

# TC EXTENDER 2001 ETH-2S - Ethernet extenders



2702409

<https://www.phoenixcontact.com/us/products/2702409>

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Second generation: Unmanaged Ethernet extender for point-to-point connections, line and ring structures, data rates up to 30 Mbps, distances of up to 20 km on in-house copper cables, diagnostics via USB and LEDs, 2 SHDSL ports, 1 LAN port

## Product description

The Ethernet extender makes broadband Ethernet applications on existing cables possible. It is the successor to the first generation PSI MODEM SHDSL/ETH, Item No. 2313643. The Ethernet extender can be used for in-house 2 and 4-wire cables, but not in the public telephone network. Point-to-point, line or ring structures can be established, with ranges of up to 20 km. You can use the Ethernet extender in a network with first generation devices (PSI-MODEM-SHDSL/ETH from firmware version 4.xx). The Ethernet extender can also be combined with managed Ethernet extenders: TC EXTENDER 6004 ETH-2S, Item No. 2702255 and TC EXTENDER 4001 ETH-1S, Item No. 2702253. This enables the central diagnosis of all users and lines via IP.

## Your advantages

- Distances up to 20 km
- Up to 15.3 Mbps in 2-wire operation
- Up to 30 Mbps in 4-wire operation
- Robust modulation method (SHDSL)
- Automatic SHDSL data rate detection
- Transparent transmission of all standard Ethernet protocols, including EtherNet/IP™, Modbus/TCP, PROFINET, PROFIsafe, EtherCAT<sup>®</sup>, KNX, BACnet/IP
- Network transparent (no IP configuration required)
- Automatic detection of network cable type (auto MDI(X))
- Automatic network data rate detection (10/100 Mbps)
- Easy startup, plug and play
- Future proof (IPv4 and IPv6-compatible)
- 2 digital outputs for alerting external controllers

## Commercial data

Item number	2702409
Packing unit	1 pc
Minimum order quantity	1 pc
Sales key	DN24
Product key	DNC442
Catalog page	Page 349 (C-6-2019)
GTIN	4055626162560
Weight per piece (including packing)	267.6 g

# TC EXTENDER 2001 ETH-2S - Ethernet extenders



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Weight per piece (excluding packing)	258.7 g
Customs tariff number	85176200
Country of origin	DE

## Technical data

### Notes

#### Utilization restriction

CCCex note	Use in potentially explosive areas is not permitted in China.
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### Product properties

Product type	Ethernet extenders
MTTF	711 Years (SN 29500 standard, temperature 25°C, operating cycle 21%)
	308 Years (SN 29500 standard, temperature 40°C, operating cycle 34.25%)
	125 Years (SN 29500 standard, temperature 40°C, operating cycle 100%)

### System properties

#### Functionality

Basic functions	Ethernet extenders in accordance with ITU-T G.991.2
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### Electrical properties

Electrical isolation	VCC // Ethernet // DSL (A) // DSL (B) // FE
Maximum power dissipation for nominal condition	4.32 W
Mains type	Permanent line
Test voltage data interface/power supply	500 V AC (In accordance with EN/IEC 60079-7)
	1.5 kV AC (50 Hz, 1 min.)

#### Supply

Supply voltage range	18 V DC ... 30 V DC
Nominal supply voltage	24 V DC $\pm 5\%$ (as an alternative or redundant, via backplane bus contact and system current supply)
	5 V DC (configuration only, via mini-USB type B)
Typical current consumption	< 180 mA (24 V DC)
Max. current consumption	$\leq 2$ A (For operation in a joining station, via the DIN rail connector)
Connection method	COMBICON plug-in screw terminal block

#### Function

Status and diagnostic indicators	LEDs: US (supply voltage), ACT/LINK (Ethernet data traffic), ERR (errors) 2x LINK / 2x STAT (DSL data traffic port A and port B), DIAG (diagnostic messages)
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### Output data

#### Signal

Output name	Digital output
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Number of outputs	2
Voltage output signal	18 V DC ... 30 V DC (depending on the operating voltage)
Current output signal	≤ 150 mA (Short-circuit-proof)
Behavior of outputs	Deactivated for device supply via DIN rail connector

## Connection data

### Supply

Connection method	COMBICON plug-in screw terminal block
Tightening torque	0.56 Nm ... 0.79 Nm

## Interfaces

Signal	Ethernet
Basic functions	Ethernet extenders in accordance with ITU-T G.991.2

Data: Ethernet interface, 10/100Base-T(X) in accordance with IEEE 802.3

Serial transmission speed	10/100 Mbps, auto negotiation
Connection method	RJ45 jack, shielded
	1 port 10/100Base-T(X), auto negotiation
No. of channels	1
Transmission length	< 100 m (shielded twisted pair)
Protocols supported	Protocol-transparent for TCP/IP, IPv4, and IPv6

