.

The mating connector for the sensor is within the responsibility of the customer. The customer must ensure that ingress of humidity into the sensor port through the mating connector is prevented under any operating conditions.

Damage to the sensor wiring harness is not permissible. Damage at the wiring harness can lead to ingress of humidity into the sensor.

Any way of locking the sensor connector other than the method described here is not permissible.

Switching the sensor ports is not permissible as the sensor can be damaged. The sensor is not equipped with reverse polarity protection.

The sensor mating connector must only be plugged and unplugged when it is in a de-energized state.

Technical information on the wiring harness

The following minimum line cross-sections are to be used:

- ▶ Supply voltage, weight: 0.5 mm² / AWG 20
- ▶ Signal line: 0.35 mm² / AWG 21-22

The maximum line length between ECU and sensor is 10m.

The data line must be bundled and routed in parallel to the supply and ground line:

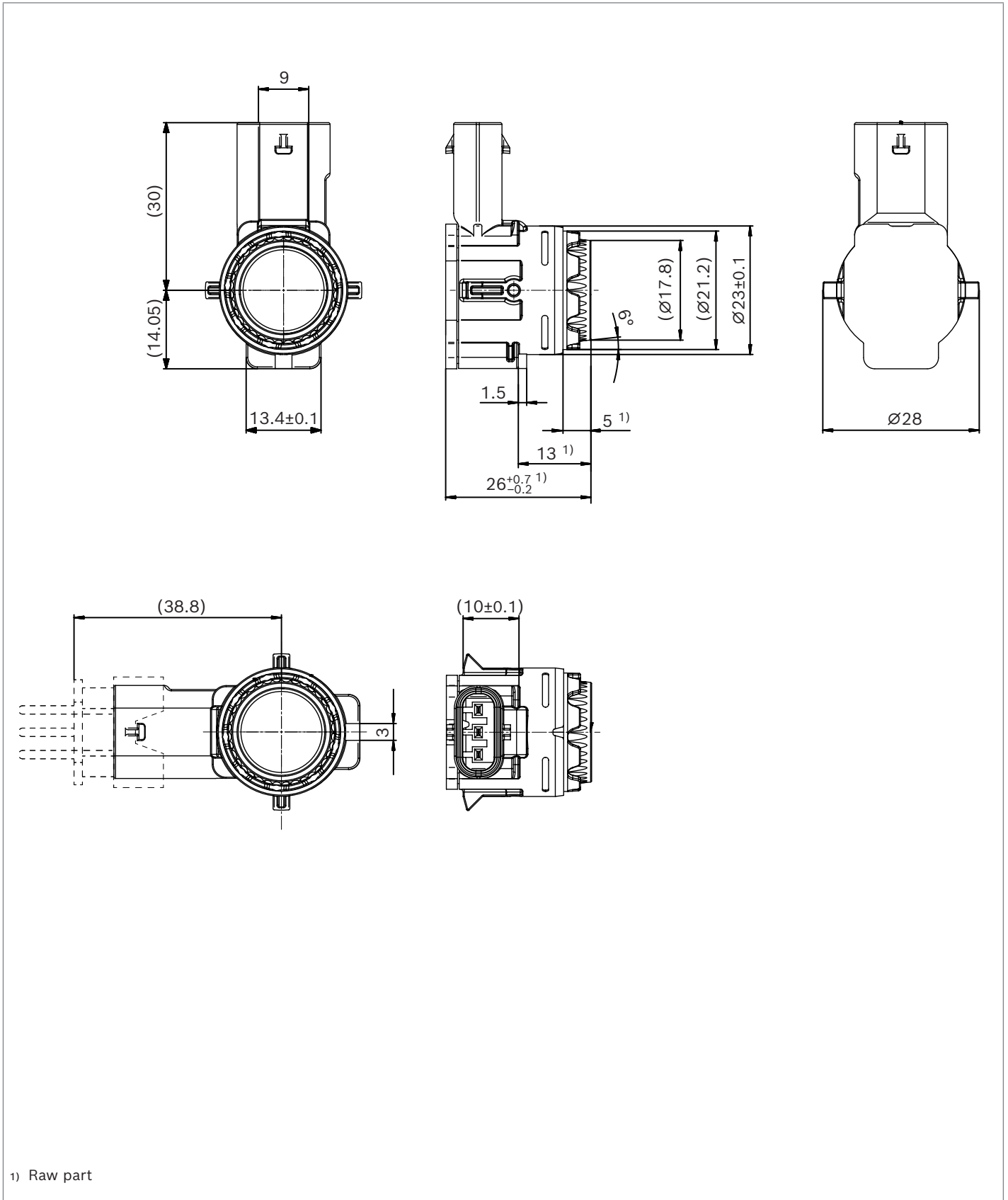
- ▶ Maximum distance of 5mm (4mm on average) referred to the line center
- ▶ Before and after the connector, the distance may only deviate by 50mm.
- ▶ A maximum of two additional plug connectors are permissible for the wiring harness connection.

