SIEMENS

SIMATIC NET

Industrial Ethernet switches SCALANCE X-200RNA

Operating Instructions

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Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION

indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified persons are those who, because of their training and experience, are familiar with the installation, assembly, commissioning, operation, decommissioning and disassembly of the product and can recognize risks and avoid possible hazards.

Proper use of Siemens products

Note the following:

⚠ WARNING

Siemens products may only be used for the application described in the catalog and the associated usage information. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Introduction

1

Purpose of the Operating Instructions

These Operating Instructions support you when commissioning networks with the IE switches of the SCALANCE X-200RNA product group.

Validity of the Operating Instructions

These Operating Instructions apply to the following devices:

IE switch	Article number
SCALANCE X204RNA	6GK5204-0BA00-2KB2 (PRP) 6GK5204-0BA00-2MB2 (HSR)
SCALANCE X204RNA EEC	6GK5204-0BS00-3LA3 (PRP) 6GK5204-0BS00-2NA3 (HSR) 6GK5204-0BS00-3PA3 (PRP/HSR)

These operating instructions are valid as of firmware version 3.2.8.

Product names of the devices in these operating instructions

The descriptions in these operating instructions always apply to the devices of the SCALANCE X-200RNA product line listed under "Validity of the Operating Instructions" in this document unless the description relates to a specific device of the product line.

Product name	Covers the following devices:
SCALANCE X-200RNA	SCALANCE X204RNA (PRP) SCALANCE X204RNA (HSR) SCALANCE X204RNA EEC (PRP) SCALANCE X204RNA EEC (HSR) SCALANCE X204RNA EEC (PRP/HSR)
SCALANCE X-200RNA (PRP)	SCALANCE X204RNA (PRP) SCALANCE X204RNA EEC (PRP) SCALANCE X204RNA EEC (PRP/HSR) in "PRP" mode
SCALANCE X-200RNA (HSR)	SCALANCE X204RNA (HSR) SCALANCE X204RNA EEC (HSR) SCALANCE X204RNA EEC (PRP/HSR) in "HSR" mode
SCALANCE X204RNA	SCALANCE X204RNA (PRP) SCALANCE X204RNA (HSR)
SCALANCE X204RNA EEC	SCALANCE X204RNA EEC (PRP) SCALANCE X204RNA EEC (HSR) SCALANCE X204RNA EEC (PRP/HSR)

Unless mentioned otherwise, the descriptions in these operating instructions refer to all devices of the SCALANCE X-200RNA product group named above in the section on validity.

Note

SCALANCE X204RNA EEC (PRP/HSR)

This device can be configured either as a PRP device or as an HSR device.

If you configure the device as a PRP device, it behaves in exactly the same way as the SCALANCE X204RNA EEC (PRP).

If you configure the device as an HSR device, it behaves in exactly the same way as the SCALANCE X204RNA EEC (HSR).

Additional documentation

The manuals

- "SIMATIC NET Industrial Ethernet Twisted Pair and Fiber Optic Networks (https://support.industry.siemens.com/cs/ww/en/view/8763736)"
- "Industrial Ethernet Networking Manual (https://support.industry.siemens.com/cs/ww/en/view/27069465)"

contain additional information on other SIMATIC NET products that you can operate along with the devices of the SCALANCE X-200RNA product line in an Industrial Ethernet network.

When commissioning the EEC variant of the device, observe the Operating Instructions of the plug-in transceivers in addition.

You can find the supplementary documentation on the Internet pages of Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/15247).

Further documentation

In the system manuals "Industrial Ethernet / PROFINET Industrial Ethernet" and "Industrial Ethernet / PROFINET passive network components", you will find information on other SIMATIC NET products that you can operate along with the devices of this product line in an Industrial Ethernet network.

There, you will find among other things optical performance data of the communications partner that you require for the installation.

You will find the system manuals here:

- On the data medium that ships with some products:
  - Product CD / product DVD
  - SIMATIC NET Manual Collection
- On the Internet pages of Siemens Industry Online Support:
  - Industrial Ethernet / PROFINET Industrial Ethernet System Manual (https://support.industry.siemens.com/cs/ww/en/view/27069465)
  - Industrial Ethernet / PROFINET Passive Network Components System Manual (https://support.industry.siemens.com/cs/ww/en/view/84922825)

SIMATIC NET manuals

You will find the SIMATIC NET manuals here:

- On the Internet pages of Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/15247).

SIMATIC NET glossary

Explanations of many of the specialist terms used in this documentation can be found in the SIMATIC NET glossary.

You will find the SIMATIC NET glossary here:

- SIMATIC NET Manual Collection or product DVD
  The DVD ships with certain SIMATIC NET products.
- On the Internet under the following address:
  50305045 (https://support.industry.siemens.com/cs/ww/en/view/50305045)

Cybersecurity notes

1.1 Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity 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 cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit
https://www.siemens.com/cybersecurity-industry (https://www.siemens.com/industrialsecurity).

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

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under
https://new.siemens.com/cert (https://www.siemens.com/cert).

Note on firmware/software support

Check regularly for new firmware/software versions or security updates and apply them. After the release of a new version, previous versions are no longer supported and are not maintained.

Catalogs

You will find the article numbers for the Siemens products of relevance here in the following catalogs:

- SIMATIC NET Industrial Communication / Industrial Identification, catalog IK PI
- SIMATIC Products for Totally Integrated Automation and Micro Automation, catalog ST 70
- Industry Mall - catalog and ordering system for automation and drive technology, Online catalog (https://mall.industry.siemens.com/goos/WelcomePage.aspx?regionUrl=/en&language=en)

You can request the catalogs and additional information from your Siemens representative.

Device defective

If a fault develops, send the device to your SIEMENS representative for repair. Repairs on-site are not possible.

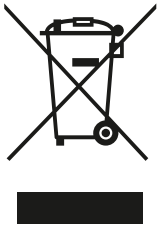
Decommissioning

Shut down the device properly to prevent unauthorized persons from accessing confidential data in the device memory.

To do this, restore the factory settings on the device.

Also restore the factory settings on the storage medium.

Recycling and disposal



The products are low in pollutants, can be recycled and meet the requirements of the WEEE directive 2012/19/EU for the disposal of electrical and electronic equipment.

Do not dispose of the products at public disposal sites.

For environmentally friendly recycling and the disposal of your old device contact a certified disposal company for electronic scrap or your Siemens contact (Product return (https://support.industry.siemens.com/cs/ww/en/view/109479891)).

Note the different national regulations.

License conditions

Note

Open source software

Read the license conditions for open source software carefully before using the product.

You will find license conditions in the following documents on the supplied data medium:

- DOC_OSS-SCALANCE-X_74.pdf
- DC_LicenseSummaryScalanceX200RNA_76.pdf

You will find these documents on the product DVD in the following directory: /Open Source Information

Trademarks

The following and possibly other names not identified by the registered trademark sign ® are registered trademarks of Siemens AG:

SCALANCE, C-PLUG, OLM

Industry Online Support

In addition to the product documentation, you are supported by the comprehensive online information platform of Siemens Industry Online Support at the following Internet address: Link: (https://support.industry.siemens.com/cs/de/en/)

Apart from news, there you will also find:

- Project information: Manuals, FAQs, downloads, application examples etc.
- Contacts, Technical Forum

- The option submitting a support query:
  Link: (https://support.industry.siemens.com/cs/my?lc=en-WW)
- Our service offer:
  Right across our products and systems, we provide numerous services that support you in every phase of the life of your machine or system - from planning and implementation to commissioning, through to maintenance and modernization.

You will find contact data on the Internet at the following address:
Link: (https://www.automation.siemens.com/aspa_app/?ci=yes&lang=en)

SITRAIN - Training for Industry

The training offer includes more than 300 courses on basic topics, extended knowledge and special knowledge as well as advanced training for individual sectors - available at more than 130 locations. Courses can also be organized individually and held locally at your location.

You will find detailed information on the training curriculum and how to contact our customer consultants at the following Internet address:

Link: (https://new.siemens.com/global/en/products/services/industry/sitrain/personal.html)

Industrial Networks Education

Training and certification for Industrial Networks

In our Industrial Networks Education courses you'll learn to design and implement wired and wireless data networks and connect them to a corporate network. You will also receive instruction on how to secure, diagnose and optimize communication networks. Certification can also be offered to supplement almost all training courses.

Link: (https://www.siemens.com/industrial-networks-education)

Electrostatic discharge



NOTICE

Electrostatic sensitive devices (ESD)

Electronic modules contain electrostatic sensitive components

These components can easily be destroyed if handled incorrectly.

Note the following instructions to avoid damage.

- Touch electronic modules only when you absolutely need to work on them.
- If electronic modules need to be touched, the body of the person involved must first be electrostatically discharged and grounded.
- Do not bring electronic modules in contact with electrically isolating materials such as plastic film, isolating table top pads or clothing made of synthetic fibers.
- Place the modules only on conductive surfaces.
- Pack, store and transport electronic modules and components only in their product packaging or in a conductive packaging such as metalized plastic or metal containers, conductive foam or household aluminum foil.

Safety notices

2

Read the safety notices

Note the following safety notices. These relate to the entire working life of the device.

You should also read the safety notices relating to handling in the individual sections, particularly in the sections "Installation" and "Connecting up".

⚠ CAUTION
To prevent injury and damage, read the manual before using the device.

Safety notices on use in hazardous areas

General safety notices relating to protection against explosion

⚠ WARNING
EXPLOSION HAZARD
Do not open the device when the supply voltage is turned on.

Safety instructions for use in hazardous locations according to UL/FM HazLoc

If you use the device under UL or FM HazLoc conditions, you must also adhere to the following safety instructions in addition to the general safety instructions for protection against explosion:

This equipment is suitable for use in Class I, Division 2, Groups A, B, C and D or non-hazardous locations only.

This equipment is suitable for use in Class I, Zone 2, Group IIC or non-hazardous locations only.

Security recommendations

3

NOTICE
Information security Connect to the device and change the standard passwords for the users "admin" and "user" before you operate the device. To be able to change passwords you need to be logged in with write access to the configuration data.

To prevent unauthorized access to the device and/or network, observe the following security recommendations.

General

- Check the device regularly to ensure that these recommendations and/or other internal security policies are complied with.
- Evaluate the security of your location and use a cell protection concept with suitable products (https://www.industry.siemens.com/topics/global/en/industrial-security/Seiten/default.aspx).
- When the internal and external network are disconnected, an attacker cannot access internal data from the outside. Therefore operate the device only within a protected network area.
- No product liability will be accepted for operation in a non-secure infrastructure.
- Use VPN to encrypt and authenticate communication from and to the devices.
- For data transmission via a non-secure network, use an encrypted VPN tunnel (IPsec, OpenVPN).
- Separate connections correctly (WBM, SSH etc.).
- Check the user documentation of other Siemens products that are used together with the device for additional security recommendations.
- Using remote logging, ensure that the system protocols are forwarded to a central logging server. Make sure that the server is within the protected network and check the protocols regularly for potential security violations or vulnerabilities.

Physical access

- Restrict physical access to the device to qualified personnel because the plug-in data medium can contain sensitive data.
- Lock unused physical interfaces on the device. Unused interfaces can be used to gain access to the plant without permission.

Software (security functions)

- Keep the firmware up to date. Check regularly for security updates for the device. You can find information on this at the Industrial Security (http://www.siemens.com/industrialsecurity) website.
- Inform yourself regularly about security recommendations published by Siemens ProductCERT (http://www.siemens.com/cert/en/cert-security-advisories.htm).
- Only activate protocols that you require to use the device.
- Restrict access to the management of the device with rules in an access control list (ACL).
- The option of VLAN structuring provides protection against DoS attacks and unauthorized access. Check whether this is practical or useful in your environment.
- Use a central logging server to log changes and accesses. Operate your logging server within the protected network area and check the logging information regularly.

Authentication

Note

Accessibility risk - Risk of data loss

Do not lose the passwords for the device. Access to the device can only be restored by resetting the device to factory settings which completely removes all configuration data.

- Replace the default passwords for all user accounts, access modes and applications (if applicable) before you use the device.
- Define rules for the assignment of passwords.
- Use passwords with a high password strength. Avoid weak passwords, (e.g. password1, 123456789, abcdefgh) or recurring characters (e.g. abcabc).
  This recommendation also applies to symmetrical passwords/keys configured on the device.
- Make sure that passwords are protected and only disclosed to authorized personnel.
- Do not use the same passwords for multiple user names and systems.
- Store the passwords in a safe location (not online) to have them available if they are lost.
- Regularly change your passwords to increase security.
- A password must be changed if it is known or suspected to be known by unauthorized persons.
- When user authentication is performed via RADIUS, make sure that all communication takes place within the security environment or is protected by a secure channel.
- Watch out for link layer protocols that do not offer their own authentication between endpoints, such as ARP or IPv4. An attacker could use vulnerabilities in these protocols to attack hosts, switches and routers connected to your layer 2 network, for example, through manipulation (poisoning) of the ARP caches of systems in the subnet and subsequent interception of the data traffic. Appropriate security measures must be taken for non-secure layer 2 protocols to prevent unauthorized access to the network. Physical access to the local network can be secured or secure, higher layer protocols can be used, among other things.

Certificates and keys

- As of firmware version V3.2.7, there has been a conversion from RSA certificates to certificates for elliptic-curve cryptography ("ECDSA certificates"). Only use ECDSA certificates in PEM format that were generated with the following curves:
  - secp256r1 (NIST P-256)
  - secp384r1 (NIST P-384)
  - secp521r1 (NIST P-521)

  RSA certificates are no longer supported as of this firmware version. The existing RSA certificates on the device will be automatically replaced by self-signed ECDSA certificates.
- There is a preset SSL certificate on the device with a key length of 256 bits for the elliptic-curve cryptography. Replace this certificate with a user-created certificate with key. We recommend that you use a certificate signed by a reliable external or internal certification authority.
- Use a certification authority including key revocation and management to sign certificates.
- Make sure that user-defined private keys are protected and inaccessible to unauthorized persons.
- Verify certificates and fingerprints on the server and client to prevent "man in the middle" attacks.
- Change certificates and keys immediately if there is a suspicion of compromise.

Available protocols

The following list provides you with an overview of the open protocol ports.

The table includes the following columns:

- **Protocol**
- **Port number**
- **Port status**
  - Open
  - Closed
- **Factory setting**
  Indicates the state of the port on delivery or after reset to factory settings.
- **Authentication**
  Specifies whether the communication partner is authenticated.
- **Encryption**
  Specifies whether or not the transfer is encrypted.

Protocol	Port number	Port status	Factory setting	Authentication	Encryption
DHCP	UDP/68	Open (when configured)	Closed	No	No
HTTP	TCP/80	Open (when configured)	Open	Yes	No
HTTPS	TCP/443	Open	Open	Yes	Yes
SNMP	UDP/161	Open	Open	Yes	Yes (SNMPv3)
SNMP traps	UDP/162	Open (when configured)	Closed [1]	No	No
SNTP	UDP/1024[2] UDP/1025	Open (when configured)	Closed	No	No
SSH	TCP/22	Open (when configured)	Open	Yes	Yes
TELNET	TCP/23	Open (when configured)	Closed	Yes	No
Syslog	UDP/514	Open (when configured)	Closed	No	No

[1] Is opened as soon as traps are sent.

[2] These ports are assigned dynamically.

Decommissioning

Shut down the device properly to prevent unauthorized persons from accessing confidential data in the device memory.

To do this, restore the factory settings on the device.

Also restore the factory settings on the storage medium.

Network topologies and redundancy

4

4.1 PRP

Parallel Redundancy Protocol

The "Parallel Redundancy Protocol" is a redundancy protocol for Ethernet networks. It is defined in Part 3 of the IEC 62439 standard. The devices of the SCALANCE X-200RNA product line support the PRP method. The areas of application of PRP are distributed real-time applications with high reliability demands that depend on the high availability of the network. Compared with classic fault-tolerant networks, PRP provides bumpless redundancy. This redundancy method allows data communication to be maintained without interruption/reconfiguration time if there are interruptions in the network. Other redundancy methods have a network reconfiguration time of, for example 200 ms (MRP, 50 nodes in the ring) or 300 ms (High Speed Redundancy, 50 nodes in the ring) and cannot therefore be used for substation applications or other applications that require high network availability.

The PRP method has the advantage that it uses parallel, separate networks made up of standard network components. The end devices that use this method are connected to the two networks via a preceding device or via two integrated device interfaces. This means that the frame of the end device can be transferred at the same time via both networks. If a transmission path is interrupted, the frame arrives at its destination via the second path.

The devices of the SCALANCE X-200RNA product line are used to connect end devices without integrated PRP interfaces to parallel networks.

Note

SCALANCE X204RNA EEC (PRP/HSR)

If you initialize the device as a PRP device, it behaves in exactly the same way as the SCALANCE X204RNA EEC (PRP).

Which topologies can be implemented?

With the devices of the SCALANCE X-200RNA (PRP) product line, nodes or entire network segments without PRP capability can be connected to a "Parallel Redundancy Protocol" network.

The products with PRP capability of the SCALANCE X-200RNA product line can be used to implement an integrated solution for network components and protective devices for a substation and also process application.

The SCALANCE X-200RNA can manage a maximum of 1023 MAC addresses.

Note

Keep to the maximum permitted cable lengths of the devices you are using. You will find the permitted cable lengths in the technical specifications.

Example

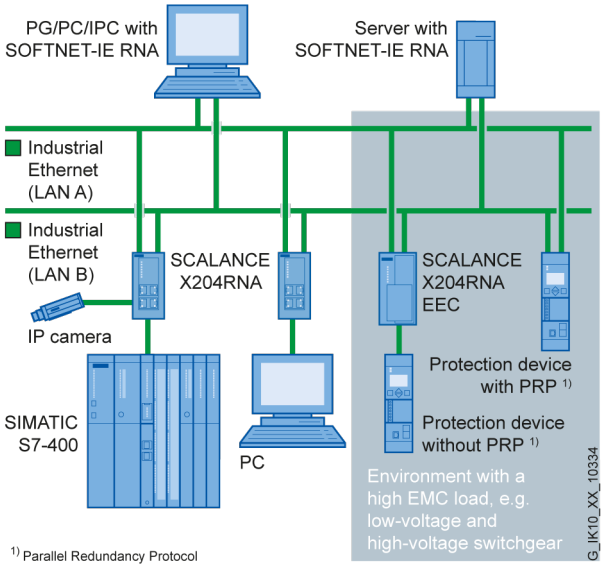


Figure 4-1 Schematic diagram of the "Parallel Redundancy Protocol"

With the "Parallel Redundancy Protocol" (PRP), each node must transmit Ethernet frames on two independent, parallel networks. These are two physically separate networks with a bus (linear), star or ring topology. The PRP destination device must also be connected to the two networks. This then receives each frame twice. The first frame is forwarded to the application. The second frame received is recognized and discarded. This achieves N-1 redundancy without reconfiguration (= bumpless switchover).

Note

Overlong frames

When a SCALANCE X204RNA IE switch feeds a frame with the maximum length into a PRP network, the IE switch appends a PRP trailer to the frame. Appending the PRP trailer results in an overlong frame that exceeds the maximum permitted frame length (according to the IEEE 802.3 standard).

To prevent data loss with overlong frames, all network components located in a PRP network must support a frame length of at least 1528 bytes.

You will find a list of compatible devices that support processing of overlong frames in the section "PRP-compatible devices (Page 161)".

There are already end devices equipped with two Ethernet interfaces that are capable of handling the "Parallel Redundancy Protocol" (Double Attached Nodes PRP = DANP).

On the other hand, there are many end devices starting with S7 controllers right through to control computers that communicate using TCP/IP but do not support PRP, and some even have only one Ethernet Interface. With all these devices, a SCALANCE X-200RNA can be connected upstream from them. This allows access for Single Attached Nodes (SAN) to PRP networks.

Industrial Ethernet bus (linear), star or ring structures with switching functionality can be implemented cost-effectively with devices of the SCALANCE X product line. You will find a list of usable network components in "Accessories and compatible devices (Page 159)".

4.2 HSR

High-availability Seamless Redundancy Protocol (HSR)

The "High-availability Seamless Redundancy" protocol is a redundancy protocol for Ethernet networks. It is defined in Part 3 of the IEC 62439 standard. The devices of the SCALANCE X-200RNA product line support the HSR method. The areas of application of HSR are distributed real-time applications with high reliability demands that depend on the high availability of the network. Compared with classic fault-tolerant networks, HSR provides bumpless redundancy. This redundancy method allows data communication to be maintained without interruption/ reconfiguration time if there are interruptions in the network. Other redundancy procedures have a reconfiguration time of the network of, for example 200 ms (MRP, 50 nodes in the ring) or 300 ms (High Speed Redundancy, 50 nodes in the ring) and cannot therefore be used for substation applications or other applications that require high network availability.
The HSR method has the advantage that the communication redundancy is achieved by the configuration as a ring. This means there is no need for other standard network components (switches) within a network. The end devices that use this method are connected to the two networks via a preceding device or via two integrated device interfaces. This means that the frame of the end device can be transferred at the same time in both directions of the ring. If a transmission path is interrupted, the frame arrives its destination via the other path.
The devices of the SCALANCE X-200RNA product line are used to connect end devices without integrated HSR interfaces to HSR networks.

Note

SCALANCE X204RNA EEC (PRP/HSR)

If you initialize the device as an HSR device, it behaves in exactly the same way as the SCALANCE X204RNA EEC (HSR).

Which topologies can be implemented?

With the devices of the SCALANCE X-200RNA (HSR) product line, nodes or entire network segments without HSR capability can be connected to a "High-availability Seamless Redundancy Protocol" network.

The products with HSR capability of the SCALANCE X-200RNA product line can be used to implement an integrated solution for network components and protective devices for a substation and also process application.

You also have the option for a redundant or non-redundant coupling to a PRP network.

The SCALANCE X-200RNA can manage a maximum of 1023 MAC addresses.

Note

Keep to the maximum permitted cable lengths of the devices you are using. You will find the permitted cable lengths in the technical specifications.

Example

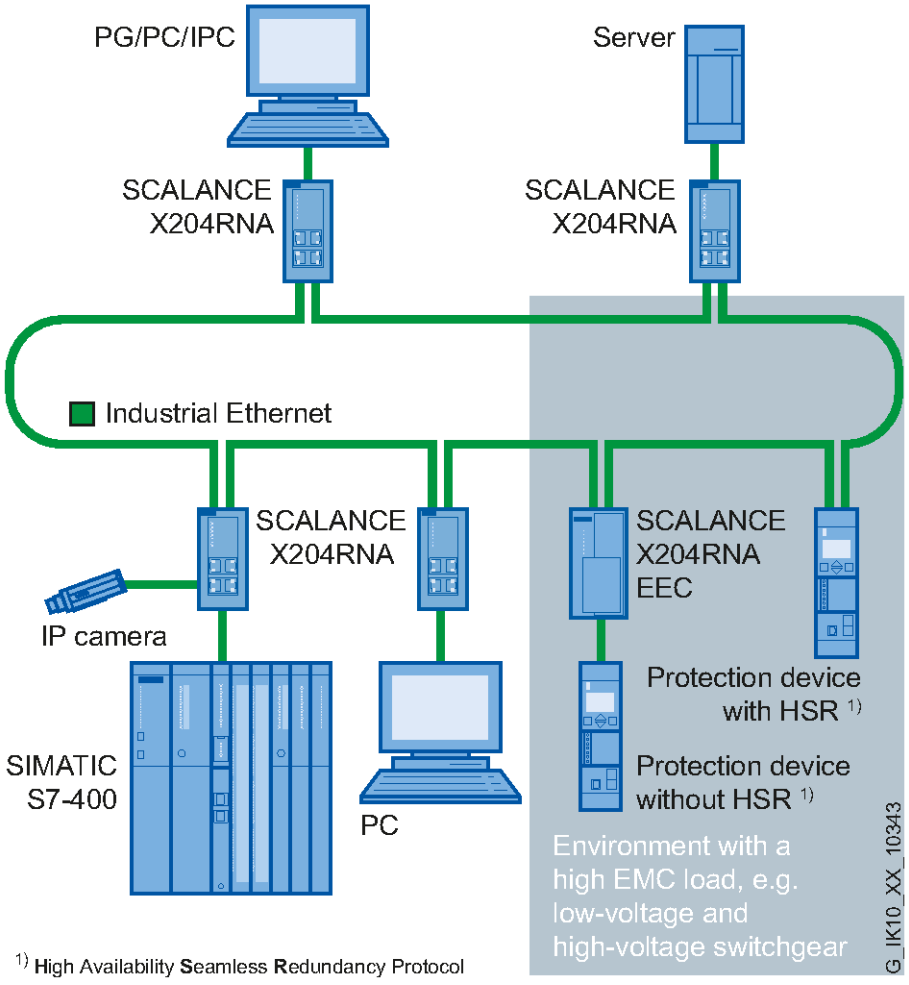


Figure 4-2 Basic diagram of a single HSR ring

With the High-availability Seamless Redundancy Protocol (HSR), each node must feed the Ethernet frames it wants to send in both directions of the ring. The HSR target device must also be connected via two ports with the ring. It now receives the same frame from both directions, in other words twice. The first frame is forwarded to the application. The second frame received is recognized and discarded. This achieves N-1 redundancy without reconfiguration (= bumpless switchover).

There are already end devices equipped with two Ethernet interfaces that are capable of using the "High-availability Seamless Redundancy Protocol" (Double Attached Nodes HSR = DANH).

On the other hand, there are many end devices starting with S7 controllers right through to control computers that communicate using TCP/IP but do not support HSR and some even have only one Ethernet interface. With all these devices, a SCALANCE X-200RNA can be connected upstream from them.

Transition between HSR and PRP (redundant)

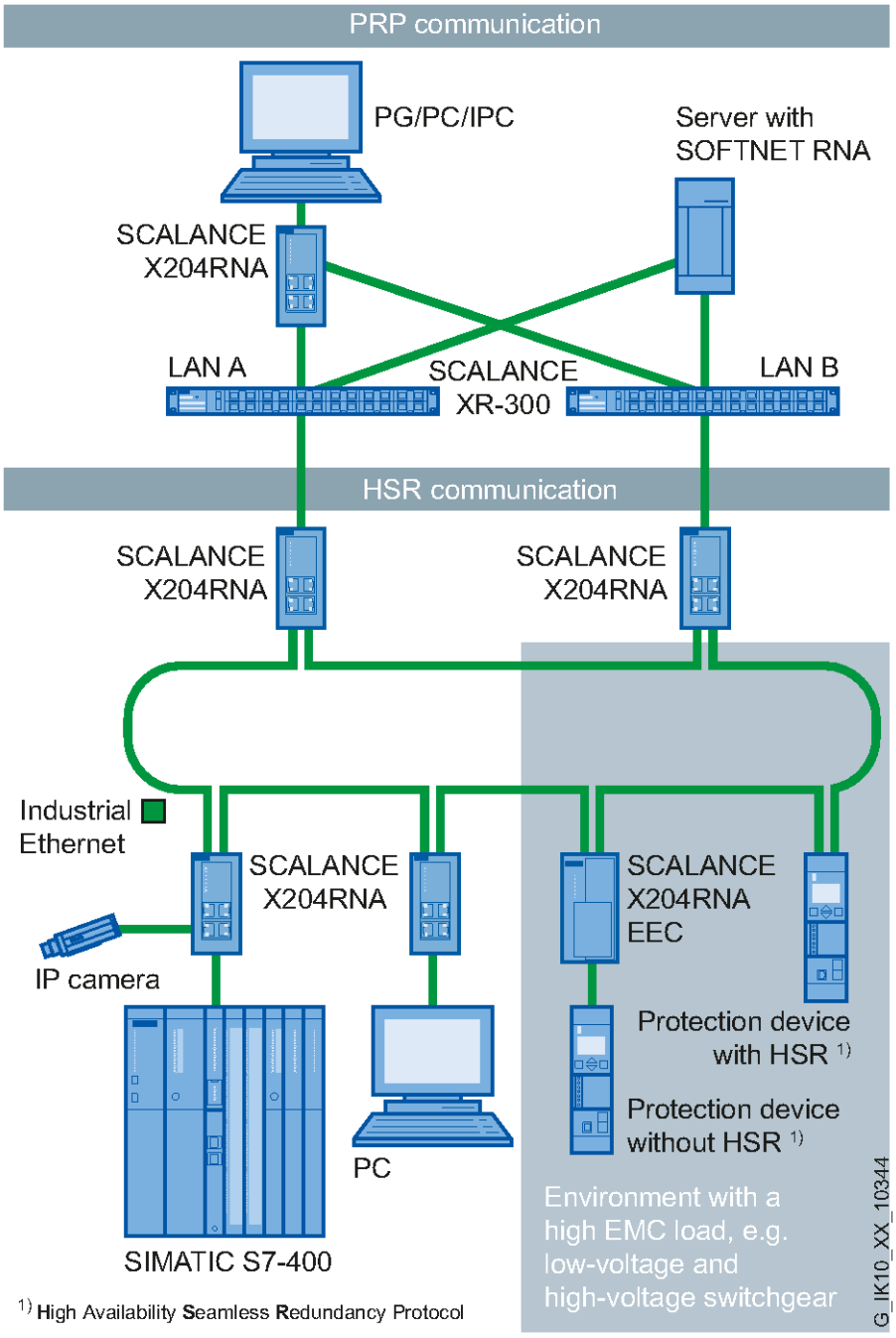


Figure 4-3 Basic diagram of the redundant HSR-PRP link

The devices of the SCALANCE X-200RNA product line allow a link with a PRP network. This coupling is in redundant form, as described in standard IEC62439-3. Two SCALANCE X-200RNA devices are required. One device is connected with the PRP network LAN A, the other with LAN B.
This means complete communication is still ensured even if one transition point fails. SANs connected without RedBox to the decoupled PRP network are an exception from this rule.

Transition between HSR and PRP (non-redundant)

The coupling with a PRP network can also take place non-redundantly. In this case, only one SCALANCE X-200RNA device is required. The device is connected to the PRP network LAN A and to LAN B.

Note

This type of linking is not recommended because if the transition point fails, the communication between HSR and PRP nodes is interrupted.

4.3 HSR-PRP coupling

4.3.1 Coupling of two HSR rings via a PRP network

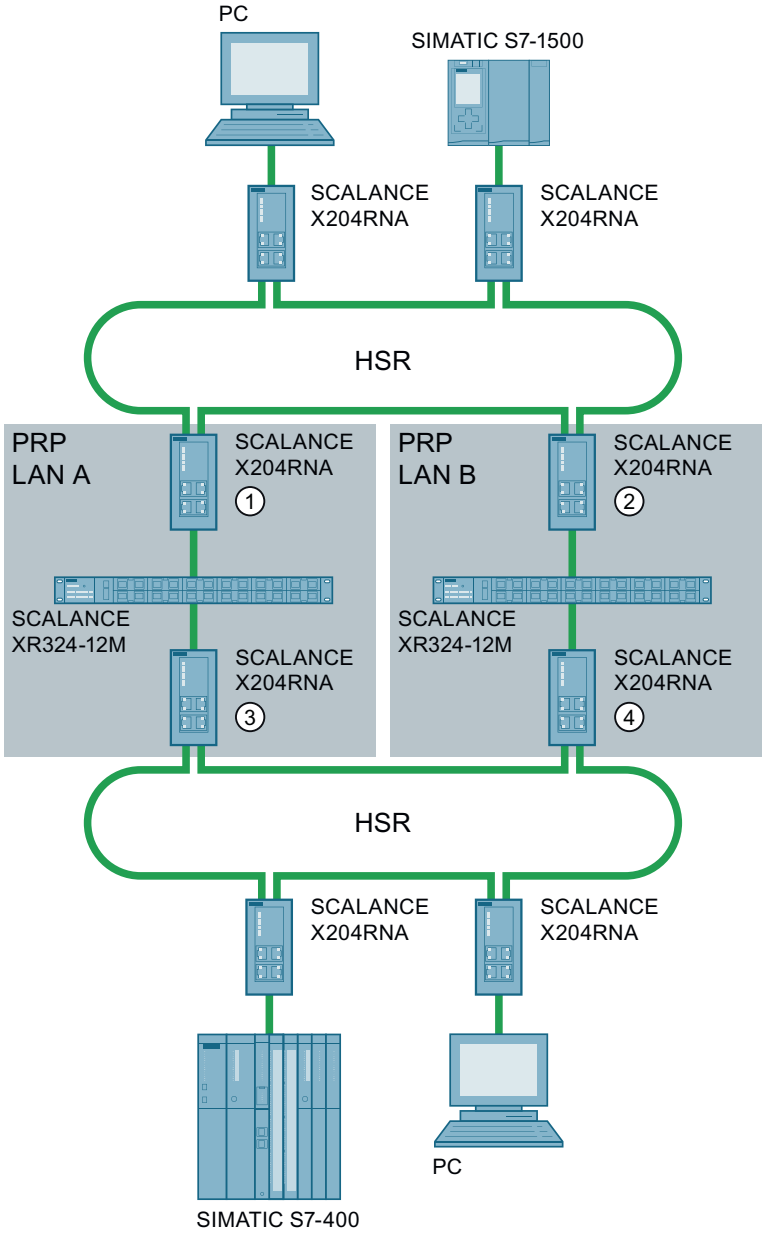


Figure 4-4 Topology of a coupling of two HSR rings via a PRP network

Settings in WBM

You specify the functionality of the devices SCALANCE X204RNA ① to ④ relating to the coupling of the two rings on the WBM page **X200 > Coupling Configuration**. You need to configure the following parameters:

- Coupling Mode
- NetID

Configuration of the "Coupling Mode" parameter

Setting for device ① and ③
Redundant HSR PRP coupling, LAN A (The port P2/B is open and must not be used.)

Setting for device ② and ④
Redundant HSR PRP coupling, LAN B (The port P1/A is open and must not be used.)

Configuration of the "NetID" parameter

The network ID of the PRP network is specified with this parameter. The valid range of values is 1 to 6. The SCALANCE X204RNA devices between the two rings belong to the same PRP network, therefore you need to set the same NetID for all devices ① to ④.

4.3.2 Coupling of two PRP networks via an HSR ring

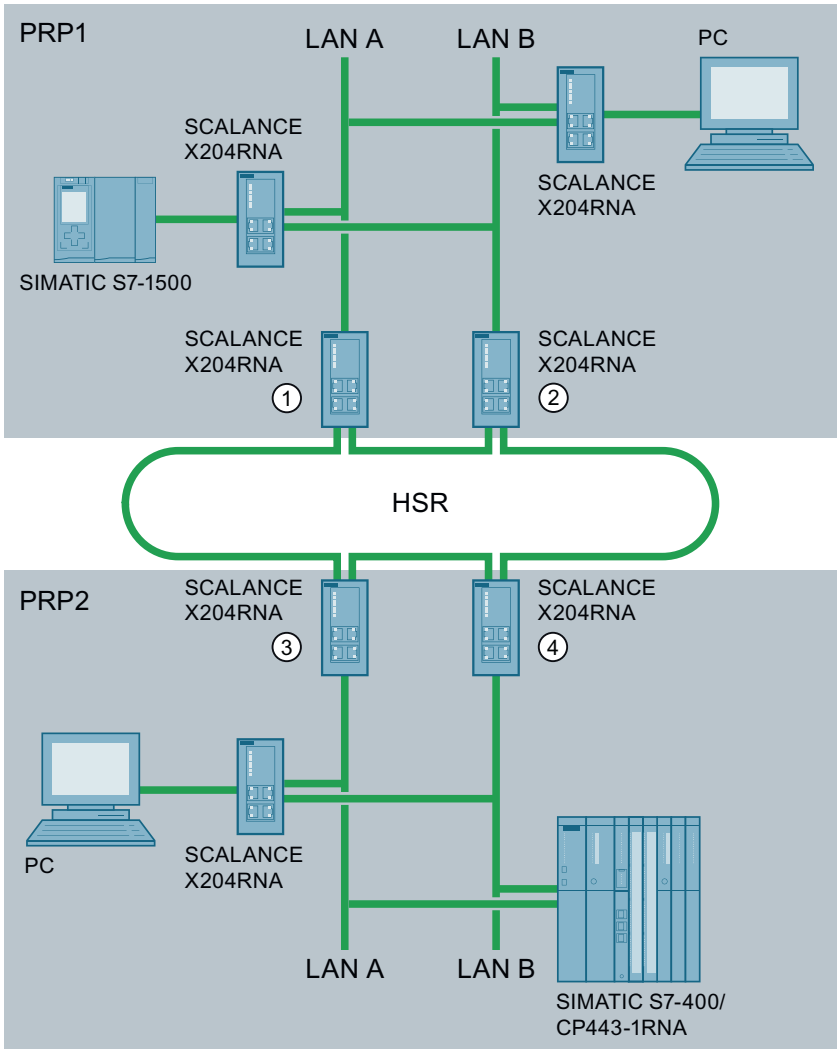


Figure 4-5 Topology of a coupling of two PRP networks via an HSR ring

Settings in WBM

You specify the functionality of the devices SCALANCE X204RNA ① to ④ relating to the coupling of the two PRP networks on the WBM page **X200 > Coupling Configuration**. You need to configure the following parameters:

- Coupling Mode
- NetID

Configuration of the "Coupling Mode" parameter

Setting for device ① and ③
Redundant HSR PRP coupling, LAN A (The port P2/B is open and must not be used.)

Setting for device ② and ④
Redundant HSR PRP coupling, LAN B (The port P1/A is open and must not be used.)

Configuration of the "NetID" parameter

The network ID of the PRP network is specified with this parameter. The valid range of values is 1 to 6. The devices SCALANCE X204RNA ① and ② belong to the same PRP network and you therefore need to set the same value for the NetID parameter for both devices. The same applies to the devices SCALANCE X204RNA ③ and ④. The last devices named belong however to a different PRP network and for this reason a different NetID from the devices ① and ② must be used. For example NetID "5" could be assigned for devices ① und ② and NetID "6" for devices ③ and ④.

Device description

5

5.1 Functions

What is possible?

The IE switches of the SCALANCE X-200RNA product line allow the cost-effective setup of IE structures with PRP or HSR functionality. You can also implement the transition between a PRP and an HSR network with the SCALANCE X-200RNA.

Product properties

The SCALANCE X204RNA and the SCALANCE X204RNA EEC devices have the same functionality and differ only in the environmental conditions, the input voltage ranges and the option of using SFP modules with the SCALANCE X204RNA EEC.

Properties	SCALANCE X204RNA	SCALANCE X204RNA EEC
SIMATIC environment	●	●
Operating temperature	-40 to +60 °C	-40 to +70 °C (up to 85 °C max.) 16h)
Diagnostics LED	●	●
24 V DC	●	-
24 ... 250 V DC / 100 ... 240 V AC	-	●
Housing	Plastic	Metal
Coated printed circuit boards	-	● (as of hardware version 3)
2 x 24 V DC	●	-
100 Base-T, full duplex	●	●
100 Base-T, half duplex	-	-
10 Base-T	-	-
SFP interface for SFP modules for HSR ports	-	●
100 Base-FX for HSR ports	-	● (using optional SFP modules)
Signaling contact + on-site operation (SELECT/SET button)	●	●
Diagnostics:		
via Web Based Management (WBM)	●	●
via e-mail notification (SMTP)	●	●
via SNMP V1,V2,V3 incl. Traps V2	●	●
using SYSLOG server notification	●	●
C-PLUG	●	●
IRT capability	-	-
SNTP	●	●

Properties	SCALANCE X204RNA	SCALANCE X204RNA EEC
Testing to IEC 61850-3	-	●
Testing to IEEE 1613	-	●

Note

PROFINET controllers can communicate with PROFINET devices via the HSR and PRP network (PROFINET IO and RT). In this case all PROFINET devices (controllers and devices) must either be capable of HSR or PRP themselves or must be connected to the HSR ring or to the PRP network via a RedBox.

Within a PRP network (A or B), PROFINET controllers and devices can also communicate with each other as SANs (PROFINET IO, RT and IRT). A direct PROFINET communication relationship between DANPs and SANs or DANHs and SANs is not supported.

Table 5-1 Possible connections

Fast Ethernet 100 Mbps	SCALANCE X204RNA	SCALANCE X204RNA EEC
TP (RJ-45)	4	2+2
Fiber multimode (duplex LC)	-	2 x SFP modules SFP991-1 multimode glass up to 3 km 6GK5991-1AD00-8AA0
Fiber single mode (duplex LC)	-	2 x SFP modules SFP991-1LD monomode glass up to 26 km 6GK5991-1AF00-8AA0
Fiber single mode (duplex LC)	-	2 x SFP modules SFP991-1LH+ monomode glass up to 70 km 6GK5991-1AE00-8AA0
Standard Ethernet ports / PRP ports	P1/A, P2/B	P1/A, P2/B
HSR ports	HSR 1, HSR 2	HSR 1, HSR 2

Note

TP connectors of SCALANCE X204RNA EEC

The SCALANCE X204RNA EEC has 2 RJ-45 ports to which you can connect two standard Ethernet or PRP end devices/network structures without HSR capability.

The SCALANCE X204RNA EEC also has 2 RJ-45 ports and 2 SFP slots. These connection options communicate with each other; in other words only one connector is ever active. If an SFP module is inserted, the corresponding RJ-45 jack is disabled.

With these connector options, you can connect the device to an HSR ring.

5.2 Product overview

Article numbers of the IE switches SCALANCE X-200RNA

The IE switches SCALANCE X-200RNA are available in different versions. These are listed in the table below for a better overview:

Device	Article number	Supported modes
SCALANCE X204RNA (PRP)	6GK5204-0BA00-2KB2	PRP ↔ standard Ethernet PRP ↔ HSR link
SCALANCE X204RNA (HSR)	6GK5204-0BA00-2MB2	HSR ↔ standard Ethernet; HSR ↔ PRP link
SCALANCE X204RNA EEC (PRP)	6GK5204-0BS00-3LA3	PRP ↔ standard Ethernet
SCALANCE X204RNA EEC (HSR)	6GK5204-0BS00-2NA3	HSR ↔ standard Ethernet; HSR ↔ PRP link
SCALANCE X204RNA EEC (PRP/HSR)	6GK5204-0BS00-3PA3	PRP ↔ standard Ethernet; HSR ↔ standard Ethernet; HSR ↔ PRP link

Unpacking and checking

⚠ WARNING

Do not use any parts that show evidence of damage

If you use damaged parts, there is no guarantee that the device will function according to the specification.

If you use damaged parts, this can lead to the following problems:

- Injury to persons
- Loss of the approvals
- Violation of the EMC regulations
- Damage to the device and other components

Use only undamaged parts.

1. Make sure that the package is complete.
2. Check all the parts for transport damage.

Scope of delivery

The following components are supplied with the SCALANCE X204RNA:

- SCALANCE X204RNA device
- 2-pin plug-in terminal block (signaling contact)
- 4-pin plug-in terminal block (redundant power supply)

- Safety notices
- DVD (operating instructions, SINEC PNI)

The following components are supplied with the SCALANCE X204RNA EEC:

- SCALANCE X204RNA EEC device
- 3-pin plug-in terminal block (signaling contact)
- 3-pin plug-in terminal block (power supply)
- Safety notices
- DVD (operating instructions, SINEC PNI)
- Bracket for guiding the cable (mechanical protection)

Note

SFP modules are not supplied with the device.

