



## Pharma Solutions

Measurement data monitoring system:  
testo Saveris

Software:  
testo Saveris CFR 4.6 SP1  
testo Saveris CFR transport add-on

Commissioning instructions





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# 1 About this document

- The instruction manual is an integral part of the testo Saveris measurement data monitoring system.
- Keep this documentation to hand so that you can refer to it when necessary.
- Please read this instruction manual through carefully and familiarize yourself with the product before putting it to use.
- Hand this instruction manual on to any subsequent users of the product.
- Pay particular attention to the safety instructions and warning advice in order to prevent injury and damage to the product.
- Please read this instruction manual through carefully and familiarize yourself with the product before putting it to use.

## 1.1 Symbols and writing standards

Display	Explanation
	Note: basic or further information.
1. ... 2. ...	Action: several steps, the sequence must be followed.
• ...	List
> ...	Action: one step or optional step.
- ...	Result of an action.
✓ ...	Requirement
	Position numbers for the clarification of the relationship between text and picture.
<b>Menu</b>	Elements of the instrument, the instrument display or the program interface.
[OK]	Control keys of the instrument or buttons of the program interface.
...   ...	Functions/paths within a menu.
“...”	Example entries

### 1.2 Warning notices

Always pay attention to any information marked with the following warning notices along with warning pictograms. Implement the specified precautionary measures!

#### DANGER

Life-threatening danger!

#### WARNING

Indicates possible serious injuries.

#### CAUTION

Indicates possible minor injuries.

#### ATTENTION

Indicates possible damage to equipment.

## 2 Safety and disposal

### 2.1 Safety

- Always operate the product properly, for its intended purpose and within the parameters specified in the technical data. Do not use any force.
- Never use the Saveris probes to measure on or near live parts.
- Only carry out maintenance and repair work on the components of the testo Saveris measurement data monitoring system that are described in the documentation. Follow the prescribed steps exactly when doing the work. Use only original spare parts from Testo.
- The use of the wireless module is subject to the regulations and stipulations of the respective country of use and, in each case, the module may only be used in countries for which a country certification has been granted. The user and every owner undertake to adhere to these regulations and prerequisites for use and acknowledge that the re-sale, export, import, etc. in particular in, to or from countries without wireless permits, is their responsibility.
- When selecting the mounting location, ensure that the permissible ambient and storage temperatures are adhered to.



At temperatures below 5°C, the (rechargeable) batteries will not charge; there is only a limited possibility of reliable system operation in this temperature range.



- Do not use the product if there are signs of damage to the housing.
- Do not commission the instrument if there are signs of damage on the housing.
- Dangers may also arise from objects being measured or the measuring environment. Always comply with the locally valid safety regulations when carrying out measurements.
- Do not store the product together with solvents.

## 2.2 Batteries


The batteries in the Saveris base, the Saveris Ethernet data loggers and the Saveris analog couplers are wearing parts which have to be replaced after approx. 2 years. If batteries are faulty, it is not possible to guarantee full operability of the GSM module. In the event of a power failure, data loss cannot be ruled out for all components. When a component's batteries are no longer fully functional, it triggers a **Defective battery** system alarm.

The batteries (order no. 0515 5021) should then be replaced immediately to ensure full functionality and data security.

## 3 Protecting the environment

- Dispose of faulty and spent batteries in accordance with the valid legal specifications.
- At the end of its useful life, deliver the product to the separate collection point for electric and electronic devices (observe local regulations) or return the product to Testo for disposal.



-  WEEE Reg. No. DE 75334352

## 4 Support

You can find up-to-date information on products, downloads and links to contact addresses for support queries on the Testo website at: [www.testo.com](http://www.testo.com).

## 5 Commissioning instructions

### 5.1 System requirements

#### 5.1.1 Computer

The following RAM and processor requirements apply to all SQL Server editions:

Component	Requirements
RAM	<p><b>Minimum</b></p> <ul style="list-style-type: none"> <li>Express editions: 512 MB</li> <li>All other editions: 1 GB</li> </ul> <p><b>Recommended</b></p> <ul style="list-style-type: none"> <li>Express editions: 1 GB</li> <li>All other editions: at least 4 GB. As the database size rises, the memory should also be increased in order to ensure optimum performance.</li> </ul>
Processor speed:	<p><b>Minimum</b></p> <ul style="list-style-type: none"> <li>X64 processor: 1.4 GHz</li> </ul> <p><b>Recommended</b></p> <ul style="list-style-type: none"> <li>2.0 GHz or faster</li> </ul>
Processor type	<p><b>X64 processor</b></p> <ul style="list-style-type: none"> <li>AMD Opteron, AMD Athlon 64, Intel Xeon with Intel EM64T support, Intel Pentium IV with EM64T support</li> </ul>

#### 5.1.2 Operating system and database

##### Saveris server

SQL Server® 2017 Express is supplied.

