SIEMENS

Rugged Communication

RUGGEDCOM RST2228 & RST2228P

19" Layer 2 IEEE 1588 rack switches with 10 Gbit/s uplinks

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Field-modular high port density rack switch with IEEE 1588 support suitable for high bandwidth multi-service Layer 2 networks in the digital substation.

Contents

Product overview and benefits

The RUGGEDCOM RST2228 is a field modular 19" Layer 2 rack switch with 10 Gbit/s uplinks, support for IEEE 1588 and optional Power-over-Ethernet - an ideal solution for multiple applications and verticals.

The RUGGEDCOM RST2228 provides a high level of immunity to electromagnetic interference, heavy electrical surges, extreme temperature and humidity for reliable operation in mission critical applications. It can be found in electric utility substations, traffic control cabinets, railways, oil&gas and other harsh environments.

High bandwidth uplinks
The 10 Gbit/s uplinks enable throughput for large networks with large amounts of bandwidth consuming applications.

Field-replaceable modular design
The field modular design allows for on-site modifications which reduce costs and network downtime in case of necessary replacements.

IEEE 1588 support
The RUGGEDCOM RST2228 is future proof device with support for modern IEEE 1588 based networking.

Removable storage media
The RUGGEDCOM CLP reduces the setup time in the field and allows for easier and faster component exchange in case of product failure.
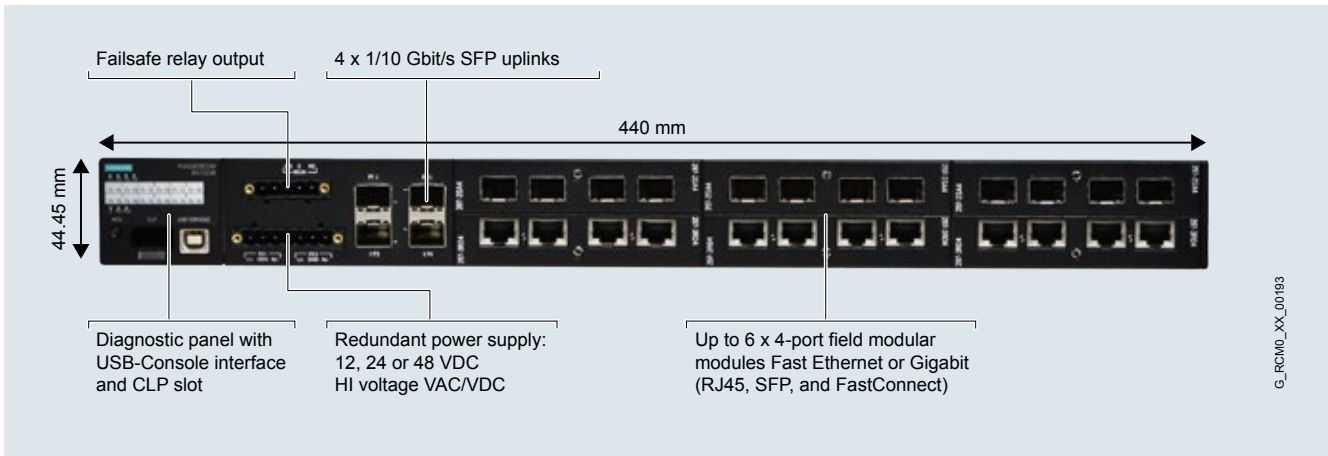
Power-over-Ethernet (PoE) Support
The RUGGEDCOM RST2228P comes with Power-over-Ethernet support (IEEE 802.3bt draft) for up to 24 devices with a combined power of 500 Watt.

Certifications and approvals
Backed by a large number of certifications and approvals for electric power, transportation and oil&gas verticals.

Technical data

Failsafe relay output

4 x 1/10 Gbit/s SFP uplinks

440 mm

44.45 mm

Diagnostic panel with USB-Console interface and CLP slot

Redundant power supply: 12, 24 or 48 VDC HI voltage VAC/VDC

Up to 6 x 4-port field modular modules Fast Ethernet or Gigabit (RJ45, SFP, and FastConnect)

