

# TC EXTENDER 2001 ETH-2S - Ethernet extender



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, PROFI-safe, 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



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## Commercial data

|                                      |               |
|--------------------------------------|---------------|
| Item number                          | 2702409       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | DN24          |
| Product key                          | DNC442        |
| GTIN                                 | 4055626162560 |
| Weight per piece (including packing) | 267.6 g       |
| 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 extender   |
| 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%)   |

#### Functions

|                      |   |
|----------------------|---|
| Diagnostic functions | Topological overview, event and path diagnostics  |
|                      | Logbook   |
| Basic functions      | Ethernet extenders in accordance with ITU-T G.991.2   |
| Filter functions     | VLAN  |
| Management           | Plug and Play, diagnostics via PSI-CONF software or web-based management (only with managed Ethernet extenders) |
| Redundancy           | Proprietary SHDSL redundancy protocol (Managed and unmanaged Ethernet extenders)                                |

#### Security functions

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

### 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) |

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|                             |  |
|-----------------------------|--|
|                             | 5 V DC (configuration only, via mini-USB type B)                       |
| Typical current consumption | < 180 mA (24 V DC)   |
| Max. current consumption    | ≤ 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<br>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<br>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   |

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|  |      |
|--|------|
| 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 |

## Material specifications

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

## Mechanical tests

|  |  |
|--|--|
| Vibration resistance in accordance with EN 60068-2-6/IEC 60068-2-6 | : 5g, 10...150 Hz, 2.5 h, in XYZ direction |
| Shock in accordance with EN 60068-2-27/IEC 60068-2-27              | : 15g                                      |

## 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)<br>-20 °C ... 55 °C (Mounted in rows with zero spacing and low power dissipation of aligned modules)<br>-20 °C ... 50 °C (Mounted in rows with zero spacing)<br>-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 | ⊕ II 3 G Ex ec IIC T4 Gc |
| Certificate    | PxCIF11ATEX2313643X      |

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|      |   |
|------|---|
| Note | Please follow the special installation instructions in the documentation! |
|------|---|

## UL, USA/Canada

|                |            |
|----------------|------------|
| Identification | 508 Listed |
|----------------|------------|

## Corrosive gas test

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

## EMC data

|                               |   |
|-------------------------------|---|
| Electromagnetic compatibility | Conformance with EMC Directive 2014/30/EU |
|-------------------------------|---|

### Electrostatic discharge

|                       |              |
|-----------------------|--------------|
| Standards/regulations | EN 61000-4-2 |
|-----------------------|--------------|

### Electrostatic discharge

|                    |             |
|--------------------|-------------|
| Contact discharge  | ± 6 kV      |
| Discharge in air   | ± 8 kV      |
| Indirect discharge | ± 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    | ± 2 kV      |
| Signal   | ± 2 kV      |
| Comments | Criterion B |

### Surge current load (surge)

|                       |              |
|-----------------------|--------------|
| Standards/regulations | EN 61000-4-5 |
|-----------------------|--------------|

### Surge current load (surge)

|          |   |
|----------|---|
| Input    | ± 0.5 kV (sym./asym.)   |
| Output   | ± 1 kV (asymmetrical, unshielded)   |
| Signal   | ± 1 kV (asymmetrical, shielded Ethernet cable)<br>± 1 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

