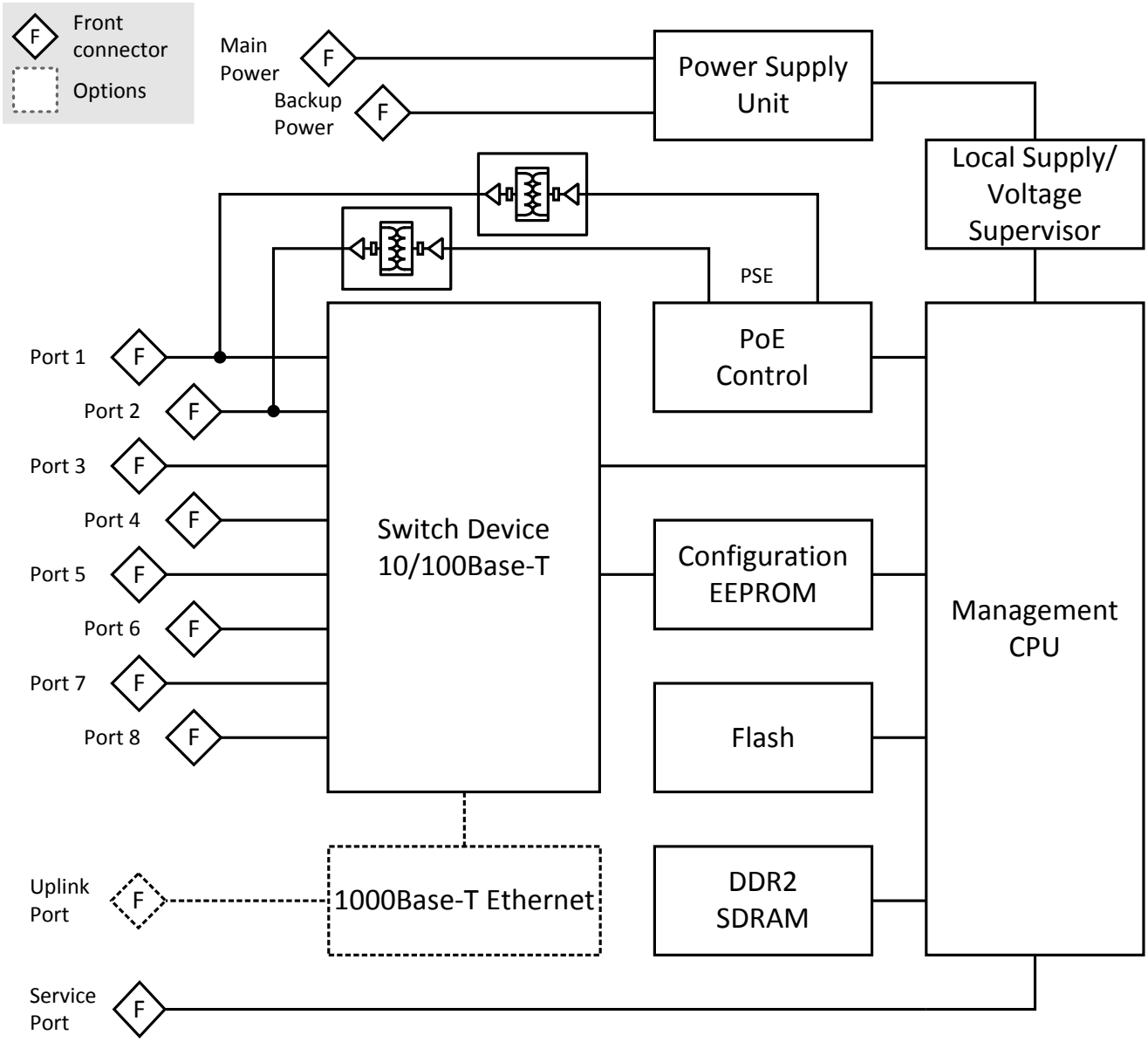
# RS1 – IP67 Industrial Ethernet Switch

- **Managed 8-port rugged Ethernet switch**
- **Rugged aluminum enclosure (220 x 130 x 70 mm)**
- **Fanless and maintenance-free**
- **8 Fast Ethernet ports via M12 connectors**
- **1 Gigabit uplink port via M12 connector**
- **Power over Ethernet (PoE) PSE (ports 1 and 2)**
- **Configuration via CLI (RS232, Telnet or SSH), SNMP ver. 3 or ext. dongle**
- **2x 24 VDC or 110 VDC nom. redundant power supply, service interface via M12 connectors**
- **Status LEDs for ports, power and more**
- **-40 to +70(+85)°C operating temperature**
- **EN 50155 class Tx (railways) and IP67 compliant**
- **ISO 7637-2 compliant (E-mark for automotive)**