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Specifications	RUGGEDCOM RST2228	RUGGEDCOM RST2228P
Network interfaces		
Total number of ports	28	
Number of ports 10/100/1000	24	
Number of ports 1/10 Gbit/s	4	
Port types	RJ45, LC, SFP and FastConnect	
Power-over-Ethernet		
Number of ports Power-over-Ethernet	24 Ports	
Power-over-Ethernet standards	IEEE 802.3at/bt (draft)	
Power budget	60W/port, 120W/module, 500W/device	
Power supply		
Range	High Voltage (88-300 VDC / 85 - 264 VDC) 48 VDC (36-72 VDC) 24 VDC (13-36 VDC) 12 VDC (10.5-15 VDC)	
Design	Fixed	
Redundant	Yes	
Mechanical design		
Design	Field modular media modules	
Dimensions (w x h x d)	440 x 44.45 x 345 mm	
Operating temperature	-40° C to + 85° C	
Degree of protection	IP40	
Other features		
IEEE 1588	Transparent clock	

Features

Hardware

The RUGGEDCOM RST2228 has been specifically designed and certified for industrial applications such as electric power, transportation systems and oil&gas applications.

Power supply

- Integrated power supply
- Universal high-voltage range: 88-300 VDC / 85-264 VAC

Harsh environments

As with all RUGGEDCOM products, Highly Accelerated Life Testing (HALT) has been used in the early stages of product development – to detect any design or performance issues.

- Temperature: -40° C to +85° C (fanless)
- Safety: CSA/UL 60950
- Vibration: IEC 60255-21-1, Class 2
- Shock: IEC 60255-21-2, Class 2
- Humidity: IEC 60068-2-30, up to 95% relative humidity

Certifications

- IEC 61850-3 (electric substations)
- IEEE 1613 (electric substations)
- IEC 61000-6-2 (industrial environments)

Certifications in progress

- NEMA TS-2 (traffic control equipment)
- EN 50121-4 (railway applications)

Power-over-Ethernet (RUGGEDCOM RST2228P only)

The RUGGEDCOM RST2228P comes with up to 24 Power-over-Ethernet (PoE) interfaces supporting IEEE 802.3at/802.3bt (draft with a shared power budget from 500 Watt.) The individual ports have a maximum of 60 Watt. For Power-over-Ethernet connections an external power input is necessary.

Configuration interfaces

The RUGGEDCOM RST2228 is equipped with a USB interface which enables easy in field configuration and upgrading. The CLP interfaces allow for fast and simple replacement devices in the field with the RUGGEDCOM CLP. This helps to reduce downtimes when errors occur.

Software

The RUGGEDCOM RST2228 runs on Rugged Operating System (ROS®) and delivers high performance switching.

ROS® supports the standard network technologies, such as Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP), Remote Monitoring (RMON), Simple Network Management Protocol (SNMP) and others, including proprietary protocol enhancements such as Siemens eRSTP (enhanced Rapid Spanning Tree Protocol) and Fast Root Failover (FRF).
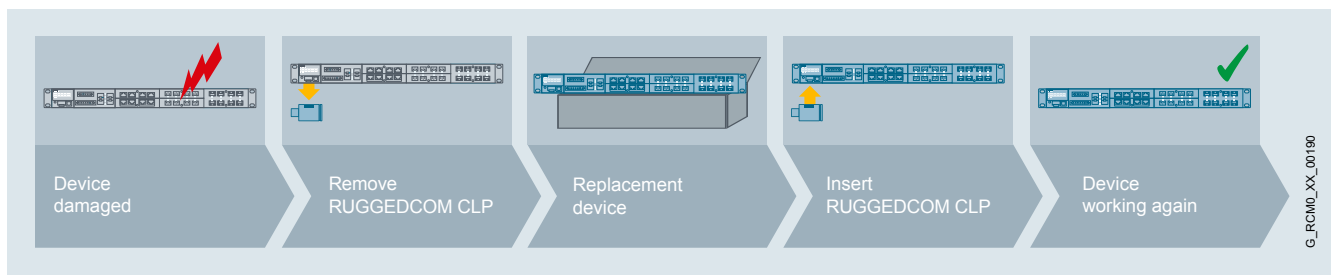
Software features

