SIEMENS

N 148/23

IP Interface Secure

Application program description

A6V11689762_en--_d
2023-07-27

Smart Infrastructure

Supplementary information

Purpose of the application program description

The application program description contains detailed information on the parameters and communication objects of the ETS application program as well as a description of the functions that can be set via the different parameters.

Target audience of the application program description

The application program description is intended for people who want to commission IP interface or reconfigure it, who have a basic understanding of network technology and have successfully attended the following courses:

- KNX basics course
- IP fundamentals KNXnet/IP

Product documentation and support

Product documentation

Documents related the product, such as operating and installation instructions, application program description, product database, additional software and CE declarations can be downloaded from the following website:

http://www.siemens.com/gamma-td

Frequently asked questions

For frequently asked questions about the product and their solutions, see:

https://support.industry.siemens.com/cs/products?dtp=Faq&mfn=ps&lc=en-WW

Support

Contact details for additional questions relating to the product:

Tel.: +49 89 9221-8000

http://www.siemens.com/supportrequest

Contents

1 Information on IP Interface Secure and on the application program

Product family: System device

Product type: Interface

Manufacturer: Siemens

Name: IP Interface Secure N148/23

Order no.: 5WG1 148-1AB23

Application: 07B0 CO IP Interface Secure 7205 03

System requirement:

- At least ETS 5.7.3 or above

1.1 Cyber security disclaimer

Siemens provides a portfolio of products, solutions, systems and services that includes security functions that support the secure operation of plants, systems, machines and networks. In the field of Building Technologies, this includes building automation and control, fire safety, security management as well as physical security systems.

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 security concept. Siemens' portfolio only forms one element of such a concept.

You are responsible for preventing unauthorized access to your plants, systems, machines and networks which 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. Additionally, Siemens' guidance on appropriate security measures should be taken into account. For additional information, please contact your Siemens sales representative or visit https://www.siemens.com/global/en/home/company/topic-areas/future-of-manufacturing/industrial-security.html.

Siemens' portfolio undergoes continuous development to make it more secure. Siemens strongly recommends that updates are applied as soon as they are available and that the latest versions are used. Use of versions that are no longer supported, and failure to apply the latest updates may increase your exposure to cyber threats. Siemens strongly recommends to comply with security advisories on the latest security threats, patches and other related measures, published, among others, under https://www.siemens.com/cert/en/cert-security-advisories.htm.

2 Function

2.1 Security functions of IP Interface Secure

IP Interface Secure supports the “**KNX IP Secure**” security standard and offers the following security functions, among others:

- Secured access only from authenticated devices
- Secure commissioning via ETS

During secure commissioning via ETS, the device certificate printed onto the device (FDSK = Factory Default Setup Key) is imported and stored for this exact device in the ETS project.

ℹ For more information on KNX IP Secure, refer to the ETS software help or go to the following website: https://support.knx.org

ℹ Alternatively, insecure commissioning without KNX IP Secure is also possible. In this case, the device is insecure and responds like other KNX devices without IP Secure.

2.2 Functions of IP Interface Secure

IP Interface Secure is a rail-mounted device for installation in distributions. The device uses the KNXnet/IP standard and acts as an interface to KNX/EIB via data networks using the internet protocol (IP). To do so, this device enables bus access from a PC or other data processing devices.

Connections and power supply

The connection to KNX is established using a bus connector terminal (black and red terminals). The connection to the data network (IP via 10 or 100BaseT (depending on the switch)) is established using an RJ–45 socket.

IP Interface Secure also needs operating voltage in order to operate. IP Interface Secure can obtain this operation voltage via the network line using “Power over Ethernet” as per IEEE 802.3af. Alternatively, the operating voltage can be obtained via the second terminal block (white-yellow terminals) from an AC/DC 24 V safety extra low voltage supply or from a bus voltage supply (unchoked voltage, DC 29 V). As soon as the safety extra low voltage supply is connected to the second terminal block, operating voltage is drawn from it.

