

# Modem - TC EXTENDER 2001 ETH-2S - 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, Order 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, Order No. 2702255 and TC EXTENDER 4001 ETH-1S, Order 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)
- ✓ PROFINET
- ✓ Automatic SHDSL data rate detection
- ✓ Network transparent (no IP configuration required)
- ✓ Protocol transparent
- ✓ 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)
- ✓ Two digital outputs for alerting external controllers



## Key Commercial Data

|              |                     |
|--------------|---------------------|
| Packing unit | 1 pc                |
| GTIN         | <br>4 055626 162560 |

## Modem - TC EXTENDER 2001 ETH-2S - 2702409

|                                      |               |
|--------------------------------------|---------------|
| GTIN                                 | 4055626162560 |
| Weight per Piece (excluding packing) | 260.000 g     |
| Custom tariff number                 | 85176200      |
| Country of origin                    | Germany       |

### Technical data

#### Note

|                         |   |
|-------------------------|---|
| Utilization restriction | EMC: class A product, see manufacturer's declaration in the download area |
|-------------------------|---|

#### Dimensions

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

#### Ambient conditions

|  |  |
|--|--|
| 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 (Mounted in rows with zero spacing and supply of other modules via the device)                  |
| Ambient temperature (storage/transport)  | -40 °C ... 85 °C   |
| Permissible humidity (operation)         | 10 % ... 95 % (non-condensing)   |
| Permissible humidity (storage/transport) | 10 % ... 95 % (non-condensing)   |
| Altitude                                 | ≤ 5000 m (For restrictions, see the manufacturer's declaration for altitude operation)                           |
| Degree of protection                     | IP20   |

#### General

|  |   |
|--|---|
| Electrical isolation                     | VCC // Ethernet // DSL (A) // DSL (B) // FE                             |
| Test voltage data interface/power supply | 1.5 kV AC (50 Hz, 1 min.)   |
| Electromagnetic compatibility            | Conformance with EMC Directive 2014/30/EU                               |
| Net weight                               | 258.7 g   |
| Housing material                         | PA 6.6-FR   |
| Color                                    | gray  |
| 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%)   |

#### Power supply

# Modem - TC EXTENDER 2001 ETH-2S - 2702409

## Technical data

### Power supply

|                             |   |
|-----------------------------|---|
| 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)  |
| Supply voltage range        | 18 V DC ... 30 V DC   |
| Typical current consumption | < 180 mA (24 V DC)  |
| Connection method           | COMBICON plug-in screw terminal block   |

### Interfaces

|                                       |   |
|---------------------------------------|---|
| Interface 1                           | Ethernet interface, 10/100Base-T(X) in accordance with IEEE 802.3 |
| Interface                             | Ethernet  |
| No. of ports                          | 1   |
| Connection method                     | RJ45 socket, shielded   |
|                                       | 1 port 10/100Base-T(X), auto negotiation                          |
| Transmission length                   | < 100 m (shielded twisted pair)                                   |
| Protocols supported                   | Protocol-transparent for TCP/IP, IPv4, and IPv6                   |
| Serial transmission speed             | 10/100 Mbps, auto negotiation                                     |
| Interface 2                           | SHDSL interface according to ITU-T G.991.2.bis                    |
| No. of ports                          | 2 (2-wire operation)  |
| Connection method                     | 2 x 2-pos. COMBICON plug-in screw terminal blocks                 |
| Transmission length                   | < 20 km (Depending on data rate and cable cross section)          |
| Conductor cross section solid min.    | 0.2 mm <sup>2</sup>   |
| Conductor cross section solid max.    | 2.5 mm <sup>2</sup>   |
| Conductor cross section flexible min. | 0.2 mm <sup>2</sup>   |
| Conductor cross section flexible max. | 2.5 mm <sup>2</sup>   |
| Conductor cross section AWG min.      | 24  |
| Conductor cross section AWG max.      | 14  |
| Serial transmission speed             | 4-wire operation: 64 kbps ... 30 Mbps                             |
|                                       | 2-wire operation: 32 kbps ... 15.3 Mbps                           |
| Interface 3                           | USB 2.0   |
| Connection method                     | Mini-USB type B, 5-pos.   |
| Transmission length                   | < 5 m (only for configuration and diagnostics)                    |

### Function

|                                  |   |
|----------------------------------|---|
| Management                       | Plug and Play, diagnostics via PSI-CONF software or web-based management (only with managed Ethernet extenders)   |
| 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) |

