

# Installation Manual

# TH LINK PROFINET



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The latest version of this manual is available in the Softing download area at: http://industrial.softing.com/en/downloads.html

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# 1 Introduction

### 1.1 About TH LINK

### What is TH LINK?

- TH LINK TH LINK provides a secure access to the fieldbus network and forms the basis for the Softing product TH SCOPE.
- TH LINK can easily be assembled/installed and is easy to put into operation. Integrated websites allow to configure the product without using additional software. The delivered default configuration allows start-up in only a few minutes. In order to prevent network disruptions by unauthorized configuration changes, all configuration functions are protected by user administration.

### **Features**

- Secure access to the PROFINET network
- Basis for TH SCOPE
- Access protection through integrated user administration

# 1.2 Intended Use

The device is designed to be used as a secure access point to PROFINET networks. Any other use is deemed non-intended use.

# 1.3 Before you connect TH LINK

Strictly observe the following safety instructions before connecting the TH LINK:



#### Note

Small objects or liquids must not enter the case of the TH LINK (e.g. through the ventilation slots). This may damage the device.

Never cover the ventilation slots on the device.



### Note

Never open the case of the TH LINK or carry out any mechanical modifications on the device. This may lead to damages on the device as well as to loss of warranty.



### **EMC** note

The TH LINK contains electronic components sensitive to electrostatic discharges. Damages due to electrostatic discharge can lead to premature failure of components or intermittent faults at a later stage. Before installing the TH LINK, divert the electrostatic discharge away from your body and the tools used.

 Carefully plan the integration of the TH LINK into an existing system and ensure proper function of the system after installation.

- The TH LINK may only be installed or uninstalled by qualified, trained electrical engineering personnel. When installing the TH LINK, observe the regulations for handling electric components in accordance with VDE 0100. In addition, you must also observe the valid safety and accident prevention regulations (UVV) when operating the device within the jurisdiction of the Federal Republic of Germany.
- Always install the device on a suitable top-hat rail (mounting rail).
- Cables used for the connection must not apply any mechanical forces to the device.
- High temperature differences between the storage site and installation site can result in condensation within the case, which may cause the TH LINK to become damaged. In case of high temperature differences, wait at least three hours before operating the device.



#### WEEE

Electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime.

Please dispose of this product according to the respective national regulations or contractual agreements. If there are any further questions concerning the disposal of this product, please contact Softing Industrial Automation.

#### Conventions used 1.4

The following conventions are used throughout Softing customer documentation:

Keys, buttons, menu items, commands and other elements involving user interaction are set in bold font and menu sequences are separated by an arrow

Open Start → Control Panel → Programs

Buttons from the user interface are enclosed in

brackets and set to bold typeface

Coding samples, file extracts and screen output is set in Courier font type

Filenames and directories are written in italic

Press [Start] to start the application

MaxDlsapAddressSupported=23

Device description files are located in *C*: \<Application name>\delivery\software \Device Description files



#### **CAUTION**

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



### Note

This symbol is used to call attention to notable information that should be followed during installation, use, or servicing of this device.



### Hint

This symbol is used when providing you with helpful user hints.

# 1.5 Delivery scope

TH LINK PROFINET includes

- TH LINK
- Installation Manual
- Release Note

You can find software and documentation in our download area at <a href="http://industrial.softing.com/en/downloads.html">http://industrial.softing.com/en/downloads.html</a>.

# 1.6 Document history

<b>Document version</b>	Release date	Modifications compared to previous version
1.00	December 2014	<ul> <li>Adaptation to new Softing documentation structure and layout</li> </ul>
1.10	April 2015	■ New section "SD card".
		<ul> <li>Startup guideline enhanced with SD card functionality.</li> </ul>
		<ul> <li>New setting Data restore after voltage recovery added to section TH SCOPE.</li> </ul>
		<ul> <li>Hint in section <u>Technical data</u> added when using an SD card.</li> </ul>
1.20	July 2016	New Corporate Identity implemented
2.00	January 2017	New network overview tab TH LINK
		HTML 5 Graphical User Interface for TH LINK

# 1.7 Configuration requirements

(not included in the scope of delivery)

- Webbrowser with Adobe Flash Player 10.0 or higher
- The following ports have to be enabled in the firewall:

