

PSI-WL-RS232-RS485/BT/...



PSI Bluetooth converter

(The products are offered exclusively for export outside the EU and the European Economic Area.)

Data sheet

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1 Description

The **PSI-WL-RS232-RS485/BT/2DO** PSI Bluetooth converter provides a quick and easy wireless connection between serial interfaces of the RS-232, RS-422, and RS-485 2-wire standard. Data connections can be established to third-party devices. Programming or diagnostic access to controllers or a wireless master/slave network can easily be implemented in fieldbus systems regardless of the location.

The PSI Bluetooth converter has been specially designed to meet the requirements of industrial environments and supports operation without software drivers, thanks to its fully integrated protocol stacks.

The wireless connection is based on the international, license-free Bluetooth standard. This wireless standard meets high requirements for interference-free data transmission, in particular through the use of the FHSS (frequency-hopping spread spectrum) method with the 2.4 GHz ISM band.

Features

- Supply of 24 V DC or AC
- Transmission speed can be set up to 187.5 kbps
- Either RS-232, RS-422 or RS-485
- External antenna connection for optimum antenna positioning
- Bluetooth access protected by password, fixed device pairing or device access list
- Scalable transmission power for specific, spatial containment of the wireless cell
- Integrated Bluetooth path diagnostics via LED bar graph
- Two digital diagnostic outputs (**not** in the case of the PSI-WL-RS232-RS485/BT/HL product version)
- 79 channels, bandwidth: 79 MHz



NOTE: device damage

The device is only intended for operation in the control cabinet and with SELV according to IEC 60950/EN 60950/VDE 0805. The device may only be connected to devices, which meet the requirements of EN 60950.



Make sure you always use the latest documentation. It can be downloaded from the product at phoenixcontact.net/products.



This document is valid for the products listed in the "Ordering data".

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3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
Bluetooth converter, wireless transmission: RS-232/RS-422/RS-485 2-wire, mounting on EN DIN rails, MCX connection for external antenna, integrated path diagnostics: bar graph + two digital outputs	PSI-WL-RS232-RS485/BT/2DO	2313805	1
Bluetooth PROFIBUS SET, pre-configured: PROFIBUS point-to-point, PROFIBUS baud rate: 187.5 kbps, integrated path diagnostics: bar graph + two digital outputs, contents: 2 x Bluetooth converter + 2 x antenna	PSI-WL-PROFIB/BT-SET/2DO	2313876	1
Bluetooth convertor, wireless transmission: RS-232/RS-422/RS-485 2-wire, mounting on EN DIN rails, MCX connection for external antenna, integrated path diagnostics: bar graph, UL-HazLoc approval	PSI-WL-RS232-RS485/BT/HL	2313795	1
Accessories	Type	Order No.	Pcs./Pkt.
RS-232 cable, 9-pos. D-SUB socket on 9-pos. D-SUB socket, 9-wire, 1:1	PSM-KA9SUB9/BB/0,5METER	2708520	1
RS-232 cable, 9-pos. D-SUB socket on 9-pos. D-SUB socket, 9-wire, 1:1	PSM-KA9SUB9/BB/2METER	2799474	1
D-SUB plug, 9-pos. female connector, one cable entry < 35°, universal type for all systems, pin assignment: 1, 2, 3, 4, 5, 6, 7, 8, 9 to screw connection terminal block	SUBCON 9/F-SH	2761499	1
V.24 (RS-232) zero modem connector	PSM-AD-D9-NULMODEM	2708753	1
USB 2.0 cable, USB A male plug to mini-USB B male plug, length: 1 m	PSI-CA-USB A/MINI B/1METER	2313575	1
USB connecting cable: USB plug type A to USB plug type Mini-B; length: 3 m	CABLE-USB/MINI-USB-3,0M	2986135	1
Connecting cable D-9-SUB to USB, with adapter D-9-SUB to D-25-SUB.	CM-KBL-RS232/USB	2881078	1
RS-232 cable, 9-pos. D-SUB socket 25-pos on D-SUB socket	PSM-KA 9 SUB 25/BB/2METER	2761059	1
Adapter cable to connect the IB IL RS232 and IB IL RS232-PRO Inline communication terminals to the interface converter, e.g. modem, Com server, Bluetooth or fiber optics.	PSM-KAD-IL RS232/9SUB/B/0,8M	2319200	1
DIN rail connector for DIN rail mounting. Universal for TBUS housing. Gold-plated contacts, 5-pos. Header, Nominal current: 8 A, Number of positions: 5, Pitch: 3.81 mm, Articles with gold-plated contacts, bus connectors for connecting with electronic housings	ME 17,5 TBUS 1,5/ 5-ST-3,81 GN	2709561	10
Plug component, Nominal current: 8 A, Nominal current (Ex): 8 A, Nominal voltage (Ex): 125 V, Number of positions: 5, Pitch: 3.81 mm, Articles with gold-plated contacts, bus connectors for connecting with electronic housings	ME 22,5 TBUS 1,5/ 5-ST-3,81 GN	2707437	50
Primary-switched MINI POWER supply for DIN rail mounting, input: 1-phase, output: 24 V DC/1.5 A	MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
Omnidirectional antenna, 2.4 GHz, 2 dBi, linear vertical, 1.5 m cable, MCX (male), IP65, 50 Ω impedance	RAD-ISM-2400-ANT-OMNI-2-1	2867461	1
Omnidirectional antenna with protection against vandalism, 2.4 GHz, 3 dBi gain, IP55 protection, 1.5 m cable length, MCX (male) connection, opening angle h/v 360°/85°. Appropriate mounting material is available for wall mounting.	RAD-ISM-2400-ANT-VAN- 3-1-MCX	2885702	1
Omnidirectional antenna, 2.4 GHz, 6 dBi, linear vertical, opening angle h/v 360°/30°, N (female), IP55, incl. mounting bracket and mast clips for 45 mm - 100 mm diameter, stainless steel, ATEX & IECEx approval	RAD-ISM-2400-ANT-OMNI-6-0	2885919	1
Omnidirectional antenna, 2.4 GHz, 6 dBi, linear vertical, opening angle h/v 360°/20°, N (female), IP65, salt water resistant	RAD-2400-ANT-OMNI-6-0-SW	2903219	1
Panel antenna, 2.4/5 GHz, 9 dBi, linear vertical, N (female), IP67, incl. mounting bracket and mast clips for 25 mm - 85 mm diameter, stainless steel, ATEX & IECEx approval	ANT-DIR-2459-01	2701186	1
Panel antenna, degree of protection IP55, 8 dBi gain, linear vertical, SMA (female), impedance 50 ohms, apex angle h/v 75°/70°	RAD-ISM-2400-ANT-PAN- 8-0	2867610	1

