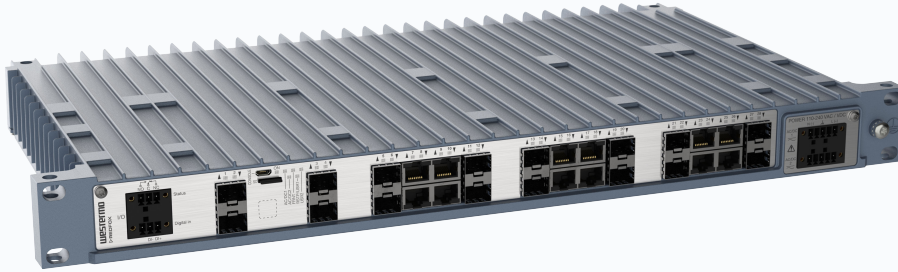


19" Managed Substation Automation Switch RedFox-5728 Series



- **High performance and configurable**
 - 28 Gigabit ports with up to 16 SFP fibre ports
 - Powerful CPU and switchcore
 - Advanced WeOS functionality
- **Designed for demanding energy applications**
 - Single or dual power supply
 - Withstand voltage interruptions up to 50 ms
 - IEC 61850-3 and IEEE 1613 Class 2 approval
- **Robust and reliable for long service life**
 - MTBF 549.000 - 710.000 hours (Telcordia)
 - -40 to +70 °C without ventilation holes
 - Ultra-robust IP40 19" rack mount housing
- **Unique future proof industrial networking solutions**
 - Transparent to PRP, GOOSE, SV and MMS
 - Advanced Cyber Security feature set
 - FRNT or RSTP/STP Ethernet Resiliency



RedFox-5728 takes communication reliability for substations to a new level. We know that in critical substation automation applications, even the loss of a single piece of data can disturb the operations, and that is why RedFox-5728 brings the highest reliability to your network. Withstanding the toughest environmental conditions, including the high EMI levels derived from load switching and lightning strikes and extreme ambient temperatures, RedFox-5728 ensures 100% uptime, no matter what.

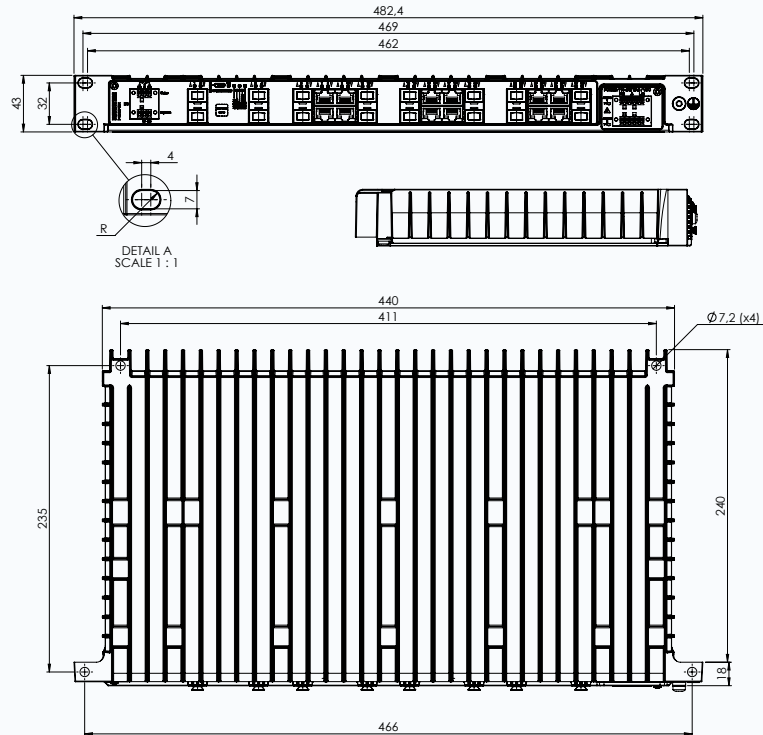
IEC 61850-3 and IEEE 1613 standards define the requirements and test levels for networking devices. They specify two different device reliability classes: Class 1 devices, which allow for communication errors; and Class 2 devices, which do not allow loss of a single transmission package even during the highest electro magnetic disturbances (EMI). RedFox-5728 meets or exceeds all test levels for Class 2 fulfilment, attaining KEMA type test gold certification, ensuring zero down-time, communication losses, delays or errors.

Superior build quality, the exclusive use of industrial grade components and extensive in-house testing results in class-leading MTBF and extended service life. Designed to run efficiently from either one or two power inputs, with dual internal power supplies fully isolated from each other and all other interfaces. The 28-port switch has all connectors located at the front for easy access and a range of different port configurations, customizable with SFP transceivers.