- Quality of service (802.1p) for traffic prioritization
- NTP time synchronization (client and server)
- Smart power management for PoE interfaces
- Port rate and Broadcast Storm Limiting
- Port configuration, status, statistics, mirroring
- Simple Management interface through WebUI and console interface
- Single file configuration ensures easy installation and configuration control
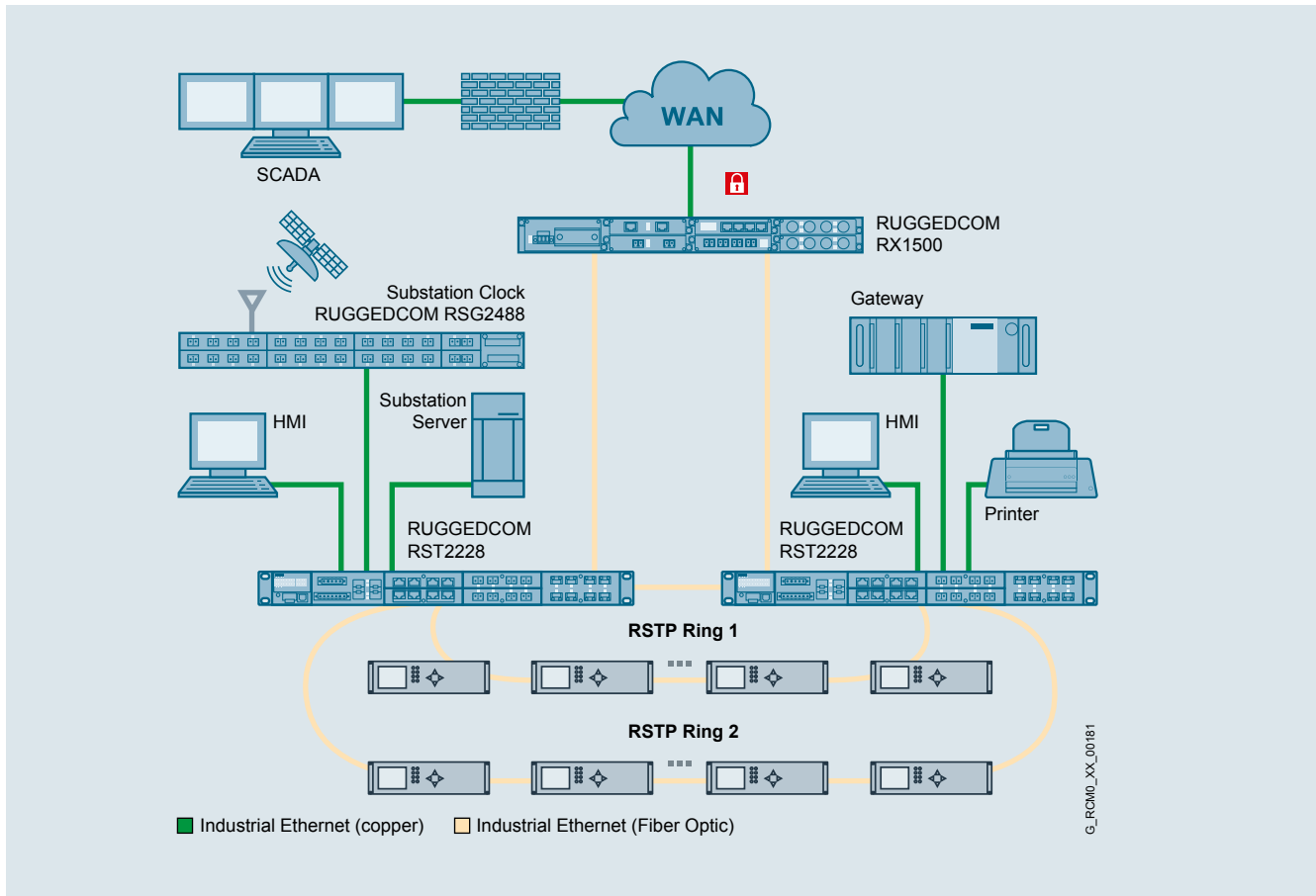
Cyber security

Cyber security is an important issue in many industries where advanced automation and communications networks play a crucial role in mission critical applications and where high reliability is of paramount importance. Key RUGGEDCOM RST2228 features that address security issues at the local area network level include:

- Passwords – support for multiple access levels with separate credentials for each level
- SSH / SSL – extends capability of password protection to add encryption of passwords and data as they cross the network
- Enable / disable ports – capability to disable ports so unauthorized devices can't connect to unused ports
- SNMPv3 – encrypted authentication and access security
- HTTPS – for secure access to the web interface
- 802.1x – to ensure only permitted devices can connect to the device
- MAC address authentication – control access to devices that do not support RADIUS


| Device damaged | Remove RUGGEDCOM CLP | Replacement device | Insert RUGGEDCOM CLP | Device working again |

