

PSI-MODEM-SHDSL/SERIAL

SHDSL-SERIAL permanent line modem



Data sheet
104460_en_04

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1 Description

The SHDSL-SERIAL permanent line modem allows the broadband networking of serial devices over in-house lines. A distance of up to 20 km can lie between two devices.

The SHDSL modem operates transparently of the protocol and supports RS-232, RS-422 and RS-485 W2 interfaces. All devices have two SHDSL ports. You can easily set up point-to-point, redundant point-to-point, line and star topologies.

The clearly visible LEDs on the front of the device provide on-site technicians with quick device diagnostics. Every device also has integrated diagnosis functions and a logbook.

Two freely configurable digital outputs are available for alarm generation for external devices. You can parameterize them via the configuration software. Power is supplied via USB cable, which enables device configuration without external 24 V power supply.

Areas of application

- For in-house cables
- Point-to-point connection
- Star topology
- Line topology, up to 255 SHDSL devices

SHDSL technology

- Symmetrical data transmission
- Two SHDSL ports
- Up to 15.3 Mbps (2-wire), 30 Mbps (4-wire)

Interfaces

- RS-232, up to 230.4 kbps, automatic DCE/DTE switchover
- RS-422, up to 2000 kbps
- RS-485 W2, up to 2000 kbps, termination resistor can be connected

Alarm outputs

- Two digital outputs, individually configurable

Via configuration software:

- Online diagnostics, logbook function
- Individual project configuration
- Saving and printing of project and device configurations



WARNING: Explosion hazard when used in potentially explosive areas

The device is a category 3 item of electrical equipment. Follow the instructions provided here during installation and observe the safety notes.



A combination of different SHDSL modems (e.g. SHDSL-SERIAL with SHDSL-Ethernet) is not possible.



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

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3 Ordering data

Description	Type	Order No.	Pcs./Pkt.
SHDSL permanent line modem , for point-to-point, line, and star topologies on in-house 2 and 4-wire cables	PSI-MODEM-SHDSL/SERIAL	2313669	1
Accessories			
Description	Type	Order No.	Pcs./Pkt.
System power supply , primary switched Input voltage range Nominal output voltage Nominal output current	45 Hz ... 65 Hz 85 V AC ... 264 V AC 24 V DC ±1% 1.5 A	MINI-SYS-PS-100- 240AC/24DC/1.5	2866983 1
DIN rail connector (2x required)	ME 17.5 TBUS 1.5/ 5-ST-3.81 GN	2709561	1
Attachment plug with surge protection for two SHDSL telecommunications interfaces (ports). Connection: RJ45 (RJ12/RJ11) and plug-in screw terminal block (COMBICON), can alternatively be snapped onto DIN rail	DT-TELE-SHDSL	2801593	1
USB cable , USB type A/mini-USB type B, 5-pos., 1 m	PSI-CA-USB A/MINI B/1METER	2313575	1 m
USB cable , USB type A/mini-USB type B, 5-pos., 3 m	CABLE-USB/MINI-USB-3.0M	2986135	3 m
RS-232 cable , for connecting the modem to a 9-pos. device interface, 2 m	D-SUB 9/D-SUB 9 (socket/socket)	PSM-KA9SUB9/BB/2METER	2799474 2 m
RS-232 cable , for connecting the modem to a 9-pos. device interface, 0.5 m	D-SUB 9/D-SUB 9 (socket/socket)	PSM-KA9SUB9/BB/0.5METER	2708520 0.5 m
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	0.8 m