### Digital outputs

# Modem - TC EXTENDER 2001 ETH-2S - 2702409

## Technical data

### Digital outputs

|                         |  |
|-------------------------|--|
| Output name             | Digital output                                       |
| Number of outputs       | 2  |
| Voltage output signal   | depending on the operating voltage                   |
| Current output signal   | ≤ 150 mA (Short-circuit-proof)                       |
| Connection method       | 2 x 2-pos. COMBICON plug-in screw terminal blocks    |
| Behavior of the outputs | Deactivated for device supply via DIN rail connector |

### Conformance/approvals

|                 |   |
|-----------------|---|
| Designation     | CE  |
| Identification  | CE-compliant  |
| Designation     | ATEX  |
| Identification  | # II 3 G Ex nA IIC T4 Gc X  |
| Additional text | Please follow the special installation instructions in the documentation! |
| Designation     | UL, USA/Canada  |
| Identification  | 508 Listed  |
| Designation     | Corrosive gas test  |
| Identification  | ISA-S71.04-1985 G3 Harsh Group A  |

### Standards and Regulations

|                               |  |
|-------------------------------|--|
| Electromagnetic compatibility | Conformance with EMC Directive 2014/30/EU                    |
| Type of test                  | Vibration resistance in acc. with EN 60068-2-6/IEC 60068-2-6 |
| Test result                   | 5g, 10...150 Hz, 2.5 h, in XYZ direction                     |
| Type of test                  | Shock in acc. with EN 60068-2-27/IEC 60068-2-27              |
| Test result                   | 15g  |
| Standards/regulations         | EN 61000-4-2   |
| Contact discharge             | ± 6 kV   |
| Indirect discharge            | ± 6 kV   |
| Standards/regulations         | EN 61000-4-3   |
| Frequency range               | 80 MHz ... 3 GHz   |
| Standards/regulations         | EN 61000-4-4   |
| Comments                      | Criterion B  |
| Standards/regulations         | EN 61000-4-5   |
| Signal                        | ± 1 kV (asymmetrical, shielded Ethernet cable)               |
| Standards/regulations         | EN 55011   |
|                               | EN 61000-4-6   |
| Frequency range               | 0.15 MHz ... 80 MHz  |
| Standards/regulations         | EN 50121-4   |

### Environmental Product Compliance

# Modem - TC EXTENDER 2001 ETH-2S - 2702409

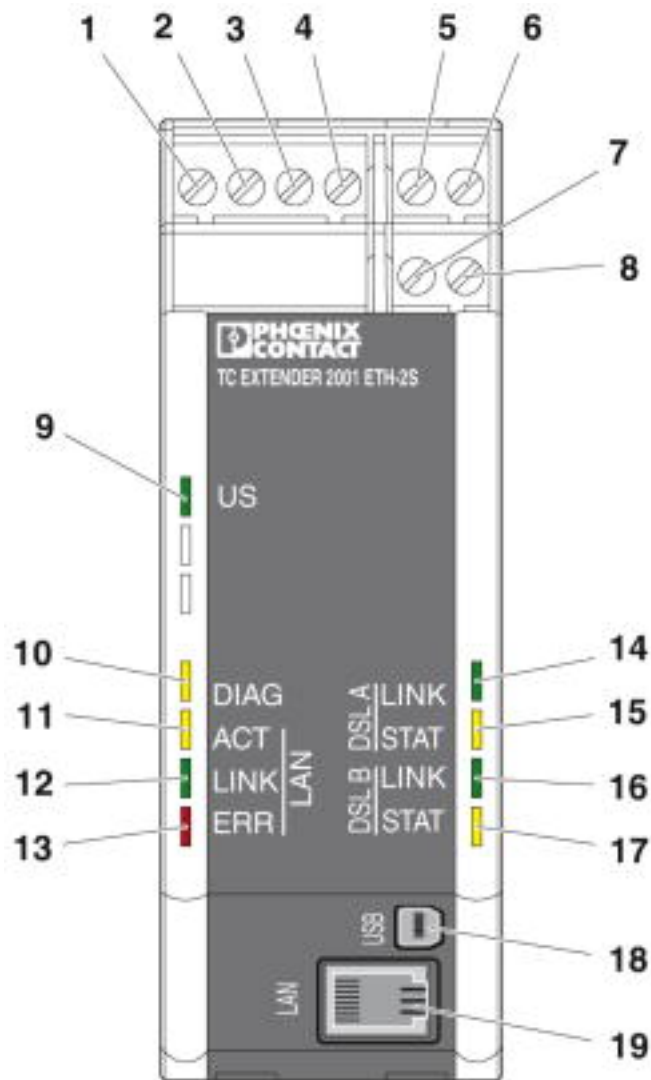
## Technical data

### Environmental Product Compliance

|            |   |
|------------|---|
| REACH SVHC | Lead 7439-92-1  |
| China RoHS | Environmentally Friendly Use Period = 50 years  |
|            | For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration" |

