

# 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®, 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             |

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

## Technical data

### Notes

#### Note on application

|                     |                         |
|---------------------|-------------------------|
| Note on application | Only for industrial use |
|---------------------|-------------------------|

#### Utilization restriction

|            |                                                               |
|------------|---------------------------------------------------------------|
| CCCex note | Use in potentially explosive areas is not permitted in China. |
|------------|---------------------------------------------------------------|

### 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%)   |

#### Data management status

|                  |    |
|------------------|----|
| Article revision | 05 |
|------------------|----|

### System properties

#### Functionality

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

### 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)                             |

#### Function

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

## Output data

### Signal

|                       |                                                          |
|-----------------------|----------------------------------------------------------|
| Output name           | Digital output                                           |
| 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 mm² ... 2.5 mm²                                      |
| Single-wire/terminal point, flexible       | 0.2 mm² ... 2.5 mm²                                      |
| 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) |

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## Dimensions

|        |          |
|--------|----------|
| Width  | 35 mm    |
| Height | 99 mm    |
| Depth  | 114.5 mm |

## Material specifications

|                    |                 |
|--------------------|-----------------|
| Color (Housing)    | gray (RAL 7042) |
| Material (Housing) | PA 6.6-FR       |

## 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 |
|-------------|--------------|

### 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 |
|----------------|------------|

### Corrosive gas test

|                |                                  |
|----------------|----------------------------------|
| Identification | ISA-S71.04-1985 G3 Harsh Group A |
|----------------|----------------------------------|

## EMC data

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|                               |                                                                                                                         |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Electromagnetic compatibility | Conformance with EMC Directive 2014/30/EU                                                                               |
| Electrostatic discharge       |                                                                                                                         |
| Standards/regulations         | EN 61000-4-2                                                                                                            |
| Electrostatic discharge       |                                                                                                                         |
| Contact discharge             | $\pm 6$ kV                                                                                                              |
| Discharge in air              | $\pm 8$ kV                                                                                                              |
| Indirect discharge            | $\pm 6$ kV                                                                                                              |
| Comments                      | Criterion B                                                                                                             |
| Electromagnetic HF field      |                                                                                                                         |
| Standards/regulations         | EN 61000-4-3                                                                                                            |
| 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                                                                                                            |
| Fast transients (burst)       |                                                                                                                         |
| Input                         | $\pm 2$ kV                                                                                                              |
| Signal                        | $\pm 2$ kV                                                                                                              |
| Comments                      | Criterion B                                                                                                             |
| Surge current load (surge)    |                                                                                                                         |
| Standards/regulations         | EN 61000-4-5                                                                                                            |
| Surge current load (surge)    |                                                                                                                         |
| Input                         | $\pm 0.5$ kV (sym./asym.)                                                                                               |
| Output                        | $\pm 1$ kV (asymmetrical, unshielded)                                                                                   |
| Signal                        | $\pm 1$ kV (asymmetrical, shielded Ethernet cable)<br>$\pm 1$ kV (asymmetrical: line to ground, unshielded SHDSL cable) |
| Comments                      | Criterion A                                                                                                             |
| Conducted interference        |                                                                                                                         |
| Standards/regulations         | EN 61000-4-6                                                                                                            |
| 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                                                                                        |

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## 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

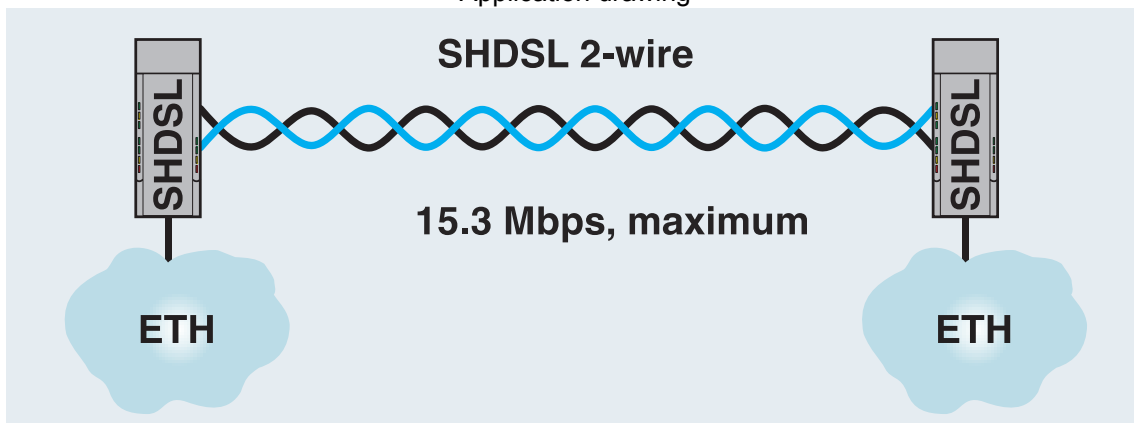
|                       |            |
|-----------------------|------------|
| Standards/regulations | EN 50121-4 |
|-----------------------|------------|