4 Technical data

Power supply	
Supply voltage	18 V DC ... 30 V DC via plug-in COMBICON screw terminal block 24 V DC $\pm 5\%$ (alternative or redundant, via DIN rail connector and system power supply unit) 5 V DC (configuration only, via mini-USB type B)
Nominal current consumption	< 180 mA at 24 V
LED indicator	VCC (green LED) – Steady light: operation – Flashing at 1 Hz: supply via USB (for configuration)
Switching outputs	$2 \times V_{\text{Nom}} / 150 \text{ mA}$ (the digital outputs cannot be used for power supply via the DIN rail connector), short-circuit-proof
SHDSL interface	
Connection method	2 x 2-pos. COMBICON plug-in screw terminal block
Type	SHDSL interface according to ITU-T G.991.2.bis
Transmission rate	
4-wire operation	64 kbps ... 30 Mbps (manual setting of the data rate) 384 kbps ... 11.39 Mbps (automatic detection of the data rate)
2-wire operation	32 kbps ... 15.3 Mbps (manual setting of the data rate) 192 kbps ... 5.696 Mbps (automatic detection of the data rate)
Transmission length	Over 20 km possible at lower data rates and with good cable quality
Connection data (conductor cross section)	0.2 mm ² ... 2.5 mm ² (24 - 14 AWG)
Status and diagnostics indicators	2 x LINK, 2 x STAT (DSL data traffic port A and port B) DIAG (yellow LED), diagnostic messages ERR (red LED), errors TERM (yellow LED), only relevant for RS-485 RS232 (yellow LED)
RS-232 interface	
Connection method	D-SUB 9-pos. plug
Type	RS-232 interface, according to ITU-T V.28, EIA/TIA-232, DIN 66259-1
Transmission rate	Can be freely parameterized from 92 bps ... 230.4 kbps
Transmission length	Maximum 15 m
Supported protocols	Software handshake (Xon/Xoff), hardware handshake (RTS/CTS), 3964R-compatible, Modbus RTU/ASCII, transparent protocol - other protocols supported
Data format/coding	Serial asynchronous UART/NRZ, 7/8 data bits, 1/2 stop bits, 1 parity bit (even, odd, mark, space, none), 9/10/11-bit character length

RS-422 interface

Connection method	Plug-in/screw connection via COMBICON plug
Type	RS-422 interface, according to ITU-T V.11, EIA/TIA-422, DIN 66348-1
Transmission rate	Can be freely parameterized from 92 bps ... 2 Mbps
Transmission length	Maximum 1200 m
Supported protocols	Modbus RTU/ASCII and others, transparent protocol
Data format/coding	Serial asynchronous UART/NRZ, 7/8 data bits, 1/2 stop bits, 1 parity bit (even, odd, mark, space, none), 9/10/11-bit character length

RS-485 interface

Connection method	Plug-in/screw connection via COMBICON plug
Type	RS-485 interface, according to EIA/TIA-485, DIN 66259-4/RS-485 2-wire
Transmission rate	Can be freely parameterized from 92 bps ... 2 Mbps
Transmission length	Maximum 1200 m
Supported protocols	Modbus RTU/ASCII and others, transparent protocol
Data format/coding	Serial asynchronous UART/NRZ, 7/8 data bits, 1/2 stop bits, 1 parity bit (even, odd, mark, space, none), 9/10/11-bit character length

USB interface (configuration/diagnostics)

Connection method	Mini-USB type B, 5-pos.
Type	USB 2.0
Transmission length	Maximum 5 m, only for configuration and diagnostics

General data

Ambient temperature range	
Operation (no other modules supplied via the device):	
– Freestanding (40 mm spacing)	-20°C ... +60°C
– Connected in series (low power dissipation of modules connected in series)	-20°C ... +55°C
– Connected in series (without restrictions)	-20 °C ... +50 °C
Operation (other modules supplied via the device (max. 1.5 A))	-20 °C ... +45 °C
Storage/transport	-40 °C ... +85 °C
Housing	ME 35 with 5-pos. bus contact and ground contact
Material	PA 6.6-FR, V0, green
Dimensions (H x W x D)	99 x 35 x 114.5 mm
Weight	205 g
Functional earth ground	Housing contact to DIN rail
Degree of protection	IP20
Electrical isolation	DIN EN 50178 (Supply // RS-485, RS-422 // DSL port A // DSL port B // FE)

