SIEMENS

Rugged Communication

RUGGEDCOM RSG900R & RSG900C

Compact IEEE 1588 Ethernet switches. Edition 08/2018

Brochure

reddot award 2018
winner industrial design

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The RUGGEDCOM RSG900R and RSG900C belong to a cost effective compact Ethernet switch family with IEEE 1588 support. RUGGEDCOM RSG900R products offer a new level of redundancy for the digitalization era.

Contents

Product overview and benefits

The RUGGEDCOM RSG900C and RSG900R product families consist of 4 switches in a compact design, all offering IEEE1588 Precision Time Synchronisation. The RSG907R and RSG909R are equipped with the Redundant Network Access features HSR and PRP to mitigate the risk of communication disruptions and downtime.

These rugged Gigabit switches are designed to operate in harsh environments with widely varying climatic and environmental conditions. Tested and certified to withstand extreme temperature, vibration and shock, the RUGGEDCOM RSG908C, RSG910C, RSG907R and RSG909R offer exceptional reliability for industrial applications such as electric utility substations, transportation systems and oil & gas.

All four products are ideal for applications that require high bandwidths and accommodate future network expansions.

The three Redundant Network Access SFP ports on the RUGGEDCOM RSG907R and RSG909R and the 4 SFP uplinks on the RSG908C and RSG910C provide ultimate flexibility in media and distance, with support for Gigabit bandwidth. The RSG907R and RSG908C connect up to 4 IEDs via 100BASE-FX fiber optics whereas the RSG909R and RSG910C connect up to 6 IEDs via copper Ethernet ports.

IEEE 1588
The RUGGEDCOM RSG908C, RSG910C, RSG907R and RSG909R enable the creation of a future proof network with support for IEEE 1588 time synchronisation.

Power redundancy
These rugged switches maintain continuous safe and reliable operations even during power failures, diminishing the risk of revenue and data loss.

SFP Ports
SFP ports can be modified at any time allowing deployment flexibility for varying customer needs.

Multiple configurations
All 4 products offer different technologies and port configurations to allow various network design options and cost savings through increased redundancy, reduced downtimes and high reliability.

HSR / PRP with Gigabit interfaces
These products help to avoid revenue loss by mitigating the risk of communicationdisruptions and downtime with a redundant fault tolerant network supporting high bandwidth.
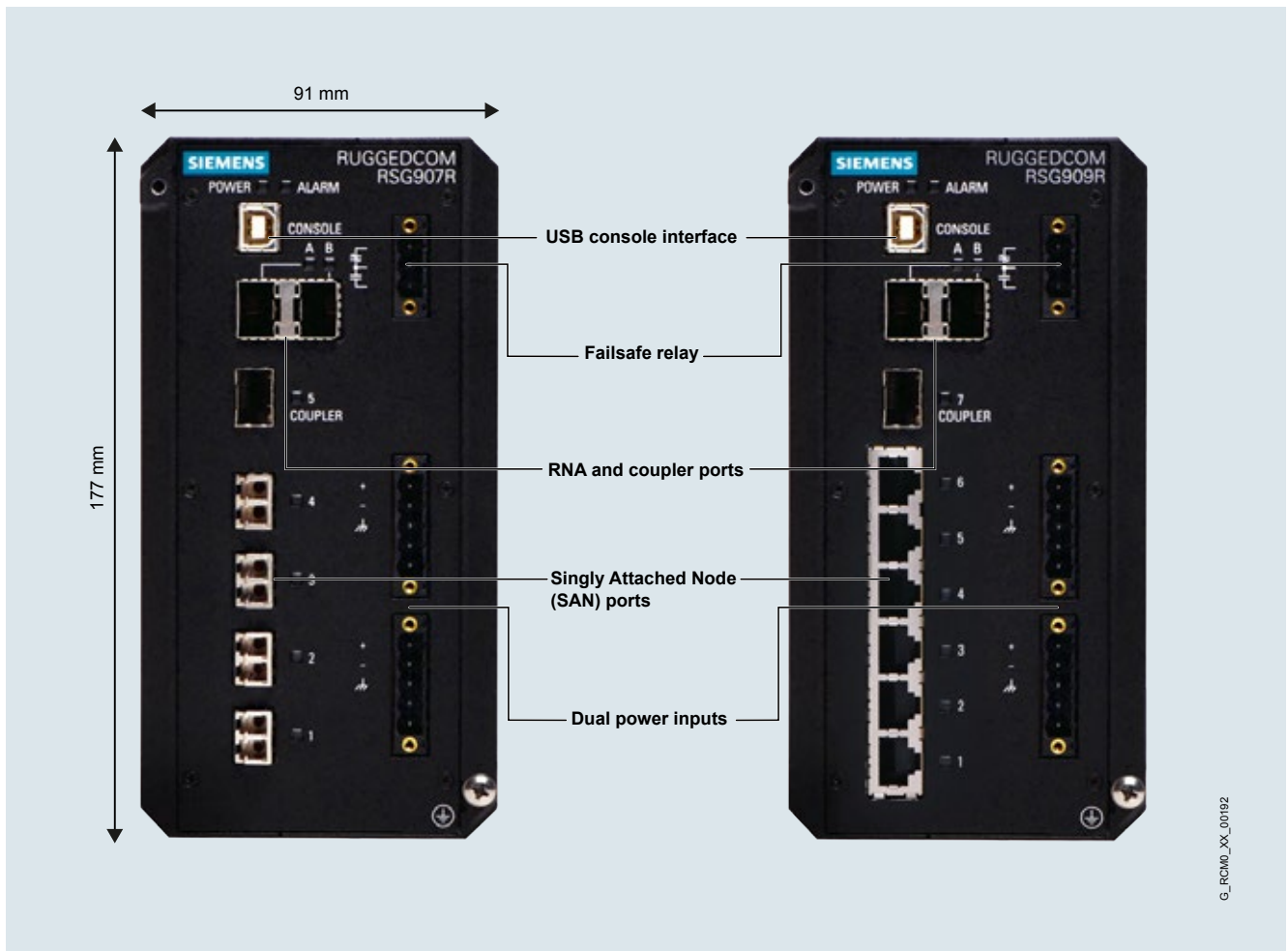
Technical data