## Mounting

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

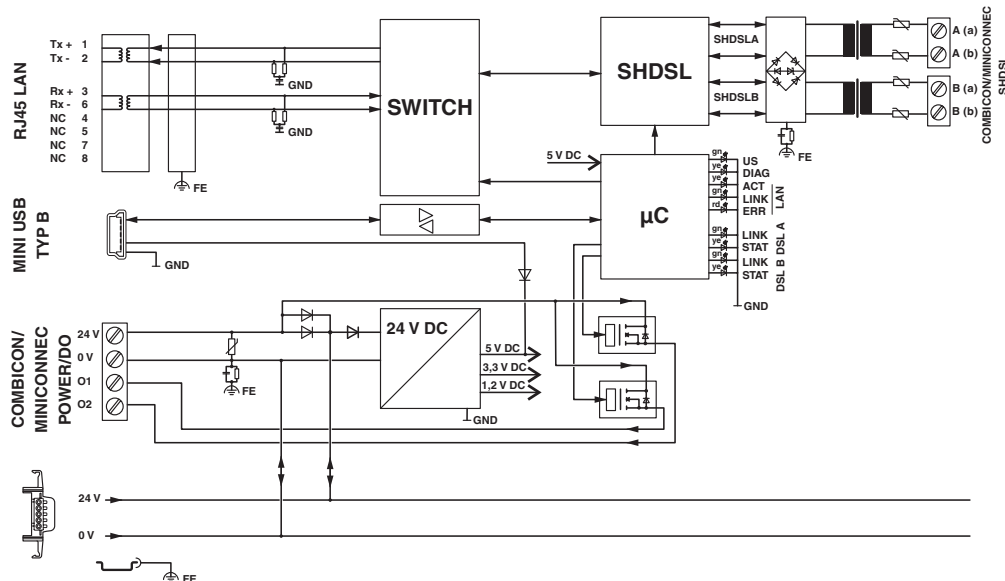
## Drawings

Application drawing

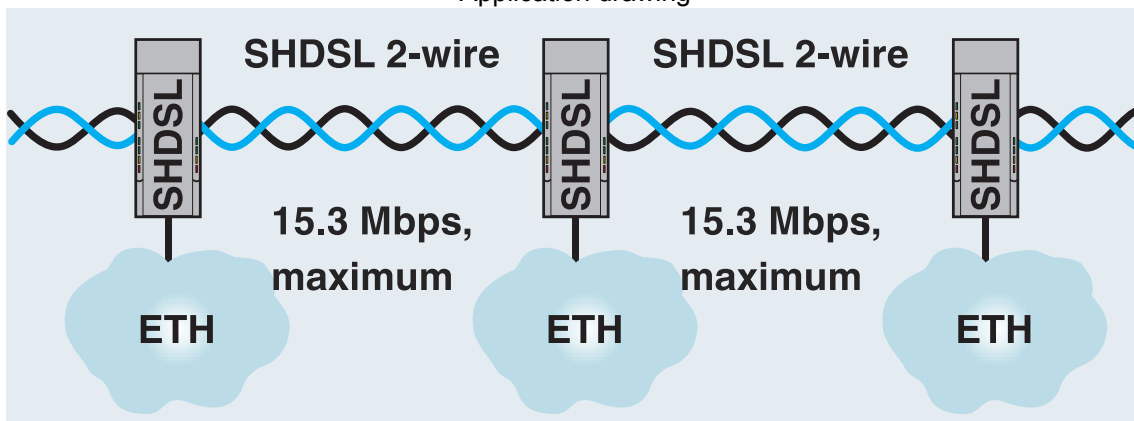


Point-to-point connection (2-wire)