Remote access

Even if there is no direct network connection between a PC and an IP router, you can use a suitable network infrastructure for remote access to a KNX installation. Five simultaneous connections (remote accesses) are possible.

Setting up remote access [→ 13]

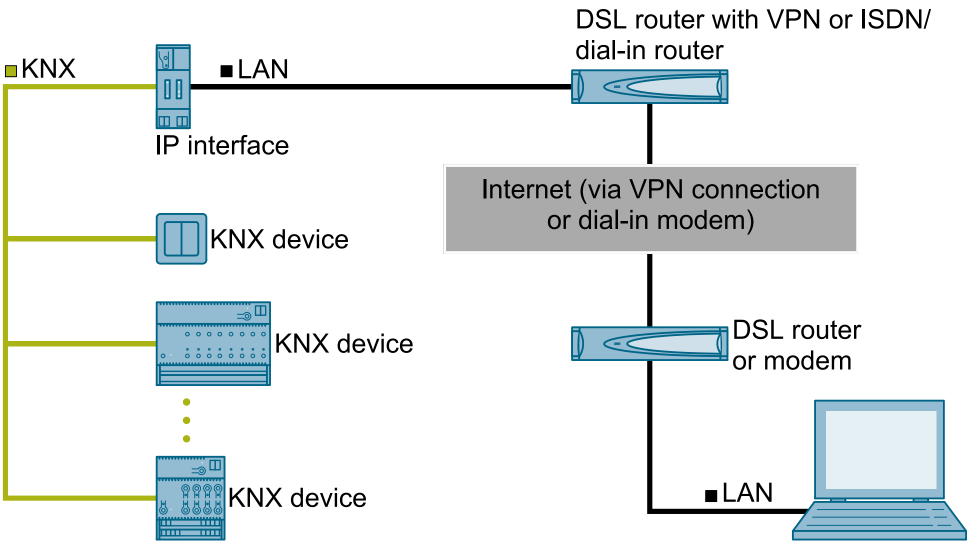

KNX
LAN
IP interface
DSL router with VPN or ISDN/ dial-in router
Internet (via VPN connection or dial-in modem)
KNX device
KNX device
KNX device
DSL router or modem
LAN

Fig. 1: Secure remote access

Additional functions

IP Interface Secure has the following attributes:

- Easy to connect to higher-level systems by using the internet protocol (IP)
- Direct access to the KNX installation from every point in the IP network (KNXnet/IP tunneling)
- Up to five KNXnet/IP tunneling connections are possible at the same time
- LED displays for operational readiness, KNX communication and IP communication
- Easy and secure configuration using ETS
- Easy to connect to visualization systems and facility management systems
- Slot for SD card (not in use)

3 Notes on secure data transfer

Instructions for secure operation of KNX IP Secure products

- Only operate the device in a protected network environment and do not allow direct access from the Internet.
- Additionally secure remote access to the device via a VPN connection.

  A virtual private network (VPN) establishes an encrypted and authorized connection (VPN tunnel) from a remote connection to a network via the internet. This VPN connection enables secure communication protected from eavesdropping between a remote device and the KNX installation.
- Only operate the device in secure mode. The device is in secure mode when the device has been commissioned via secure commissioning, secure tunneling is enabled and strong and different passwords are used.
- Set up a separate IP network with its own hardware for KNX communication.
- Use user IDs and strong passwords to restrict access to the (KNX) IP network.
- Restrict access to the (KNX)IP network to an authorized group of people using user IDs and strong passwords..
- Document network settings and give them to the building owner/operator or LAN administrator.
- Coordinate the administration of access rights to this KNXnet/IP device in an IP network with the respective IP network administrator.