Accessories	Type	Order No.	Pcs./Pkt.
Antenna cable, 3 m in length; SMA (male) -> SMA (male), attenuation approx. 0.93 dB at 2.4 GHz; impedance 50 Ω	RAD-CAB-EF142-3M	2884512	1
Antenna cable, 5 m in length; SMA (male) -> SMA (male), attenuation approx. 0.93 dB at 2.4 GHz; impedance 50 Ω	RAD-CAB-EF142-5M	2884525	1
Antenna cable, 3 m in length, N (male) -> N (male), 50 Ω impedance	RAD-CAB-EF393- 3M	2867649	1
Antenna cable, 5 m in length, N (male) -> N (male), 50 Ω impedance	RAD-CAB-EF393- 5M	2867652	1
Antenna cable, 10 m in length, N (male) -> N (male), 50 Ω impedance	RAD-CAB-EF393-10M	2867665	1
Antenna extension cable, 15 m in length, N (male) -> N (male), 50 Ω impedance	RAD-CAB-EF393-15M	2885634	1
Vulcanizing sealing tape for external protection of adapters, cable connections, etc. against the effects of weather, roll length: 3 m	RAD-TAPE-SV-19-3	2903182	1
Adapter cable, 100 cm pigtail, MCX (male) -> SMA (male), 50 Ω impedance	RAD-PIG-EF316-MCX-SMA	2867678	1
Adapter cable, 50 cm pigtail, MCX (male) -> N (male), 50 Ω impedance	RAD-PIG-EF316-MCX-N	2867681	1
Adapter cable, 30 cm pigtail, N (female) -> SMA (male), 50 Ω impedance	RAD-PIG-EF316-N-SMA	2867694	1
Adapter cable, 50 cm pigtail, N (male) -> N (female), 50 Ω impedance	RAD-PIG-EF316-N-N	2867704	1
Attachment plug with Lambda/4 technology as surge protection for coaxial signal interfaces. Connection: N connectors socket-socket	CN-LAMBDA/4-5.9-BB	2838490	1
Adapter, SMA (female) -> SMA (female); insertion attenuation <0.3 dB at 2.4 GHz	RAD-ADP-SMA/F-SMA/F	2884541	1
Adapter, N (male) -> SMA (female); insertion attenuation <0.3 dB at 2.4 GHz	RAD-ADP-N/M-SMA/F	2917036	1

