

# TH LINK PROFIBUS



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

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# 1 Introduction

## 1.1 About TH LINK

### What is TH LINK?

- TH LINK provides access to the communication system and connects the higher-level network structure with the field level. It is the basis for the products TH SCOPE, DTM Library and TACC.
- TH LINK can easily be assembled/installed and is easy to put into operation. 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

- Connection between higher-level network and field level
- Access to the PROFIBUS network
- It is the basis for the products TH SCOPE, DTM Library and TACC.
- Access protection through integrated user administration

## 1.2 Intended use

The device is designed to be used as a secure access point to PROFIBUS 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 device (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 device 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 device into an existing system and ensure proper function of the system after installation.
- The device may only be installed or uninstalled by qualified, trained electrical engineering personnel. When installing the device, 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.
- Observe the IEC 61158 standard.
- 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 device to become damaged. In case of high temperature differences, wait at least three hours before operating the device.
- Lock the connected plug (PROFIBUS) using the screw connections intended for this purpose.



## 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.

## 1.4 Conventions

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

Press **[Start]** to start the application

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

```
MaxDlsapAddressSupported=23
```

Filenames and directories are written in italic

Device description files are located in *C:\StarterKit\delivery\software\Device Description files*



### 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 Scope of delivery

TH LINK PROFIBUS includes

- TH LINK
- Installation manual
- Release Note

You can find the latest software, firmware and documentation in our download area at <http://industrial.softing.com/en/downloads.html>.

## 1.6 Configuration requirements

(not included in the delivery)

- Web browser with Adobe Flash Player 10.0 or higher.
- Application software for PROFIBUS configuration.
- The following ports have to be enabled in the firewall:

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

## 1.7 Ethernet network presettings

- The TH LINK is preset to Ethernet network operation with a DHCP server. No Ethernet network configuration settings are required in this operating mode.
- In case of manual allocation of IP addresses the TH LINK has the following standard IP configuration:

IP address	169.254.0.1
Subnet mask	255.255.0.0
Standard gateway	0.0.0.0

## 2 TH LINK design

### 2.1 Connections and display elements

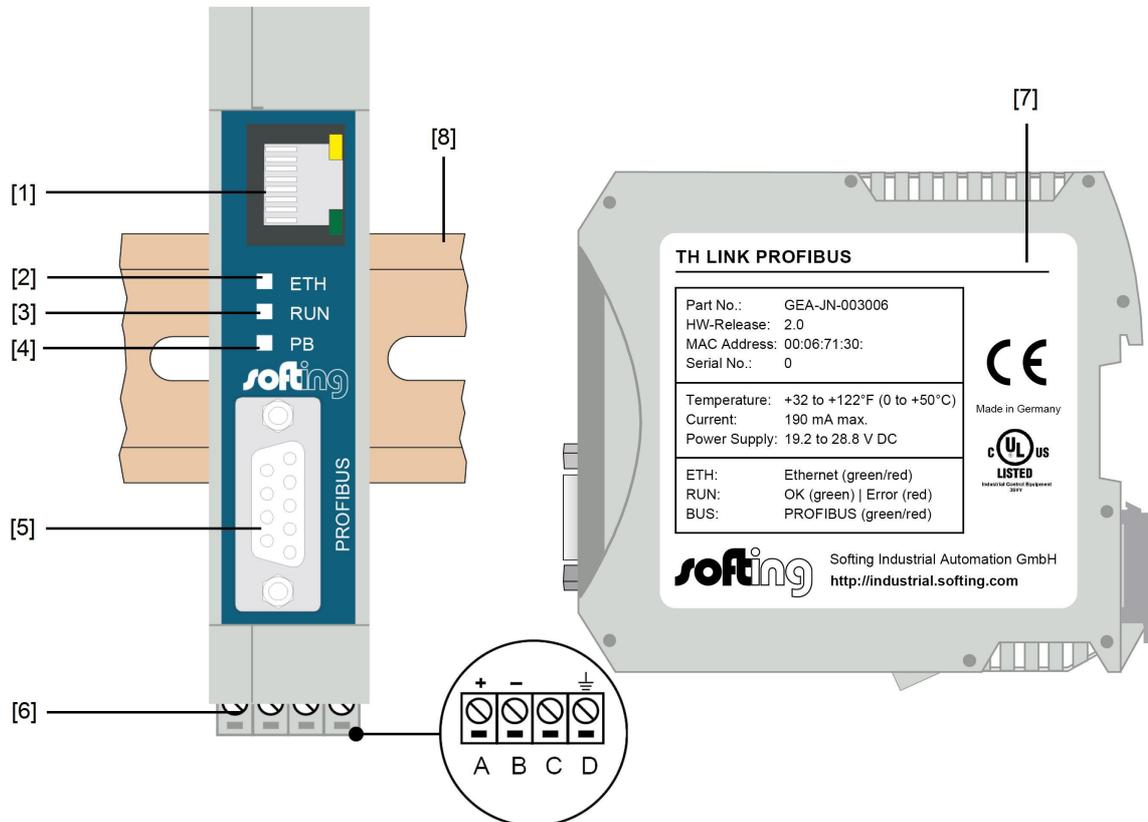


Figure 1: TH LINK (front and lateral view)

#### [1] Ethernet interface: RJ-45 (10Base-T/100Base-TX)

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

#### [2] LED ETH

- ETH lights red: first start phase
- ETH flashes red: boot procedure
- ETH lights red or flashes red or green in case of an error: internal firmware failure
- ETH lights green: connection to application via Ethernet

**[3] LED RUN**

- RUN lights red: internal error identified
- RUN lights green: 24 V power supply is fed

**[4] LED PB**

- PB lights green or flashes green: TH LINK communicates actively via PROFIBUS

**[5] PROFIBUS interface: D-Sub socket****[6] Terminal strip for +24 V DC power supply**

- A: 24 V (+)
- B: 0 V (-)
- C: not assigned
- D: protective earth

**[7] Type label****2.2 Attachment**

**[8]** Device is attached on **35 mm DIN rail** (not included in the delivery)

## 3 Start up

### 3.1 Start-up guideline

The following steps are required for start-up:

1. Installing (see [Mount TH LINK](#)<sup>[13]</sup> ).
2. Connect to Ethernet (see [Connect to Ethernet](#)<sup>[14]</sup>).
3. Connect to the power supply (see [Connecting the power supply](#)<sup>[14]</sup>).
4. Configure Ethernet (see [Configuring the TH LINK in the Ethernet network](#)<sup>[16]</sup>).



#### Note

To set the IP address manually you must connect your PC/notebook to the TH LINK via crossover cable.

5. Connect the PROFIBUS (see [Connecting the PROFIBUS](#)<sup>[25]</sup>).
6. If you use the TH LINK as a class 2 master you have to configure PROFIBUS parameters of the TH LINK using an application software (see [Setting PROFIBUS parameters](#)<sup>[26]</sup>).

### 3.2 Note regarding the application software

For operating the TH LINK as a class 2 master, an application software with the appropriate drivers is required. For more information about purchasing and operating the software consult our website or contact our Technical Support.