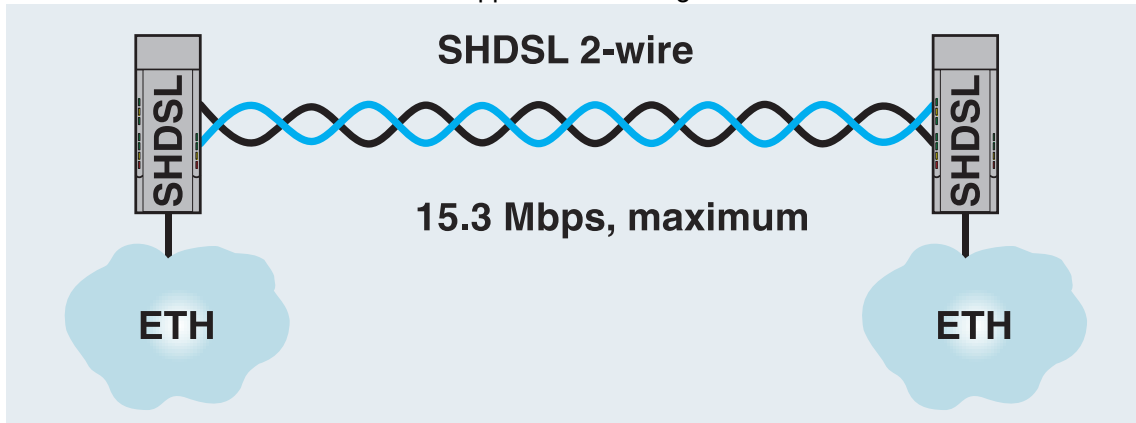
|                       |                      |
|-----------------------|----------------------|
| Standards/regulations | EN 50121-4           |
| Standard designation  | Railway applications |

## Mounting

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

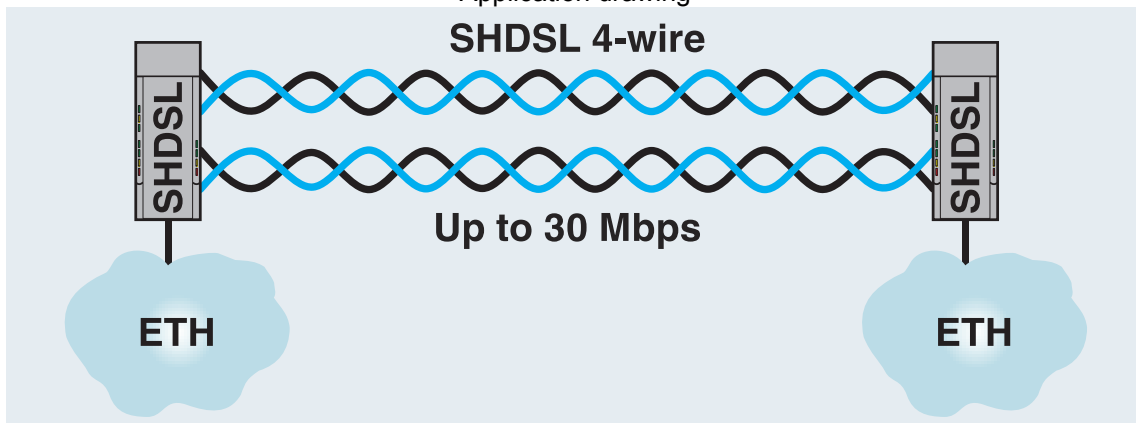
## Drawings

Application drawing



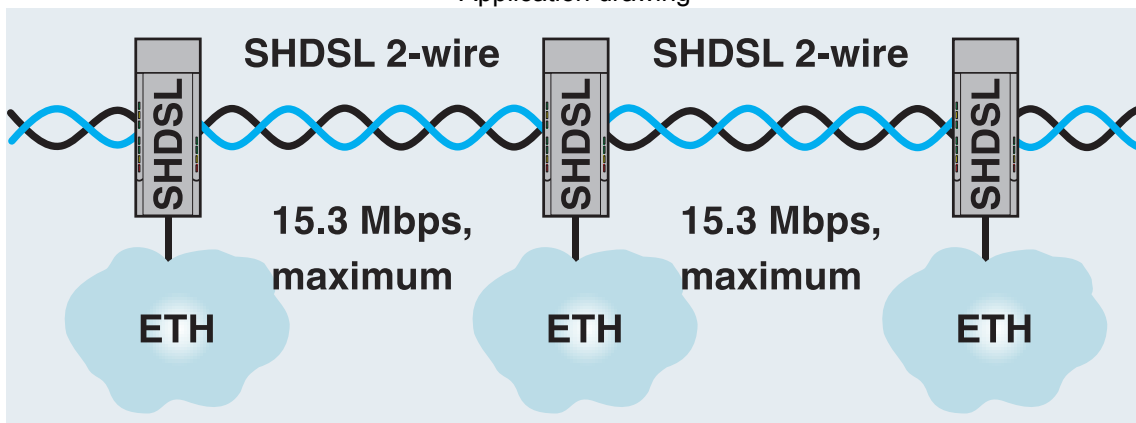
Point-to-point connection (2-wire)