RUGGEDCOM RSG900C
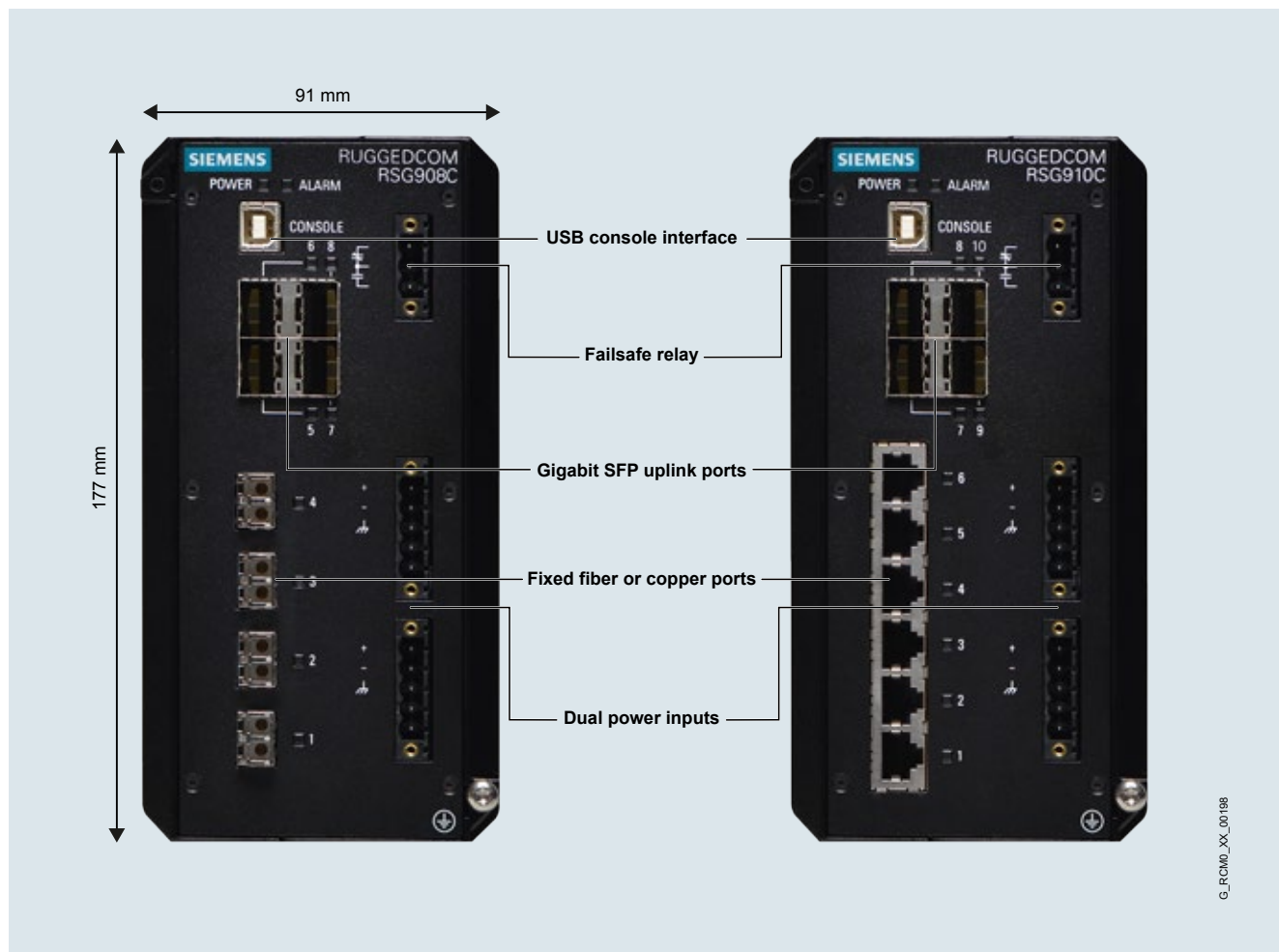
Technical data	RUGGEDCOM RSG908C	RUGGEDCOM RSG910C
Ethernet interfaces		
Ports	4 x 1000 BASE-X (SFP) + 4 x 100BASE-FX	4 x 1000 BASE-X (SFP) + 6 x 10/100/1000BASE-T
Power supply characteristics		
Supported input voltage ranges	12/24/48 VDC (10 – 60 VDC) HI (100 – 240 VAC / 100 – 300 VDC)	
Mechanical specifications		
Dimensions (w x h x d) in mm	91 mm x 177 mm x 173 mm	
Weight	2.9 kg	
Mounting	DIN rail and panel mount	
Ambient conditions		
Operating temperature	-40 °C to +85 °C	
IP rating	IP40	
Other features		
IEEE 1588	Transparent Clock	

