PSI-WL-RS232-RS485/BT

PSI Bluetooth Converter

INTERFACE

Data Sheet
102403_03_en

Description

The PSI Bluetooth converter provides a quick and easy wireless connection between serial interfaces of the V.24 (RS-232), RS-422, and RS-485 2-wire standard. Data connections can be established to third-party devices or the PSI-WL-PLUG-RS232/BT PSI Bluetooth RS-232 adapter. Program and diagnostic access to control systems or a wireless master/slave network can easily be implemented in fieldbus systems regardless of the location.

The PSI-WL-RS232-RS485/BT 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 can extend up to 150 m and 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 method (Frequency Hopping Spread Spectrum) with the 2.4 GHz ISM band.

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If you have any technical problems, which you cannot resolve with the aid of this documentation, please contact us during the usual office hours at:

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Make sure you always use the latest documentation.
It can be downloaded at www.download.phoenixcontact.com.

A conversion table is available on the Internet at
www.download.phoenixcontact.com/general/7000_en_00.pdf.

Ordering Data

PSI Bluetooth Converter

Description	Type	Order No.	Pcs./Pck.
PSI Bluetooth converter for converting V.24 (RS-232)/RS-422/RS-485 2-wire to Bluetooth, range with omni-directional antenna up to 150 m, DIN rail mounting, 24 V supply; Scope of supply: DIN-rail mountable Bluetooth device, CD with configuration software, and user manual	PSI-WL-RS232-RS485/BT	2708517	1

Accessories

Description		Type	Order No.	Pcs./Pkt.
Lambda/4 antenna with omni-directional characteristics, mounting bracket Antenna cable with angled antenna connector Gain Degree of protection Dimensions	 1.50 m, MCX 0 dBi IP65 Ø 8.2 x 82.5 mm	RAD-ISM-2400-ANT-OMNI-2-1	2867461	1
Panel antenna with directional characteristics, mounting clamp, and antenna connection Gain Degree of protection Dimensions (H x W x D)	 Ø 40 mm ... 60 mm SMA 8 dBi IP55 101 x 80 x 20 mm	RAD-ISM-2400-ANT-PAN-8-0	2867610	1
Coaxial antenna cable for panel antenna Connections Attenuation Impedance	1 m MCX/SMA 2 dB 50 Ω	RAD-PIG-EF316-MCX-SMA	2867678	1
System power supply Primary-switched Input voltage range Nominal output voltage Nominal output current	 45 Hz ... 65 Hz 85 V AC to 264 V AC 24 V DC ±1% 1.5 A	MINI-SYS-PS-100-240AC/24DC/1.5	2866983	1
DIN rail bus connector		ME 22.5 TBUS 1.5/ 5-ST-3.81 GN	2707437	1
V.24 (RS-232) cable, 2 m, to connect the converter to a 9-pos. device interface	9-pos. D-SUB/ 9-pos. D-SUB (Female/female)	PSM-KA9SUB9/BB/2METER	2799474	1
V.24 (RS-232) cable, 2 m, to connect the converter to a 25-pos. device interface	9-pos. D-SUB/ 25-pos. D-SUB (Female/female)	PSM-KA9SUB25/BB/2METER	2761059	1
V.24 (RS-232)/USB converter, 1.8 m, to connect the converter to a USB interface	9-pos. or 25-pos. D-SUB/ USB Type A (Male/male)	CM-KBL-RS232/USB	2881078	1

Technical Data

Power Supply	
Supply voltage 1	10 V DC ... 30 V DC, 19 V AC ... 29 V AC Via plug-in COMBICON screw terminal block, protection against polarity reversal via bridge rectifier
Supply voltage 2 (alternative or redundant)	24 V DC ±20% Via backplane bus contact and appropriate system power supply, protection against polarity reversal via series diode
Frequency	DC or 50 Hz ... 60 Hz
Nominal current consumption	40 mA at 24 V DC, approximately 70 mA RMS at 24 V DC, approximately
LED indicators	VCC (green LED): – Steady light during operation in RUN mode – Flashing during operation in CONF mode

Configuration

System requirements	Windows 98 SE, 2000, NT4, XP
Configuration interface	V.24 (RS-232) or Bluetooth The system is configured in CONF mode via the V.24 (RS-232) interface and the configuration software supplied. Either the directly connected device is configured or the remote device is configured via Bluetooth.