Circuit diagram



Application drawing



Linear structure (2-wire)

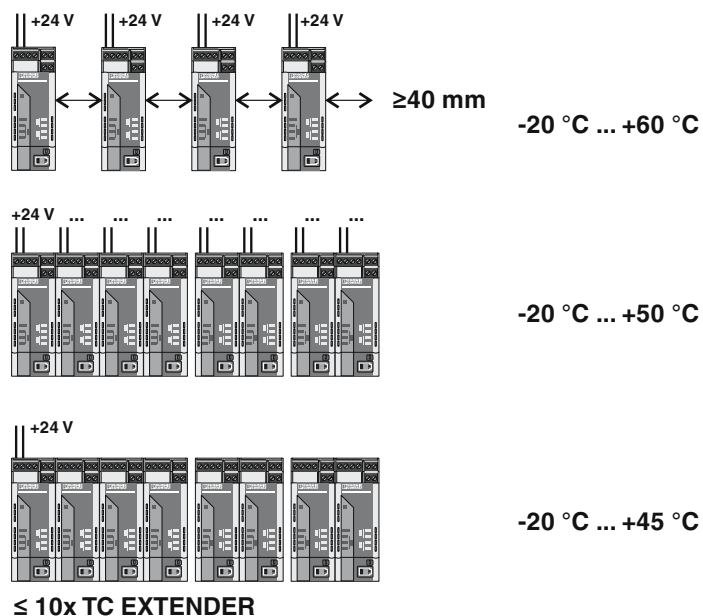
# TC EXTENDER 2001 ETH-2S - Ethernet extenders



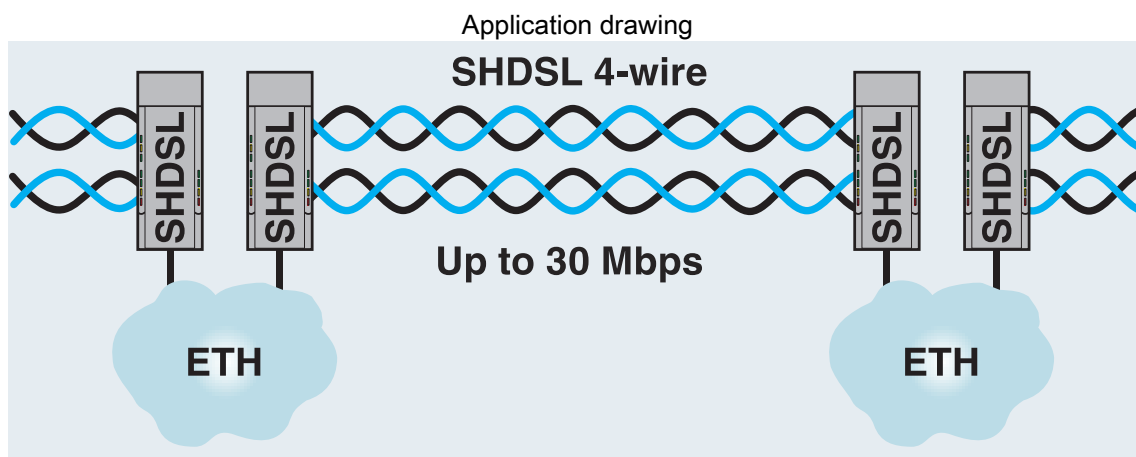
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## Application drawing