This requires a 64-bit operating system from the following list:



Windows® Server 2016 or compatible next version is generally recommended for new installations.

Windows® Server 2016 is required for operating testo Saveris CFR Transport Add-on (0572 1860).

- Windows® Server 2016 Datacenter
- Windows® Server 2016 Standard
- Windows® Server 2012 R2 Datacenter
- Windows® Server 2012 R2 Standard

- Windows® Server 2012 R2 Essentials
  - Windows® Server 2012 R2 Foundation
  - Windows® Server 2012 Datacenter
  - Windows® Server 2012 Standard
  - Windows® Server 2012 Essentials
  - Windows® Server 2012 Foundation
  - Windows® 10 Home
  - Windows® 10 Professional
  - Windows® 10 Enterprise
  - Windows® 10 IoT Enterprise
  - Windows® 8.1
  - Windows® 8.1 Pro
  - Windows® 8.1 Enterprise
  - Windows® 8
  - Windows® 8 Pro
  - Windows® 8 Enterprise
- 



Microsoft® SQL Servers as from SQL Server 2005 are supported.

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testo Saveris works with an SQL database. If an SQL database is already on the installation PC, a second instance can be created for testo Saveris.

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Saveris servers require 64-bit Windows operating systems (see “Saveris servers” list). Saveris Client, Saveris Viewer, Saveris startup wizard and Saveris Ethernet configuration wizard are compatible with Windows® 7 SP1 64-bit/ 32-bit (or higher).

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The computer's processor, hard disk and interfaces must be configured for continuous operation in order to ensure smooth automatic operation. If necessary, check your computer's energy-saving options.

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SQL Server® 2017 Express is a product of Microsoft Corporation (Redmond, USA). Please pay attention to the current information from the manufacturer about this product.

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Date and time settings will be automatically adopted from the PC. The administrator must make sure that the system time is regularly compared with a reliable time source and adjusted if necessary, so as to ensure the authenticity of the measurement data.

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In client-server operation, we recommend a network with AD and DNS (Domain Name System) to enable online updating using MSMQ (Microsoft® Message Queuing).

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When access to the Saveris instance of the Microsoft® SQL database is to be performed via a firewall, a port in the firewall must be enabled for this. Note the safety instructions from Microsoft® for this.



The use of virus scanners can noticeably reduce system performance, depending on the configuration.



When installing the software on virtual operating systems, the available system resources must be checked and, if necessary, improved.

The USB connection works unreliably in combination with virtual systems, which is why we recommend connecting the base via Ethernet.

### 5.1.3 Network environment

The testo Saveris software is installed as a client / server installation. In the process, the database and Saveris Client are installed on a server computer and the Client and Viewer program components can also be installed on additional client computers.

#### 5.1.3.1 WLAN-specific data

WLAN data loggers	Feature
0572 2035 01	
Radio frequency	2.4 GHz (IEEE 802.11 b/g/n)
General encryption method	WEP, WPA (TKIP), WPA2 (TKIP, AES, CCMP)
WPA2 Enterprise	EAP-TLS, EAP-TTLS-TLS, EAP-TTLS-MSCHAPv2, EAP-TTLS-PSK, EAP-PEAPO-TLS, EAP-PAPO-MSCHAPv2, EAP-PEAPO-PSK, EAP-PEAP1-TLS, EAP-PEAP1-MSCHAPv2, EAP-PEAP1-PSK