Protocol/purpose	Port
НТТР	80 TCP
Firmware update	1100 TCP
TH LINK communication with each other	1123, 1124, 2364 UDP
TH LINK communication with TH SCOPE	
via Multicast	
via Unicast	2364 UDP
	1151, 2365, UDP

# 1.8 Network presettings

- The device is preset to network operation with a DHCP server. No network configuration settings are required in this operating mode.
- In case of manual allocation of IP addresses the device can be reached via the following IP addresses (Factory setting):

For office networks:

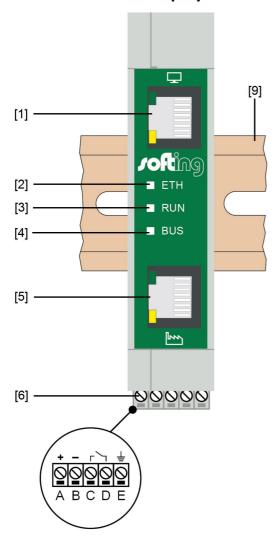
IP Address 169.254.0.1 Subnet Mask 255.255.0.0

For automation networks:

IP Address 169.254.0.2 Subnet Mask 255.255.0.0

# 2 TH LINK design

# 2.1 Connections and display elements



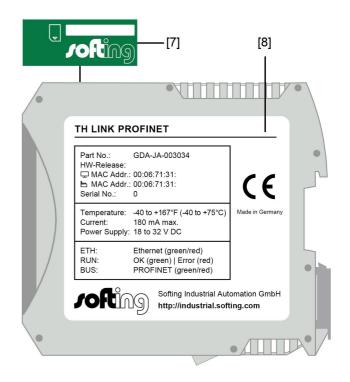


Figure 1: TH LINK (front and lateral view)

### [1] Ethernet interface for office network

- o lights yellow: Ethernet data communication
- o lights green: physical connection available

# [2] LED ETH

- o lights red: boot procedure
- o lights green: firmware update in progress
- o is off: boot procedure is completed

### [3] LED RUN

- o lights red: internal error
- o lights green: power supply is applied
- o is off: device is not powered

# [4] LED BUS

- o lights red: relay contact active (error occurred in the bus)
- o lights green: TH SCOPE measurement is running
- o is off: TH SCOPE measurement is stopped

# [5] Ethernet interface for automation network

- o lights yellow: Ethernet data communication
- o lights green: physical connection available

# [6] Terminal strip for +24 V DC power supply

- o A: 24 V (+)
- o B: 0 V (-)
- o C: Relay contact input
- D: Relay contact output
- o E: Protective earth
- [7] SD card slot
- [8] Type label

# 2.2 Mounting

[9] 35 mm DIN rail mounting unit (not included in the delivery)

# 2.3 SD card

TH LINK disposes of an SD card slot (refer to <u>Connections and display elements</u> [7]). You can save data on the SD card to have the data available even after voltage recovery. You can find a list of recommended SD cards in Release Notes on your installation CD or in the Softing download area (<a href="http://industrial.softing.com/en/downloads.html">http://industrial.softing.com/en/downloads.html</a>).

- 1. Insert the SD card before installing the device or putting it into operation. Thus you make sure the card is recognized during boot procedure.
- 2. Now go to TH LINK → Settings → TH SCOPE and set the parameter Data restore after voltage recovery to Yes (see also TH SCOPE).
- 3. Following the initial device commissioning the SD card is formatted automatically. From this time on you can save data independently from power interruptions.



#### Note

If the SD card is not recognized during boot procedure, restart the TH LINK.



### Note

If the device power supply is interrupted, all previously saved data will be retained on the SD card. Following a device restart the data will be read. In case the TH LINK detects a faulty file system or no existing TH LINK structure during startup, the card will be formatted again. The position of the blocking switch at the left card border has no effect, i.e. the card will also be formatted or written in the blocked state.

# 3 Start-up guideline

The following steps are required for start-up:

- 1. Mounting (see Mount/unmount device).
- 2. Plug-in SD card (recommended see SD card).
- 3. Connect to network (see Connect to network).
- 4. Connect to the power supply (see Connecting the power supply).
- 5. Configure network (see Configure the device in the network).



### Note

To set the IP address manually you must connect a PC to the device via crossover cable.