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The CLP interface allows for quick and easy exchange of defective devices in the field.
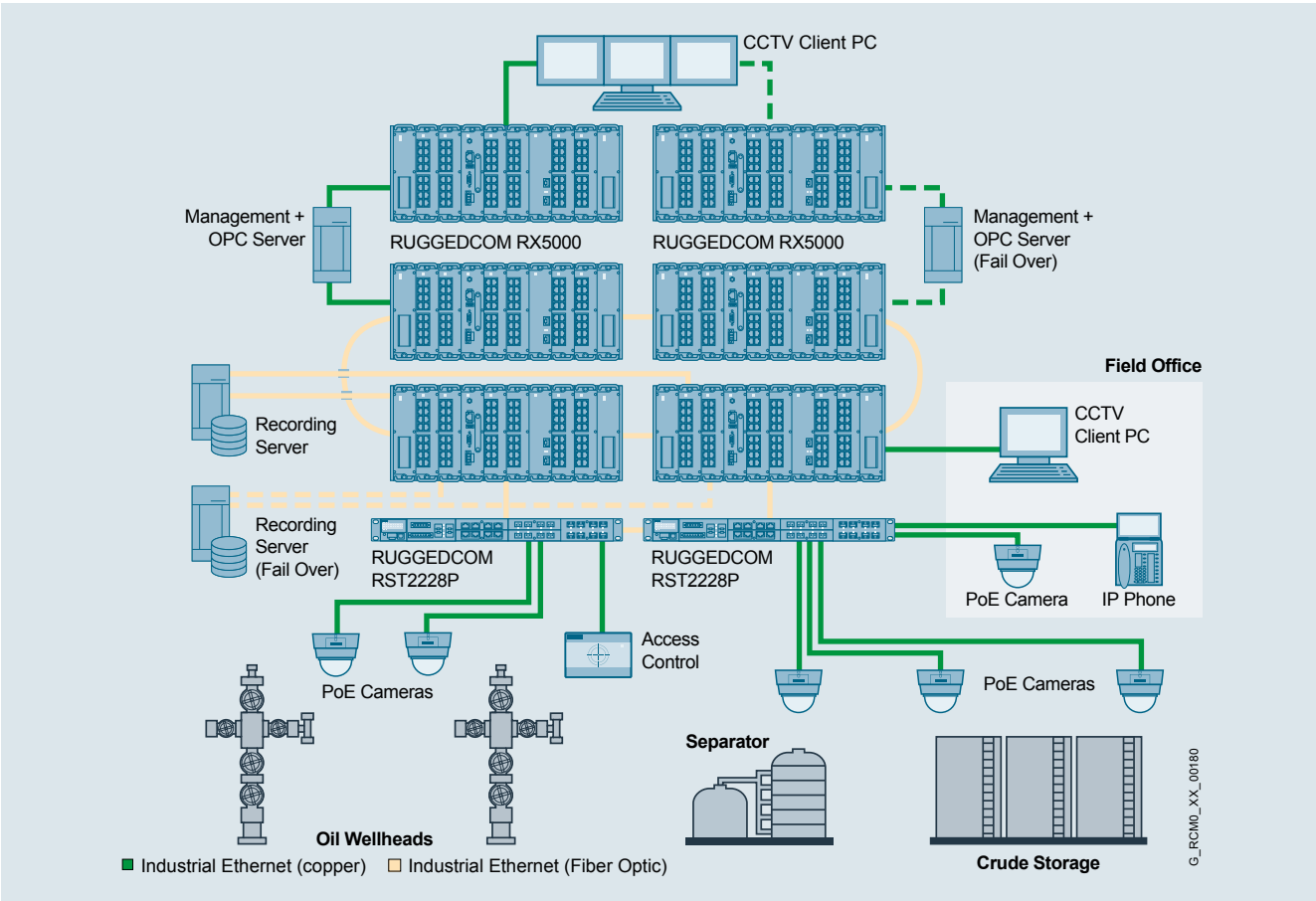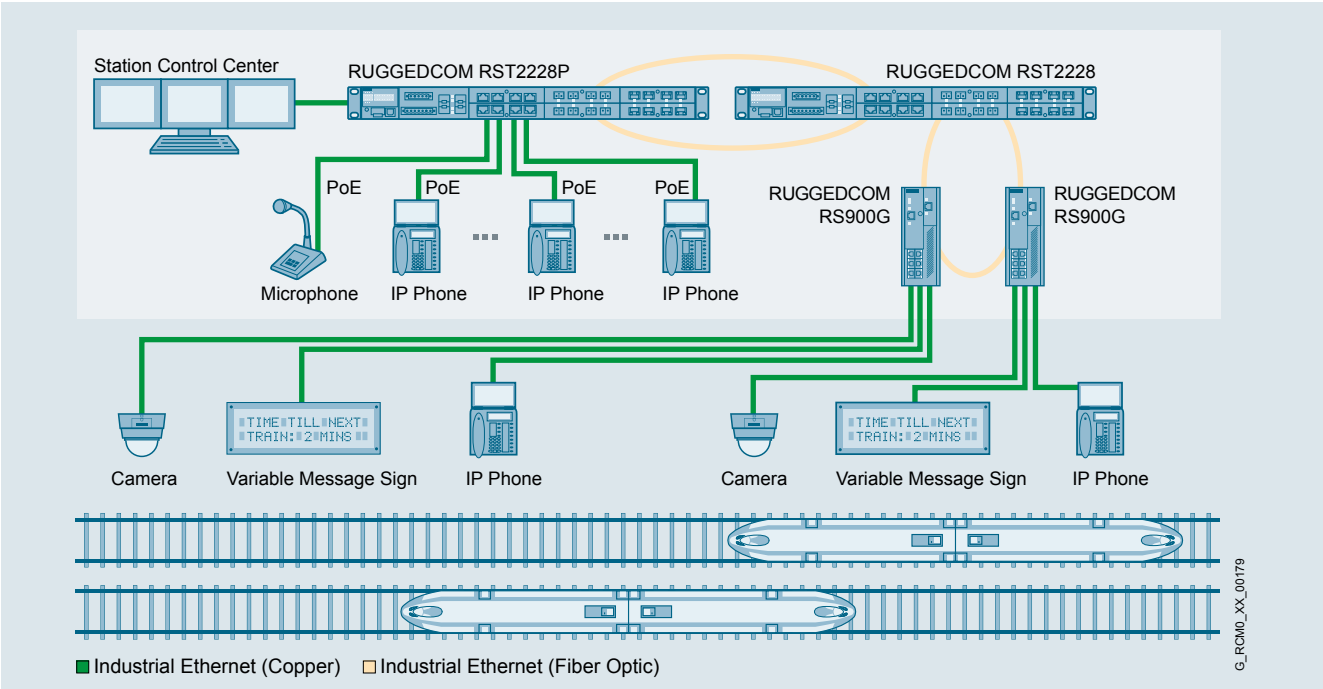
Use cases