4 Technical data

Supply	
Supply voltage range	10 V DC ... 30 V DC (via pluggable COMBICON screw terminal block) 19 V AC ... 29 V AC (50/60 Hz)
Nominal supply voltage	24 V DC ±20 % (as an alternative or redundant, via backplane bus contact and system current supply)
Typical current consumption	≤ 100 mA (24 V DC)
Electrical isolation	VCC // Bluetooth, RS-232, RS-422, RS-485, USB
Test voltage data interface/power supply	1.5 kV AC (50 Hz, 1 min.)
Torque	0.56 Nm ... 0.79 Nm

V.24 (RS-232) interface in acc. with ITU-T V.28, EIA/TIA-232, DIN 66259-1

Connection method	D-SUB-9 plug
Data format/encoding	Serial asynchronous UART/NRZ, 8 data, 1/2 stop, 1 parity, 10/11-bit character length
Serial transmission speed	1.2; 2.4; 4.8; 7.2; 9.6; 19.2; 31.25; 38.4; 57.6; 75; 93.75; 115.2 kbps
Transmission length	≤ 15 m
Data flow control/protocols	Software handshake, Xon/Xoff, or hardware handshake RTS/CTS, 3964 compatible
Pin assignment	DCE (Data Communication Equipment)



The RS-232 interface and the USB interface cannot be used simultaneously.

RS-422 interface in acc. with ITU-T V.11, EIA/TIA-422, DIN 66348-1

Connection method	Pluggable screw connection
Data format/encoding	Serial asynchronous UART/NRZ, 8 data, 1/2 stop, 1 parity, 10/11-bit character length
Termination resistor	390 Ω - 180 Ω - 390 Ω configurable
Serial transmission speed	1.2; 2.4; 4.8; 7.2; 9.6; 19.2; 31.25; 38.4; 57.6; 75; 93.75; 115.2; 136; 187.5 kbps
Transmission length	≤ 1200 m
Data flow control/protocols	Automatic control

RS-485 interface, in acc. with EIA/TIA-485, DIN 66259-4/RS-485 2-wire

Connection method	Pluggable screw connection
Data format/encoding	Serial asynchronous UART/NRZ, 8 data, 1/2 stop, 1 parity, 10/11-bit character length
Termination resistor	390 Ω - 180 Ω - 390 Ω configurable
Serial transmission speed	1.2; 2.4; 4.8; 7.2; 9.6; 19.2; 31.25; 38.4; 57.6; 75; 93.75; 115.2; 136; 187.5 kbps
Transmission length	≤ 1200 m
Data flow control/protocols	Automatic control

USB 2.0

Connection method	Mini-USB B, socket
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Wireless interface

Interface description	Bluetooth 2.1 + EDR
Frequency range	2.402 GHz ... 2.48 GHz (ISM bandwidth)
Antenna	External
Connection method	MCX socket
Channel distance	1 MHz
Transmission method	1.6 kHz (FHSS)
Transmit capacity, maximum	14 dBm (Outside of Europe, adjustable via software) 10 dBm (Europe, can be set via software) 10 dBm (Default setting, adjustable)
Minimum receiver sensitivity	-91 dBm
Bluetooth Multidrop master/slave	1/7
Operating mode	GAP: Generic Access Profile (Method for authentication and connection establishment) SDAP: Service Discovery Application (Method for requesting supported services) SPP: Serial Port Profile (COM port emulation method) DUN: Dial-Up Networking Profile (Modem dialing method) LAP: LAN Access Point Profile (Network connection method)

Digital outputs

Number of outputs	2
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General data