General data [...]	
SN 29500 standard, temperature 25°C, operating cycle 21% (5 days a week, 8 hours a day)	693 years
SN 29500 standard, temperature 40°C, operating cycle 34.25% (5 days a week, 12 hours a day)	301 years
SN 29500 standard, temperature 40°C, operating cycle 100% (7 days a week, 24 hours a day)	121 years
Test voltage	1.5 kV _{rms} , 50 Hz, 1 min.
Vibration resistance	According to IEC 60068-2-6: 5 g, 150 Hz
Shock resistance	15g in each space direction, according to IEC 60068-2-27
Noise emission	EN 55011
Noise immunity	EN 61000-6-2
Electromagnetic compatibility	Conformity with EMC Directive 2014/30/EU
UL, USA/Canada	UL 508 listed
Manufacturer's declaration	<p>EN 50121-4 (Railway applications - Electromagnetic compatibility, Part 4: Emission and Immunity of the Signaling and Telecommunications Apparatus)</p> <p>Exceptions include installations within the 3 m area and safety-related devices. For these devices, there are further requirements according to EN 50121-4 Table 1, Note 1.</p> <p>Section 1, Paragraph 3 of EN 50121-4 applies.</p> <p>Phoenix Contact QUINT power supply units are to be used directly on the device.</p>
ATEX	⊕ II 3 G Ex nA nC IIC T4 Gc X

5 Safety regulations and installation notes

5.1 Installation notes



WARNING:

Observe the following safety notes when using the device.

- The category 3 device is designed for installation in Zone 2 potentially explosive areas. It meets the requirements of EN 60079-0:2012+A11:2013 and EN 60079-15:2010.
- Installation, operation, and maintenance may only be carried out by qualified electricians. Follow the installation instructions as described. When installing and operating the device, the applicable regulations and safety directives (including national safety directives), as well as the general codes of practice, must be observed. The safety data is provided in the packing slip and on the certificates (conformity assessment, additional approvals where applicable).
- Do not open or modify the device. Do not repair the device yourself; replace it with an equivalent device instead. Repairs may only be carried out by the manufacturer. The manufacturer is not liable for damage resulting from violation.
- The IP20 degree of protection (IEC 60529/EN 60529) of the device is intended for use in a clean and dry environment. Do not subject the device to mechanical and/or thermal loads that exceed the specified limits.
- This device is not designed for use in atmospheres with a risk of dust explosions.
- The device is designed exclusively for operation with safety extra-low voltage (SELV) according to IEC 60950/EN 60950/VDE 0805. The device may only be connected to devices that meet the requirements of EN 60950.

5.2 Installation in zone 2



WARNING: Explosion hazard when used in potentially explosive areas

Make sure that the following notes and instructions are observed.

- Observe the specified conditions for use in potentially explosive areas!
- Install the device in a suitable, approved housing (with at least IP54 protection) that meets the requirements of EN 60079-15. For this purpose, observe the requirements of IEC 60079-14 / EN 60079-14.
- Only connect devices to the supply and signal circuits in zone 2 that are suitable for operation in the Ex zone 2 and for the conditions at the installation location.
- In potentially explosive areas, snap the device on or off the DIN rail connector and connect or disconnect the cables only when the power is disconnected.
- The mini-USB configuration interface may only be used if it has been ensured that there is no explosive atmosphere.
- Connection to the D-SUB interface is only permitted if the screw connection is fully tightened.
- The device must be stopped and immediately removed from the Ex area if it is damaged, was subjected to an impermissible load, stored incorrectly or if it malfunctions.

5.3 UL notes



INDUSTRIAL CONTROL EQUIPMENT 11AE

Wire Range: 24-14 AWG

Cu Copper Wire, 60/75C

Terminal tightening torque value: 5-7 (Lbs-Ins)

Environmental designation: "Open Type Device"

"Pollution Degree 2 Installation Environment"

6 Range

The maximum possible SHDSL data rate depends on several parameters. Two important parameters are the cable length and cable cross section.

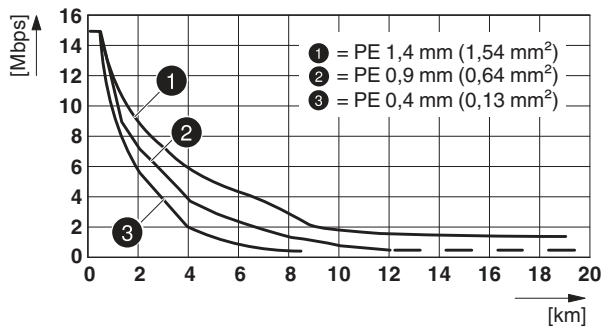


Figure 1 SHDSL data rate depending on the distance, 2-wire

The diagram illustrates the dependency of the maximum SHDSL data rate on the line length with 3 cable types. Longer distances can be achieved using high-quality cables with larger diameters.