The RUGGEDCOM RST2228 with built-in 4 SFP slots for fiber connections between protection bays and up to 6 slots that can host 4-port line modules offers flexibility for future upgrades and cost optimization.
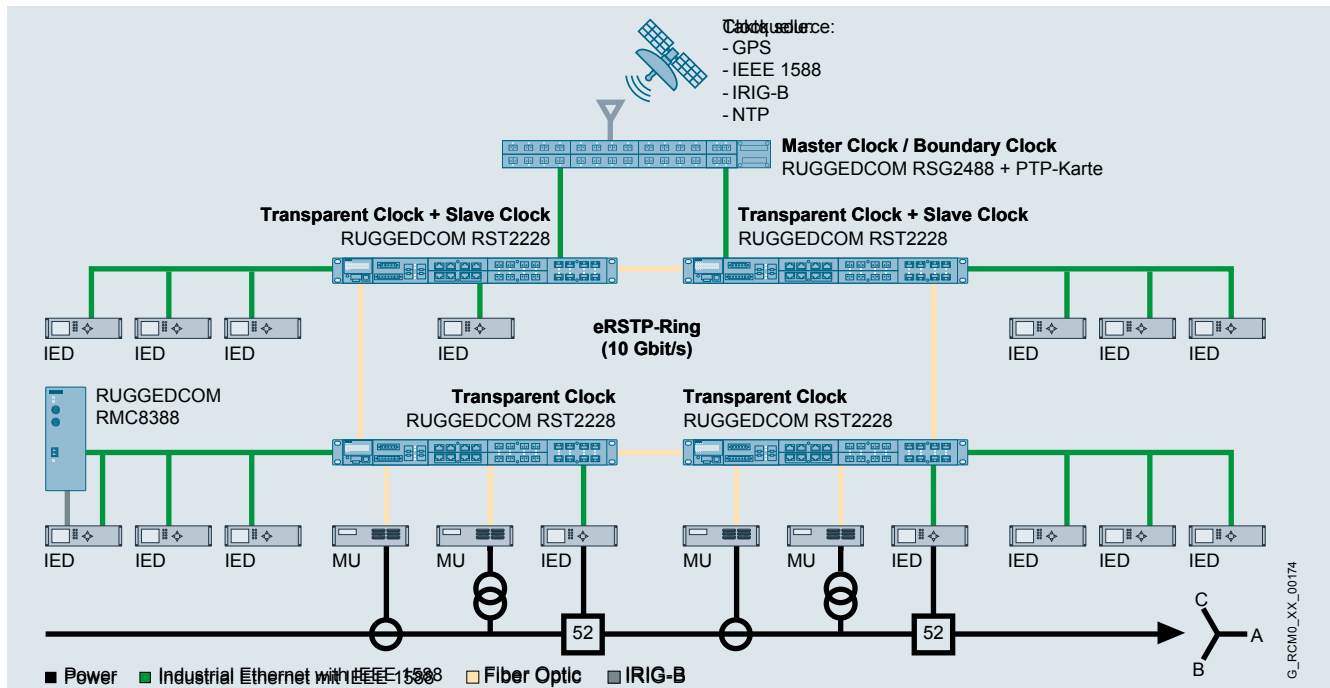
Up to 24 modern IEDs or other IEEE 1588 slaves can be connected directly to the RUGGEDCOM RST2228 via Fast Ethernet or Gigabit/s ports.