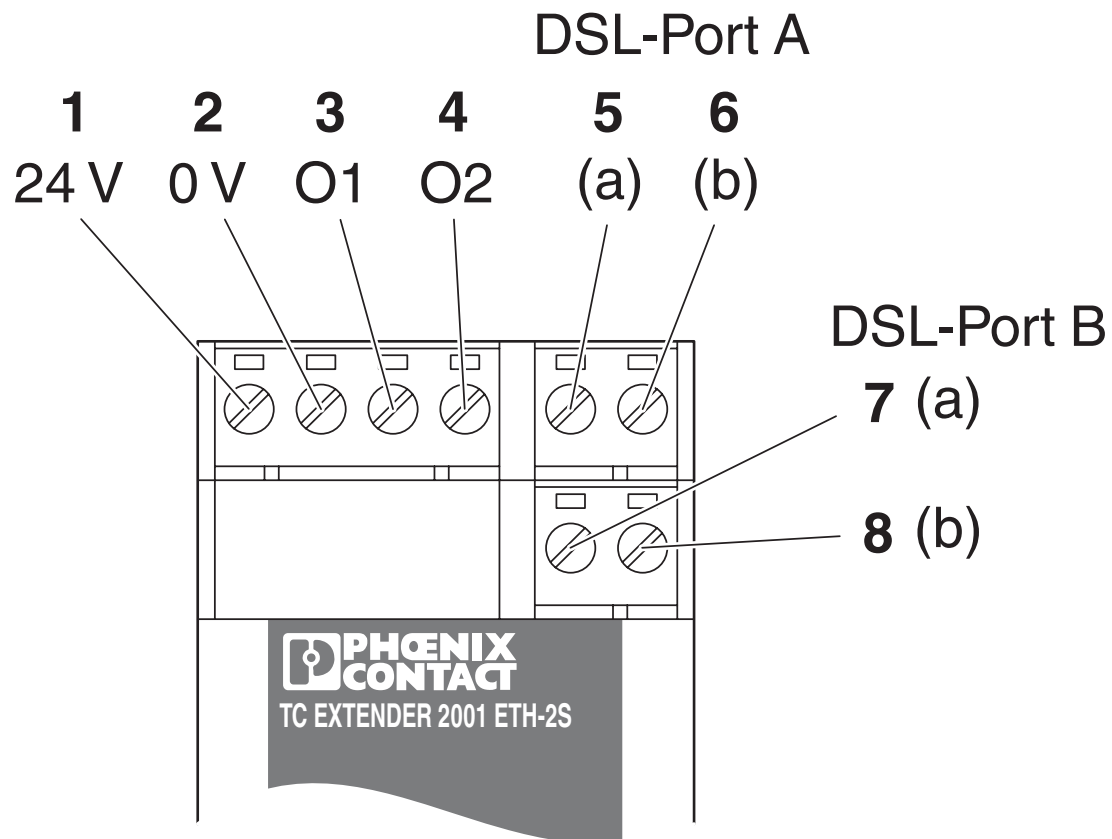


## Restrictions for combined assembly



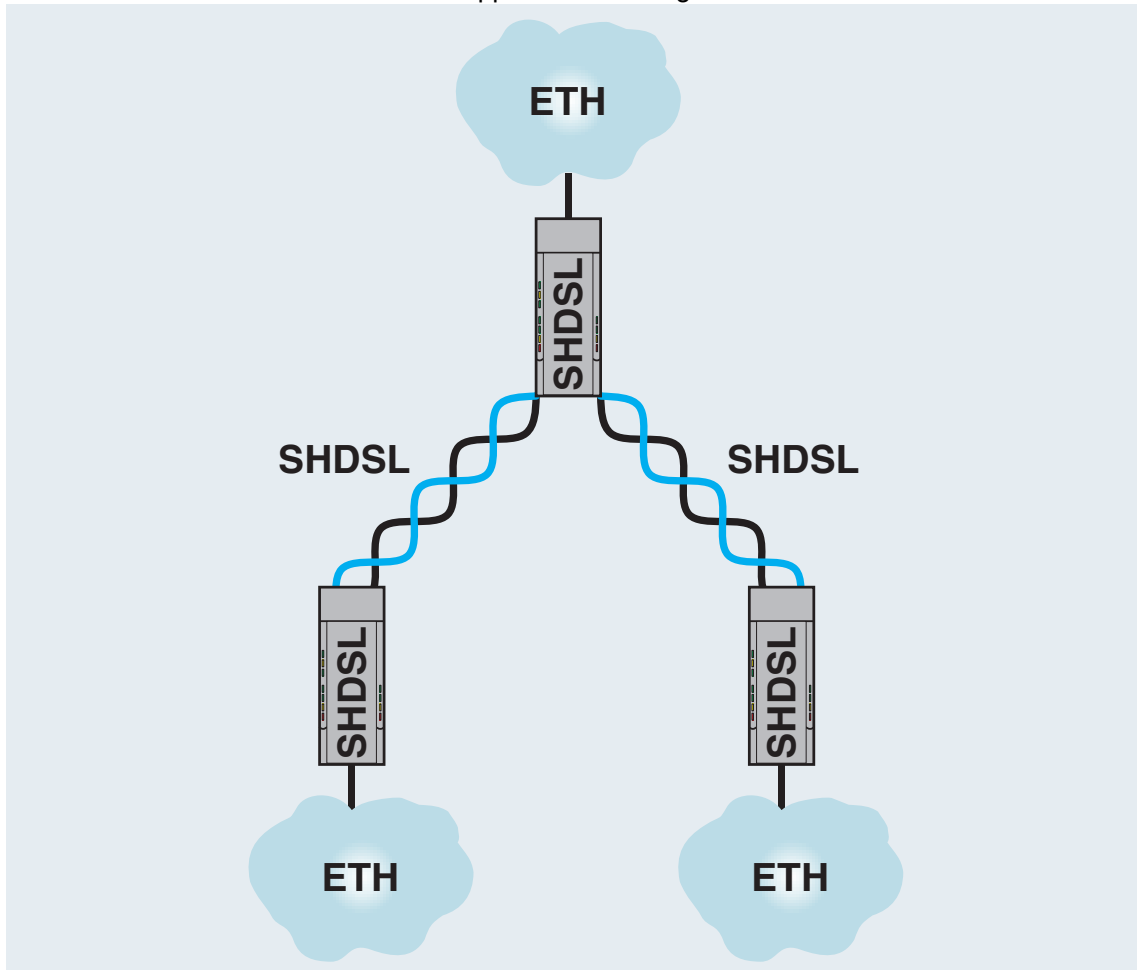
Linear structure (4-wire)