Application drawing



Point-to-point connection (4-wire)

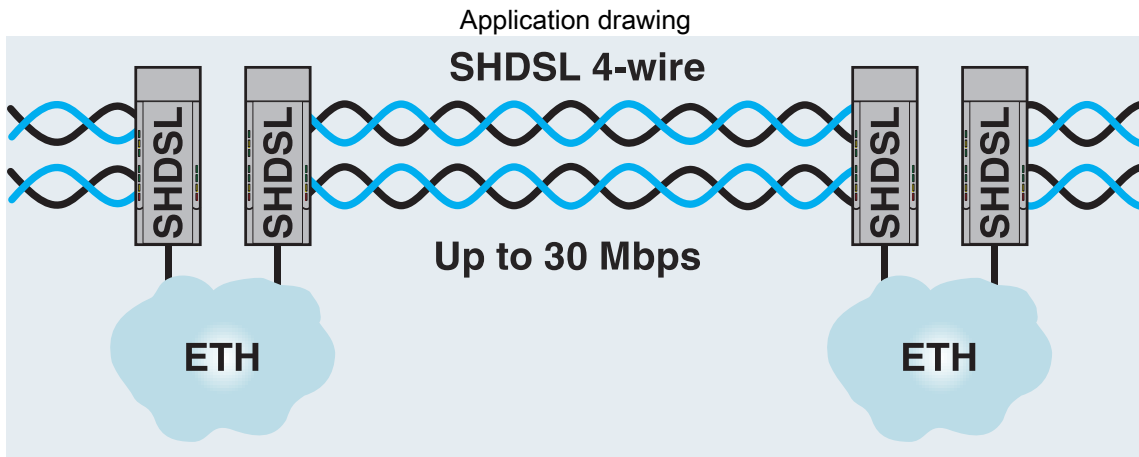
Application drawing



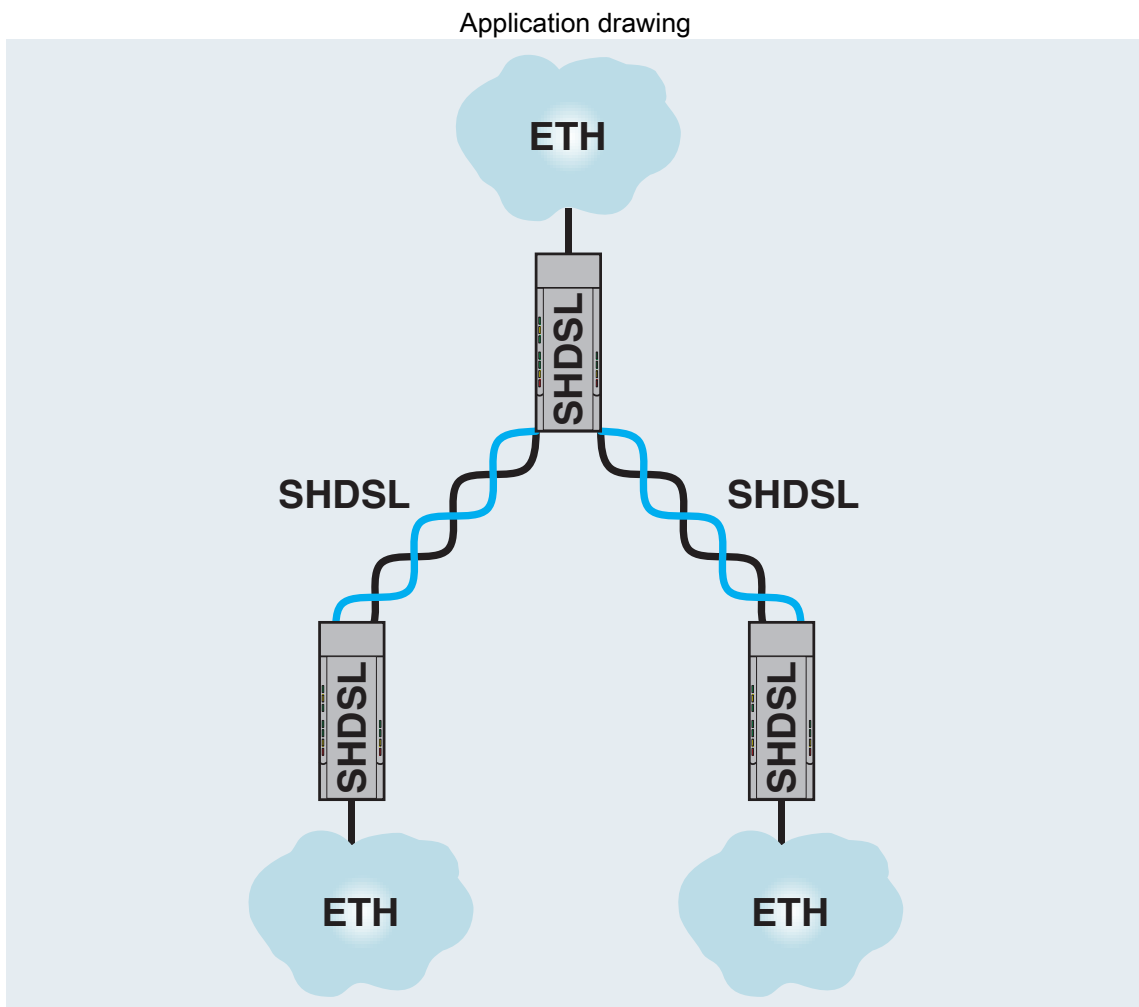
Linear structure (2-wire)

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Linear structure (4-wire)