RUGGEDCOM RSG900R

91 mm

177 mm

USB console interface

Failsafe relay

RNA and coupler ports

Singly Attached Node (SAN) ports

Dual power inputs

G_RCM0_XX_00192

Technical data	RUGGEDCOM RSG907R	RUGGEDCOM RSG909R
Ethernet interfaces		
Ports	4 x 100BASE-FX + 3 x 1000 BASE-X (SFP)	6 x 10/100/1000BASE-T + 3 x 1000 BASE-X (SFP)
RNA uplinks (A / B) & coupler port	3 x 1 Gbit/s SFP ports	
Power supply characteristics		
Supported input voltage ranges	12/24/48 VDC (10 – 60 VDC) HI (100 – 240 VAC / 100 – 300 VDC)	
Mechanical specifications		
Dimensions (w x h x d) in mm	91 mm x 177 mm x 173 mm	
Weight	2.9 kg	
Mounting	DIN rail and panel mount	
Ambient conditions		
Operating temperature	-40 °C to +85 °C	
IP rating	IP40	
Other features		
IEEE 1588	Transparent Clock	

Features

Software

The RUGGEDCOM RSG908C, RSG910C, RSG907R and RSG909R run on Rugged Operating System (ROS®) and deliver high performance switching.

ROS® supports standard network technologies, such as Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP), Media Redundancy Protocol (MRP), 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)
- 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 RSG907R, RSG908C, RSG909R and RSG910C 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

Hardware

The Red Dot Award winning RUGGEDCOM RSG908C, RSG910C, RSG907R and RSG909R have been specifically designed and certified for substation and distribution automation applications within electric power industry.

Power Supply

- Integrated power supply with redundant inputs
- Universal high voltage range: 100 – 240 VAC or 100 – 300 VDC
- Universal low voltage power supply range: 10 – 60 VDC

Configuration interface

All four new RUGGEDCOM switches are equipped with a USB console interface which enables easy in-field configuration and upgrading.

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

Technology highlights

Precision timing solutions

Precision timing solutions serve to increase an efficiency and uptime by improving monitoring and troubleshooting capability while also reducing capital expenses by converging timing and data networks by using IEEE 1588 v2. Available since 2008, the IEEE 1588v2 has become the industry standard for time synchronisation.

For the electric power industry the power profile for IEEE 1588 v2 was created to meet the timing accuracy needs for the applications of today and the future while reducing the cost to install and maintain separate dedicated timing networks. With IEEE 1588, the cabling infrastructure requirement is reduced by allowing time synchronization information to be transported over the same Ethernet medium as the data communications. This convergence of timing and data information networks can be carried right to the network edge. With the RUGGEDCOM RSG908C, RSG910C, RSG907R and the RSG909R Siemens allows the implementation of green-field Precision Time Protocol networks based on IEEE 1588 v2 where the new switches act as Transparent Clocks.