Serial Interfaces

V.24 (RS-232) Interface

Physics	EIA/TIA RS-232
Connection	9-pos. D-SUB pin strip
Device type	DCE (Data Communication Equipment), with 1:1 cable to DTE (Data Terminal Equipment)
Signal assignment	TxD = 3, RxD = 2, RTS = 7, CTS = 8, DTR = 4, DSR = 6, GND = 5
Data format	Serial asynchronous UART/NRZ
Encoding	7/8 data, 1/2 stop, 1 parity, 10/11-bit character length, can be adjusted via software
Serial transmission speed	0.3, 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)
Data flow control	**Hardware handshake:** Termination device directly with the PSI Bluetooth converter via RTS/CTS with 187.5 kbps, maximum **Software handshake:** Xon/Xoff is negotiated directly between the termination devices. Setting on the PSI Bluetooth converter: "none" up to 38.4 kbps, maximum **Message-oriented protocols:** For example, Modbus, PROFIBUS, etc.: Setting on the PSI Bluetooth converter: "none" up to 93.75 kbps, maximum
Default upon delivery	9.6 kbps, 8 data, no parity, 1 stop bit, hardware handshake
LED indicator/serial data indicator	TD (yellow LED), dynamic, serial port is transmitting data RD (green LED), dynamic, serial port is receiving data
LED indicator/serial system diagnostics	SER ERR (red LED), parity error, handshake error, buffer data overrun

RS-422/RS-485 2-Wire Interface

Physics	EIA/TIA RS-422 and RS-485 2-wire, default upon delivery: V.24 (RS-232), can be switched via software
Connection	Plug-in COMBICON screw terminal block
Termination resistor/termination	390/150/390 Ω can be enabled, default upon delivery: OFF
Signal assignment for RS-422	Transmit positive = TB, Transmit negative = TA Receive positive = DB, Receive negative = DA Signal ground = GND, Shield = FE
Signal assignment for RS-485 2-wire	Transmit/Receive positive = DB Transmit/Receive negative = DA Signal ground = GND, Shield = FE

Bluetooth Interface

Physics	Bluetooth 2.0 specification
Frequency	2.402 GHz ... 2.480 GHz (ISM band)
Channel distance	1 MHz
Bandwidth	79 MHz
Number of channels	79
Transmission method	Adaptive Frequency hopping 1.6 kHz (AFH)
R&TTE device class	Class 2
Bluetooth device class	Class 1 = 20 dBm (100 mW), maximum
Transmission power	Default upon delivery: 20 dBm, can be adjusted via software -28 dBm ... +20 dBm
Range guide values (depending on the application environment)	20 dBm = 80 m to 150 m 10 dBm = 40 m to 70 m 0 dBm = 10 m to 30 m
Receiver sensitivity	-80 dBm at 0 dBi antenna gain
Antenna	External antenna, not included in the scope of supply (see list of accessories)
Antenna connection	MCX

Bluetooth Interface (Continued)	
Bluetooth profiles	– GAP / Generic Access Profile (access regulation) – SDAP / Service Discovery Application (device detection) – SPP / Serial Port Profile (serial transmission) – DUN / Dial-Up Networking Profile (internet dialing connection) – LAP / LAN Access Point Profile (network connection)
Number of Bluetooth masters/Bluetooth slaves	1x master/7x slaves
LED indicator/Bluetooth data indicator	BT SIGNAL (1x yellow LED flashing) Bluetooth is transmitting/receiving data
LED indicator/Bluetooth transmission quality	– BT SIGNAL (1x yellow LED, 2x green LEDs) Very good reception – BT SIGNAL (1x yellow LED, 1x green LED) Good reception – BT SIGNAL (1x yellow LED) Poor reception, close to the system reserve