5.3 SCALANCE X204RNA product properties

5.3.1 SCALANCE X204RNA (PRP)

Possible attachments

The SCALANCE X204RNA (PRP) has two RJ-45 jacks for connection of end devices or network segments without PRP capability (P1 and P2) and two RJ-45 jacks for connecting to PRP networks LAN A and LAN B (PRP A and PRP B).



Figure 5-1 SCALANCE X204RNA (PRP)

5.3.2 SCALANCE X204RNA (HSR)

Possible attachments

The SCALANCE X204RNA (HSR) has two RJ-45 jacks for connection of end devices or network segments without HSR capability (P1/A and P2/B) and two RJ-45 jacks for connecting to the "High-availability Seamless Redundancy Protocol" ring (HSR 1 and HSR 2).



Figure 5-2 SCALANCE X204RNA (HSR)

5.4 SCALANCE X204RNA interfaces

5.4.1 TP interfaces

Connector pinout

On the SCALANCE X204RNA, the TP interfaces are implemented as RJ-45 jacks with the MDI-X assignment (Medium Dependent Interface Autocrossover) of a network component.

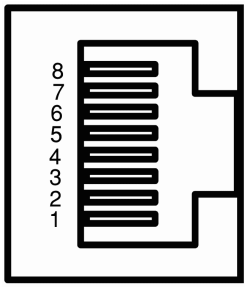


Figure 5-3 RJ-45 jack

Table 5-2 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

Note

TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port.

With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of up to 100 m is permitted between two devices depending on the cable type.

Note

The interfaces of the SCALANCE X204RNA meet the requirements for environment B according to IEEE 802.3, section 33.4.1.1.

Autonegotiation

With the autonegotiation mechanism, repeaters and end devices can automatically determine the transmission speed and the transmission mode of the partner interface. This makes it possible to configure different devices automatically. Two components connected to a link segment can exchange information about the data transfer and can adapt their settings to each other. The mode with the highest possible speed is set.

Note

The SCALANCE X204RNA operates permanently in autonegotiation mode and can therefore be connected to other devices that either also use the autonegotiation mode or the "100 Mbps mode FD (full duplex)".

Note

The SCALANCE X204RNA is a plug-and-play device that does not require settings to be made for commissioning.

MDI / MDI-X autocrossover function

The advantage of the MDI /MDI-X autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

The SCALANCE X204RNA supports the MDI / MDI-X autocrossover function.

Note

Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Transmission speed

The transmission speed of the Fast Ethernet ports is 100 Mbps full duplex.

5.5 SCALANCE X204RNA EEC product properties

5.5.1 SCALANCE X204RNA EEC (PRP)

Possible attachments

The SCALANCE X204RNA EEC (PRP) has four RJ-45 jacks and two slots for SFP modules. The SFP modules can be used as an alternative to the two RJ-45 jacks PRP A and PRP B and are intended for the connection of the LAN A and LAN B networks. End devices or network segments without PRP capability are connected to the RJ-45 jacks P1 and P2.



Figure 5-4 SCALANCE X204RNA EEC (PRP)

5.5.2 SCALANCE X204RNA EEC (PRP/HSR)

Possible attachments

The SCALANCE X204RNA EEC (PRP/HSR) has four RJ-45 jacks and two slots for SFP modules. The SFP modules can be used as alternatives to the two RJ-45 jacks A/H1 and B/H2 and are intended to connect networks LAN A and LAN B or to connect to the "High-availability Seamless Redundancy Protocol" ring.

End devices or network segments without PRP or HSR capability are connected to the RJ-45 jacks 1|1/B and 2|2/B.



Figure 5-5 SCALANCE X204RNA EEC (PRP/HSR)

5.5.3 SCALANCE X204RNA EEC (HSR)

Possible attachments

The SCALANCE X204RNA EEC (HSR) has four RJ-45 jacks and two slots for SFP modules. The SFP modules can be used as an alternative to the two RJ-45 jacks HSR 1 and HSR 2 and are intended for connection to the "High-availability Seamless Redundancy Protocol" ring. Standard Ethernet end devices or network segments that do not support HSR or networks to be linked are connected to the RJ-45 jacks P1/A and P2/B.



Figure 5-6 SCALANCE X204RNA EEC (HSR)

5.6 SCALANCE X204RNA EEC interfaces

5.6.1 TP interfaces

Connector pinout

On the SCALANCE X204RNA EEC (PRP and HSR), the TP interfaces are implemented as RJ-45 jacks with the MDI-X assignment (Medium Dependent Interface Autocrossover) of a network component.

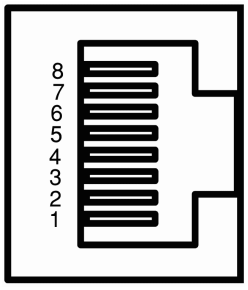


Figure 5-7 RJ-45 jack

Table 5-3 Pin assignment

Pin number	Assignment
Pin 8	n. c.
Pin 7	n. c.
Pin 6	TD-
Pin 5	n. c.
Pin 4	n. c.
Pin 3	TD+
Pin 2	RD-
Pin 1	RD+

Note

TP cords or TP-XP cords with a maximum length of 10 m can be connected to the RJ-45 TP port.

With the IE FC cables and IE FC RJ-45 plug 180, an overall cable length of up to 100 m is permitted between two devices depending on the cable type.

Note

The interfaces of the SCALANCE X204RNA EEC (PRP and HSR and PRP/HSR) meet the requirements for environment B according to IEEE 802.3, section 33.4.1.1.

Autonegotiation

Autonegotiation means the automatic detection of the functionality of the port at the opposite end. Using autonegotiation, repeaters or end devices can detect the functionality available at the port of a partner device allowing automatic configuration of different types of device. With autonegotiation, two components connected to a link segment can exchange parameters and set themselves to match the supported communication functionality.

Note

The SCALANCE X204RNA EEC (PRP and HSR and PRP/HSR) operates permanently in autonegotiation mode and can therefore be connected to other devices that either also use the autonegotiation mode or the "100 Mbps mode FD (full duplex)".

Note

The SCALANCE X204RNA EEC (PRP and HSR) is a plug-and-play device that does not require settings to be made for commissioning.

MDI / MDIX autocrossover function

The advantage of the MDI /MDIX autocrossover function is that straight-through cables can be used throughout and crossover Ethernet cables are unnecessary. This prevents malfunctions resulting from mismatching send and receive wires. This makes installation much easier for the user.

The SCALANCE X204RNA EEC (PRP and HSR) supports the MDI / MDIX autocrossover function.

Note

Please note that the direct connection of two ports on the switch or accidental connection over several switches causes an illegal loop. Such a loop can lead to network overload and network failures.

Transmission speed

The transmission speed of the Fast Ethernet ports is 100 Mbps full duplex.

5.6.2 SFP interface

NOTICE
Failure of the data traffic due to contamination of optical plug-in connections Optical sockets and plugs are sensitive to contamination of the end face. Contamination can lead to the failure of the optical transmission network. Take the following precautions to avoid functional impairments: • Clean the end face of field-assembled connectors carefully before connecting. No residues of processing may remain on the connector. • Only remove the dust caps of optical transceivers and pre-configured cables shortly before connecting the cables. • Close unused optical sockets and plugs as well as pluggable transceivers and slots with the supplied protective caps.

Transmission medium and range

Note

The SFP slots are intended for SFP transceivers with optical interface. SFP inserts with electrical interface (RJ45) are not supported.

Table 5-4 SFP transceiver - overview

SFP transceiver	SFP991-1	SFP991-1LD
Transmission medium • Wavelength • Core diameter • Outer diameter	Multimode FO cable 1310 nm 50 or 62.5 µm 125 µm	Monomode FO cable 1310 nm 9 µm 125 µm
Maximum range	3 km	26 km
Order number	6GK5991-1AD00-8AA0	6GK5991-1AF00-8AA0

Note

The SFP modules do not ship with the product and must be ordered separately, if needed.

Connectors

- Electrical connection: SFP slot
- Optical connection: Duplex LC connector

Transmission speed

The transmission speed of the optical Fast Ethernet ports is 100 Mbps.

Transmission technique

The transmission mode for 100Base-FX is specified in the IEEE 802.3 standard.

5.6.3 SFP interface for application on rail vehicles

5.6.3.1 Overview

If you use the SCALANCE X204RNA EEC in the context of the railway approval EN50155, use the following plug-in transceivers with coated printed circuit boards (conformal coating).

Component	Article number
SFP991-1(C)	6GK5 991-1AD00-8FA0
SFP991-1LD(C)	6GK5 991-1AF00-8FA0

Note

The SFP modules do not ship with the product and must be ordered separately, if needed.

5.6.3.2 SFP991-1(C)

Properties			
Transmission mode	100Base-FX complying with IEEE 802.3		
Transmission rate	100 Mbps (Fast Ethernet)		
Transmission medium	Multimode fiber-optic cable		
Light source	LED/Class1-LASER "Eye safe"		
Wavelength	1300 nm		
Cable length (max.) *)	At 50 µm fiber core diameter		3 km
	At 62.5 µm fiber core diameter		3 km
Transmitter output (optical)	Minimum	At 50 µm	-24 dBm
		At 62.5 µm	-20 dBm
	Maximum		-14 dBm
Receiver input	Sensitivity min.		-31 dBm
	Input power max.		-12 dBm

*) Depending on the cable used:

- If you are using at least OM1 fibers (attenuation ≤ 1.5 dB/km, bandwidth length product ≥ 500 MHz*km), you can reach a cable length of up to 3 km.
- When are using fibers with attenuation values ≤ 1 dB/km, you can reach a cable length of up to 5 km.

You can find additional information in the "Industrial Ethernet / PROFINET Passive network components" System Manual, see also section "Introduction", paragraph "Additional documentation".

5.6.3.3 SFP991-1LD(C)

Properties		
Transmission mode	100Base-LX complying with IEEE 802.3	
Transmission rate	100 Mbps (Fast Ethernet)	
Transmission medium	Single mode fiber-optic cable	
Light source	Class1-LASER "Eye safe"	
Wavelength	1310 nm	
Cable length (max.) *)	26 km	
Transmitter output (optical)	Minimum	-15 dBm
	Maximum	-8 dBm
Receiver input	Sensitivity min.	-28 dBm
	Input power max.	-8 dBm

*) Depending on the cable used, you can find additional information in the "Industrial Ethernet / PROFINET Passive network components" System Manual, see also section "Introduction", paragraph "Additional documentation".

5.7 C-PLUG

CPLUG (configuration plug)

The C-PLUG is an exchangeable medium for storage of the configuration and project engineering data of the base device. This means that the configuration data remains available if the basic device is replaced.

How it works

Power is supplied by the basic device. The C-PLUG retains all data permanently when the power is turned off.

If an empty C-PLUG (factory settings) is inserted, all configuration data of the SCALANCE X-200RNA is saved to it when the device starts up. Changes to the configuration during operation are also saved on the C-PLUG without any operator intervention being necessary.

A basic device with an inserted C-PLUG automatically uses the configuration data of the C-PLUG when it starts up. This is, however, only possible when the data was written by a compatible device type.

This allows fast and simple replacement of the basic device. If a device needs to be replaced, the C-PLUG is simply taken from the failed component and inserted in the replacement device. The first time it is started up, the replacement device has the same configuration as the failed device except for the MAC address set by the vendor.

Compatible devices

As a general rule, the data on the C-PLUG is only compatible with devices having an identical order number and the same device name.

Over and above this, the data of the SCALANCE X204RNA and the SCALANCE X204RNA is compatible.

Using a previously written C-PLUG

If you want to insert a C-PLUG that has already been used and has been written to in a SCALANCE X-200RNA with a different configuration, the existing C-PLUG data must first be deleted.

Note

The devices of the SCALANCE X200RNA product line normally start up with the configuration of the C-PLUG, assuming this was written to by a compatible device type.

Diagnostics

Inserting a C-PLUG that does not contain the configuration of a compatible device type or general malfunctions of the C-PLUG are signaled by the diagnostics mechanisms of the devices of the SCALANCE X-200RNA product line (LEDs, SNMP, WBM, etc.).

Inserting a C-PLUG

The C-PLUG is not supplied with the SCALANCE X-200RNA. It is available as an optional accessory.

The slot for the C-PLUG is located as follows:

- With a SCALANCE X204RNA on the front of the device
- With the SCALANCE X204RNA EEC on the top of the device

See "SELECT/SET button (Page 49)"

Follow the steps below to insert the C-PLUG:

1. Turn off the power to the device.
2. Remove the protective cover.
3. Insert the C-PLUG in the intended compartment.
4. Close the protective cover.

Note

The C-PLUG may only be inserted or removed when the power is off!

Removing the C-PLUG

Follow the steps below to remove the C-PLUG:

1. Turn off the power to the device.
2. Remove the protective cover.
3. Remove the C-PLUG from the compartment using flat pliers, tweezers or a small screwdriver.
4. Close the protective cover.

5.8 SELECT/SET button

Function of the SELECT/SET button

With the SELECT/SET button, you can change various settings of the device. Modified settings are retained after device power off/on.

The SELECT/SET button is used to switch over the display mode and to make other settings. After turning on the SCALANCE X-200RNA, it is in the display mode.

The SELECT/SET button has three functions:

- Triggering a device restart
- Reset to the factory defaults All settings made are overwritten by the factory defaults.
- Define the fault mask and the display at the LEDs. The current states of all ports and the states of the power supplies L1 and L2 are included in the "X200 Fault Mask Power" dialog box. The previous fault mask is then overwritten.

Different settings are made depending on how long you hold down the SELECT/SET button:

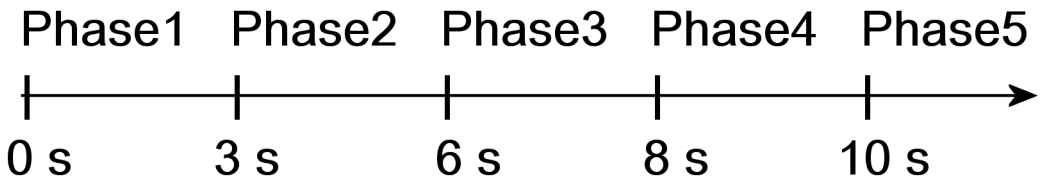


Figure 5-8 The five button phases

Time the button is pressed in seconds

Table 5-5 Button phases

Phase	Description
1	The currently set fault mask is displayed. If no fault mask has been set, all ports flash one after the other. If you release the SELECT/SET button in phase 1, this has no effect.
2	The LEDs of the ports at which there is currently a link flash at 2.5 Hz. If you release the SELECT/SET button in phase 2, this has no effect.
3	The LEDs of the ports at which there is currently a link and the LEDs of the connected power supply are lit permanently. If you release the button in phase 3, the fault mask corresponding to the lit LEDs is adopted.
4	All port LEDs flash at 2.5 Hz. Releasing the SELECT/SET button during this phase brings about a device restart (soft reset)
5	All port LEDs flash alternately yellow/green at 2.5 Hz. The device is reset to the factory defaults.

Properties of the button on the SCALANCE X204RNA EEC (PRP/HSR):

- If the SELECT/SET button is pressed on the SCALANCE X204RNA EEC (PRP/HSR), the mode LED goes off (display "PRP"). If the button is released within 5 seconds, the "PRP" mode is programmed and the device goes through a restart. The SCALANCE X204RNA (PRP/HSR) behaves in this way only with the factory settings.
- After 5 seconds, the mode LED goes on ("HSR"). If the SELECT/SET button is now released, the "HSR" mode is programmed and the device goes through a restart.
- After 10 seconds, the mode LED returns to flashing mode (SELECT/SET button can be released without setting a mode).
- If you have accidentally programmed the wrong mode (e.g. by releasing at the switchover moment), you can trigger a "factory reset" after the normal startup with the normal SELECT/SET button functionality (press for > 10 seconds) and reverse the programming.

Position of the SELECT/SET button and C-PLUG

Note

On the SCALANCE X204RNA, the SELECT/SET button is located below the C-PLUG compartment.

On the SCALANCE X204RNA EEC, the SELECT/SET button is on the top of the device in a recess next to the C-PLUG compartment.



① C-PLUG
② SELECT/SET button

Figure 5-9 Position of the C-PLUG and SELECT/SET button

5.9 LEDs

5.9.1 SCALANCE X-200RNA (PRP)

5.9.1.1 Fault LED

If the LED is lit red, a SCALANCE X-200RNA (PRP) has detected an error/fault.

At the same time, the signaling contact opens assuming that the response of the signaling contact has not been configured differently.

The LED signals that the SCALANCE X-200RNA (PRP) can adopt the following statuses:

Device type SCALANCE	LED lit red	LED lit yellow	LED not lit
X204RNA (PRP)	1, 2, 3, 4, 5	6	7
X204RNA EEC (PRP)	1, 3, 4, 5	6	7
X204RNA EEC (PRP/HSR) If configured as PRP device.	1, 3, 4, 5	6	7

1. Link down event on a monitored port.
2. Failure of one of the two redundant power supplies.
3. C-PLUG error.
4. Device startup, the LED is lit for approx. 20 seconds.
5. Internal error.
6. A redundancy error was detected.
7. No problem has been detected by the SCALANCE X-200RNA (PRP).

5.9.1.2 Power LED

The LEDs signal the following statuses of the SCALANCE X-200RNA (PRP).

The status of the power supply is indicated by a green LED:

Device type SCALANCE	LED lit green	LED lit yellow	LED not lit
X204RNA (PRP)	1	2	3
X204RNA EEC (PRP)	4	-	5
X204RNA EEC (PRP/HSR) If configured as PRP device.	4	-	5

1. Both L power supplies are connected (redundant supply).
2. One L power supply is connected (non-redundant supply).
3. Power supply L1 and L2 are not connected or supply voltages are <14 V.

4. Power supply L is connected
5. Power supply L is not connected or the supply voltage is too low.

5.9.1.3 Port LED

The LEDs signal the following port statuses of the SCALANCE X-200RNA (PRP).

The status of the ports is indicated by two-color LEDs:

Device type SCALANCE		LED lit green	LED lit yellow	LED flashes yellow
	Number of LEDs			
X204RNA (PRP)	2 port LEDs	1	2, 3	4
	2 PRP port LEDs	1	2, 3	4
X204RNA EEC (PRP)	2 port LEDs	1	2, 3	4
	2 PRP port LEDs	1	2, 3	4
X204RNA EEC (PRP/HSR) If configured as PRP device.	2 port LEDs	1	2, 3	4
	2 PRP port LEDs	1	2, 3	4

1. TP link exists, no data reception.
2. TP link, data received at TP port.
3. Device startup, the LED is lit for approx. 6 seconds.
4. Setting or display of the fault mask.

5.9.1.4 LED displays during startup

When the SCALANCE X-200RNA (PRP) starts up, the following LED displays light up in the order shown:

1. Power LEDs (green) light up immediately after turning on the power.
2. Port LEDs go off, the red error LED is lit for approx. 10 seconds.
3. Following startup, the correct link status is indicated by the port LEDs after approximately 5 seconds.
4. The SCALANCE X-200RNA (PRP) is now ready for operation.

Note

SCALANCE X204RNA EEC (PRP/HSR)

If the device has not yet been configured, a device error is indicated (red fault LED lit permanently). This means that no link can be established on the redundancy ports.

In this case, the mode LED also flashes since the operating mode is not defined.

5.9.1.5 Mode LED (SCALANCE X204RNA EEC (PRP/HSR))

The SCALANCE X204RNA EEC (PRP/HSR) has the labeling of both devices on its housing, in other words, that of the SCALANCE X204RNA EEC (PRP) and the SCALANCE X204RNA EEC (HSR). Depending on how you configure the SCALANCE X204RNA EEC (PRP/HSR), the labeling is valid as described in the sections above.

The exception is the mode LED (third LED from the top):

- When the LED is lit, the SCALANCE X204RNA EEC (PRP/HSR) is in HSR mode. This means that the right-hand labeling of the LED displays applies. The device behaves like a SCALANCE X204RNA EEC (HSR).
- When the LED is not lit, the SCALANCE X204RNA EEC (PRP/HSR) is in PRP mode. This means that the left-hand labeling of the LED displays applies. The device behaves like a SCALANCE X204RNA EEC (PRP).

5.9.2 SCALANCE X-200RNA (HSR)

5.9.2.1 Fault LED

If the LED is lit red, a SCALANCE X-200RNA (HSR) has detected an error/fault.

At the same time, the signaling contact opens assuming that the response of the signaling contact has not been configured differently.

The LED signals that the SCALANCE X-200RNA (HSR) can adopt the following statuses:

Device type SCALANCE	LED lit red	LED lit yellow	LED not lit
X204RNA (HSR)	1, 2, 3, 4, 5, 6	7	8
X204RNA EEC (HSR)	1, 3, 4, 5, 6	7	8
X204RNA EEC (PRP/HSR) If configured as HSR device.	1, 3, 4, 5, 6	7	8

1. Link down event on a monitored port.
2. Failure of one of the two redundant power supplies.
3. C-PLUG error.
4. Device startup, the LED is lit for approx. 20 seconds.
5. Internal error.
6. A redundancy error has been detected (unexpected frames via HSR1, HSR2, P1/A or P2/B ports).
7. Redundancy warning (incorrect LAN ID at P1/A or P2/B)
8. No problem has been detected by the SCALANCE X-200RNA (HSR).

5.9.2.2 Power LED

The LEDs signal the following statuses of the SCALANCE X-200RNA (HSR).

The status of the power supply is indicated by a green LED:

Device type SCALANCE	LED lit green	LED lit yellow	LED not lit
X204RNA (HSR)	1	2	3
X204RNA EEC (HSR)	4	-	5
X204RNA EEC (PRP/HSR) If configured as HSR device.	4	-	5

1. Both L power supplies are connected (redundant supply).
2. One L power supply is connected (non-redundant supply).
3. Power supply L1 and L2 are not connected or supply voltages are <14 V.
4. Power supply L is connected
5. Power supply L is not connected or the supply voltage is too low.

5.9.2.3 Port LED

The LEDs signal the following port statuses of the SCALANCE X-200RNA (HSR).

The status of the ports is indicated by two-color LEDs:

Device type SCALANCE		LED lit green	LED lit yellow	LED flashes yellow
	Number of LEDs			
X204RNA (HSR)	2 port LEDs	1	2, 3	4
	2 PRP port LEDs	1	2, 3	4
X204RNA EEC (HSR)	2 port LEDs	1	2, 3	4
	2 PRP port LEDs	1	2, 3	4
X204RNA EEC (PRP/HSR) If configured as HSR device.	2 port LEDs	1	2, 3	4
	2 PRP port LEDs	1	2, 3	4

1. TP link exists, no data reception.
2. TP link, data received at TP port.
3. Device startup, the LED is lit for approx. 6 seconds.
4. Setting or display of the fault mask.

5.9.2.4 LED displays during startup

When the SCALANCE X-200RNA (HSR) starts up, the following LED displays light up in the order shown:

1. Power LEDs (green) light up immediately after turning on the power.
2. Port LEDs go off, the red error LED is lit for approx. 10 seconds.

3. Following startup, the correct link status is indicated by the port LEDs after approximately 5 seconds.
4. The SCALANCE X-200RNA (HSR) is now ready for operation.

Note

SCALANCE X204RNA EEC (PRP/HSR)

If the device has not yet been configured, a device error is indicated (red fault LED lit permanently). This means that no link can be established on the redundancy ports.

In this case, the mode LED also flashes since the operating mode is not defined.

5.9.2.5 Mode LED (SCALANCE X204RNA EEC (PRP/HSR))

The SCALANCE X204RNA EEC (PRP/HSR) has the labeling of both devices on its housing, in other words, that of the SCALANCE X204RNA EEC (PRP) and the SCALANCE X204RNA EEC (HSR). Depending on how you configure the SCALANCE X204RNA EEC (PRP/HSR), the labeling is valid as described in the sections above.

The exception is the mode LED (third LED from the top):

- When the LED is lit, the SCALANCE X204RNA EEC (PRP/HSR) is in HSR mode. This means that the right-hand labeling of the LED displays applies. The device behaves like a SCALANCE X204RNA EEC (HSR).
- When the LED is not lit, the SCALANCE X204RNA EEC (PRP/HSR) is in PRP mode. This means that the left-hand labeling of the LED displays applies. The device behaves like a SCALANCE X204RNA EEC (PRP).

Installation and disassembly

6

6.1 Safety notices for installation

Safety notices

When installing the device, keep to the safety notices listed below.

WARNING

If a device is operated in an ambient temperature of more than 50 °C, the temperature of the device housing may be higher than 70 °C. The device must therefore be installed so that it is only accessible to service personnel or users that are aware of the reason for restricted access and the required safety measures at an ambient temperature higher than 50 °C.

WARNING

If the device is installed in a cabinet, the inner temperature of the cabinet corresponds to the ambient temperature of the device.

WARNING

If the cable or conduit entry point exceeds 70 °C or the branching point of conductors exceeds 80 °C, special precautions must be taken. If the equipment is operated in an air ambient in excess of 60 °C, only use cables with admitted maximum operating temperature of at least 80 °C.

NOTICE

Improper mounting

Improper mounting may damage the device or impair its operation.

- Before mounting the device, always ensure that there is no visible damage to the device.
- Mount the device using suitable tools. Observe the information in the respective section about mounting.

Safety notices on use in hazardous areas

General safety notices relating to protection against explosion

⚠ WARNING
EXPLOSION HAZARD Replacing components may impair suitability for Class 1, Division 2 or Zone 2.

⚠ WARNING
The device is intended for indoor use only.

⚠ WARNING
The device shall only be used in an area with pollution degree 1 or 2 (according to EN/IEC 60664-1, GB/T 16935.1).

⚠ WARNING
When used in hazardous environments corresponding to Class I, Division 2 or Class I, Zone 2, the device must be installed in a cabinet or a suitable enclosure.

Notes for use in hazardous locations according to ATEX, IECEx, UKEX and CCC Ex

If you use the device under ATEX, IECEx, UKEX or CCC Ex conditions you must also keep to the following safety instructions in addition to the general safety instructions for protection against explosion:

The following information applies only to the SCALANCE X204RNA:

⚠ WARNING
To comply with EU Directive 2014/34 EU (ATEX 114), UK Regulation SI 2016/1107 or the conditions of IECEx or CCC-Ex, the housing or cabinet must meet the requirements of at least IP54 (according to EN/IEC 60529, GB/T 4208) in compliance with EN IEC/IEC 60079-7, GB/T 3836.3.

⚠ WARNING
If the temperature of the cable or housing socket exceeds 60 °C or the temperature at the branching point of the cables exceeds 80 °C, special precautions must be taken. If the equipment is operated in an air ambient in excess of 60 °C, only use cables with admitted maximum operating temperature of at least 80 °C.

Safety notices when using according to FM

If you use the device under FM conditions you must also keep to the following safety notices in addition to the general safety notices for protection against explosion:

⚠ WARNING

Wall mounting outside of the control cabinet or housing does not fulfill the requirements of the FM approval.

⚠ WARNING

Wall mounting is only permitted if the requirements for the housing, the installation regulations, the clearance and separating regulations for the control cabinets or housings are adhered to. The control cabinet cover or housing must be secured so that it can only be opened with a tool. An appropriate strain-relief assembly for the cable must be used.

Safety notices when using the device according to ATEX/IECEx and FM

If you use the device under ATEX/IECEx or FM conditions, you must also observe the following safety notices in addition to the general safety notices for protection against explosion:

Note

You must not install the device on a wall in hazardous areas.

6.2 EEC device variant restriction

The following information applies only to the EEC variant of the device:

Safety notices when using according to IEC 61131-2

If you use the device supplied with 100 ... 240 V AC according to IEC 61131-2, you must observe the following safety notices in addition to the general safety notices for protection against explosion:

According to the requirements of the IEC 61131-2 standard and the EC directive 2006/95/EC (Low Voltage Directive), the devices are "open equipment" and, in accordance with UL/CSA certification, they are an "open type".

To fulfill requirements for safe operation with regard to mechanical stability, flame retardation, stability, and protection against contact, the following alternative types of installation are specified:

- Installation in a suitable cabinet
- Installation in a suitable enclosure
- Installation in a suitably equipped, enclosed control room

Additional notes

⚠ CAUTION

Use only approved components

If you use components and accessories that are not approved for SIMATIC NET devices or their target systems, this may violate the requirements and regulations for safety and electromagnetic compatibility.
Only use components approved for the SIMATIC NET devices.

NOTICE

Warming and premature aging of the IE switch due to direct sunlight

Direct sunlight can heat up the device and can lead to premature aging of the IE switch and its cabling.

Provide suitable shade to protect the IE switch against direct sunlight.

Note

During installation and operation, keep to the installation guidelines and safety notices described in this document and in the system manuals "Industrial Ethernet / PROFINET Industrial Ethernet" and "Industrial Ethernet / PROFINET passive network components".

You will find information on the system manuals in the section "Introduction", under "Further documentation".

6.3 Types of installation

Unless stated otherwise, the mounting options listed below apply to all devices of the type SCALANCE X-200RNA.

The SCALANCE X-200RNA devices can be mounted in the following ways:

- Installing on a 35 mm DIN rail
- Wall mounting

Note

Mounting on a SIMATIC S7-300 standard rail is not possible.

NOTICE
Do not cover the ventilation grilles During installation, select a mounting position so that the ventilation grilles are always free to achieve adequate cooling. In the standard position, the ventilation grilles are on the top and bottom of the housing; in the case of SCALANCE X204RNA EEC, they are also on the sides of the housing.

See also

27069465 (https://support.industry.siemens.com/cs/ww/en/view/27069465)

6.4 Installation clearance

Keep to the following minimum clearances so that the convection ventilation of the device is not blocked:

- Below at least 10 cm
- Above at least 10 cm

If you install the device with installation distances < 10 cm, you must observe the following:

- The minimum distance must not be less than 30 mm.
- The maximum permissible ambient temperature in the direct vicinity of the device must be observed.
- Sufficient convection ventilation of the device must be ensured.

If you install the SCALANCE X-200RNA without forced ventilation or cooling, minimum clearances must be maintained to neighboring devices or the wall of the housing. By keeping to the minimum clearances, there is then an adequate stream of air for heat dissipation during operation.

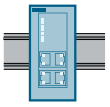
Table 6-1 Minimum clearances when installing in cabinets

Minimum clearance to devices below the SCALANCE X-200RNA	10 cm
Minimum clearance to devices above the SCALANCE X-200RNA	10 cm
Minimum lateral clearance to devices (SCALANCE X204RNA EEC only)	20 mm

6.5 Mounting position

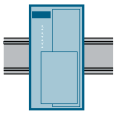
Mounting position of a SCALANCE X204RNA

SCALANCE X204RNA allows the following mounting positions:

Horizontal Horizontal installation of the rack (DIN rail).	
Vertical Vertical installation of the rack (DIN rail).	
On side with the interfaces pointing upwards	

Mounting position of a SCALANCE X204RNA EEC

SCALANCE X204RNA EEC allows the following mounting positions:

Horizontal Horizontal installation of the rack (DIN rail).	
Vertical Vertical installation of the rack (DIN rail). Remember that the permitted temperature ranges depend on the position of the installed device. You will find the permitted temperature ranges in the section "Technical specifications (Page 155)".	

6.6 Mounting on DIN rails

Installation

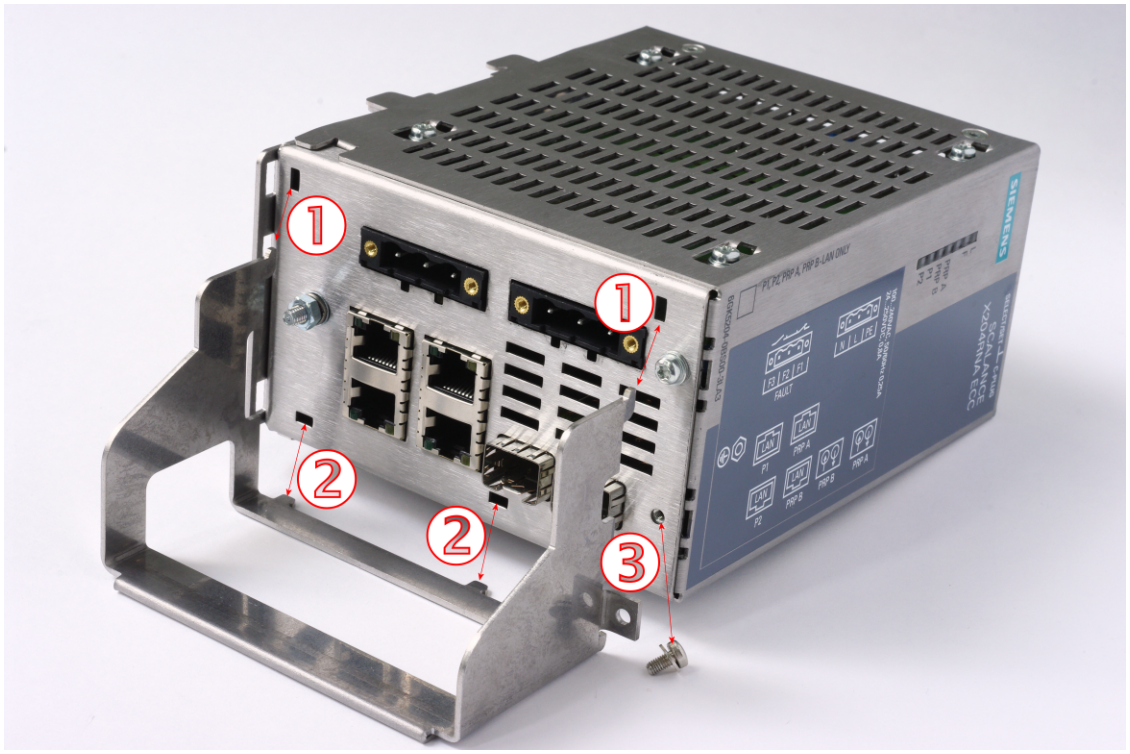
To install the devices on a 35 mm DIN rail complying with DIN EN 60715, follow the steps below:

1. Fit the upper part of the locking mechanism of the device on to the DIN rail.
2. Press the device down against the DIN rail until it locks into place.
3. Fit the connectors for the power supply.
4. Fit the connectors for the signaling contact.
5. Insert the terminal blocks into the sockets on the device.



Figure 6-1 Mounting on a 35 mm DIN rail based on the example of a SCALANCE X204RNA EEC

Fitting the protective bracket



① Hang onto rail at top
② Lock in position below
③ Secure with the screw

Figure 6-2 Mounting the protective bracket on the SCALANCE X204RNA EEC

Uninstalling

To remove devices from the DIN rail, follow the steps below:

1. First disconnect all connected cables.
2. Release the DIN rail catch on the bottom of the device using a screwdriver.
3. Then pull the lower part of the device away from the DIN rail.

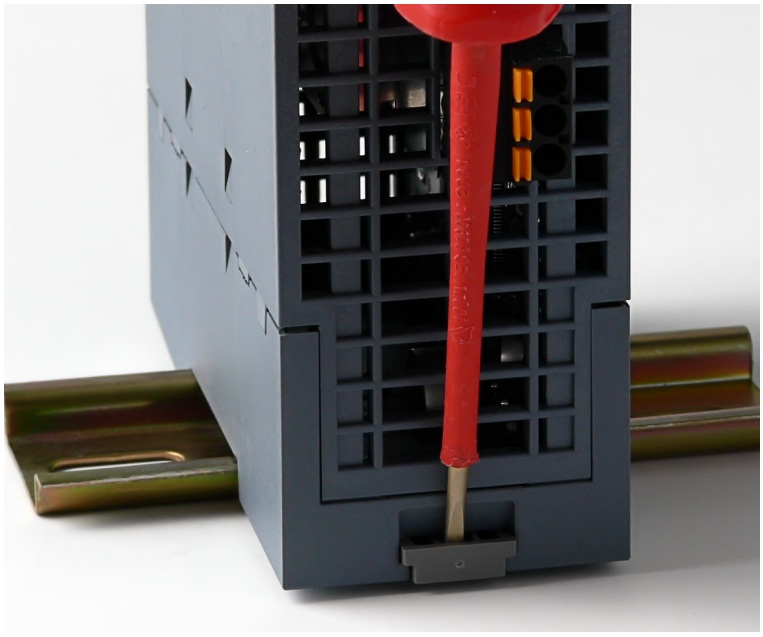
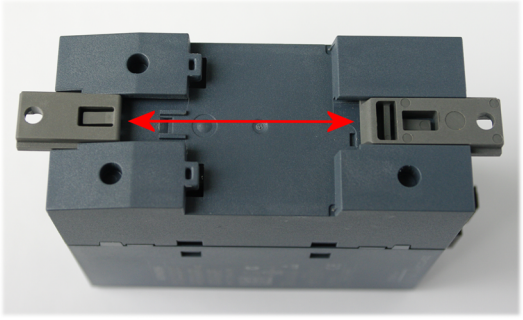


Figure 6-3 Removing from a 35 mm DIN rail based on the example of the SCALANCE X204RNA

6.7 Wall mounting

Wall mounting of a SCALANCE X204RNA



Preparation for wall mounting



Wall mounting

To mount the device on a wall, you require the following:

- 2 wall plugs, 6 mm in diameter and 30 mm long
- 2 screws 3.5 mm in diameter and 40 mm long

To install a SCALANCE X204RNA on a standard rail, follow the steps below:

1. Prepare the drill holes for wall mounting. For the precise dimensions, refer to the section "Dimension drawings".
2. Connect the electrical cable connecting cables.
3. Fit the connectors for the signaling contact.
4. Insert the terminal blocks into the sockets on the SCALANCE X204RNA.
5. Screw the device to the wall.

Note

The wall mounting must be capable of supporting at least four times the weight of the SCALANCE X204RNA (see "Technical specifications (Page 155)").

Wall mounting of a SCALANCE X204RNA EEC

To mount the device on a wall, you require the following:

- 2 wall plugs, 6 mm in diameter and 30 mm long
- 2 screws 3.5 mm in diameter and 40 mm long

To install a SCALANCE X204RNA on a standard rail, follow the steps below:

1. Secure an adequately long piece of DIN rail (35 mm) to the wall.
2. Now mount the SCALANCE X-204RNA on the DIN rail as described in the section "DIN rail mounting".

See also

Mounting on DIN rails (Page 64)

Dimension drawings (Page 165)

6.8 Disassembly

⚠ WARNING

Improper disassembly

Improper disassembly may result in a risk of explosion in hazardous areas.

For proper disassembly, observe the following:

- Before starting work, ensure that the electricity is switched off.
- Secure remaining connections so that no damage can occur as a result of disassembly if the system is accidentally started up.

Connecting up

7

7.1 Safety when connecting up

Safety notices

When connecting up the device, keep to the safety notices listed below.

⚠ WARNING

Safety extra low voltage

The SCALANCE X204RNA is designed for operation with Safety Extra-Low Voltage (SELV) by a Limited Power Source (LPS). (This does not apply to the SCALANCE X204RNA EEC.)

The power supply therefore needs to meet at least one of the following conditions:

- Only safety extra low voltage (SELV) with limited power source (LPS) complying with IEC 60950-1 / EN 60950-1 / VDE 0805-1 or IEC 62368-1 / EN 62368-1 / VDE 62368-1 may be connected to the power supply terminals.
- The power supply unit for the device must meet NEC Class 2 according to the National Electrical Code (r) (ANSI / NFPA 70).

If the equipment is connected to a redundant power supply (two separate power supplies), both must meet these requirements.

⚠ WARNING

Maximum current

The maximum current via the terminals is 10 A. You should therefore include a fuse that trips at a current higher than 10 A. The fuse must meet the following requirements:

- Suitable for 300 V DC / 250 V AC / max. 10 A
- Breaking current at least 10 kA
- UL/CSA listed (UL 248-1 / CSA 22.2 No. 248.1)

As an alternative, the following requirements:

- Breaking current at least 10 kA
- Approved in compliance with IEC 60127-1 / EN 60127-1
- Breaking characteristics: B or C for a circuit breaker or slow-blow fuse

Safety notices on use in hazardous areas

General safety notices relating to protection against explosion

WARNING

EXPLOSION HAZARD

Do not connect or disconnect cables to or from the device when a flammable or combustible atmosphere is present.

WARNING

EXPLOSION HAZARD

Do not press the SELECT/SET button when there is an explosive atmosphere.

WARNING

Suitable cables at high ambient temperatures in hazardous area

At an ambient temperature of ≥ 60 °C, use heat-resistant cables designed for an ambient temperature at least 20 °C higher. The cable entries used on the housing must comply with the IP degree of protection required by EN IEC / IEC 60079-0, GB/T 3836.1.

WARNING

Unsuitable cables or connectors

Risk of explosion in hazardous areas

- Only use connectors that meet the requirements of the relevant type of protection.
- If necessary, tighten the connector screw connections, device fastening screws, grounding screws, etc. according to the specified torques.
- Close unused cable openings for electrical connections.
- Check the cables for a tight fit after installation.

WARNING

Lack of equipotential bonding

If there is no equipotential bonding in hazardous areas, there is a risk of explosion due to equalizing current or ignition sparks.

- Ensure that equipotential bonding is available for the device.

⚠ WARNING

Unprotected cable ends

There is a risk of explosion due to unprotected cable ends in hazardous areas.

- Protect unused cable ends according to IEC/EN 60079-14.

⚠ WARNING

Improper installation of shielded cables

There is a risk of explosion due to equalizing currents between the hazardous area and the non-hazardous area.

- Ground shielded cables that cross hazardous areas at one end only.
- Lay a potential equalization conductor when grounding at both ends.

⚠ WARNING

Insufficient isolation of intrinsically safe and non-intrinsically safe circuits

Risk of explosion in hazardous areas

- When connecting intrinsically safe and non-intrinsically safe circuits, ensure that the galvanic isolation is performed properly in compliance with local regulations (e.g. IEC 60079-14).
- Observe the device approvals applicable for your country.

Notes for use in hazardous locations according to ATEX, IECEx, UKEX and CCC Ex

If you use the device under ATEX, IECEx, UKEX or CCC Ex conditions you must also keep to the following safety instructions in addition to the general safety instructions for protection against explosion:

The following information applies only to the SCALANCE X204RNA:

⚠ WARNING

Transient overvoltages

Take measures to prevent transient surges of more than 40% of the rated voltage. Under no circumstances may transient surges exceed 119 V. This is the case if you only operate devices with SELV (safety extra low voltage).

Safety notices when using the device according to Hazardous Locations (HazLoc)

If you use the device under HazLoc conditions you must also keep to the following safety notices in addition to the general safety notices for protection against explosion:

WARNING

EXPLOSION HAZARD

You may only connect or disconnect cables carrying electricity when the power supply is switched off or when the device is in an area without inflammable gas concentrations.

Further notes

WARNING

Safety notice for connecting with a LAN ID (Local Area Network)

A LAN or LAN segment with all the interconnected devices should be contained completely in a single low voltage power distribution in a building. The LAN is designed either for “Environment A” according to IEEE802.3 or "Environment 0" according to IEC TR 62102.

Do not connect any electrical connectors directly to the telephone network (telephone network voltage) or a WAN (Wide Area Network).

7.2 Power supply

Connecting the power supply

The power supply is connected using a 3- or 4-pin plug-in terminal block. Usable cross-section 0.25 to 2.5 mm^2. Permitted tightening torque 0.57 - 0.79 Nm (5 - 7 in.lb.).