# 4 Mount/unmount device

### 4.1 Mount device



#### Note

Make sure you have a minimum of 5 cm below and above the TH LINK in order to ensure heat dissipation.

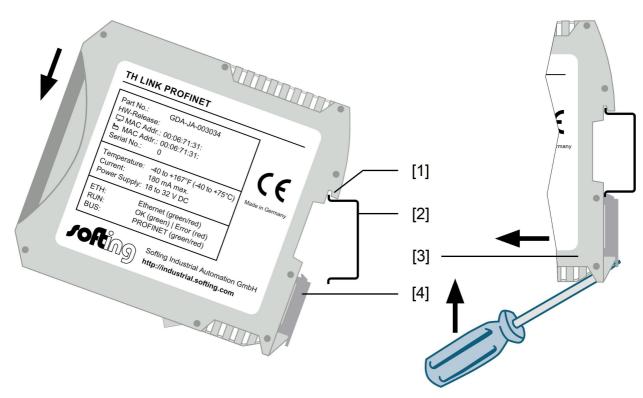


Figure 2: Mount and unmount the TH LINK

- [1] Device with notch on DIN rail
- [2] DIN rail
- [3] Device on DIN rail
- [4] Stop lever
- 1. Place the device with its notch on the DIN rail.
- 2. Move the device downwards until the stop lever locks into place on the DIN rail.

# 4.2 Unmount device

- 1. Remove the connected supply and signal lines (Ethernet, power supply).
- 2. Place the screwdriver into the stop lever on the device (see figure above).
- 3. Press the screwdriver in the direction of the device and simultaneously swing the device off the DIN rail.

# 5 Connect to network

- 1. Insert the patch cable plug (RJ-45, not included in the scope of delivery) into the Ethernet socket on the device until the plug locks into place.
- 2. The green LED on the Ethernet socket lights as soon as the device is energized and a network is available.

## **Connection options**

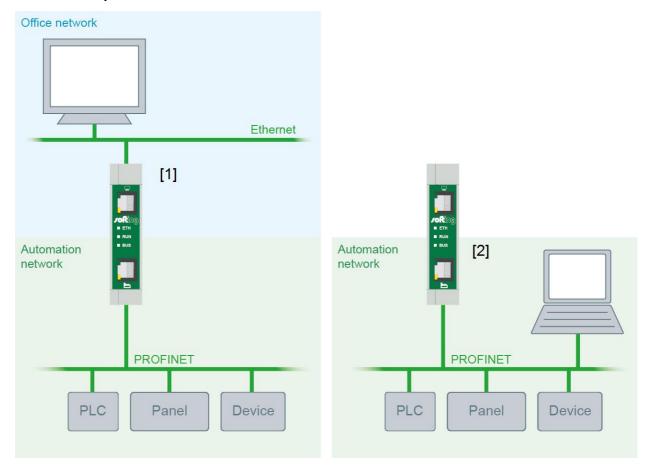


Figure 3: Connection options

- 1. Secure access at separated networks connection to office network and automation network
  - a. At the upper Ethernet interface with the monitor icon (see figure 1 no. [1]) the office network is connected, from which the access to the automation network should be done.
  - b. At the lower Ethernet interface with the factory icon (see figure 1 no. [5]) the automation network is connected that should be monitored.
- 2. One network connection to automation network only
  - a. Connect the TH LINK with the lower Ethernet interface with the factory icon (see figure 1 no. [5]) in the automation network.
  - b. The connection of the upper Ethernet interface is not required, if the access to the TH LINK is done from the automation network.



## Note

There must be no firewall between the TH LINK and the PROFINET devices.



### Note

The TH LINK does not provide any switch or router functionality.

# 6 Connecting power supply and relay contact



# **Electrical voltage**

Only qualified electricians are allowed to work on the electrical equipment.



### Danger due to incorrect earthing

Incorrect device earthing may cause injury to personnel or damage the device. Ensure correct and proper earthing of the device.



### Note

Reverse polarity in the power supply can damage the device. Make sure the power supply is connected with correct polarity.