The maximum difference in length between the data and ground/supply line must not exceed 0.2m.

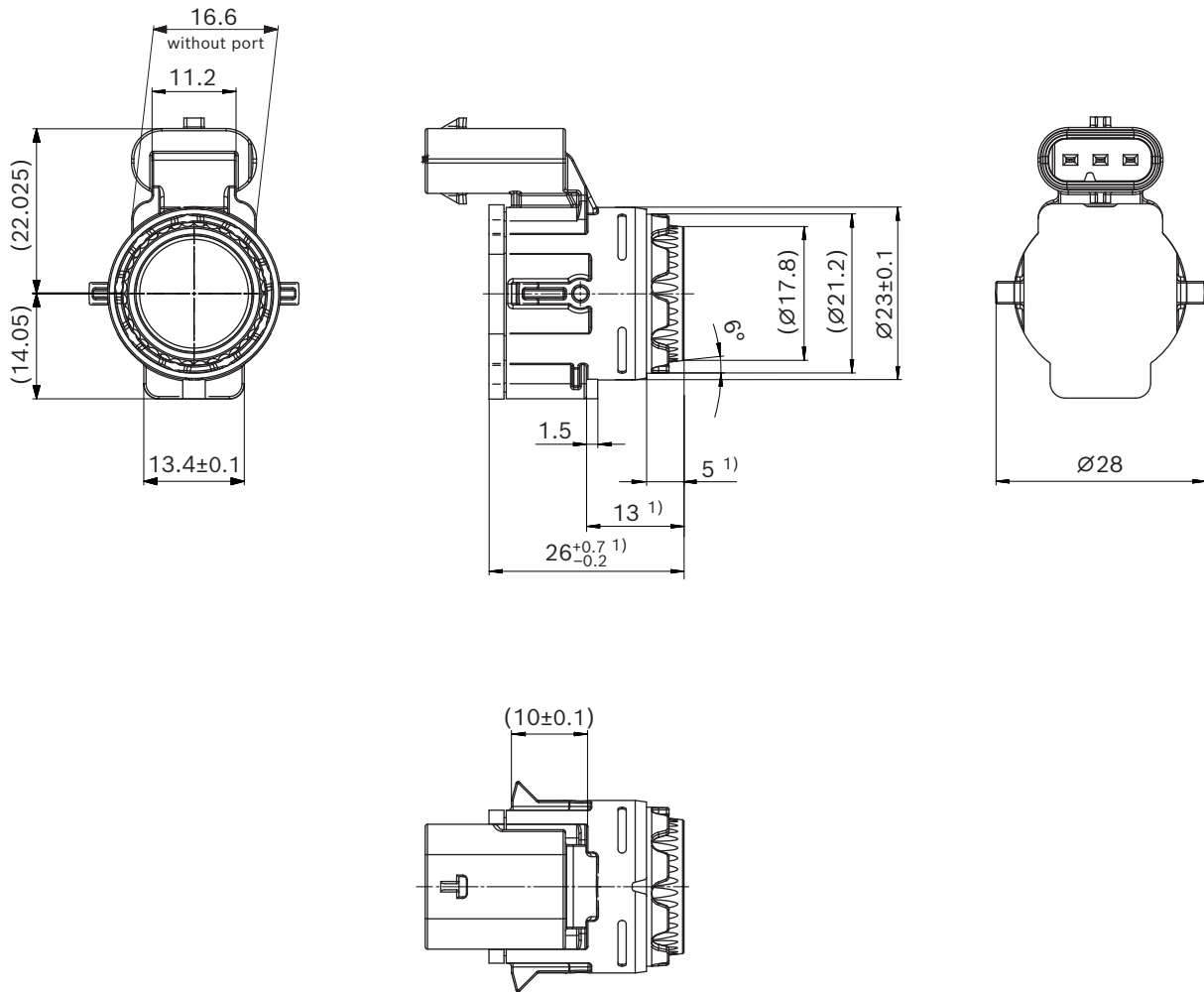
- ▶ If possible, lines should be routed in the vehicle interior. If the lines are routed outside of the vehicle, their secure mounting is to be ensured.
- ▶ Lines must not be kinked or twisted, must not rub against edges and must not be routed through sharp-edged ducts without protection.