The power supply is non-floating. The signal cables of the Ethernet TP ports are floating.

Note

Removing or inserting the power supply with the power on is not permitted.

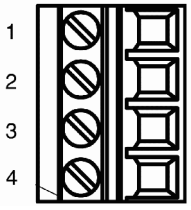
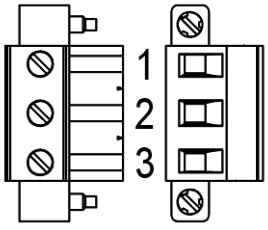
Coding

With the SCALANCE X204RNA EEC the supplied plugs and the socket on the device for the power supply match in their coding.

The plug and socket for the signaling contact are coded differently from the connection of the power supply. The plugs for power supply and signaling contact cannot therefore be interchanged.

You can use non-coded plugs in coded sockets and coded plugs in non-coded sockets.

Pin assignment

Pin number	Pin assignment of the SCALANCE X204RNA (PRP and HSR)	Pin assignment of the SCALANCE X204RNA EEC (PRP and HSR and PRP/HSR)
		
Pin 1	L1 +24 VDC	PE Coding of the socket
Pin 2	M1	L1 +24 V ... +250 VDC L1 100 V ... 240 VAC Coding of the plug
Pin 3	M2	N1 Coding of the socket
Pin 4	L2 +24 VDC	-

Note

Since the SCALANCE X204RNA EEC does not have a redundant power supply, connect the power supply between L1 and N1.

⚠ WARNING

The SCALANCE X204RNA is designed for operation with safety extra-low voltage (SELV). This means that only safety extra-low voltages (SELV) complying with IEC950/EN60950/ VDE0805 can be connected to the power supply terminals.

Measures must be taken to prevent transient overvoltages of more than 40% of the rated voltage. This is the case if the devices are operated exclusively with SELV (Safety Extra Low Voltage).

The power supply unit for the SCALANCE X204RNA power supply must meet NEC Class 2, as described by the National Electrical Code(r) (ANSI/NFPA 70).

The power of all connected power supply units must total the equivalent of a power source with limited power (LPS limited power source).

If the device is connected to a redundant power supply (two separate power supplies), both must meet these requirements.

The signaling contact can be subjected to a maximum load of 100 mA (safety extra-low voltage (SELV), 24 VDC).

Never operate the SCALANCE X204RNA (PRP and HSR) with AC voltage or DC voltage higher than 28.8 V DC.

24 VDC power supply

NOTICE

If the SCALANCE X204RNA is supplied over long 24 V power supply lines or networks, measures are necessary to prevent interference by strong electromagnetic pulses on the supply lines. These can result, for example, due to lightning or switching of large inductive loads.

One of the tests used to attest the immunity of the SCALANCE X204RNA to electromagnetic interference is the "surge immunity test" according to EN61000-4-5. This test requires overvoltage protection for the power supply lines. A suitable device is, for example, the Dehn Blitzductor BVT AVD 24 V type no. 918 422 or a comparable protective element.

Manufacturer: DEHN+SÖHNE GmbH+Co.KG, Hans-Dehn-Str.1, Postfach 1640, D-92306 Neumarkt, Germany.

Power supply 100 AC .. 240 V / 24 .. 250 VDC

⚠ WARNING

Danger from line voltage

The SCALANCE X204RNA EEC has a power supply of 100 to 240 VAC or 24 to 250 VDC.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

Connecting and disconnecting may only be performed by an electrical specialist. Connect or disconnect power supply cables only when the power is turned off.

⚠ WARNING

The SCALANCE X204RNA EEC does not have an ATEX approval.

Devices with a 100 to 240 VAC or 24 to 250 VDC power supply are not approved for use in hazardous areas according to EC-RL--94/9 (ATEX).

NOTICE

Securing cables with dangerous voltage

Make sure that the connector cannot be released accidentally by pulling on the connecting cable. Lay the cables in cable ducts or cable channels and secure the cables, where necessary, with cable ties.

Protective ground

⚠ WARNING

PE connector of SCALANCE X204RNA EEC

Simple grounding via the housing is inadequate. For reliable operation, the PE cable must be connected via the ground bolt. On the SCALANCE X204RNA EEC, the grounding bolt is on the bottom of the device.

7.3 Signaling contact

The signaling contact (relay contact) is a floating switch with which error/fault states can be signaled by breaking the contact.

The signaling contact is connected to a 2- or 3-pin plug-in terminal block. Usable cable cross-section 0.25 to 2.5 mm^2. Permitted tightening torque 0.57 - 0.79 Nm (5 - 7 in.lb.).

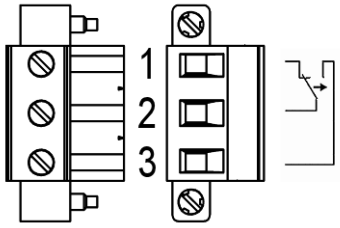
Coding

With the SCALANCE X204RNA EEC the supplied plugs and the socket on the device for the signaling contact match in their coding.

The plug and socket for the power supply are coded differently from the connection of the signaling contact. The plug for power supply and signaling contact cannot therefore be interchanged.

You can use non-coded plugs in coded sockets and coded plugs in non-coded sockets.

Pin assignment

Pin number	Pin assignment of the SCALANCE X 204RNA	Pin assignment of the SCALANCE X 204RNA EEC	
			
Pin 1	F1 (NO contact / NC contact if a fault occurs)	F1	NC contact / NO contact if a fault occurs Coding of the plug
Pin 2	F2	F2	Pole terminal Coding of the socket
Pin 3	-	F3	NO contact / NC contact if a fault occurs Coding of the plug

The following errors/faults can be signaled by the signaling contact:

- The failure of a link at a monitored port.
- The failure of one of the two redundant power supplies (SCALANCE X204RNA only).
- The loss of the entire power supply
- Internal error
- Incompatible C-PLUG was inserted.

The connection or disconnection of a communication node on an unmonitored port does not lead to an error message.

The signaling contact remains activated until the error/fault is eliminated or until the current status is applied as the new desired status using the SELECT/SET button.

When the SCALANCE X-200RNA is turned off, the signaling contact is always activated (signals "error/fault").

Note

The signaling contact correlates with the red fault LED.

Exception: The absence of the power supply is signaled only by the signaling contact (no display by the fault LEDs).

Note

During startup, the signaling contract is always active (signals "error/fault").

7.4 SFP transceiver

The SFP modules are supplied with power via the SFP slot of the SCALANCE X204RNA EEC.

7.5 Grounding

SCALANCE X204RNA

The housing is made of plastic. There is no need and no possibility of grounding.

SCALANCE X204RNA EEC

The device is grounded over the DIN rail. There is also a grounding bolt on the underside of the housing. Connect the grounding bolt of the device to the nearest grounding point using the grounding cable. To do this use the same wire cross-section as the power supply cable, however not smaller than 1.5 mm^2/16 AWG.

Maintenance and cleaning

8

⚠ WARNING

Unauthorized repair of devices in explosion-proof design

Risk of explosion in hazardous areas

- Repair work may only be performed by personnel authorized by Siemens.
- For function checks, maintenance and servicing work, you need to observe the requirements on checking and maintaining plants in hazardous areas according to the standards EN / IEC 60079-17.

⚠ WARNING

Impermissible accessories and spare parts

Risk of explosion in hazardous areas

- Only use original accessories (Page 159) and original spare parts.
- Observe all relevant installation and safety instructions described in the manuals for the device or supplied with the accessories or spare parts.



⚠ CAUTION

Hot surfaces

Risk of burns during maintenance work on parts with a surface temperature above 70 °C (158 °F).

- Take appropriate protective measures, for example, wear protective gloves.
- Once maintenance work is complete, restore the touch protection measures.

NOTICE

Cleaning the housing

If the device is not in a hazardous area, only clean the outer parts of the housing with a dry cloth.

If the device is in a hazardous area, use a slightly damp cloth for cleaning.

Do not use solvents.

Functional description and configuration using Web Based Management

9

9.1 Introduction

To make the best possible use of the technical possibilities of the devices SCALANCE X-200RNA of the product line, you can adapt the configuration of the device to the concrete situation in which it is used.

Web Based Management (WBM) accesses the configuration of the SCALANCE X-200RNA using a Web browser. An Ethernet connection to the device is necessary.

Note

To prevent unauthorized access to the SCALANCE X200RNA, there is an automatic logout after 15 minutes or after the time configured in the "Agent Timeout Configuration" menu. A manual logout is also possible with the appropriate button in the user interface. Exiting the browser does not close the session. If the browser is started again within the timeout, the session continues to be used.

Note

To use SNMP Management and traps, you require a network management station. This does not ship with IE switches.

9.2 Prerequisite

Note

The dialog boxes described in this section apply to the SCALANCE X-200RNA devices. The dialog boxes of the SCALANCE X204RNA EEC were chosen to illustrate the examples. Any significant deviations from the dialog boxes of the SCALANCE X204RNA are pointed out or shown.

Principle of Web Based Management

The devices of the SCALANCE X-200RNA product line have an integrated HTTP server for Web Based Management. If a SCALANCE X-200RNA is addressed using a Web browser, it returns HTML pages to the client computer depending on the user input.

The user enters the configuration data in the HTML pages sent by the SCALANCE X-200RNA. A SCALANCE X-200RNA evaluates this information and generates reply pages dynamically. The great advantage of this method is that apart from a Web browser, no special software is required on the client.

Requirements for Web Based Management

- A SCALANCE X-200RNA must have an IP address before you can use Web Based Management, see section "Assignment of an IP address (Page 88)".
- To use Web Based Management, there must be an Ethernet connection between the SCALANCE X-200RNA and the client computer.
- Use of a Microsoft Internet Explorer, version 8 or higher is recommended.
- All the pages of Web Based Management require JavaScript. You should therefore make sure that Java Script is enabled in your browser settings.

  Note

  The browser must not be set so that it reloads the page from the server each time the page is accessed. The updating of the dynamic content of the page is ensured by other mechanisms. In the Internet Explorer, you can make the appropriate setting in the "Options > Internet Options > General" menu in the section "Temporary Internet Files" with the "Settings" button.

  Below the text "Check for newer versions of stored pages", the "Automatically" check box must be selected.

- Web Based Management is HTTP- or HTTPS-based, so you must also enable access to port 80 or 443 if you have a firewall installed.

Starting Web Based Management and logging on

1. Enter the IP address in the address box of the Web browser. If there is a problem-free connection to the SCALANCE X-200RNA, the Logon dialog box of Web Based Management is displayed:

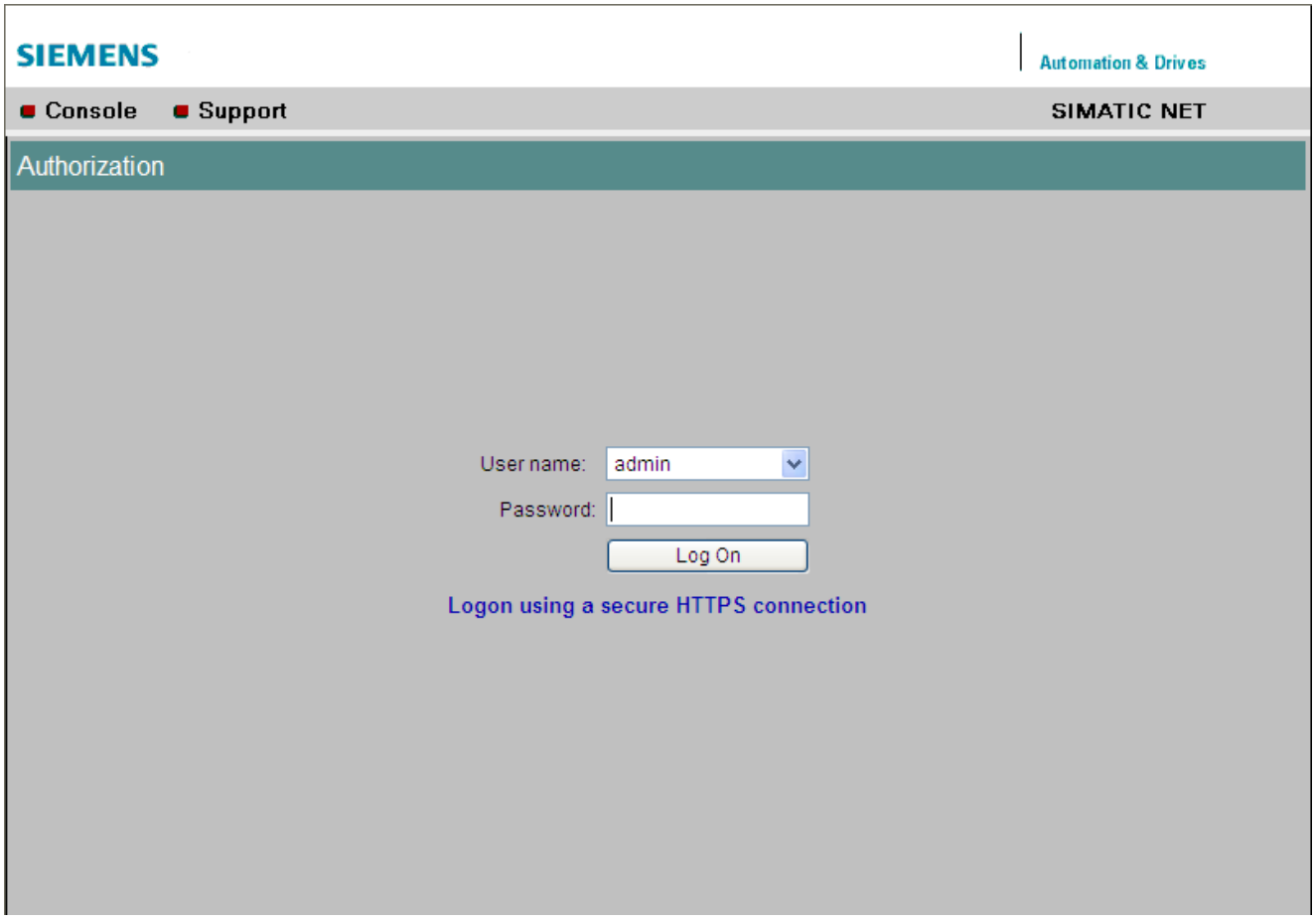


Figure 9-1 Logon dialog box of Web Based Management

2. In the "User name" drop-down list, select the "admin" entry if you want to change settings of the SCALANCE X-200RNA (read and write access). If you select the "User" entry, you only have read access to the configuration data of the SCALANCE X-200RNA.
3. Enter your password in the "Password" input box. If you have not yet set a password, the default passwords as shipped apply: Enter "admin" if you selected "admin" as the user name or user if you selected "user".

   Note

   For security reasons, make sure that you change the original factory-set passwords.

4. Click the "Log On" button to start the logon.

   Note

   By clicking on "Logon using a secure HTTPS connection", you select a secure connection with SSL encryption.

9.3 Assignment of an IP address

9.3.1 Introduction

Introduction

An IE switch provides a wide range of functions for settings and diagnostics. To access these functions over the network, the Internet protocol is used.

The Internet protocol has its own address mechanism using IP addresses. As the protocol of layer 3 of the ISO/OSI reference model, the IP protocol is independent of hardware allowing flexible address assignment. In contrast to layer 2 communication (where the MAC address is permanently assigned to a device), this makes it necessary to assign an address to a device explicitly.

This section describes the structure of an IP address and the various options for assigning the address with an IE switch.

Note

The initial assignment of an IP address for X-200 IE switches cannot be made with Web Based Management because this configuration tool can only be used if an IP address already exists.

Address classes to RFC 1518 and RFC 1519

An IP address consists of 4 bytes. Each byte is represented in decimal, with a dot separating it from the previous one. This results in the following structure, where XXX stands for a number between 0 and 255:

XXX.XXX.XXX.XXX

The IP address is made up of two parts, the network ID and the host ID. This allows different subnets to be created. Depending on the bytes of the IP address used as the network ID and those used for the host ID, the IP address can be assigned to a specific address class.

IP address range	Max. number of networks	Max. number of hosts/ network	Class	CIDR notation
1.x.x.x to 126.x.x.x	126	16777214	A	/8
128.0.x.x to 191.255.x.x	16383	65534	B	/16
192.0.0.x to 223.255.255.x	2097151	254	C	/24
Multicast groups			D	
Reserved for experiments			E	

Subnet mask

The bits of the host ID can be used to create subnets. The leading bits represent the address of the subnet and the remaining bits the address of the host in the subnet.

A subnet is defined by the subnet mask. The structure of the subnet mask corresponds to that of an IP address. If a "1" is used at a bit position in the subnet mask, the bit belongs to the corresponding position in the IP address of the subnet address, otherwise to the address of the computer.

Example of a class B network:

The standard subnet address for class B networks is 255.255.0.0; in other words, the last two bytes are available for defining a subnet. If 16 subnets must be defined, the third byte of the subnet address must be set to 11110000 (binary notation). In this case, this results in the subnet mask 255.255.240.0.

To find out whether two IP addresses belong to the same subnet, the two IP addresses and the subnet mask are ANDed bit by bit. If both logic operations have the save result, both IP addresses belong to the same subnet, for example 141.120.246.210 and 141.120.252.108.

Outside the local network, the described division of the end node address has no significance. For packet switching here, only the entire IP address is of interest.

Note

In the bit representation of the subnet mask, the "ones" must be set left-justified; there must be no "zeros" between the "ones".

9.3.2 Initial assignment of an IP address

Configuration options

An initial IP address for an IE switch cannot be assigned using Web Based Management or the Command Line Interface because these configuration tools require that an IP address already exists.

The following options are available to assign an IP address to an unconfigured device currently without an IP address:

- By DHCP (factory setting)
  When the devices ship and after resetting to factory defaults, DHCP is active. If a DHCP server is available in the local area network, and this responds to the DHCP request of the IE switch, the IP address, subnet mask and gateway are assigned automatically when the module first starts up.
- With the STEP 7 configuration tool
- With the NCM PC configuration tool
- With PNI (SINEC Primary Network Initialization)
  This program for initial commissioning of network devices uses the DCP protocol o detect devices in a network and assign an IP address.
  For more information, refer to PNI (https://support.industry.siemens.com/cs/products?mfn=ps&pnid=26672&lc=en-US)

For more detailed information on using the configuration tools, refer to the relevant manuals.

9.4 Initializing the SCALANCE X204RNA EEC (PRP/HSR)

Status as shipped

The SCALANCE X204RNA EEC (PRP/HSR) is always in the uninitialized status if it still has the factory settings. You can return the device to the factory settings using the SELECT/SET button (see section "SELECT/SET button (Page 49)"), using WBM and the CLI.

Initializing with WBM

You can initialize the SCALANCE X204RNA EEC (PRP/HSR) using WBM. When doing this, you can specify whether the device will be operated in the "PRP" or "HSR" mode using the "Set PRP Mode and Restart" and "Set HSR Mode and Restart" buttons. The device is then restarted and is in the selected operating mode.

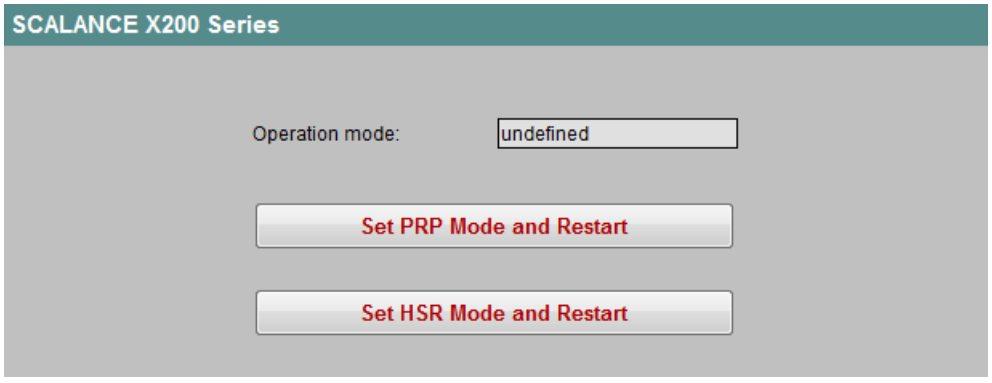


Figure 9-2 Initializing the SCALANCE X204RNA EEC (PRP/HSR) using WBM

Initializing with CLI

You can also initialize the SCALANCE X204RNA EEC (PRP/HSR) using the CLI command "setmode [PRP|HSR]".

```
/                                (Go to top of menu tree)
..                               (Go up in menu tree)
?                                (Show menus/commands)
exit                             (Exit from CLI/TELNET session)
restart                          (Shutdown and startup again)
setmode [PRP|HSR]                (Set PRP-/HSR mode and restart)

info                             (Show identification data)
SYSTEM                           (Open SYSTEM menu)
X-200                            (Open X-200 menu)
AGENT                            (Open AGENT menu)
SWITCH                           (Open SWITCH menu)
```

The device is then restarted and is in the selected operating mode.

Note

Once you have initialized the SCALANCE X204RNA EEC (PRP/HSR) using the CLI, the CLI command "setmode [PRP|HSR]" is no longer displayed.

After initializing

After you have initialized the SCALANCE X204RNA (PRP/HSR) and restarted the device, the corresponding dialog box is displayed in WBM:

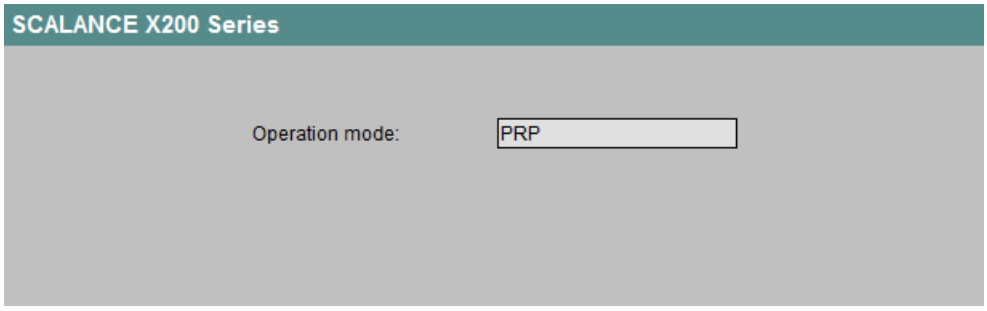


Figure 9-3 SCALANCE X204RNA EEC (PRP/HSR) in "PRP" mode

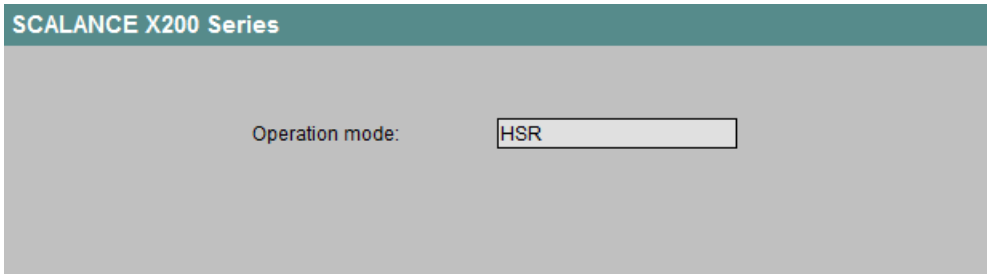


Figure 9-4 SCALANCE X204RNA EEC (PRP/HSR) in "HSR" mode

9.5 LED simulation of the WBM

Display of the operating state

Each SCALANCE X-200RNA has several LEDs that provide information on the operating state of the device. Depending on its location, direct access to the SCALANCE X-200RNA may not always be possible. Web Based Management therefore displays simulated LEDs.

The top quarter of the screen shows a schematic representation of the SCALANCE X-200RNA with the corresponding LEDs. The meaning of the LED displays is described in the section "LEDs (Page 52)" in these Operating Instructions.

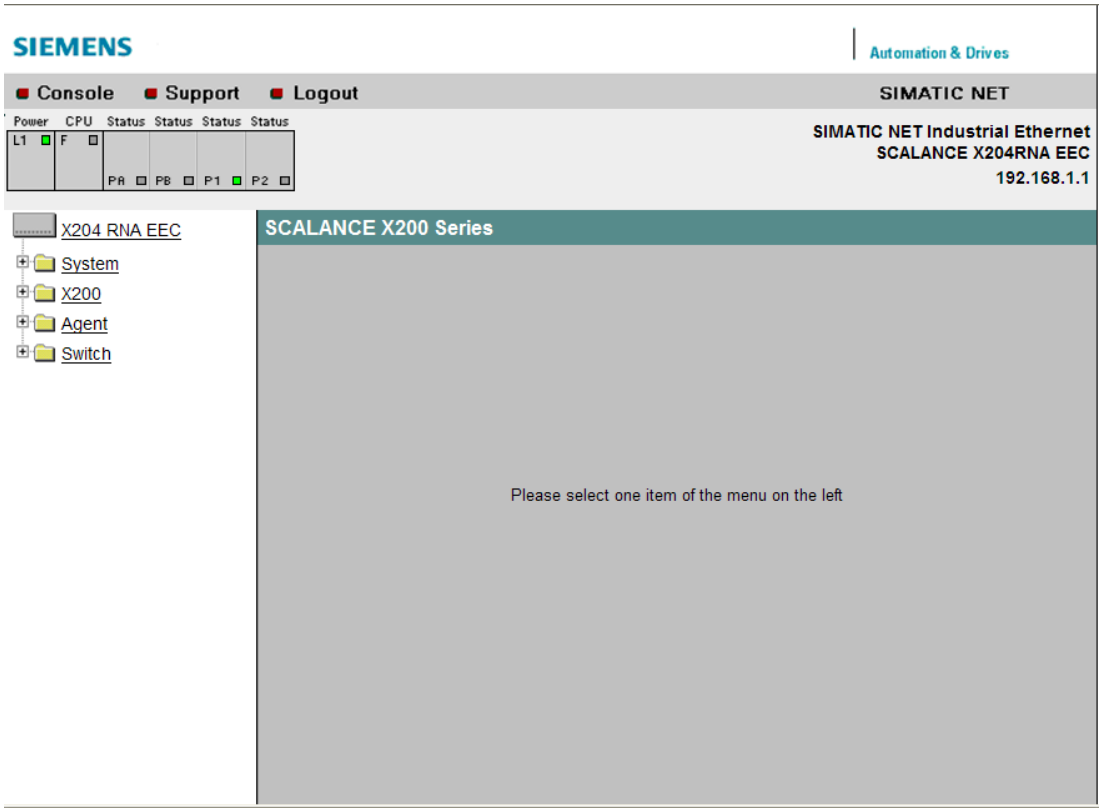


Figure 9-5 LED simulation of the SCALANCE X204RNA EEC

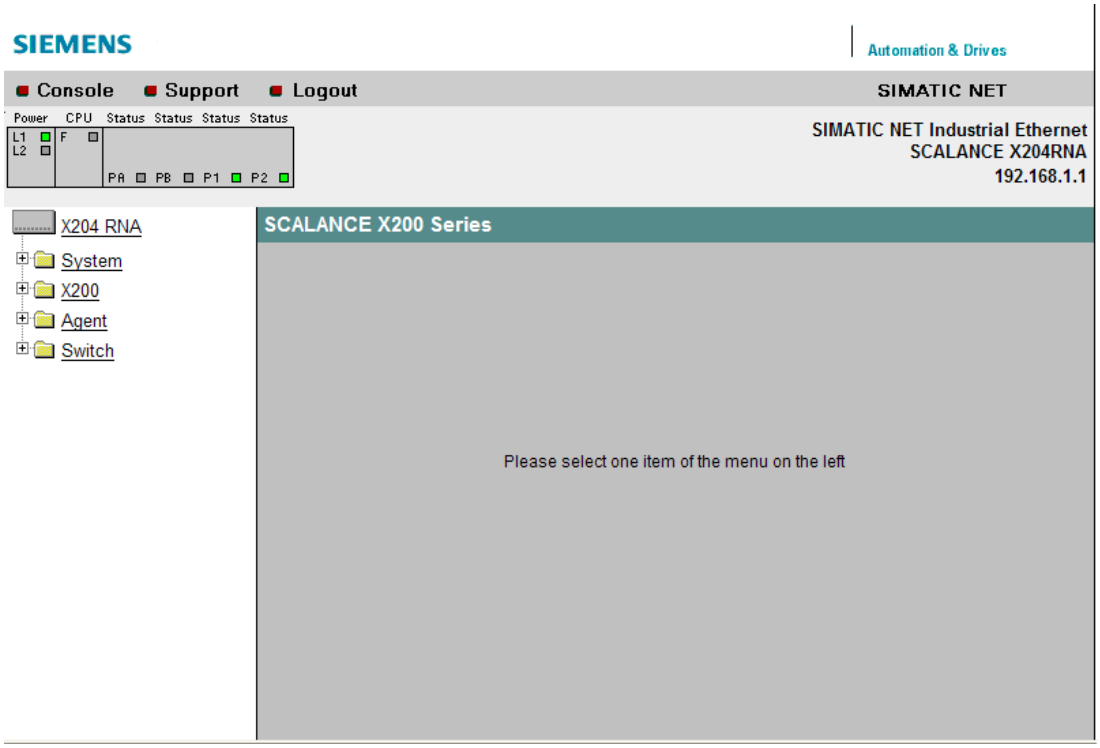


Figure 9-6 LED simulation of the SCALANCE X204RNA

9.6 Enabling/disabling the HTTP server

You can disable and enable the HTTP server integrated in the device using CLI commands. The HTTP server is enabled in the delivery state so that you can use the WBM. When you disable the HTTP server, Port 80 and Port 443 are also disabled.

Disabling the HTTP server

To disable the HTTP server, follow these steps:

1. Enter the following command in the CLI:
   `CLI/AGENT> wbm d`
2. Restart the device so that the change takes effect.

Enabling the HTTP server

To enable the HTTP server, follow these steps:

1. Enter the following command in the CLI:
   `CLI/AGENT> wbm e`
2. Restart the device so that the change takes effect.

9.7 Working with the WBM

Navigation bar

The upper menu bar of WBM contains the following links:

- Console
  This link opens a TELNET connection to the module.
  Note: With the Windows 7 operating systems or with Internet Explorer 8, access to the devices **via the console link** in WEB management is no longer possible.
- Support

  When you click this link, you open a SIEMENS AG support page. SIEMENS Support is, however, only accessible when your PC has a connection to the Internet.
- Logout
  By clicking on this link, you log out from the device.

Updating the display with "Refresh"

Web Based Management pages have a "Refresh" button at the lower edge of the page. Click this button to request up-to-date information from the IE switch for the current page.

Storing entries with "Set Values"

Pages in which you can make configuration settings have a "Set Values" button at the lower edge. Click this button to save the configuration data you have entered on the IE switch.

Note

Changing configuration data is possible only with the "Administrator" login.

9.8 The "System" menu

9.8.1 System Configuration

General device information

This dialog box appears if you click the "System" folder icon.

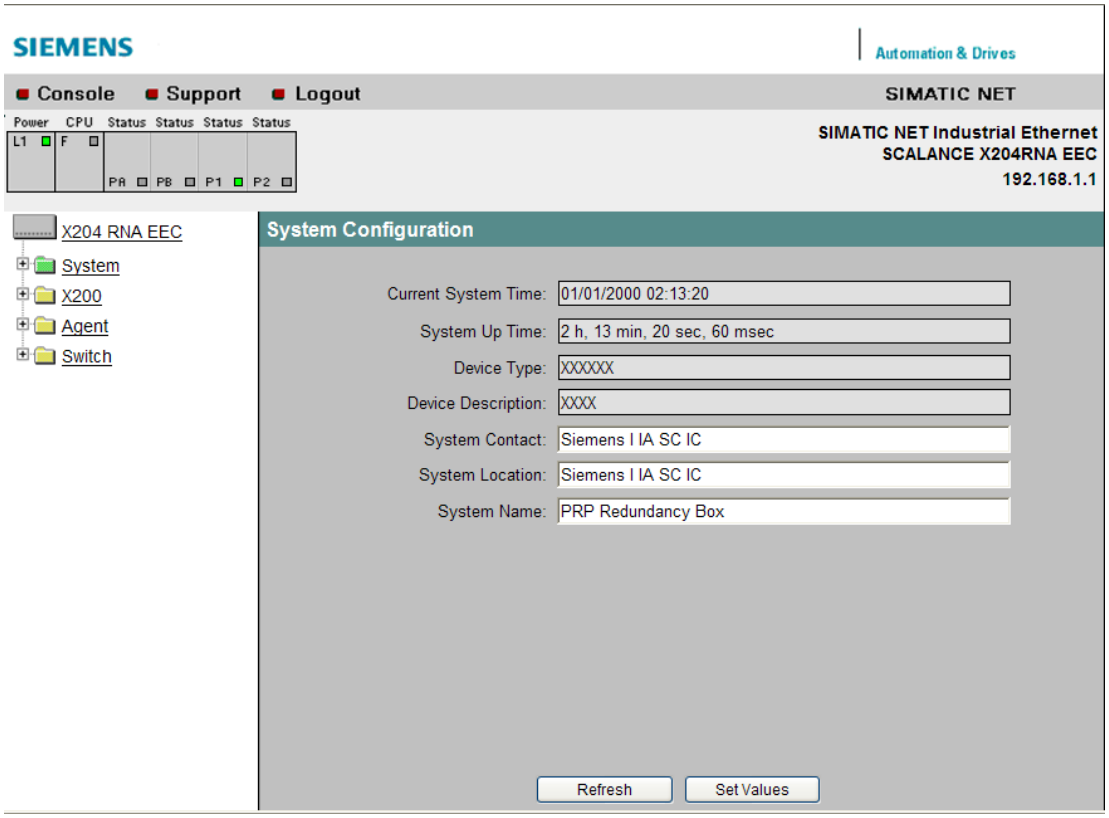


Figure 9-7 System Configuration

- "Current System Time" (read-only)
  The system time is set either by the user or is synchronized by a time-of-day frame (either SINEC H1 time frame or SNTP). You can also see when and how it was set:
  - (m) The setting was made manually.
  - (p) The setting was made by the Simple Network Time Protocol (SNTP).
- System Up Time (read-only)
  The time since the last restart.
- "Device Type" (read-only)
  The type designation of the device.
- "Device Description" (read-only)
  The type description of the device.

- "System Contact"
  Enter the name of a contact person responsible for managing the device in this box.
- "System Location"
  In this box, you enter a location for the device, for example a room number.
- "System Name"
  Enter a description of the device in this box.

9.8.2 System Identification & Maintenance

The following dialog box contains information on device-specific vendor and maintenance data such as the order number, serial number, version numbers.

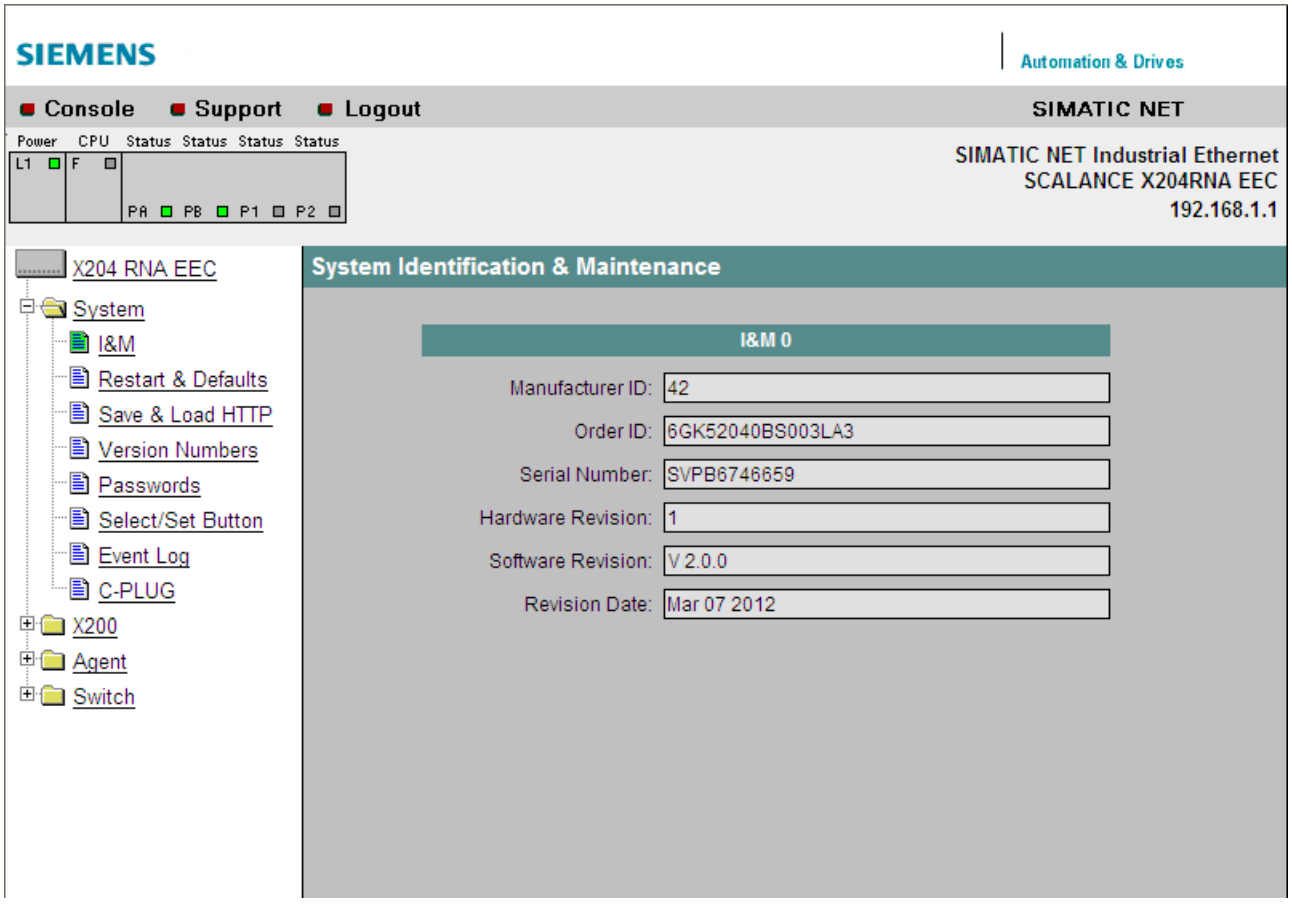


Figure 9-8 System Identification & Maintenance

- "I&M 0"
  Here, you can see the individual parameters for Identification & Maintenance.

9.8.3 System Restart & Defaults

Resetting the settings

In this menu, you will find a button for restarting the SCALANCE X-200RNA as well as an option for resetting the settings of the SCALANCE X-200RNA.

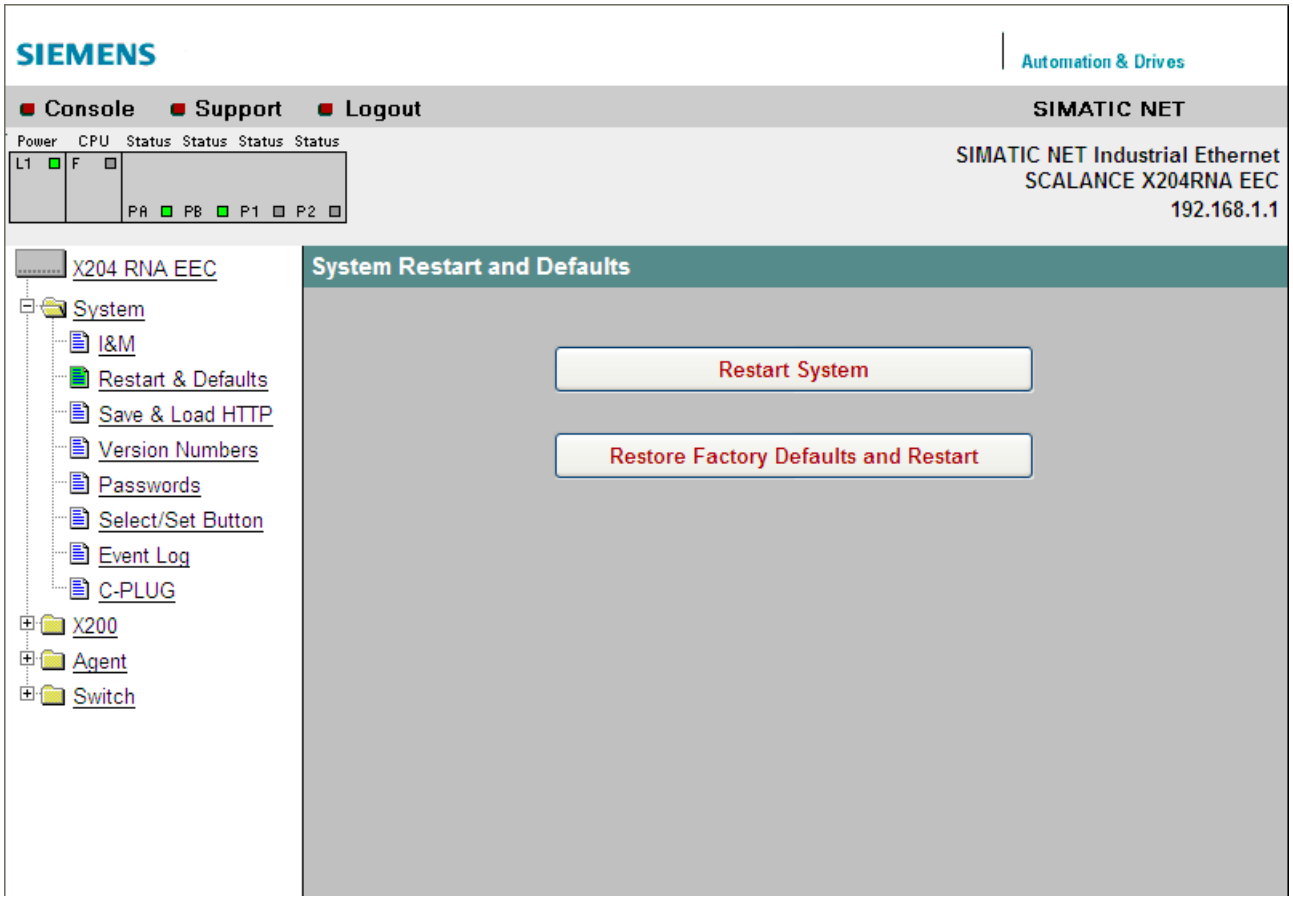


Figure 9-9 System Restart and Defaults

Note

Note the following points about restarting a SCALANCE X-200RNA:

- You can only restart the SCALANCE X-200RNA with administrator privileges.
- A SCALANCE X-200RNA should only be restarted with the buttons of this menu and not by a power cycle on the device.
- The browser must not be set so that it reloads the page from the server each time the page is accessed. The updating of the dynamic content of the page is ensured by other mechanisms. In the Internet Explorer, you can make the appropriate setting in the "Options > Internet Options > General" menu in the section "Temporary Internet Files" with the "Settings" button.
- Below the text "Check for newer versions of stored pages", the "Automatically" check box must be selected.

Restart System

Click the "Restart System" button to restart the SCALANCE X-200RNA. You are prompted to confirm the restart in a separate dialog box. During a restart, the SCALANCE X-200RNA is reinitialized, the internal firmware is reloaded, and the device runs a self-test. The learned entries in the address table are deleted. You can leave the browser window open while the SCALANCE X-200RNA restarts.