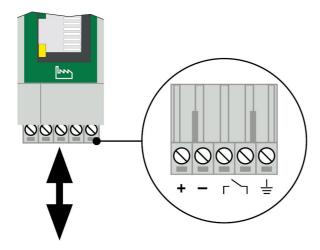


Figure 4: Terminal strip for power supply on the device

- 1. Connect the cable of a 24 V power supply and the earth conductor (earth terminal) to the terminal strip on the device. The terminal strip can be plugged and lifted out for installation using a screwdriver.
- 2. Connect the cable of the circuit that should be closed by the relay contact to the terminal strip on the device.
- 3. Switch on the power supply. The LED RUN is green and the LED ETH flashes red until the device's boot procedure is completed. Afterwards the LED RUN and BUS light green.

# 7 Configuring the device in the network

Depending on your network you have two connection options for each Ethernet interface:

- Connection in a network with a DHCP server (Dynamic Host Configuration Protocol):
   automatic and dynamic allocation of IP addresses (connection with patch cable via hub or switch)
- Connection in a network with manual IP assignment (peer-to-peer):
   manual allocation of IP addresses (connection with crossover cable)



#### Note

One TH LINK device can monitor a range of up to 254 IP-addresses. Those IP-addresses should all be reachable from the TH LINK device. To configure up to five different IP-ranges, please open the settings page of the TH LINK device.

# 7.1 Connection in a network with DHCP server (Dynamic Host Configuration Protocol)

The device is preset to network operation with a DHCP server and in this case it is automatically assigned an IP address. No network configuration settings are required in this operating mode.



### Note

If you connect the network whilst the boot procedure is running or completed, the DHCP may fail to be identified. The routine for the DHCP identification only runs during device start-up. Briefly switch off the power supply for a new DHCP identification.

# 7.2 Connection in a network with manual IP address assignment

If you use the device in an Ethernet network without DHCP server, you need the following for configuration information:

- TCP/IP settings for this network,
- a PC/notebook with a web browser
- a crossover cable between PC/notebook and TH LINK (peer-to-peer connection).



### Note

Always notify your system administrator prior to allocating IP addresses.

If you set an address already assigned, other devices in the network may be deactivated and communication may be affected.



### Note

The PC/notebook must be in the same subnet as the TH LINK.

# 7.3 Setting new IP and network address

- 1. Connect the TH LINK with the upper Ethernet interface with the monitor icon (see figure 1 no. [1]) to a PC/notebook via crossover cable. The PC/notebook has to be in the same subnet as the TH LINK (e.g. with the IP address 169.254.0.5).
- 2. Start a web browser on your PC/notebook.
- 3. Enter the IP address http://169.254.0.1 and press Enter.
- 4. Click Language and select English to get the user interface with English texts.
- 5. Click **Login** to log in as administrator.

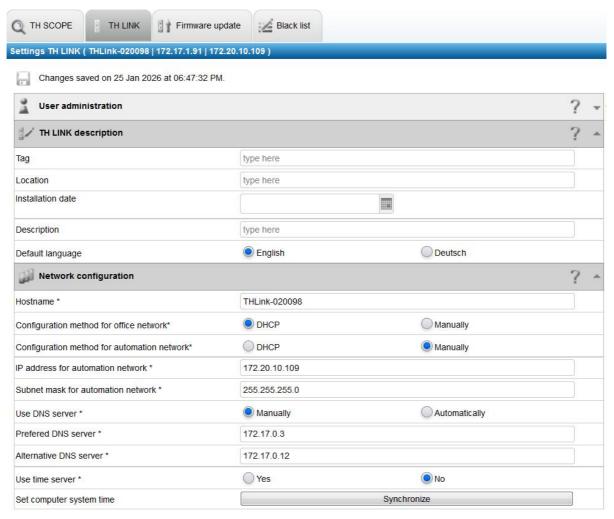
- 6. Enter the password. The default password is the nine-digit serial number of the device. You can find it on the serial number type label on the housing or under **Info**.
- 7. Then click OK.



#### Note

We recommend changing the password after login (see User administration.

- 8. Click on **Settings** and then on **TH LINK**.
- 9. In menu **Network configuration** switch the configuration method for office networks and/or automation networks from **DHCP** to **Manual** (see figure 5).



10. Enter the new IP address.



#### Note

Note down the IP address. You can only access the device's configuration page by using this IP address.

11. Enter the new addresses for **Subnet mask** and **Default gateway**.



## Note

The entry of the standard gateway is required only if you set the IP addresses for both networks manually Otherwise, the standard gateway address is given by DHCP.