## Drawings

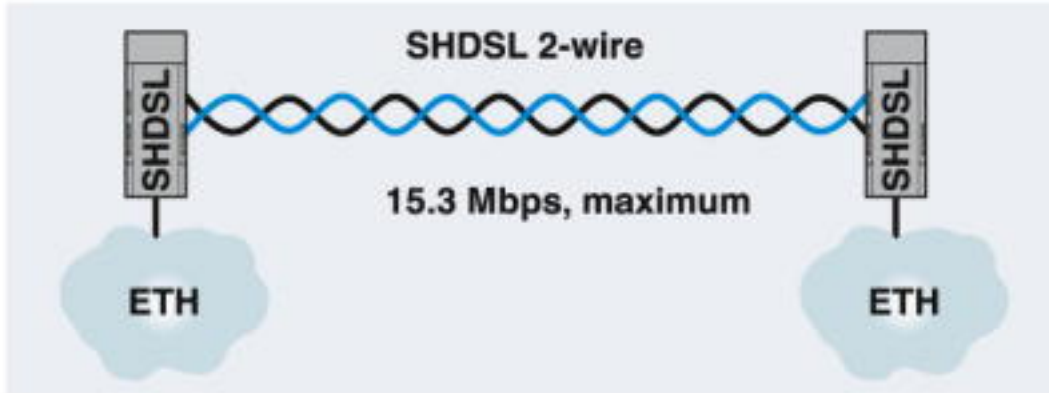
Schematic diagram



Front view

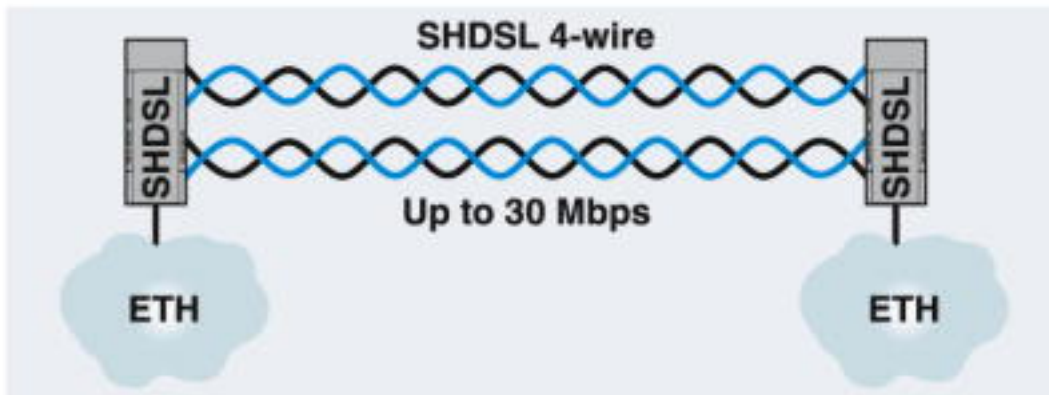
# Modem - TC EXTENDER 2001 ETH-2S - 2702409

Application drawing



Point-to-point connection (2-wire)

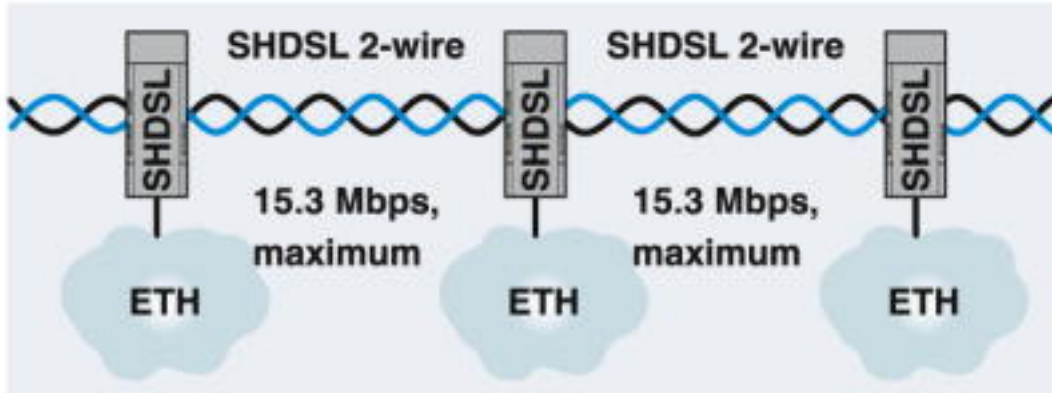
Application drawing



Point-to-point connection (4-wire)