Data: SHDSL interface according to ITU-T G.991.2.bis

Serial transmission speed	4-wire operation: 64 kbps ... 30 Mbps
	2-wire operation: 32 kbps ... 15.3 Mbps
Connection method	2 x 2-pos. COMBICON plug-in screw terminal blocks
No. of channels	2 (2-wire operation)
Tightening torque	0.56 Nm ... 0.79 Nm
Transmission length	< 20 km (Depending on data rate and cable cross section)
Single conductor/terminal point, rigid	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Single-wire/terminal point, flexible	0.2 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Max. AWG conductor cross section, flexible	14
Min. AWG conductor cross section, flexible	24
Single-wire/terminal point, rigid AWG max.	14
Single-wire/terminal point, rigid AWG min.	24
Stripping length	7 mm

Data: USB 2.0

Connection method	Mini-USB type B, 5-pos.
Transmission length	< 5 m (only for configuration and diagnostics)

## Dimensions

Width	35 mm
Height	99 mm
Depth	114.5 mm

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## Material specifications

Material	PA 6.6-FR
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## Environmental and real-life conditions

### Ambient conditions

Degree of protection	IP20
Ambient temperature (operation)	-20 °C ... 60 °C (Freestanding (40 mm spacing to the right and left), no supply of other modules via the device) -20 °C ... 55 °C (Mounted in rows with zero spacing and low power dissipation of aligned modules) -20 °C ... 50 °C (Mounted in rows with zero spacing) -20 °C ... 45 °C (aligned without spacing and supply of other modules via the device, 1.5 A)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Altitude	≤ 5000 m (For restrictions, see the manufacturer's declaration for altitude operation)
Permissible humidity (operation)	10 % ... 95 % (non-condensing)
Permissible humidity (storage/transport)	10 % ... 95 % (non-condensing)

## Approvals

### CE

Certificate	CE-compliant
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### ATEX

Identification	Ex II 3 G Ex ec IIC T4 Gc
Certificate	PxCIF11ATEX2313643X
Note	Please follow the special installation instructions in the documentation!

### UKEX

Identification	Ex II 3 G Ex ec IIC T4 Gc
Certificate	PxCIMA22UKEX2313643X

### UL, USA/Canada

Identification	508 Listed
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### Corrosive gas test

Identification	ISA-S71.04-1985 G3 Harsh Group A
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## EMC data

Electromagnetic compatibility	Conformance with EMC Directive 2014/30/EU
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### Electrostatic discharge

Standards/regulations	EN 61000-4-2
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### Electrostatic discharge

Contact discharge	± 6 kV
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Discharge in air	$\pm 8 \text{ kV}$
Indirect discharge	$\pm 6 \text{ kV}$
Comments	Criterion B

## Electromagnetic HF field

Standards/regulations	EN 61000-4-3
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## Electromagnetic HF field

Frequency range	80 MHz ... 3 GHz
Field intensity	10 V/m
Comments	Criterion A

## Fast transients (burst)

Standards/regulations	EN 61000-4-4
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## Fast transients (burst)

Input	$\pm 2 \text{ kV}$
Signal	$\pm 2 \text{ kV}$
Comments	Criterion B

## Surge current load (surge)

Standards/regulations	EN 61000-4-5
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## Surge current load (surge)

Input	$\pm 0.5 \text{ kV (sym./asym.)}$
Output	$\pm 1 \text{ kV (asymmetrical, unshielded)}$
Signal	$\pm 1 \text{ kV (asymmetrical, shielded Ethernet cable)}$ $\pm 1 \text{ kV (asymmetrical: line to ground, unshielded SHDSL cable)}$
Comments	Criterion A

## Conducted interference

Standards/regulations	EN 61000-4-6
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## Conducted interference