Schematic diagram



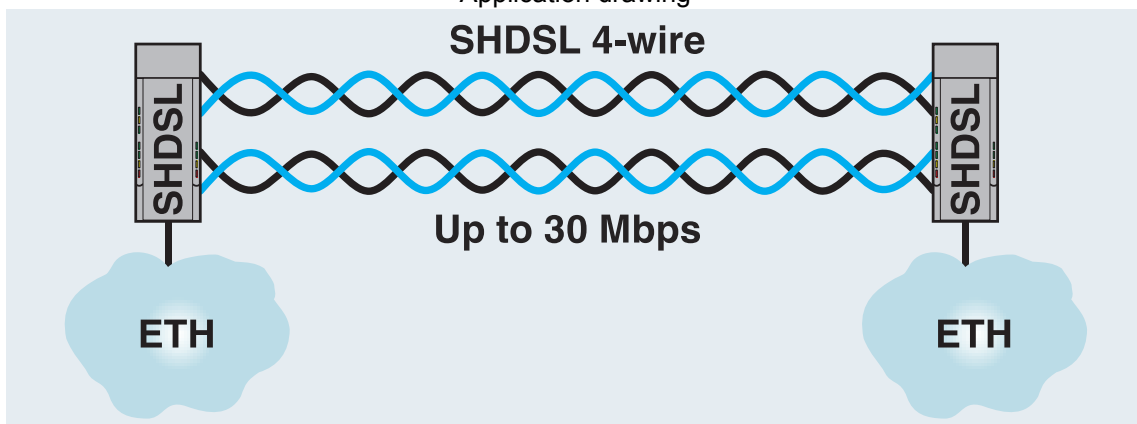
Device connections

Application drawing



Star structure

Application drawing



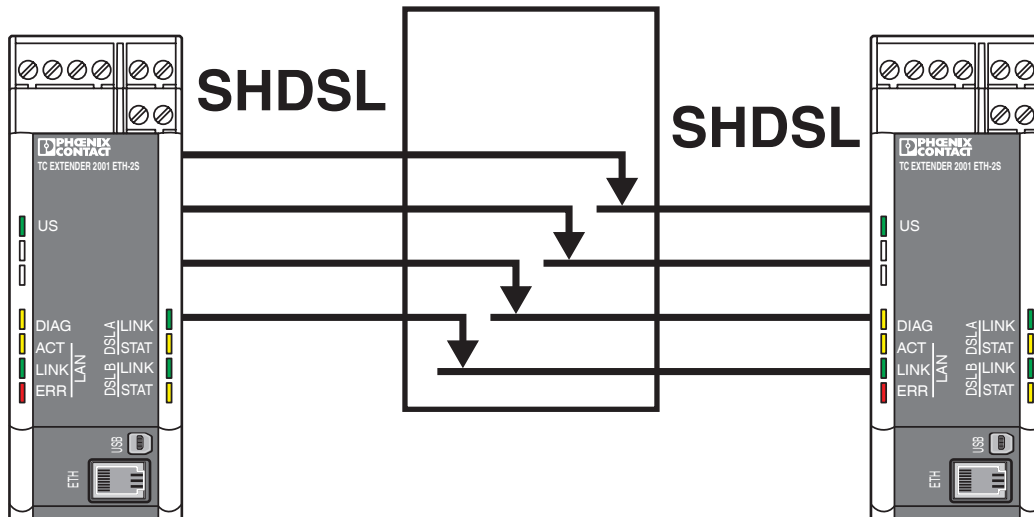
Point-to-point connection (4-wire)