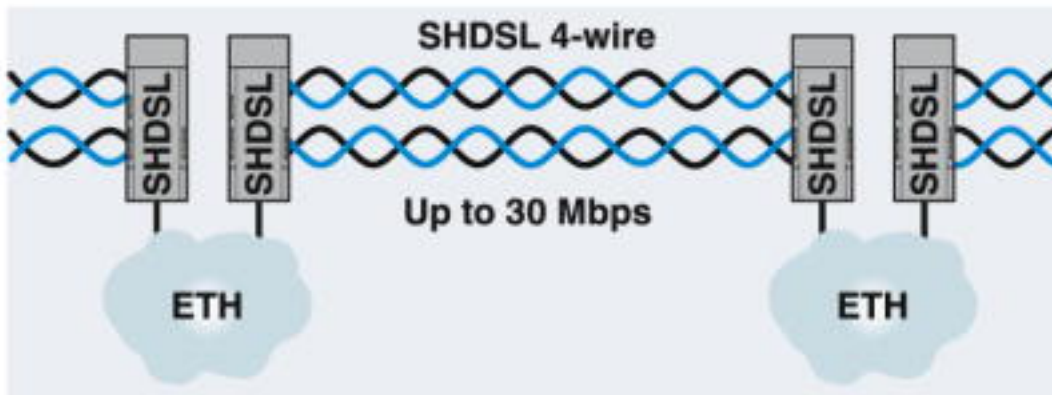
# Modem - TC EXTENDER 2001 ETH-2S - 2702409

Application drawing



Linear structure (2-wire)

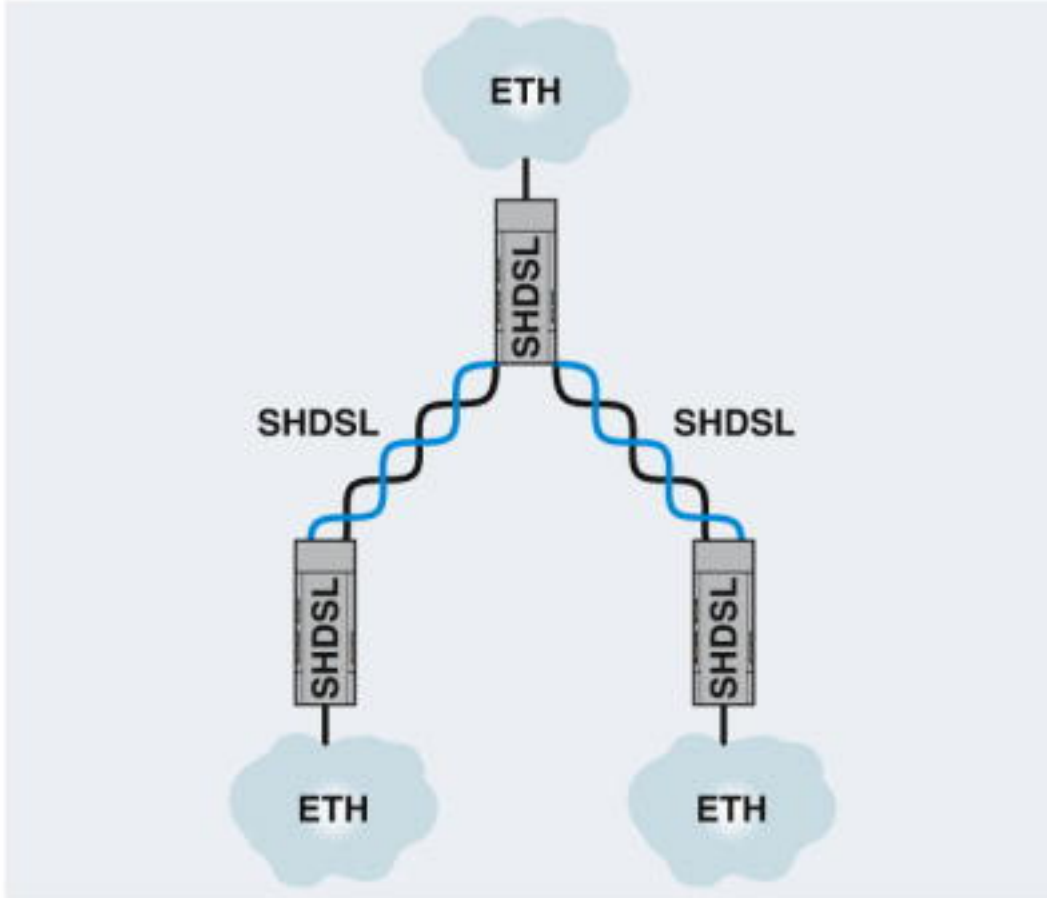
Application drawing



Linear structure (4-wire)