Frequency range	0.15 MHz ... 80 MHz
Comments	Criterion A
Voltage	10 V

## Emitted interference

Standards/regulations	EN 55011
Comments	Class A, industrial applications

## Criteria

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

## Standards and regulations

Standards/regulations	EN 50121-4
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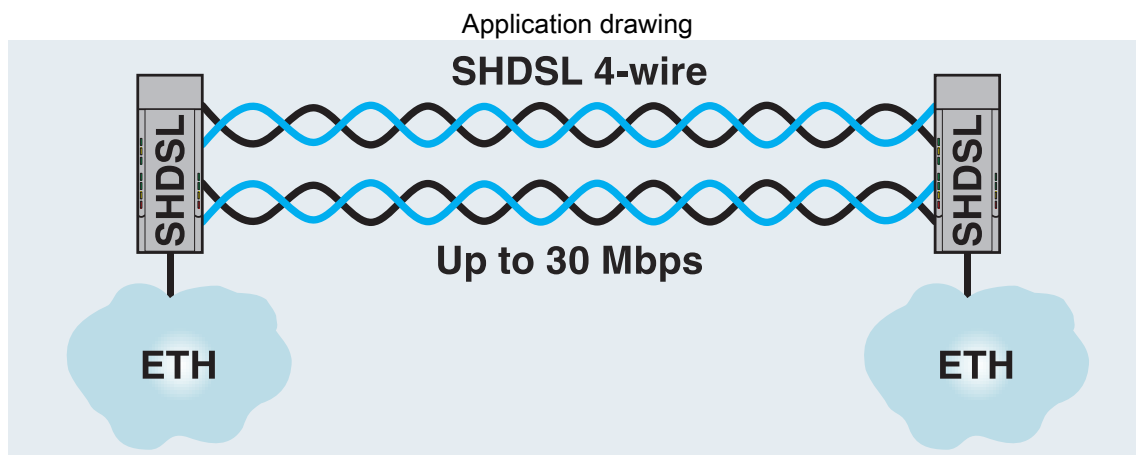
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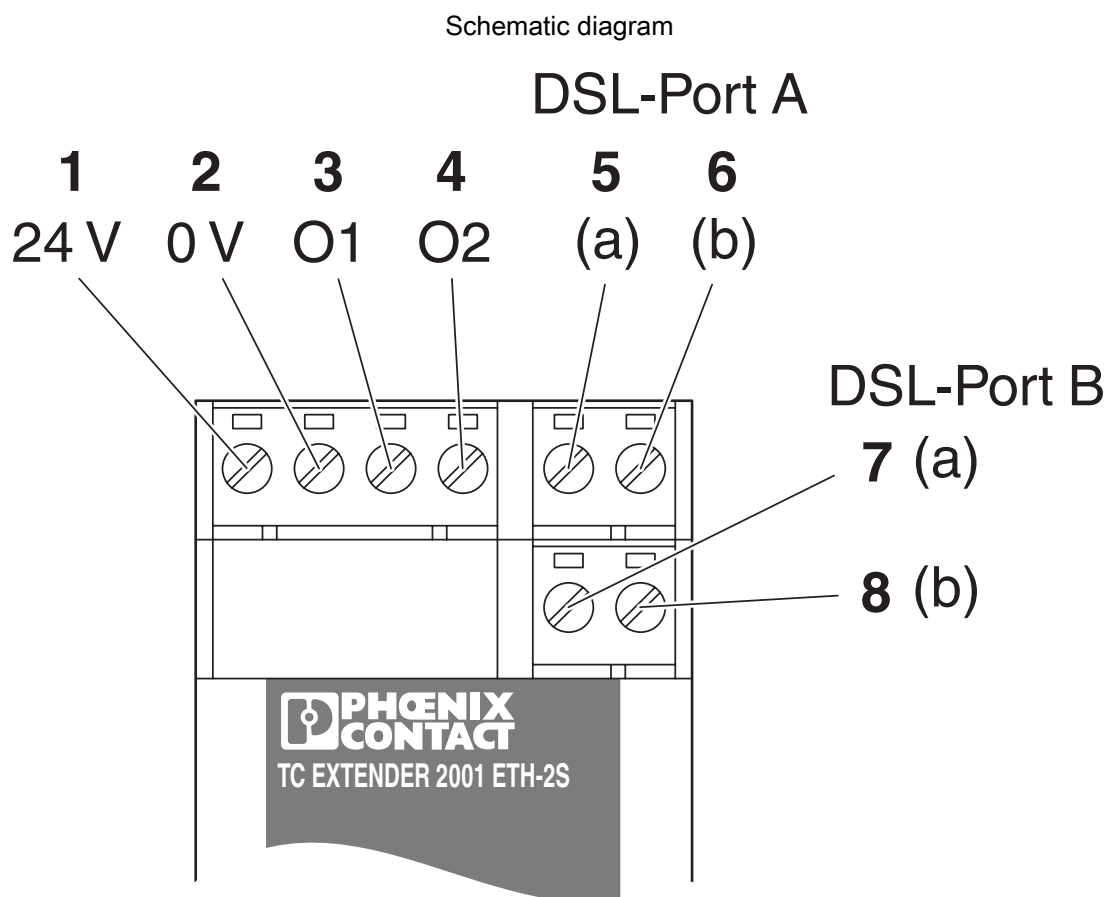
## Mounting

Mounting type	DIN rail: 35 mm
Assembly instructions	The product can be snapped onto all 35 mm DIN rails in accordance with EN 60715.