For resilient operations in substations not only is the most robust hardware needed, but also the most robust software. Available with both layer 2 and layer 3 functionality, RedFox-5728 is powered by the next generation WeOS operating system, which ensures continuous operation and support for an expanding range of protocols and features. Intuitive set-up and configuration enable easy and cost-efficient installation and removes the need for specialized IT support or training. Recognizing the growing sophistication of cyberattacks, an extensive suite of cyber security tools is also available.

Specifications - RedFox-5728

Dimensional drawing



Housing

| | |
|------------------------|---|
| Dimensions (W x H x D) | 482.4 x 43 x 258 mm (18.99 x 0.12 x 10.16 inches) |
| Housing | Full metal |
| Weight | 3.8 kg |

| Interface | Ports | Fibre SFP | Copper RJ-45 |
|--------------------------------|---------------------------------|-----------|--------------|
| RedFox-5728-(E-)F4G-T24G-HV | 28 | 4 | 24 |
| RedFox-5728-(E-)F4G-T24G-HVHV | 28 | 4 | 24 |
| RedFox-5728-(E-)F16G-T12G-HV | 28 | 16 | 12 |
| RedFox-5728-(E-)F16G-T12G-HVHV | 28 | 16 | 12 |
| Console | USB 2.0 device interface | | |
| Digital I/O | 1 x digital in, 1 x digital out | | |
| Micro SD | Secure Digital 2.0 | | |

Power parameters

| | | |
|--|---------------------------------------|--|
| Rated voltage | 110 to 240 VAC, 50-60 Hz, 110-240 VDC | |
| Operating voltage AC | 85 to 264 VAC, 47-63 Hz | |
| Operating voltage DC | 85 to 264 VDC | |
| Rated current (incl. transceivers) HV = single power supply HVHV = two individual power supplies | RedFox-5728-(E-)F4G-T24G-HV | 0.14 A at 240 V AC/DC 0.27 A at 110 V AC/DC |
| | RedFox-5728-(E-)F4G-T24G-HVHV | 0.14 A at 240 V AC/DC 0.27 A at 110 V AC/DC |
| | RedFox-5728-(E-)F16G-T12G-HV | 0.16 A at 240 V AC/DC 0.31 A at 110 V AC/DC |
| | RedFox-5728-(E-)F16G-T12G-HVHV | 0.16 A at 240 V AC/DC 0.31 A at 110 V AC/DC |
| Isolation | Galvanic isolation to all ports | |

| Environmental | | |
|--|--|--|
| Operating temperature | -40 to +70 °C (-40 to +158 °F) | |
| Storage and transport temperatures | -50 to +85 °C (-58 to +185 °F) | |
| Ingress protection | RedFox-5728-(E-)F4G variants: up to IP40 RedFox-5728-(E-)F16G variants: up to IP30 | |
| Humidity (operating) | 5-95% relative humidity | |
| Altitude | 2000 mA/70 kPa | |
| MTBF 1) MIL-HDBK-217F 2) Telcordia | RedFox-5728-(E-)F4G-T24G-HV RedFox-5728-(E-)F4G-T24G-HVHV RedFox-5728-(E-)F16G-T12G-HV RedFox-5728-(E-)F16G-T12G-HVHV | 1) 316.000 hours, 2) 678.000 hours 1) 269.000 hours, 2) 549.000 hours 1) 353.000 hours, 2) 710.000 hours 1) 295.000 hours, 2) 570.000 hours |

| Approvals | |
|-----------------------|--|
| EMC | EN 50121-4/IEC 62236-4, Railway signalling and telecommunications apparatus EN/IEC 61000-6-2, Immunity industrial environments EN/IEC 61000-6-4, Emission industrial environments EN/IEC 61000-6-5, Immunity power station and substation environments |
| EMI | FCC Part 15.105 class A |
| Substation Automation | IEEE 1613, Testing Requirements for Communications Networking Devices Installed in Electric Power Substations IEC 61850-3, Communication networks and systems for power utility automation – Part 3: General requirements |
| Safety | EN/IEC 61010-1, Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements UL 61010-2-201, Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-201: Particular requirements |

| Switch properties | |
|-------------------|----|
| Number of VLAN | 64 |
| Priority queues | 8 |

| Software | |
|----------|---|
| WeOS | https://www.westermo.com/solutions/weos |
| WeConfig | https://www.westermo.com/solutions/weconfig |

| Warranty | |
|----------|---------|
| Validity | 5 years |

| Ordering information | |
|----------------------|------------------------------|
| Art. no. | Description |
| 3641-4550 | RedFox-5728-F4G-T24G-HV |
| 3641-4555 | RedFox-5728-F4G-T24G-HVHV |
| 3641-4560 | RedFox-5728-F16G-T12G-HV |
| 3641-4565 | RedFox-5728-F16G-T12G-HVHV |
| 3641-4450 | RedFox-5728-E-F4G-T24G-HV |
| 3641-4455 | RedFox-5728-E-F4G-T24G-HVHV |
| 3641-4460 | RedFox-5728-E-F16G-T12G-HV |
| 3641-4465 | RedFox-5728-E-F16G-T12G-HVHV |

| Accessories | |
|-----------------------|---|
| 100 Mbit transceivers | https://www.westermo.com/products/accessories/sfp-transceivers/100m-sfp-transceivers |
| Gbit transceivers | https://www.westermo.com/products/accessories/sfp-transceivers/1gbit-sfp-transceivers |