### 3.3 Mount/unmount TH LINK

#### 3.3.1 Mount TH LINK



#### Note

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

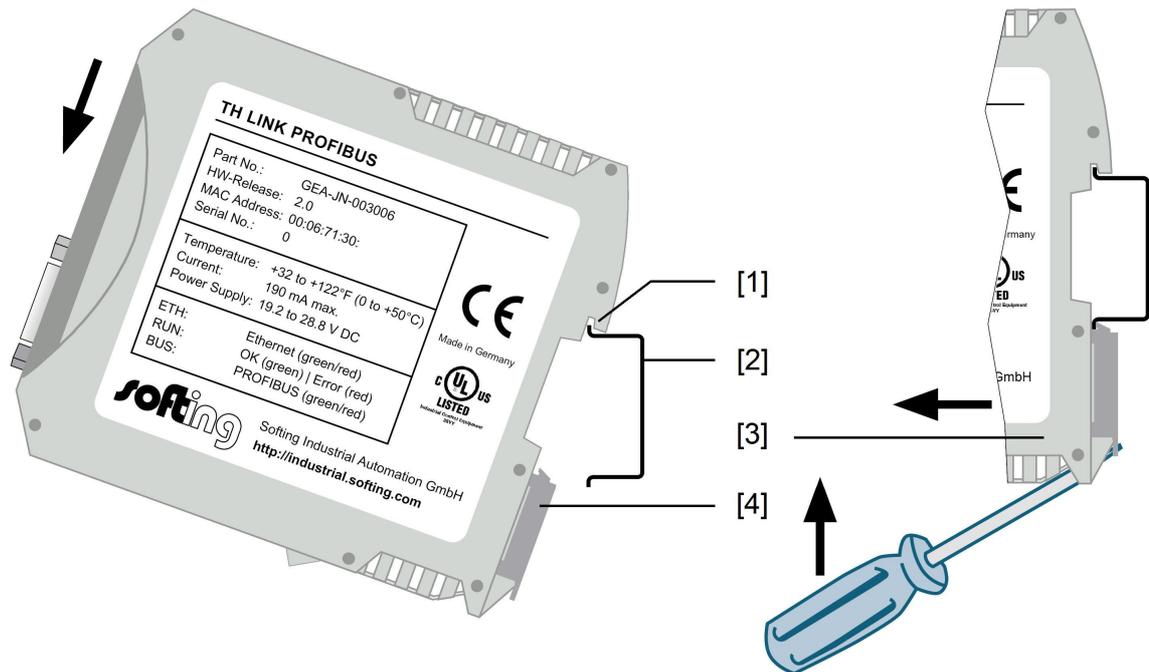


Figure 2: Mount and unmount the TH LINK

[1] Device with notch on DIN rail

[2] DIN rail

[3] TH LINK on DIN rail

[4] Stop lever

1. Place the notch of the TH LINK on the DIN rail.
2. Move the TH LINK downward until the stop lever locks into place on the DIN rail.

### 3.3.2 Unmount TH LINK

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

### 3.4 Connect to Ethernet

1. Insert the patch cable plug (RJ-45, not included in the scope of delivery) into the Ethernet socket (see figure 1 no. [1]) on the TH LINK until the plug locks into place.
2. The green LED on the Ethernet socket lights as soon as the TH LINK is energized and an Ethernet network is available.

### 3.5 Connecting the power supply



#### Electrical voltage

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



#### Danger due to incorrect earthing

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



#### Note

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

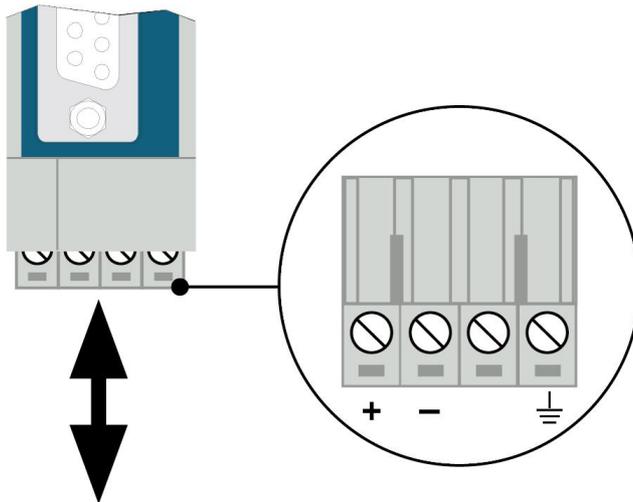


Figure 3: Terminal strip for power supply on the TH LINK

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. Switch on the power supply. The LED RUN is green and the LED ETH flashes red until the TH LINK's initiation procedure is completed. Afterward only the LED RUN lights green.