### IEC 61850 Manufacturing Message Specification

With the integration of Manufacturing Message Specification (MMS), according to IEC 61850-90-4 in network devices, operators can monitor network devices and Intelligent Electronic Devices (IED) through a standardized protocol and visualize them in their SCADA systems. This allows for enhanced diagnostics and eliminates the need for additional network monitoring tools.

Redundant Network Access

Redundant network structures increase network availability, but usually also result in short-term delays in data transfer when a different network path is configured in the event of a failure. These delays are no longer an issue when using PRP (Parallel Redundancy Protocol) and/or HSR (High-availability Seamless Redundancy Protocol). These two protocols are supported in the RUGGEDCOM RSG907R and RSG909R.

PRP redundancy protocol

PRP networks are designed using two seperate LANs in accordance with the IEC 62439-3 standard. Frames traverse both networks in parallel, with compliant devices and switches using the first frame to arrive. This guarantees frame delivery, without delay, even in the event of a failure in either of the two networks.
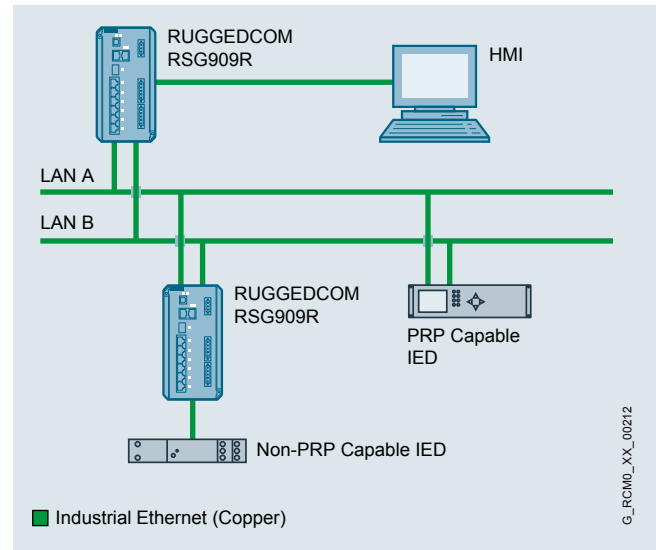


HSR redundancy protocol

HSR networks are specialized ring networks in accordance with the IEC 62439-3 standard, Frames traverse the ring in both directions in parallel, with compliant devices and switches using the first frame to arrive. This guarantees frame delivery, without delay, even in the event of a single failure in the ring.