Restore Factory Defaults and Restart

Click the "Restore Factory Defaults and Restart" button to restore the factory default configuration settings. The protected defaults are also reset. An automatic restart is triggered.

Note

By resetting all the defaults, the IP address is also lost. A SCALANCE X-200RNA can then be accessed using SINEC PNI.

9.8.4 System Save & Load

System Save & Load via HTTP

The WBM allows you to store configuration information in an external file on your client PC or to load such data from an external file from the PC to the SCALANCE X-200RNA. You can also download both new firmware as well as a new FPGA configuration from suitable files on your client PC.

Note

Following a firmware update, delete the cache of the Web browser.

Note

As of firmware version V3.2.7, there has been a conversion from RSA certificates to certificates for elliptic-curve cryptography ("ECDSA certificates"). Only use ECDSA certificates in PEM format that were generated with the following curves:

- secp256r1 (NIST P-256)
- secp384r1 (NIST P-384)
- secp521r1 (NIST P-521)

RSA certificates are no longer supported as of this firmware version. The existing RSA certificates on the device will be automatically replaced by self-signed ECDSA certificates.

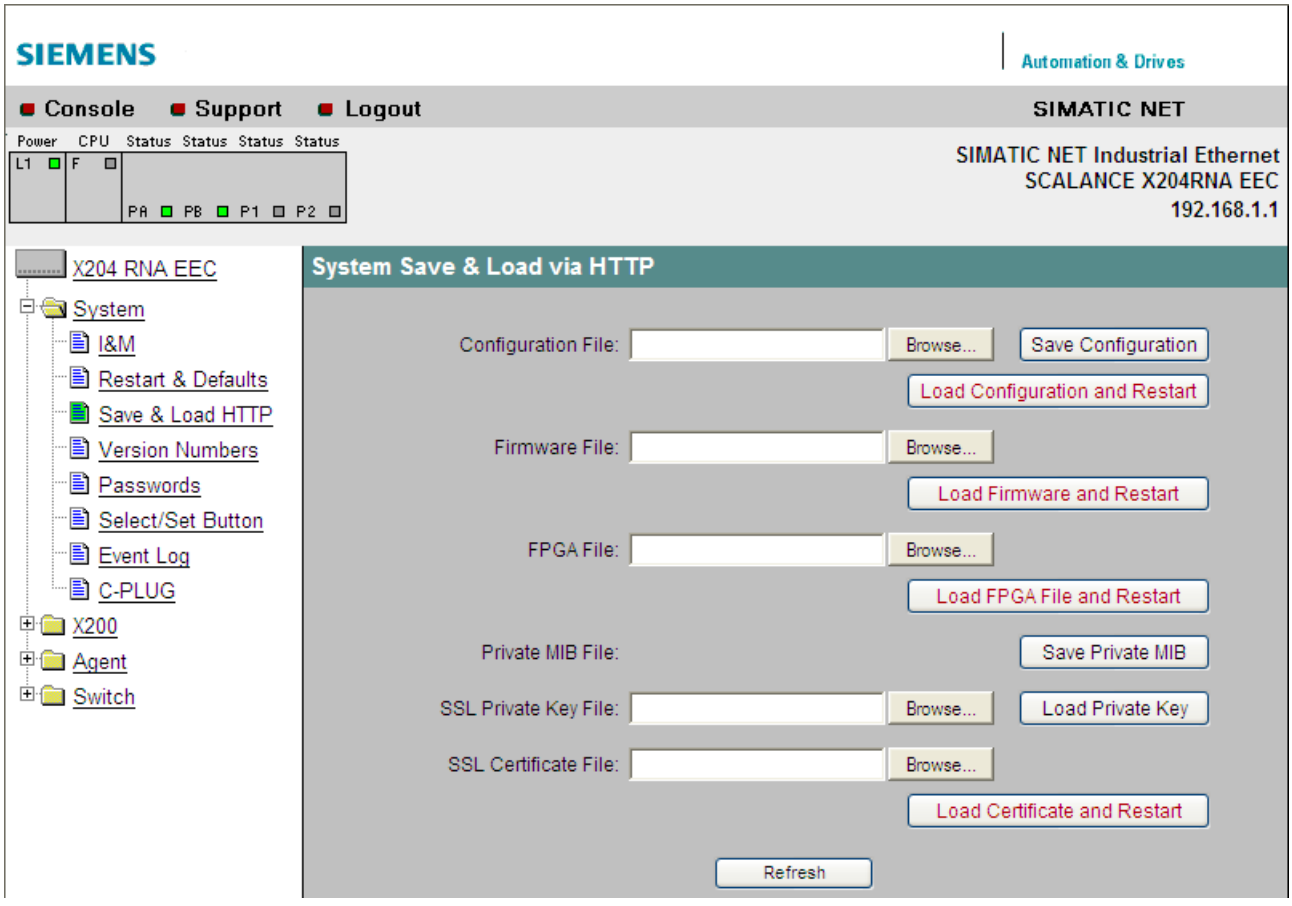


Figure 9-10 System Save & Load via HTTP

- "Configuration File"
  Name and directory path of the configuration file you want to load on the SCALANCE X-200RNA.
- "Firmware File"
  Name and directory path of the file from which you want to load the new firmware.
- "FPGA File"
  Name and directory path of the file from which you want to load the new FPGA configuration.

- "SSL Private Key File"
  Name and directory path of the file from which you want to load the new SSL key.
- "SSL Certificate File"
  Name and directory path of the file from which you want to load the new SSL certificate.

How to download data using HTTP

1. In the relevant text box, enter a name and directory path for the file from which you want to take the data.
2. Start the download of the relevant file by clicking one of the buttons "Load Configuration and Restart", "Load Firmware and Restart" or "Load FPGA File and Restart", "Load Private Key" or "Load Certificate and Restart". Following the download, there is an automatic restart except with "Load Private Key" and the device starts up with the new data. Please note the following:

   Note

   If a firmware version is loaded that is older than the current version, it is possible that the current parameter record cannot be adopted. In this case the current IP address is deleted and access using WBM, CLI or SNMP is no longer possible. This means that after downloading the firmware and restarting the device, the IP address needs to be assigned again with the SINEC PNI and the required parameters set again.

   Note

   If newer firmware and a newer FPGA version required on the device, it is advisable to download the FPGA and then the firmware following the restart.

How to save data using HTTP

1. Start the save function by clicking either the "Save Configuration" or "Save Private MIB" button.
2. You will be prompted to select a storage location and a name for the file or to accept the proposed file name.

Reusing configuration data

Saving and reading in configuration data reduces the effort if several devices of the SCALANCE X-200RNA product line have the same configuration and when IP addresses are obtained using DHCP.

Save the configuration data on your computer after you have configured a SCALANCE X-200RNA.

Download this file to all other devices of the SCALANCE X-200RNA product line you want to configure.

If individual settings are necessary for specific devices, these must be made online.

The stored configuration data is coded and, as a result, these files cannot be edited with a text editor.

9.8.5 System Version Numbers

Versions of hardware and software

This dialog box shows the versions of the hardware and software with which the SCALANCE X-200RNA is being operated:

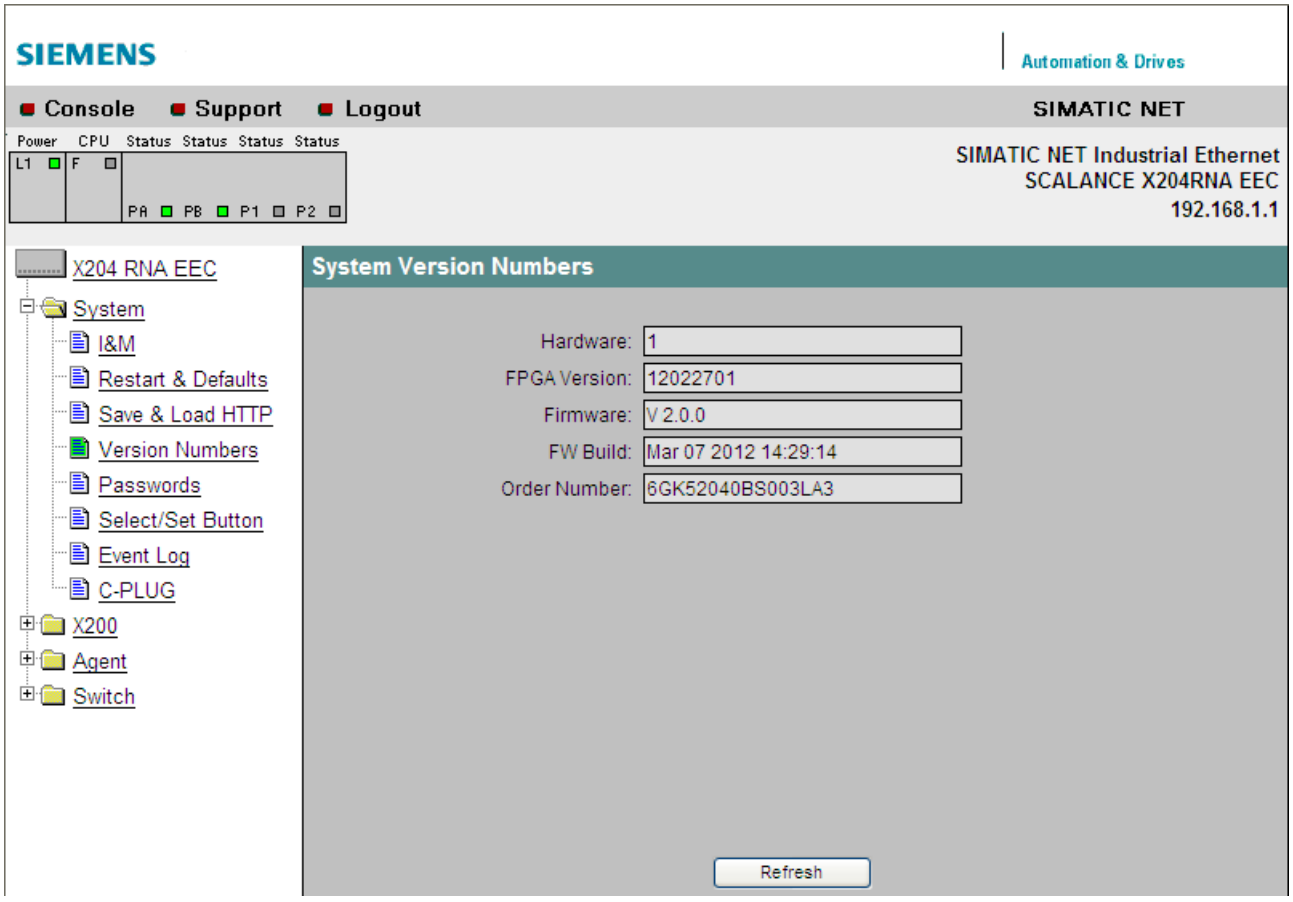


Figure 9-11 System Version Numbers

- "Hardware"
  The version of the firmware is shown here. The hardware version (= product version) is stored permanently on the SCALANCE X-200RNA.
- "FPGA Version"
  The FPGA version is shown here.
- "Firmware"
  The version of the firmware running on the SCALANCE X-200RNA.
- "FW Build"
  The date on which the firmware running on the SCALANCE X-200RNA was created is displayed here.
- "Order Number"
  The order number of the device is shown here.

9.8.6 System Passwords

Note

Default for the passwords when supplied

Admin password: admin

User password: user

In this dialog box, if you are the administrator, you can change the passwords for Admin and User. The password can be up to a maximum of 16 characters (7-bit ASCII) long.

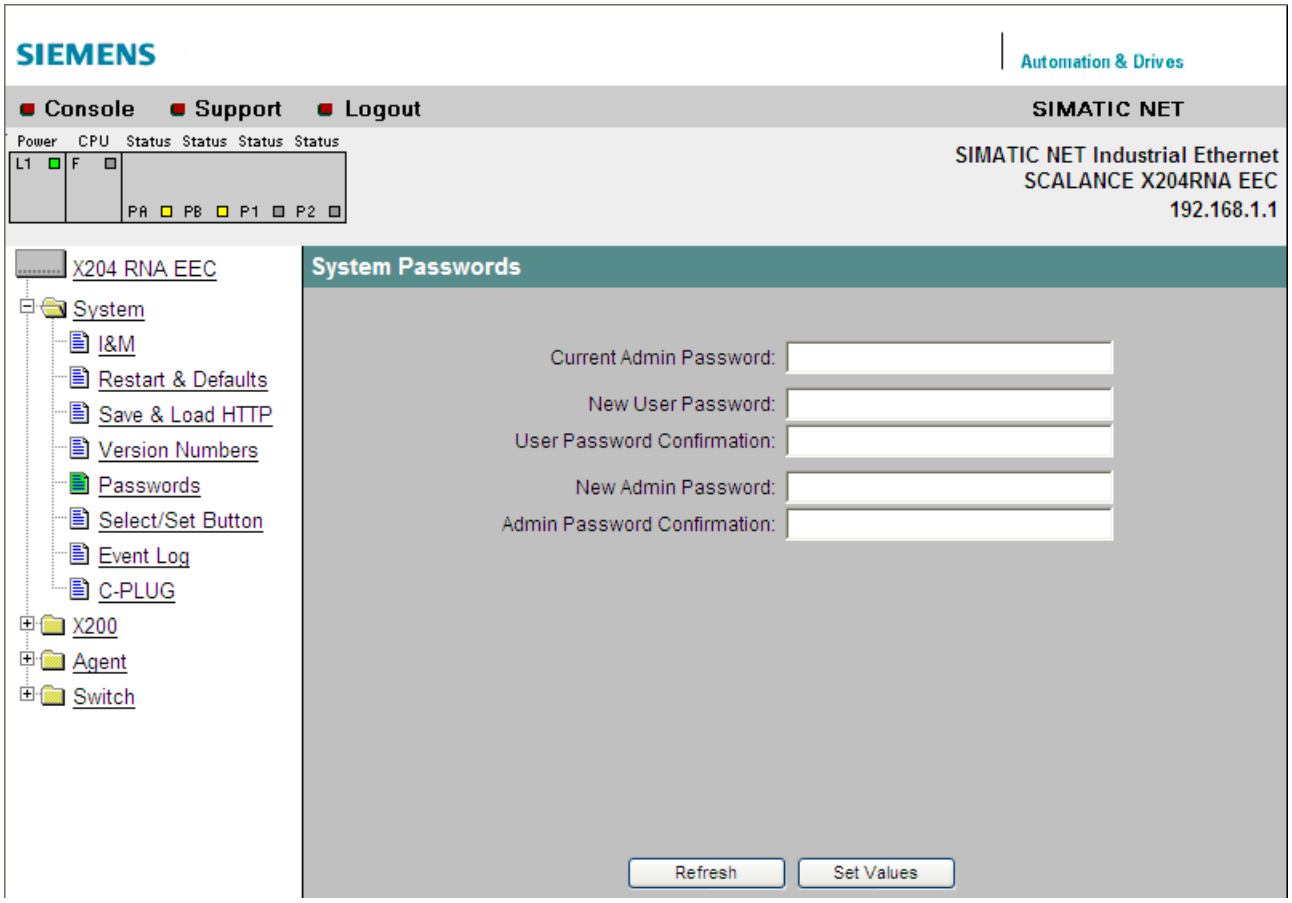


Figure 9-12 System Passwords

You apply your settings with "Set Values".

9.8.7 System SELECT/SET button

Configuring the SELECT/SET button

On the SCALANCE X-200RNA, the SELECT/SET button is used to

- Change the display mode
- Reset to the factory defaults
- Define the dialog box and the LED display

You will find a detailed description of the individual functions available with the button in the section "SELECT/SET button (Page 49)".

On this page, the functionality of the SELECT/SET button can be restricted or fully disabled. This is possible for the following three functionalities:

- "Restore Factory Defaults"
- "Enable/Disable Reset"
- "Set Fault Mask"

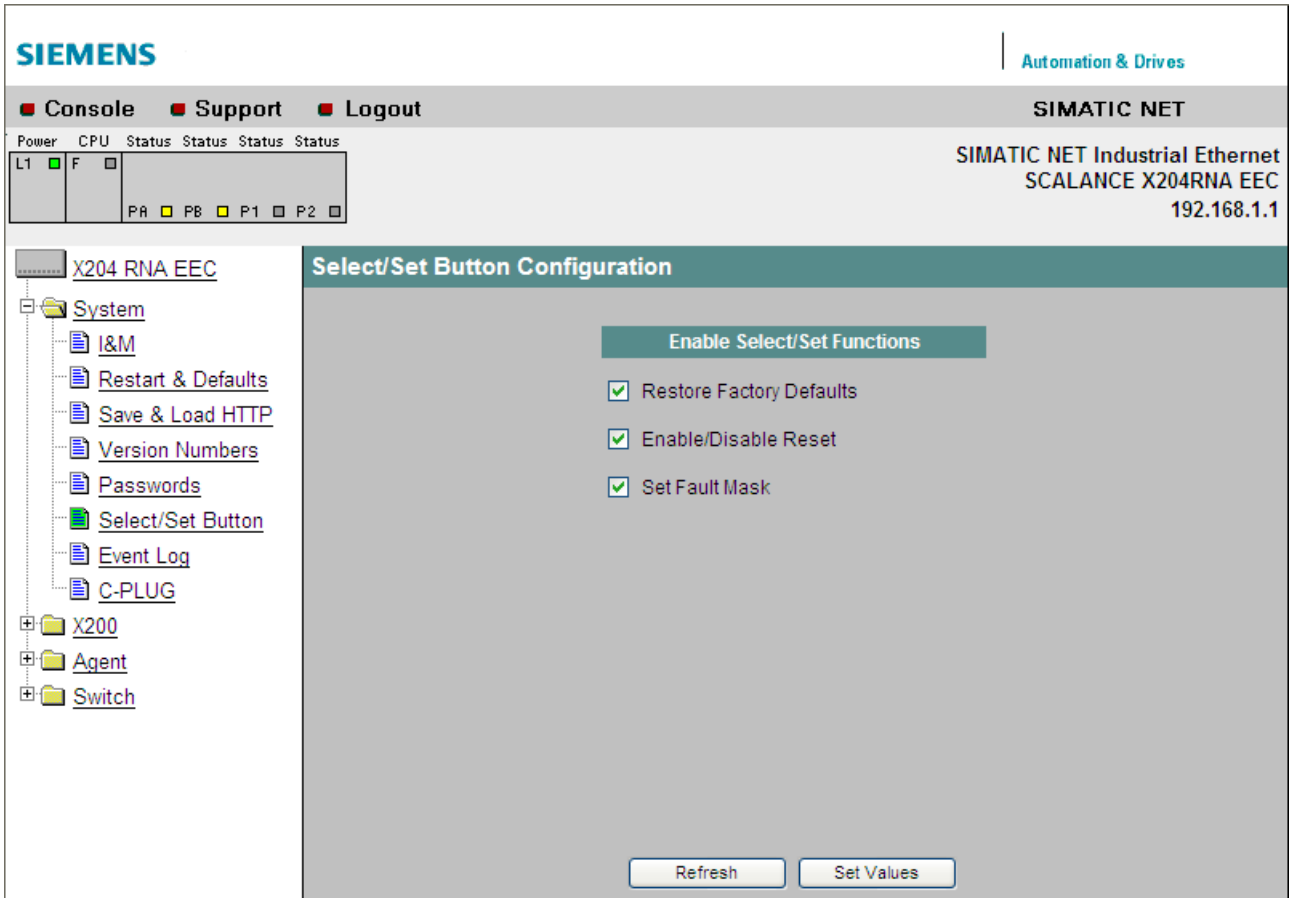


Figure 9-13 Select/Set button configuration

Enable Select/Set Functions

You can enable or disable the individual functions of the button by selecting or deselecting the relevant check box.

You apply your settings with "Set Values".

9.8.8 System Event Log Table

Logging events

A SCALANCE X-200RNA allows you to log events and to display them on the page of the "Log Table" menu. This, for example, allows you to record when an SNMP authentication attempt failed or when the connection status of a port has changed. You can specify which events are logged in the "Agent Event Configuration" menu item.

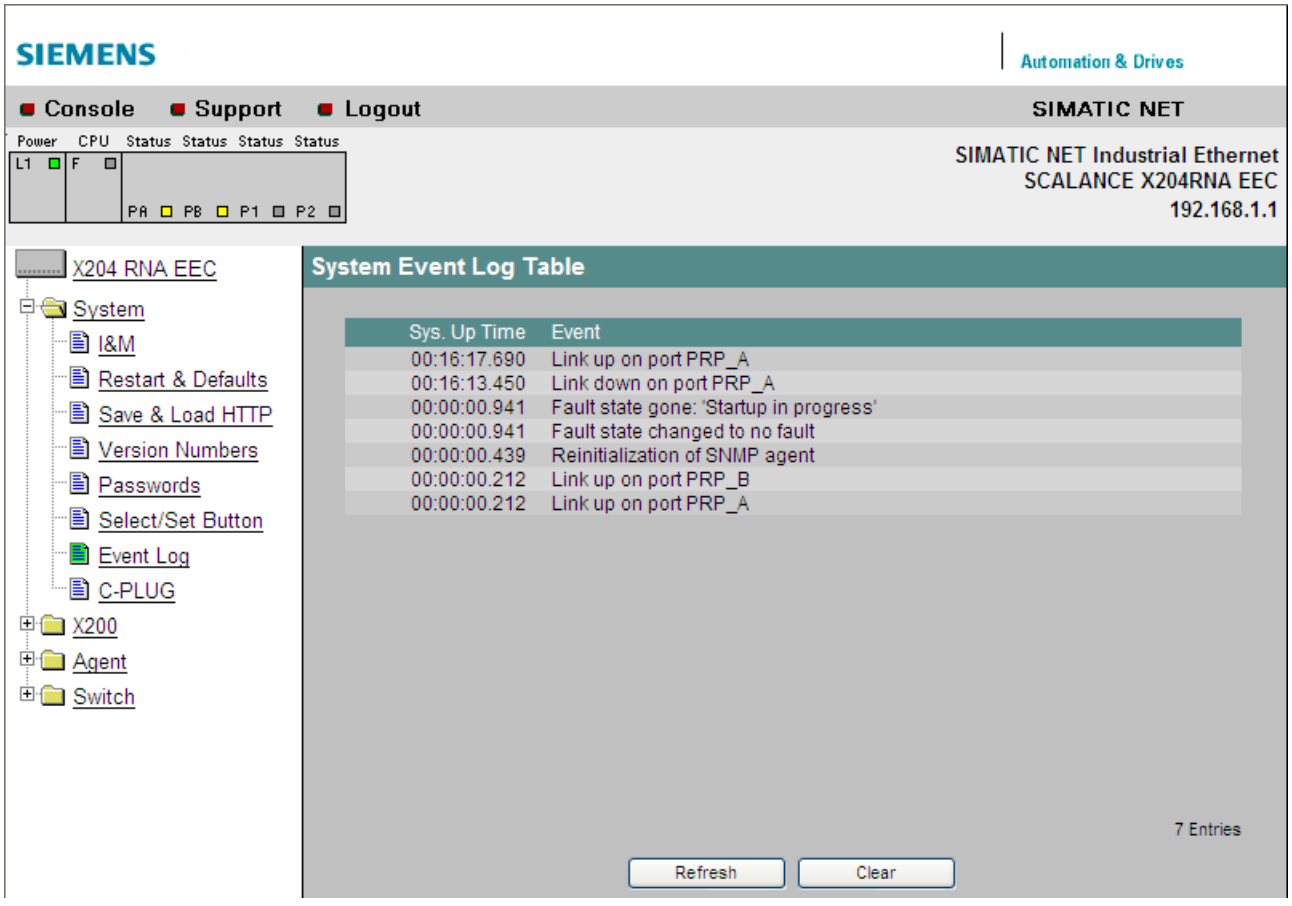


Figure 9-14 System Event Log Table

- "Sys.Up Time"
  This column shows the time since the SCALANCE X-200RNA was last restarted in the format HH:MM:SS.
- "Refresh"
  Click this button to refresh the display.
- "Clear"
  With this button, you can delete the content of the log table.

9.8.9 C-PLUG Information

A SCALANCE X-200RNA allows configuration data to be stored on an external C-PLUG and configuration data to be loaded from an external C-PLUG. The C-PLUG information menu allows you to read out the inserted C-PLUG and to manage configuration data stored on it.

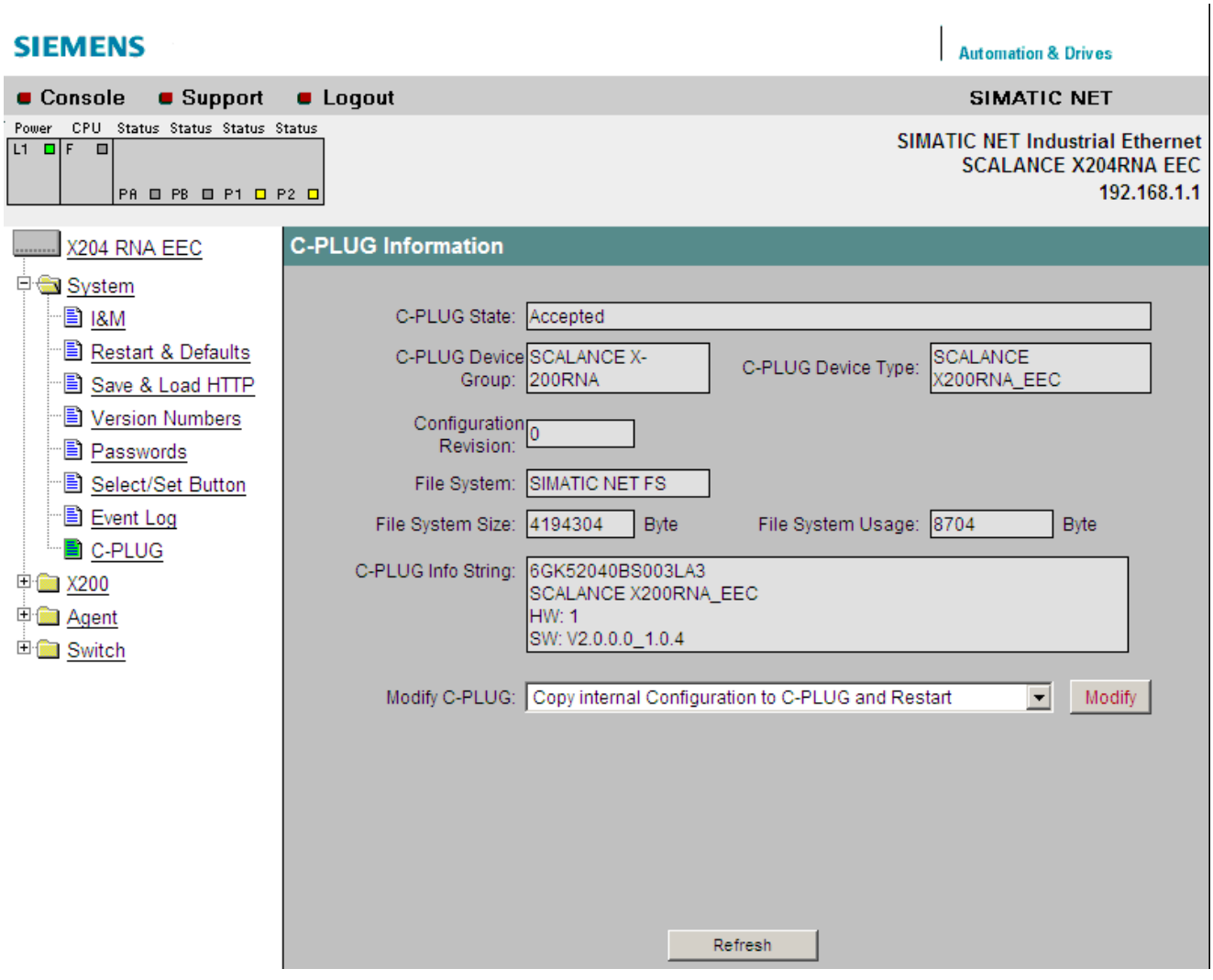


Figure 9-15 C-PLUG Information

- "C-PLUG State" (read-only)
  The status of the C-PLUG.
- "C-PLUG Device Group" (read-only)
  The module to which the C-PLUG belongs.
- "C-PLUG Device Type" (read-only)
  The device type of the C-PLUG.
- "Configuration Revision" (readonly)
  Configuration version of the C-PLUG.
- "File System" (readonly)
  Data system of the C-PLUG.
- "File System Size" (readonly)
  Size of the available data system memory of the C-PLUG.
- "File System Usage" (readonly)
  Size of the memory of the C-PLUG used by the data system.
- "C-PLUG Info String" (read-only)
  Information line of the C-PLUG.
- "Modify C-PLUG"
  Modification of the configuration stored on the C-PLUG.
  - Copying the current configuration on the C-PLUG with associated restart
  - Copying the factory configuration to the C-PLUG with associated restart
  - Deleting the configuration stored on the C-PLUG

9.9 The "X200" menu

9.9.1 X200 Status

Information on the operating status

This dialog box appears if you click the "X200" folder icon.

The dialog box shows information about the power supply and the error status.

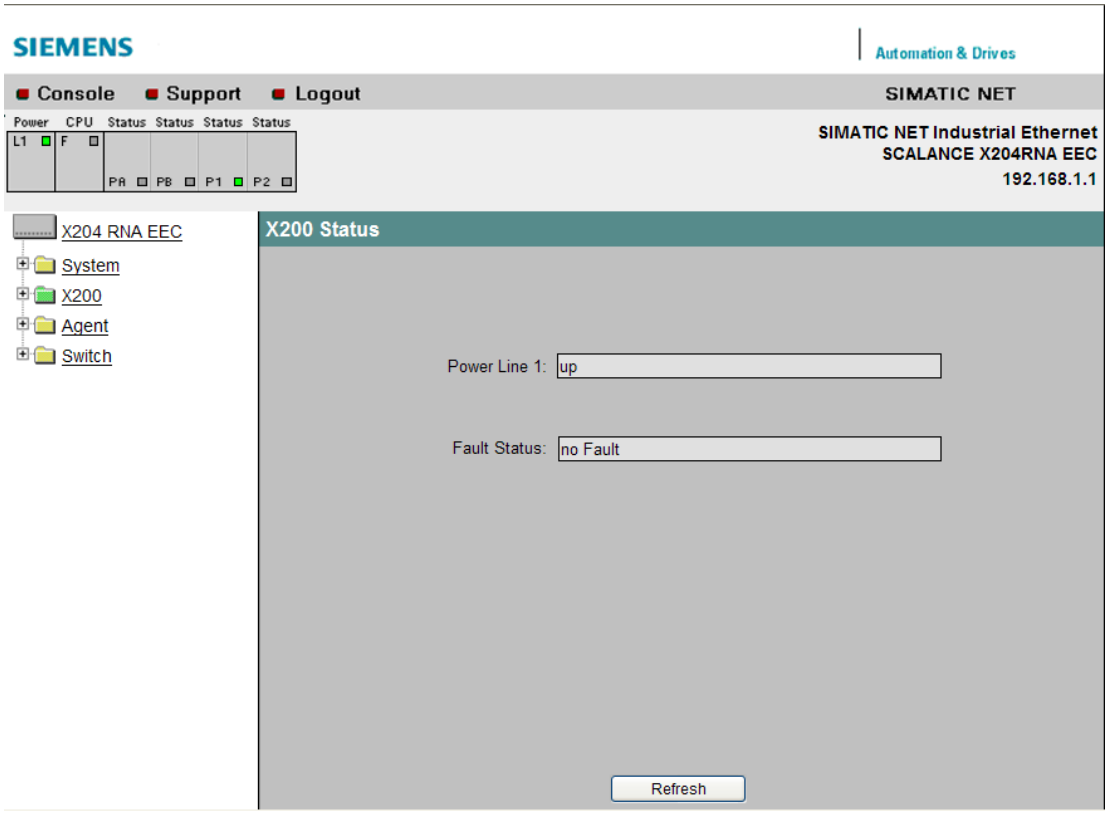


Figure 9-16 X200 Status

- "Power Line 1"
  - "Up":
    Power supply 1 (line 1) is applied.
  - "Down":
    Power supply 1 is not applied or is below the permitted voltage.
- "Power Line 2" (SCALANCE X204RNA only, not illustrated)
  - "Up":
    Power supply 2 (line 2) is applied.
  - "Down":
    Power supply 2 is not applied or is below the permitted voltage.
- "Fault Status"
  The fault status of the SCALANCE X-200RNA is shown here. The following table contains examples of possible error messages. If more than one problem has occurred, they are listed in the text box one above the other.

Error messages	Meaning
Redundant power line down	The redundant power supply has failed.
Link down on monitored port	The connection to a monitored port is interrupted.
No Fault	The SCALANCE X-200RNA has not detected a fault (the signaling contact has not responded and the fault LED is not lit).

9.9.2 PRP configuration

The PRP-specific parameters are entered in the "PRP Config" dialog box.

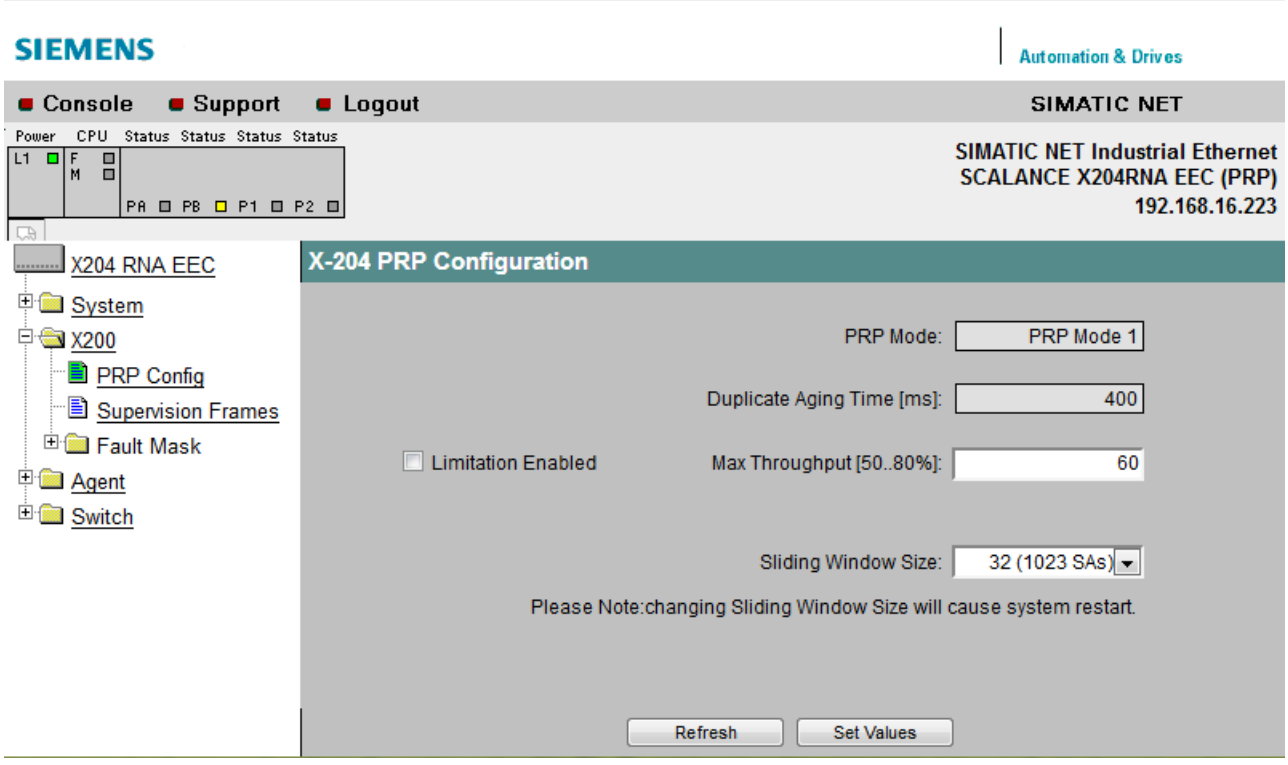


Figure 9-17 PRP configuration

- "PRP Mode"
  The mode used is PRP (previously "PRP Mode 1"). This value cannot be changed.
- "Duplicate Aging Time"
  The default value from the PRP standard is 400 ms. This value cannot be changed.

- "Limitation / Max Throughput"
  By setting the check mark for "Limitation Enabled", the data throughput from the interlinks to the PRP ports is limited to the set value. The limitation can be specified with "Max Throughput". A limitation between 50 and 80% is possible. If the load on the interlinks is greater than the value set, frames are discarded. This occurs regardless of Ethertypes and any VLAN priorities.
- "Sliding Window Size"
  With this function, you can change the properties of the duplicate filter that filters redundantly received packets. The default value is 32 (1023 SAs).
  When you increase the number of possible "Source MAC addresses", the number of sequence numbers that can be filtered per "Source MAC address" also increases. At the same time, the number of "Source MAC addresses" whose packets can be filtered decreases.
  When you decrease the number of possible "Source MAC addresses", fewer sequence numbers can be filtered per "Source MAC address". However, the number of "Source MAC addresses" that the duplicate filter can filter is increased.

Note

Increasing the "Sliding Window Size" makes sense when there are significant runtime differences between the PRP_A and PRP_B subnets due to different network topologies.

9.9.3 HSR Coupling Configuration

HSR Coupling Configuration

The HSR-specific parameters are entered in the "Coupling Configuration" dialog box.

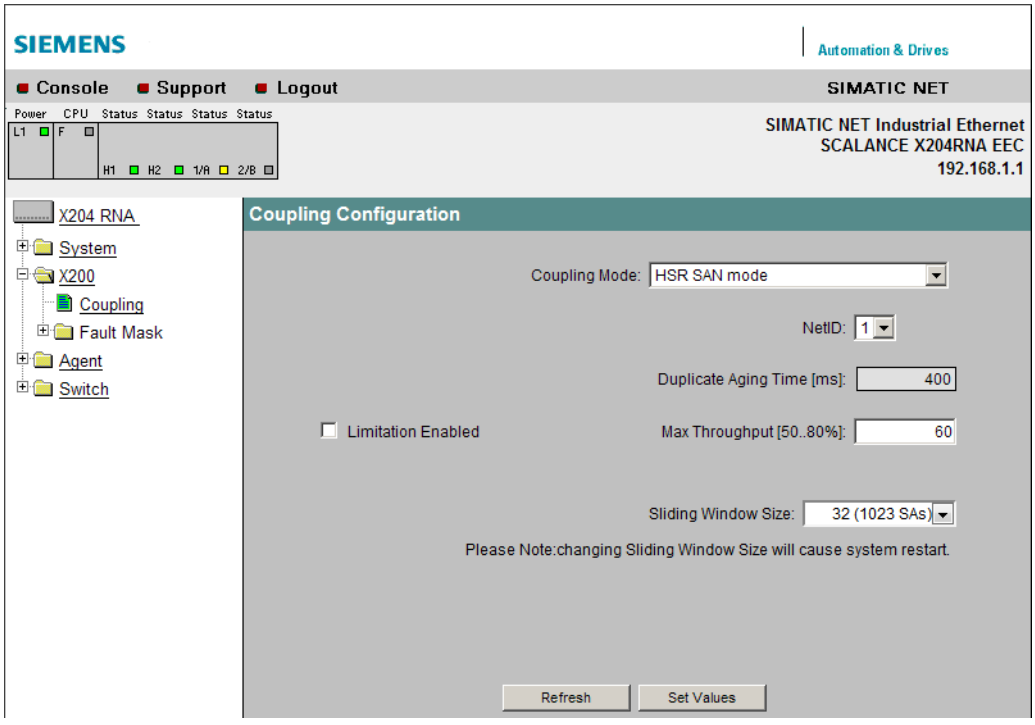


Figure 9-18 X204 Coupling Configuration

- "Coupling Mode"
  Here you can set the coupling mode between HSR and the remaining network.

Coupling Mode	Meaning
HSR SAN Mode	The HSR ring is connected with Standard Ethernet end devices or network segments (default).
Non Redundant HSR PRP coupling	Setting with non-redundant HSR<->PRP coupling. P1/A is connected with LAN A, P2/B with LAN B of a PRP network.
Redundant HSR PRP coupling, LAN A	Setting with redundant HSR<->PRP coupling. P1/A is connected with LAN A of a PRP network. P2/B is open and may not be used.
Redundant HSR PRP coupling, LAN B	Setting with redundant HSR<->PRP coupling. P1/B is connected with LAN B of a PRP network. P1/A is open and may not be used.

- "NetID"
  Here you can set the network ID of the connected PRP network. The valid value range is 1 to 6.
  The NetID is used to distinguish between frames from different redundant PRP networks in an HSR ring. It is not relevant in "HSR SAN Mode".

- "Duplicate Aging Time"
  The default value from the HSR standard is 400 ms. This value cannot be changed.
- "Limitation Enabled" / "Max. Throughput"
  By selecting the "Limitation Enabled" check box, the data throughput from the interlinks to the HSR ports is limited to the set value. The limitation can be specified with "Max Throughput". A limitation between 50% and 80% is possible. If the load on the interlinks is greater than the value set, frames are discarded. This occurs regardless of Ethertypes and any VLAN priorities.
- "Sliding Window Size"
  You can use this function to change the properties of the duplicate filter that filters redundantly received packets. The default value is 32 (1023 SAs).
  If you increase the number of possible "Source MAC addresses", this increases the number of sequence numbers that can be filtered per "Source MAC address". At the same time, the number of "source MAC addresses" whose packets can be filtered is reduced.
  If you reduce the number of possible "Source MAC addresses", fewer sequence numbers can be filtered per "Source MAC address". However, the number of "Source MAC addresses" that the duplicate filter can filter is increased.

Note

Increasing the "Sliding Window Size" makes sense if there are significant runtime differences between the two directions in the HSR ring due to different network topologies.

9.9.4 Supervision Frames

In the "Supervision Frames" dialog box, you enable/disable sending of Supervision Frames per port.

