

Integrated ETBN PoE version

KONUENDO NETWORKING



VDS Rail
The onboard networking company



The Integrated ETBN device is a perfect combination of an IEC standard Train Backbone Node implementation with a multi-port Ethernet Consist Switch.

Due to this mix of backbone and consist ports, it provides an integrated and cost sensitive solution. Equipped with double switched backbone lines protected by bypass relays for train backbone use and an additional bypass relay between two Gigabit Ethernet or Fast Ethernet ports at consist level, it allows more reliable consist topologies implementation.

IEC Train inauguration procedure is fully supported as well as ETBN control interface for TRDP devices. Other interfaces (SNMP, REST) are also available in order to provide a wider range of potential implementations.

On the consist side, the TTCMP® protocol provides automatic device configuration and continuous monitoring giving the customer a way to reduce commissioning and maintenance costs.

Designed to operate in harsh environmental conditions typical of rolling stock applications, the Integrated ETBN can be powered from 24 Vdc to 110 Vdc nominal voltage.

Fully EN 50155 compliant, the Integrated ETBN provides the highest level of reliability and robustness required by the railway industry.

Technical Specifications

Management

- Device bypasses for maximum reliability
- Extended RMON counters
- Fallback firmware image for maximum reliability
- IPv4 protocol supported
- In-band (SSH) and out-of-band (console) CLI interface for device management
- In-band and out-of-band firmware upgrade
- Train Topology and Configuration Management Protocol (TTCMP®) for automatic device configuration
- RADIUS authentication
- Simple Network Management Protocol (SNMP) v1/v2c/v3

Layer 2 features

- Wire-speed switching
- Auto MDI/MDIX
- 4 output hardware queues for each port
- Up to 8192 MAC addresses table
- DSCP/802.1p Class of Service
- Ingress/egress rate limiting
- Strict priority or weighted (WRR) scheduler
- Up to 4096 802.1Q VLANs

Backbone side features

- 4 FE or GbE ports protected by hardware bypasses
- Support for IPv4 protocol
- Standard IEC 61375 TTDP topology discovery protocol
- R-NAT (railway 1:1 NAT)
- Router Redundancy Protocol
- Static unicast/multicast routing
- Dynamic inter-consist routing following train inauguration
- Train-wide standard multicast routing

Consist side features

- 10 Fast Ethernet ports or 2 Gigabit Ethernet ports + 8 Fast Ethernet ports
- 1 hardware bypass on FE/GbE ports pair for maximum reliability
- Spanning tree (STP 802.1D) and Rapid Spanning Tree (RSTP 802.1w)
- Link aggregation protocol (LACP 802.3ad)
- DHCP option 82 handling
- Integrated per-port DHCP server
- IGMP versions 1, 2 and 3
- SNMP v1/v2c/v3 device management
- Extended RMON counters
- Link Layer Discovery Protocol (LLDP 802.1ab) with LLDP-MED extensions
- 802.1X port authentication
- RADIUS authentication
- IEEE 802.3af PoE delivered on 8 ports

Technical Specifications

PHYSICAL DATA

System status indicators:	8 LEDs
Fast Ethernet connectors:	M12, female, 4-ways, D-coding
Gigabit Ethernet connectors:	M12, female, 8-ways, X-coding
Power supply connector:	M12, male, 4-ways, A-coding
Maintenance port connector:	M12, female, 8-ways, A-coding
Power supply voltage range (isolated):	
24 Vdc nominal	14,4 Vdc ÷ 40 Vdc, according to EN 50155
37,5 Vdc nominal	23 Vdc ÷ 42,5 Vdc, according to EN 50155
48 Vdc nominal	28 Vdc ÷ 72 Vdc, according to EN 50155
72 Vdc nominal	44 Vdc ÷ 108 Vdc, according to EN 50155
96/110 Vdc nominal	66 Vdc ÷ 165 Vdc, according to EN 50155
Power supply class:	S2, according to EN 50155
Power consumption (excluding PoE):	
24/37,5/48 Vdc version	15 W max
72/96/110 Vdc version	22 W max
PoE class:	0, 1, 2, 3 and 4 (max 15 W per port), according to IEEE 802.3at Type-1
PoE max power:	60 W
Overall dimensions:	207 x 184 x 73 mm
Weight:	2,6 Kg
Operating temperature:	
Standard	-25 ÷ +55 °C (+70 °C for 10 min. according to EN 50155 class T1)
Optional	-25 ÷ +70 °C (+85 °C for 10 min. according to EN 50155 class T3)
Optional	-40 ÷ +70 °C (+85 °C for 10 min. according to EN 50155 class TX)
Relative humidity (non condensing):	0 ÷ 95 %
Storage temperature:	-40 ÷ +85 °C
Degree of protection:	
Standard	IP40
Optional	IP54, IP65

APPROVALS / COMPLIANCE

EN 50155	Railway Applications (Electronic equipment used on rolling stock)
EN 50121-3-2	Electromagnetic compatibility rolling stock apparatus
IEC 61000-4-2 (2008-12)	Electrostatic discharge immunity test
IEC 61000-4-3 (2006-02)	Radiated, radiofrequency, electromagnetic field immunity test 3
IEC 61000-4-4 (2004-07)	Electrical fast transient/burst immunity test
IEC 61000-4-5 (2005-11)	Surge immunity test

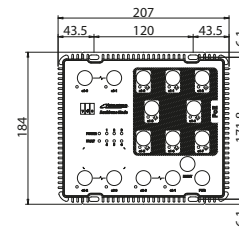
IEC 61000-4-6 (2008-10)	Immunity to conducted disturbances, induced by radiofrequency fields
IEC 60068-2-1	Environmental testing - Part 21: Tests - Test A: Cold
IEC 60068-2-2	Environmental testing - Part 22: Tests - Test B: Dry heat
EN 61373	Shock & Vibration
IEC 61375-2-5	Ethernet Train Backbone

INTERNETWORKING STANDARDS

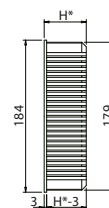
IEEE 802.3u	Fast Ethernet
IEEE 802.3ab	Gigabit Ethernet
IEEE 802.1Q	Tagged VLANs
IEEE 802.1D	Spanning Tree Protocol
IEEE 802.1w	Rapid Spanning Tree Protocol
IEEE 802.1X	Port-based network access control
IEEE 802.1AB	Link Layer Discovery Protocol (LLDP)
IEEE 802.3ad	Link Aggregation Protocol (LACP)

Wall Mounting

Dimensions only for reference



FRONT VIEW



SIDE VIEW



TOP VIEW

H*: see overall dimensions specification