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Use cases

Industrial Ethernet (Copper)   Industrial Ethernet (Fiber Optic)
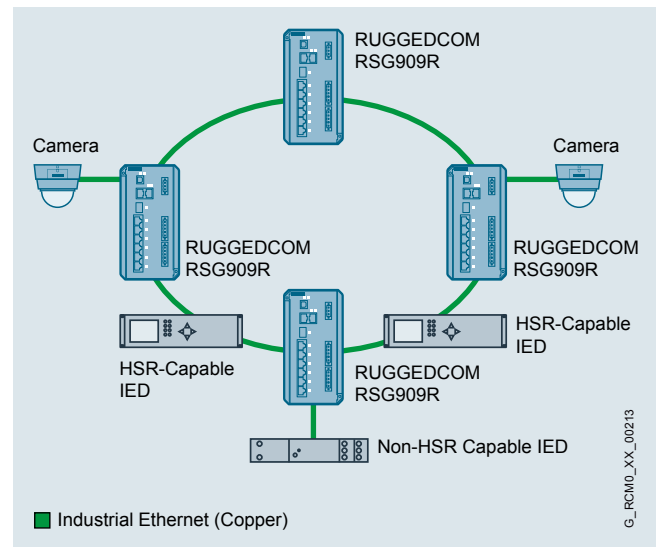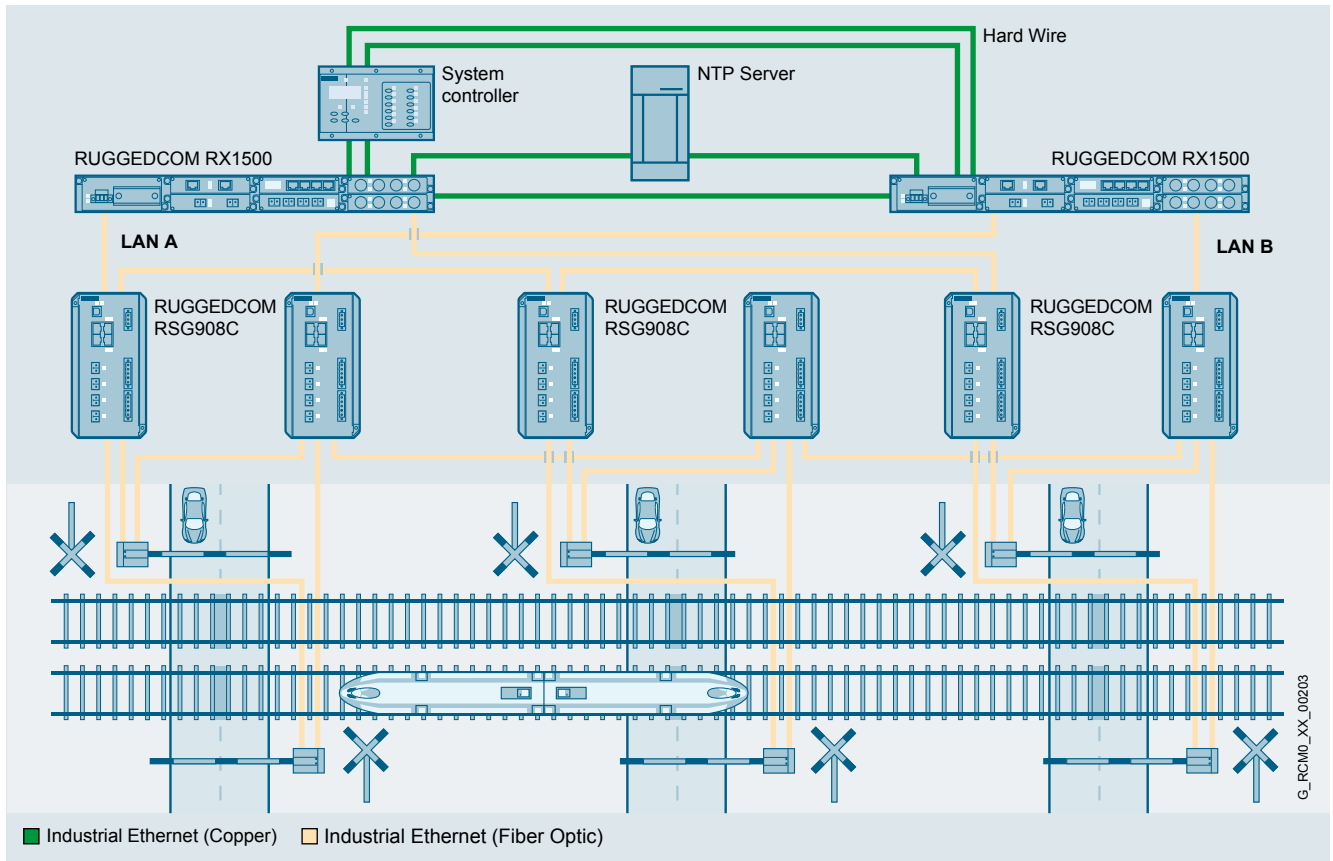
The full fiber RUGGEDCOM RSG908C allows for the connection of end devices to a backbone only with fiber optic cabling, reducing the failure rates due to increased immunity from electromagnetic phenomena.