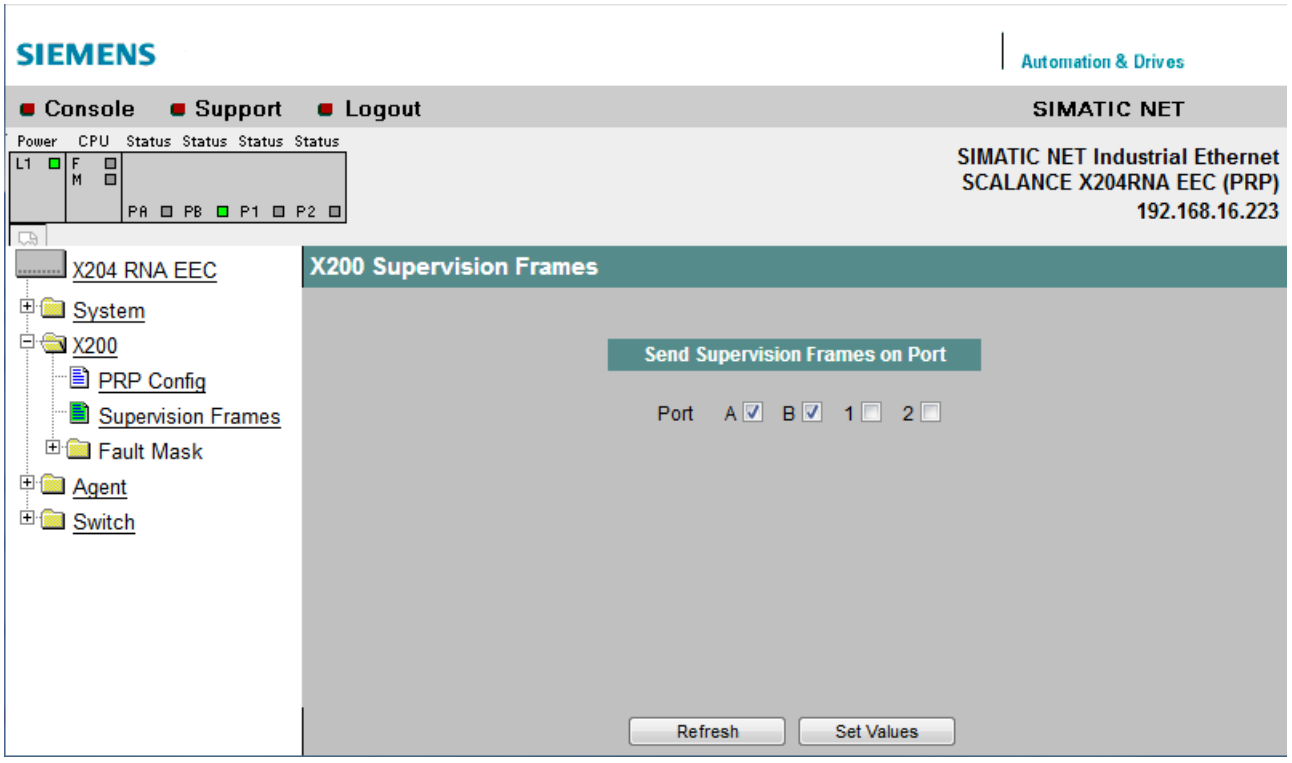


Figure 9-19 Supervision Frames

Send Supervision Frames on Port

Select the check box for the ports at which you want to send Supervision Frames.

When the check box for a port is cleared, neither are own Supervision Frames sent to this port nor are Supervision Frames that were received at different ports forwarded to this port.

9.9.5 Fault Mask

Function of the "X200 Fault Mask Power" dialog box

With the "X200 Fault Mask Power" dialog box, you specify the fault/error states to be monitored by the SCALANCE X-200RNA and that will trigger the signaling contact. Possible fault/error states are the absence of the power supply, power supply too low, or an interrupted connection or an unexpected connection established to a partner device. If the signaling contact is triggered, this causes the fault LED on the device to light up and, depending on the configuration of the event table, can trigger a trap or an entry in the log table.

Device-related link monitoring of the ports

A SCALANCE X-200RNA provides device-related link monitoring. A link-up or link-down also affects the message system if the SCALANCE X-200RNA was appropriately configured.

Setting of the "X200 Fault Mask Power" dialog box on the device

Optionally, the dialog box can be set using the SELECT/SET button on the SCALANCE X-200RNA. For more detailed information, refer to the section "SELECT/SET button (Page 49)".

Settings in WBM

In WBM, you can set the monitoring of the power supply (SCALANCE X204RNA only) and the device-related link monitoring. The settings are made in three separate dialog boxes:

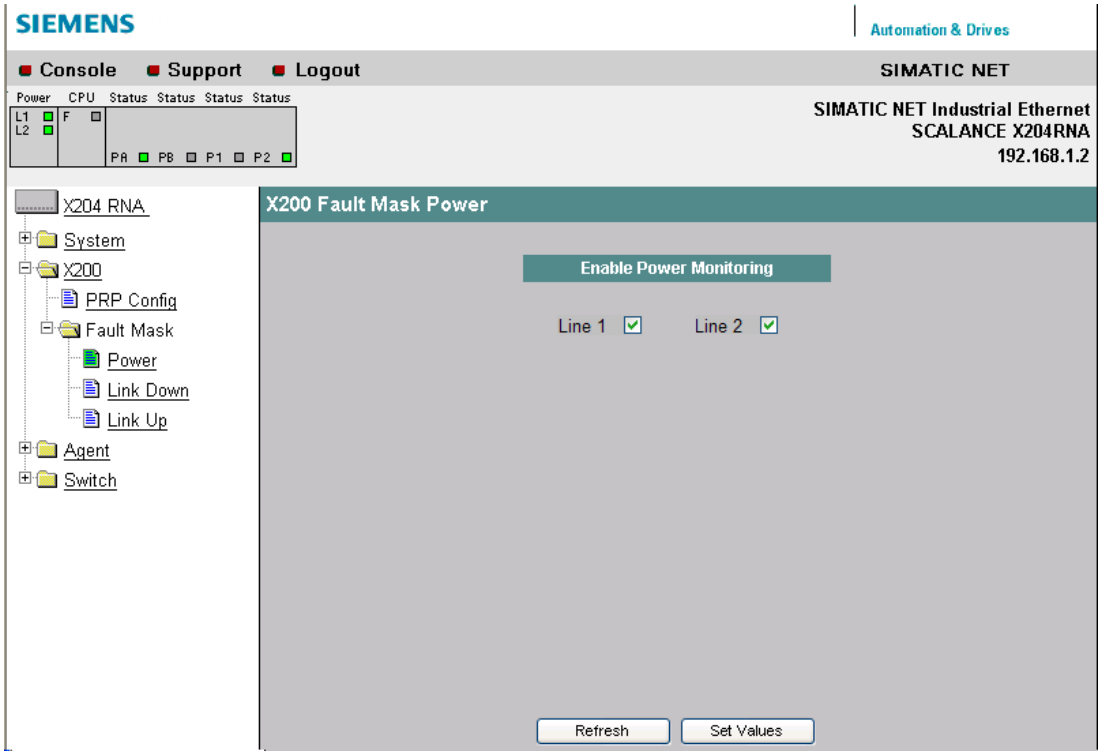


Figure 9-20 SCALANCE X204RNA Fault Mask Power Monitoring

Enable Power Monitoring (SCALANCE X204RNA only)
Here, you specify which of the two power supplies of the SCALANCE X204RNA (line 1 and line 2) is monitored. A fault is then indicated by the message system when there is no power on one of the monitored lines (line 1 or line 2) or when the voltage is too low (less than 14 V).

Note

This dialog box is not displayed with the SCALANCE X204RNA EEC because it does not have a redundant power supply.

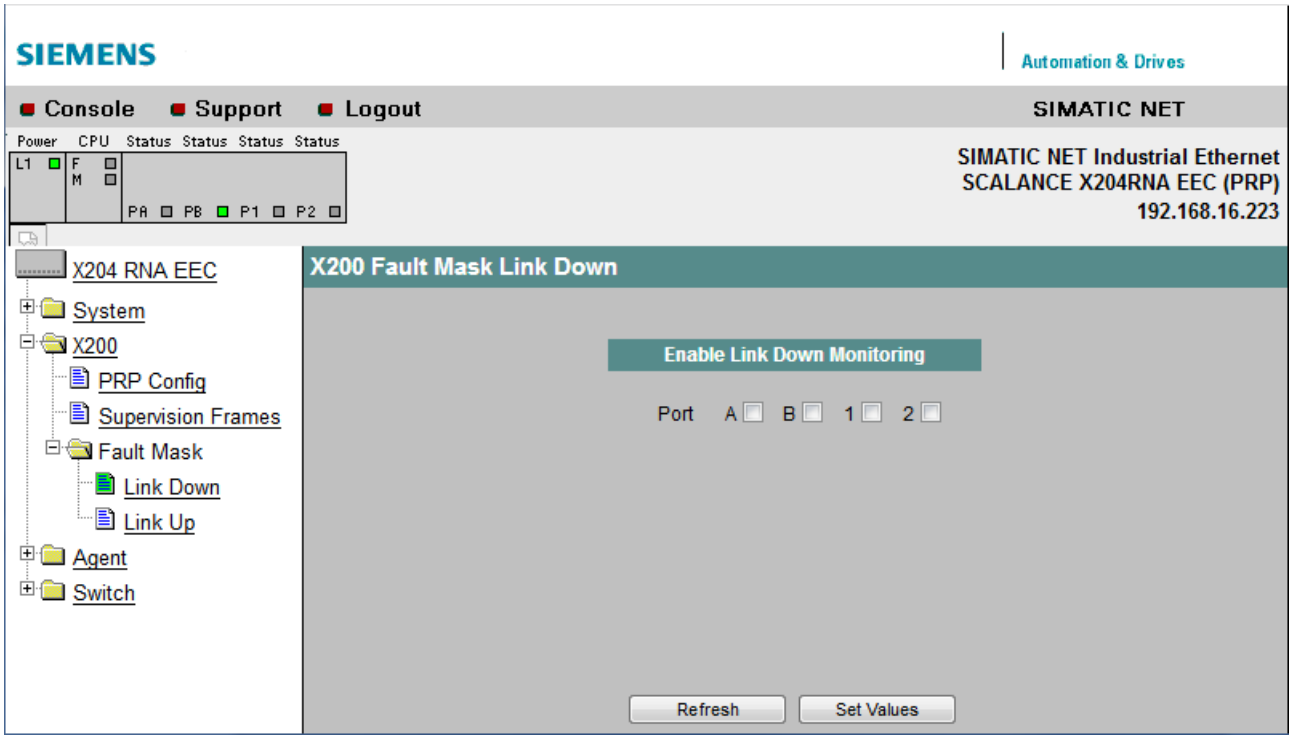


Figure 9-21 Fault Mask Link Down Monitoring

Enable Link Down Monitoring
Select the check boxes of the ports whose connection status you want to monitor. If link monitoring is activated, an error is signaled when there is no valid link at this port because, for example, the cable is not plugged in or the connected device is turned off.

An error/fault can be signaled in the following ways depending on the configuration of the SCALANCE X-200RNA: Signaling contact, fault LED, SNMP trap, entry in the log table and the syslog.

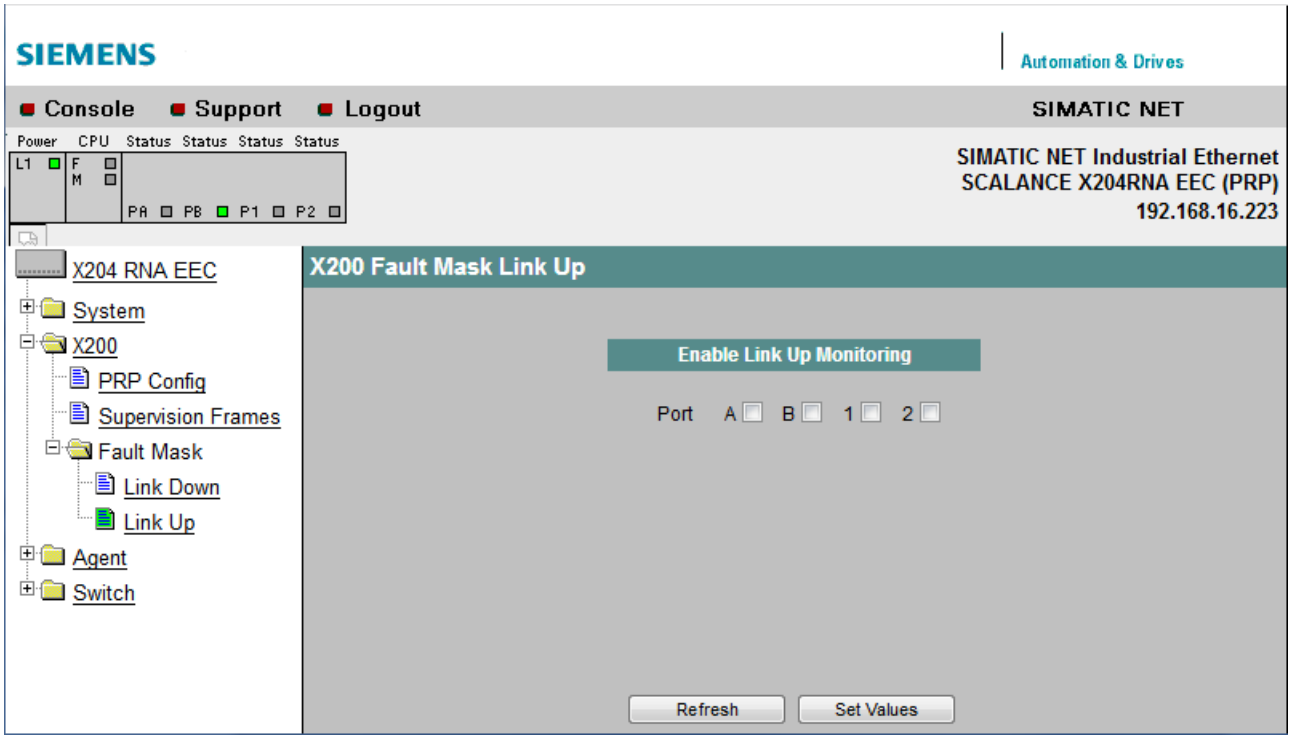


Figure 9-22 Fault Mask Link Up Monitoring

Enable Link Up Monitoring
Select the check boxes of the ports whose connection status you want to monitor. If link monitoring is activated, an error is signaled when there is a valid link at this port because, for example, the cable should not be plugged in.

An error/fault can be signaled in the following ways depending on the configuration of the SCALANCE X-200RNA: Signaling contact, fault LED, SNMP trap, entry in the log table and the syslog.

9.10 The "Agent" menu

9.10.1 Agent Configuration

Introduction

The "Agent Configuration" dialog box appears if you click the "Agent" folder icon. This dialog box provides you with options for the IP address. You can specify whether a SCALANCE X-200RNA obtains the IP address dynamically or you can assign a fixed address.

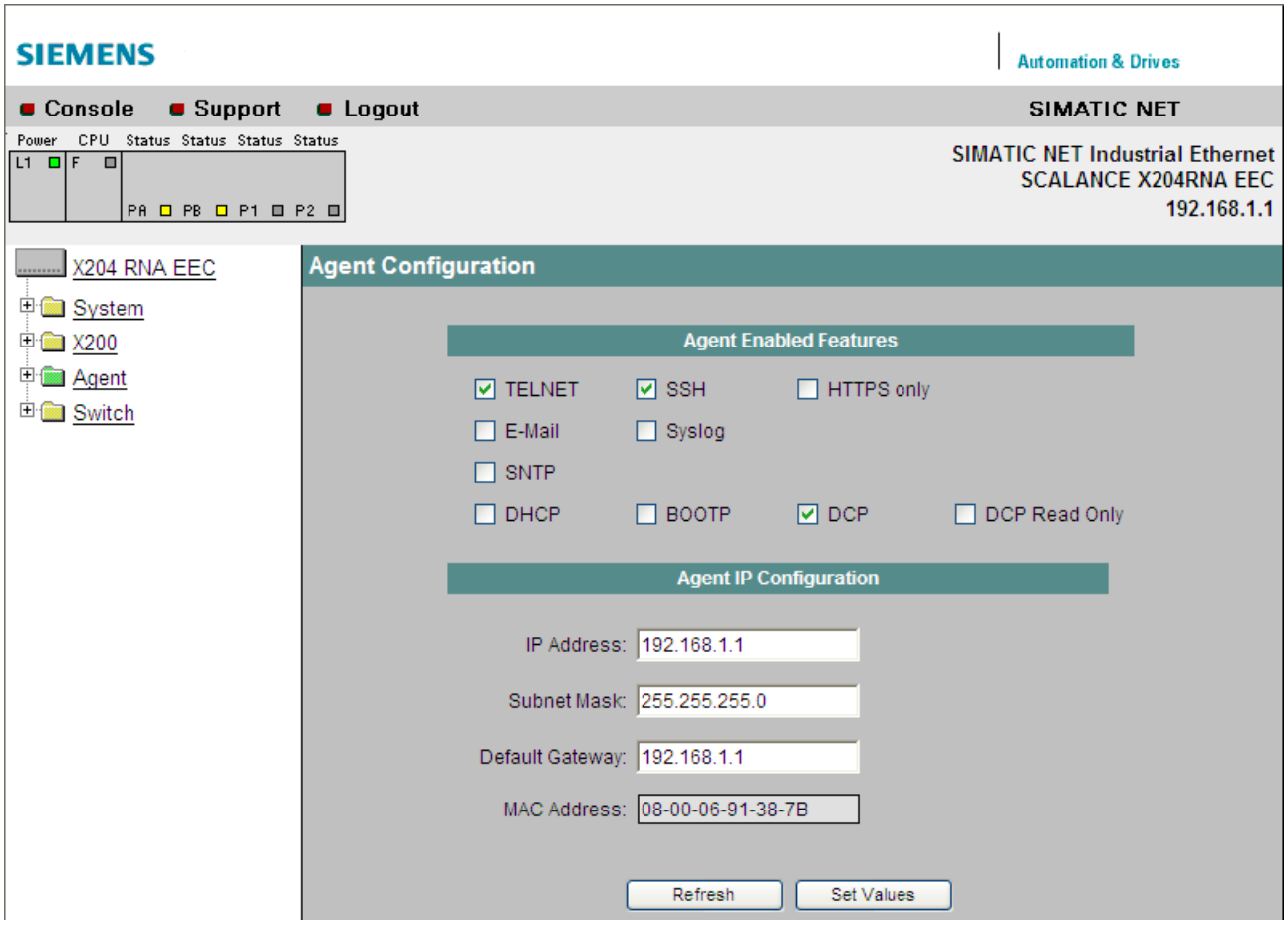


Figure 9-23 Agent Configuration

Agent Enabled Features

- "TELNET"
  Here, you specify whether or not an unencrypted connection using TELNET can be established.
- "SSH"
  Here, you specify whether or not an encrypted connection using SSH can be established.
- "HTTPS only"
  Here, you specify whether or not the WBM can only be reached via an SSL encrypted connection.
- "E-Mail"
  Here, you specify whether or not events are sent to an e-mail address.
- "Syslog"
  Here, you specify whether or not events are sent to a Syslog server.
- "SNTP"
  Enables / disables synchronization of the IE switch system time using an SNTP server in the network.
- "DHCP"
  Here, you specify whether or not the IP address can be obtained using the Dynamic Host Configuration Protocol.
- "BOOTP"
  Here, you specify whether the IP address can be obtained using the Bootstrap Protocol.
- "DCP"
  If you select this option, the device can be accessed and configured using DCP (SINEC PNI and STEP 7).
- "DCP Read Only"
  If you select this option, the configuration data can only be read via DCP (SINEC PNI and STEP 7).

Agent IP Configuration

- "IP Address"
  Enter the IP address of the SCALANCE X-200RNA here.
- "Subnet Mask"
  Enter the subnet mask of the SCALANCE X-200RNA here.
- "Default Gateway"
  If you require the IE switch to communicate with devices (diagnostics stations, E-mail servers, etc.) in a different subnet, you will need to enter the IP address of the default gateway here.
- "MAC Address"
  The MAC address of the SCALANCE X-200RNA.

Note

After changing the IP address, to be able to connect to the SCALANCE X-200RNA again, the new address will need to be entered in the WEB browser manually.

9.10.2 Agent Ping

The "Ping" dialog box appears if you click the "Agent" folder icon. In this dialog box, you can send a PING to another device in the network to check whether it can be reached.

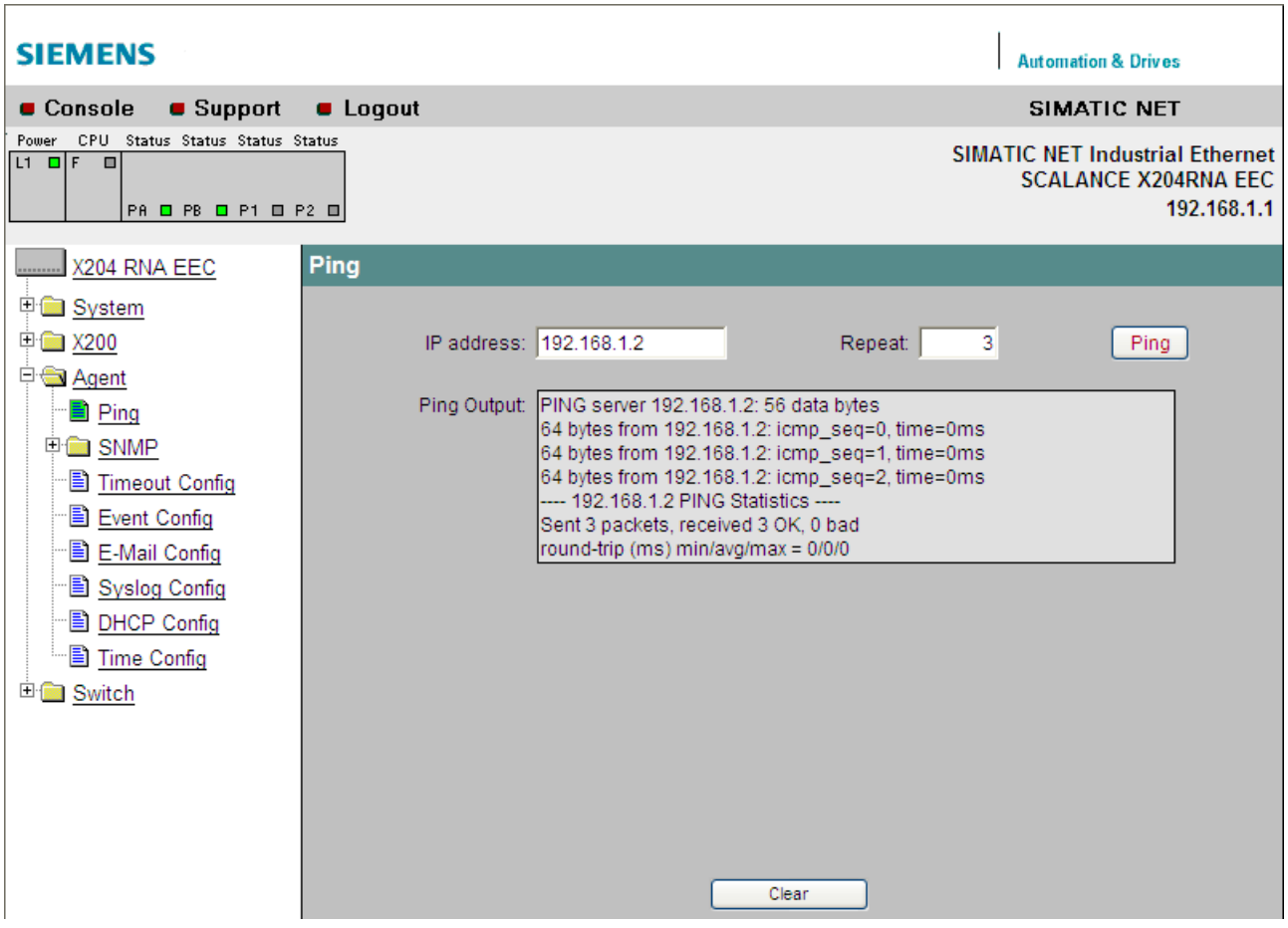


Figure 9-24 Ping

- "IP Address"
  Enter the IP address of the target device here.
- "Repeat"
  Here, enter how often the ping should be sent.
- "Ping"
  If you click the "Ping" button, you start the ping.

9.10.3 Agent SNMP Configuration

How SNMP works

Using SNMP (Simple Network Management Protocol), a network management station can configure and monitor SNMP-compliant nodes, such as a SCALANCE X-200RNA. To allow this, a management agent is installed on the SCALANCE X-200RNA with which the management station exchanges data. There are three frame types:

- Read (management station fetches values from a SCALANCE X-200RNA)
- Write (management station writes values to a SCALANCE X-200RNA)
- Send events to registered nodes (traps). The agent sends messages to registered management stations.

Access permissions with SNMP

When using the SNMP protocol, you specify access permissions by means of the community string. A community string contains information about the user name and password in a string. Different community strings are defined for read and write permissions. More complex and more secure authentications are possible only in some SNMPv2 variants and in SNMPv3.

Note

To preserve security, you should not use the default values "public" or "private".

Configuration of SNMP with a SCALANCE X-200RNA

The "Agent SNMP Configuration" dialog box appears if you click the "SNMP" folder icon.

In the "Agent SNMP Configuration" dialog box, you make the basic settings for SNMP. Enable the check boxes according to the SNMP functionality you want to use. For detailed settings (for example traps), there are separate menu items in WBM.

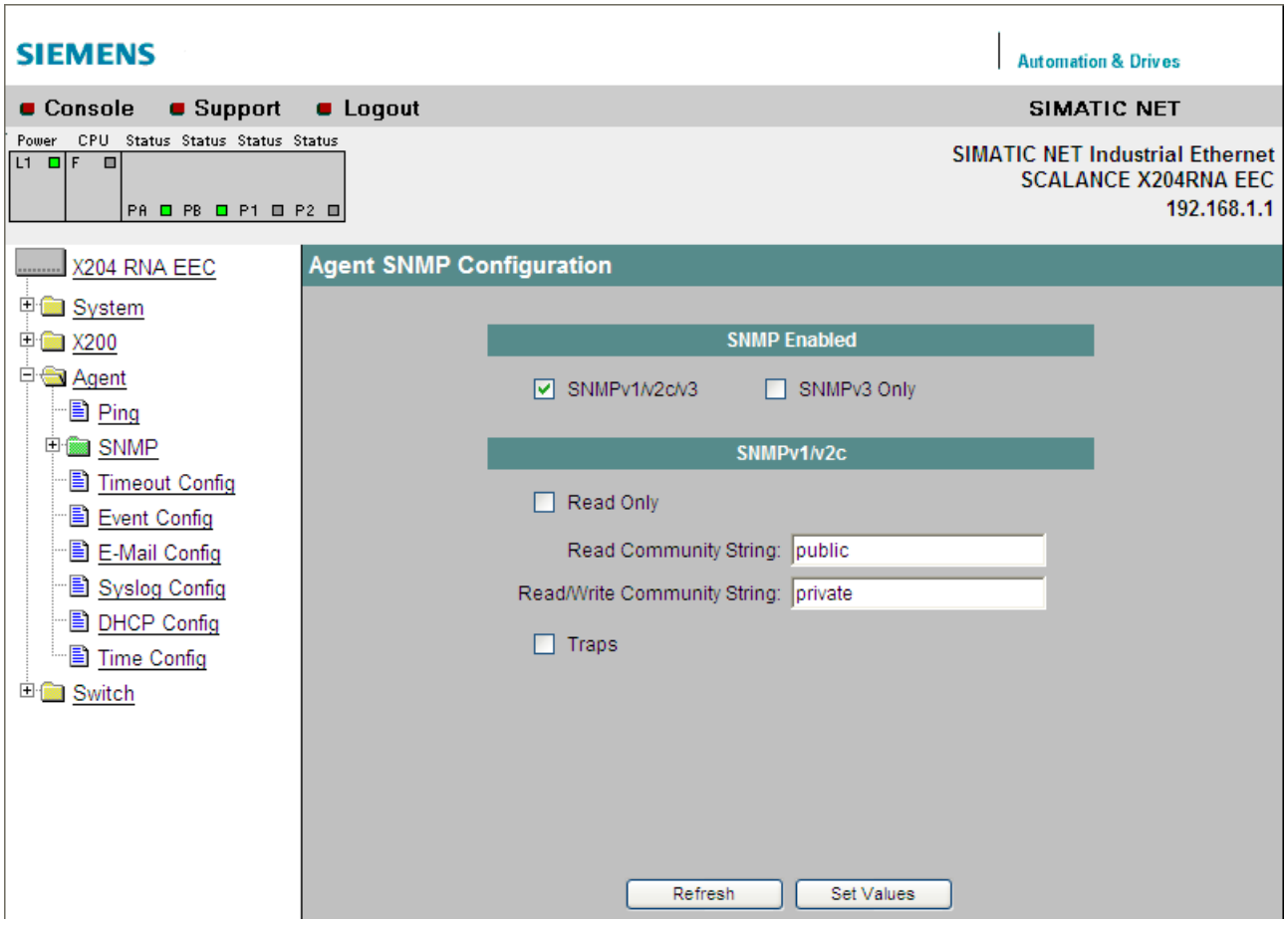


Figure 9-25 Agent SNMP Configuration

- "SNMPv1/v2c/v3"
  Here, you enable / disable SNMPv1/v2c/v3 for a SCALANCE X-200RNA.
- "SNMPv3 Only"
  Here, you enable / disable SNMPv3 Only for a SCALANCE X-200RNA.
- "Read Only"
  When this check box is selected, you can only read SNMP variables with SNMPv1/v2c.
- "Read Community String"
  Here, you enter the read community string (maximum of 63 characters) for the SNMP protocol.
- "Read/Write Community String"
  Here, you enter the write community string (maximum of 63 characters) for the SNMP protocol.
- "Traps"
  This enables / disables the sending of SNMPv1/v2c traps.

9.10.4 SNMP Trap Configuration

SNMP traps for alarm events

If an alarm event occurs, a SCALANCE X-200RNA can send traps (alarm frames) to up to 10 different (network management) stations at the same time. Traps are only sent when events as specified in the "Agent Event Configuration" menu occur (see Section "Agent Event Configuration (Page 129)").

Note

Traps are sent only when the "Traps" option was selected in "SNMP Configuration".

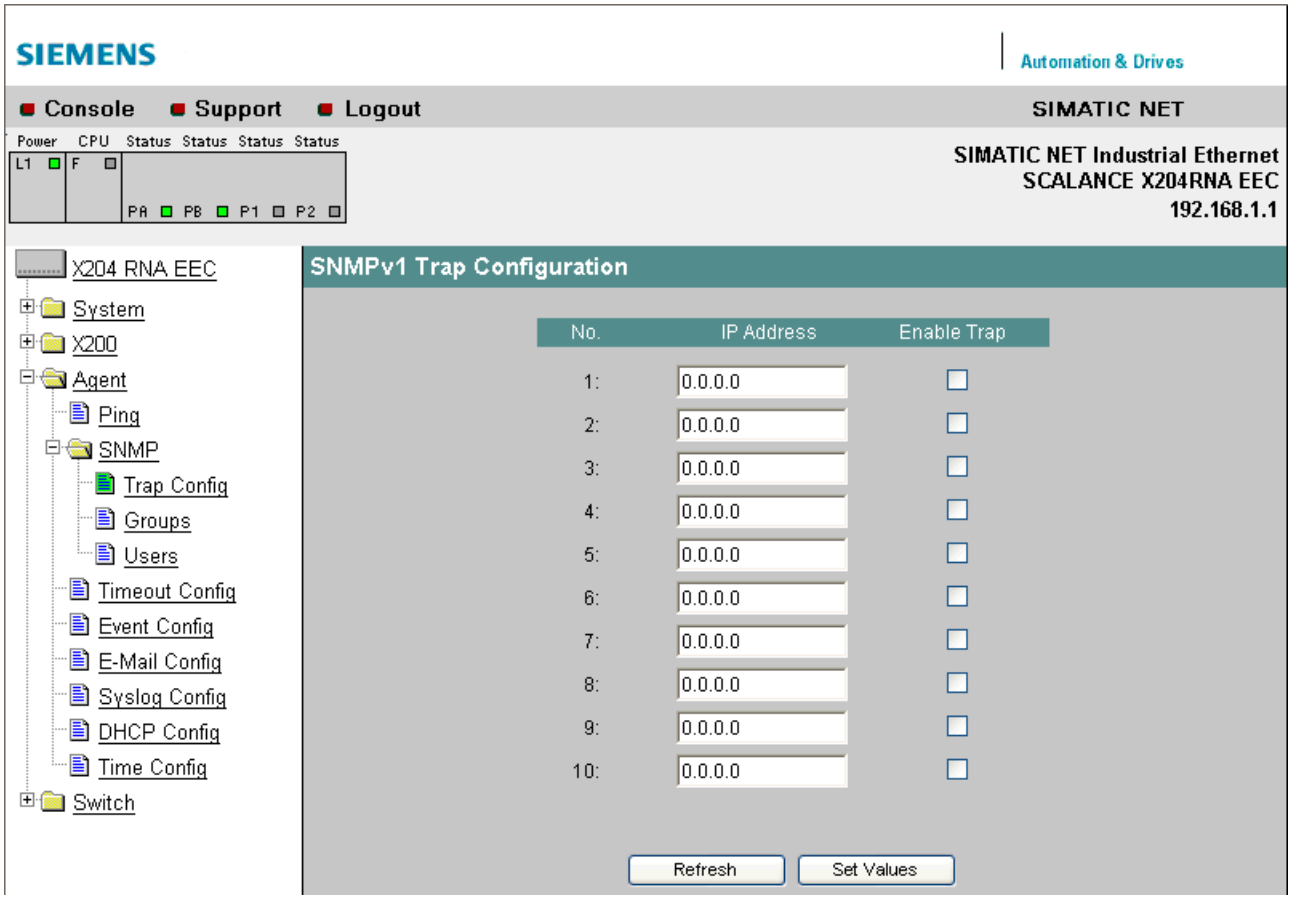


Figure 9-26 SNMPv1 Trap Configuration

- "IP Address"
  Here, you enter the IP addresses of the stations to which a SCALANCE X-200RNA will send traps.
- "Enable Trap"
  Click on the check box next to the IP addresses to enable the sending of traps to the corresponding stations.

9.10.5 SNMP v3 Groups

SNMP v3 Groups

The "SNMPv3 Groups" dialog box appears if you click the "Groups" folder icon.

It shows all existing SNMPv3 groups. The access rights of these groups can also be found in the table.

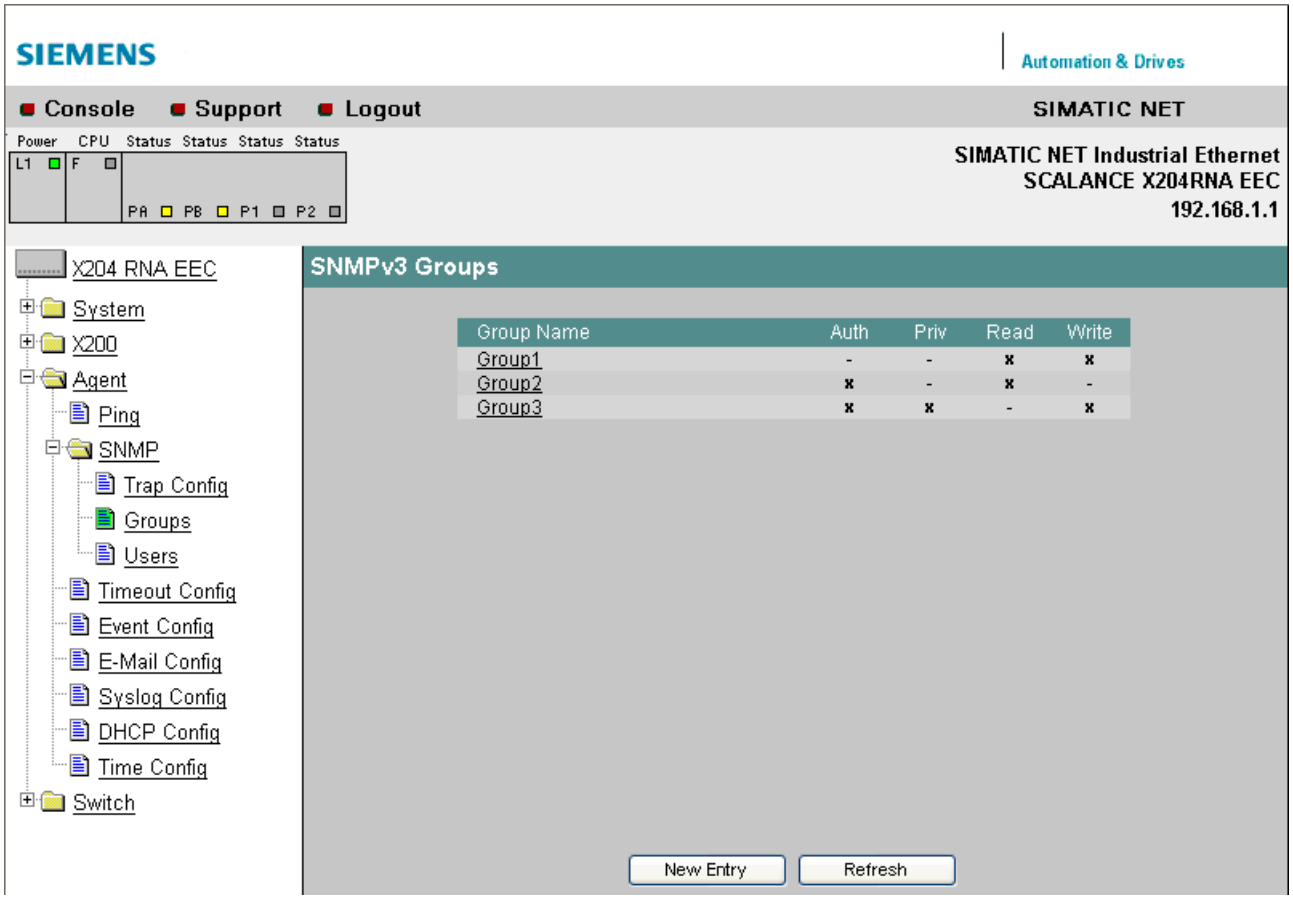


Figure 9-27 SNMPv3 Groups

By clicking the "New Entry" button or clicking on an entry, the "SNMPv3 Group Configuration" dialog box is displayed.

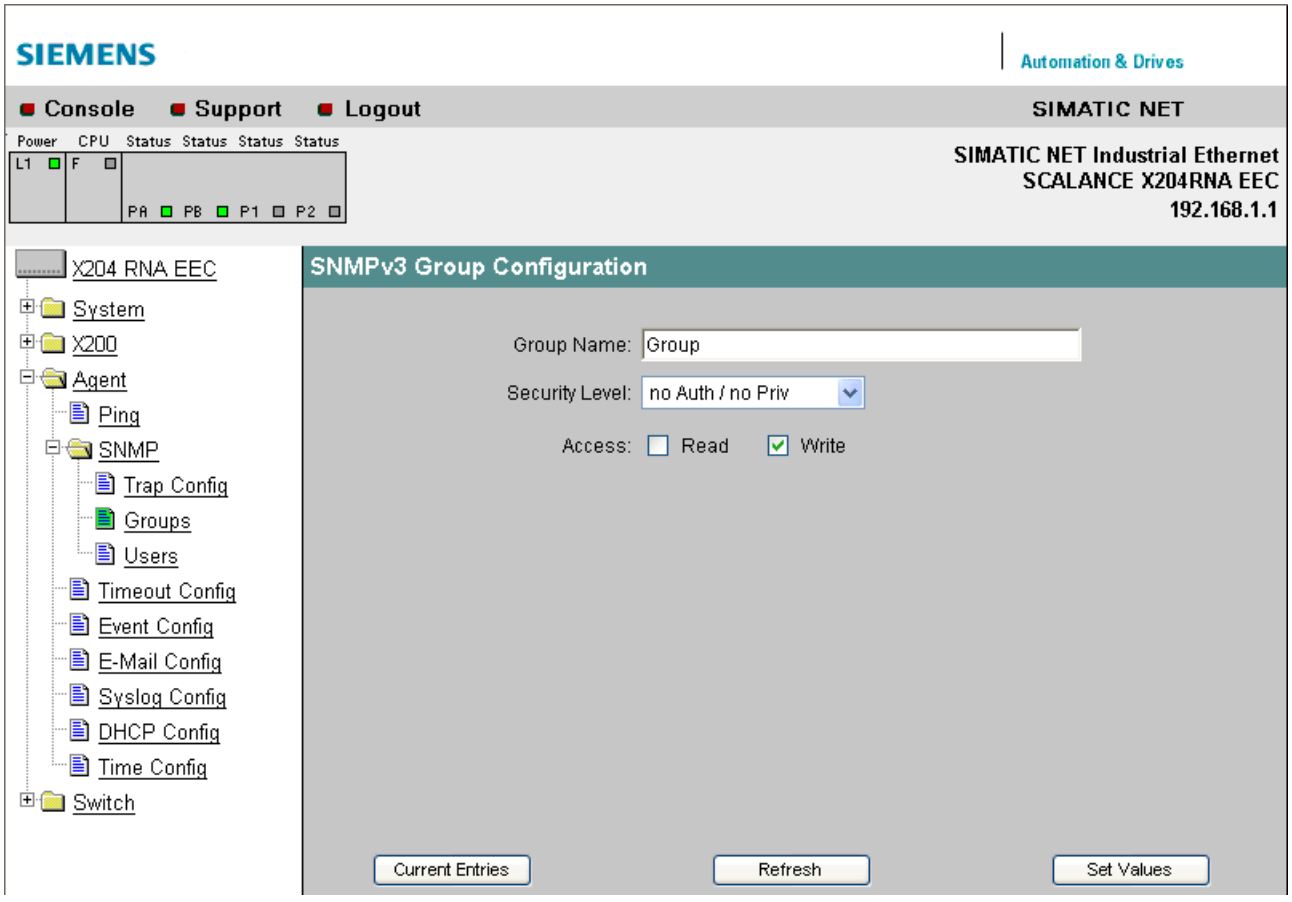


Figure 9-28 SNMPv3 Add Groups

- "Group Name"
  Here, enter the name of a new group.
- "Security Level"
  Here, enter the security level of the new group.
- "Access"
  Here, enter the access rights of the new group.
- "Set Values"
  By clicking the "Set Values" button, you create a group according to the parameters set above.
- "Current Entries"
  By clicking the "Current Entries" button, you exit the "SNMPv3 Group Configuration" dialog box and return to the "SNMPv3 Groups" dialog box.

9.10.6 SNMP v3 User

SNMP v3 User

The "SNMPv3 Users" dialog box appears if you click the "Users" folder icon.

It shows all existing SNMPv3 users. You can also see the groups to which the user belongs and the security level of the user in the table.

