

Consist Switch

28 ports 5x10GbE+11xGbE+12xFE - PoE+ - Gen2



VDS Rail

The onboard networking company



*Preliminary image, for reference only

The **28 ports 10 Gigabit Ethernet Consist Switch (Gen2)** is a 10Gigabit/Gigabit/Fast Ethernet Layer 2 managed switch **EN 50155 compliant**, specifically designed for network applications in Rolling-Stock environments.

Besides providing wire speed layer 2 forwarding, it supports also **Layer 3 capabilities** allowing IPv4 unicast and multicast routing among different VLANs. Its purpose is to enable the implementation of network topologies in a train.

The Consist Switch is **IEC 62443-4-2 certified**, ensuring robust cybersecurity.

The Consist Switch has **five (5) 10GBASE-T ports, eleven (11) 1000BASE-T ports and twelve (12) 100BASE-TX ports**.

Two (2) pairs of 10 Gigabit Ethernet ports can be optionally equipped with **bypass function**.

One (1) 10Gigabit Ethernet, four (4) Gigabit Ethernet and twelve (12) Fast Ethernet ports can be optionally equipped with **PoE+** capability.

The Consist Switch provides advanced traffic switching capabilities, including **support for VLANs, IGMP, Spanning Tree protocols (STP/RSTP)** and the possibility to apply **Quality of Service (QoS) policies**. Layer 3 extensions include **inter-VLAN routing** with packet filtering together with NAT. OSPF and RIP dynamic protocols are also supported. IPv4 router redundancy can be provided through standard VRRP protocol. The bypass feature makes the device completely transparent to the network in case of power loss or failure, thus avoiding or reducing the impact of possible local dropouts or malfunction on network performance.

Designed to operate in **harsh environmental conditions typical of Rolling-Stock applications**, the Consist Switch is fully EN 50155 compliant and provides the highest level of reliability and robustness required by the railway industry.

Besides the standard features provided by this class of devices, the Consist Switch provides **advanced software facilities for on-board network discovery and configuration**. The device includes a sophisticated programming interface and is capable of completely **auto-configure** itself from an abstract project definition right after power on. Both these features dramatically ease maintenance activities and provide smart tools for fine-grained control over device operations and configuration.

Highlights

- Layer 2 managed switch with Layer 3 services
- 28 Ethernet ports - 5x10GbE+11xGbE+12xFE ports
- Rolling-Stock Applications
- EN 50155 compliant
- IEC 62443-4-2 certified
- Designed for harsh environmental conditions
- Wide operational temperature up to $-40^{\circ}\text{C} \div +70^{\circ}\text{C}$
- Wide operating voltage range $24 \div 110\text{ VDC}$
- IP65 rated
- Power over Ethernet PoE+
- Up to two hardware bypasses for maximum reliability
- TTCMP Network Toolkit
 - Fast network design
 - First set-up and commissioning simplification
 - Maintenance optimization

Technical specifications

- Five (5) 10/100/1000/10GBASE-T(X) Ethernet ports - one (1) of them with optional PoE+ capability
- Eleven (11) 10/100/1000BASE-T(X) Ethernet ports - four (4) of them with optional PoE+ capability
- Twelve (12) 10/100BASE-T(X) Ethernet ports with optional PoE+ capability
- M12 circular connectors for Ethernet ports
- M12 circular connector for power supply port
- IPv4 protocol supported
- Two (2) hardware bypasses for maximum reliability (option)
- Spanning tree (STP 802.1D) and Rapid Spanning Tree (RSTP 802.1w)
- Link aggregation protocol (LACP 802.3ad)
- Up to 4094 802.1Q VLANs
- DHCP option 82 handling
- Advanced and flexible per-port DHCP server
- IGMP versions 1, 2 and 3 snooping
- SNMP v1, v2c, v3 device management
- Extended RMON counters
- Link Layer Discovery Protocol (LLDP 802.1ab)
- 802.1X port authentication
- RADIUS authentication
- DSCP/802.1p Class of Service
- Static IPv4 unicast and multicast routing
- OSPF and RIP dynamic routing protocols
- VRRP v3 Router Redundancy
- Network Address Translation (SNAT, DNAT and R-NAT)
- Packets filtering
- Eight (8) output hardware queues for each port
- Strict priority or weighted (WRR) scheduler
- Ingress/egress/broadcast traffic rate limiting
- In-band (SSH) and out-of-band (console) CLI interface for device management
- In-band and out-of-band firmware upgrade
- Fallback firmware images for maximum reliability
- Train Topology and Configuration Management Protocol (TTCMP[®]) technology to support project-based device configuration management, including network discovery and auto-configuration