Dimensions

Radial connector orientation



Axial connector orientation



1) Raw part

Installation instructions

- ▶ The sensor must always be mounted with decoupling ring.
- ▶ Decoupling rings from external suppliers not approved by Bosch Rexroth must not be used. Use of non-approved decoupling rings can lead to relevant safety situations.
- ▶ When inserting the sensor module into the sensor bracket, make sure that the decoupling ring is correctly installed and not damaged or shifted during insertion. Coiled or jammed external decoupling rings are not permissible.
- ▶ Do not apply any torque on the membrane and/or the sleeve.
- ▶ Do not use sharp tools and objects at the sensor membrane.
- ▶ Mechanical loads and particularly radial forces on the membrane during installation and handling must be avoided.
- ▶ Additional coating/painting of the membrane is not permissible.
- ▶ Lamination with color films or use of protective films on the membrane is not permissible.

Safety instructions

General instructions

- ▶ Before finalizing your design, request a binding installation drawing.
- ▶ The proposed circuits do not imply any technical liability for the system on the part of Bosch Rexroth.
- ▶ Opening the sensor or carrying out modifications to or repairs on the sensor is prohibited. Modification or repairs to the wiring could result in dangerous malfunctions.
- ▶ The sensor may only be assembled/disassembled in a de-energized state.
- ▶ System developments, installations and commissioning of electronic systems for controlling hydraulic drives must only be carried out by trained and experienced specialists who are sufficiently familiar with both the components used and the complete system.
- ▶ When commissioning the sensor, the machine may pose unforeseen hazards. Before commissioning the system, you must therefore ensure that the vehicle and the hydraulic system are in a safe condition.
- ▶ Make sure that nobody is in the machine's danger zone.
- ▶ Do not use defective components or components which are not in a proper working order. If the sensor fails or demonstrates a faulty operation, it must be replaced.
- ▶ Despite the greatest care being taken when compiling this document, it is impossible to consider all feasible applications. If information on your specific application is missing, please contact Bosch Rexroth.
- ▶ The use of sensors by private users is not permissible, since these users do not typically have the required level of expertise.

Information on installation location and position

- ▶ Do not assemble the sensor close to parts that generate considerable heat (e.g., exhaust).
- ▶ Lines are to be routed with sufficient distance from hot or moving vehicle parts.
- ▶ A sufficient distance to radio systems must be maintained.
- ▶ Before electric welding and painting operations, the sensor must be disconnected from the power supply and the sensor connector must be removed.
- ▶ Cables/wires must be sealed individually to prevent water from entering the sensor.

Notes on transport and storage

- ▶ Please examine the sensor for any damage which may have occurred during transport. If there are obvious signs of damage, please inform the transport company and Bosch Rexroth immediately.
- ▶ If the sensor is dropped, it is not permissible to use it any longer, as invisible damage could have a negative impact on reliability.

Intended use

- ▶ The sensor is designed for use in mobile working machines provided no limitations/restrictions are made to certain application areas in this data sheet.
- ▶ Operation of the sensor must generally occur within the operating ranges specified and approved in this data sheet, particularly with regard to voltage, temperature, vibration, shock and other described environmental influences.
- ▶ Its use outside of these specified and approved boundary conditions may result in danger to life and/or cause damage to components which could result in sequential damage to the mobile working machine.
- ▶ Serious personal injury and/or damage to property may occur in case of non-compliance with the appropriate regulations.

Improper use

- ▶ Any use of the sensor other than that described in chapter "Intended use" is considered to be improper use.
- ▶ Its use in explosive areas is not permissible.
- ▶ Damage resulting from improper use and/or from unauthorized interference in the component not described in this data sheet render all warranty and liability claims void with respect to the manufacturer.

Use in safety-related functions

- ▶ The customer is responsible for performing a risk analysis of the mobile working machine and determining the possible safety-related functions.
- ▶ In safety-related applications, the customer is responsible for taking proper measures for achieving the desired level of safety (sensor redundancy, plausibility check, emergency switch...).
- ▶ Product data that is required for the safety assessment of the machine is included in this data sheet.

Disposal

- ▶ The sensor and its packaging must be disposed of according to the national environmental regulations of the country in which the sensor is used.

Further information

- ▶ Further information about the sensor can be found at www.boschrexroth.com/mobile-electronics.

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