#### 5.1.3.2 Technical data for a secure WLAN

##### Ports

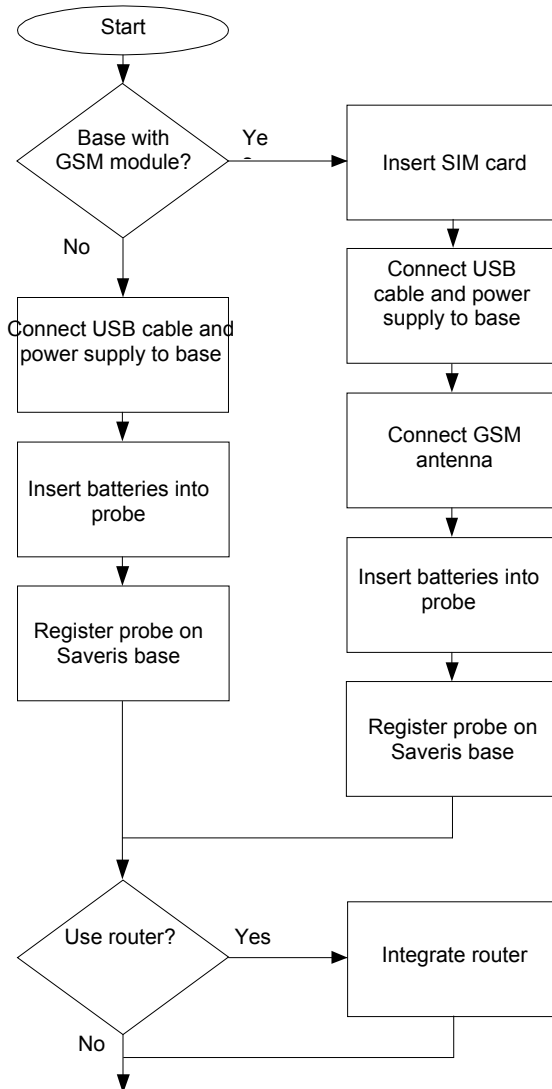
The testo Saveris 2 H2 WLAN data logger uses the http protocol which communicates via port 80.

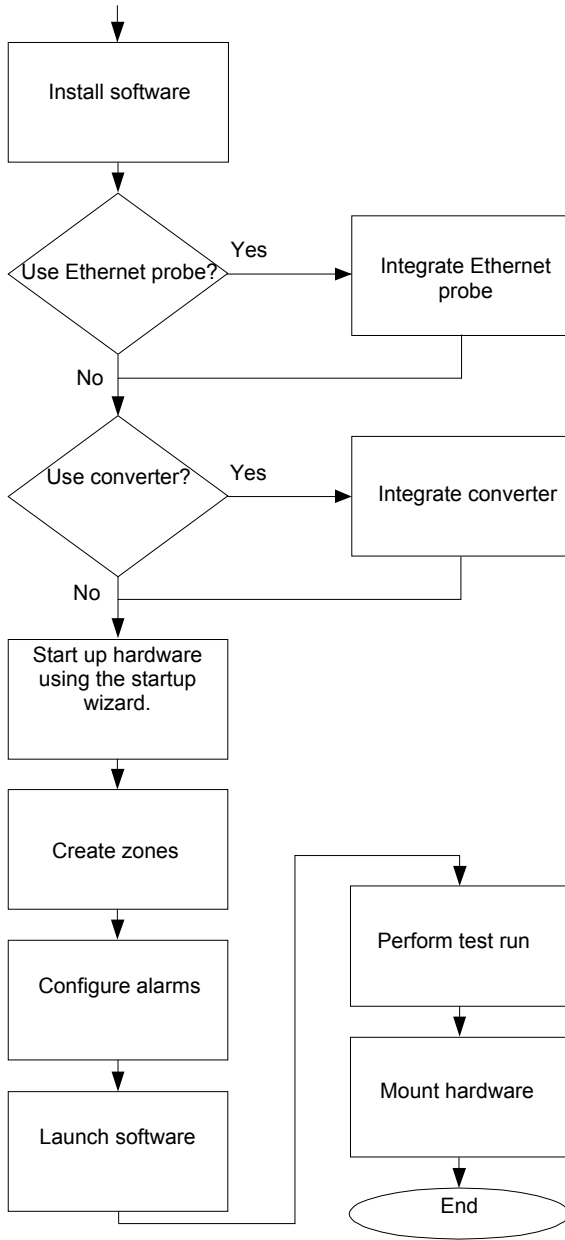


During the initial configuration, it is possible to choose whether DHCP or static IP is to be used (select expert mode)