# Modem - TC EXTENDER 2001 ETH-2S - 2702409

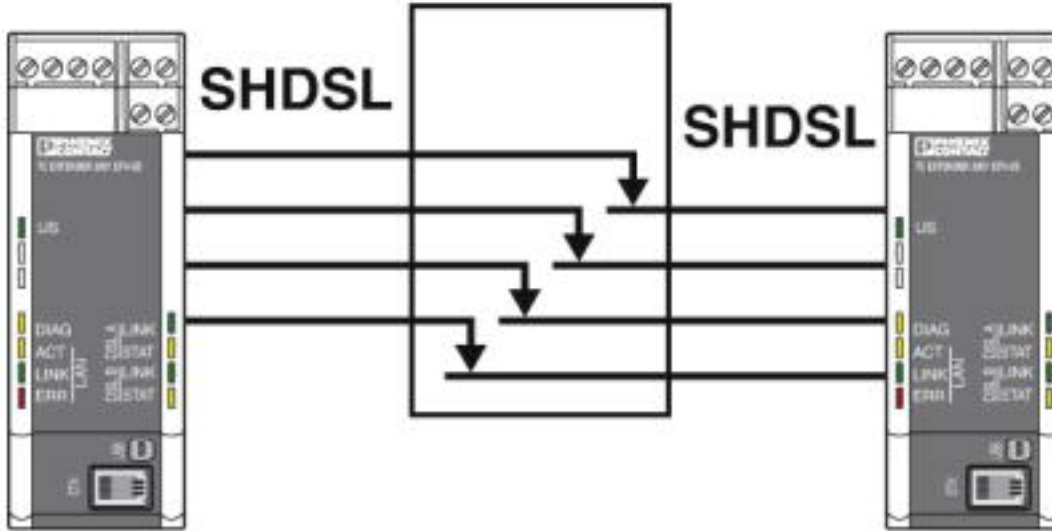
Application drawing



Star structure

# Modem - TC EXTENDER 2001 ETH-2S - 2702409

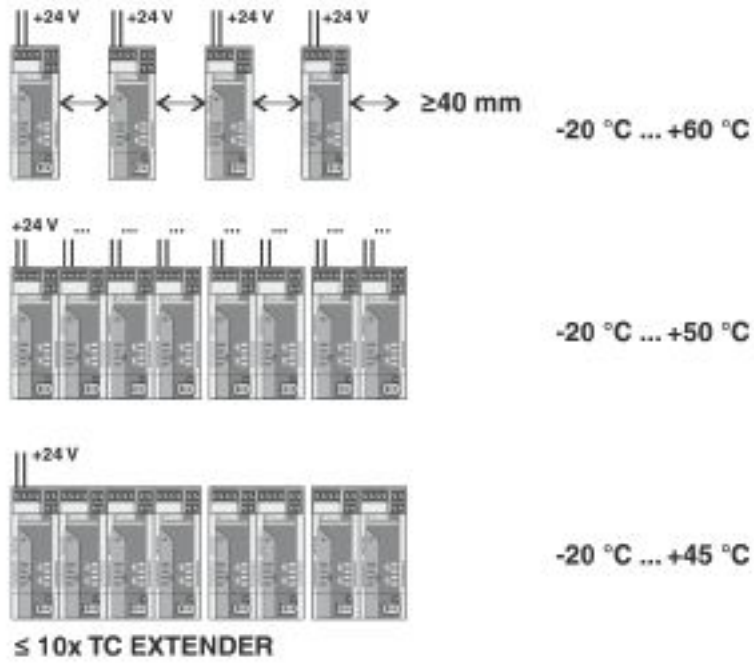
Application drawing



Slip ring communication

# Modem - TC EXTENDER 2001 ETH-2S - 2702409

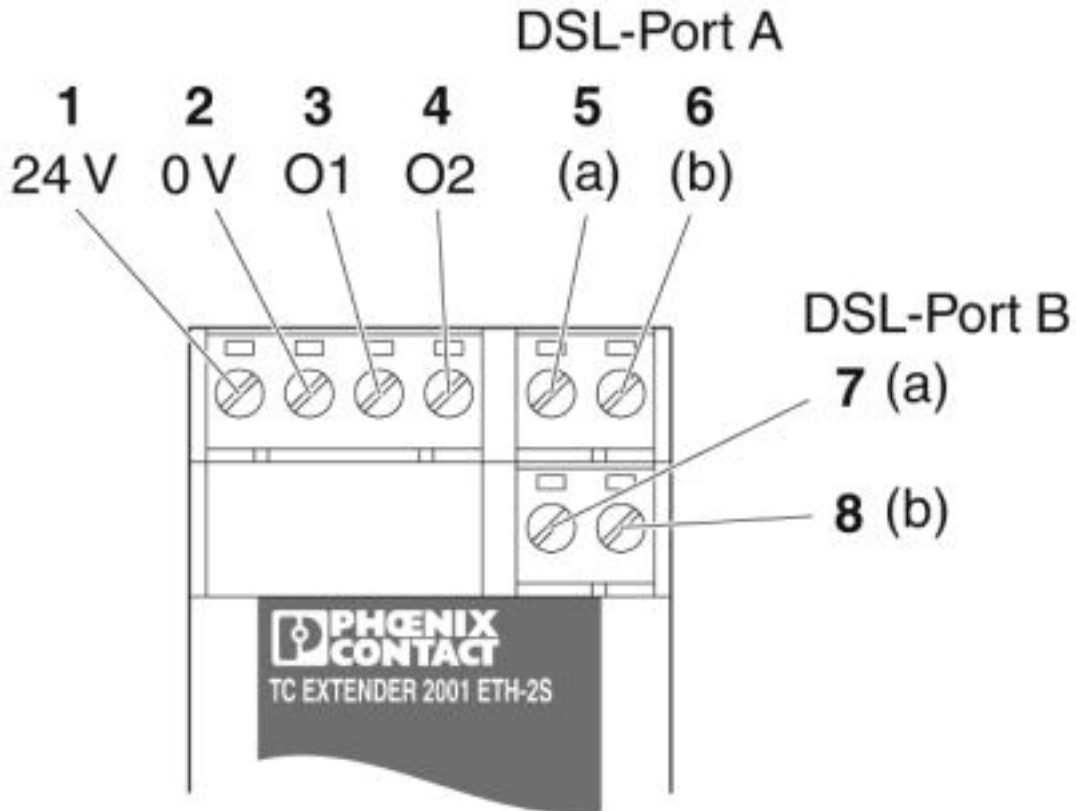