CCTV Client PC

Management +
OPC Server

RUGGEDCOM RX5000

RUGGEDCOM RX5000

Management +
OPC Server
(Fail Over)

Field Office

Recording
Server

CCTV
Client PC

Recording
Server
(Fail Over)

RUGGEDCOM
RST2228P

RUGGEDCOM
RST2228P

PoE Camera   IP Phone

PoE Cameras

Access
Control

PoE Cameras

Separator

Oil Wellheads

Crude Storage

■ Industrial Ethernet (copper)   □ Industrial Ethernet (Fiber Optic)

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Fully redundant communication network based on the RUGGEDCOM RST2228P is suitable for oil & gas applications thanks to its comprehensive set of approvals and rugged design.

Station Control Center

RUGGEDCOM RST2228P

RUGGEDCOM RST2228

PoE   PoE   PoE   PoE

RUGGEDCOM
RS900G

RUGGEDCOM
RS900G

Microphone   IP Phone   IP Phone   IP Phone

TIME TILL NEXT
TRAIN: 2 MINS

TIME TILL NEXT
TRAIN: 2 MINS

Camera   Variable Message Sign   IP Phone   Camera   Variable Message Sign   IP Phone

■ Industrial Ethernet (Copper)   □ Industrial Ethernet (Fiber Optic)

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The RUGGEDCOM RST2228P is designed to connect up to 24 PoE end-devices while maintaining the uplinks from the field in one unique NMS (network management software) environment.

Order options

Product	Article number						
RUGGEDCOM RST2228	6GK6222-6AB00-	.	.	.	.	–	Z
RUGGEDCOM RST2228P	6GK6222-6PB00-	.	.	.	.	–	Z
Mounting Options							
No mounting option					0		
19" rack mounting kit, panel mount kit					5		
Power supply 1							
24 VDC (13 – 36 VDC) with screw terminal block				A			
48 VDC (36 – 72 VDC) with screw terminal block				B			
88 – 300 VDC / 85 – 264 VAC with screw terminal block				C			
24 VDC (13 – 36 VDC) with pluggable terminal block				D			
48 VDC (36 – 72 VDC) with pluggable terminal block				E			
88 – 300 VDC / 85 – 264 VAC with pluggable terminal block				F			
12 VDC (10.5-15 VDC) with screw terminal block				G			
12 VDC (10.5-15 VDC) with pluggable terminal block				H			
Power supply 2 (terminal block must be equal to power supply 1)							
No power supply option			N				
24 VDC (13 – 36 VDC)			A				
48 VDC (36 – 72 VDC)			B				
88 – 300 VDC / 85 – 264 VAC			C				
12 VDC (10.5-15 VDC)			G				
Manufacturing modification							
Standard		0					
Conformal coating		1					

Service panel location	
Mounted on the front (connector side)	A00
Mounted on the back (heatsink side)	A01