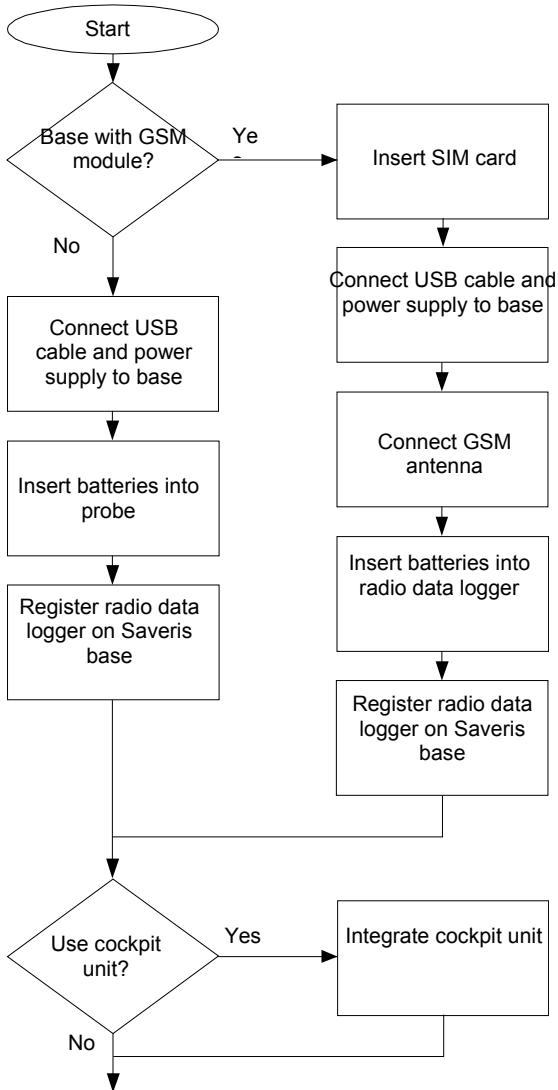
## 6 Commissioning

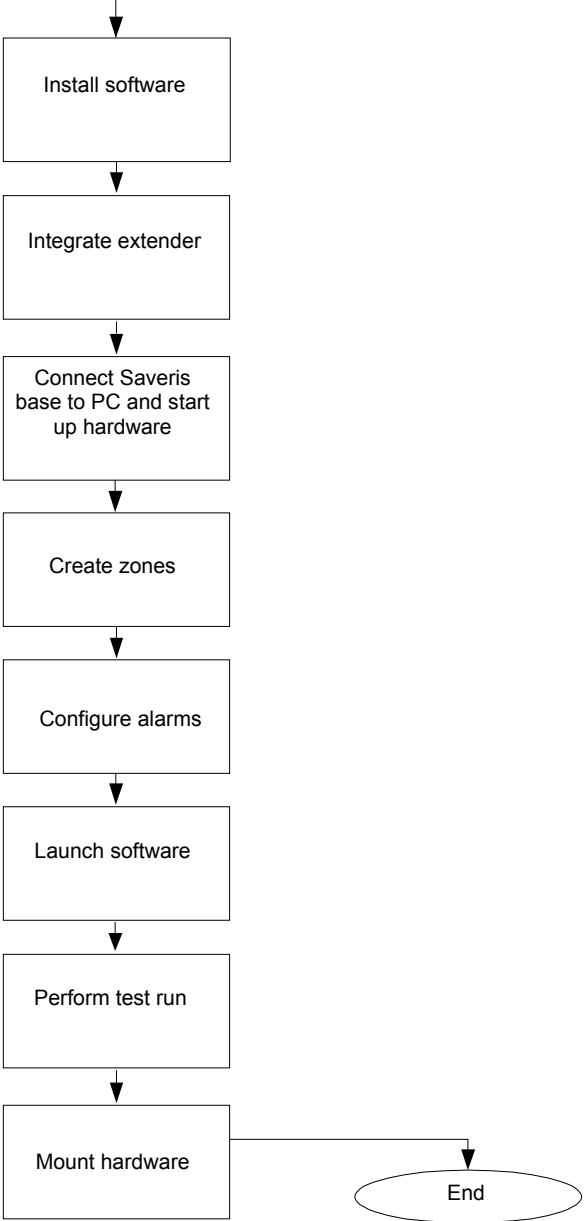
### 6.1 Flowchart: Configuration for monitoring stationary zones