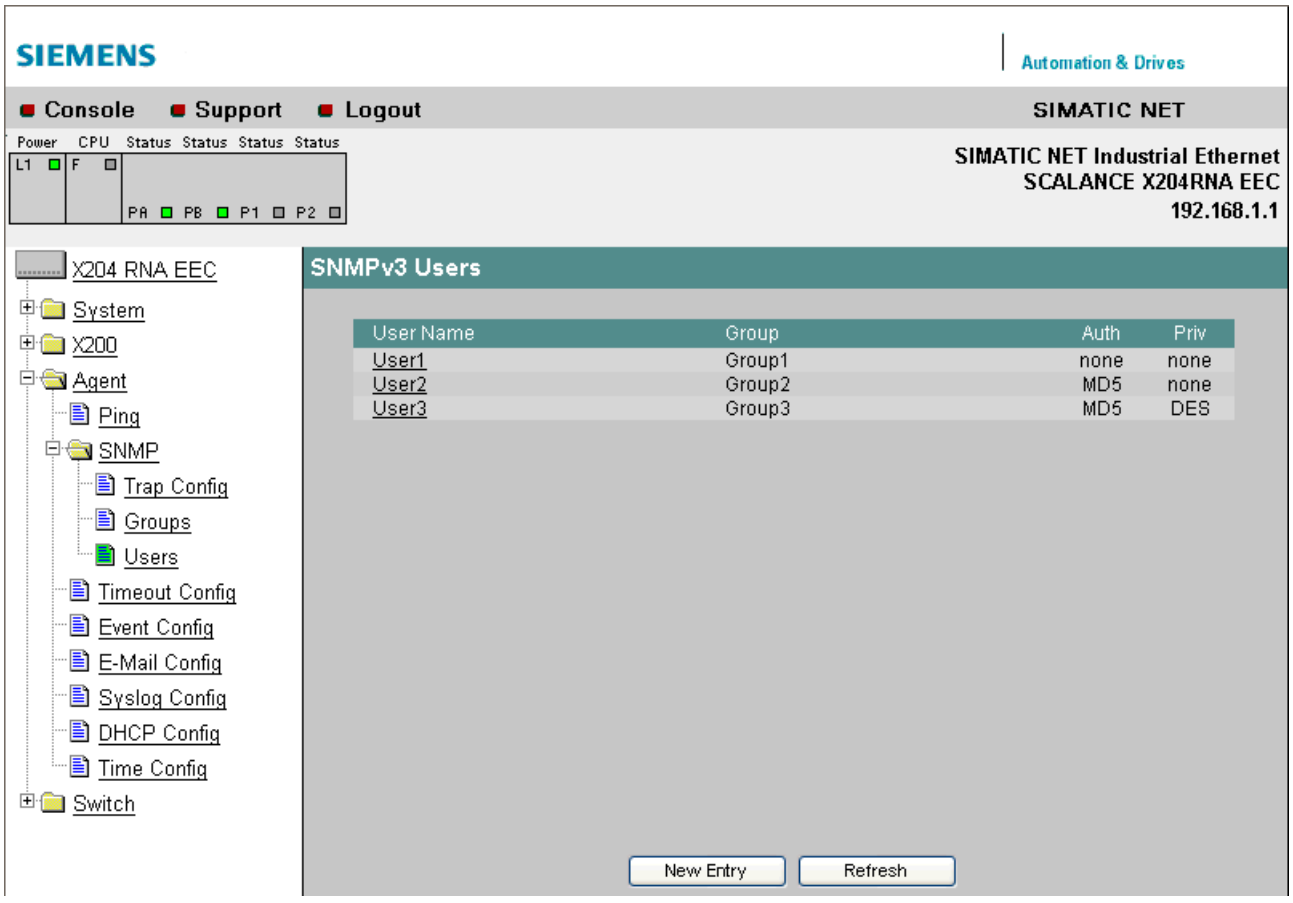


Figure 9-29 SNMPv3 Users

By clicking the "New Entry" button or clicking on an entry, the "SNMPv3 Users Configuration" dialog box is displayed.

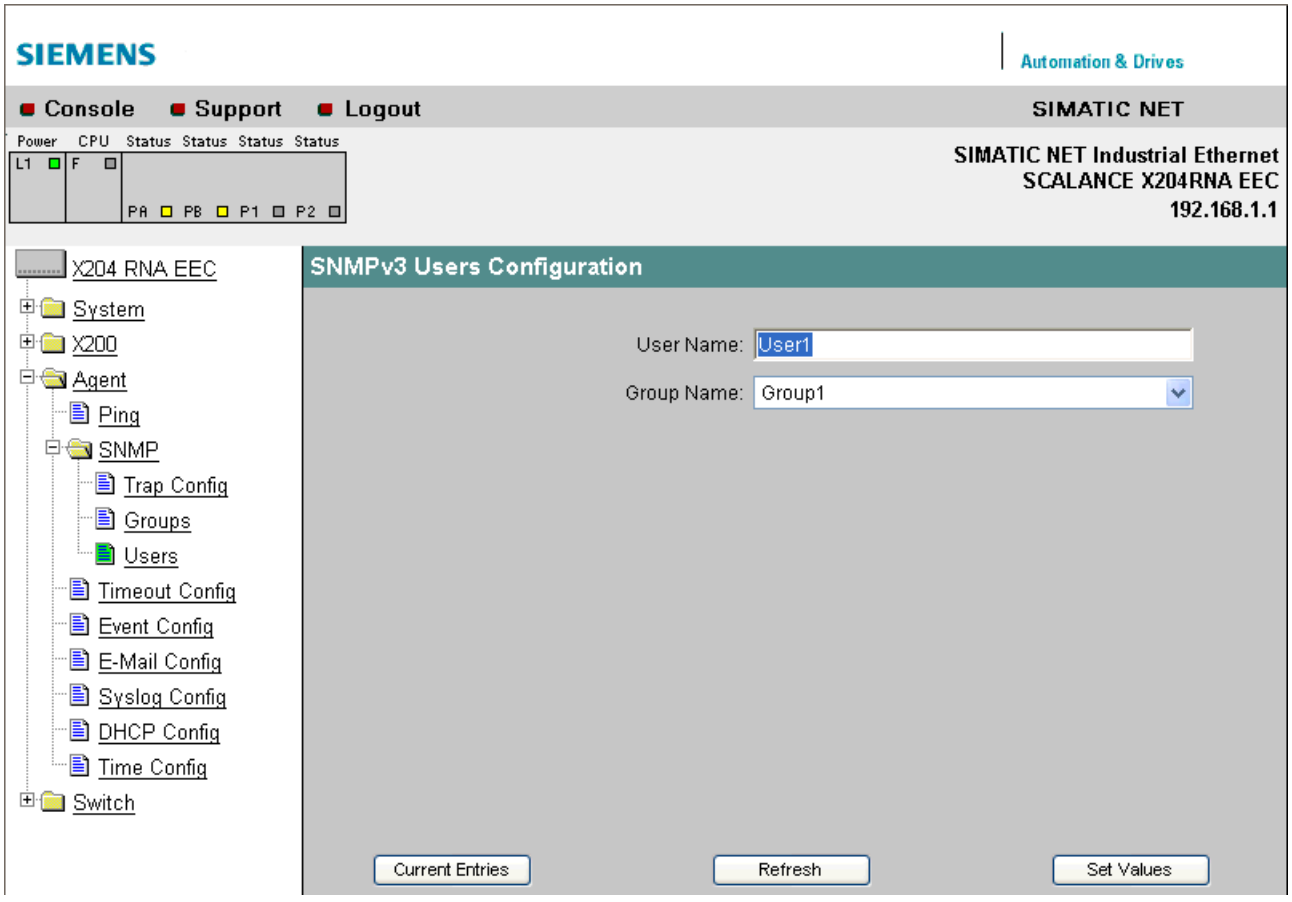


Figure 9-30 SNMPv3 Add Users

- "User Name"
  Here, enter the name of a new user.
- "Group Name"
  Here, specify the group to which the user will belong.
- "Set Values"
  By clicking the "Set Values" button, you create a user according to the parameters set above.
- "Current Entries"
  By clicking the "Current Entries" button, you exit the "SNMPv3 Users Configuration" dialog box and return to the "SNMPv3 Users" dialog box.

9.10.7 Agent Timeout Configuration

Setting the timeout

Here, you can set the times after which there is an automatic logout in WBM.

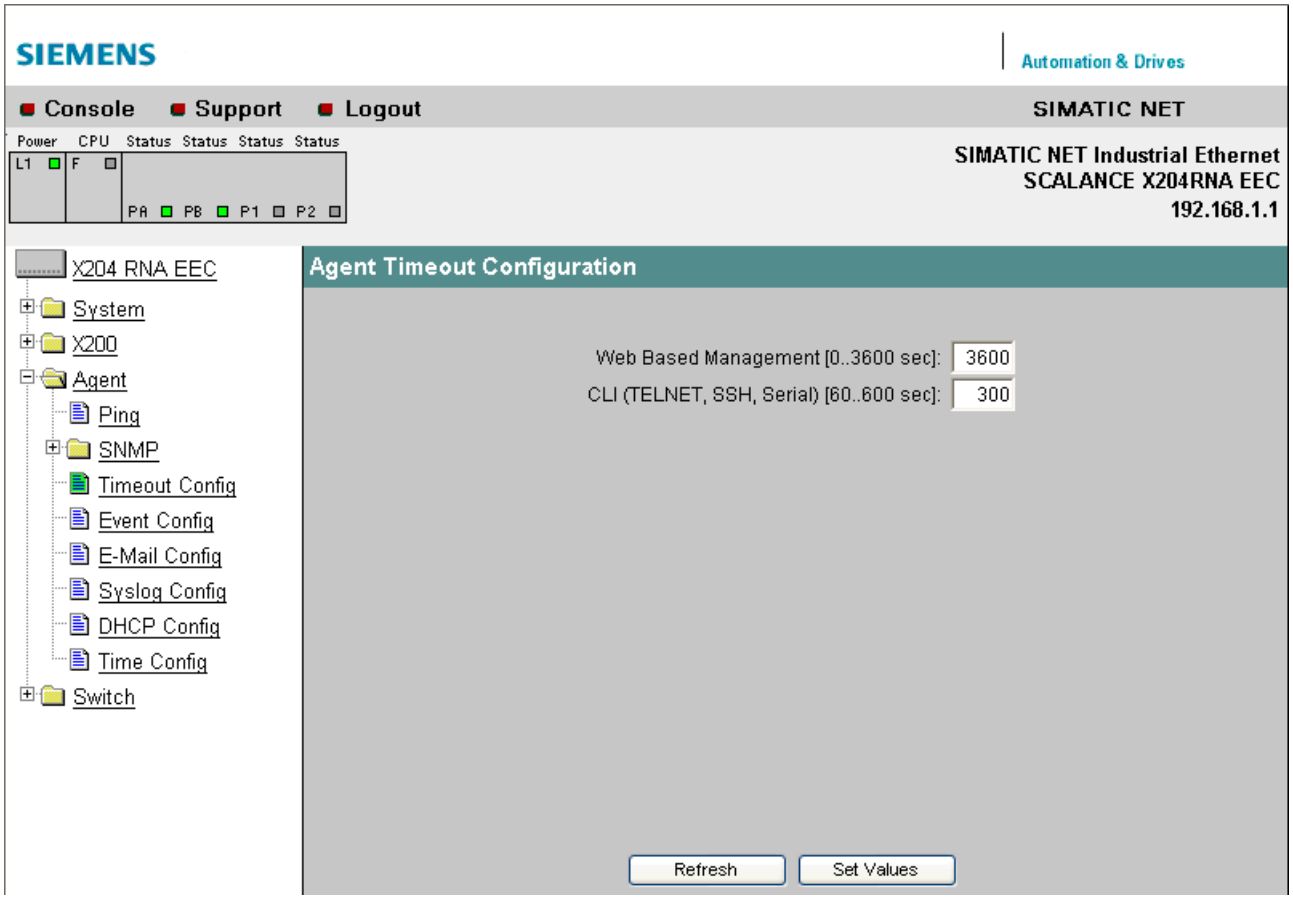


Figure 9-31 Agent Timeout Configuration

- "Web Based Management (sec)"
  Here, you specify the WBM timeout.
  Permitted values for the WBM timeout: 0 ... 3600 (seconds)
  0 means: There is no automatic logout.
- "CLI (TELNET, SSH, Serial) (sec)"
  Here, you specify the CLI timeout.
  Permitted values for the CLI timeout: 60 ... 600 (seconds)

9.10.8 Agent Event Configuration

System events of the SCALANCE X-200RNA

On this page, you specify how a SCALANCE X-200RNA reacts to system events. By enabling the appropriate check boxes, you specify which events trigger which reactions on the SCALANCE X-200RNA. The following options are available:

- The SCALANCE X-200RNA sends an e-mail with the error message
- The SCALANCE X-200RNA triggers an SNMP trap.

- The SCALANCE X-200RNA writes an entry in the log file.
- The SCALANCE X-200RNA writes an entry to the Syslog server.

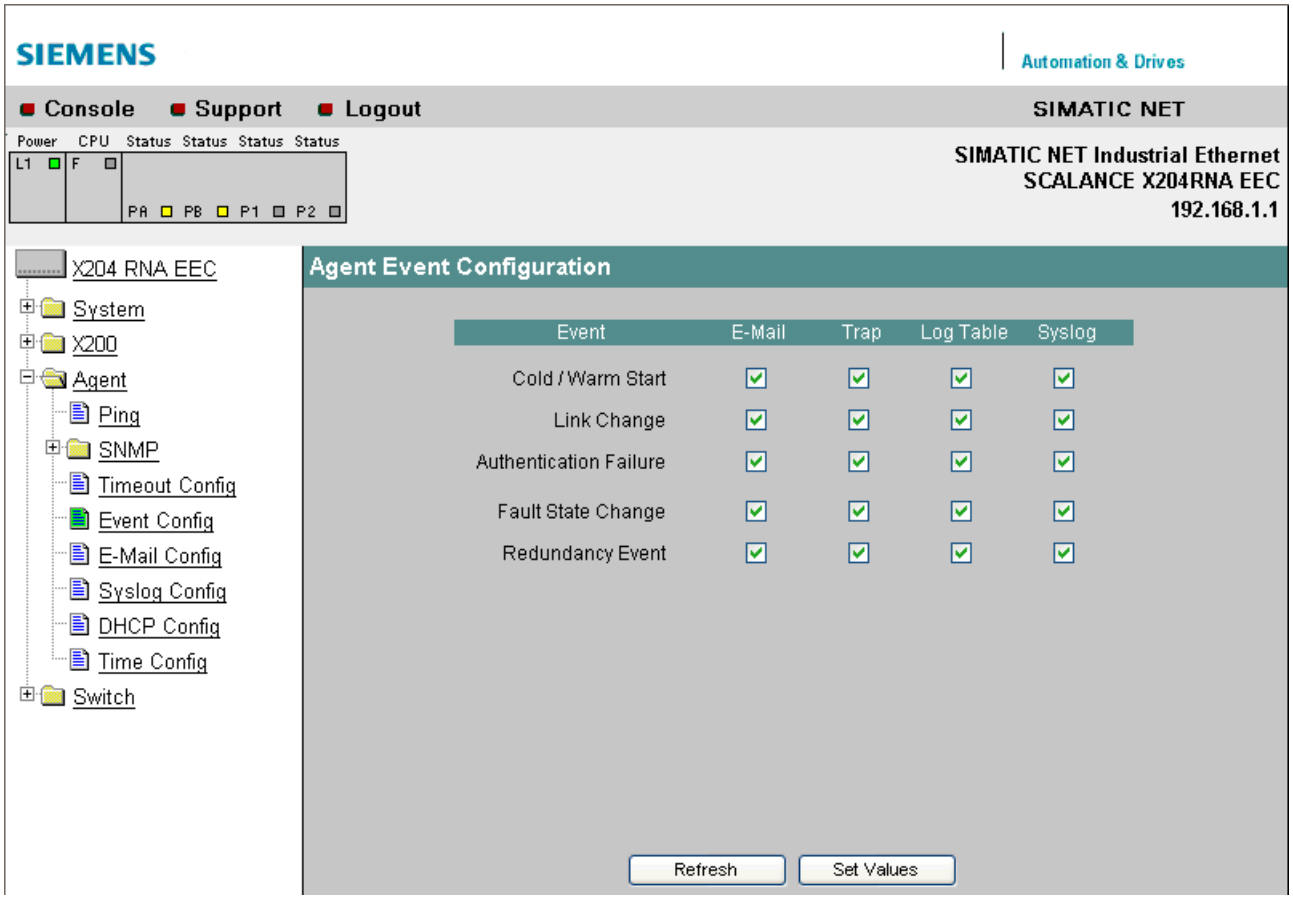


Figure 9-32 Agent Event Configuration with the SCALANCE X204RNA EEC

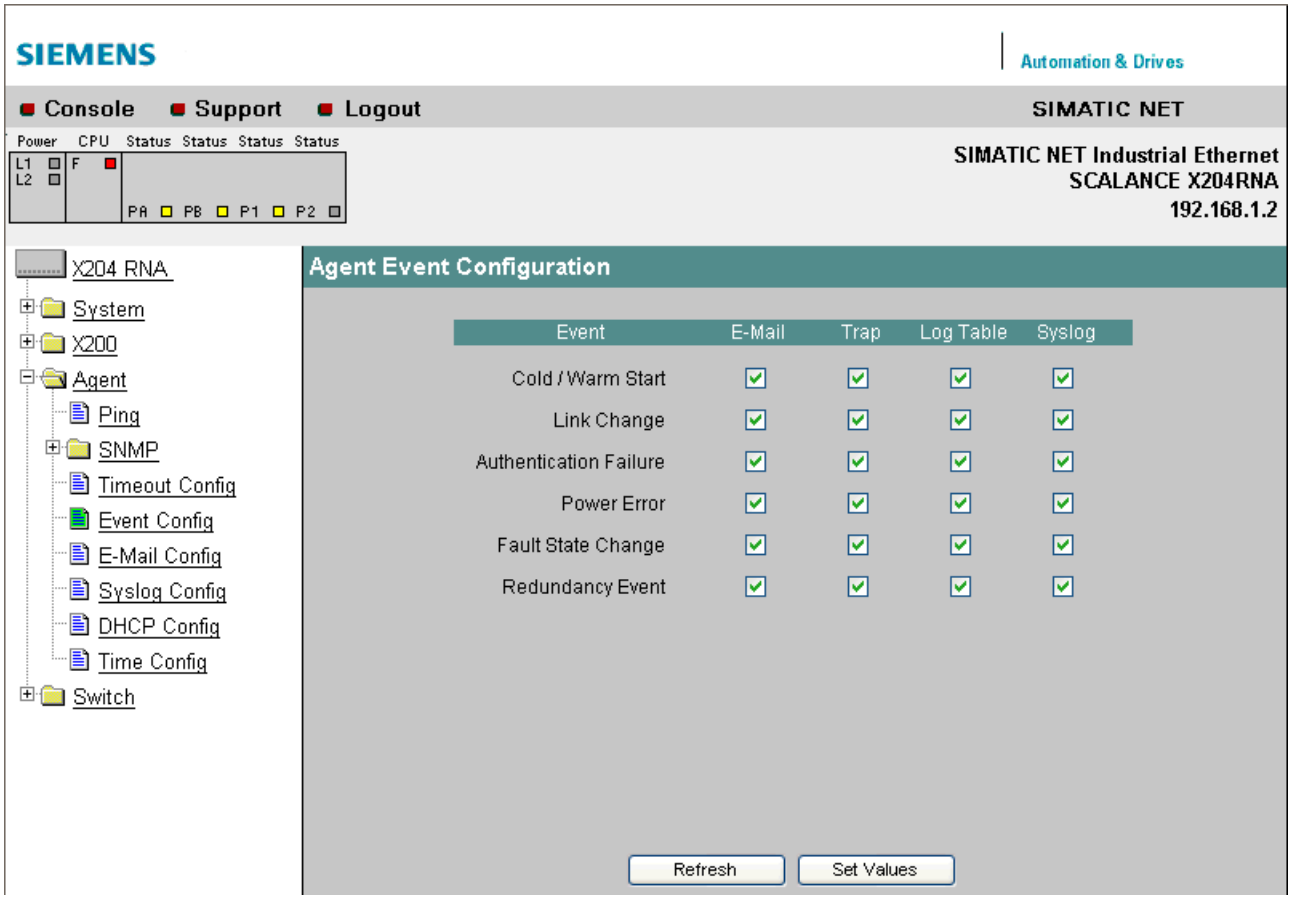


Figure 9-33 Agent Event Configuration with the SCALANCE X204 RNA

You can configure the reaction of the SCALANCE X-200RNA to the following events:

- "Cold / Warm Start"
  The SCALANCE X-200RNA was turned on or restarted by the user.
- "Link Change"
  A port has failed or data traffic is being handled again via a port that had previously failed.
- "Authentication Failure"
  There was an SNMP access with a bad password or inadequate access rights.
- "Power Error" (SCALANCE X204RNA only)
  This event occurs only when power supply line 1 and line 2 are monitored. It indicates that there was a change to line 1 or line 2.

- "Fault State Change"
  The fault status has changed. The fault status can relate to the activated port monitoring, the response of the signaling contact or the power supply monitoring.
- "Redundancy Event"
  There are two situations that are signaled as a redundancy error.
  - If a different number of PRP frames are received in LAN A and LAN B, the error is set. The error is reset if the difference in PRP frames received in LAN A and B remains almost the same.
  - If a PRP B frame is received at PRP A or vice versa, the error is set until no more incorrect frames are received for approximately 30 seconds.

9.10.9 Agent E-Mail Configuration

Setting the e-mail client

Here, you can set the recipient, sender and the SMTP server.

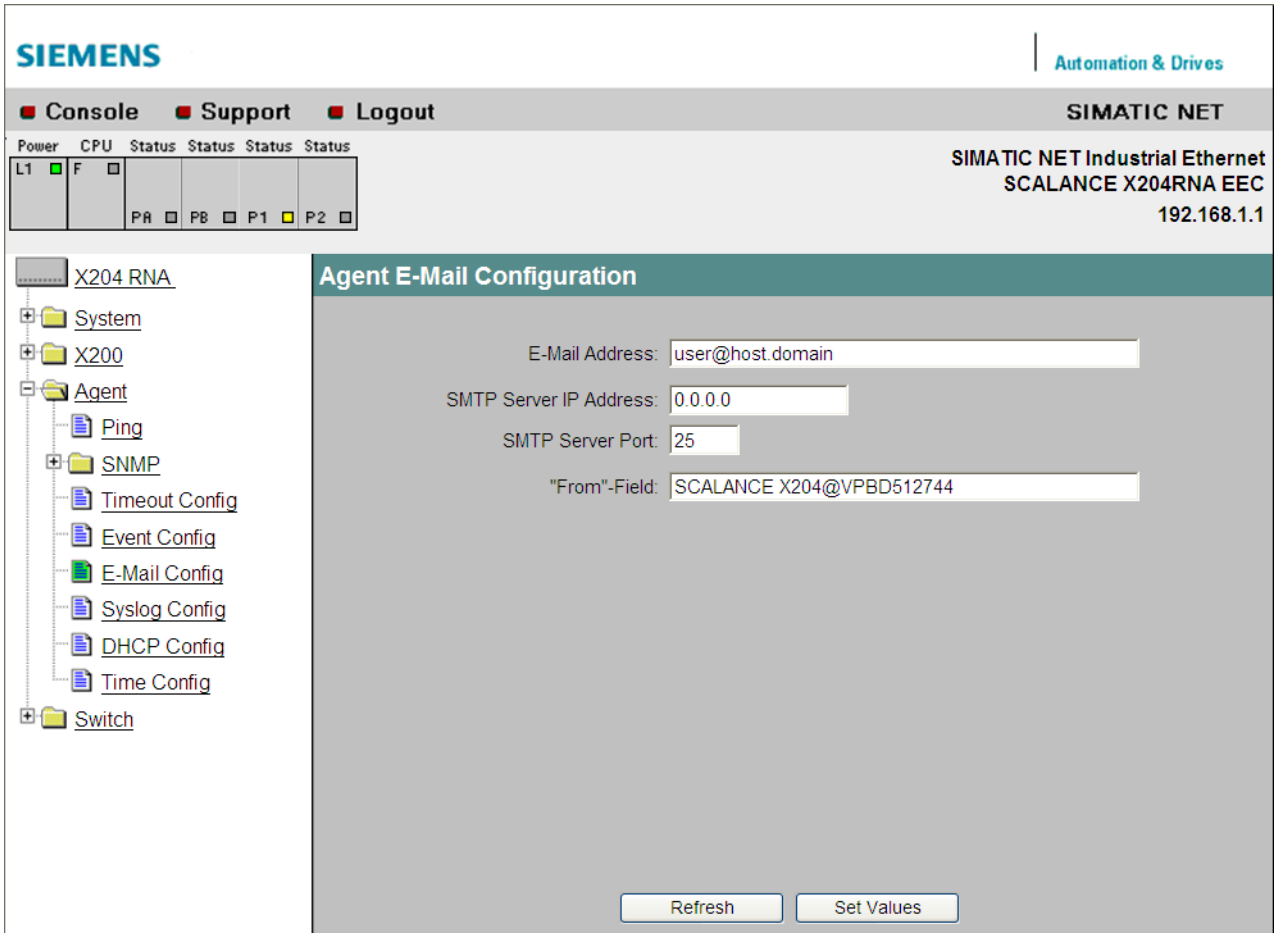


Figure 9-34 Agent E-Mail Configuration

- "E-Mail Address"
  Here, you specify the e-mail address of the recipient.
- "SMTP Server IP Address"
  Enter the IP address of the SMTP server.
- "SMTP Server Port"
  Enter, the port of the SMTP server.
- ""From"-Field"
  Here, enter the e-mail address of the sender.

9.10.10 Agent Syslog Configuration

Setting the Syslog server

Here, you can specify the address of the Syslog server.

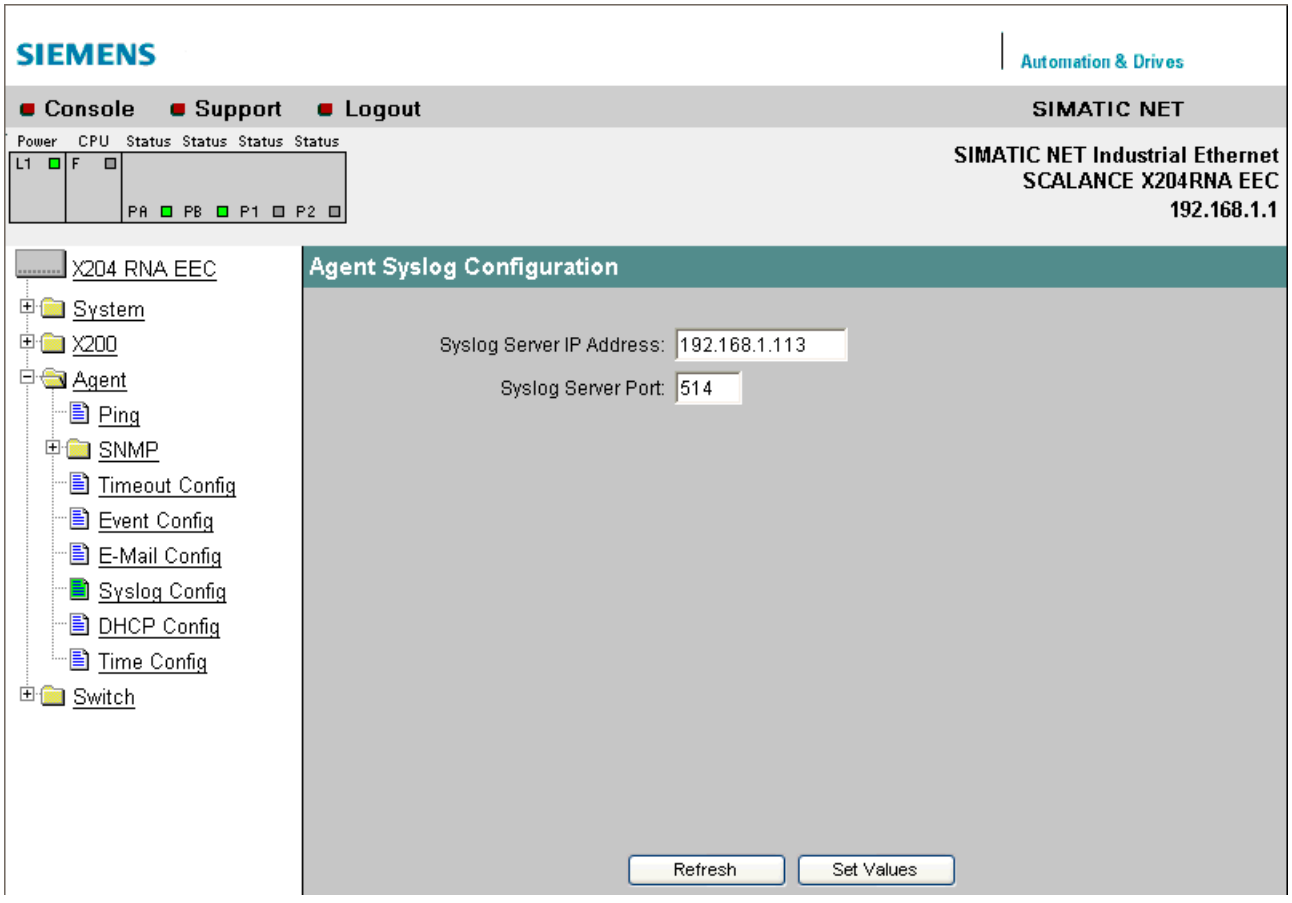


Figure 9-35 Agent Syslog Configuration

- "Syslog Server IP Address"
  Enter, the IP address of the Syslog server.
- "Syslog Server Port"
  Enter, the port of the Syslog server.

9.10.11 Agent DHCP Configuration

Setting the DHCP mode

There are several ways of identifying the SCALANCE X-200RNA in the configuration of the DHCP server:

- with the MAC address
- with a freely defined client ID

- with the system name

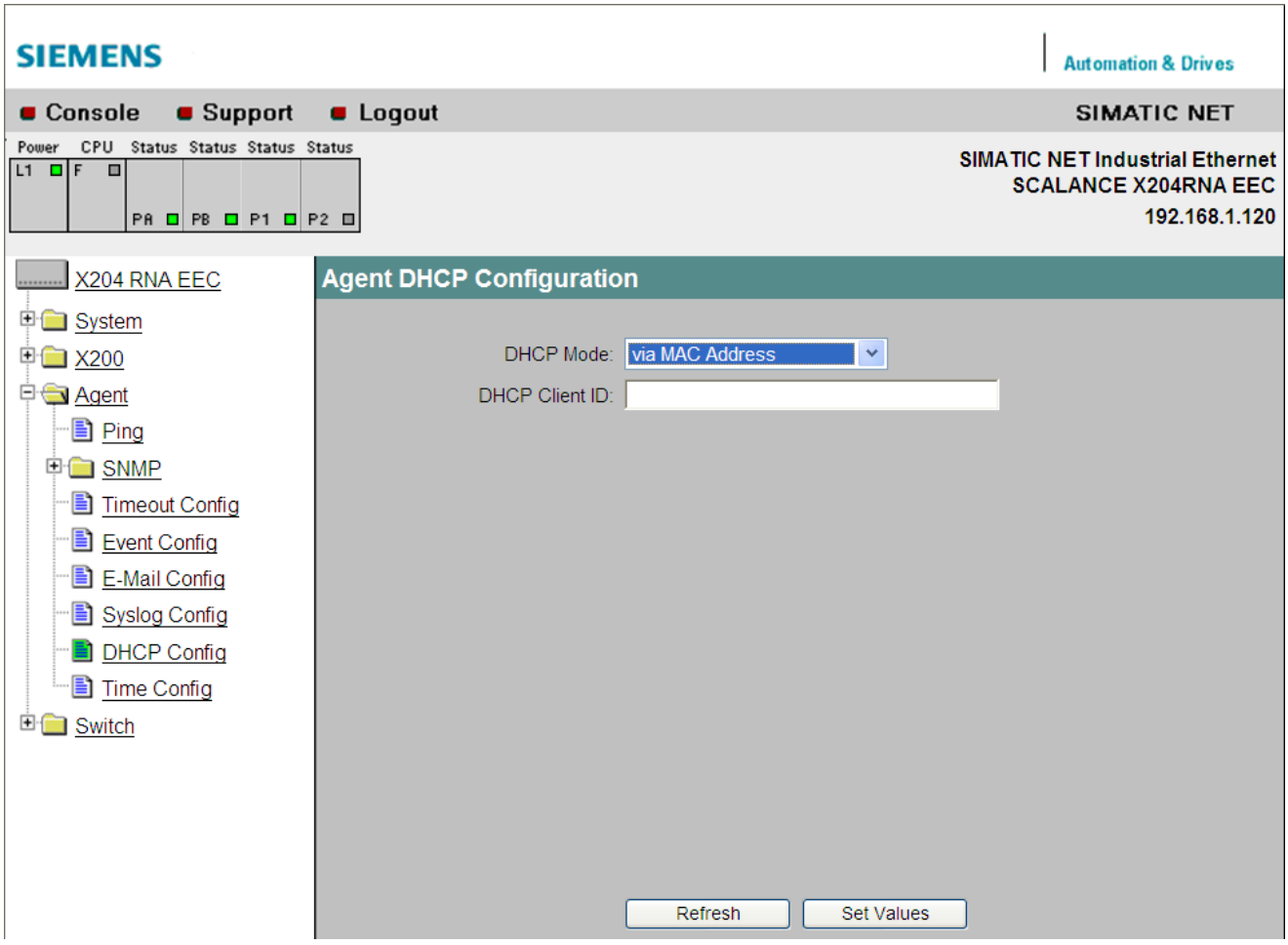


Figure 9-36 Agent DHCP Configuration

- "DHCP Mode"
  Here, you set the DHCP mode.

Note

If DHCP is not enabled in the "Agent Configuration" menu item, no mode can be selected and the text "disabled" is displayed.

- "DHCP Client ID"
  For the DHCP mode "via Client ID", you can assign an identification string here that is assigned to a SCALANCE X-200RNA and will be evaluated by the DHCP server.

9.10.12 Agent Time Configuration

Time-of-day synchronization in the network

SNTP (Simple Network Time Protocol) is used for synchronizing the time in the network. The appropriate frames are sent by an SNTP server in the network. A SCALANCE X-200RNA logs on as client with this server as recipient of time-of-day frames.

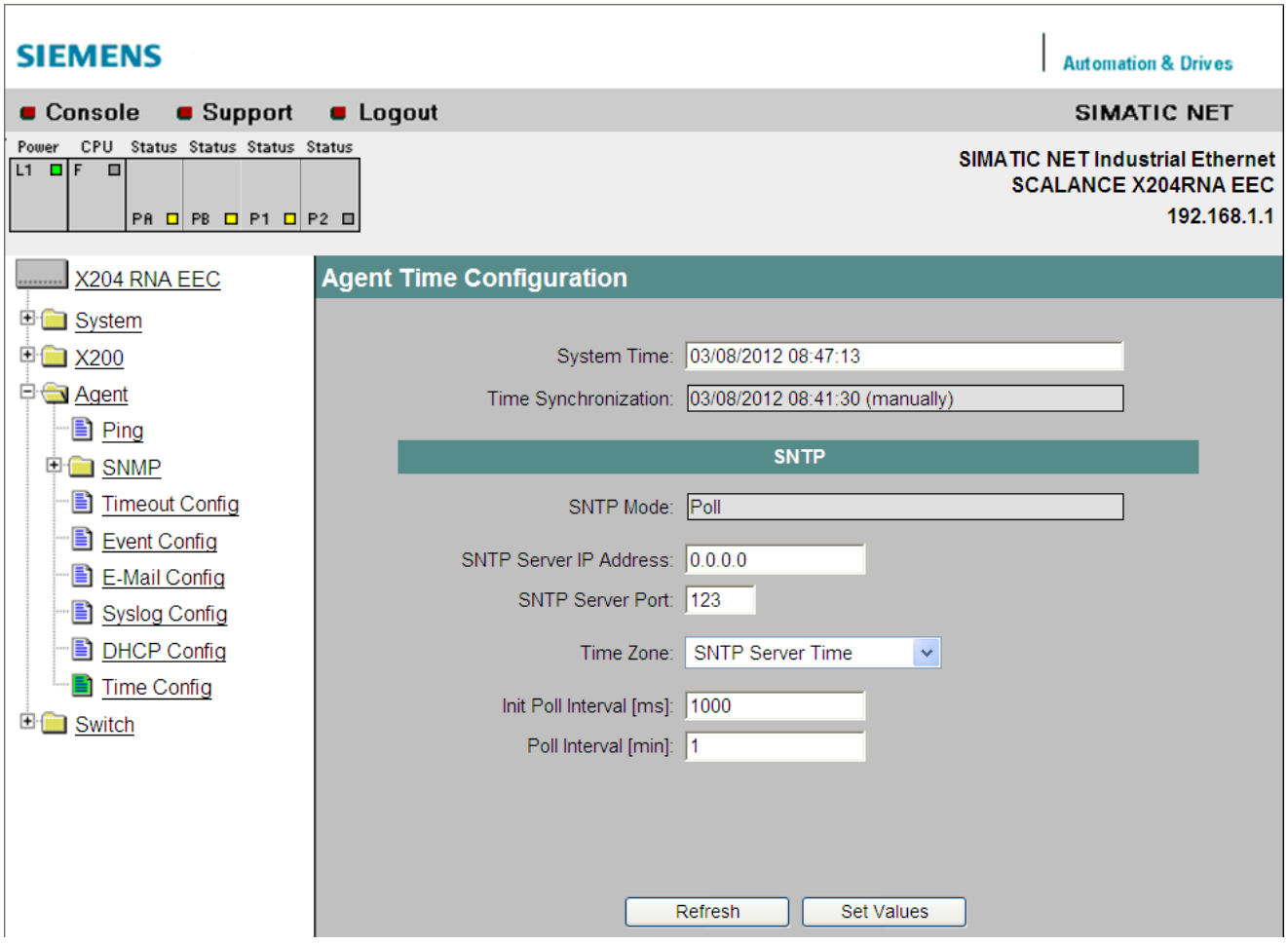


Figure 9-37 Agent Time Configuration

- "System Time"
  This box displays the current system time. If no time-of-day synchronization was possible, the box displays "Date/time not set".
- You can also set the date and time manually, the required input format is MM/DD/YYYY HH:MM:SS. In this case, the text box displays the data and time along with the suffix (m). If the system time was set as a result of synchronization with a server, the suffix is (p).
- "Time Synchronization"
  This box is read-only and shows when the last time-of-day synchronization took place.

- "SNTP Mode"
  The protocol type used is displayed here:
  - "Poll"
    If you choose this protocol type, you will need to define further settings:
    Time Zone Offset, Time Server, Init Poll Interval, Poll Interval.
- "SNTP Server IP Address"
  Here, you enter the IP address of the SNTP server whose frames will be used by a SCALANCE X-200RNA to synchronize the time of day.
- "SNTP Server Port"
  Here, enter the port via which the SNTP server is available.
- "Time Zone"
  Select the time zone for the location of the SCALANCE X-200RNA because the SNTP server always sends UTC time. This time is then recalculated and displayed as the local time based on the time zone. There is no standard/daylight-saving time switchover on the SCALANCE X-200RNA.
- "Init Poll Interval"
  Here, you can enter the interval at which a SCALANCE X-200RNA repeats the poll when the system time is initially set, if this was not successful the first time.
- "Poll Interval"
  Once the system time has been adopted the first time from the time server, it is updated cyclically with renewed polls to the time server. Here, you specify how often the updates take place.

9.11 The "Switch" menu

9.11.1 Introduction

In this menu, you set the parameters for the switch functionality (assign it to layer 2) of the SCALANCE X-200RNA. This includes the following functions:

- General switch settings such as aging.
- Display of statistical data.

9.11.2 Switch Config

Switch functionality

The "Switch Configuration" dialog box appears if you click the "Switch" folder icon. In this dialog box, you specify the aging time of the SCALANCE X-200RNA.

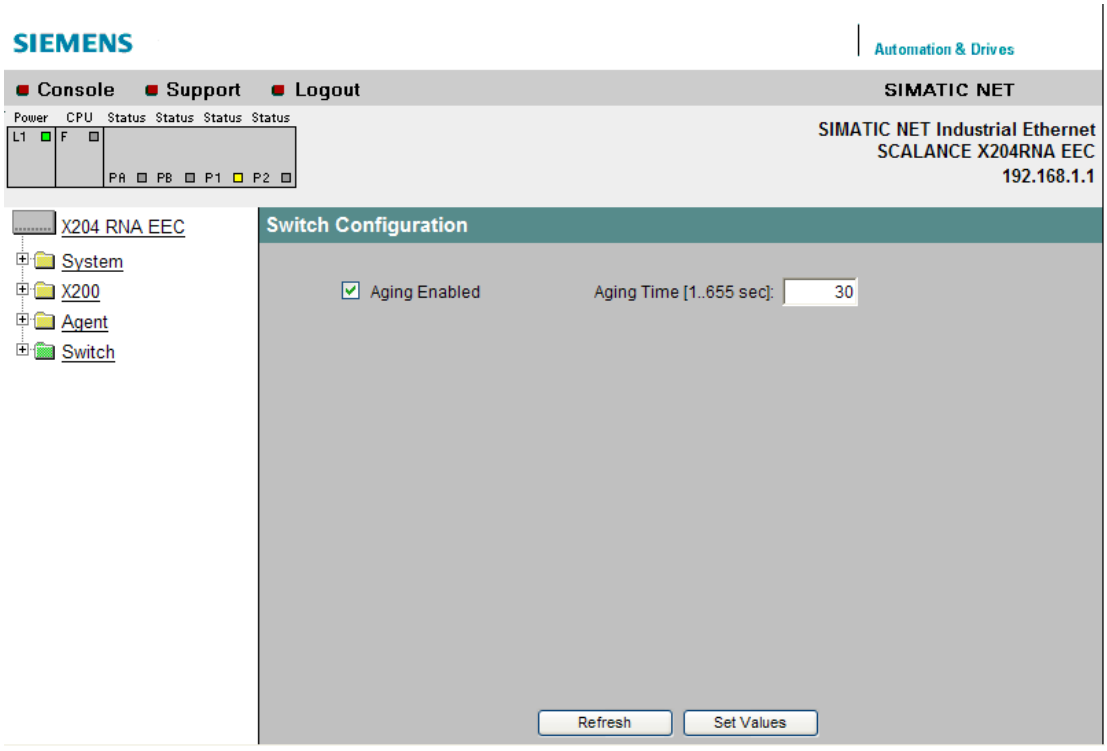


Figure 9-38 Switch Configuration

- "Aging Enabled"
  A SCALANCE X-200RNA automatically learns the source addresses of the nodes connected to it. This information is used in the SCALANCE X-200RNA to forward data frames to the nodes specifically involved. This reduces the network load for the other nodes.
  If a SCALANCE X-200RNA does not receive a frame whose source address matches a learnt address within a certain time, it deletes the learnt address. This mechanism is known as aging. Aging prevents frames being forwarded incorrectly, for example when an end device (for example a programming device) is connected to a different switch port.
  If the check box is not enabled, a SCALANCE X-200RNA does not delete learnt addresses automatically.
- "Aging Time [sec]"
  Here, you enter the time after which the SCALANCE X-200RNA deletes an address if it has not received frames with the corresponding sender address.
  Here, the aging time can be set as required within the range from 1 to 655 seconds.

9.11.3 Port status

Overview of the configuration of the ports

The "Port Status" dialog box appears if you click the "Ports" folder icon.

The dialog box shows the configuration for data transfer for all ports of the SCALANCE X-200RNA.