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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
10 Gigabit Ethernet connectors	M12, female, 8-ways, X-coding
Power supply connector	M12, male, 5-ways (4+PE), K-coding
Maintenance port connector	M12, female, 8-ways, A-coding
Power supply voltage (insulated)	Nominal voltage 24 ÷ 110 Vdc Range according to EN 50155
Interruption voltage supply class	S2, according to EN 50155
PoE class	0, 1, 2, 3 and 4, (max 30W per port), according to IEEE 802.3at Type-2
PoE budget (option)	150 W derating of 1 W/ °C @ > 55 °C
Total power consumption	
noPoE version	50 W max
PoE version	260 W max
Overall dimensions (W x H x D)	315 x 240 x 73 mm (without connectors)
Weight (max.)	5.2 Kg
Operating temperature	
Standard	-25 °C ÷ +70 °C (+85 °C for 10 min. according to EN 50155 class OT3 with extended operating temperature ST1)
Optional	-40 °C ÷ +70 °C (+85 °C for 10 min. according to EN 50155 class OT4 with extended operating temperature ST1)
Relative humidity (non-condensing)	0 % ÷ 95 %
Storage temperature	-40 °C ÷ +85 °C
Color codes	RAL 7016 (frame) Pantone 425C (front panel)
Degree of protection	IP65
Mechanical enclosure	Passivated aluminium

APPROVALS / COMPLIANCE

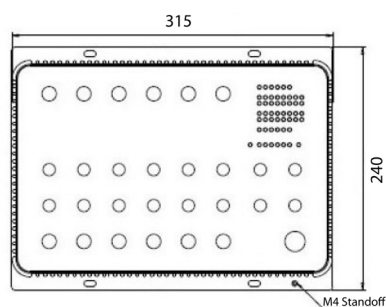
EN 50155	Railway Applications (Electronic equipment used on rolling stock)
EN 50121-3-2	Electromagnetic compatibility rolling stock apparatus
IEC 60068-2-1	Environmental testing: Tests - Test Ad: Cold
IEC 60068-2-2	Environmental testing: Tests - Test Bd: Dry heat
EN 60068-2-30	Environmental testing: Tests - Test Db Variant 2 - Damp heat
EN 61373	Shock & Vibration - Category 1 class B
EN 50124-1	Insulation coordination
EN 45545-2	Fire & Smoke
IEC 62443-4-2	Security for industrial automation and control systems - Part 4-2: Technical security requirements for IACS components

Available from FW version: 8.0.0

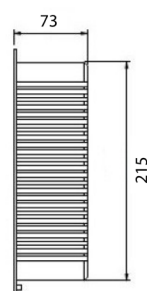
INTERNET WORKING STANDARDS

IEEE 802.3	Fast Ethernet (10/100BASE-T(X)) Gigabit Ethernet (10/100/1000BASE-T(X)) 10 Gigabit Ethernet (10/100/1000/10GBASE-T(X))
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)
RFC 2328	OSPF v2
RFC 2453	RIP v2
RFC 3768	VRRP v2
RFC 5798	VRRP v3

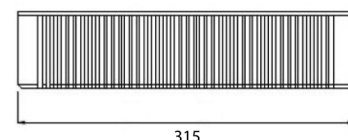
Wall Mounting



FRONT VIEW



SIDE VIEW



TOP VIEW

Ordering codes

Part Number **NODC28xxxx**

Description **NC-CS28-5X11G12F-xxxx-xB-IPxx-Tx-xX**



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