#### 12. Enter the IP address of the DNS server.



#### Note

The entry of the DNS server is required only if you set the IP addresses for both networks manually Otherwise, the DNS server address is given by DHCP.

13. Click on the floppy disk sign to save the settings. The device then performs a restart.



#### Note

If you use several TH LINK, one TH LINK can be defined as "Parameter distributor". All TH LINK units can receive and save the parameters after login (see Parameter distribution).

### 7.4 Check the connection to the device

You can check the device in the network if:

- the device is integrated into the office and/or automation network.
- the device is supplied with voltage.
- the PC/notebook is in the office or in the automation network.

### **Procedure**

Start a web browser on your PC/notebook.

For DHCP:

Enter the hostname http://THLINK-serial number (e.g.: http://THLINK-143500067) and press Enter.

For manual IP configuration:

Depending on the network in which your PC/notebook is installed, enter the specified IP address of the office or automation network (basic setting: 169.254.0.1 or 169.254.0.2) and press **Enter**.

Now the website of the TH LINK should be displayed in the web browser.

# 8 Network overview

With the new firmware (v4.0), the TH LINK will be provided with a new webinterface: a new network overview tab provides a quick and essential view on the network that is being monitored by the TH LINK device.

Detailed information about the selected TH LINK will be provided, as well as essential information about network infrastructure, network availability, errors & failures and diagnostic entries. With that piece of information, the user can decide whether the monitored network is in ordern, or if further analysis (with TH SCOPE) is necessary.

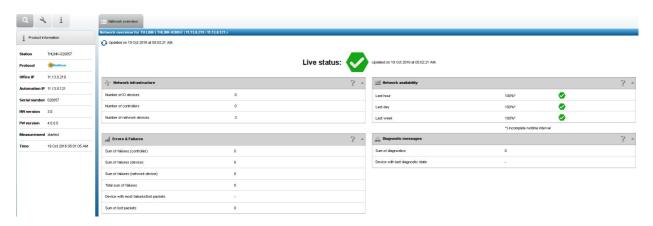


Figure 5: TH LINK network overview tab



### Note

Currently, it is only possible for PROFINET devices to distinguish between IO devices, controllers and network devices. Network devices using EtherNet/IP or Modbus TCP protocols will all be classified as "network devices" in the overview tab.

# 9 Login/Logout



### Note

You must be logged in as an administrator to be allowed to change settings.

# 9.1 Login

- 1. Proceed as described in Check the connection to the device.
- 2. Click Login.
- 3. Enter the password.



## Note

The default password is the nine-digit serial number of the device. You can find it on the serial number type label on the housing or under **Info**.

4. Then click OK.



#### Note

We recommend changing the password after login (see User administration).

# 9.2 Logout

Click Logout.

# 10 Settings pages

# **10.1** TH LINK

- 1. Log in as administrator to change the settings (see Login).
- 2. Click **Settings** → **TH LINK**.

The TH SCOPE settings page includes all settings for monitoring the automation network. This includes: User administration, TH LINK description and network configuration.

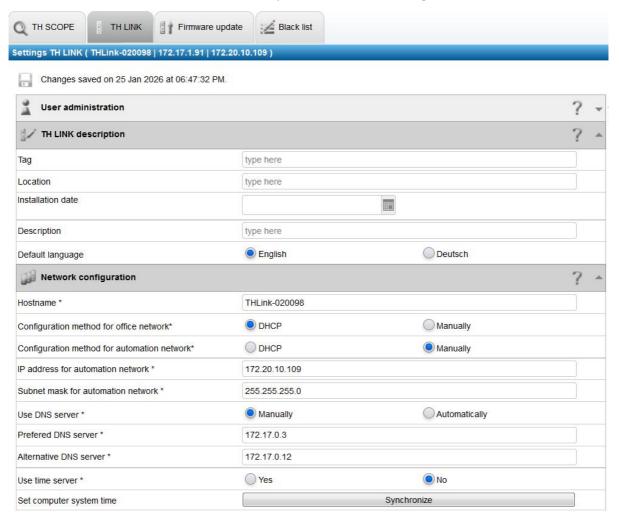


Figure 6: TH LINK settings



### Note

Log in as administrator to change the settings (see Login).

For detailed information about each setting, click on the question mark.