## Drawings



Point-to-point connection (4-wire)



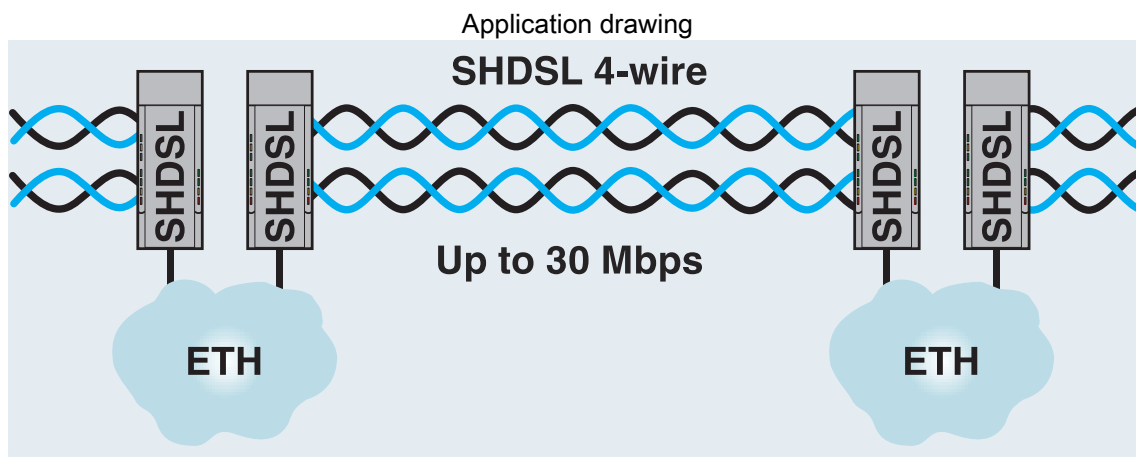
Device connections



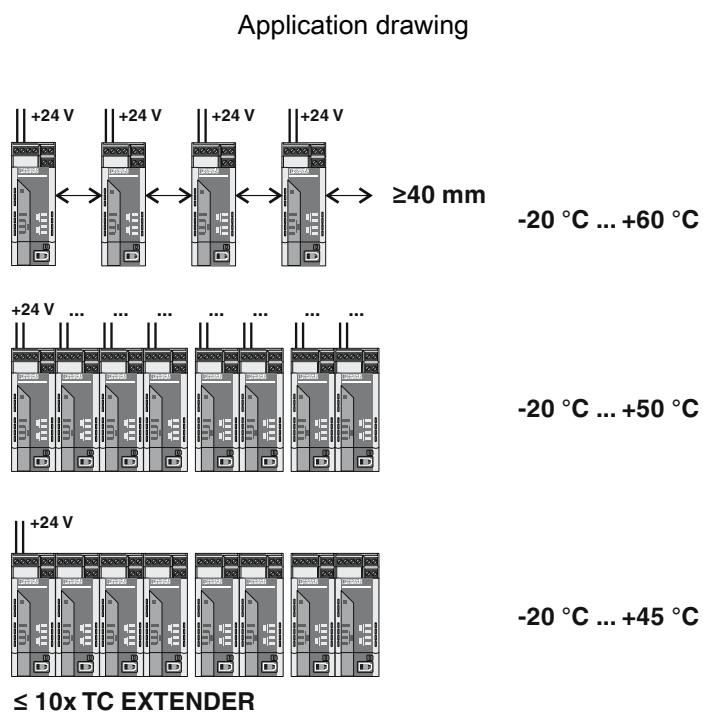
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Linear structure (4-wire)