Star structure

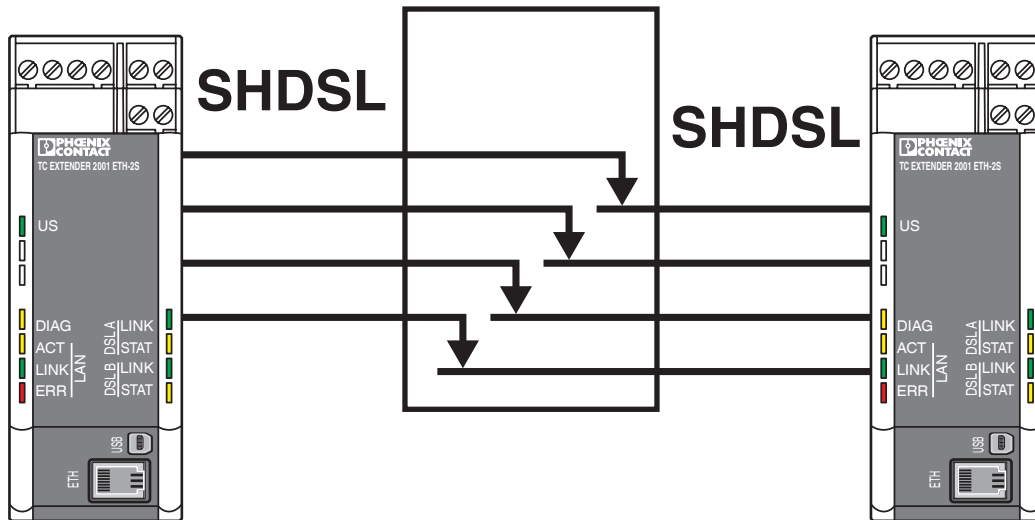
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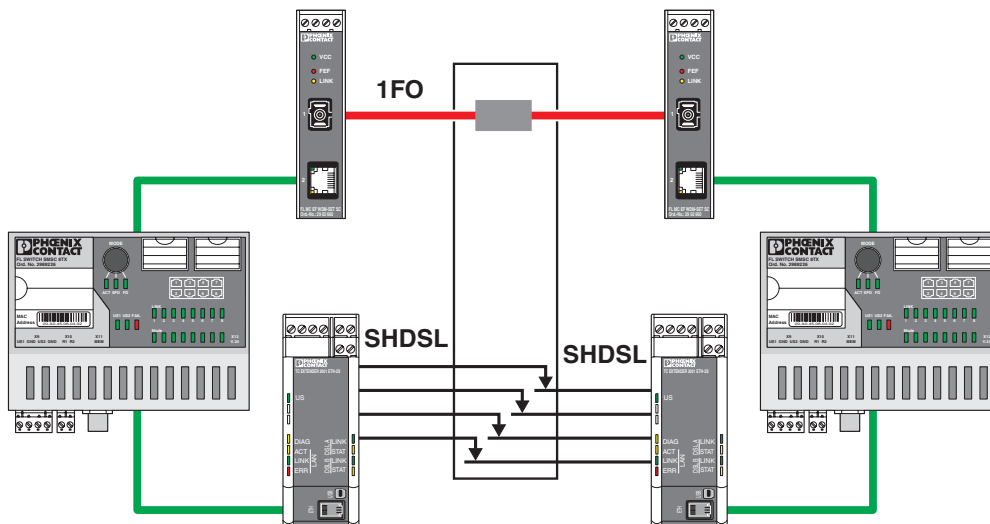
<https://www.phoenixcontact.com/us/products/2702409>