### 10.1.1 User administration - change password

- 1. Log in as administrator to change the settings (see Login).
- 2. Click **Settings** → **TH LINK**.
- 3. Enter the old password.
- 4. Select a new password and confirm it by re-entering.
- 5. Finally click **Change password**.

# 10.1.2 TH LINK description

Here you can enter the tag name, the location, an installation date, a description of the installed TH LINK and the default language.

For detailed information about each setting, click on the question mark.

# 10.1.3 Network configuration

Here you can change the network-specific settings. These include hostname, configuration method for office and automation network, DNS server and time server use.

For detailed information about each setting, click on the question mark.

### 10.2 TH SCOPE

- 1. Log in as administrator to change the settings (see Login).
- 2. Click **Settings** → **TH SCOPE**.

The TH SCOPE settings page includes all settings required for monitoring the automation network. These include settings for measurement, alerting and parameter distribution.



### Note

In order to save data after a voltage recovery on an SD card, set the parameter **Data restore after voltage recovery** to **Yes** (see also <u>SD card</u>).

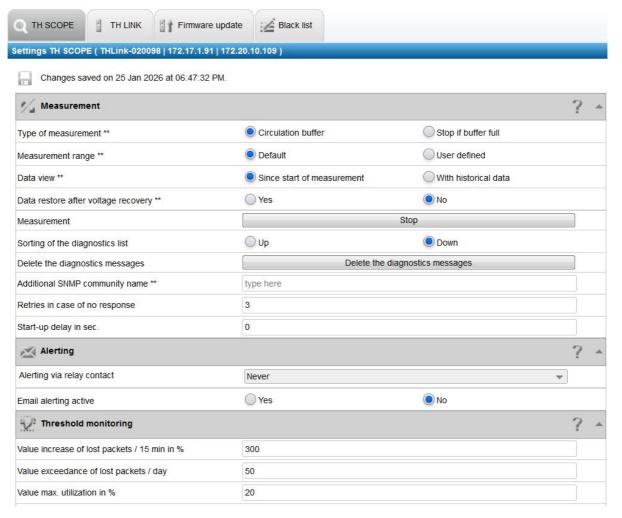


Figure 7: TH SCOPE settings

### 10.2.1 Measurement

The measurement settings include the type of measurement, the measurement range (default oder user-defined ranges), start/stop of the measurement, the sorting of the diagnostics list, delete of diagnostics messages, the additional SNMP community name, number of retries in case of no response of the device and the startup delay.

For detailed information about each setting, click on the question mark.

### 10.2.2 Alert

The alerting settings include the alerting via relay contact, the email alerting, alerting interval, SMTP server settings, email sender and receiver, subject and sending of a test email.

For detailed information about each setting, click on the question mark.

#### 10.2.3 Parameter distribution

The parameter distribution serves for a quick and easy configuration of several TH LINK. Therefore one TH LINK has to be set a parameter provider. All other units can request the parameters from this device.

### 10.2.3.1 Set parameter provider

The TH LINK from which all other units can take over the set parameters is called parameter provider.

- 1. Log in as administrator.
- 2. Click **Settings** → **TH SCOPE**.
- 3. Select the distribution role **Parameter provider** and save your settings by clicking on the floppy disk icon.
- 4. Configure this TH LINK completely.
- 5. Log out by clicking Logout.

Select the distribution role **Parameter provider** and save your settings by clicking on the floppy disk icon.



#### Note

Only one parameter provider is allowed in the entire network.

### 10.2.3.2 Apply parameters

By default all TH LINK are set as parameter receiver. Before taking over the parameters of a TH LINK, make sure that this TH LINK is set as a parameter provider.

- 1. Log in as administrator.
- 2. Click Settings → TH SCOPE.
- 3. On **Parameter distribution** → **Apply parameters** click **Request** to request the parameters from the parameter provider.
- 4. The TH LINK restarts and you will be logged out as administrator automatically.



#### Note

Applying and storing of parameters causes an automatic restart of the TH LINK. Make sure you are using an SD card and you have set the parameter **Data restore after voltage recovery** in TH SCOPE settings to **Yes**. Thus you avoid data loss (refer to sections <u>SD card</u> and <u>TH SCOPE</u>).