Degree of protection	IP20
Dimensions (W/H/D)	22.5 mm x 99 mm x 116 mm
Housing material	PA 6.6-FR green
Free fall in acc. with IEC 60068-2-32	1 m
Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6	5g, 150 Hz, 2.5 h, in XYZ direction
Shock in acc. with EN 60068-2-27/IEC 60068-2-27	15g, 11 ms period, half-sine shock pulse
MTTF (mean time to failure) SN 29500 standard, temperature 25°C, operating cycle 21 % (5 days a week, 8 hours a day)	2115 Years
MTTF (mean time to failure) SN 29500 standard, temperature 40 °C, operating cycle 34.25 % (5 days a week, 12 hours a day)	850 Years
MTTF (mean time to failure) SN 29500 standard, temperature 40°C, operating cycle 100 % (7 days a week, 24 hours a day)	346 Years
Noise emission according to	EN 55011
Noise immunity according to	EN 61000-6-2:2005
Electromagnetic compatibility	Conformance with R&TTE Directive 1999/5/EC (outdated)

Ambient conditions

Ambient temperature (operation)	-20 °C ... 60 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity (operation)	10 % ... 95 % (non-condensing)
Permissible humidity (storage/transport)	5 % ... 95 % (non-condensing)
Altitude	5000 m (For restrictions see manufacturer's declaration)

Approvals / Certificates

Conformance	EAC
Free from substances that could impair the application of coating	according to P-VW 3.10.7 57 65 0 VW-AUDI-Seat central standard
UL, USA / Canada	cULus listed UL 508
Standards/regulations	FCC Part 15.247 / ISC RSS 210

Conformance with R&TTE Directive 1999/5/EC (outdated)**Noise immunity according to EN 61000-6-2**

Electrostatic discharge	EN 61000-4-2	
	Contact discharge	± 6 kV
	Discharge in air	± 8 kV
	Comments	Criterion B
Electromagnetic HF field	EN 61000-4-3	
	Frequency range	80 MHz ... 3 GHz
	Field intensity	10 V/m
	Comments	Criterion A
Fast transients (burst)	EN 61000-4-4	
	Input	± 2 kV
	Signal	± 2 kV
	Comments	Criterion B
Surge current loads (surge)	EN 61000-4-5	
	Input	± 2 kV
	Signal	± 1 kV
	Comments	Criterion B
Conducted interference	EN 61000-4-6	
	Voltage	10 V
	Comments	Criterion A

Emitted interference in acc. with EN 61000-6-4

Noise emission EN 55022

Criterion A Normal operating behavior within the specified limits
 Criterion B Temporary impairment of operating behavior that is corrected by the device itself

R&TTE Directive 1999/5/EC (outdated)

EMC - immunity to interference (electromagnetic compatibility of wireless systems)	EN 61000-6-2	Generic standard for the industrial sector
Safety - protection of personnel with regard to electrical safety	EN 60950-1	
Health - limitation of exposure of the population to electromagnetic fields	EC Gazette 1999/519/EC	EC Council recommendation of July 12, 1999
Radio - effective use of the frequency spectrum and prevention of radio interference	EN 300328	

4.1 Configuration

Configuration	PSI-WL-RS232-RS485/BT/...	PSI-WL-PROFIB/BT-SET/2DO
System requirements	Windows operating system, Windows XP or later	
Configuration interface	USB, RS-232 or Bluetooth	
Delivery state	9.6 kbps, no parity, 1 stop bit, hardware handshake	187.5 kbps, even parity, 1 stop bit, 8 data bits, no hardware handshake



Configure the device with the configuration software in CONF mode via the RS-232 or USB interface. Either configure the directly connected device or the device that is connected via Bluetooth.

The PSI-WL-PROFIB/BT-SET/2DO devices are preconfigured for a PROFIBUS connection.

The PSI-CONF configuration software and further information can be found at phoenixcontact.net/products.

4.2 Dimensions

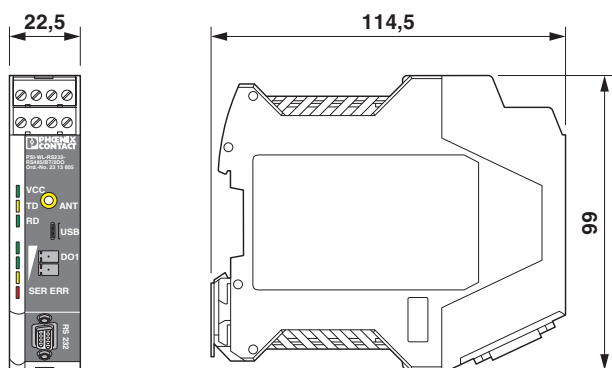


Figure 1 Dimensions

5 Safety and warning notes



WARNING:

Observe the following safety notes when using the device.