General Data	
CE conformance	According to R&TTE directive 1999/5/EC
RoHs conformance	Yes
Approvals / radio approvals	
Europe	ETSI EN 300328, ETSI EN 300826
USA	UL 508 / UL 1604, FCC/CFR47 Part 15
Canada	RSS-210
Ambient operating temperature range	-20°C ... +60°C
Housing	ME 22,5 with 5-pos. ME-T bus contact and ground contact
Material	ABS-V0, green
Dimensions (H x W x D)	99 x 22.5 x 114.5 mm
Weight	120 g, approximately
Functional earth ground	Housing contact with DIN rail
Vibration resistance	Criterion A According to DIN EN 60068-2-6 5g, 2.5 h in each x, y, and z direction
Shock test (operation)	Criterion C According to DIN EN 60068-2-27 15g, 11 ms, half-sine shock pulse
Free fall	According to DIN EN 60950-1 from a height of 1 m (without packaging)
Degree of protection	IP20
Air and creepage distances	According to DIN EN 60664-1/VDE 0110-1, DIN EN 50178, DIN EN 60950-1
Separate ground levels	24 V (supply) // 5 V (logic) + serial ports // functional earth ground
Test voltage	1.5 kV AC, 50 Hz, 1 min. between all ground levels according to DIN EN 50178 and DIN EN 61131-2
Chloroform test	Free from substances that would hinder coating with paint or varnish according to central standard P-VW-3.10.757 650 of VW, Audi, and Seat

Conformance With EMC Directive 89/336/EC		
Electrostatic discharge (ESD)	EN 61000-4-2	Criterion B 8 kV air discharge 6 kV contact discharge
Electromagnetic HF field	EN 61000-4-3	Criterion A
Amplitude modulation		10 V
Pulse modulation		10 V
Fast transients (burst)	EN 61000-4-4	Criterion B
Signal		2 kV/2 min.
Power supply		2 kV/2 min.

Conformance With EMC Directive 89/336/EC (Continued)		
Surge current load (surge)	EN 61000-4-5	Criterion B
Signal		1 kV/42 Ω
Power supply		0.5 kV symmetrical/2 Ω 0.5 kV asymmetrical/12 Ω
Immunity to interference	EN 61000-4-6	Criterion A
Conducted interference		10 V
Noise emission		
Conducted emission	EN 55011	Class A
Radiated emission	ETSI EN 300328: V1.4.1, V1.2.1	

Conformance With R&TTE Directive 1999/5/EEC		
EMI		
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	ETSI EN 300328: V1.4.1, V1.2.1	