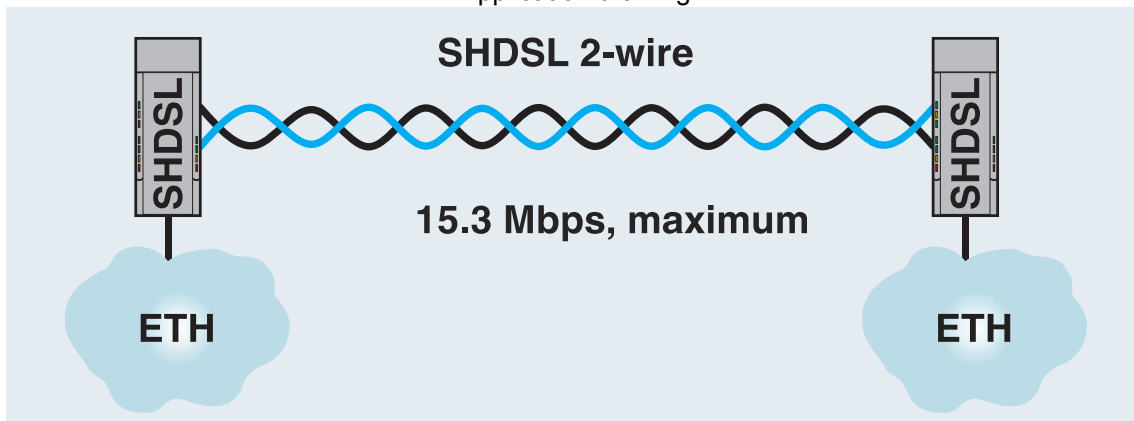
Restrictions for combined assembly

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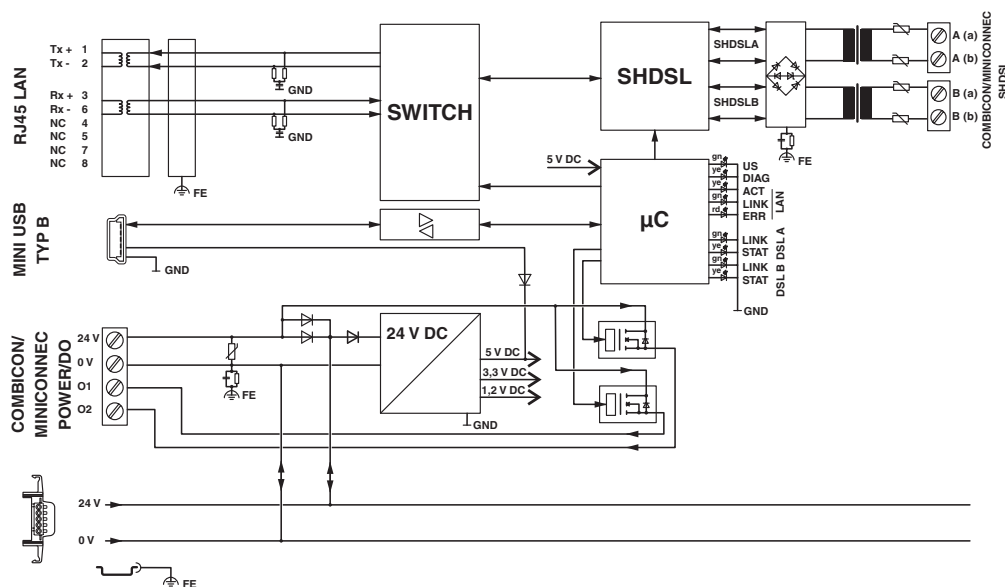
<https://www.phoenixcontact.com/us/products/2702409>

Application drawing



Point-to-point connection (2-wire)