## 6.2 Flowchart (“Mobile monitoring”): Configuration for transport monitoring with Saveris radio data loggers







## 6.3 Commissioning the Saveris base

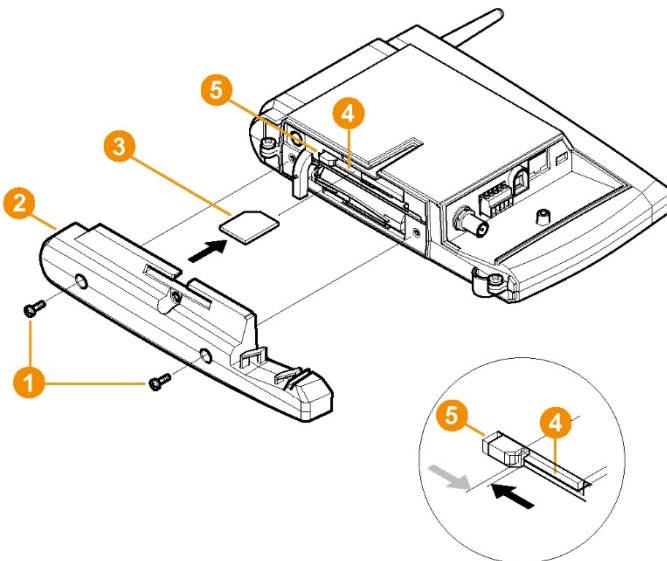
### 6.3.1 Inserting SIM card (optional)

For a Saveris base with integrated GSM module, you must insert the SIM card.



The SIM card for sending SMS messages is not included in the scope of delivery and must be purchased separately from a mobile phone provider.

It is recommended that you use a contract card instead of a so-called prepaid card, as no alarm messages can be sent if you use up your credit.



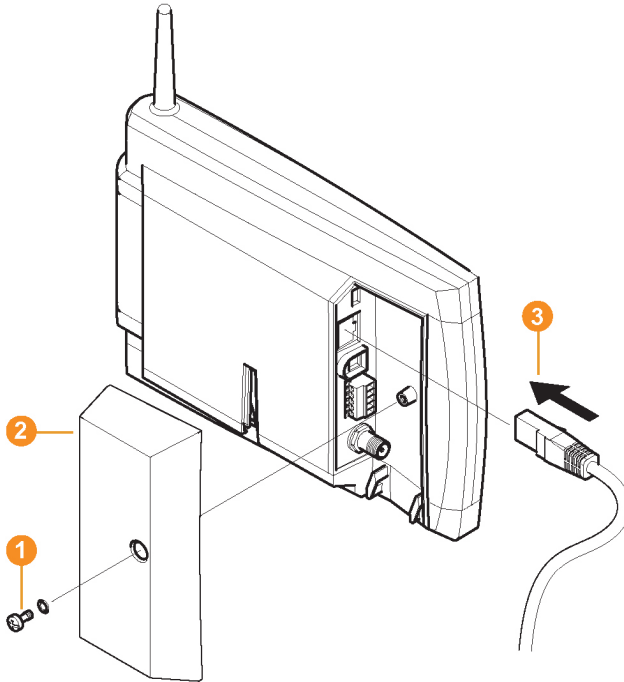
- 1 Switch off the Saveris base (with the **Info Base** view selected, press **[ESC]** briefly twice).
- 2 Undo the screw connection **1** and remove the base plate **2** from the Saveris base.
- 3 Push the SIM card **3** into the card slot **4** as shown.



The SIM card **3** pushes the catch **5** to the side as it is being inserted. If the card is inserted, a spring pushes the catch back and the SIM card is thus secured in the card slot.

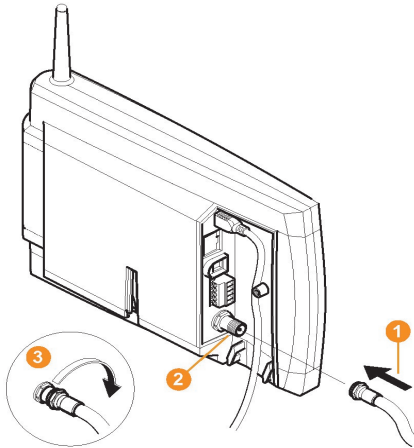
- 4 Place the base plate on the Saveris base and screw it down.

### 6.3.2 Connecting network cable to the Saveris base



- 1 | Undo screw connection ① and remove.
- 2 | Take cover ② off Saveris base.
- 3 | Plug the network cable ③ into the Saveris base.
- 4 | Connect the network cable ③ to the Ethernet.