Measures after replacing a device in the network

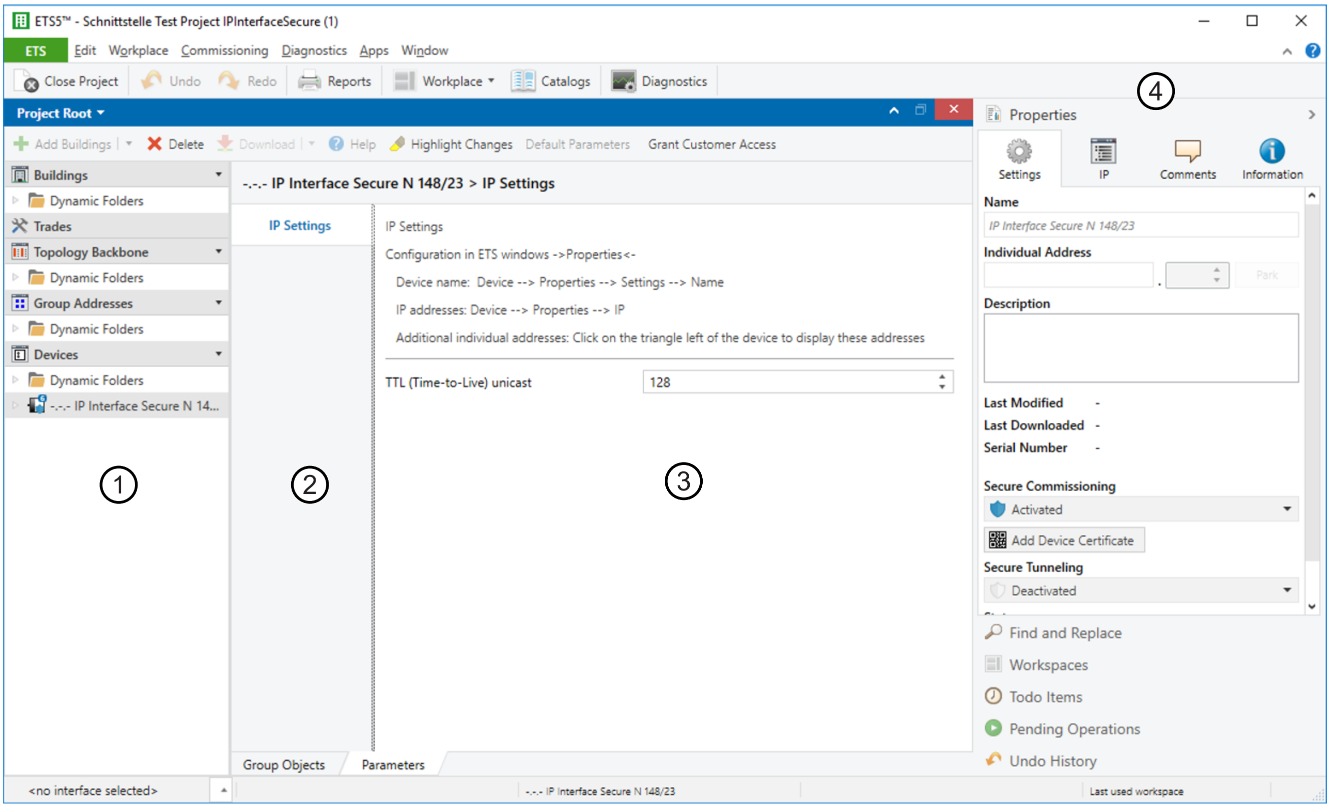
If an IP Router Secure or an IP Interface Secure in secure mode is stolen from a network or replaced due to a defect, secure commissioning has to be repeated for all other devices in the network. To do this, deactivate the“Secure commissioning“ option for each device in the settings of the project, activate the option again and load the data to the devices again. (There is no need to load the data into the device between deactivation and reactivation.)

Secure commissioning has to be repeated because it is not possible to exclude the possibility that the keys that are in the secure section of the device can be read. Recommissioning has the effect that new keys are generated and the old keys become worthless. The removed device no longer works in the network.

More information on KNX security

For more information on KNX security, including, for example, a security check, refer to the “KNX Secure” section on the KNX website (http://www.knx.org).