Circuit diagram

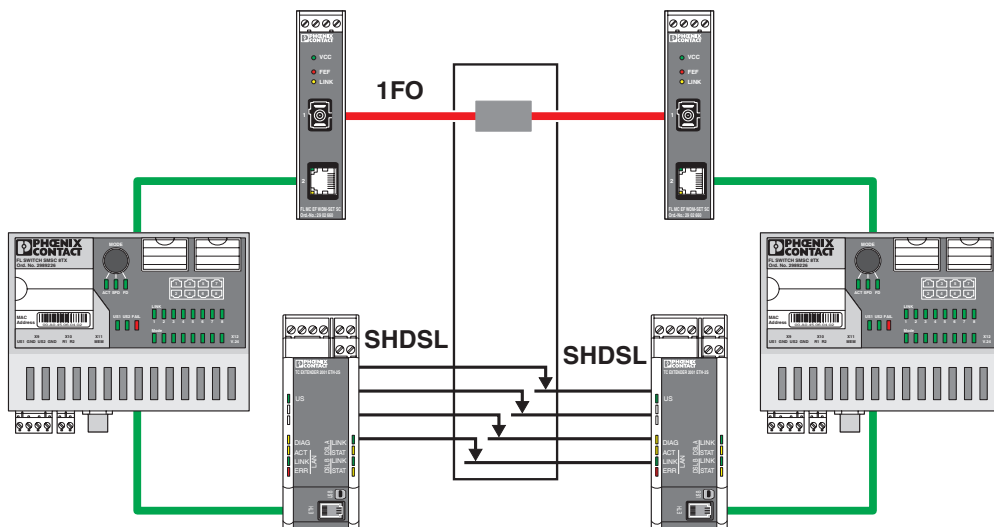


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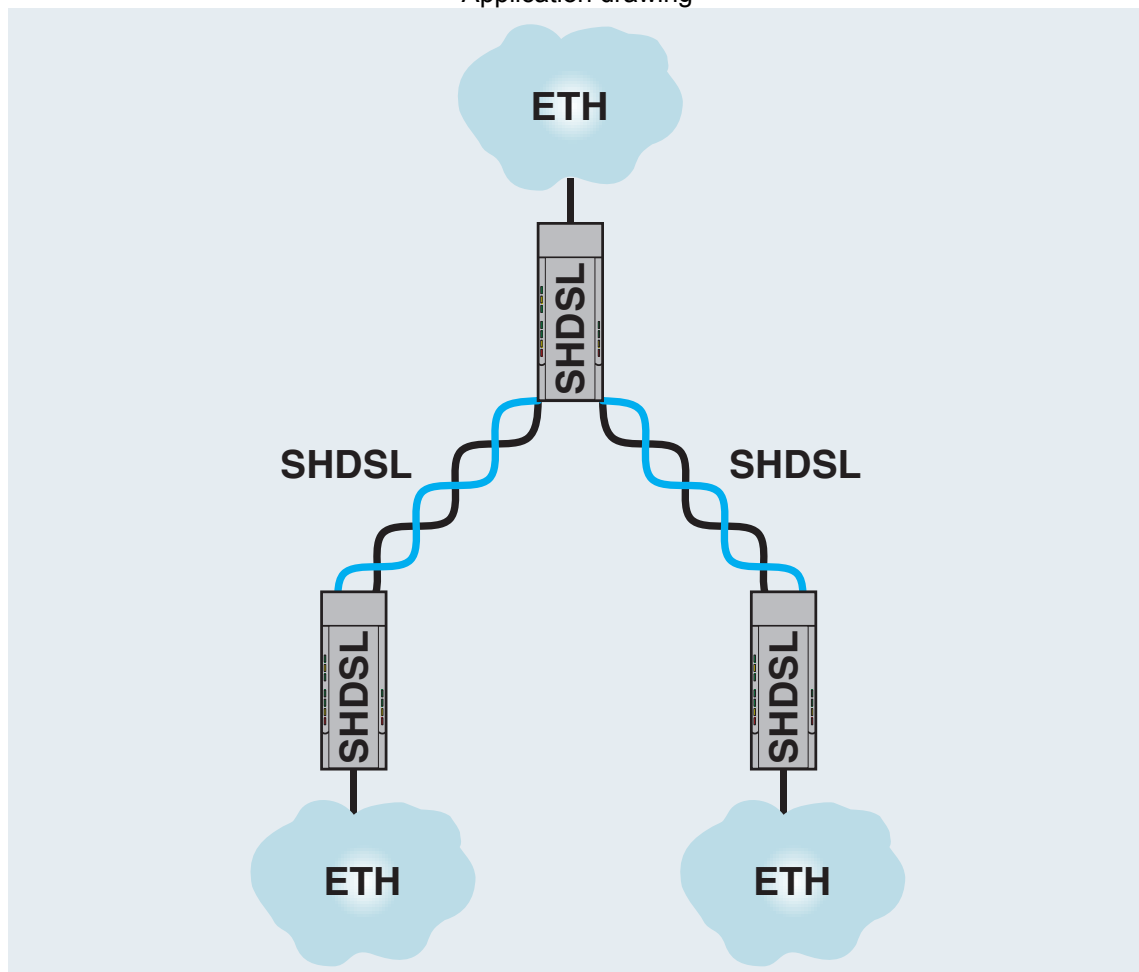
<https://www.phoenixcontact.com/us/products/2702409>