### 6.3.3 Connecting GSM antenna (optional)

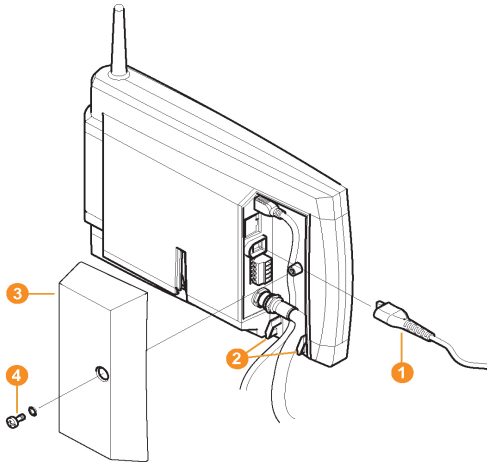


- 1 Fit antenna cable 1 onto the coaxial connector 2 and screw in 3.

## 6.4 Connecting Saveris base to power supply

You can connect the Saveris base to the power supply via the mains unit which is included or via the 24 V AC/DC plug-in/screw terminal.

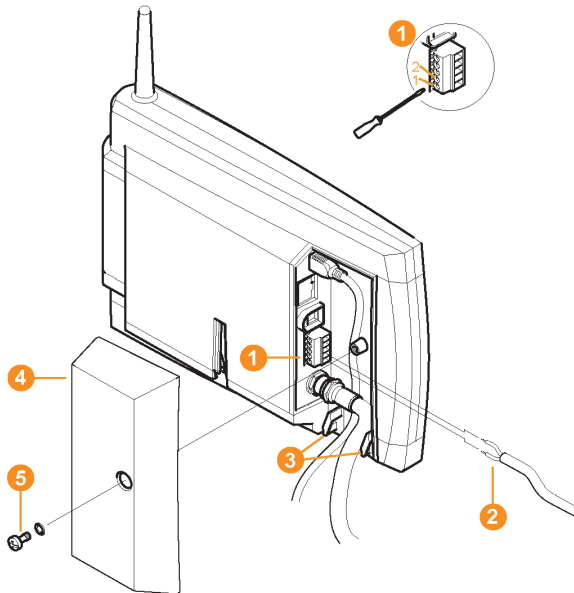
### 6.4.1 Power supply via mains unit



- 1 Connect mains cable 1 to the Saveris base.

- 2 Ensure that cabling cannot be pulled out using a cable tie at the eyelets for strain relief **2**.
  - 3 Connect mains plug to the power supply.
- ▶ The Saveris base automatically starts up and is ready for operation once the language has been selected on the base.

### 6.4.2 Power supply via plug-in/screw connection (optional)



- 1 Loosen clamping screws **1** no. 1 and no. 2.
  - 2 Put cable **2** into the terminals as shown in the illustration. Observe permissible operating voltage!
- ▶ The Saveris base automatically starts up and is ready for operation once the language has been selected on the base.
- 3 Tighten clamping screws.
  - 4 Ensure that cabling cannot be pulled out using a cable tie at the eyelets for strain relief **3**.

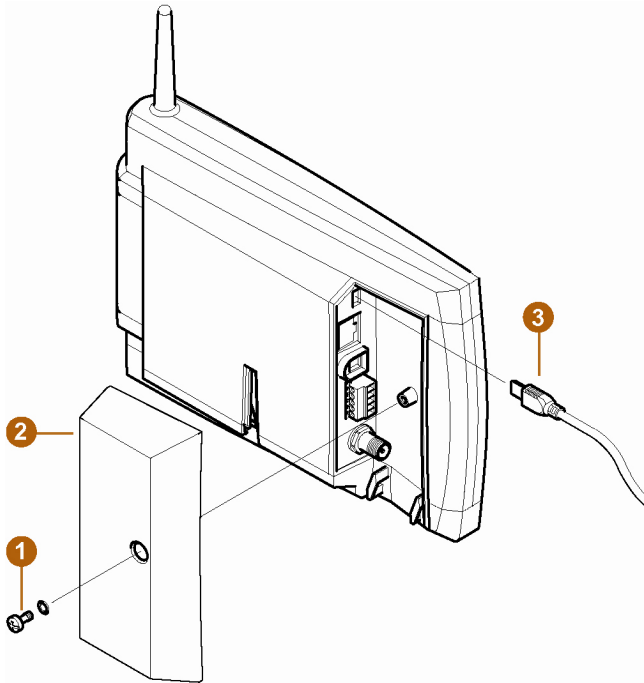
### 6.4.3 Connecting USB cable (optional)

For the commissioning, you can connect the Saveris base via a USB cable to the computer on which the testo Saveris Client is installed. For this, first connect the USB cable to the Saveris base.