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Application drawing



Slip ring communication

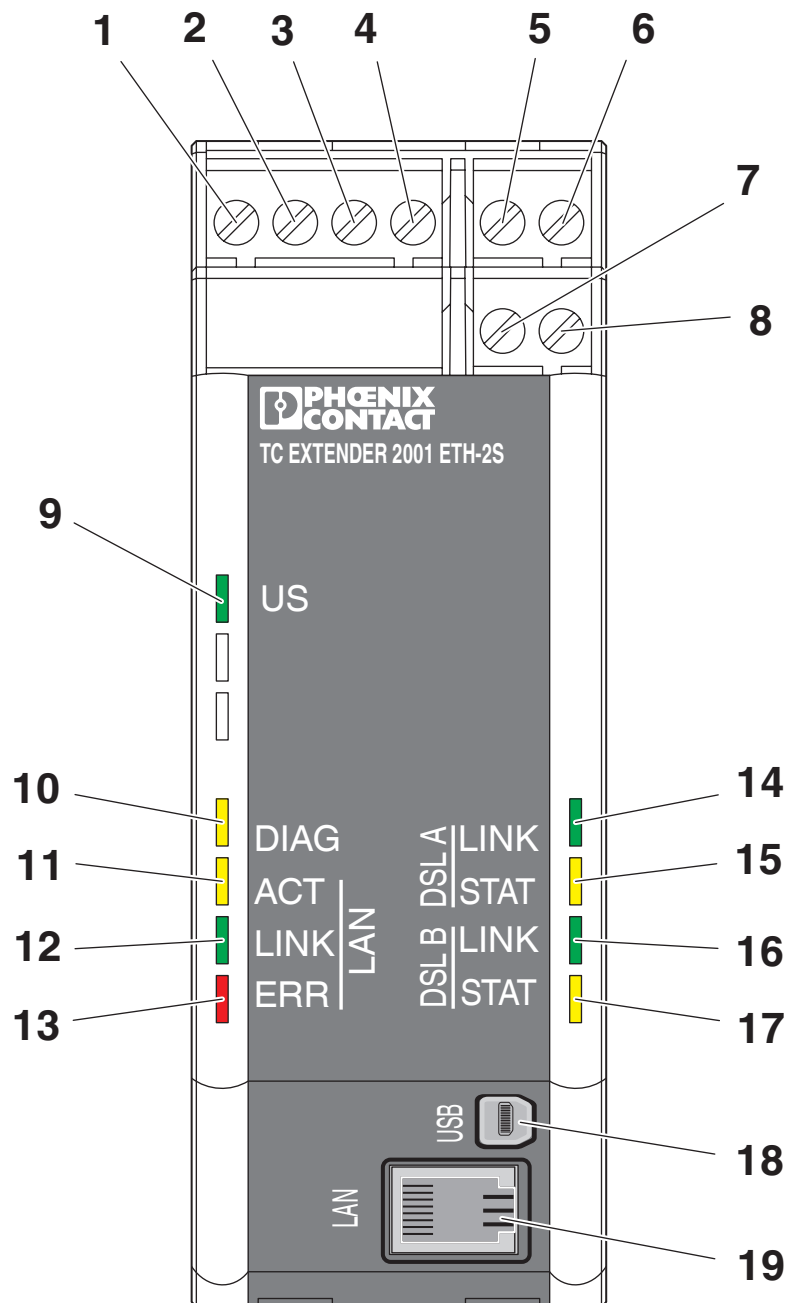
# TC EXTENDER 2001 ETH-2S - Ethernet extenders