Application drawing



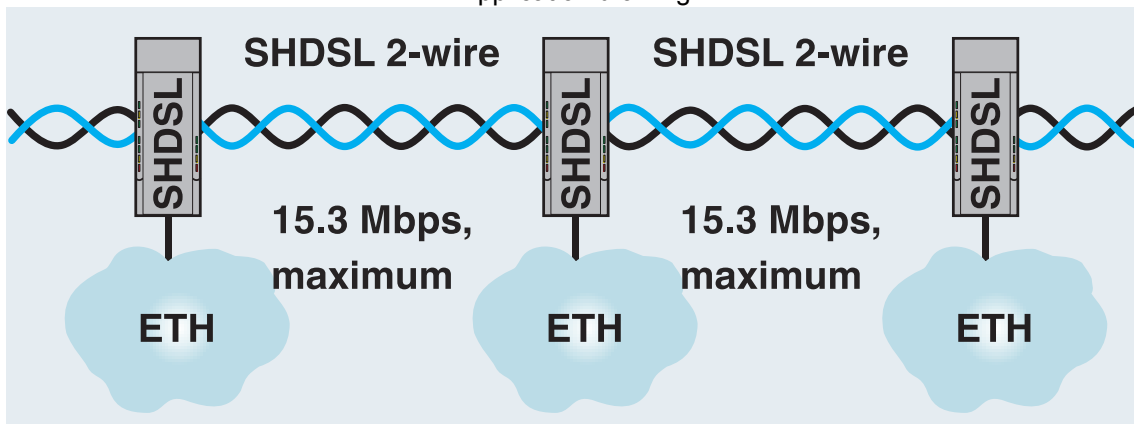
Redundant slip ring communication

Application drawing



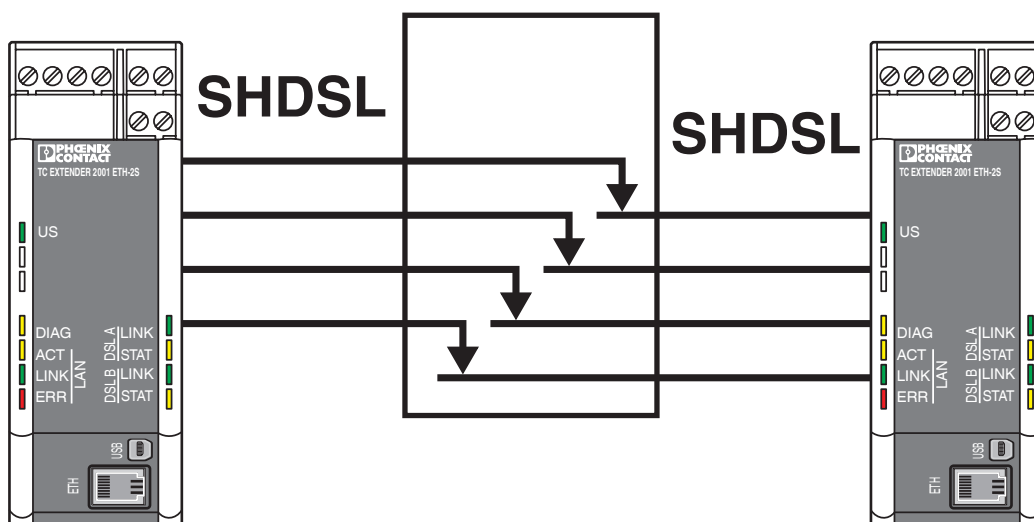
Star structure

Application drawing



Linear structure (2-wire)

Application drawing



Slip ring communication

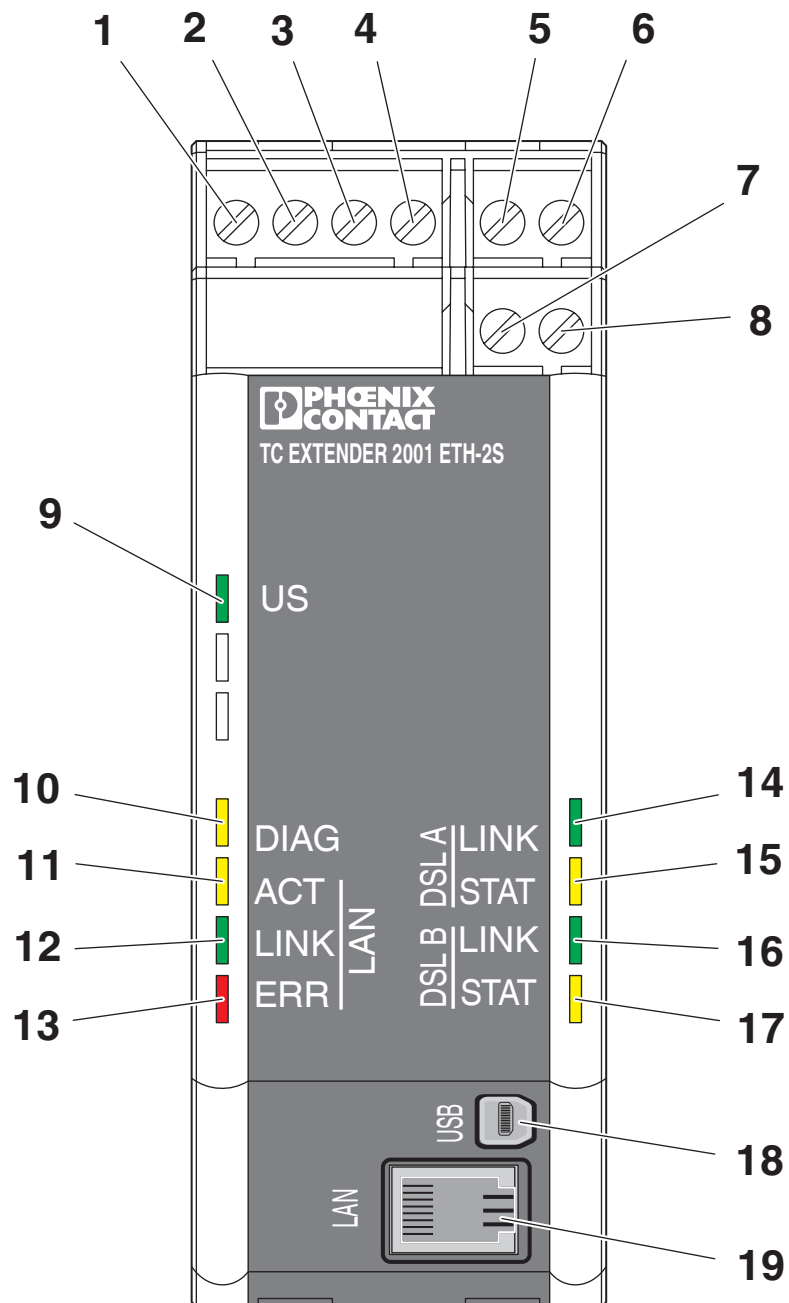
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Schematic diagram



Front view


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## Approvals

 To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2702409>



**UL Listed**

Approval ID: FILE E 238705



**cUL Listed**

Approval ID: FILE E 238705

**UAE-RoHS**

Approval ID: 23-02-63194



**ATEX**

Approval ID: PxCIF11ATEX2313643X

**cULus Listed**

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## Classifications

### ECLASS

ECLASS-11.0	19170407
ECLASS-12.0	19170407
ECLASS-13.0	19170407

### ETIM

ETIM 8.0	EC000309
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### UNSPSC