Only qualified specialists staff may install, set up and operate the device. Observe the national safety rules and regulations for the prevention of accidents.

- Installation should be carried out according to the instructions provided in the operating instructions. Access to circuits within the device is not permitted.
- The device does not require maintenance. Repairs may only be carried out by the manufacturer.
- The device is only intended for operation in the control cabinet and with SELV according to IEC 60950/EN 60950/VDE 0805. The device may only be connected to devices, which meet the requirements of EN 60950.



The products are offered exclusively for export outside the EU and the European Economic Area.

This device complies with R&TTE device class 1, with the following restrictions on use according to ERC recommendation 70-03:

Turkey The device must only be operated with Phoenix Contact antennas - according to the regulations in Gazette "Short Range Radio Devices (SRD) Regulations" no. 26464 dated 16/03/2007.

Operation of the wireless system is only permitted only when using accessories available from Phoenix Contact. The use of any other components can lead to the withdrawal of the operating license.



You can find the approved accessories for this wireless system listed with the item at phoenixcontact.net/products.

- Please note that, in combination with antennas, the maximum permissible transmission power of the device may be exceeded.
- Set the transmission power via the software.



The Bluetooth converter does **not** support the SIMATIC® PCS 7 process control system.

5.1 UL note (only for PSI-WL-RS232-RS485/BT/2DO and PSI-WL-PROFIB/BT-SET/2DO)



Wire Range: 30-12 AWG

Torque: 5-7 (Lbs-Ins)

"Maximum Ambient Temperature 60°C"

Environmental designation: "Open Type Device"

5.2 UL note (only for PSI-WL-RS232-RS485/BT/HL with HazLoc approval)



WARNING: Explosion hazard when used in potentially explosive areas

Use the digital outputs DO1 and DO2 within the safe area only. They are **not** suitable for use in a potentially explosive area.

INDUSTRIAL CONTROL EQUIPMENT 11AE

10 ... 30 V DC <170 mA, 24 V AC \pm 20 % <110 mA,
Class 2

Wire Range: 30-12 AWG

Torque: 5-7 (Lbs-Ins)

Maximum Ambient Temperature 60°C

Environmental designation: "Open Type Device"

PROCESS CONTROL EQUIPMENT FOR HAZARDOUS LOCATIONS 31ZN

- A This equipment is suitable for use in Class I, Zone 2, AEx nA IIC T6; Class I, Zone 2, Ex nA IIC T6 Gc X and Class I, Division 2, Groups A, B, C, D or non-hazardous locations only.
- B Conductor temperature rating must be 65°C or higher.
- C Product must be installed in Class I, Zone 2 certified and at least an IP54 enclosure.
- D Product must be used in no more than a degree of pollution 2 environment as defined by IEC 60664-1.
- E Provisions must be made to provide transient protection to the product so that voltage levels do not exceed 40 % of the rated voltage at the power supply terminals.
- F The product has to be installed in an enclosure with tool removable cover or door.

Ambient temperature: -20°C ... +60°C

24 V AC <100 mA, 24 V DC <170 mA

Wire Range: 30-12 AWG

Torque: 5-7 (Lbs-Ins)