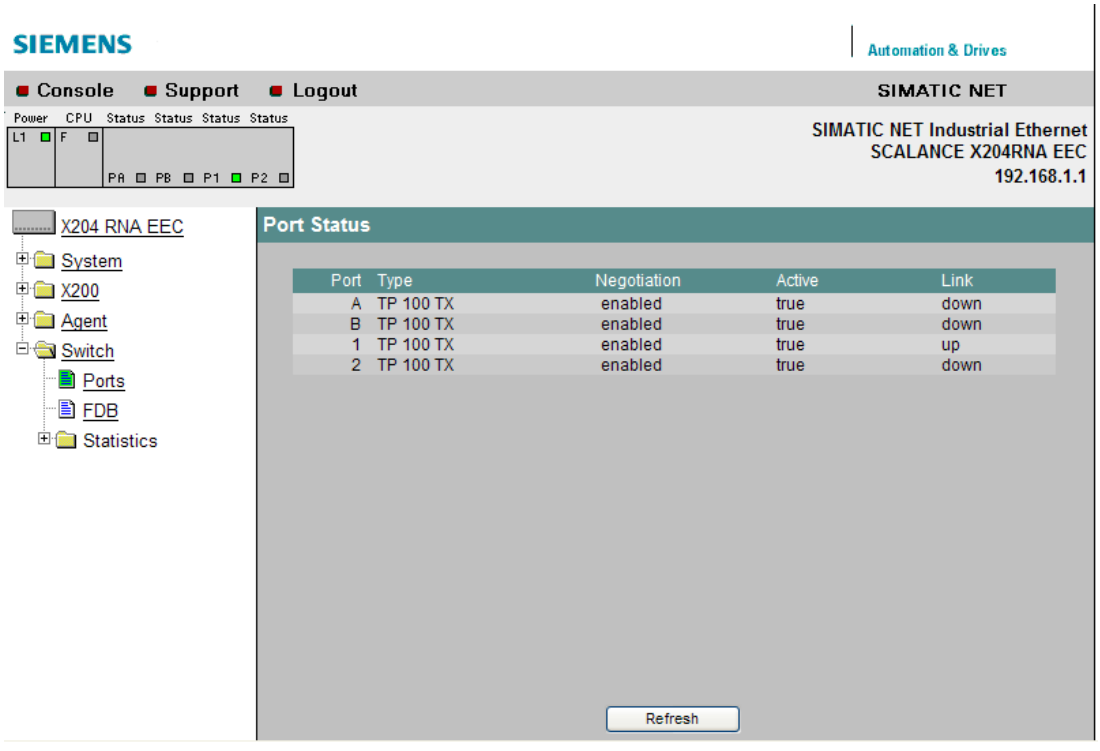


Figure 9-39 Port status

The five columns of the table display the following information:

- "Port"
  This shows the port (with the SCALANCE X204RNA EEC also the SFP slot) to which the following information relates.
- "Type"
  Displays the type of port. This information is important because difference modules and therefore different ports can be used in some slots. The following port types are possible:
  - TP 100 TX
  - FO 100 FX
- "Negotiation"
  Indicates whether or not autonegotiation is enabled.

Note

Since the SCALANCE X-200RNA supports only 100 Mbps Ethernet in full duplex mode, autonegotiation is always enabled.

- "Active"
  Indicates whether or not the port is turned on (true). Data traffic is possible only over an enabled port.

Note

With the SCALANCE X-200RNA, the ports cannot be turned off.

- "Link"
  Shows the connection status to the network. The available options are as follows:
  - Up
    The port has a valid link to the network, a link integrity signal is being received.
  - Down
    The link is down, for example because the connected device is turned off.

9.11.4 Switch Forwarding Database

The "Switch Forwarding Database" dialog box appears if you click the "FDB" folder icon.

The dialog box shows the dynamically learnt MAC addresses in the FDB table for all ports. In addition to this, to allow PRP diagnostics, the screen also shows whether the displayed MAC addresses are listed in the duplicate filter or in the proxy node table.

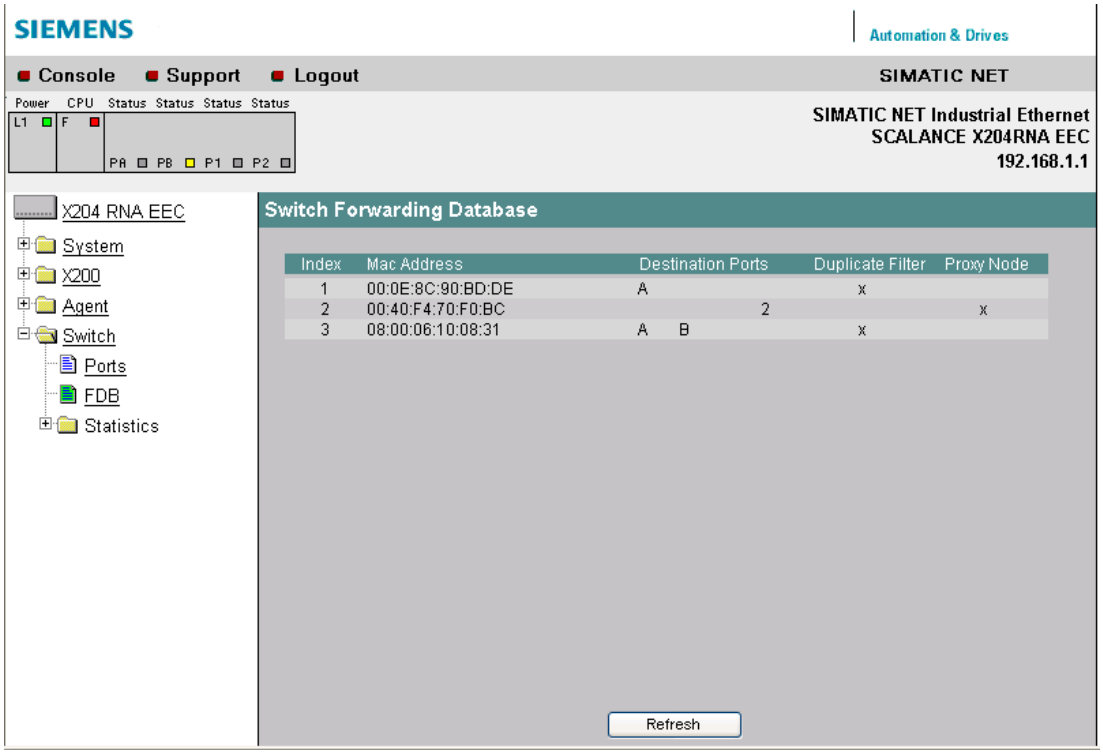


Figure 9-40 Switch Forwarding Database

The five columns of the table display the following information:

- "Index"
  Index of the entry
- "Mac Address"
  Learnt MAC address
- "Destination Ports"
  Specifies the destination port via which a frame with the learnt destination MAC address must be output.
- "Duplicate Filter"
  Shows whether the MAC address is listed as a source MAC address in the duplicate filter table.
- "Proxy Node"
  Shows whether the MAC address is listed as a source MAC address in the proxy node table.

9.11.5 LLDP Configuration

In the "LLDP Configuration" dialog box, you enable/disable the forwarding of received LLDP frames for the device.

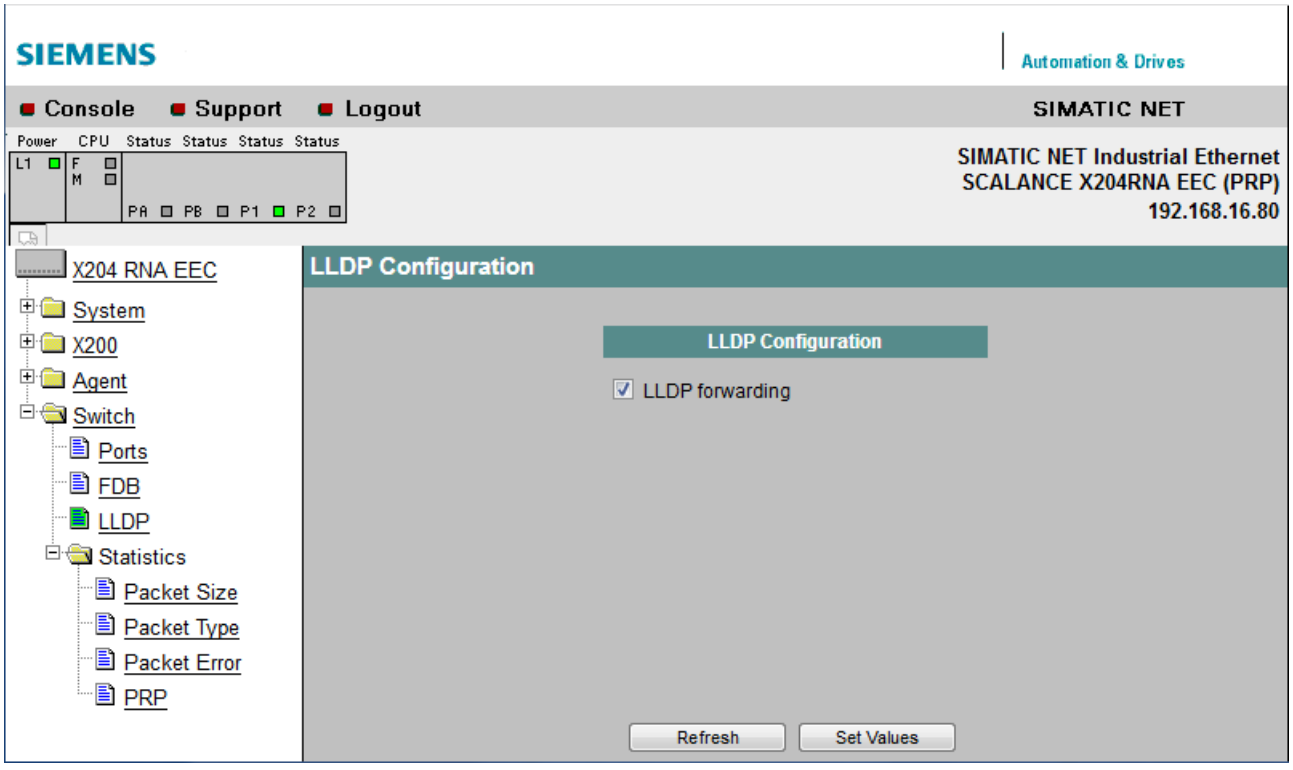


Figure 9-41 Supervision Frames

If the option is selected, the device handles LLDP telegrams as follows:

- LLDP telegrams received on non-redundancy ports are marked with a tag or trailer and forwarded to the HSR ring or PRP LANs.
- LLDP telegrams that are received on redundancy ports and do not have an HSR tag or PRP trailer are discarded.

If the option is disabled, the device discards all received LLDP frames.

9.11.6 The "Statistics" Menu

Counting and evaluation of received frames

A SCALANCE X-204RNA has internal statistics counters with which it counts the number of received frames for each port according to the following criteria:

- Frame length
- Message frame type
- Bad frames

This information provides you with an overview of the data traffic and any problems on the network.

9.11.6.1 Packet Size Statistic

Received frames sorted by length

The "Packet Size Statistic" dialog box displays how many packets of which size were received at each port.

If you click the "Reset Counters" button, you reset this counter for all ports.

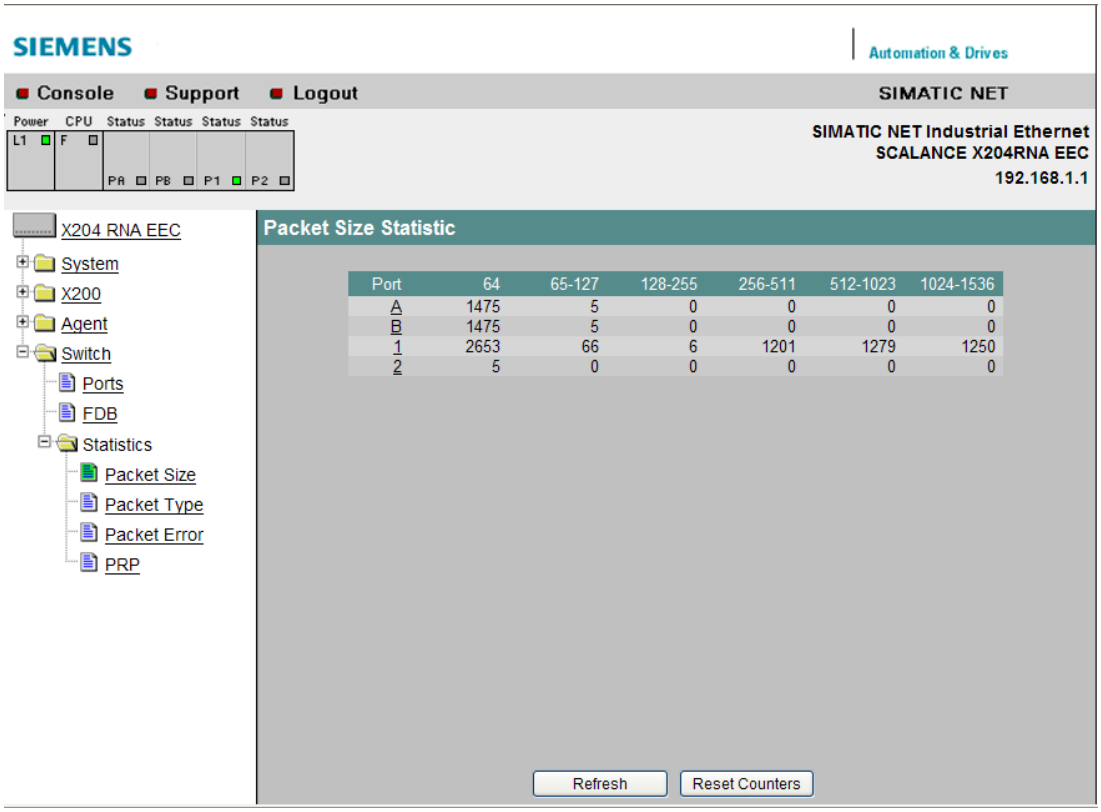


Figure 9-42 Packet Size Statistic

If you click on an entry in the "Port" column, the "Packet Size Statistic Graphic" dialog box is displayed for the selected port. You then see a configurable graphical representation of the counter value.

Graphic representation of the statistics

This dialog box displays the number of frames received at each port graphically. The display is dependent on the frame length. There is a separate element in the graphic for each of the following ranges:

- 64 bytes
- 65 - 127 bytes

- 128 -255 bytes
- 256 - 511 bytes
- 512 - 1023 bytes
- 1024 - 1536 bytes

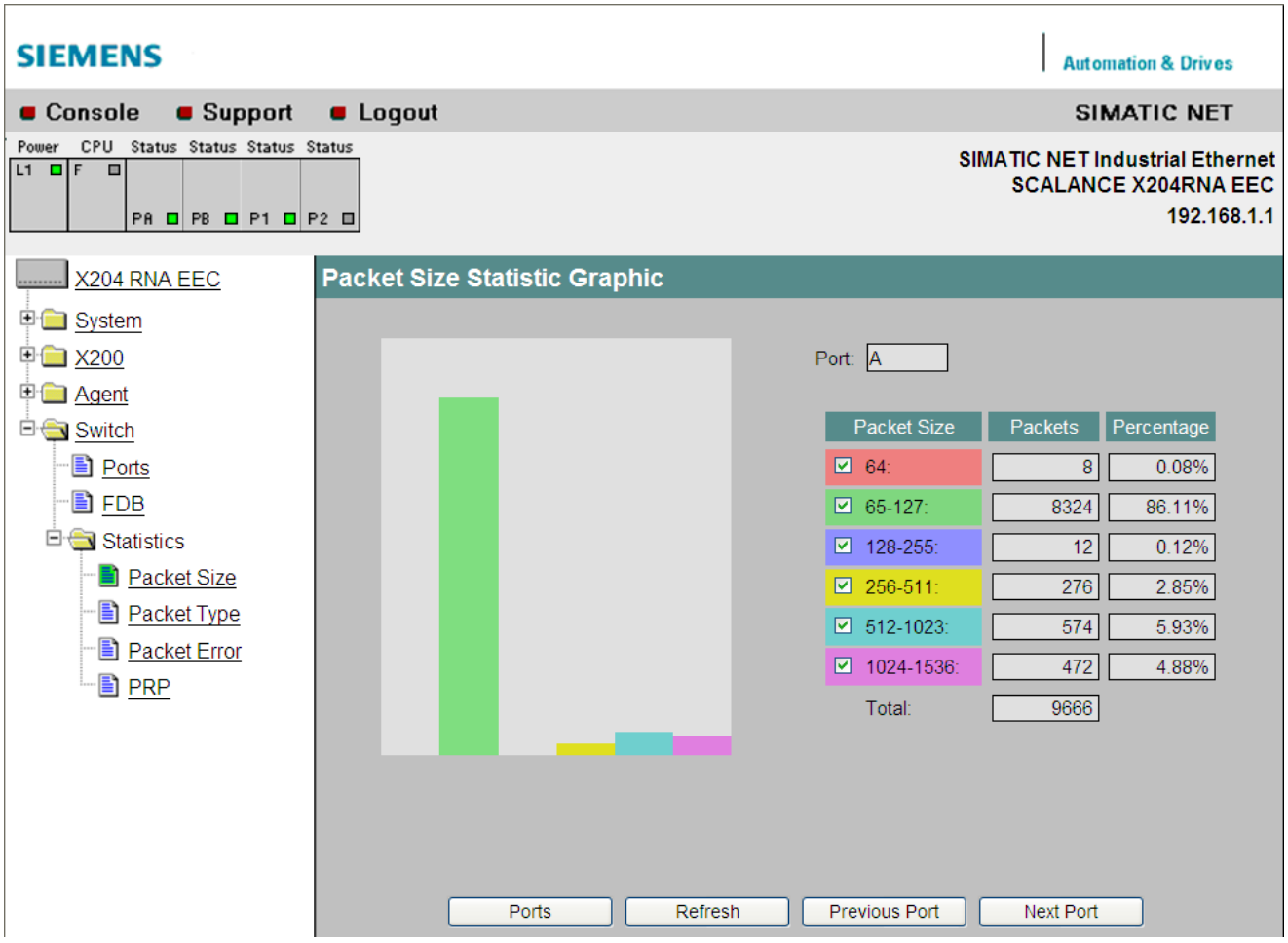


Figure 9-43 Packet Size Statistic Graphic

With the check box in the "Packet Size" column, you decide the content of the graphic. The value in the "Packets" column in the graphic is only displayed for a certain range if the appropriate check box is selected. The "Percentage" column shows the packets in a certain length range as a percentage of the total packets for this port. When the percentage is calculated, ranges are included only if their check boxes are selected.

With the "Previous Port" and "Next Port" buttons, you can change to the display of the previous or next port.

9.11.6.2 Packet Type Statistic

Received frames sorted by type

The "Packet Type Statistic" dialog box displays how many frames of the type unicast, multicast, and broadcast were received and sent at each port.

If you click the "Reset Counters" button, you reset this counter for all ports.

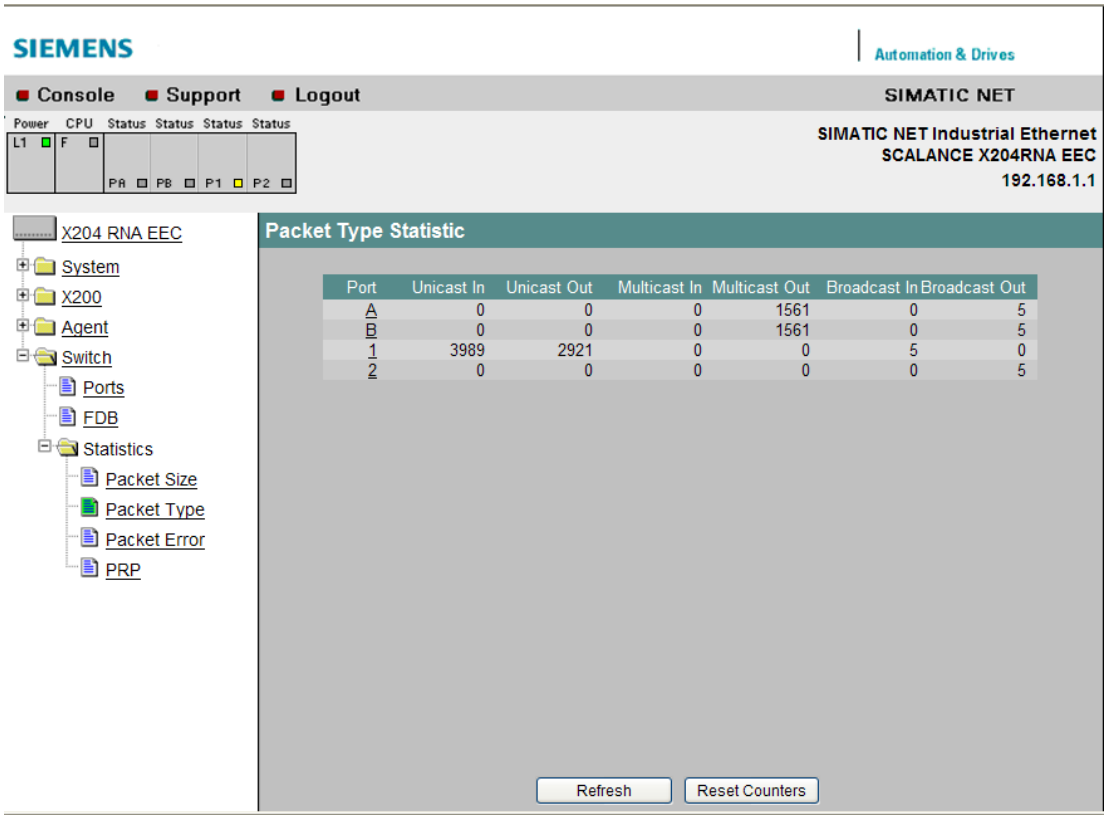


Figure 9-44 Packet Type Statistic

If you click on an entry in the "Port" column, the "Packet Type Statistic Graphic" dialog box is displayed for the selected port. You then see a configurable graphical representation of the counter value.

Graphic representation of the statistics

This dialog box displays the number of frames received at each port graphically. The display depends on the packet type. There is a separate element in the graphic for each of the following ranges:

- Unicast
- Multicast
- Broadcast

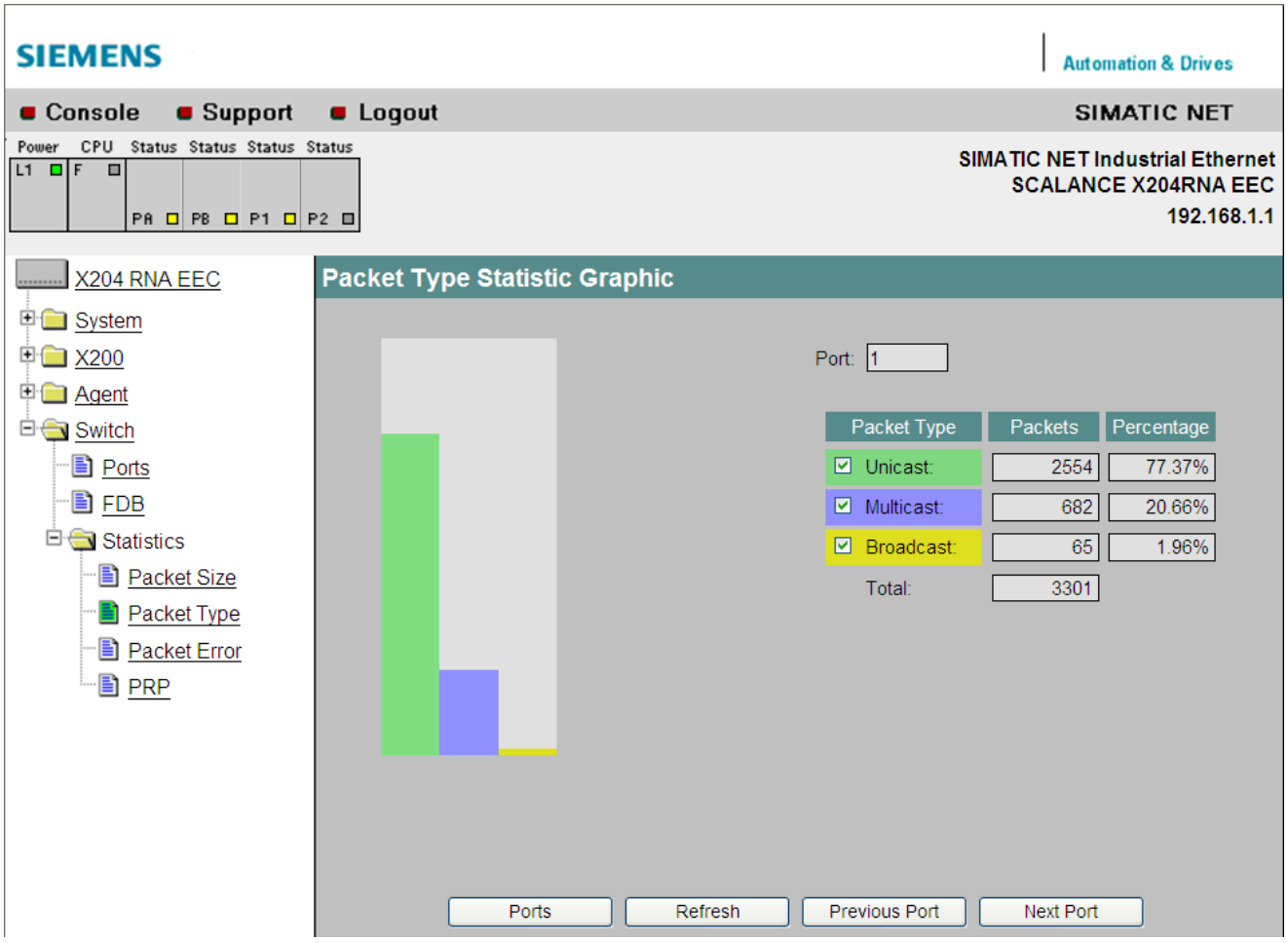


Figure 9-45 Packet Type Statistic Graphic

With the check box in the "Packet Type" column, you decide the content of the graphic. The value in the "Packets" column in the graphic is only displayed for a certain packet type if the appropriate check box is selected. The "Percentage" column shows the packets of a certain type as a percentage of the total packets for this port. When the percentage is calculated, packet types are included only if their check boxes are selected.

With the "Previous Port" and "Next Port" buttons, you can change to the display of the previous or next port.

9.11.6.3 Packet Error Statistic

Errors in received packets

The "Packet Error Statistic" dialog box shows how many bad frames were received per port. The following error types are distinguished:

- "Bad Frames"
  Total number of bad received frames.
- "CRC"
  Number of frames whose content did not match the CRC checksum.
- "Undersize"

  Number of frames with a length less than 64 bytes.
- "Oversize"

  Number of frames with a length greater than 1536 bytes.
- "Dropped L2"
  Number of frames that were discarded at the receiving port due to lack of resources on the switch.

If you click the "Reset Counters" button, you reset this counter for all ports.

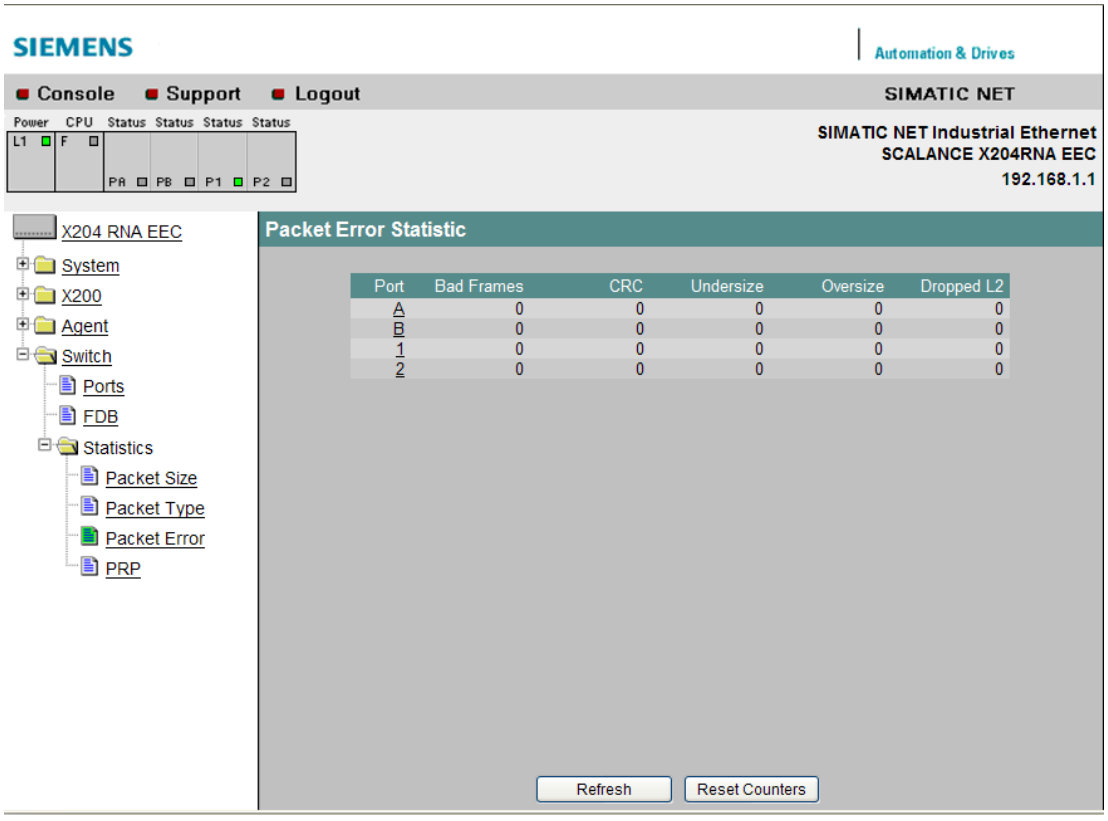


Figure 9-46 Packet Error Statistic

If you click on an entry in the "Port" column, the "Packet Error Statistic Graphic" is displayed for the selected port. You then see a configurable graphical representation of the counter value.

Graphic representation of the statistics

This dialog box displays the number of bad frames graphically. The display is dependent on the cause of the error. There is a separate element in the graphic for each of the following causes of error:

- "Bad Frames"
- "CRC"
- "Undersize"
- "Oversize"
- "Dropped L2"

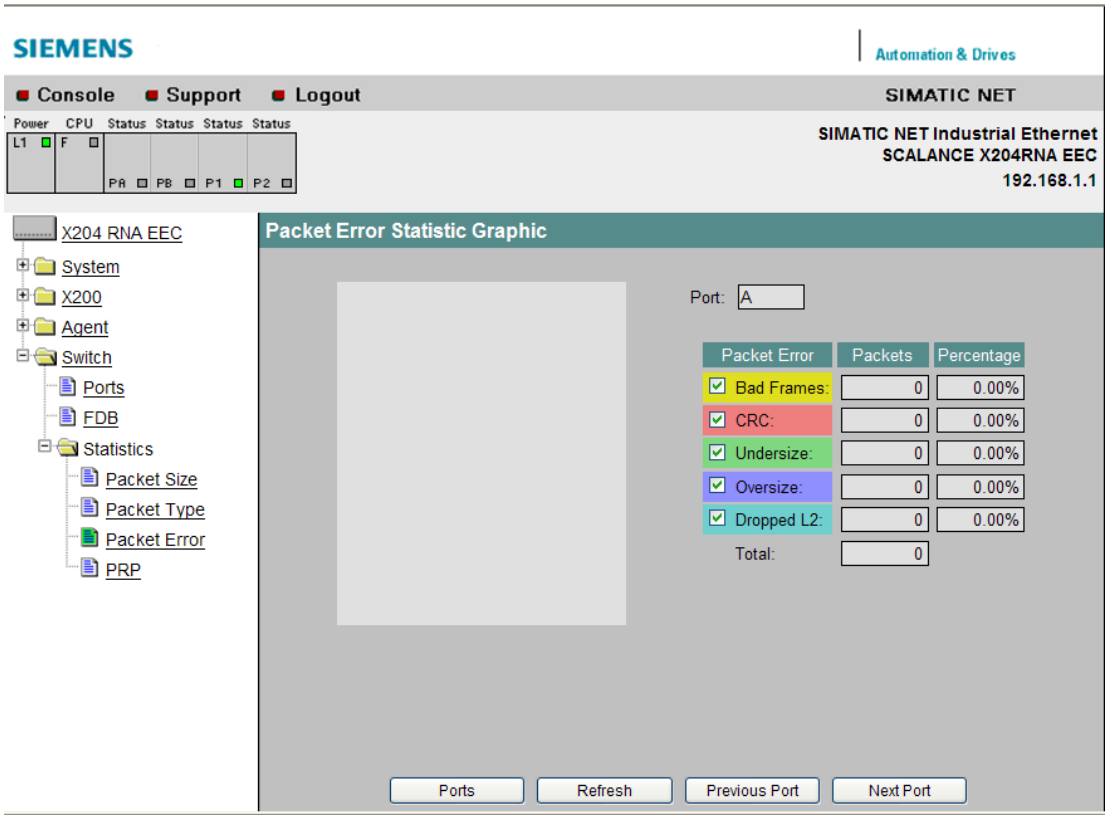


Figure 9-47 Packet Error Statistic Graphic

With the check box in the "Packet Error" column, you decide the content of the graphic. The value in the "Packets" column in the graphic is only displayed for a certain packet type if the appropriate check box is selected. The "Percentage" column shows the errors of a certain type as a percentage of the total errors for this port. When the percentage is calculated, error types are included only if their check boxes are selected.

With the "Previous Port" and "Next Port" buttons, you can change to the display of the previous or next port.

9.11.6.4 PRP Statistic

PRP Statistic

The "PRP Statistic" dialog box shows interesting statistical data for the PRP protocol. The following events are distinguished:

- "Received A Frames at PRP A Port"
  Number of valid A frames received at port PRP A.
- "Received B Frames at PRP B Port"
  Number of valid B frames received at port PRP B.
- "Received B Frames at PRP A Port"
  Number of B frames received at port PRP A (error).
- "Received A Frames at PRP B Port"
  Number of A frames received at port PRP B (error).

If you click the "Reset Counters" button, you reset this counter for all ports.

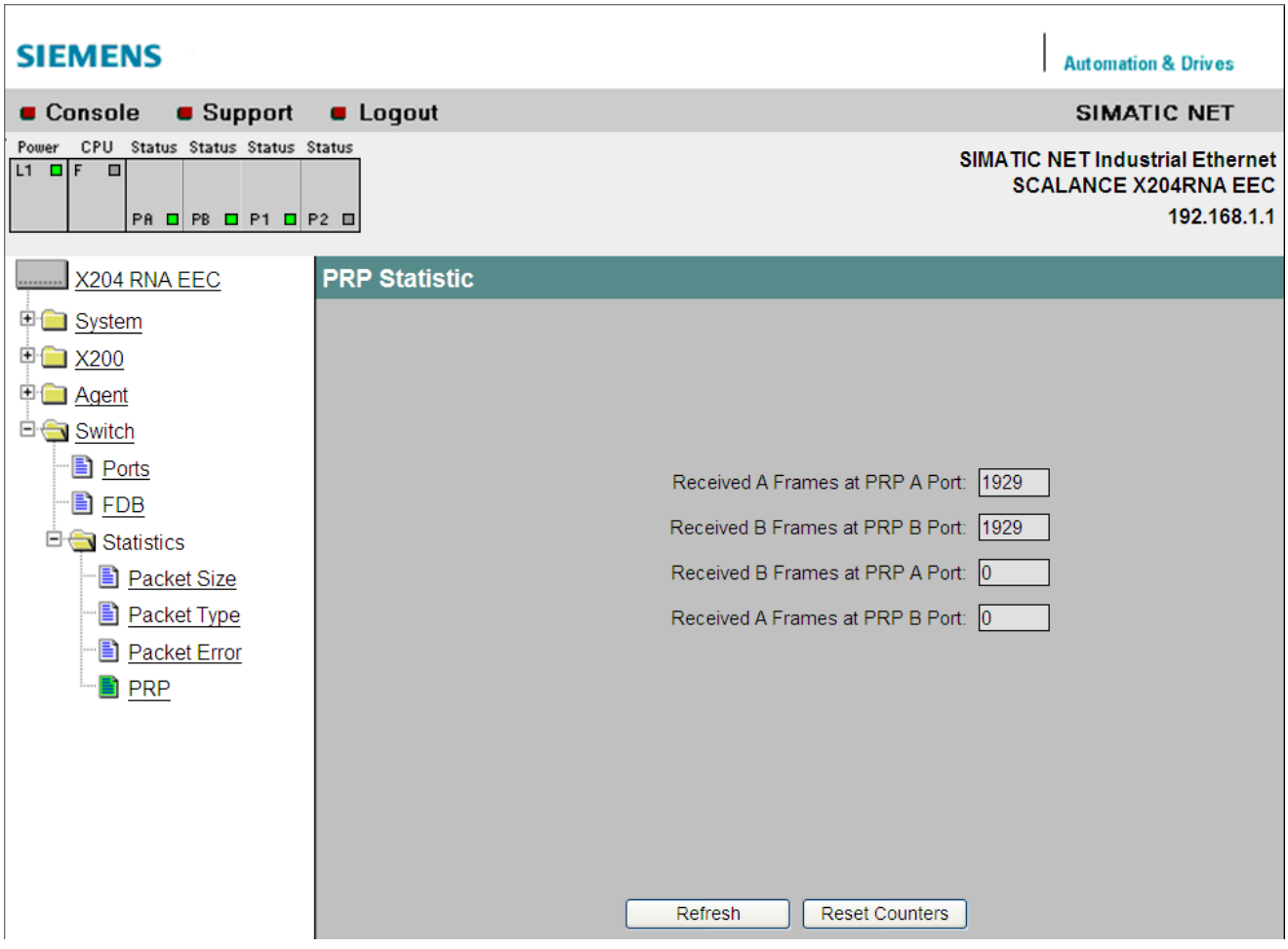


Figure 9-48 PRP Statistic

9.11.6.5 Redundancy Statistic

Redundancy Statistic

The "Redundancy Statistic" dialog box shows interesting statistical data for the HSR protocol. The following events are distinguished:

- Received HSR Frames at HSR 1
  Number of valid HSR frames that were received at port HSR 1.
- Received HSR Frames at HSR 2
  Number of valid HSR frames that were received at port HSR 2.
- Received PRP A Frames at Port P1/A
  Number of valid PRP A frames that were received at port P1/A.
- Received PRP B Frames at Port P2/B
  Number of valid PRP B frames that were received at port P2/B.
- Received PRP B Frames at Port P1/A
  Number of PRP B frames that were received at port P1/A (error).
- Received PRP A Frames at Port P2/B
  Number of PRP A frames that were received at port P2/B (error).
- Received own Proxy Source MAC address
  Number of received frames with their own source MAC address (error).
- Received PRP or Standard Frames at HSR 1
  Number of valid PRP or Standard Ethernet frames that were received at HSR 1 (error).
- Received PRP or Standard Frames at HSR 2
  Number of valid PRP or Standard Ethernet frames that were received at HSR 2 (error).
- Received HSR Frames at Port P1/A
  Number of valid HSR frames that were received at port P1/A (error).
- Received HSR Frames at Port P2/B
  Number of valid HSR frames that were received at port P2/B (error).

If you click the "Reset Counters" button, you reset this counter for all ports.

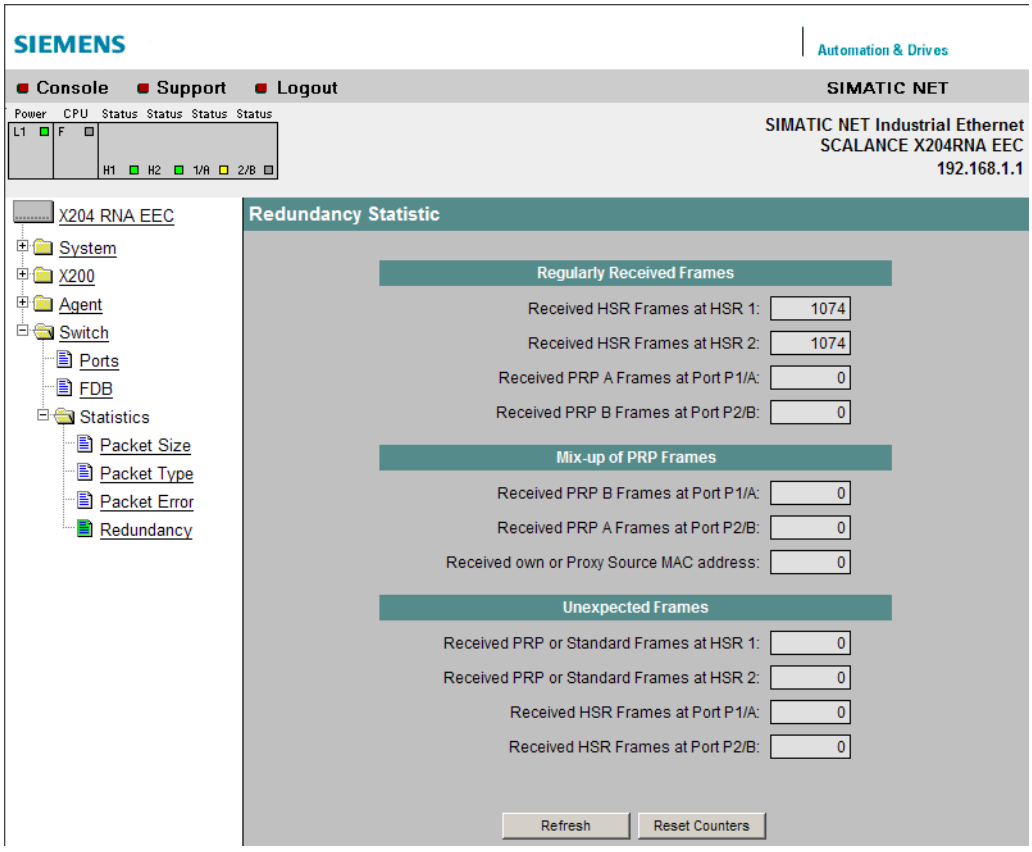


Figure 9-49 Redundancy Statistic

9.12 Encryption methods used (ciphers)

The following tables list the encryption methods (ciphers) used by SCALANCE X-200RNA.