During continuous operation, operate the Saveris base via the network cable, not via the USB cable.

The USB connection works unreliably in combination with virtual systems, which is why we recommend connecting the Saveris base via Ethernet.



1 Plug the USB cable 3 into the Saveris base.



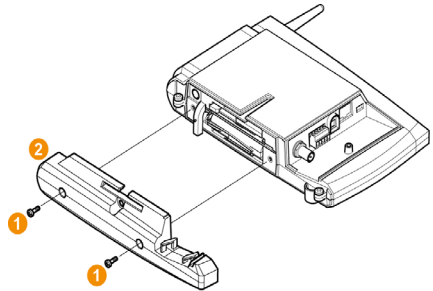
Do not screw on the cable cover of the Saveris base until after commissioning and removal of the USB cable.

### 6.4.4 Assigning an IP address to the Saveris base (optional)

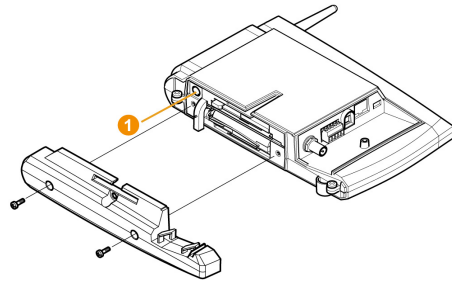
Generally, a static IP address should be assigned for the Saveris base, or an IP reservation should be made on the DHCP server with the MAC address of the Saveris base.

For assignment of the IP address, the software must be installed and the programming adapter 0440 6723 must be present.

- 1 Undo screw connections (1) and remove base plate (2) from the Saveris base.



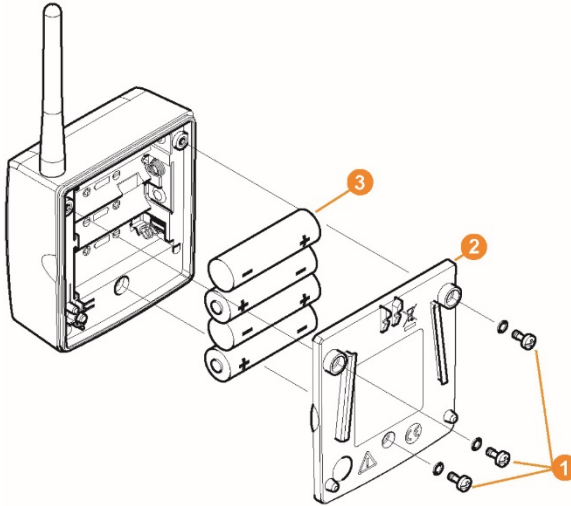
- 2 Plug the USB cable into the testo programming adapter (0440 6723) and connect to the service interface for the Saveris base.



- 3 Connect the USB cable to the computer.
- 4 Via **Start | All Programs | Testo | Testo Saveris Ethernet Wizard**, open the wizard for entering the connection settings.
- 5 Follow the wizard's instructions and assign the IP address for the Saveris base.

## 6.5 Commissioning of radio data loggers in testo Saveris

### 6.5.1 Inserting batteries into Saveris radio data logger



- 1 Undo screws ❶ on the rear of the Saveris radio data logger.
- 2 Remove housing cover of the Saveris radio data logger ❷.
- 3 Insert batteries ❸.



Ensure that you insert the batteries correctly.  
The correct polarity is illustrated in the respective battery compartment.

- 4 Place housing cover on the housing of the Saveris radio data logger.
- 5 Screw cover tightly onto the housing.



A control switch is located in the housing which is actuated through the cover. To this end, the cover must be screwed to the housing of the Saveris radio data logger without any gap.

If the cover is not screwed on without any gap, the Saveris radio data logger cannot be operated.



Transport tip: If the Saveris radio data loggers are to be sent via air freight, the batteries must be removed beforehand to avoid inadvertent radio communication.