The industrial permanent line modems enable data rates in 2-conductor operation from 32 kbps to 15.3 Mbps. Data rates of up to 30 Mbps are possible in 4-conductor operation.

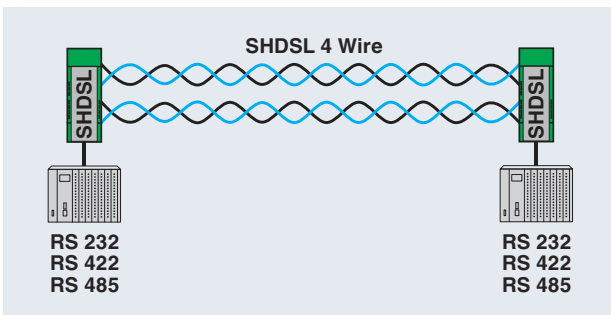
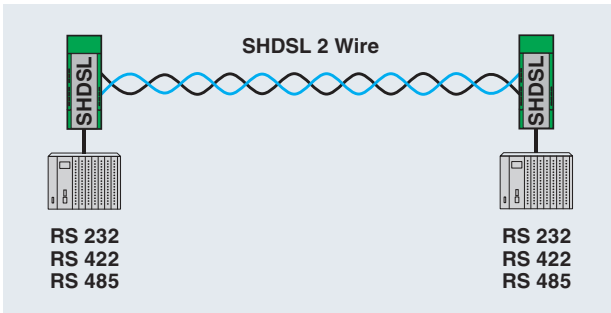
SHDSL permanent line modems are suitable for in-house cables, not for public telephone networks.

7 Application examples

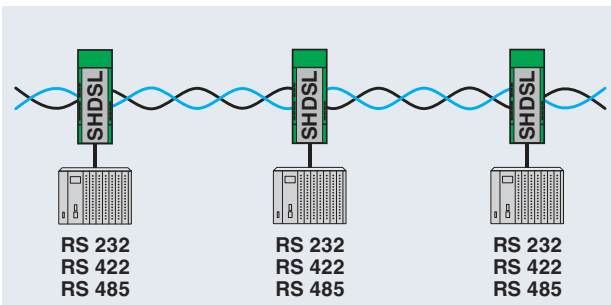


For more information, please refer to the UM EN PSI-MODEM-SHDSL/SERIAL user manual.

7.1 Point-to-point connection

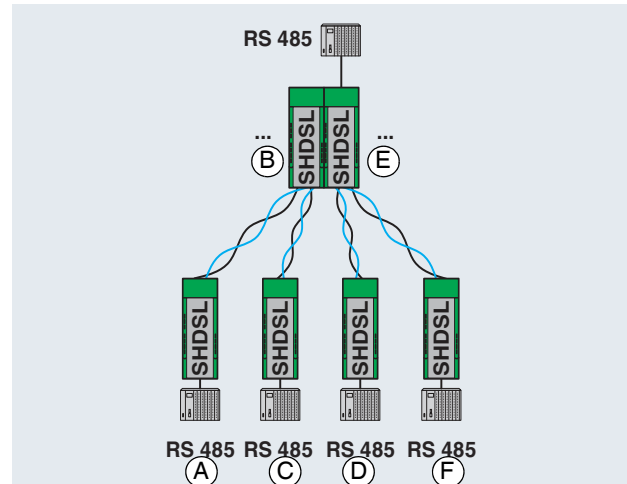


7.2 Linear topology

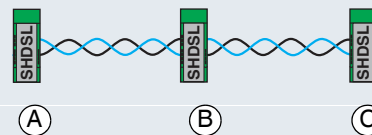


Atypical application cases are also supported, e.g. the linear topology of multiple RS-232 interfaces or a mixed operation using different interfaces. The customer does, however, then need his custom protocol. The SHDSL modem transmits the data protocol transparently.

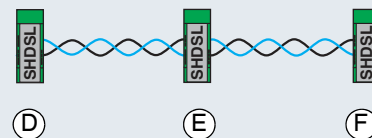
7.3 Star topology



Line 1



Line 2



The devices are connected via the DIN rail connector (TBUS) in the head station. The DIN rail connector supports RS-485. It can only be used with RS-232 and RS-422.

In order to configure a star topology, you must create several line topologies. In the example, you have to create two linear topologies each comprising three devices.