SSL

Port	443
Client/Server	Server

Category	Official name	Hexadecimal value	Enabled by default
Encryption suite	TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384	c02c	Yes
Encryption suite	TLS_ECDHE_ECDSA_WITH_AES_256_CBC_SHA384	c024	Yes
Encryption suite	TLS_ECDHE_ECDSA_WITH_AES_256_CCM	c0ad	Yes
Encryption suite	TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256	c02b	Yes
Encryption suite	TLS_ECDHE_ECDSA_WITH_AES_128_CBC_SHA256	c023	Yes
Encryption suite	TLS_ECDHE_ECDSA_WITH_AES_128_CCM	c0ac	Yes
Key exchange	ECDH >= 250 Bit	-	Yes
Known group	secp256r1 (prime256v1)	0x0017	Yes
Protocol version	TLSv1.2	-	Yes
Signature	sha256+ecdsa	0x0403	Yes

SSH

Port	22
Client/Server	Server

Category	Official name	Hexadecimal value	Enabled by default
Encryption method (enc)	aes128-ctr	Not available	Yes
Encryption method (enc)	aes128-gcm@openssh.com (AEAD_AES_128_GCM)	Not available	Yes
Encryption method (enc)	aes192-ctr	Not available	Yes
Encryption method (enc)	aes256-ctr	Not available	Yes
Encryption method (enc)	aes256-gcm@openssh.com (AEAD_AES_256_GCM)	Not available	Yes
Encryption method (enc)	chacha20-poly1305@openssh.com	Not available	Yes

Category	Official name	Hexadecimal value	Enabled by default
Host key	ecdsa-sha2-nistp256	Not available	Yes
Key exchange (kex)	curve25519-sha256	Not available	Yes
Key exchange (kex)	curve25519-sha256@libssh.org	Not available	Yes
Key exchange (kex)	ecdh-sha2-nistp256	Not available	Yes
Key exchange (kex)	ecdh-sha2-nistp384	Not available	Yes
Key exchange (kex)	ecdh-sha2-nistp521	Not available	Yes
Key length	ECDH >= 250 Bit	Not available	Yes
MAC	hmac-sha2-256	Not available	Yes
MAC	hmac-sha2-256-etm@openssh.com	Not available	Yes
MAC	hmac-sha2-512	Not available	Yes
MAC	hmac-sha2-512-etm@openssh.com	Not available	Yes
MAC	umac-128-etm@openssh.com	Not available	Yes
MAC	umac-128@openssh.com	Not available	Yes
Protocol version	SSHv2.0	Not available	Yes

Technical specifications

10

Construction

Device type SCALANCE	Dimensions (W x H x D) in mm	Weight in grams	Installation options - DIN rail - Wall mounting
X204RNA	45 x 100 x 87	230	+
X204RNA EEC	70 x 147 x 123 (without protective bracket) 70 x 189 x 123 (with protective bracket)	780 (without protective bracket) 800 (with protective bracket)	+ Wall mounting with DIN rail possible

Ports

Device type SCALANCE	Connectors end devices or network components via twisted pair RJ-45 jacks with MDI X pinning 100 Mbps full duplex	Connections for end devices or network components via FO cable Duplex LC connector (with SFP module)	Connectors for the power supply Plug-in terminal block	Connectors for the signaling contact Plug-in terminal block
X204RNA	4	-	1 x 4-pin	1 x 2-pin
X204RNA EEC	2 + 2	max. 2	1 x 3-pin	1 x 3-pin

Electrical data

Device type SCALANCE	Supply voltage [tolerance range]	Power loss (typ.)	Current consumption (typ.)	Overvoltage protection at input
X204RNA	2 x 24 V DC SELV (Safety Extra Low Voltage) [19.2 .. 28.8 V DC]	3.5 W at 24 V DC	150 mA at 24 V DC	Fuse 1.5 A, can only be replaced in factory
X204RNA EEC	1 x 24 V DC (24 ... 250 V DC) [19.2 .. 300 V DC] or 1x 240 V DC (50/60 Hz) Overvoltage category II (100 .. 240 V AC) [85 .. 276 V AC]	6 W at 240 V AC	110 mA at 240 V AC 25 mA at 250 V DC 150 mA at 100 V AC 250 mA at 24 V DC	Fuse 1.25 A, can only be replaced in factory

Signaling contact

Device type SCALANCE	Voltage for the signaling contact	Current through the signaling contact	Contact type	Connectors for the signaling contact
X204RNA	Max. 24 V DC	max. 100 mA	NC contact	1 x 2-pin
X204RNA EEC	max. 240 V AC	max. 100 mA	Changeover contact	1 x 3-pin

Permitted cable lengths (copper)

Device type SCALANCE	0 - 55 m IE TP torsion cable with IE FC RJ-45 Plug 180 or 0 - 45 m IE TP torsion cable with IE outlet RJ-45 + 10 m TP cord	0 - 85 m IE FC TP marine / trailing / flexible / FRNC / festoon / food cable with IE FC RJ-45 Plug 180 or 0 - 75 m IE FC TP marine / trailing / flexible / FRNC / festoon / food cable + 10 m TP cord over IE FC outlet RJ-45	0 - 100 m IE FC TP standard cable with IE FC RJ-45 plug 180 or over IE FC outlet RJ-45 with 0 90 m IE FC TP standard cable + 10 m TP cord
X204RNA	+	+	+
X204RNA EEC	+	+	+

Permitted cable lengths (fiber-optic)

SFP modules only for SCALANCE X204RNA EEC	0 - 3,000 m Glass FO cable 62.5/125 µm multimode glass fiber	0 - 26,000 m Glass FO cable 10/125 µm single mode fiber	0 - 70,000 m Glass FO cable 10/125 µm single mode fiber
SFP module SFP991-1	+	-	-
SFP module SFP991-1LD	-	+	-
SFP module SFP991-1LH+	-	-	+

Degree of protection and MTBF

Device type SCALANCE	Degree of protection	MTBF
X204RNA	IP20	92.45 years
X204RNA EEC	IP20	67.64 years

Switching properties

Device type SCALANCE	Max. number of learnable addresses	Aging time	Switching technique	Latency
X204RNA	1023	30 seconds	"Store and forward"	15 - 135 µs
			With HSR device: Cut-through between the ring ports HSR 1 and HSR 2.	With HSR device: 9 µs (regardless of frame length)

Device type SCALANCE	Max. number of learnable addresses	Aging time	Switching technique	Latency
X204RNA EEC	1023	30 seconds	"Store and forward"	15 - 135 µs
			With HSR device:	With HSR device:
			Cut-through between the ring ports HSR 1 and HSR 2.	9 µs (regardless of frame length)

Permitted ambient conditions

Device type SCALANCE	Operating temperature up to 2000 m with horizontal mounting position	Storage/transportation temperature	Relative humidity in operation	Operating altitude at max. xx°C ambient temperature
X204RNA	-40 °C ... +60 °C [1]	-40 °C to +70 °C	‹ 95%	2000 m - 3000 m at max. 56 °C
			(no condensation)	3000 m - 4000 m at max. 50 °C
X204RNA EEC	-40 °C ... +70 °C [2]	-40 °C to +70 °C	‹ 95%	2000 m - 3000 m at max. 56 °C
	(up to +85 °C / max. 16 h)		(no condensation)	3000 m - 4000 m at max. 50 °C

[1] The operating temperature of SCALANCE X204RNA is independent of the mounting position.

[2] **Consider mounting position of the SCALANCE X204RNA EEC**

If you install the SCALANCE X204RNA EEC in a vertical mounting position, an ambient temperature of max. +40 °C is permitted. If you install the SCALANCE X204RNA EEC in a vertical mounting position at > 40 °C, the device approvals will no longer be valid.

Resistance to harmful gases

The devices listed in the scope of validity meet the following requirements regarding resistance to harmful gases:

Corrosive gases as airborne contaminants	ISA-71.04 severity level	G1, G2, G3
		RH ≤ 75%, no condensation
Reactive species H_2S and SO_2	Test according to	IEC 60068-2-42 (SO_2 10ppm)
		IEC 60068-2-43 (H_2S 1ppm)

Accessories and compatible devices

11

11.1 Accessories

Table 11-1 Accessories and order numbers

	Order number	Available for SCALANCE
System manual "Industrial Ethernet Network Manual"	6GK1970 1BA10 0AA0 Only available here: (http://support.automation.siemens.com/WW/view/en/27069465/)	All
IE cables and accessories		
IE FC Stripping Tool	6GK1901-1GA00	All
IE FC blade cassettes	6GK1901-1GB00	All
IE FC TP standard cable GP	6XV1840-2AH10	All
IE FC TP trailing cable	6XV1840-3AH10	All
IE FC TP marine cable	6XV1840-4AH10	All
IE FC TP trailing cable GP	6XV1870-2D	All
IE FC TP flexible cable GP	6XV1870-2B	All
IE FC FRNC cable GP	6XV1871-2F	All
IE TP ground cable	6XV1871-2G	All
IE FC TP festoon cable GP	6XV1871-2S	All
IE TP train cable	6XV1871-2T	All
IE FC TP food cable	6XV1871-2L	All
IE TP torsion cable	6XV1870-2F	All
Energy cable 2 x 0.75	6XV1812-8A	All
IE FC RJ-45 Plug 180 pack of 1	6GK1901 1BB10 2AA0	All
IE FC RJ-45 Plug 180 pack of 10	6GK1901 1BB10 2AB0	All
IE FC RJ-45 Plug 180 pack of 50	6GK1901 1BB10 2AE0	All
IE FC outlet RJ-45	6GK1901-1FC00-0AA0	All
TP cord RJ-45/RJ-45		
0.5 m	6XV1870-3QE30	All
1.0 m	6XV1870-3QH10	All
2.0 m	6XV1870-3QH20	All
6.0 m	6XV1870-3QH60	All
10 m	6XV1870-3QN10	All
SFP module		
SFP991-1 multimode glass up to 3 km	6GK5991-1AD00-8AA0	SCALANCE X204RNA EEC

	Order number	Available for SCALANCE
SFP991-1LD monomode glass up to 26 km	6GK5991-1AF00-8AA0	SCALANCE X204RNA EEC
SFP991-1LH+ monomode glass up to 70 km	6GK5991-1AE00-8AA0	SCALANCE X204RNA EEC
Glass fibers		
MM robust cable (50/125) (900 µm)	6XV1873-2R	SCALANCE X204RNA EEC
SM robust cable (4x19/125) (900 µm)	6XV1843-2R	SCALANCE X204RNA EEC
MM LC duplex plug	6GK1 901-0RB10-2AB0	SCALANCE X204RNA EEC
SM LC duplex plug	6GK1 901-0SB10-2AB0	SCALANCE X204RNA EEC
Other hardware		
C-PLUG	6GK1900-0AB00	X-200RNA
Software		
SOFTNET-IE RNA	6GK1711-1EW12-0AA0	All

11.2 PRP-compatible devices

PRP-compatible devices

For a device to be used in PRP networks, it must be able to process a frame length of at least 1528 bytes (Jumbo Frames). This value is the maximum frame length including VLAN tag of 1522 bytes plus the length of the PRP trailer of 6 bytes.

The SCALANCE X devices meet these requirements with a few exceptions. You will find the exact "Maximum frame size" value in the technical specifications of the respective operating instructions.

The devices listed below are suitable for use in PRP networks as of a specific version.

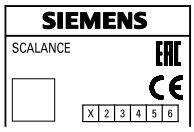
Product	Article number	As of version *
SCALANCE X005, unmanaged IE switch	6GK5 005-0BA00-1AA3	HS 7
SCALANCE X005-TS, unmanaged IE switch, printed-circuit board painted, -40 °C ... +75 °C	6GK5 005-0BA00-1CA3	HS 7
SCALANCE X204-2, managed IE switch	6GK5 204-2BB10-2AA3	V4.4
SCALANCE X204-2TS, managed IE switch	6GK5 204-2BB10-2CA2	V4.4
SCALANCE X204-2LD, managed IE switch	6GK5 204-2BC10-2AA3	V4.4
SCALANCE X206-1, managed IE switch	6GK5 206-1BB10-2AA3	V4.4
SCALANCE X206-1LD, managed IE switch	6GK5 206-1BC10-2AA3	V4.4
SCALANCE X208, managed IE switch	6GK5 208-0BA10-2AA3	V4.4
SCALANCE X208PRO, managed IE switch	6GK5 208-0HA10-2AA6	V4.5
SCALANCE X212, managed IE switch	6GK5 212-2BB00-2AA3	V4.4
SCALANCE X212-LD, managed IE switch	6GK5 212-2BC00-2AA3	V4.4
SCALANCE X216, managed IE switch	6GK5 216-0BA00-2AA3	V4.4
SCALANCE X224, managed IE switch	6GK5 224-0BA00-2AA3	V4.4
SCALANCE XF204, managed IE switch	6GK5 204-0BA00-2AF2	V4.4
SCALANCE XF204-2, managed IE switch	6GK5 204-2BC00-2AF2	V4.4
SCALANCE XF206-1, managed IE switch	6GK5 206-1BC00-2AF2	V4.4
SCALANCE XF208, managed IE switch	6GK5 208-0BA00-2AF2	V4.4
RUGGEDCOM RS950G, managed PRP Redundancy Box	6GK6 095-0GS1-... ("..." means, depending on combination) 6GK6 095-0GS2-...("..." means, depending on combination)	V3.11.1
SCALANCE X304-2FE, managed IE switch	6GK5 304-2BD00-2AA3	V3.7.0
SCALANCE X306-1LD FE, managed IE switch	6GK5 306-1BF00-2AA3	V3.7.0
SCALANCE X307-3, managed IE switch	6GK5 307-3BL00-2AA3	V3.7.0
SCALANCE X307-3LD, managed IE switch	6GK5 307-3BM00-2AA3	V3.7.0
SCALANCE X308-2, managed IE switch	6GK5 308-2FL00-2AA3	V3.7.0
SCALANCE X308-2LD, managed IE switch	6GK5 308-2FM00-2AA3	V3.7.0
SCALANCE X308-2LH, managed IE switch	6GK5 308-2FN00-2AA3	V3.7.0
SCALANCE X308-2LH+, managed IE switch	6GK5 308-2FP00-2AA3	V3.7.0
SCALANCE X310, managed IE switch	6GK5 310-0FA00-2AA3	V3.7.0
SCALANCE X310-FE, managed IE switch	6GK5 310-0BA00-2AA3	V3.7.0

Product	Article number	As of version *
SCALANCE X320-1FE, managed IE switch	6GK5 320-1BD00-2AA3	V3.7.0
SCALANCE X320-3LD FE, managed IE switch	6GK5 320-3BF00-2AA3	V3.7.0
SCALANCE X308-2M, managed IE switch	6GK5 308-2GG00-2AA2	V3.7.0
	6GK5 308-2GG10-2AA2	HS 1
SCALANCE X308-2M TS, managed IE switch, printed-circuit board painted	6GK5 308-2GG00-2CA2	V3.7.0
	6GK5 308-2GG10-2CA2	HS 1
SCALANCE XR324-12M, managed IE switch, 24 V DC power supply unit, cable outlet front	6GK5 324-0GG00-1AR2	V3.7.0
	6GK5 324-0GG10-1AR2	HS 1
SCALANCE XR324-12M, managed IE switch, 230 V AC power supply unit, cable outlet front	6GK5 324-0GG00-3AR2	V3.7.0
	6GK5 324-0GG10-3AR2	HS 1
SCALANCE XR324-12M, managed IE switch, 24 V DC power supply unit, cable outlet rear	6GK5 324-0GG00-1HR2	V3.7.0
	6GK5 324-0GG10-1HR2	HS 1
SCALANCE XR324-12M, managed IE switch, 230 V AC power supply unit, cable outlet rear	6GK5 324-0GG00-3HR2	V3.7.0
	6GK5 324-0GG10-3HR2	HS 1
SCALANCE XR324-12M TS, managed IE switch, 24 V DC power supply unit, cable outlet front, printed-circuit board painted	6GK5 324-0GG00-1CR2	V3.7.2
	6GK5 324-0GG10-1CR2	HS 1
SCALANCE X302-7EEC, managed IE switch, 24 V DC power supply unit	6GK5 302-7GD00-1EA3	V3.7.0
SCALANCE X302-7EEC, managed IE switch, 24 V DC power supply unit, printed-circuit board painted	6GK5 302-7GD00-1GA3	V3.7.0
SCALANCE X302-7EEC, managed IE switch, 24 V DC redundant power supply unit	6GK5 302-7GD00-2EA3	V3.7.0
SCALANCE X302-7EEC, managed IE switch, 24 V DC redundant power supply unit, printed-circuit board painted	6GK5 302-7GD00-2GA3	V3.7.0
SCALANCE X302-7EEC, managed IE switch, 100 ... 240 V AC/DC power supply unit	6GK5 302-7GD00-3EA3	V3.7.0
SCALANCE X302-7EEC, managed IE switch, 100 ... 240 V AC/DC power supply unit, printed-circuit board painted	6GK5 302-7GD00-3GA3	V3.7.0
SCALANCE X302-7EEC, managed IE switch, 100 ... 240 V AC/DC redundant power supply unit	6GK5 302-7GD00-4EA3	V3.7.0
SCALANCE X302-7EEC, managed IE switch, 100 ... 240 V AC/DC redundant power supply unit, printed-circuit board painted	6GK5 302-7GD00-4GA3	V3.7.0
SCALANCE X307-2EEC, managed IE switch, 24 V DC power supply unit	6GK5 307-2FD00-1EA3	V3.7.0
SCALANCE X307-2EEC, managed IE switch, 24 V DC power supply unit, printed-circuit board painted	6GK5 307-2FD00-1GA3	V3.7.0
SCALANCE X307-2EEC, managed IE switch, 24 V DC redundant power supply unit	6GK5 307-2FD00-2EA3	V3.7.0
SCALANCE X307-2EEC, managed IE switch, 24 V DC redundant power supply unit, printed-circuit board painted	6GK5 307-2FD00-2GA3	V3.7.0
SCALANCE X307-2EEC, managed IE switch, 100 ... 240 V AC/DC power supply unit	6GK5 307-2FD00-3EA3	V3.7.0
SCALANCE X307-2EEC, managed IE switch, 100 ... 240 V AC/DC power supply unit, printed-circuit board painted	6GK5 307-2FD00-3GA3	V3.7.0
SCALANCE X307-2EEC, managed IE switch, 100 ... 240 V AC/DC redundant power supply unit	6GK5 307-2FD00-4EA3	V3.7.0

Product	Article number	As of version *
SCALANCE X307-2EEC, managed IE switch, 100 ... 240 V AC/DC redundant power supply unit, printed-circuit board painted	6GK5 307-2FD00-4GA3	V3.7.0
SCALANCE XR324-4M EEC, managed IE switch, 24 V DC power supply unit, cable outlet front	6GK5 324-4GG00-1ER2	V3.7.0
	6GK5 324-4GG10-1ER2	HS 1
SCALANCE XR324-4M EEC, managed IE switch, 24 V DC redundant power supply unit, cable outlet front	6GK5 324-4GG00-2ER2	V3.7.0
	6GK5 324-4GG10-2ER2	HS 1
SCALANCE XR324-4M EEC, managed IE switch, 100 ... 240 V AC/DC power supply unit, cable outlet front	6GK5 324-4GG00-3ER2	V3.9.3
	6GK5 324-4GG10-3ER2	HS 1
SCALANCE XR324-4M EEC, managed IE switch, 100 ... 240 V AC/DC redundant power supply unit, cable outlet front	6GK5 324-4GG00-4ER2	V3.9.3
	6GK5 324-4GG10-4ER2	HS 1
SCALANCE XR324-4M EEC, managed IE switch, 24 V DC power supply unit, cable outlet rear	6GK5 324-4GG00-1JR2	V3.7.0
	6GK5 324-4GG10-1JR2	HS 1
SCALANCE XR324-4M EEC, managed IE switch, 24 V DC redundant power supply unit, cable outlet rear	6GK5 324-4GG00-2JR2	V3.7.0
	6GK5 324-4GG10-2JR2	HS 1
SCALANCE XR324-4M EEC, managed IE switch, 100 ... 240 V AC/DC power supply unit, cable outlet rear	6GK5 324-4GG00-3JR2	V3.9.3
	6GK5 324-4GG10-3JR2	HS 1
SCALANCE XR324-4M EEC, managed IE switch, 100 ... 240 V AC/DC redundant power supply unit, cable outlet rear	6GK5 324-4GG00-4JR2	V3.9.3
	6GK5 324-4GG10-4JR2	HS 1
SCALANCE X308-2M PoE, managed IE switch	6GK5 308-2QG00-2AA2	V3.7.0
	6GK5 308-2QG10-2AA2	HS 1
SCALANCE XR324-4M PoE, managed IE switch, 24 V DC power supply unit, cable outlet front	6GK5 324-4QG00-1AR2	V3.7.0
	6GK5 324-4QG10-1AR2	HS 1
SCALANCE XR324-4M PoE, managed IE switch, 230 V AC power supply unit, cable outlet front	6GK5 324-4QG00-3AR2	V3.9.3
	6GK5 324-4QG10-3AR2	HS 1
SCALANCE XR324-4M PoE, managed IE switch, 24 V DC power supply unit, cable outlet rear	6GK5 324-4QG00-1HR2	V3.7.0
	6GK5 324-4QG10-1HR2	HS 1
SCALANCE XR324-4M PoE, managed IE switch, 230 V AC power supply unit, cable outlet rear	6GK5 324-4QG00-3HR2	V3.9.3
	6GK5 324-4QG10-3HR2	HS 1
SCALANCE XR324-4M PoE TS, managed IE switch, 24 V DC power supply unit, module painted	6GK5 324-4QG00-1CR2	V3.9.3
	6GK5 324-4QG10-1CR2	HS 1
SCALANCE X408-2, modular IE switch	6GK5 408-2FD00-2AA2	V3.7.0
SCALANCE X414-3E, modular IE switch	6GK5 414-3FC00-2AA2	V3.7.0
CP 343-1 Lean	6GK7 343-1CX10-0XE0	V2.4
CP 343-1 Bacnet	6FL4 343-1CX10-0XE0	V1.1
CP 343-1	6GK7 343-1EX30-0XE0	V2.4
CP 343-1 Advanced	6GK7 343-1GX30-0XE0	V1.2
CP 343-1 Advanced	6GK7 343-1GX31-0XE0	V3.0
CP 443-1 Advanced	6GK7 443-1GX20-0XE0	V2.1
CP 443-1 Advanced	6GK7 443-1GX30-0XE0	V3.0
CP 443-1	6GK7 443-1EX20-0XE0	V2.1
CP 443-1	6GK7 443-1EX30-0XE0	V3.0

***** Information about the hardware release (HS) or the firmware version (V) as of which PRP is supported.

Hardware version



You will find the hardware version of your device on the type plate. On the type plate, the hardware version is printed as a placeholder “X”.

Example: X 2 3 4 5 6

In this case, "X" would be the placeholder for hardware version 1.

HSR rings

Note that other requirements are in effect for rings in which the "High-availability Seamless Redundancy Protocol" (HSR) is used.

Only devices equipped with HSR interfaces can be used in HSR rings.. Devices without HSR capability, must be connected to the HSR ring by an HSR version of the SCALANCE X-200RNA.

Dimension drawings

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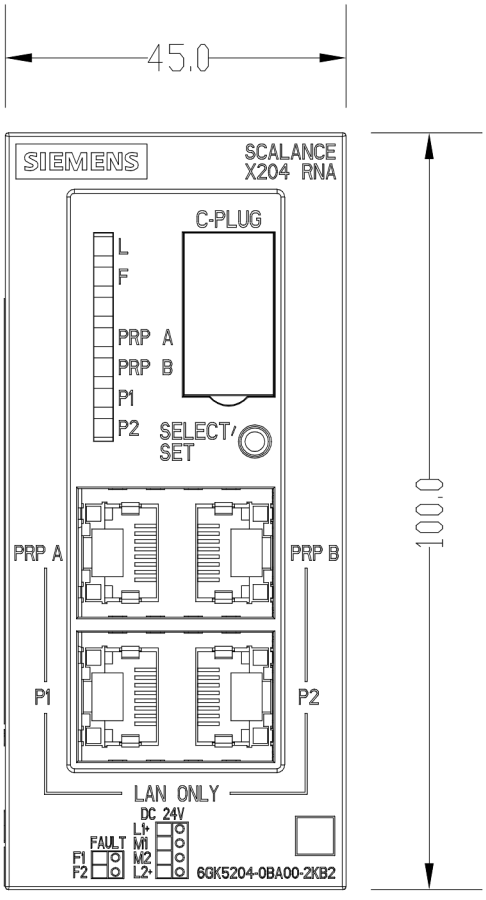


Figure 12-1 SCALANCE X204RNA, front view

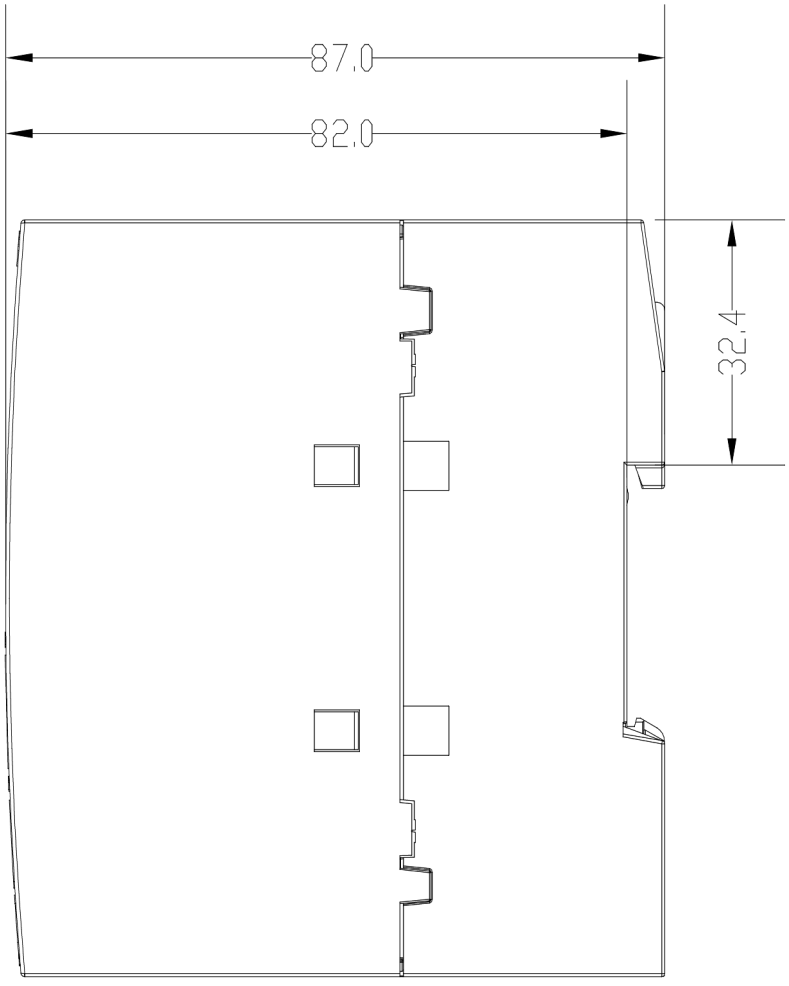


Figure 12-2 SCALANCE X204RNA, side view

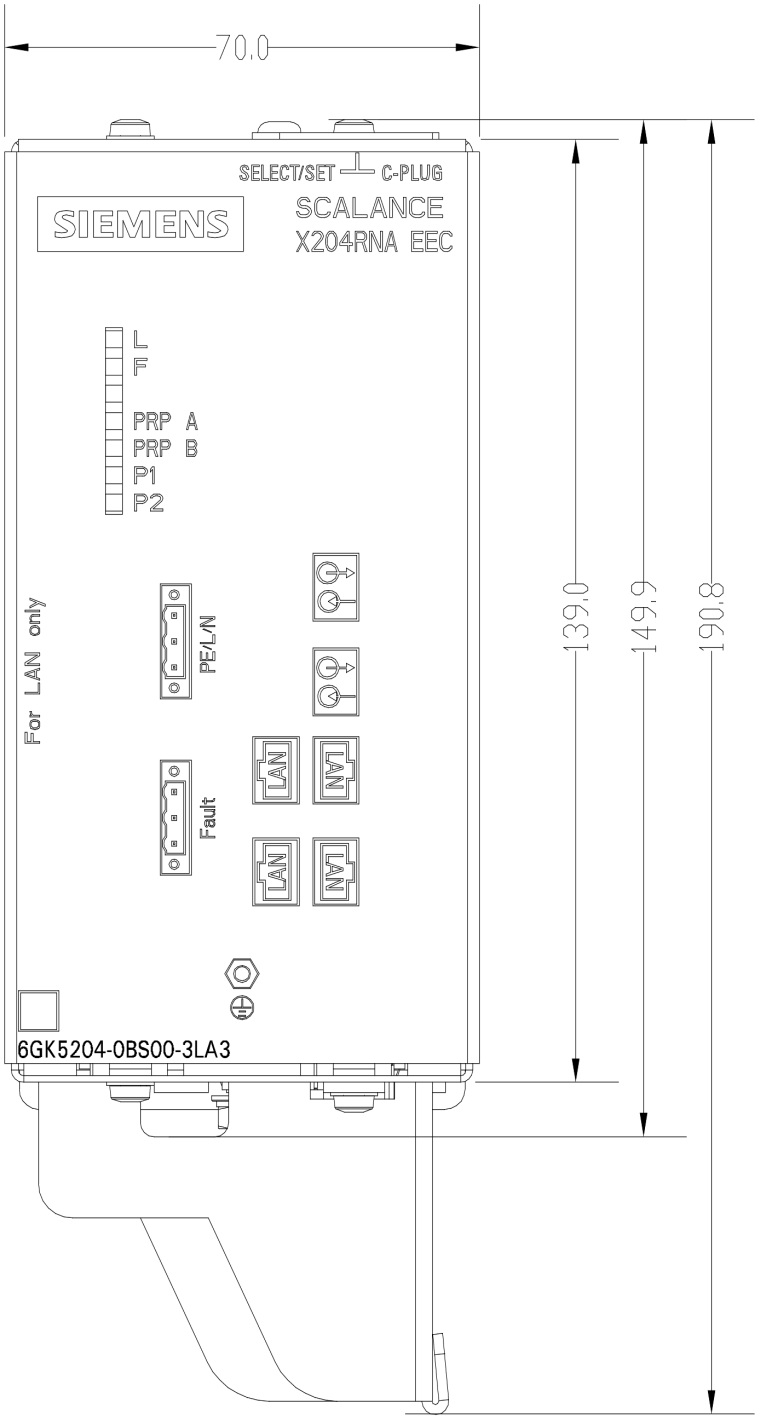


Figure 12-3 SCALANCE X204RNA EEC, front view

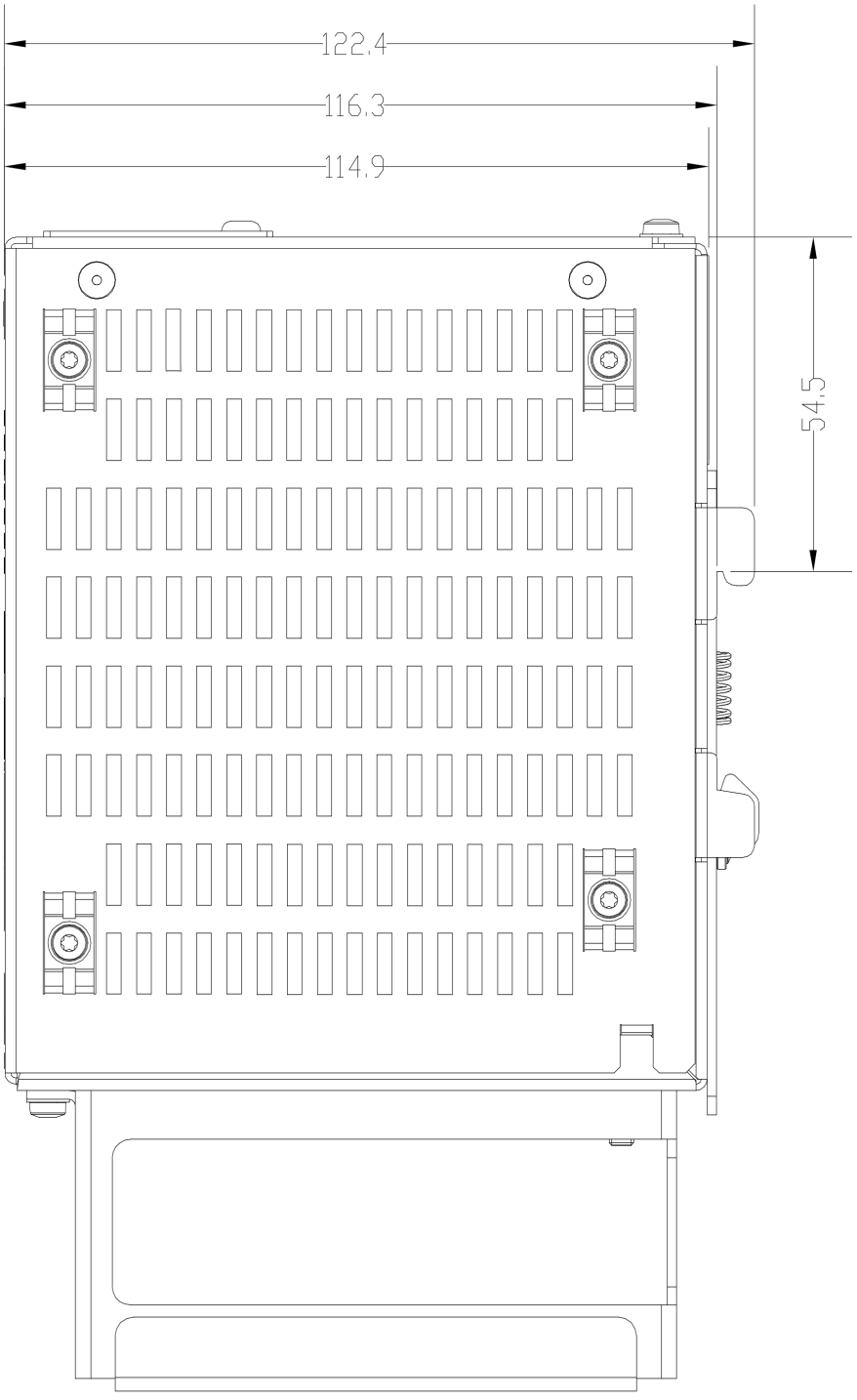


Figure 12-4 SCALANCE X204RNA EEC, side view

Approvals

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The SIMATIC NET products described in these Operating Instructions have the approvals listed below.

Note

Issued approvals on the type plate of the device

The specified approvals apply only when the corresponding mark is printed on the product. You can check which of the following approvals have been granted for your product by the markings on the type plate.

Current approvals on the Internet

You will find the current approvals for the product on the Internet pages of Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/15273/cert).

Notes for the manufacturers of machines

This product is not a machine in the sense of the EC Machinery Directive or the Supply of Machinery (Safety) Regulations (UK).

There is therefore no declaration of conformity relating to the EC Machinery Directive 2006/42/EEC or the Supply of Machinery (Safety) Regulations 2008 (UK) for this product.

If the product is part of the equipment of a machine, it must be included in the procedure for obtaining the EU/UK conformity assessment by the manufacturer of the machine.

Machinery directive

The product is a component in compliance with the EC Machinery Directive 2006/42/EEC and the Supply of Machinery (Safety) Regulations 2008 (UK).

According to the Machinery Directive respectively the Supply of Machinery (Safety) Regulations (UK), we are obliged to point out that the product described is intended solely for installation in a machine.

Before the final product can be put into operation, it must be tested to ensure that it conforms with the Machinery Directive 2006/42/EEC and the Supply of Machinery (Safety) Regulations 2008 (UK).

EC declaration of conformity

CE

The SIMATIC NET products described in these operating instructions meet the requirements and safety objectives of the following EU directives and comply with the harmonized

European standards (EN) which are published in the official documentation of the European Union and here.

- **2014/34/EU (ATEX explosion protection directive)**
  Directive of the European Parliament and the Council of 26 February 2014 on the approximation of the laws of the member states concerning equipment and protective systems intended for use in potentially explosive atmospheres, official journal of the EU L96, 29/03/2014, p. 309-356

  Note

  Only variants with 24 V DC power supply meet the requirements of this approval.

- **2014/35/EU (Low Voltage Directive)**
  Directive of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits; official journal of the EU L96, 29/03/2014, p. 357-374.

  Note

  Only variants with 240 V AC power supply meet the requirements of this approval.

- **2014/30/EU (EMC)**
  EMC directive of the European Parliament and of the Council of February 26, 2014 on the approximation of the laws of the member states relating to electromagnetic compatibility; official journal of the EU L96, 29/03/2014, p. 79-106
- **2011/65/EU (RoHS)**
  Directive of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, official journal of the EC L174, 01/07/2011, p. 88-110

You will find the EC declaration of conformity for these products on the Internet pages of Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/15273/cert).

The EC Declaration of Conformity is available for all responsible authorities at:

Siemens Aktiengesellschaft

Digital Industries
DE-76181 Karlsruhe
Germany

UK Declaration of Conformity

UK CA

The UK declaration of conformity is available to all responsible authorities at:

Siemens Aktiengesellschaft
Digital Industries
Process Automation
DE-76181 Karlsruhe
Germany

Importer UK:

Siemens plc,
Manchester M20 2UR

You can find the current UK Declaration of Conformity for these products on the Internet pages under Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/ps/15273/cert).

The SIMATIC NET products described in this document meet the requirements of the following directives:

- UK-Regulation
  SI 2016/1107 Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016, and related amendments
- Low-Voltage Directive
  SI 2016/1101 Electrical Equipment (Safety) Regulations 2016
- EMC Regulation
  SI 2016/1091 Electromagnetic Compatibility Regulations 2016, and related amendments
- RoHS Regulation
  SI 2012/3032 Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, and related amendments

ATEX, IECEx, UKEX and CCC Ex certification

WARNING

Risk of explosion in hazardous areas

When using SIMATIC NET products in hazardous area zone 2, make absolutely sure that the associated conditions in the following document are adhered to:

"SIMATIC NET Product Information Use of subassemblies/modules in a Zone 2 Hazardous Area".

You will find this document

- on the data medium that ships with some devices.
- on the Internet pages under Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/view/78381013).

Enter the document identification number "C234" as the search term.

The markings of the electrical devices are:



II 3 G Ex ec IIC T4 Gc
DEKRA 18ATEX0025 X
IECEx DEK 18.0017X



II 3 G Ex ec IIC T4 Gc
DEKRA 21UKEX0001 X

Importer UK:
Siemens plc,
Manchester, M20 2UR, UK



(Ex ec IIC T4 Gc, not on the nameplate)

The products meet the requirements of the following standards:

- EN/IEC 60079-7, GB/T 3836.3
- EN IEC/IEC 60079-0, GB/T 3836.1

You will find the current versions of the standards in the currently valid certificates.

Note

Only variants with 24 VDC power supply meet the requirements of this approval.

Note for devices with CLASS 1 LASER

Important note on products certified according to Type Examination Certificate KEMA 07ATEX0145 X as of Issue 95 / DEKRA 18ATEX0025 X and IECEx Certificate of Conformity DEK 14.0025X as of Issue 43 / DEK 18.0017X and containing Class 1 optical radiation sources.

Note

CLASS 1 LASER

The device contains optical radiation sources which comply with the limits of Class 1 according to IEC 60825-1. Fiber-optic cables connected to these optical radiation sources may therefore be routed either to or through hazardous areas requiring Category 2G, 3G, 2D or 3D equipment.

Safety of electrical equipment (Low Voltage Directive)

The EEC device variants also meet the requirements of the EU Directive 2014/35/EU "Low Voltage Directive".

Applied standard:

- DIN EN 61131–2 Programmable logic controllers - Part 2: Operating resource requirements and tests.

EMC (electromagnetic compatibility)

The SIMATIC NET products described in these operating instructions meet the electromagnetic compatibility requirements according to the EU Directive 2014/30/EU as well as the UK-Regulation SI 2016/1091 and their associated amendments.

Applied standards:

- EN 61000-6-2 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
- EN 61000-6-4 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

You will find the current versions of the standards in the currently valid EC/UK Declaration of Conformity.

EMC (railway applications)

The EEC device versions also meet the electromagnetic compatibility requirements according to the EU Directive 2014/30/EU as well as the UK-Regulation SI 2016/1091.

Applied standards:

- EN 50121-3-2 Railway applications - Electromagnetic compatibility - part 3-2: Rolling stock - Devices
- EN 50121-4 Railway applications - Electromagnetic compatibility - part 4: Interference emissions and immunity of signal telecommunications equipment

You will find the current versions of the standards in the currently valid EC declaration of conformity.

RoHS

The SIMATIC NET products described in these operating instructions meet the requirements on the restriction of the use of certain hazardous substances in electrical and electronic equipment according to the EU Directive 2011/65/EU as well as the UK-Regulation SI 2012/3032 and their associated amendments.

Applied standard:

- EN IEC 63000

FM

The product meets the requirements of the standards:

- Factory Mutual Approval Standard Class Number 3611
- FM Hazardous (Classified) Location Electrical Equipment:
  Non Incendive / Class I / Division 2 / Groups A,B,C,D / T4 and
  Non Incendive / Class I / Zone 2 / Group IIC / T4

Note

Only variants with 24 VDC power supply meet the requirements of this approval.

13.1 cULus Information Technology Equipment

cULus Approval for Information Technology Equipment



cULus Listed I. T. E.

Underwriters Laboratories Inc. complying with

- UL 60950-1 (Information Technology Equipment)
- CAN/CSA C22.2 No. 60950-1

Report no. E115352

13.2 cULus Industrial Control Equipment

cULus approval for industrial control equipment

cULus Listed IND. CONT. EQ.

Underwriters Laboratories Inc. complying with

- UL 508
- CSA C22.2 No. 142-M1987

Report no. E85972

13.3 UL Industrial Control Equipment

UL Industrial Control Equipment

Underwriters Laboratories (UL) complying with Standard UL 508

13.4 UL Information Technology Equipment

UL Information Technology Equipment

Underwriters Laboratories (UL) complying with Standard UL 60950-1

CSA Approval for Information Technology Equipment

CSA Certification Mark

Canadian Standard Association CSA C22.2 No. 60950-1-03

CSA Approval for Industrial Control Equipment

CSA Certification Mark

Canadian Standard Association CSA C22.2 No. 142-1987

Railway approval

EEC variants of the device meet the requirements of the standards:

- EN 50155 "Railway applications - Electronic equipment used on rolling stock"
- EN 45545 "Railway applications - Fire protection on railway vehicles"

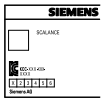
Note

When used on railway stock, a stabilized power supply with railway approval must be used to comply with EN50155.

Note

Only devices as of hardware version 3 meet the requirements of this approval.

Hardware version



You will find the hardware version of your device on the type plate. On the type plate, the hardware version is printed as a placeholder “X”.

Example: X 2 3 4 5 6

In this case, "X" would be the placeholder for hardware version 1.

Note for Australia - RCM

The product meets the requirements of the RCM standard.

Applied standards:

- AS/NZS CISPR11 (Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement).
- EN 61000-6-4 Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

You will find the current versions of the standards in the currently valid RCM SDoCs (Self-Declaration of Conformity).

MSIP 요구사항 - For Korea only

A급 기기(업무용 방송통신기자재)

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정 외의 지역에서 사용하는것을 목적으로 합니다.

13.5 FDA and IEC X204RNA EEC marking

FDA and IEC marking

The EEC variants of the device meet the FDA and IEC requirements listed below:

Device	CLASS 1 LASER Product
6GK5204-0BS00-3LA3 (PRP)	(*)
6GK5204-0BS00-2NA3 (HSR)	(*)
6GK5204-0BS00-3PA3 (PRP/HSR)	(*)

* In modular devices, you can find the marking on the plug-in transceiver used or in the relevant operating instructions.

CAUTION

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

Installation guidelines

The devices meet the requirements if you adhere to the installation and safety instructions contained in this documentation and in the following documentation when installing and operating the devices.

- "Industrial Ethernet / PROFINET Industrial Ethernet" System Manual (https://support.industry.siemens.com/cs/ww/en/view/27069465)
- "Industrial Ethernet / PROFINET - Passive Network Components" System Manual (https://support.industry.siemens.com/cs/ww/en/view/84922825)
- "EMC Installation Guidelines" configuration manual (https://support.industry.siemens.com/cs/ww/en/view/60612658)

WARNING

Personal injury and property damage can occur

The installation of expansions that are not approved for SIMATIC NET products or their target systems may violate the requirements and regulations for safety and electromagnetic compatibility.

Only use expansions that are approved for the system.

Note

The test was performed with a device and a connected communications partner that also meets the requirements of the standards listed above.

When operating the device with a communications partner that does not comply with these standards, adherence to the corresponding values cannot be guaranteed.

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