Application drawing



Mounting on a DIN rail

# Modem - TC EXTENDER 2001 ETH-2S - 2702409

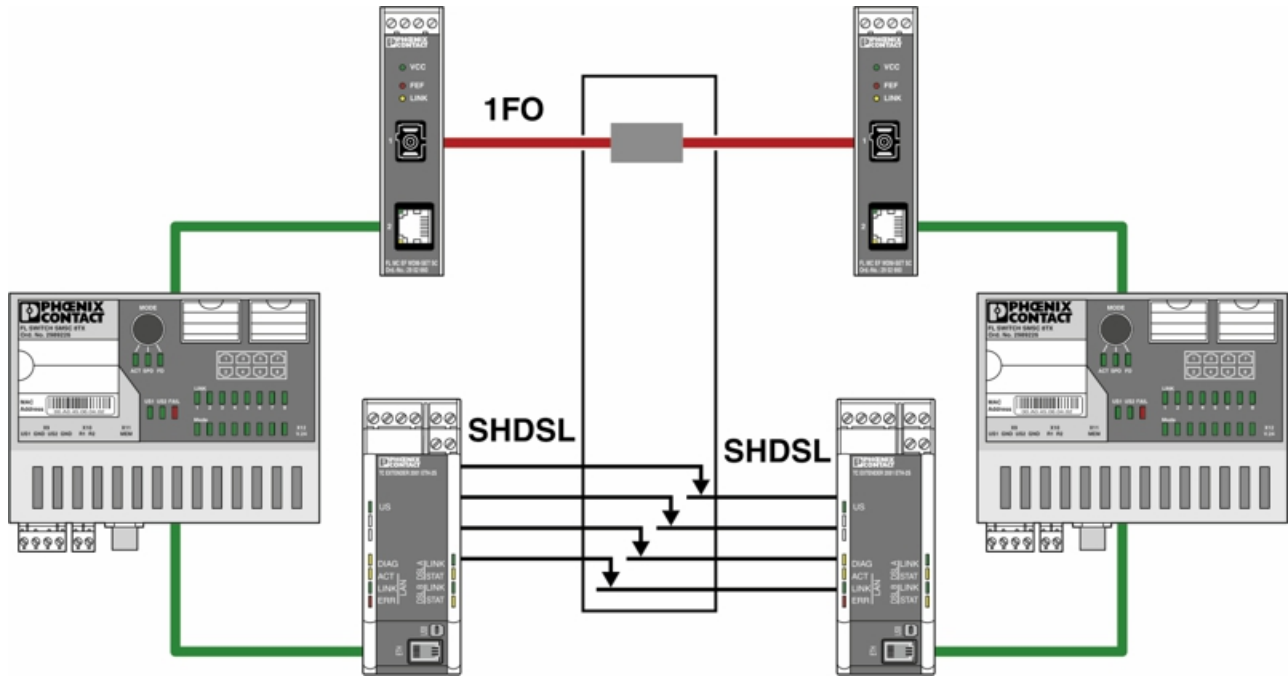
Schematic diagram



Device connections

# Modem - TC EXTENDER 2001 ETH-2S - 2702409

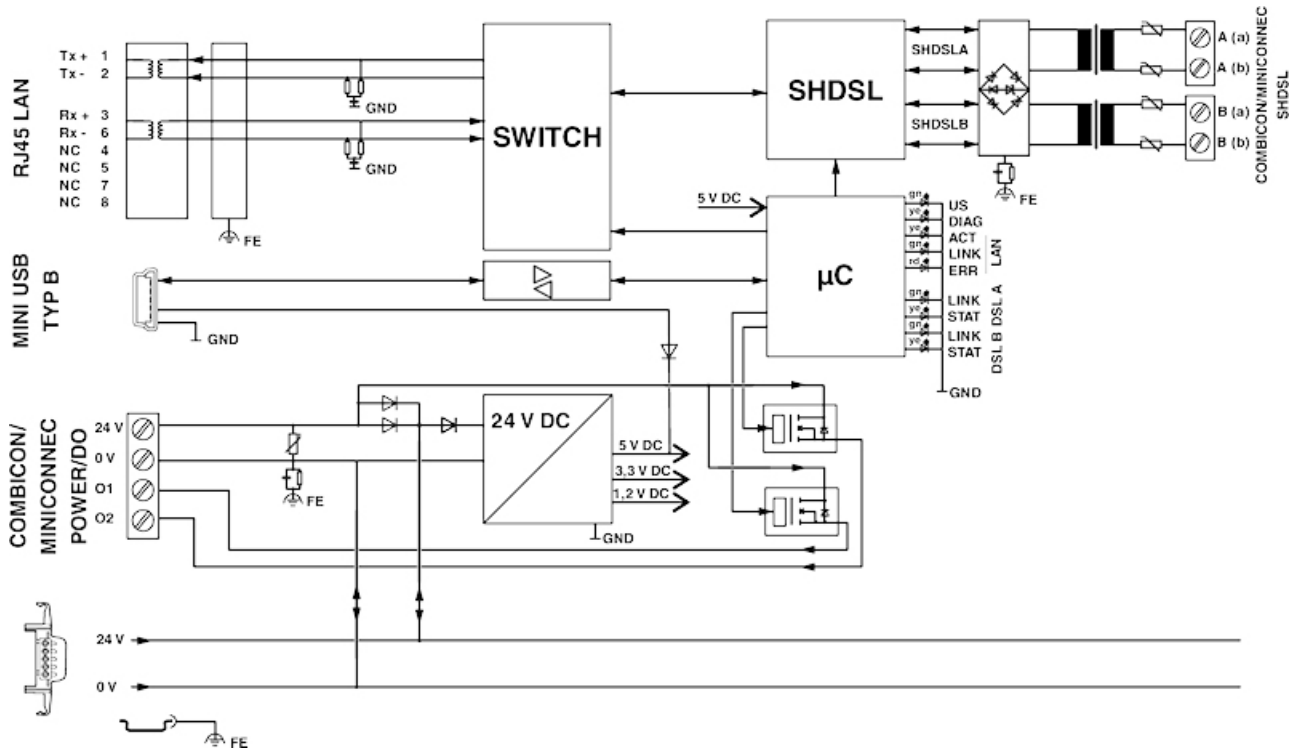
Application drawing



Redundant slip ring communication

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Circuit diagram



## Classifications

eCl@ss

|               |          |
|---------------|----------|
| eCl@ss 10.0.1 | 19060590 |
| eCl@ss 5.0    | 19030100 |
| eCl@ss 5.1    | 19030100 |