Z options	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6
RUGGEDCOM RMM2931-4, blank module	B00	C00	D00	E00	F00	G00
RUGGEDCOM RMM2973-4RJ45, 4 x RJ45, 10/100/1000 BASE-TX	B01	C01	D01	E01	F01	G01
RUGGEDCOM RMM2973-4FC, 4 x FastConnect (RJ45), 10/100/1000 BASE-TX	B02	C02	D02	E02	F02	G02
RUGGEDCOM RMM2973-4POE, Power-over-Ethernet [1]	B03	C03	D03	E03	F03	G03
RUGGEDCOM RMM2973-4PFC, 4 x FastConnect (RJ45), Power-over-Ethernet [1]	B04	C04	D04	E04	F04	G04
RUGGEDCOM RMM2942-4LC2, 4 x LC-Interface, 100BASE-FX, multi-mode, 1300 nm	B05	C05	D05	E05	F05	G05
RUGGEDCOM RMM2972-4SFP, 4 x SFP-slot, Supporting 100BASE-FX, 1000BASE-X SFPs, SFPs are not included	B06	C06	D06	E06	F06	G06

[1] Power-over-Ethernet (PoE) modules can only be used in the RUGGEDCOM RST2228P.

Examples	Order code
RUGGEDCOM RST2228P with 2 x 24 VDC power supplies with screw terminal blocks, 19" rack mounting kit, panel mount kit, Ethernet connectors on rear; LED panel on front; power connector on rear with 2 x RUGGEDCOM RMM2973-4POE, 2 x RUGGEDCOM RMM2973-4PFC, and 2 x RUGGEDCOM RMM2972-4SFP media modules.	6GK6222-6PB00-5AA0-Z A00 + B03 + C03 + D04 + E04 + F06 + G06

Media modules

RMM2931-4   RMM2973-4RJ45   RMM2973-4FC   RMM2973-4PoE

RMM2973-4PFC   RMM2942-4LC2   RMM2972-4SFP

The RUGGEDCOM RST2228 and RST2228P are field modular Ethernet switches equipped with 6 slots for various media modules. Media modules are available with different interface options.

Modules	Article number
Standard modules	
RUGGEDCOM RMM2931-4, blank module	6GK6293-1BA00-4AA0
RUGGEDCOM RMM2973-4RJ45, 4 x RJ45, 10/100/1000 BASE-TX	6GK6297-3RD00-4AB0
RUGGEDCOM RMM2973-4FC, 4 x FastConnect (RJ45), 10/100/1000 BASE-TX	6GK6297-3FD00-4AB0
RUGGEDCOM RMM2973-4POE, Power-over-Ethernet (PoE) 4 x RJ45 [1]	6GK6297-3PD00-4AB0
RUGGEDCOM RMM2973-4PFC, Power-over-Ethernet (PoE) 4 x FastConnect RJ45 [1]	6GK6297-3WD00-4AB0
RUGGEDCOM RMM2942-4LC2, 4 x LC-Interface, 100BASE-FX, multi-mode, 1300 nm	6GK6294-2LD00-4AC0
RUGGEDCOM RMM2972-4SFP, 4 x SFP-slot, supporting 100BASE-FX, 1000BASE-X SFPs, SFPs are not included	6GK6297-2SA00-4AA0
Conformal coated modules	
RUGGEDCOM RMM2973C-4RJ45, 4 x RJ45, 10/100/1000 BASE-TX with conformal coating	6GK6297-3RD00-4AB1
RUGGEDCOM RMM2973C-4FC, 4 x FastConnect (RJ45), 10/100/1000 BASE-TX with conformal coating	6GK6297-3FD00-4AB1
RUGGEDCOM RMM2973C-4POE, Power-over-Ethernet (PoE) 4 x RJ45 with conformal coating [1]	6GK6297-3PD00-4AB1
RUGGEDCOM RMM2973C-4PFC, Power-over-Ethernet (PoE) 4 x FastConnect RJ45 with conformal coating [1]	6GK6297-3WD00-4AB1
RUGGEDCOM RMM2942C-4LC2, 4 x LC-Interface, 100BASE-FX, multi-mode, 1300 nm with conformal coating	6GK6294-2LD00-4AC1
RUGGEDCOM RMM2972C-4SFP, 4 x SFP-slot, supporting 100BASE-FX, 1000BASE-X SFPs, SFPs are not included, with conformal coating	6GK6297-2SA00-4AA1

[1] Power-over-Ethernet (PoE) modules can only be used in the RUGGEDCOM RST2228P.