## 4 Configuring the TH LINK in the Ethernet network

### 4.1 Establish a connection to the TH LINK

1. Connect the TH LINK to a PC/notebook via crossover cable. The PC/notebook has to be in the same subnet as the TH LINK.
2. Start a web browser on your PC/notebook.
3. Enter the IP address `http://169.254.0.1` and press **Enter**. The website is loaded.

### 4.2 Login

1. Click **Login**.
2. Enter the password. The default password is the nine-digit of the TH LINK. You can find it on the type label on the housing or under **Info**.
3. Then click **OK**.



#### Note

We recommend changing the password after login (see [User administration](#) <sup>17</sup>).



#### Note

Log out after changing settings (Click **Logout**). Otherwise you have to wait about 10 minutes to get access to this TH LINK, if you have left the site or closed the browser.

## 4.3 Settings

1. Click on **Settings** and then on **TH LINK**.
2. Here you can change the settings for user administration, TH LINK description and network configuration:

Settings TH LINK ( THLINK-143500067   169.254.0.1 )	
<b>User administration</b> ? v	
TH LINK description ? ^	
Tag	<input type="text" value="type here"/>
Location	<input type="text" value="type here"/>
Installation date	<input type="text" value="DD.MM.YYYY"/>
Description	<input type="text" value="type here"/>
Default language	<input checked="" type="radio"/> English <input type="radio"/> Deutsch
<b>Network configuration</b> ? ^	
Operation mode	<input type="text" value="Passive PROFIBUS station"/>
Hostname *	<input type="text" value="THLINK-143500067"/>
Configuration method *	<input type="radio"/> DHCP <input checked="" type="radio"/> Manually
IP address *	<input type="text" value="169.254.0.1"/>
Subnet mask *	<input type="text" value="255.255.0.0"/>
Default gateway *	<input type="text" value="0.0.0.0"/>
Use DNS server *	<input checked="" type="radio"/> Manually <input type="radio"/> Automatically
Preferred DNS server *	<input type="text" value="195.25.2.129"/>
Alternative DNS server *	<input type="text" value="208.67.220.220"/>
Use time server *	<input type="radio"/> Yes <input checked="" type="radio"/> No
Set computer system time	<input type="button" value="Synchronize"/>

Figure 4: TH LINK settings



### Note

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

## 4.4 User administration

Change the standard password. Proceed as follows:

1. Enter the old password.
2. Select a new password and confirm it by re-entering.
3. Finally click **Change password**.

## 4.5 TH LINK description

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

## 4.6 Network configuration

Here you have to set the operation mode and the configuration method. You can also perform time settings.

### 4.6.1 Operation mode

In **Network configuration** select the operation mode of the TH LINK.

When using the operation mode **Passive PROFIBUS station** the TH LINK is a passive station in the bus. Thus TH LINK does not need an own PROFIBUS address.

In the operation mode **Active/Passive PROFIBUS station** the TH LINK can be used as a class 2 master in connection with an external master application (FDT or Emerson's AMS Suite). The TH LINK is passive until a PROFIBUS address is set in the master application and the communication is started. Then the TH LINK is an active station.

### 4.6.2 Configuration method (DHCP/Manual)

Depending on your network you have the following two connection options:

1. Connection in an Ethernet network with DHCP server - automatic and dynamic allocation of IP addresses (connection with patch cable via hub or switch).
2. Connection in an Ethernet network with manual IP address assignment (peer-to-peer) – manual allocation of IP addresses (connection with crossover cable).

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

The TH LINK is preset to network operation with a DHCP server and in this case it is automatically assigned an IP address. Therefore, no further configuration settings are necessary.



##### Note

If you connect to Ethernet network with the power supply already connected, the DHCP may fail to be identified. The routine for the DHCP identification only runs during TH LINK start-up.

Briefly switch off the power supply for a new DHCP identification.