Industrial Ethernet (Kupfer)   Industrial Ethernet (Fiber Optic)
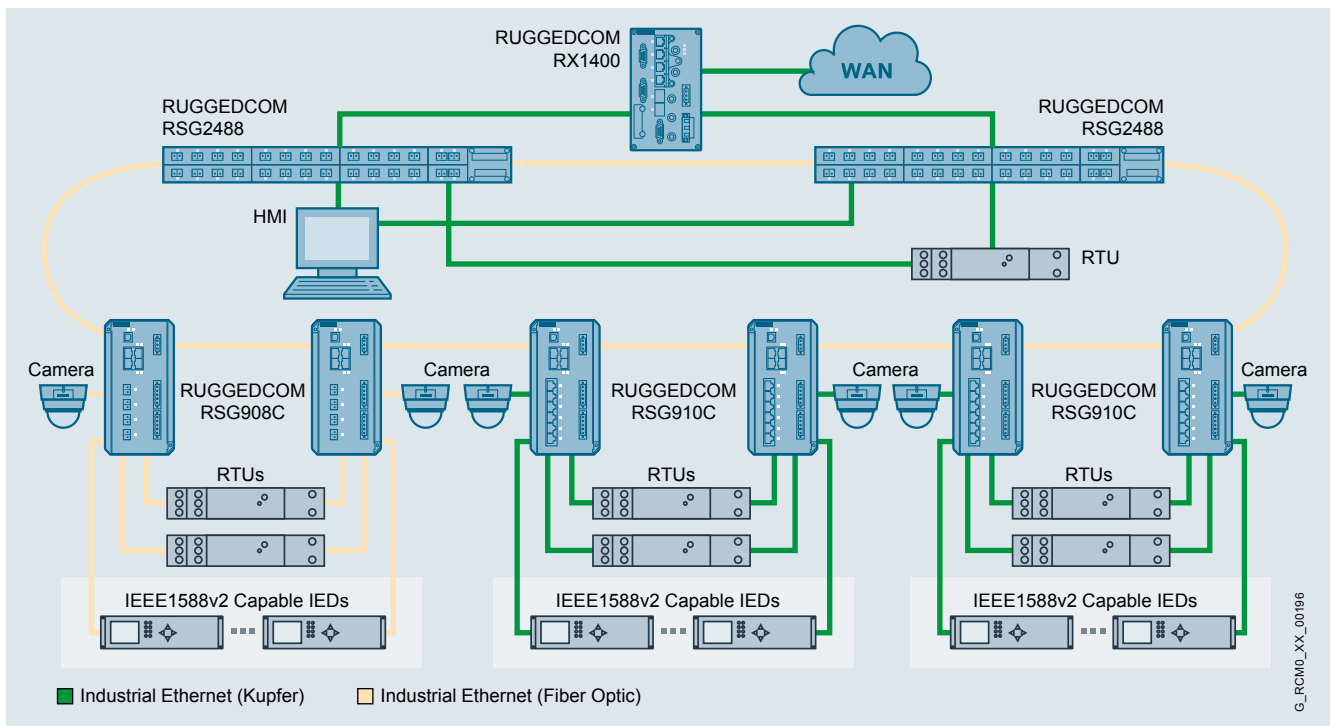
A combination of RUGGEDCOM RSG908C and RSG910C switches provides a mix of fiber optic and copper ports for IEDs and other edge equipment, such as RTUs and IP Cameras, at dispersed cabinets throughout substations with IEEE1588 timing.