#### 10.2.3.3 Parameters

The following parameters are transferred:

- TH LINK
  - o Default language
  - DNS server settings
  - Time server settings / PC system time (after synchronization)
- TH SCOPE
  - Measurement type
  - o Measurement
  - Sorting of diagnostics list
  - o Additional SNMP community name
  - Retries in case of no response
  - Startup delay in seconds
  - o Alert settings

# 11 Firmware update

Firmware updates for the TH LINK are available free of charge from our website. Proceed as follows:

- 1. Log in as administrator to perform a firmware update (see Login).
- 2. Click **Settings** and then **Firmware Update**.
- 3. Check if the requirements for a firmware update are met. Stop the current measurements and the external application.
- 4. Download the latest firmware version from (<a href="http://industrial.softing.com/en/downloads.html">http://industrial.softing.com/en/downloads.html</a>) and save it to a local directory.
- 5. Click [...] and then select the firmware file.
- 6. Click Start.



#### Note

Do not turn off the power during the entire firmware update process!

After the firmware update the TH LINK restarts automatically.

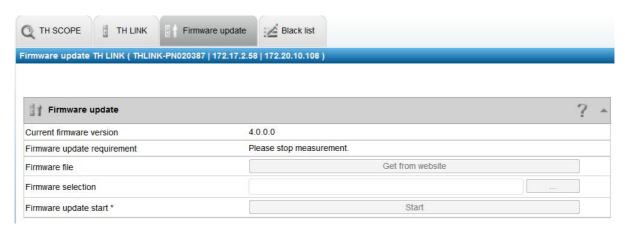


Figure 8: Firmware update

# 12 Blacklist

The blacklist functionality has been developed for TH SCOPE to reduce request for selected, non-conform PROFINET devices in order to increase network stability. The blacklist feature is available for TH LINK PROFINET, TH LINK PC and TH LINK Industrial Ethernet. Network devices that had not been configured according to PNO-guidelines could cause network errors in some circumstances. For that reason, those devices can be added to the blacklist. TH SCOPE then reduces the requests and only a limited number of device information will be read and shown.

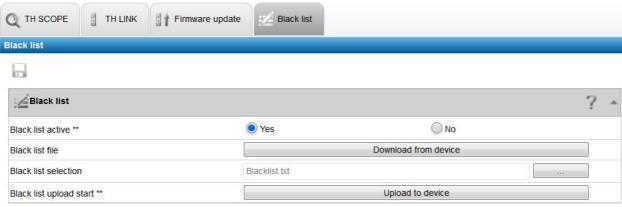


Abbildung 9: Import a blacklist into TH LINK

The blacklist functionality can be activated manually (Activation is set to "yes"). The default setting will be "Yes". Forwarding information concerning writing and supporting blacklist files will be provided by the Softing customer support.

# 13 Troubleshooting

### TH LINK is not found in the Ethernet network

- Check the power supply (LED RUN must light green).
- Check for correct connection (RJ-45, see <u>Connecting to Ethernet</u>).
- The device is preset to network operation with a DHCP server (IP address for the device is assigned by the DHCP server. If your network server does not support DHCP, you need to set the IP address for the TH LINK manually (see Connection in a network with manual IP address assignment).
- When a crossover cable is used between PC/notebook and TH LINK, both devices must be in the same subnet.

# LED RUN lights red – internal error

Internal error or defect: Please contact the Technical Support (<u>support.automation@softing.com</u>).

# 14 Technical Data

Electrical data			
Nominal supply voltage (limit values)	V DC	24 (18 32)	
typical current consumption	mA	150	
continuous current consumption	mA	180	
maximum current consumption relay contact	mA	100	
Protection class	IP	20	



#### Note

The maximum current consumption on turn on is limited to 8 A in the TH LINK

Operating conditions			
Ambient temperature range (*)	°C	-40+75	
Relative humidity	%	5 95 (no condensation)	

(\*) Depending on the SD card used the ambient temperature range might deviate from the values indicated here. Verify the ambient temperature range specified by the SD card manufacturer. You can find a list of recommended SD cards in Release Notes on your installation CD or in the Softing download area (<a href="http://industrial.softing.com/en/downloads.html">http://industrial.softing.com/en/downloads.html</a>).

Housing dimensions			
Dimensions W × H × D	mm	22,5 × 99 × 114,5	
Weight (approx.)	g	120	

Other			
Ethernet connection	Туре	RJ-45 (10Base-T/100Base-TX)	
Certificates		CE, UL	

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