#### 4.6.2.2 Connection in a network with manual IP address assignment

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

- TCP/IP settings for this network,
- a PC/notebook with a web browser and Adobe Flash Player,
- 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.

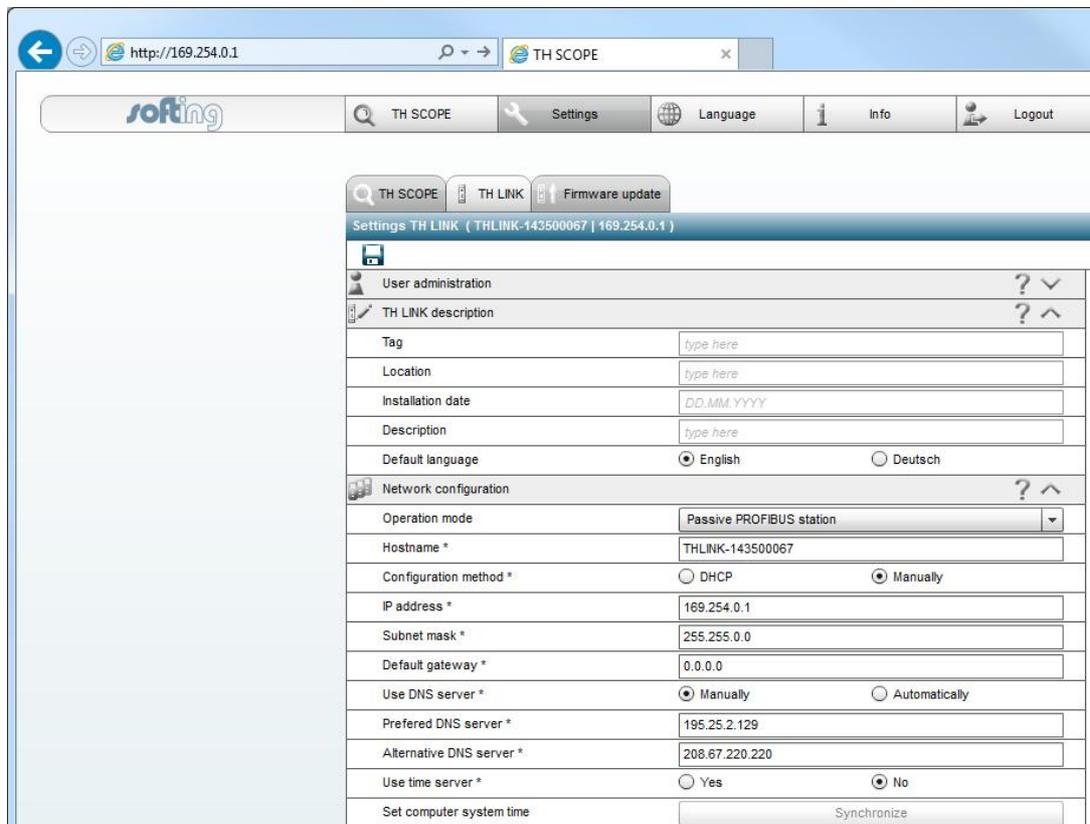
The PC/notebook must be in the same subnet as the TH LINK.

The TH LINK has the following manual default IP addresses (default settings at the time of delivery):

IP address	169.254.0.1
Subnet mask	255.255.0.0
Standard gateway	0.0.0.0

### 4.6.2.3 Setting new IP and network addresses

1. Change the configuration method from DHCP to **Manually**:



The screenshot shows the TH SCOPE web interface for configuring a TH LINK device. The browser address bar shows 'http://169.254.0.1'. The page title is 'Settings TH LINK ( THLINK-143500067 | 169.254.0.1 )'. The configuration is divided into two main sections: 'User administration' and 'Network configuration'.