The RS1 is an industrial, IP67 stand-alone Fast Ethernet switch. It is managed and provides eight Ethernet channels and a Gigabit uplink port on M12 connectors. The rugged switch supports full-duplex and half-duplex operation with auto-negotiation, high-speed non-blocking store-and-forward switching, Quality of Service (QoS) support with four traffic classes IEEE 802.1p and three-level 802.1x security as well as the logical segmentation of ports (802.1q VLANs). The switch is fault tolerant and restores itself on its own: If a link is temporarily unavailable, frames can be sent via backup/redundant links (spanning tree protocol / link aggregation) and no data loss occurs. Its built-in test mechanisms make the RS1 an even more reliable component in the communication system.
A service port is accessible at the front panel on an M12 connector, providing an easy way to configure the switch. A command line interface is available via the RS232 at the service port and over Ethernet via Telnet or Secure Shell (SSH). The switch can also be configured via SNMP (version 3). Additionally, the service connector can be used to attach an external dongle to store or update the switch configuration. This makes it easy to exchange the unit for service purposes.
The RS1 has two power inputs on M12 connectors, making it possible to connect a backup power source (e.g., a battery). If the primary supply fails, the unit switches to the secondary supply automatically. The unit offers Power over Ethernet (PoE) PSE functionality to supply two other devices on ports 1 and 2.
The RS1 is one of the first members of the MIPIOS® family of extremely rugged IP67 compliant products designed for Ethernet connectivity and highly demanding applications, e.g., for redundancy systems.
The industrial-grade unit is fully compliant with EN 50155 railway standard. All components inside the enclosure are specified for -40..+85° C operation, thus enabling the device for EN 50155 class Tx operation. Additionally, the device is compliant with ISO 7637-2 (E-mark for automotive). Convection cooling is sufficient. There are no socketed components, hardening the box against shock and vibration. The internal electronics are prepared for conformal coating.
The Ethernet switch is prepared for wall or DIN-rail mounting.

# Diagram


Front connector
Options
Main Power
Backup Power
Power Supply Unit
Local Supply/ Voltage Supervisor
PSE
PoE Control
Port 1
Port 2
Port 3
Port 4
Port 5
Port 6
Port 7
Port 8
Switch Device 10/100Base-T
Configuration EEPROM
Management CPU
Flash
DDR2 SDRAM
Uplink Port
1000Base-T Ethernet
Service Port