Application drawing



Slip ring communication

Application drawing



Redundant slip ring communication

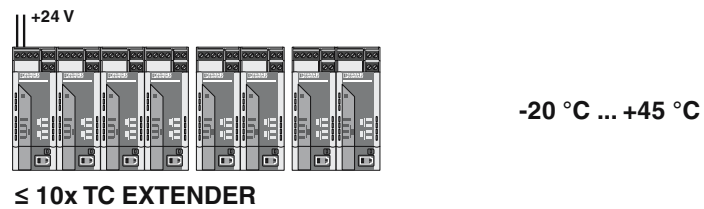
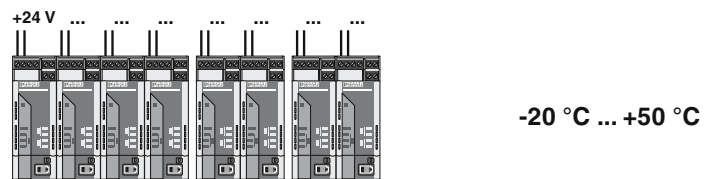
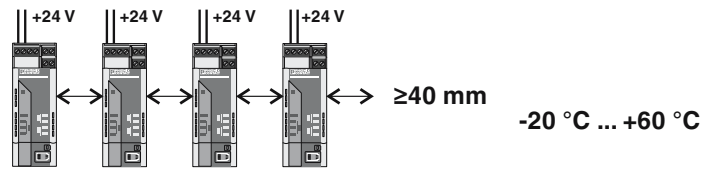
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## Application drawing