**Network configuration settings:**

- Operation mode: Passive PROFIBUS station
- Hostname \*: THLINK-143500067
- Configuration method \*:  Manually (DHCP is unselected)
- IP address \*: 169.254.0.1
- Subnet mask \*: 255.255.0.0
- Default gateway \*: 0.0.0.0
- Use DNS server \*:  Manually (Automatically is unselected)
- Preferred DNS server \*: 195.25.2.129
- Alternative DNS server \*: 208.67.220.220
- Use time server \*:  Yes (No is selected)
- Set computer system time: Synchronize

Figure 5: Setting IP and network addresses

2. Enter the new IP address.



#### Note

Note down the IP address. You can only access the TH LINK by using this IP address.

3. Enter the new addresses for **Subnet mask** and **Default gateway**.
4. Set the DNS server setting to **Manually** and enter the DNS server IP addresses.



#### Note

If you want to have the DNS server address assigned automatically, you need to set the configuration method to **DHCP**.

5. Click on the floppy disk symbol to save the settings. The TH LINK restarts and you will be logged out as administrator automatically.

**Note**

If you use several TH LINK, you can facilitate the configuration by using the parameter distribution (see [Parameter distribution](#)<sup>23</sup>).

### 4.6.3 Check the connection to the TH LINK

You can check the connection to the TH LINK within the network when:

- TH LINK is integrated into the Ethernet network,
- TH LINK is energized,
- the PC/notebook is in the same subnet.

**Procedure**

1. Start a web browser on your PC/notebook.
2. For DHCP: Enter the host name (basic setting is http://LINK-serial number) found on the TH LINK's type label (e.g.: http://LINK-143500067) and press **Enter**.
3. Manual IP configuration: Enter the set IP address (basic setting: 169.254.0.1) and press **Enter**.
4. The TH SCOPE website is loaded.

## 5 TH SCOPE settings

1. Click **Settings** → **TH SCOPE**.
2. Here you can change the settings for measurement, alerting, threshold monitoring and parameter distribution.

Figure 6: TH SCOPE settings



### Note

Log in as administrator to change the settings (see [Login](#) 16).

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

### 5.1 Measurement

The measurement settings include among other settings for baud rate and Start/Stop of the TH SCOPE measurement.

## 5.2 Alert

The alert settings include among other settings for activating the email alert function, when an email should be sent, SMTP Server, subject, email sender and receiver.

## 5.3 Threshold monitoring

The threshold monitoring is used to monitor whether telegram repeats of slaves are exceeded. The threshold values are set for which a diagnostics message is generated in the diagnostics list. The threshold values apply similarly for email alerting. Furthermore the slaves to be monitored can be selected.

## 5.4 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 TH LINK.

### 5.4.1 Set parameter provider

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

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



#### Note

Only one parameter provider is allowed in the entire network.

In the **TH SCOPE network overview** → **Network list** the parameter provider is marked with the following icon:



## 5.4.2 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.

Click on **Request** at **Apply parameters** to query the parameters from the parameter provider.

The TH LINK restarts and you will be logged out as administrator automatically.

## 5.4.3 Parameters

The following parameters will be assigned:

### TH LINK

- Default language
- Operation mode
- DNS server
- Time server settings / PC system time

### TH SCOPE

- Measurement type
- Measurement
- Slave that has never responded
- Sorting of diagnostics list
- Alert settings

## 6 Connecting the PROFIBUS

The 9-pin D-Sub socket is used for connection.

- Only use standard PROFIBUS plugs and cables.
- Wire the PROFIBUS plug according to the details for pin assignment (see [Technical data](#)<sup>[29]</sup>).
- If the TH LINK is installed at the beginning or end of the PROFIBUS cable segment, you will need a bus terminating resistor (see [Bus terminating resistor](#)<sup>[26]</sup>).



### Note

If local conditions do not allow a direct connection, use a repeater (connection according to PROFIBUS norm).

1. Attach the PROFIBUS connector to the PROFIBUS socket on the TH LINK.
2. Secure the plug with screws.
3. Turn the switch for the bus terminating resistor on the PROFIBUS connector to the required position (ON/OFF).