Block Diagram

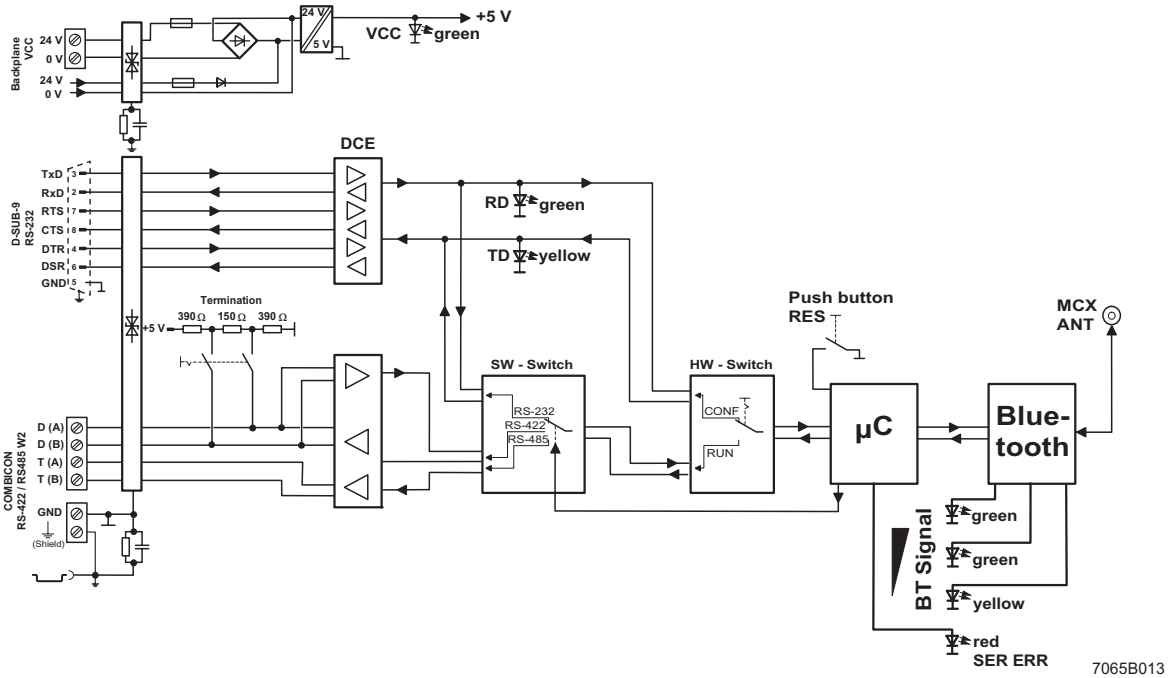


Figure 1 Block diagram

Housing Dimensions

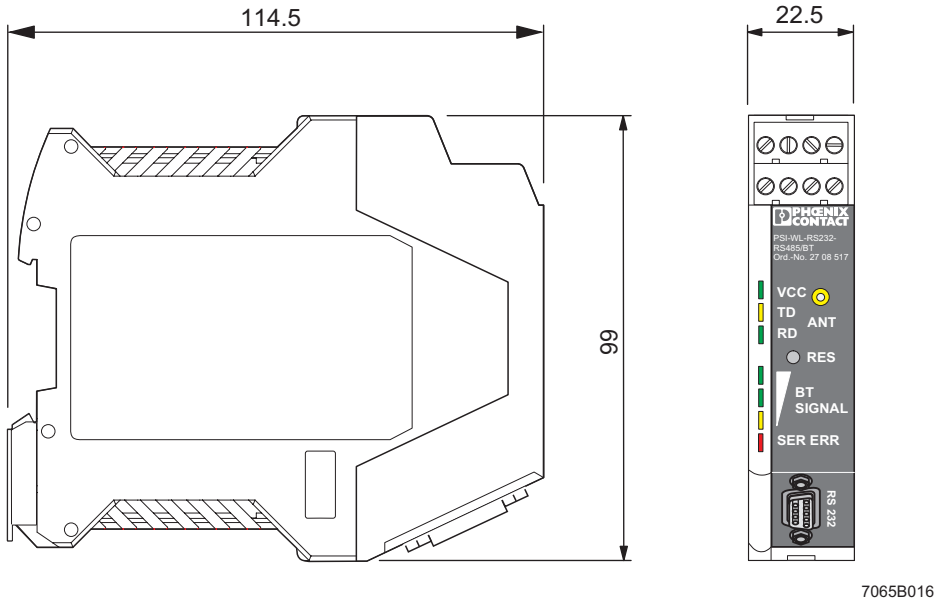


Figure 2 Housing dimensions (in mm)

International Approvals (As At 06/2007)

The PSI-WL-RS232-RS485/BT has a maximum transmission power of 100 mW (20 dBm) and corresponds to R&TTE device class 2. At the time of going to print, the operation of this device had been approved/notified for the following countries:

European Union (EU)

Austria, Belgium, Czech Republic, Cyprus, Denmark, Estonia, Finland, France[1], Germany, Great Britain, Hungary, Ireland, Italy[2], Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden.

Europe (excluding EU)

Iceland, Norway (excluding Spitzbergen), Switzerland

North America

Canada, USA

1 Outside buildings, a maximum transmission power of 10 mW (10 dBm) is permitted.

2 A license is required to use the adapter outside buildings. A maximum transmission power of 10 mW (10 dBm) is permitted.