6 Structure

6.1 Function elements

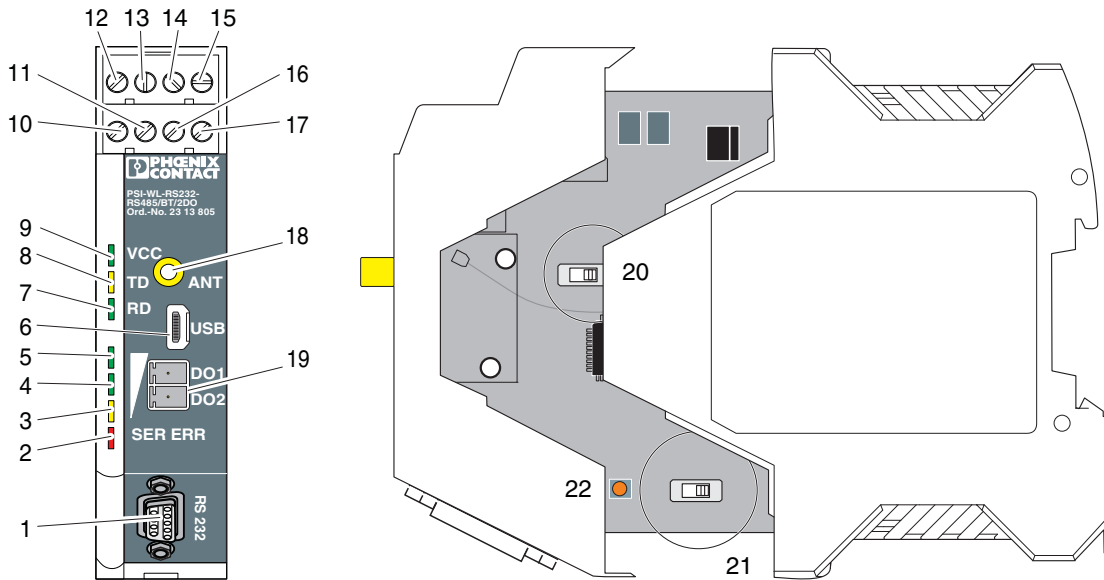


Figure 2 Function elements

- 1 D-SUB9: RS-232 interface (pin strip)
- 2 Red LED, SER ERR, flashes in the event of any serial error, e.g., parity, transmission speed
- 3 ... 5 LED bar graph
- 6 Mini-USB type B: USB interface
- 7 Green LED, RD, receive data
- 8 Yellow LED, TD, transmit data
- 9 Green LED, VCC
- 10 Shield connection, same potential as FE
- 11 GND
- 12 24 V 24 V DC supply voltage
- 13 0 V 0 V DC supply voltage
- 14 T(A) RS-422 connection, negative
- 15 T(B) RS-422 connection, positive
- 16 D(A) RS-422/485 connection, negative
- 17 D(B) RS-422/485 connection, positive
- 18 Antenna connection (MCX socket)
- 19 DO1, DO2 Digital output of the wireless signal strength (only for use in safe areas)
- 20 Slide switch for RS-422/485 termination network
- 21 CONF / RUN slide switch
- 22 Reset button

6.2 Diagnostics and status indicators

A 3-stage LED bar graph displays the wireless reception quality during operation.

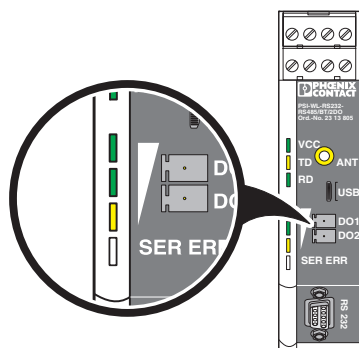


Figure 3 Diagnostics indicators in normal operation

Bar graph	LEDs	Receive signal	DO 1	DO 2
	All LEDs light up	Wireless signal very good	1	1
	Yellow and 1 green LEDs light up	Wireless signal good	1	0
	Yellow LED lights up	Wireless signal available	0	1
	OFF	Not connected	0	0

6.3 Digital diagnostic outputs

Note for the PSI-WL-RS232-RS485/BT/HL product version with HazLoc approval:



WARNING: Explosion hazard when used in potentially explosive areas

Use the digital outputs DO1 and DO2 within the safe area only. They are **not** suitable for use in a potentially explosive area.

In addition, the current signal quality can be read via digital outputs DO1/DO2. A coded status of the bar graph LEDs is output here and can be processed externally. The 24 V supply voltage is output via an optocoupler with a maximum current carrying capacity of 120 mA.

Diagnostic outputs	
Connection	MINI COMBICON connector, 2-pos., maximum 1.5 mm ²
Function	Digital output of current Bluetooth receive quality, output of the supply voltage via optocoupler
Maximum current carrying capacity	120 mA
Separate potential levels	VCC // Logic
Test voltage	1.5 kV AC, 50 Hz, 1 minute between all potential levels according to EN 50178 and EN 61131-2



Only for PSI-WL-RS232-RS485/BT/2DO and PSI-WL-PROFIB/BT-SET/2DO:

A 2-pos. MINI COMBICON connector (Order No. 1803578) for outputs DO1/DO2 is supplied as standard.



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