Restrictions for combined assembly

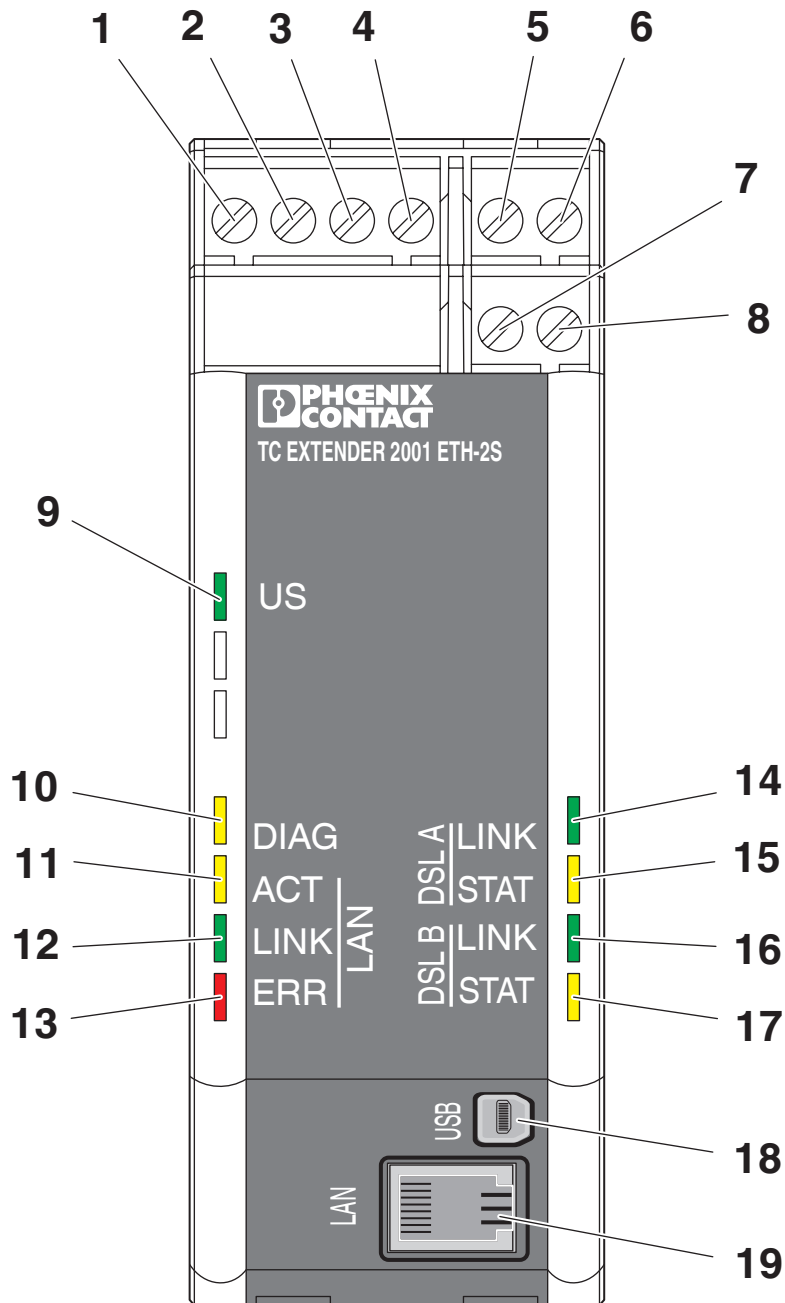
# TC EXTENDER 2001 ETH-2S - Ethernet extender