Operating Elements

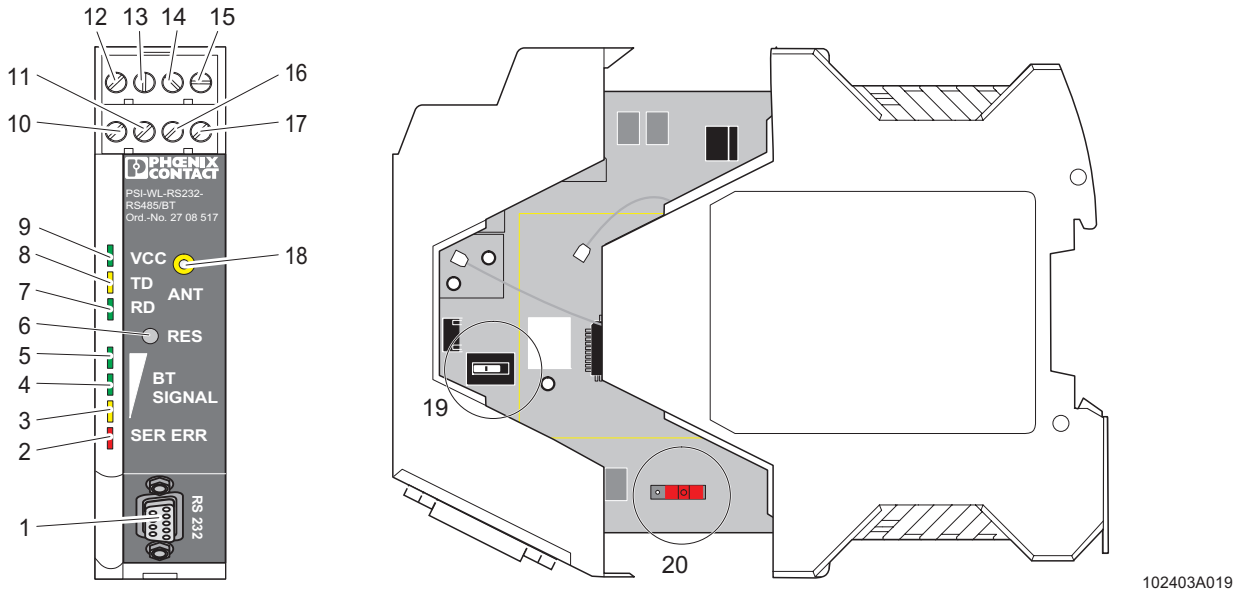


Figure 3 Operating elements

1 V.24 (RS-232) data interface, 9-pos. D-SUB
2 Red LED (SER ERR)
3 Yellow LED (BT SIGNAL)
4 Green LED (BT SIGNAL)
5 Green LED (BT SIGNAL)
6 RESET button: Resets settings
7 Green LED (RD)
8 Yellow LED (TD)
9 Green LED (VCC)
10 Shield connection
11 GND (operating ground)
12 24 V supply (10 V DC to 30 V DC, 19 V AC to 29 V AC)
13 0 V supply
14 T(A) transmit data –
15 T(B) transmit data +
16 D(A) data wire –
17 D(B) data wire +
18 Antenna connection (MCX female connector)

The antenna is mounted outside the control cabinet.
Observe the mounting instructions for the antenna used.