UNSPSC 21.0	43223100
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## Environmental product compliance

REACH SVHC	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50 years
	For information on hazardous substances, refer to the manufacturer's declaration available under "Downloads"



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## Accessories

### QUINT4-SYS-PS/1AC/24DC/2.5/SC - Power supply unit

2904614

<https://www.phoenixcontact.com/us/products/2904614>



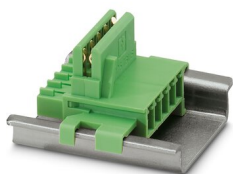
Primary-switched power supply, QUINT POWER, screw connection, DIN rail mounting, supply of devices possible via the TBUS DIN rail connector, protective coating, input: single-phase, output: 24 V DC/2.5 A

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### ME 17,5 TBUS 1,5/ 5-ST-3,81 GN - DIN rail bus connectors

2709561

<https://www.phoenixcontact.com/us/products/2709561>



DIN rail connector for DIN rail mounting. Universal for TBUS housing. Gold-plated contacts, 5-pos.

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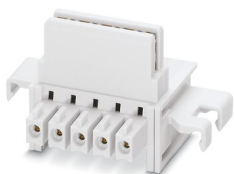
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## ME 17,5 TBUS 1,5/ 5-ST-3,81 KMGY - DIN rail bus connectors

2713645

<https://www.phoenixcontact.com/us/products/2713645>



DIN rail connector, color: light grey, nominal current: 8 A (parallel contacts), rated voltage (III/2): 125 V, number of positions: 5, pitch: 3.81 mm, mounting: DIN rail mounting, locking: without, mounting: without, type of packaging: packed in cardboard, Item with gold-plated contacts, bus connectors for connecting with electronics housings, 5 parallel contacts

## DT-TELE-SHDSL - Surge protection device

2801593

<https://www.phoenixcontact.com/us/products/2801593>



Attachment plug with surge protection for two SHDSL telecommunications interfaces (ports). Connection: RJ45 (RJ12/RJ11) and plug-in screw terminal block (COMBICON). Alternatively, can be snapped onto a DIN rail.

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## CABLE-USB/MINI-USB-3,0M - USB cable

2986135

<https://www.phoenixcontact.com/us/products/2986135>

USB connecting cable: USB plug type A to USB plug type Mini-B; length: 3 m



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## FL PATCH SAFE CLIP - Port Guard Security Element

2891246

<https://www.phoenixcontact.com/us/products/2891246>

Security element for FL patch cable



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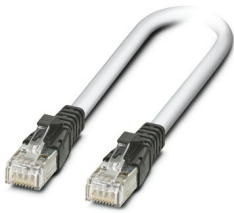
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## FL CAT5 PATCH 0,5 - Patch cable

2832263

<https://www.phoenixcontact.com/us/products/2832263>



Patch cable, CAT5, assembled, 0.5 m

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## FL CAT5 PATCH 5,0 - Patch cable

2832580

<https://www.phoenixcontact.com/us/products/2832580>



Patch cable, CAT5, assembled, 5 m

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## FL CAT5 HEAVY CONF/ - Network cable

2744827

<https://www.phoenixcontact.com/us/products/2744827>



CAT5-SF/UTP cable (J-02YS(ST)C HP 2 x 2 x 24 AWG), heavy-duty installation cable, 2 x 2 x 0.22 mm<sup>2</sup>, solid conductor, shielded, outer sheath: 7.8 mm diameter, inner sheath: 5.75 mm ± 0.15 mm diameter, preassembled on both sides with RJ45 plug, crossover or line

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## SCC 10-NS35 - Shield connection clamp

1019440

<https://www.phoenixcontact.com/us/products/1019440>



Shield connection clamp, number of positions: 1, connection method: Spring-cage connection, mounting type: NS 35/7,5, NS 35/15, color: black

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## TC EXTENDER 6004 ETH-2S - Ethernet extenders

2702255

<https://www.phoenixcontact.com/us/products/2702255>



Managed Ethernet extender, point-to-point, line and ring structures, data rates up to 30 Mbps, distances of up to 20 km on in-house copper cables, replaceable surge protection, 2 SHDSL ports, 4-port switch, diagnostics via display and Ethernet

## VS-08-RJ45-5-Q/IP20 - RJ45 connector

1656725

<https://www.phoenixcontact.com/us/products/1656725>



RJ45 connector, design: RJ45, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5, material: Plastic, connection method: Insulation displacement connection, connection cross section: AWG 26- 23, cable outlet: straight, color: traffic grey A RAL 7042, Ethernet

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Phoenix Contact USA  
586 Fulling Mill Road  
Middletown, PA 17057, United States  
(+717) 944-1300  
[info@phoenixcon.com](mailto:info@phoenixcon.com)