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## Classifications

### eCl@ss

|            |          |
|------------|----------|
| eCl@ss 6.0 | 19060500 |
| eCl@ss 7.0 | 19060590 |
| eCl@ss 8.0 | 19060590 |
| eCl@ss 9.0 | 19060590 |

### ETIM

|          |          |
|----------|----------|
| ETIM 4.0 | EC000740 |
| ETIM 5.0 | EC000740 |
| ETIM 6.0 | EC000740 |
| ETIM 7.0 | EC000740 |

### UNSPSC

|               |          |
|---------------|----------|
| UNSPSC 6.01   | 30211506 |
| UNSPSC 7.0901 | 39121008 |
| UNSPSC 11     | 39121008 |
| UNSPSC 12.01  | 39121008 |
| UNSPSC 13.2   | 43222628 |
| UNSPSC 18.0   | 43222628 |
| UNSPSC 19.0   | 43222628 |
| UNSPSC 20.0   | 43222628 |
| UNSPSC 21.0   | 43222628 |

## Approvals

### Approvals

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Approvals

UL Listed / cUL Listed / cULus Listed

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Ex Approvals

ATEX

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### Approval details

|           |  |   |               |
|-----------|--|---|---------------|
| UL Listed |  | <a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a> | FILE E 238705 |
|-----------|--|---|---------------|

# Modem - TC EXTENDER 2001 ETH-2S - 2702409

## Approvals

|            |  |   |               |
|------------|--|---|---------------|
| cUL Listed |  | <a href="http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm">http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.htm</a> | FILE E 238705 |
|------------|--|---|---------------|

|              |  |  |  |
|--------------|--|--|--|
| cULus Listed |  |  |  |
|--------------|--|--|--|

## Accessories

### Accessories

#### Data cable preassembled

Network cable - FL CAT5 HEAVY CONF/ - 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

#### Data plug

RJ45 connector - VS-08-RJ45-5-Q/IP20 - 1656725



RJ45 connector, degree of protection: IP20, number of positions: 8, 1 Gbps, CAT5 (IEC 11801:2002), material: PA, connection method: IDC fast connection, connection cross section: AWG 26- 23, cable outlet: straight, color: traffic grey A RAL 7042

#### DIN rail connector

DIN rail bus connectors - ME 17,5 TBUS 1,5/ 5-ST-3,81 GN - 2709561



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

## Modem

## Modem - TC EXTENDER 2001 ETH-2S - 2702409

### Accessories

#### Modem - TC EXTENDER 6004 ETH-2S - 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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#### Modem - TC EXTENDER 4001 ETH-1S - 2702253



Managed Ethernet extender, point-to-point connections, data rates up to 15.3 Mbps, distances of up to 20 km on in-house copper cables, replaceable surge protection, 1 SHDSL port, 1 LAN port, diagnostics via Ethernet

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### Patch cable

#### Patch cable - FL CAT5 PATCH 0,5 - 2832263



Patch cable, CAT5, assembled, 0.5 m

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#### Patch cable - FL CAT5 PATCH 5,0 - 2832580



Patch cable, CAT5, assembled, 5 m

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### Power supply

#### Power supply unit - MINI-SYS-PS-100-240AC/24DC/1.5 - 2866983



Primary-switched MINI POWER supply for DIN rail mounting, input: 1-phase, output: 24 V DC/1.5 A

## Modem - TC EXTENDER 2001 ETH-2S - 2702409

### Accessories

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Power supply unit - MINI-PS-100-240AC/24DC/1.5/EX - 2866653



Primary-switched power supply MINI POWER for DIN rail mounting, input: 1-phase, output: 24 V DC/1,5 A, for the potentially explosive area

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### Programming cable

USB cable - CABLE-USB/MINI-USB-3,0M - 2986135



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

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### Safety locking

Port Guard Security Element - FL PATCH SAFE CLIP - 2891246



Security element for FL patch cable

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### Shield connection clamp

Shield connection clamp - SKS 8-SNS35 - 3062786



Shield connection terminal block, for applying the shield to busbars

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### Surge protection for information technology

## Modem - TC EXTENDER 2001 ETH-2S - 2702409

### Accessories

Surge protection device - DT-TELE-SHDSL - 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.