19 Terminate switch (activates and deactivates termination resistors for RS-485 and RS-422)
20 RUN/CONF switch

Features

The PSI-WL-RS232-RS485/BT serial PSI Bluetooth converter is designed for industrial use and features the following performance characteristics:

- Mounting by snapping onto a DIN rail
- Supply of 24 V DC or AC
- Transmission speed of up to 187.5 kbps
- Can be set to V.24 (RS-232), RS-422 or RS-485
- Supports all popular 10/11-bit UART data formats
- 3964R-compatible
- External antenna connection for optimum antenna positioning
- Bluetooth access protected by password, fixed device pairing or device access list
- Scalable transmission power (-28 dBm to +20 dBm) for specific localization of the radio cell
- Integrated Bluetooth path diagnostics indicate the signal quality of the radio connection

The PSI Bluetooth converter can be used for a wide range of different applications, for example:

- Replacement of simple, serial point-to-point cabling for V.24 (RS-232), RS-422, and RS-485 2-wire interfaces
- Creation of master/slave multi-drop connections
- Wireless operation and monitoring for processes
- Wireless parameterization, and diagnostic and programming connections
- Replacement of slip ring joints or drag chains
- Implementation of high-quality electrical isolation between the stations

Application Examples

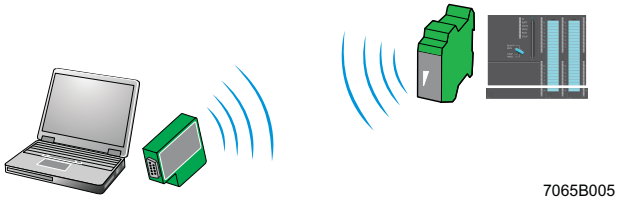
The PSI-WL-RS232-RS485/BT PSI Bluetooth converter is accessed via a second identical device or via the PSI-WL-PLUG-RS232/BT PSI Bluetooth V.24 (RS-232) adapter, which is designed as a connector. Wireless access via third-party devices, which already have an integrated Bluetooth interface, e.g., PDA, notebook or cell phone, is also supported.

Point-to-Point Connection

Examples for Point-to-Point Connections Without Termination Device Addressing (V.24 (RS-232), RS-422, etc.)

Programming Device and PLC

Direct programming connection between a laptop and a programmable logic controller (PLC).



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PDA and PLC

Data connection between a third-party device with integrated Bluetooth interface (PDA or cell phone) and an industrial controller.

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PLC and Operator Interface

Connection between a mobile operator interface and an industrial controller.

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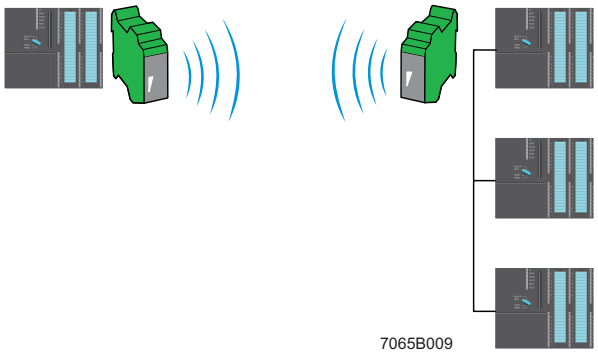
Example for a Point-to-Point Connection With Termination Device Addressing (RS-485 2-Wire)

RS-485 2-Wire Bus System

Integration of a device into an existing bus system, e.g., Modbus or PROFIBUS.



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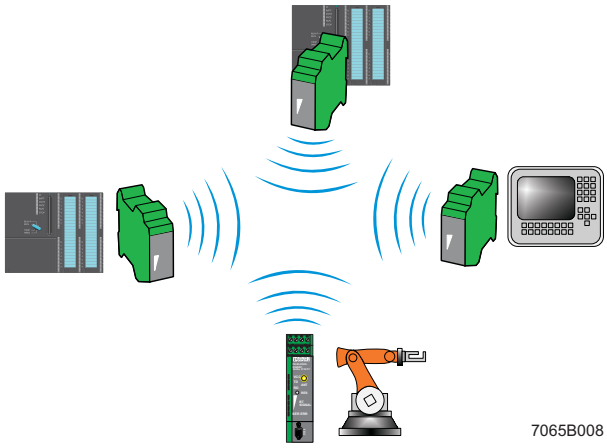
Multi-Drop Connection

Networking of Automation Components

One example is a PC-based control system with an RS-232 interface. Up to seven Bluetooth slaves can be connected to a Bluetooth master.



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