4 Structure of the setting options in ETS


ETS5™ - Schnittstelle Test Project IPInterfaceSecure (1)
ETS Edit Workplace Commissioning Diagnostics Apps Window
Close Project Undo Redo Reports Workplace Catalogs Diagnostics
Project Root
Add Buildings Delete Download Help Highlight Changes Default Parameters Grant Customer Access
Buildings
Dynamic Folders
Trades
Topology Backbone
Dynamic Folders
Group Addresses
Dynamic Folders
Devices
Dynamic Folders
-.-.- IP Interface Secure N 14...
IP Settings
Group Objects
Parameters
Properties
Settings IP Comments Information
Find and Replace
Workspaces
Todo Items
Pending Operations
Undo History
<no interface selected>
-.-.- IP Interface Secure N 148/23
Last used workspace
1
2
3
4

-.-.- IP Interface Secure N 148/23 > IP Settings

IP Settings

Configuration in ETS windows ->Properties<-

Device name: Device --> Properties --> Settings --> Name

IP addresses: Device --> Properties --> IP

Additional individual addresses: Click on the triangle left of the device to display these addresses

TTL (Time-to-Live) unicast 128

Name: IP Interface Secure N 148/23

Individual Address

Description

Last Modified -

Last Downloaded -

Serial Number -

Secure Commissioning: Activated

Add Device Certificate

Secure Tunneling: Deactivated

Fig. 2: ETS overview

1 Tree view of the different sections (e.g. devices, topology and group addresses)

2 Listing of parameter cards

3 Parameter section

In this area, parameters are set, enabled or disabled.

4 “Properties” section (e.g. configuration of IP and security, additional physical addresses)

You can use the ‘Highlight changes’ button to highlight in yellow any parameters that do not have the default settings.

5 Parameter

Parameters of the “IP settings” parameter card

TTL (Time-to-Live) Unicast

Parameter	Settings
TTL (Time-to-Live) Unicast	0 ... 255

Function:

This parameter can be used to set the TTL value for the IP protocol. The default value is “128.” If the local network administrator specifies a different value, this value can be entered here.

The value specifies the number of intermediate stations (e.g. routers) which a data package may pass through between sender and receiver. If the value is set too low, data packages can get lost and are not received by the recipient.

6 Commissioning

6.1 Function in factory settings

In the factory settings, the configuration parameters are set as follows:

- Physical address of IP Interface Secure: Setting: “15.15.255” (=FFFF hex)
  - Specifying the name and physical address of the device [→ 12]
- IP address assignment: Setting: “Obtain IP address automatically”
  - Assigning an IP address [→ 12]

6.2 Location of the device certificate QR code

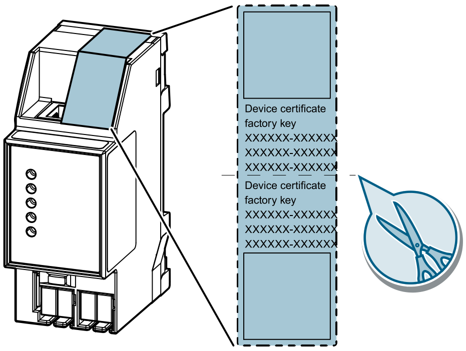


Fig. 3: Device certificate

The QR code of the device certificate is affixed to the device as a sticker. There is a duplicate QR code, which can be removed for easy commissioning.

6.3 Commissioning the device

Commissioning the device with “KNX IP Secure”

▷ A project is open in ETS.

1. Add the device to the project.

   ➪ If the project is not yet password-protected, the ‘Set project password’ window appears.

2. Enter the password in the ‘New password’ and ‘Confirm password’ input fields, then click ‘OK’ to confirm.

   ➪ The ‘Add device certificate’ window appears.

3. If you have a webcam, press the ‘...’ button and then scan the QR code sticker on the device.

4. If you do not have a webcam or are unable to read the QR code, enter the 6x6-character certificate key on the sticker on the device.