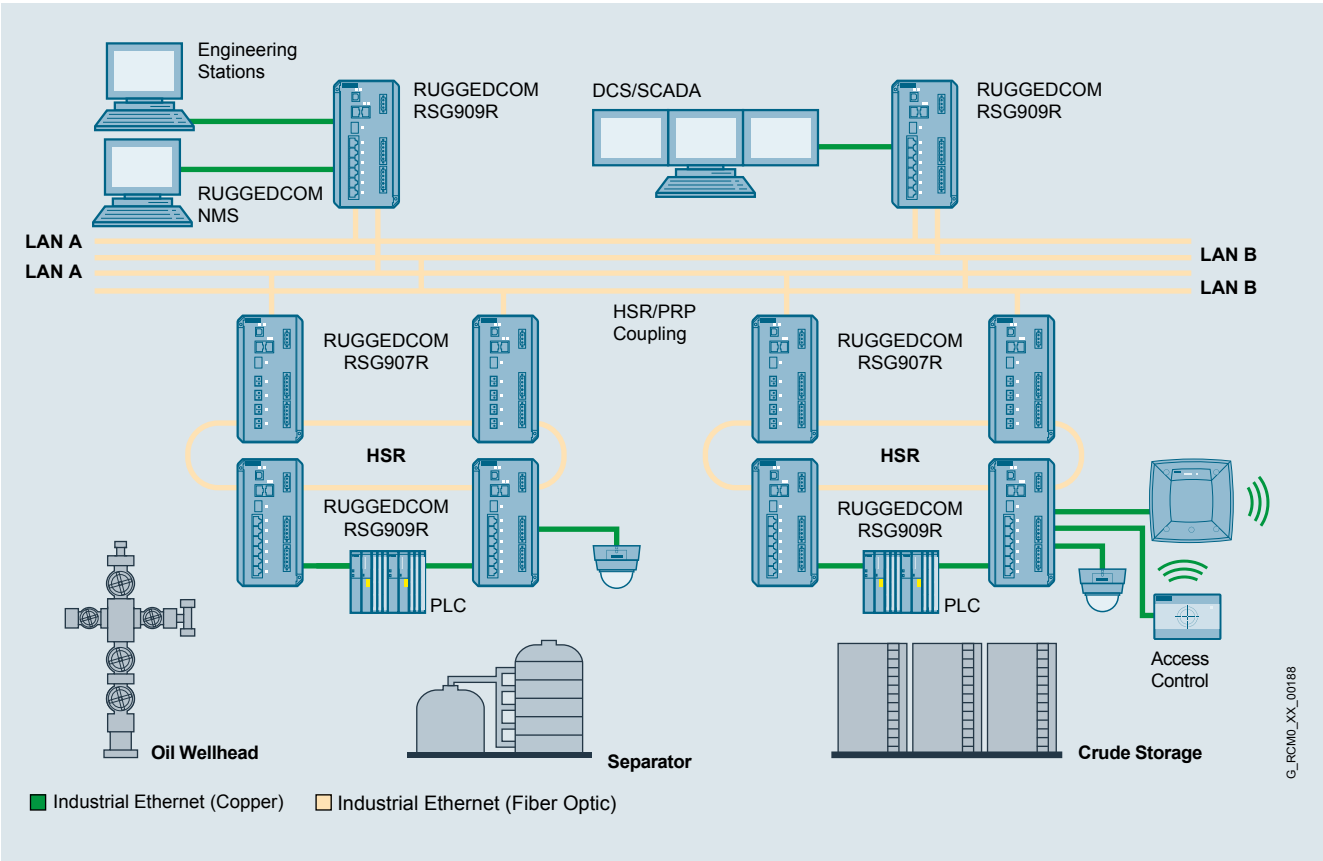
Multi-port Redundancy Box (Redbox) connects up to 6 non-PRP or non-HSR end devices.
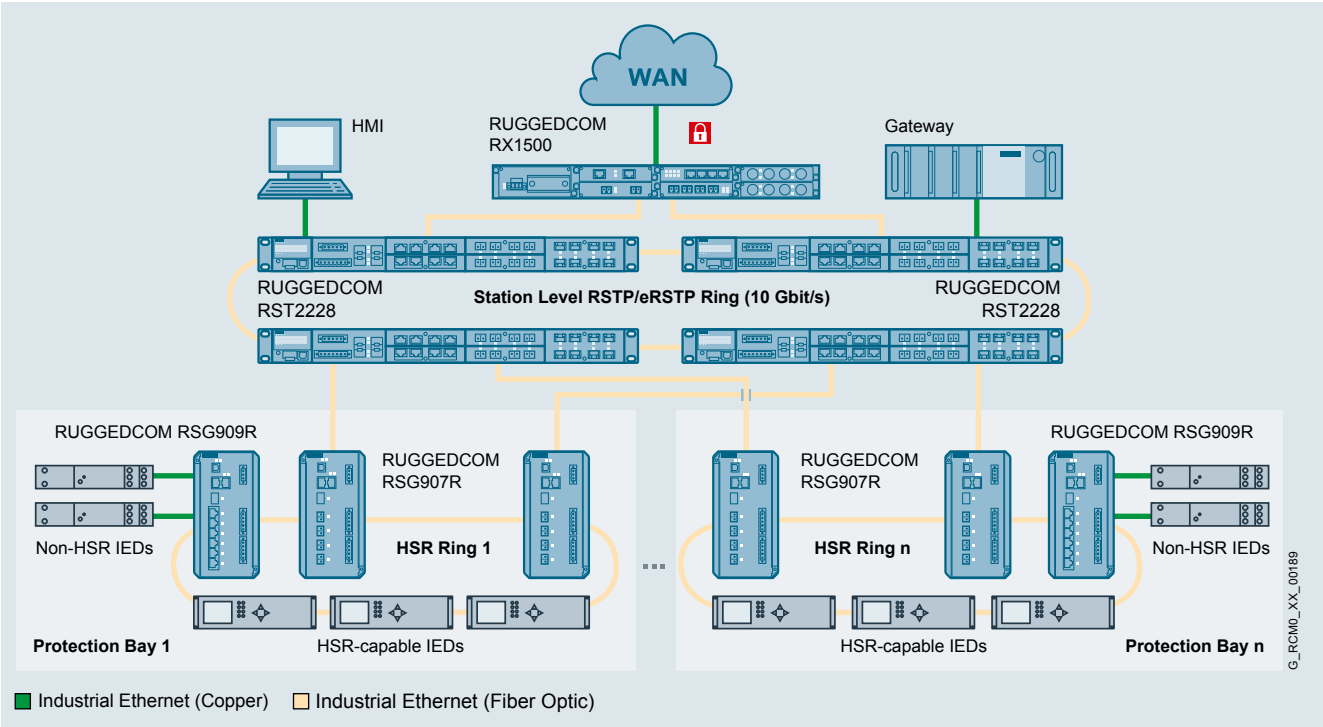
RUGGEDCOM RSG907R and RSG909R switches terminating each HSR ring can be directly connected to RSTP network via their coupling ports.