# Technical Data

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| **Key Features** | ■ Simple Switch replacement: configuration can be done via external dongle without any tools<br>■ High-speed non-blocking, store-and-forward switching<br>■ Eight 10/100-T ports at front panel (Electrical isolation: 1500 Vrms)<br>■ One Gigabit uplink port at front panel<br>■ Port configuration: copper, 10/100 Mbit/s<br>■ Auto-negotiation / Auto MDI/MDIX crossover on all ports / manual configuration possible<br>■ Layer2-based Policy Control List<br>■ 8K MAC address lookup table with automatic learning and aging<br>■ Up to 4096 VLANs<br>■ Rapid Spanning Tree Protocol and Multiple Spanning Tree Protocol to ensure loop free topology formation<br>■ Reducing multicast traffic in the network through multicast snooping - IGS (IPv4) and MLDS (IPv6) |
| **Management Firmware System Features** | ■ Saving and restoring user configurations<br>■ Software upgrades through TFTP<br>■ System logs (syslog) and e-mail alerts for critical events<br>■ Remote monitoring (RMON) and alarm generation<br>■ Displaying the running configuration in the form of CLI commands<br>■ Management interfaces through<br>□ CLI (RS232 console, Telnet, SSH)<br>□ SNMP v3<br>■ Switch configuration can be loaded from external dongle |
| **Management Firmware Security Features** | ■ User authentication using 802.1x<br>■ Controlling management access through SNMP and CLI only from authorized managers<br>■ MAC based access list (ACL) for traffic filtering<br>■ Rate-limiting and storm control to prevent packet flooding from malicious peers |
| **Supported Protocols and Standards** | ■ DHCP client / server / relay (IEEE 1394)<br>■ Ethernet flow control (IEEE 802.3x)<br>■ GARP (VLAN-aware bridging)<br>■ GVRP/GMRP support (IEEE 802.1D, 2004)<br>■ Hypertext Transport Protocol (HTTP) Server for Remote Management and Monitoring (RFC2626)<br>■ HTTP Secure (HTTPS) - HTTP-based Remote Management over encrypted data channel (RFC2818)<br>■ IGMP snooping / IGMP proxy / IGMP Querier / MLD Discovery (RFC 4541)<br>■ Link aggregation LACP / EtherChannel (IEEE 802.3ad, 2005)<br>■ Link Layer Discovery Protocol LLDP (IEEE 802.1ab, 2005)<br>■ Multiple Spanning Tree (MSTP) (IEEE 802.1s)<br>■ Path MTU Discovery Protocol (PMTUD) (RFC 1984)<br>■ Priority-based switching, Quality of Service/DiffServ, tagged frames, Layer2-based 801.1Q VLAN-ID packet routing (IEEE 802.1p)<br>■ Port-based authentication with EAP (IEEE 802.1x - REV2004/RFC3748)<br>■ Power over Ethernet support (IEEE 802.3af / IEEE 802.3at, Type 1)<br>■ Rapid Spanning Tree Protocol (RSTP IEEE 802.1w)<br>■ Remote Network Monitoring Information Base v1 (RFC2819)<br>■ Secure Shell (SSH) for Remote Configuration (CLI) over secure channel<br>■ Secure Sockets Layer - Encrypted Data Exchange (RFC5246)<br>■ SNMP v1, v2c, v3 management<br>■ Syslog (RFC 5424)<br>■ TCP/IP v4 and v6<br>■ TFTP (RFC 1350)<br>■ VLAN/port-based VLANs GVRP/MVRP (IEEE 802.1Q Rev D5.0, 2005) |
| **Power Over Ethernet Features** | ■ Power over Ethernet functions on ports 1 and 2<br>□ PSE (Power Sourcing Equipment) function<br>□ Supplies one PD class 0 device or two PD class 2 devices (up to 15 W total) |
| **Service Interface** | ■ M12 connector at front<br>■ RS 232 / V24<br>■ I²C interface for external dongle |

# Technical Data

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| **Front I/O** | ■ Eight Ethernet ports via M12 connectors<br>■ Gigabit uplink port<br>□ 8-pin M12 connector, A-coded<br>■ One service interface via M12 connector<br>■ Two redundant power inputs via M12 connectors<br>■ Link and activity Ethernet status LEDs (2 per channel)<br>■ Power over Ethernet status LEDs<br>■ Status LEDs for power, reset and error codes |
| **Electrical Specifications** | ■ Power input<br>□ Nominal input voltage 24 VDC (9 to 36 V) or 110 VDC (77 to 150 V) according to EN50155<br>□ Two redundant inputs<br>□ Power-on threshold: 0.7xUn = 16.8 V (for 24 VDC PSU) or 77 V (for 110 VDC PSU)<br>□ Power change-over threshold (when a secondary power source is connected): 12 V (for 24 VDC PSU) or 66 V (for 110 VDC PSU) (lower input voltage results in automatic switch to secondary power source)<br>□ Minimum input voltage when no secondary power source is connected: 9 V (for 24 VDC PSU) or 66 V (for 110 VDC PSU)<br>■ EN50155 power interruption class S2<br>■ Isolation (according to EN50155)<br>□ 1500 Vrms<br>■ Power consumption at Unom (24 V): 24 W (incl. 15 W PoE) |
| **Mechanical Specifications** | ■ Dimensions: 220 mm x 130 mm x 70 mm (without connectors)<br>■ Prepared for wall or DIN-rail mounting with special mounting plates (available separately)<br>■ Weight: 1.9 kg |
| **Environmental Specifications** | ■ Temperature range (operation):<br>□ -40..+70°C (+85°C) with up to 85°C for 10 minutes according to class Tx (EN50155)<br>□ Airflow: natural convection<br>■ Temperature range (storage): -40..+85°C<br>■ Relative humidity (operation): max. 95% non-condensing<br>■ Relative humidity (storage): max. 95% non-condensing<br>■ Altitude: -300 m to + 3000 m<br>■ Shock: 50 m/s², 30 ms (EN 61373)<br>■ Vibration (function): 1 m/s², 5 Hz - 150 Hz (EN 61373)<br>■ Vibration (lifetime): 7.9 m/s², 5 Hz - 150 Hz (EN 61373)<br>■ Conformal coating on request<br>■ Climatic tests according to EN68068<br>■ IP67 compliant<br>■ Fully EN 50155-compliant (Power Interruption Class 2, Temperature Class Tx) |
| **MTBF** | ■ 250 185 h @ 40°C according to IEC/TR 62380 (RDF 2000) |
| **Safety** | ■ Flammability<br>□ PCBs manufactured with a flammability rating of 94V-0 by UL recognized manufacturers |
| **EMC** | ■ Tested according to the following railway standards:<br>□ EN50121 (radio disturbance)<br>□ EN61000-4-2 (ESD)<br>□ EN61000-4-4 (burst)<br>□ EN61000-4-5 (surge)<br>■ Conforming to E1 requirements of the German Federal Motor Transport Authority<br>■ Tested according to the following automotive standards:<br>□ CISPR25/CISPR16 (radiated emission)<br>□ ISO7637-2 (conducted emission - power line)<br>□ ISO7637-2 (conductive immunity - power line)<br>□ ISO7637-3 (capacitive immunity - signal line)<br>□ ISO11452-2, ISO11452-5 (radiation immunity)<br>□ EN50121 (radio disturbance) |