   ➪ Once the certificate key has been entered correctly, a green checkmark appears at the end of the line. In addition, the serial numbers and the factory key of the device are displayed.

5. Compare the displayed serial number to the serial number on the device.
   - ⇨ If the serial numbers do not match, the certificate key of a different device was entered and transfer of data will not work later on.
6. Press ‘OK’ to confirm the entries.
   - ⇨ The device has been added to the project. The security functions of “KNX IP Secure” are activated automatically.

Commission device without “KNX IP Secure”

Commissioning without “KNX IP Secure”

Alternatively, the device can also be commissioned without KNX IP Secure. In this case, the device is insecure and responds like other KNX devices without the KNX IP Secure function.

To commission the device without KNX IP Secure, select the device in the ‘Topology’ or ‘Devices’ section and set the ‘Secure commissioning option’ to ‘Deactivated’ in the ‘Properties’ area of the ‘Settings’ tab.

6.4 Specifying the name and physical address of the device

A unique device name helps recognize and find the device in a KNXnet/IP visualization or within a project in ETS.

▷ The device has been added to the project.

1. Select the device in the ‘Topology’ or ‘Devices’ section.
2. In the ‘Properties’ section, switch to the ‘Settings’ tab.
3. In the ‘Name’ input field, enter a unique name of 30 characters maximum for the selected device.
4. In the ‘Physical address’ input field, enter the physical address of the device The address must be as yet unassigned.
   - ⇨ The settings are saved automatically.

6.5 Assigning an IP address

For details on the IP address and additional network settings, contact your local network administrator.

▷ The device has been added to the project.

1. Select the device in the ‘Topology’ or ‘Devices’ section.
2. In the ‘Properties’ section, switch to the ‘IP’ tab.
3. Make the desired IP address settings.
   - ⇨ The settings are saved automatically in the ETS project.
4. Saving settings in the device. To do so, use the ETS software for full programming (menu item: “Program” > “Physical address & application program”).

The following settings are possible:

- **Obtain IP address automatically**
  If you select this option, the device is automatically assigned an IP address. This happens either via an DHCP service in the network or, if no DHCP service

has been configured, via the device itself (AutoIP).
The MAC address required for configuring the DHCP service can be read underneath this setting option or on a sticker on the device.

- **Use fixed IP address**
  When this option is selected, additional input fields are displayed in which the desired IP address for the device as well as a subnetwork screen and the standard gateway can be entered.

6.6 Setting up additional physical addresses

For stable device communication via KNXnet/IP tunneling, the device must use a separate physical address for each connection.

These additional addresses must not be identical to the physical address of the device and must not be used by any other bus device either.

When inserting the device into a project in ETS, additional physical addresses are automatically created for the device. These can be changed, if necessary.

For additional information on assigning and changing physical addresses, refer to the ETS software help.

When the entire device is reset to factory settings, the physical addresses are reset: Resetting the device to factory settings [→ 16]

6.7 Setting up remote access

Even if there is no direct network connection between a PC and an IP router, you can use a suitable network infrastructure for remote access to a KNX installation. Five simultaneous connections (remote accesses) are possible.