Ordering options

RUGGEDCOM RSG900C

Product	Article number					
RUGGEDCOM RSG908C	6GK6490-8CB00-	.	.	N	.	–	Z
RUGGEDCOM RSG910C	6GK6491-0CB00-	.	.	N	.	–	Z
Mounting kit						
DIN rail mounting kit		1				
DIN rail and panel mounting kit		3				
Power supply 1 + terminal block type						
12/24/48 VDC (10 – 60 VDC)			A			
HI (100 – 240 VAC / 100 – 300 VDC)			C			
Manufacturing modification						
Standard					0	
Conformal coating					1	

Examples	Order code
RUGGEDCOM RSG908C with DIN rail mounting kit, HI (100 – 240 VAC / 100 – 300 VDC) power supply and conformal coating.	6GK6490-8CB00-1CN1-Z
RUGGEDCOM RSG910C with DIN rail and panel mounting kit, 12/24/48 VDC (10 – 60 VDC) power supply and standard coating.	6GK6491-0CB00-3AN0-Z

RUGGEDCOM RSG900R

Product	Article number					
RUGGEDCOM RSG907R	6GK6490-7RB00-	.	.	N	.	–	Z
RUGGEDCOM RSG909R	6GK6498-0RB00-	.	.	N	.	–	Z
Mounting kit						
DIN rail mounting kit		1				
DIN rail and panel mounting kit		3				
Power supply 1 + terminal block type						
12/24/48 VDC (10 – 60 VDC)			A			
HI (100 – 240 VAC / 100 – 300 VDC)			C			
Manufacturing modification						
Standard					0	
Conformal coating					1	

Examples	Order code
RUGGEDCOM RSG907R with DIN rail mounting kit, HI (100 – 240 VAC / 100 – 300 VDC) power supply and conformal coating.	6GK6490-7RB00-1CN1-Z
RUGGEDCOM RSG909R with DIN rail and panel mounting kit, 12/24/48 VDC (10 – 60 VDC) power supply and standard coating.	6GK6498-0RB00-3AN0-Z

Accessories

| Accessories	Description	Article number
USB Console cable	USB 2.0 A type to B type cable assembly 10 feet / 3 meters	6GK6000-8DT01-0AA0
Panel mounting kit	Makes wall and other lateral mounting possible, requires assembly and even mounting plane	6GK6000-8MR00-0AA1
Power cable without lugs	Power cable with NA plug for pluggable terminal blocks (6 ft.) for RUGGEDCOM products	6GK6000-8BB00-0AA0

Supported SFPs

Product name	Cable	Max. range	Temperature	Article number
SFP1132-1BX10R	SM, LC, Bi-Di	10 km	-40 - 85 ℃	6GK6000-8FB51-0AA0
SFP1132-1BX10T	SM, LC, Bi-Di	10 km	-40 - 85 ℃	6GK6000-8FB52-0AA0
SFP1132-1BX40R	SM, LC, Bi-Di	40 km	-40 - 85 ℃	6GK6000-8FB53-0AA0
SFP1132-1BX40T	SM, LC, Bi-Di	40 km	-40 - 85 ℃	6GK6000-8FB54-0AA0
SFP1122-1SX	MM, LC	0.5 km	-40 - 85 ℃	6GK6000-8FG51-0AA0
SFP1122-1SX2	MM, LC	2 km	-40 - 85 ℃	6GK6000-8FE58-0AA0
SFP1132-1LX10	SM, LC	10 km	-40 - 85 ℃	6GK6000-8FG52-0AA0
SFP1132-1LX25	SM, LC	25 km	-40 - 85 ℃	6GK6000-8FG53-0AA0
SFP1132-1LX40	SM, LC	40 km	-40 - 85 ℃	6GK6000-8FG57-0AA0
SFP1132-1LX70	SM, LC	70 km	-40 - 85 ℃	6GK6000-8FG54-0AA0
SFP1132-1LX100	SM, LC	100 km	-40 - 85 ℃	6GK6000-8FG55-0AA0
SFP1132-1LX115	SM, LC	115 km	-40 - 85 ℃	6GK6000-8FE56-0AA0

* SM = Single-mode, MM = Multi-mode, Bi-Di = Bi Directional

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**
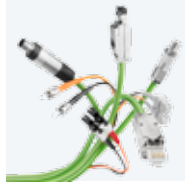
FastConnect™ Cabling System

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.

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