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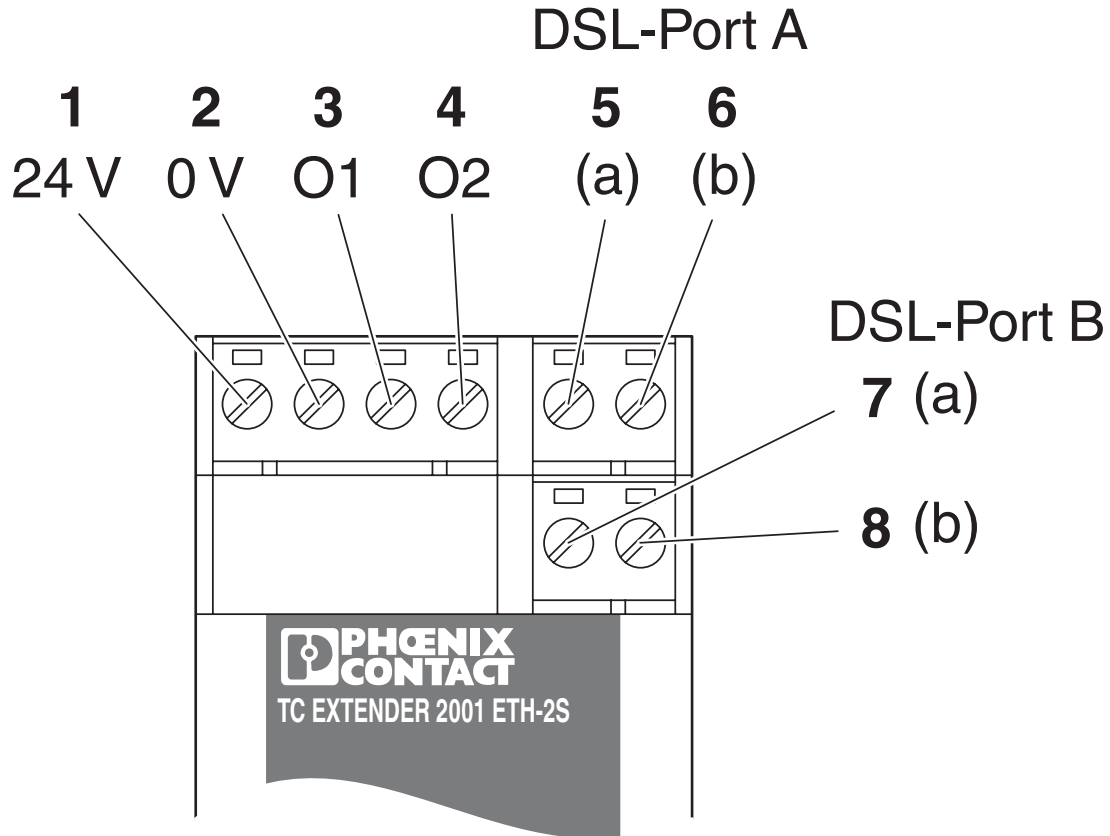
<https://www.phoenixcontact.com/us/products/2702409>

Schematic diagram



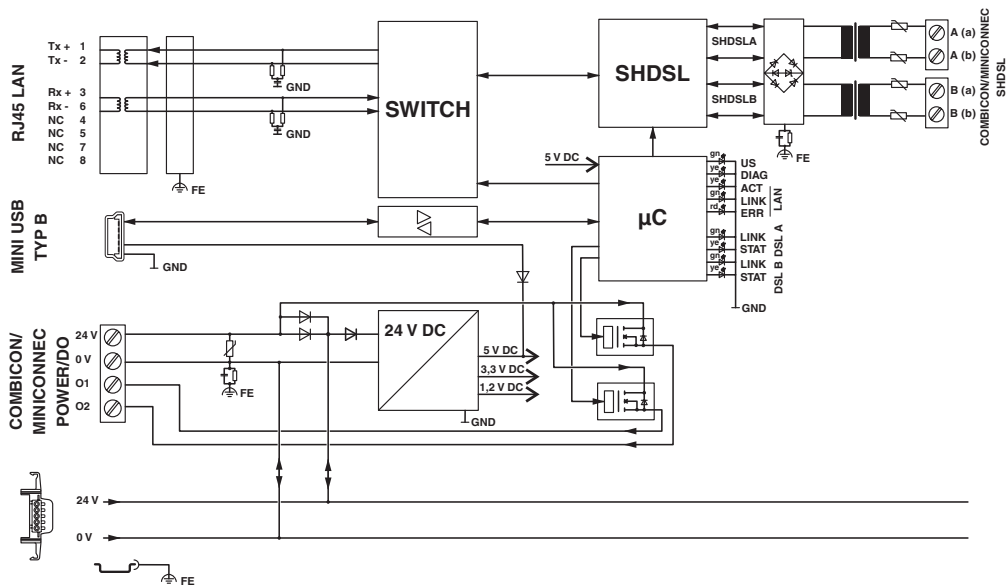
Front view

Schematic diagram



Device connections

Circuit diagram



Basic circuit diagram

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## Approvals

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



**cULus Listed**

Approval ID: E238705

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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-13.0 | 19170407 |
| ECLASS-15.0 | 19170407 |

### ETIM

|           |          |
|-----------|----------|
| ETIM 10.0 | EC000309 |
|-----------|----------|

### UNSPSC

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

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## 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 |

### EF3.1 Climate Change

|         |               |
|---------|---------------|
| CO2e kg | 15.96 kg CO2e |
|---------|---------------|

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