Accessories

Available pluggable transceivers	Medium, interface	Range	Operating temperature	Article number
Fast Ethernet SFPs				
SFP1112-1	Copper, RJ45	0 - 100 m	-40 - 85 ℃	6GK6000-8CG01-0AA0
SFP1121-1FX2	Multi-mode, LC	2 km	-40 - 85 ℃	6GK6000-8FE51-0AA0
SFP1121-1FX2A	Multi-mode, LC, active	2 km	-40 - 85 ℃	6GK6000-8FE50-0AA0
SFP1131-1FX20	Single-mode, LC	20 km	-40 - 85 ℃	6GK6000-8FE52-0AA0
SFP1131-1FX50	Single-mode, LC	50 km	-40 - 85 ℃	6GK6000-8FE53-0AA0
SFP1131-1FX90	Single-mode, LC	90 km	-40 - 85 ℃	6GK6000-8FE54-0AA0
SFP1131-1LX10A	Single-mode, LC	10 km	-40 - 85 ℃	6GK6000-8FE60-0AA0
SFP1131S-1LX40A	Single-mode, LC	40 km	-5 - 70 ℃	6GK6000-8FE62-0AA0
Gigabit SFPs				
SFP1132-1BX10R	Single-mode, LC, bi-directional	10 km	-40 - 85 ℃	6GK6000-8FB51-0AA0
SFP1132-1BX10T	Single-mode, LC, bi-directional	10 km	-40 - 85 ℃	6GK6000-8FB52-0AA0
SFP1132-1BX40R	Single-mode, LC, bi-directional	40 km	-40 - 85 ℃	6GK6000-8FB53-0AA0
SFP1132-1BX40T	Single-mode, LC, bi-directional	40 km	-40 - 85 ℃	6GK6000-8FB54-0AA0
SFP1122-1SX	Multi-mode, LC	0.5 km	-40 - 85 ℃	6GK6000-8FG51-0AA0
SFP1122-1SX2	Multi-mode, LC	2 km	-40 - 85 ℃	6GK6000-8FE58-0AA0
SFP1132-1LX10	Single-mode, LC	10 km	-40 - 85 ℃	6GK6000-8FG52-0AA0
SFP1132-1LX25	Single-mode, LC	25 km	-40 - 85 ℃	6GK6000-8FG53-0AA0
SFP1132-1LX40	Single-mode, LC	40 km	-40 - 85 ℃	6GK6000-8FG57-0AA0
SFP1132-1LX70	Single-mode, LC	70 km	-40 - 85 ℃	6GK6000-8FG54-0AA0
SFP1132-1LX100	Single-mode, LC	100 km	0 - 70 ℃	6GK6000-8FG55-0AA0
SFP1132-1LX150	Single-mode, LC	115 km	-40 - 85 ℃	6GK6000-8FE56-0AA0
10 Gigabit SFPs				
SFP2133-1LR10	Single-mode, LC	10 km	-40 - 85 ℃	6GK6000-8FT51-0AA0
SFP2133-1ER40	Single-mode, LC	40 km	-40 - 85 ℃	6GK6000-8FT53-0AA0
SFP2133-1ZR80	Single-mode, LC	80 km	-40 - 85 ℃	6GK6000-8FT52-0AA0

Miscellaneous	
Product	Article number
USB console cable, 10 ft.	6GK6000-8DT01-0AA0
19" Rack & panel mounting kit	6GK6000-8MA01-0AA0
Connector Kit RST2228 pluggable terminal blocks (5 sets)	6GK6000-8HC05-0AA0
Connector Kit RST2228 screw terminal blocks (5 sets)	6GK6000-8HC06-0AA0
Power cable with NEMA 5-15P plug with lugs for screw terminal blocks, 6 ft.	6GK6000-8BA00-0AA0
Power cable with NEMA 5-15P plug without lugs for pluggable terminal blocks, 6 ft.	6GK6000-8BB00-0AA0
RJ45 dust covers for RUGGEDCOM products, 8 pieces	6GK6000-8HT01-0CA0
SFP slot dust covers for RUGGEDCOM products, 8 pieces	6GK6000-8HT02-0CA0

With the RUGGEDCOM Selector you can transfer the order number to the Siemens Industry Mall and order your products.

To use the RUGGEDCOM Selector for the selection and configuration of RUGGEDCOM products, visit: **siemens.com/ruggedcom-selector**
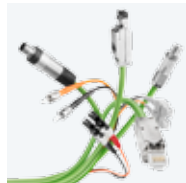
FastConnect™ Cabling System

Stringent demands are placed on the installation of cables in an industrial environment. Siemens offers FastConnect™, a system that fulfills all these requirements: on-site assembly – quick, easy and error-free. For more information, visit: **siemens.com/fastconnect**

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions only form one element of such a concept.

Customer is responsible to prevent unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit:
siemens.com/industrialsecurity

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under:
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