Specification WeOS 5

The WeOS operating system has been developed by Westermo for its current as well as future range of Ethernet hardware products. This layer 2 and layer 3 switching solution enables Westermo to create complex multimedia ring networks and routing solutions. WeOS not only provides solutions to many challenging industrial networking issues, but also helps to protect investments by ensuring the future availability of fully compatible solutions. WeOS is the core of our latest ranges of Ethernet hardware allowing complex multimedia ring networks and routing solutions to be created.

Westermo has many years of experience developing products for industrial applications. At the heart of all Westermo networking solutions is the need for ease of use. By standardising on a single operating system for all Westermo Ethernet products this helps to simplify the installation, operation and maintenance of individual devices and complete networks. Once a user is familiar with a Westermo product, that knowledge can be readily applied to all our other devices. A web screen simplifies the configuration of many functions, whilst a command line interface allows for fine tuning.

| WeOS Standard - Layer 2 protocols and functionality |
|---|
| Resilience and High Availability FRNTv0 ring topologies (rings, ring coupling and horseshoe topologies), IEEE 802.1D/802.1w (RSTP), IEEE 802.1AX/802.3ad Link Aggregation (LACP and Static), IEC 62439-2 Media Redundancy Protocol (MRP) ^a |
| Layer 2 Switching IEEE 802.1D MAC Bridges, IEEE 802.1Q Static VLAN and VLAN Tagging, IEEE 802.1AB LLDP, IGMPv1/v2/v3 Snooping, Static Multicast MAC filters |
| Layer 2 QoS IEEE 802.1p Class of Service with flexible classification (VLAN tag priority, IP DSCP/ToS, Port ID), Ingress and Egress Rate limiting |
| IP Host Services Static IP Address, DHCP Client, DNS Client, DDNS, ZeroConf (mDNS and SSDP), NTP Client (NTPv4), IP Interfaces (Ethernet, VLAN, Loopback and Blackhole) |
| Network Servers DHCP Server (including options 1, 3, 6, 7, 12, 15, 42, 61 and 82), DHCP Relay Agent (including options 54 and 82), DNS Proxy Server (DNS forwarder and Host records), NTP server (NTPv4) |
| Management Tools Westermo configuration tool WeConfig, Web interface (HTTP and HTTPS), Command Line Interface (CLI) via console port, SSHv2 and Telnet, SNMPv1/v2c/v3, Secure Copy (SCP) for remote file upload and download, Local file management (via HTTP, FTP, TFTP and SCP), Load/save files from/to external memory, Configuration and Deployment using external memory, Tech support button, Flexible alarm and event handling system, RFC5424/RFC3164 Syslog (log files and remote syslog server), Port monitoring |
| SNMP MIB Support (read-only) RFC 1213 MIB-2, RFC 2819 RMON MIB, RFC 2863 Interface MIB, RFC 3433 Entity Sensor MIB, RFC 3635 Ether-like Interface MIB, RFC 4133 Entity MIB, RFC 4188 Bridge MIB, RFC 4318 RSTP MIB, RFC4363 Q-BRIDGE MIB, RFC 4836 MAU MIB, IEEE 802.1AB LLDP MIB, IEEE 802.1AX LAG MIB, WESTERMO-DDM MIB (SFP), WESTERMO-EVENT MIB, WESTERMO-FRNT MIB, WESTERMO-INTERFACE MIB |

^aAvailable as add-on-function. Please see your local Westermo sales contact to purchase a license for your product.

| WeOS Extended - Layer 3 protocols and functionality ^a |
|---|
| IP Host Services IP Interfaces (SSL, VPN, GRE) |
| IP Routing and VPN Static IP Routing, Floating Static Routes, Multinetting, Proxy ARP, Dynamic IP routing (OSPFv2, RIPv1/v2), VRRPv2/v3, Static Multicast Routing, Stateful Inspection Firewall, IP Masquerading (NAT/NAPT), Port Forwarding, Stateless NAT (1-1 NAT), SSL VPN (Client and Server, Certificate Authentication, Pre-shared Key (PSK) Point-to-Point Mode, Layer-2 and Layer-3 VPN, Layer-2 VPN bridging, Address pool and address per CN, TLS Authentication), Generic Routing Encapsulation (GRE) |
| SNMP MIB Support (read-only) RFC 2787 VRRPv2 MIB, RFC 6527 VRRPv3 MIB |

^aProducts with software level WeOS Extended include all functionality listed for WeOS Standard