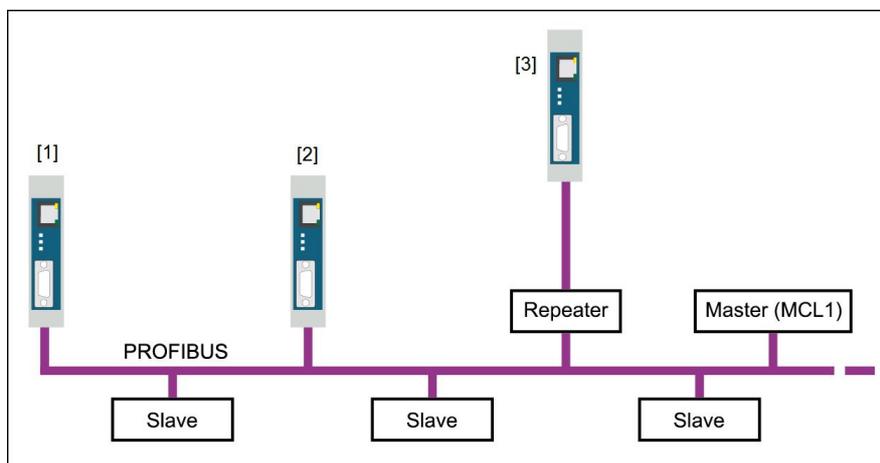


Figure 7: Interface connection possibilities in the PROFIBUS network

- [1] Connection at end/start of bus with terminating resistor
- [2] Connection in the middle of the PROFIBUS segment 1
- [3] Connection in a separate PROFIBUS segment behind a repeater

## 6.1 Bus terminating resistor

Terminations of a PROFIBUS segment must each be terminated with a bus terminating resistor. Use standardized plugs containing terminating resistors.

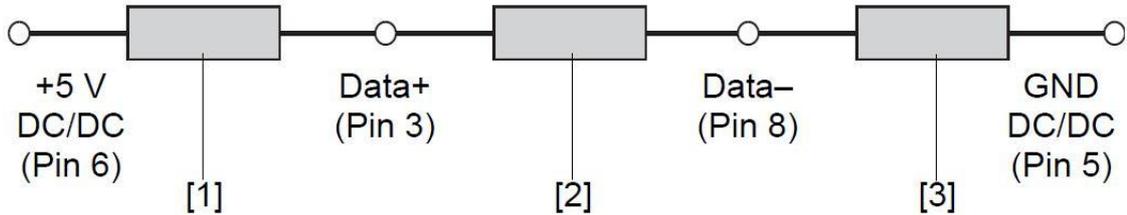


Figure 8: Bus termination configuration (see standard IEC 61158)

- [1] 390  $\Omega$  Pull-up resistance from pin 3 to positive supply voltage at pin 6
- [2] 220  $\Omega$  Cable terminating resistor between pin 3 and pin 8
- [3] 390  $\Omega$  Pull-down resistance from pin 8 to data reference potential at pin 5

## 6.2 Setting PROFIBUS parameters

Depending on the used application software (not included in the scope of delivery), the TH LINK can be a passive station (without an own station address) or an active station (class 2 PROFIBUS master).

The setting of the PROFIBUS parameters is only required, if you use the TH LINK as a class 2 master in the operation mode active/passive PROFIBUS station. The PROFIBUS parameters are given by the class 1 master.

## 7 Firmware update

Firmware updates for the TH LINK are available free of charge from our website.

### Precondition

Before starting the update make sure current measurements and the external application are stopped.

### Procedure

1. Log in as administrator to perform a firmware update (see [Login](#) (16)).
2. Click **Settings** and then **Firmware Update**.
3. Check if the requirements for a firmware update are met.
4. Click **[Download]** to open the Softing download page. Download the latest firmware file and save it to a local directory.
5. Click **[...]** and then select the previously saved firmware file.
6. Click **[Start]** to update the firmware.