# Technical Data

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| **Software Support** | ■ Firmware for configuration and management included |

# Configuration & Options

### Standard Configurations

| Article No. | Channels | Uplink port | Management | PSU | PoE |
|---|---|---|---|---|---|
| 06RS01-01 | 8x 100Base-T | 1Gb uplink | managed | 24 VDC in (S2) | 2x PSE |
| 06RS01-05 | 8x 100Base-T | 1Gb uplink | managed | 110 VDC in (S2) | 2x PSE |
| 06RS02-01 | 8x 100Base-T | 1Gb uplink | unmanaged | 24 VDC in (S2) | 2x PSE |
| 06RS02-05 | 8x 100Base-T | 1Gb uplink | unmanaged | 110 VDC in (S2) | 2x PSE |

### Options

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| **Ethernet Switch Functions / Mechanical Specifications** | ■ No Gigabit Uplink port |
| **Electrical Specifications** | ■ Other nominal input voltages: 36, 48, 72 or 96 VDC<br>□ Wide input range (according to EN50155): 0.7 x nominal voltage < nominal voltage < 1.25 x nominal voltage |

# Ordering Information

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|---|---|---|
| **Standard RS1 Models** | **06RS01-01** | Managed, 8 x 100BaseT, 1 x Gbit Uplink Port, 2 x PoE, PSU 24V (9-36V), -40...+70°C screened, EN50155 compliant, IP67 |
| | **06RS01-05** | Managed, 8 x 100BaseT, 1 x Gbit Uplink Port, 2 x PoE, PSU 110V (77-150V), -40...+70°C screened, EN50155 compliant, IP67 |
| **Related Hardware** | **06RS02-01** | Unmanaged, 8 x 100BaseT, 1 x Gbit Uplink Port, 2 x PoE, PSU 24V (9-36V), -40...+70°C screened, EN50155 compliant, IP67 |
| | **06RS02-05** | Unmanaged, 8 x 100BaseT, 1 x Gbit Uplink Port, 2 x PoE, PSU 110V (77-150V), -40...+70°C screened, EN50155 compliant, IP67 |
| **Miscellaneous Accessories** | **05RS01-00** | DIN-Rail mounting plate for MIPIOS® family, -40..+85°C |
| | **05RS01-01** | Wall-mounting plate for MIPIOS® family, -40..+85°C |
| | **05RS01-02** | I2C Dongle for MIPIOS® Switch, 32Kb, M12, -40..+85°C |
| | **05RS01-03** | Cable set for G302, RSx and 19" rack-mountable SFx switches, consisting of: 4 Ethernet cables (M12 to RJ45), 1 service adapter (M12 to D-sub), 1 service cable, 1 dongle adapter (D-Sub to M12), 1 power cable (M12 to open end), -40..+85°C |
| **Software: Firmware/BIOS** | **14ETSW-00** | Ethernet Switch Firmware for managed RSx, SFx, F302 and G302 models |

**For operating systems not mentioned here** contact MEN sales**.**

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| **Documentation** | Compare Chart Industrial Ethernet switches for different platforms » Download | |
| | **20RS01-00** | RS1 User Manual |
| | **21ETSW-ER** | 14ETSW-00 Managed Ethernet Switch Firmware Errata |
| | **21ETSW-00** | Managed Ethernet Switch Quick Start Guide |
| | **21ETSW-01** | Managed Ethernet Switch Command Line Interface User Manual - Command Reference |

# Contact Information

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