STANDARDS: ALL MODULES ACCORDING TO EN 50155

AMBIENT TEMPERATURE
Class Ta: -40 °C ... +70 °C

RELATIVE HUMIDITY
Annual average ≤ 75%
30 days per year 95%

VIBRATION AND SHOCK
Installation in racks and housings; inside the vehicle or underframe: value 0.3 g ... 30 g

LONG-TERM AVAILABILITY
Available for 20 years from market release, then repairable or replaceable for a further 10 years

FIRE PROTECTION
EN 45545

AMBIENT TEMPERATURE

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THE SEAMLESSLY INTEGRATED SYSTEM ACCORDING TO THE TCN STANDARD

Ethernet Technology for Rail Vehicles
**SYSTEM OVERVIEW**

**ETHERNET TECHNOLOGY**

**EFFICIENT ETHERNET COMMUNICATION ACCORDING TO THE IEC 61375-2-5/-3-4 STANDARD**

- High-bandwidth network technology for vehicle control technology and multimedia applications
- Ethernet is deployable in multiple units as a vehicle bus, as a network in coupled trains (consist network), or as a train bus (Ethernet Train Backbone)
- An end-to-end Ethernet platform integrates all vehicle systems into one logical network
- The use of a standardized technology (IEC 61375-2-5/-3-4) provides access to the most cutting-edge and popular communication technology for rolling stock manufacturers and operators
- Various physically separate networks can be logically consolidated into one network
- Ethernet security gateways offer secure data exchange between safe and non-safe networks
- The linking of wireless data connections provides solutions for proactive vehicle maintenance, vehicle diagnostics, and software updates
- Routers as Ethernet Train Backbone Nodes enable dynamic train inauguration and the transparent connection of other vehicle segments
- The system can be extended with decentralized Ethernet I/O modules

**SYSTEM OVERVIEW**

**ETHERNET TECHNOLOGY**

**NEW ETHERNET TRAIN CONTROL AND MONITORING SYSTEM TCMS COMPREHENSIVELY INTEGRATED**

**ETHERNET MODULES**

<table>
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<td>Vehicle Control Unit</td>
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<td>Remote I/O Connection</td>
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**CONFIGURATION TOOL NED61375**

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SYSTEM OVERVIEW

ETHERNET TECHNOLOGY

- 8/13 Port 10/100/1000 Mbit/s
- Bypass function
- Autoconfiguration
- DHCP
- USB Interface: Master, Slave
- 24 - 36 VDC / 96 - 110 VDC
- 2x Ethernet (10/100 Mbit/s)
- Safety-oriented Communication
- SIL/non-SIL
- Touch Displays 10.4” and 12.1”
- CANopen, Ethernet, MVB
- 24 - 110 VDC
- SW Tool MaestroDesigner®
- 24 ... 110 VDC
- Firewall
- Security according to IEC 62443 SL-1

ETHERNET MODULES

Consit Switch ESM 83x-Tx/PoE
Fast Ethernet / Gigabit
- 8/13 Port 10/100/1000 Mbit/s
- Bypass function
- Autoconfiguration
- DHCP
- USB Interface: Master, Slave
- 24 - 36 VDC / 96 - 110 VDC

HMI Displays SIL and Non-SIL
- 2x different (10/100 Mbit/s)
- Safety-oriented Communication
- CANopen
- Speaker external
- Touch Displays 10.4” and 12.1”
- Touch and UIC 612 Display 10.4”
- CANopen, Ethernet, MVB
- 24 - 110 VDC

Modem DEM HU-TM 80/200 AN LTE
Security Gateway SGW 801-TM
- 2x Ethernet
- Open IPv4/IPv6
- Security according to IEC 62443 SL-1

Train-Bus-Based Node GBT 801-Tx
Modular
- 5/14 Port 10/100 Mbit/s
- Bypass function
- ISP protocol
- CANopen/Fieldbus Master, Slave
- CANopen/IIC / SPI
- USB Interface: Master, Slave
- 24 - 36 VDC / 96 - 110 VDC

CPU 801x/Tx(SIL) with Fast Ethernet
Vehicle Control Unit (VCU)
- 4x different
- 26 CAN
- 32 card slot
- Service interface
- 24 - 36 VDC

MAS 3xx-T: Remote I/O Connection
- Smart terminal
- Digital and analog I/Os
- CANopen, Ethernet, MVB
- 80/200 A
- 24 - 75 VDC

GSM/UMTS/EDGE/LTE
GPS/GLONASS/Galileo
WLAN (2.4 GHz, 5 GHz)
2x Ethernet
Open IPv4/IPv6
Firewall

*Router with integrated Switch
ETHERNET TECHNOLOGY

SYSTEM OVERVIEW

ETHERNET TECHNOLOGY

STANDARDS: ALL MODULES ACCORDING TO EN 50155

AMBIENT TEMPERATURE
Class T2: -25°C ... +60°C

RELATIVE HUMIDITY
Annual average: ≤ 75%
Over 30 days per year: 95%

DNC
DNC measures according to EN 50625-1-9-2

VIBRATION AND SHOCK
Installation in racks and housings, inside the vehicle or underframe:
Value: 0.3 g … 30 kg

LONG-TERM AVAILABILITY
Available for 20 years from market release, then repairable or replaceable for a further 10 years

FIRE PROTECTION
EN 45545

AMBIVENT TEMPERATURE
Class T2: -25°C ... +60°C

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FIRE PROTECTION
EN 45545

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Subject to technical changes and amendments to technical specification at any time

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ACCORDING TO THE TCN STANDARD

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STANDARDS: ALL MODULES ACCORDING TO EN 50155

Ambient temperature
Class T5: -40 °C ... +70 °C

Relative humidity
Annual average ≤ 75%
On 30 days per year 95%

ECN
ECN measures according to EN 50133-2

Vibration and shock
Installation in racks and housings, inside the vehicle or underframe:
Value 0.3 g ... 30 kg

Long-term availability
Available for 20 years from market release, then repairable or replaceable for a further 10 years

Fire protection
EN 45545

Ambient temperature
Class Tx: -40 °C ... +70 °C

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