### Note

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

After the firmware update the TH LINK restarts automatically.

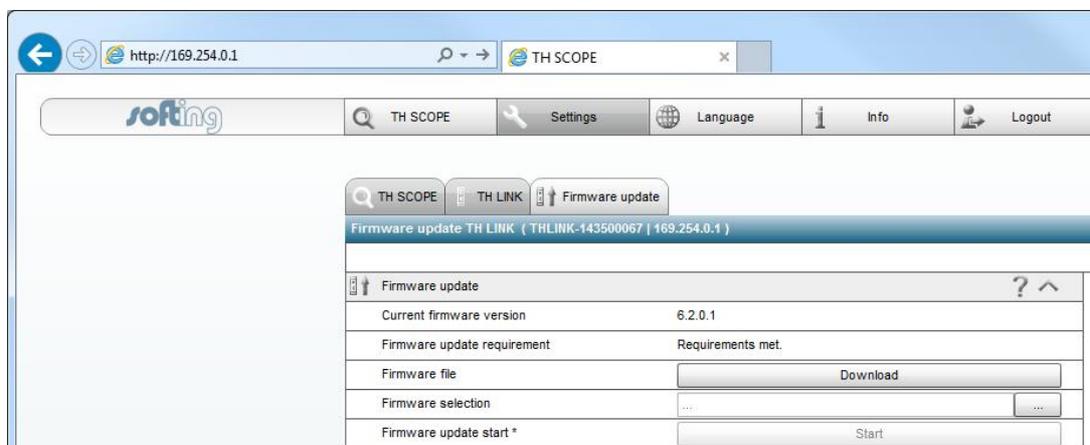


Figure 9: Firmware update

## 8 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 [Connecting to Ethernet](#) <sup>14</sup>).
- The TH LINK is preset to network operation with a DHCP server (IP address for the TH LINK 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](#) <sup>19</sup>.)
- When a crossover cable is used between PC/notebook and TH LINK, both devices must be in the same subnet.

### PROFIBUS network is not found

TH LINK as Passive PROFIBUS station:

- Check for proper connection (see [Connecting the PROFIBUS](#) <sup>25</sup>) and switch the baud rate in **Settings** → **TH SCOPE** → **Measurement to Automatic detection**.

TH LINK as Active/Passive PROFIBUS station:

- Check the PROFIBUS parameters for the used TH LINK (see application software, not included in the delivery). Each station has its own station address, which can only be assigned once in the network.

### LED ETH lights red or flashes red or green in case of failure

or

### LED RUN lights red – internal error

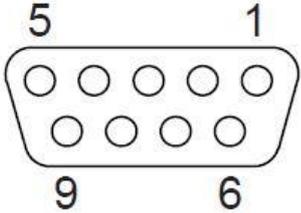
- Internal error or defect: Please contact the Technical Support ([support.automation@softing.com](mailto:support.automation@softing.com), phone +49 89 456 56-326).

## 9 Technical data

Electrical data		
Nominal supply voltage (limit values)	V DC	(19.2...28.8)
Current consumption max.	mA	190
Protection class	IP	20

Operating conditions		
Ambient temperature range	°C	0...+50
Relative humidity	%	20 ... 80 (no condensation)

Housing dimensions		
Dimensions W × H × D	mm	22.5 × 99 × 114.5
Weight (approx.)	g	120

PROFIBUS interface		
Interface	Type	RS 485
Transmission rate	Bit/s	9,600...12M
Sub-D plug pin assignment	Pin1	not assigned
	Pin2	not assigned
	Pin3	B line data+ (RxD/TxD-P)
	Pin4	RTS
	Pin5	GND (0 V)
	Pin6	Potential (+5 V DC)
	Pin7	not assigned
	Pin8	A line data - (RxD/TxD-N)
	Pin9	not assigned

<b>Other</b>		
Ethernet connection	Type	RJ-45 (10Base-T/100Base-TX)
Certificates		CE, UL

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