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Schematic diagram



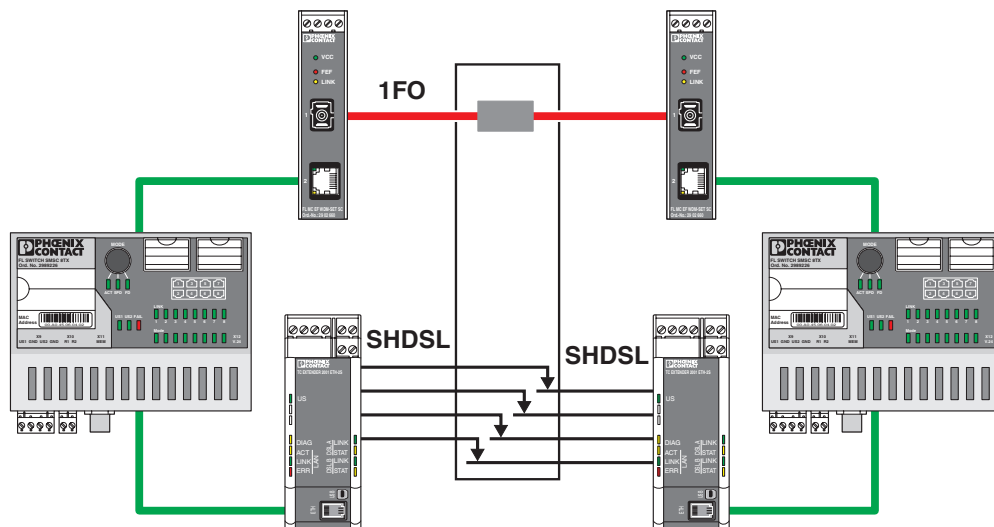
Front view

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Application drawing



Redundant slip ring communication

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## Approvals

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

### UAE-RoHS

Approval ID: 23-02-63194



### cULus Listed

Approval ID: E238705

# TC EXTENDER 2001 ETH-2S - Ethernet extenders



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## Classifications

### ECLASS

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

### ETIM

|          |          |
|----------|----------|
| ETIM 9.0 | EC000309 |
|----------|----------|

### UNSPSC

|             |          |
|-------------|----------|
| UNSPSC 21.0 | 43223100 |
|-------------|----------|

Environmental product compliance

|                                         |                                                                                                                                                                                                                                   |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EU RoHS                                 |                                                                                                                                                                                                                                   |
| Fulfills EU RoHS substance requirements | Yes                                                                                                                                                                                                                               |
| Exemption                               | 7(a), 7(c)-I                                                                                                                                                                                                                      |
| China RoHS                              |                                                                                                                                                                                                                                   |
| Environment friendly use period (EFUP)  | EFUP-50                                                                                                                                                                                                                           |
|                                         | An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required. |
| EU REACH SVHC                           |                                                                                                                                                                                                                                   |
| REACH candidate substance (CAS No.)     | Lead(CAS: 7439-92-1)                                                                                                                                                                                                              |
| SCIP                                    | dba34674-8cbd-46b5-9b49-69846dee180d                                                                                                                                                                                              |
| EF3.0 Climate Change                    |                                                                                                                                                                                                                                   |
| CO2e kg                                 | 15.96 kg CO2e                                                                                                                                                                                                                     |

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## Accessories

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

2904614

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



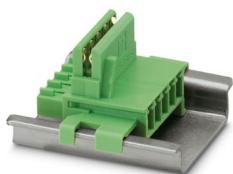
Primary-switched power supply, QUINT POWER, screw connection, DIN rail mounting, supply of devices possible via the TBUS DIN rail connector, protective coating, input: single-phase, output: 24 V DC/2.5 A

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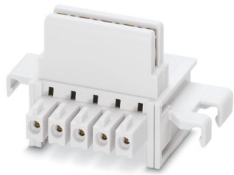
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## ME 17,5 TBUS 1,5/ 5-ST-3,81 KMGY - DIN rail bus connectors

2713645

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



DIN rail connector, color: light gray, nominal current: 8 A (parallel contacts), rated voltage (III/2): 125 V, number of positions: 5, product range: TBUS5-17,5..., 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

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## 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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## 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

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## 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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## FL DIN RA - DIN rail adapter

2891053

<https://www.phoenixcontact.com/us/products/2891053>

The FL DIN RA is installed in a standard, 19-inch rack (EIA-310-D, IEC 60297-3-100) to allow DIN rail mounted equipment to be rack mounted.



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