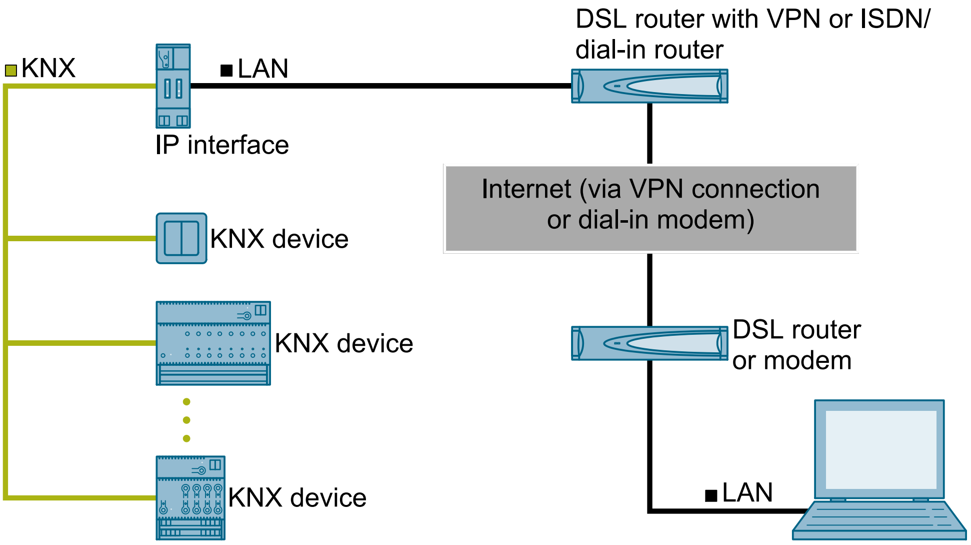

KNX
LAN
DSL router with VPN or ISDN/ dial-in router
IP interface
Internet (via VPN connection or dial-in modem)
KNX device
KNX device
DSL router or modem
KNX device
LAN

Fig. 4: Secure remote access

▷ The device must be reachable from outside of the own network.

◈ In the DSL router with VPN or in the ISDN/analogous dial-in router, create two separate protocol release (port extension tunnels) for the same port number for the UDP and TCP protocol.
The default port for KNX devices is port “3671.” The ports can be masked because the external port number differs from the internal port number.

7 Help in case of errors and problems

7.1 Frequently asked questions

Frequently asked questions

For frequently asked questions about the product and their solutions, see:
https://support.industry.siemens.com/cs/ww/en/ps/faq

FAQ

7.2 Possible errors

Description	Possible cause	Solution
When the device is commissioned, the following error message appears: "The physical address: x.y.z is being used by another device."	Physical addresses have been used multiple times.	Check and/or reset physical addresses and re-assign. Setting up additional physical addresses [→ 13] Troubleshooting using ETS [→ 14]
When the device is commissioned, the following error message appears: "This is the certificate of another device."	An incorrect device certificate was scanned or an incorrect certificate key entered.	Checking device certificates [→ 15]
Changes to the settings for the IP address were not copied to the device.	Only partial programming was performed.	Perform full programming of the device (physical address and application program) via the ETS software (menu item: 'Program' > 'Physical address & application program').
KNX IP Secure routing is not possible.	The ETS detects dummy applications as non-secure.	Remove the dummy applications from the project.
The project cannot be opened.	The project password is unknown.	The project password cannot be reset. Create the project again, reset all devices to factory settings, and commission it again.
A device cannot be added to the project.	A QR code for the device certificate is no longer available or cannot be assigned to a device. The 6X6-digit certificate key for the device certificate is unknown or can no longer be assigned to a device.	The device can no longer be commissioned and must be disposed of.

7.3 Troubleshooting using ETS

These are some of the troubleshooting options in ETS:

'Diagnostics' section

This section lets you check the physical address, group monitor, and bus monitor among other things.

‘Reports’ section

This area lets you export details on different areas of the project or print them directly.

ℹ For more information on ETS, see the online help of the ETS software.

7.4 Checking device certificates

1. Click the ‘ETS’ button in the menu bar.
2. Select the project from the list.
   - ⇨ Details on the project are shown on the right side.
3. Select the ‘Security’ tab page.
   - ⇨ A list of device certificates belonging to the project is displayed.

8 Resetting the device to factory settings

NOTICE	
!	**Loss of data due to resetting device!** When you reset the device, all parameters and settings entered are deleted. ● Ensure that the device is really supposed to be reset.

Resetting the device to factory settings

◈ Press the Learn button (at least 20 seconds) until the programming LED starts flashing quickly.

➪ The programming LED flashes for 8 seconds.

➪ The device has been reset to factory settings. All parameter settings have been deleted.

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