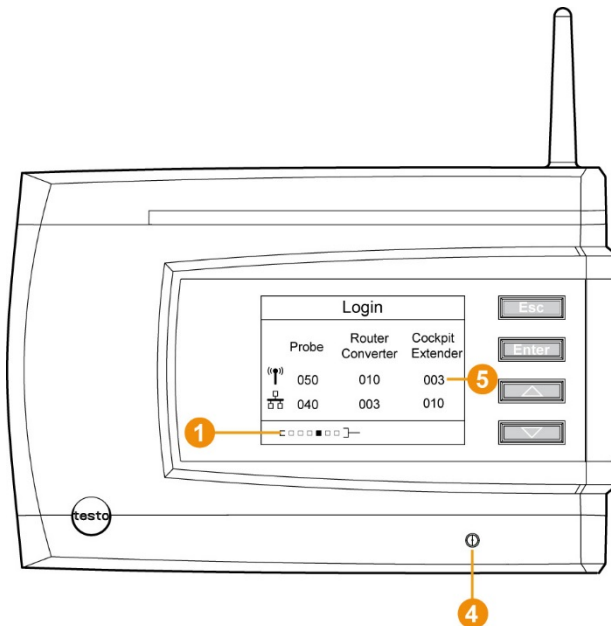
### 6.5.2 Registering Saveris radio data loggers in the system



You can register a maximum of 15 radio data loggers on the Saveris base directly via radio.

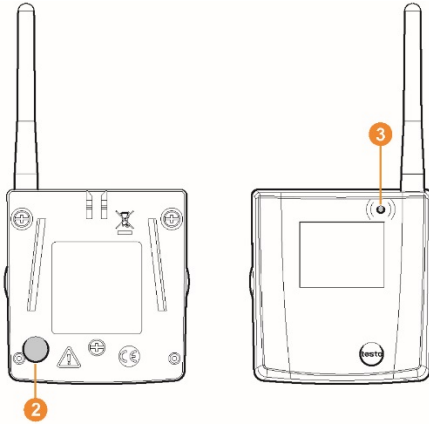
In addition, you can operate 15 more radio data loggers per Saveris converter and 5 more radio data loggers per Saveris router or router cascade on the Saveris base.

Note that a maximum of 450 channels can be processed by the Saveris software.



- 1 On the Saveris base, use the [▼] key to switch to the **Info System** menu.
  - 2 Press [Enter] to call up the **Login** function.
- ▶ The status bar 1 on the display indicates that the Saveris base is ready for Saveris radio data logger detection.






- ✓ With the H2D/H4D Saveris radio data logger, the external humidity probe must be plugged in.
- 3 Hold the connect key 2 on the rear of the Saveris radio data logger pressed down until the LED 3 on the Saveris radio data logger starts to flash orange.
- ▶ The LED 3 on the Saveris radio data logger briefly turns green when this has been detected by the Saveris base.  
The LED on the Saveris base 4 briefly flashes green and a prompt to register more Saveris radio data loggers or Saveris routers appears in the display of the base.



It is not possible to register multiple Saveris radio data loggers on the Saveris base at the same time. Multiple Saveris radio data loggers can only be registered one after the other.

- 4 On the Saveris base,
  - 4.1 Press the **[Esc]** key if there are no other components to be registered.
    - ▶ Information about the necessary execution of the startup wizard is shown on the display for about ten seconds. The Saveris base then switches to the **Info System** menu where the number of registered components 5 is now displayed.
  - 4.2 Press the **[Enter]** key if there is another component to be registered; see previous step.

- 5 Position Saveris radio data loggers precisely at their measuring points to check the radio link.
- 6 Briefly press the connect key  on the rear of the Saveris radio data logger.

If the LED  on the Saveris radio data logger flashes

- green, there is a radio link.
- red, there is no radio link.



If there is no radio link to the Saveris base, even after a change of location of the Saveris radio data logger, register a router on the Saveris base; see section 6.9.5, **testo Integrating a Saveris router (optional)**.



In order to complete the commissioning of the Saveris radio data logger, the latter still has to be configured using the startup wizard.

---

## 6.6 BT Gateway for testo 182

### 6.6.1 Equipment required

- ✓ PC/laptop.
- ✓ Common browser (e.g. Firefox as from version 50, Internet Explorer as from version 8, Google Chrome)
- ✓ Power supply: via PoE (Power over Ethernet) or 5V DC micro USB.
- ✓ Configuration: via A-A USB cable.

### 6.6.2 Establishing connections to the gateway

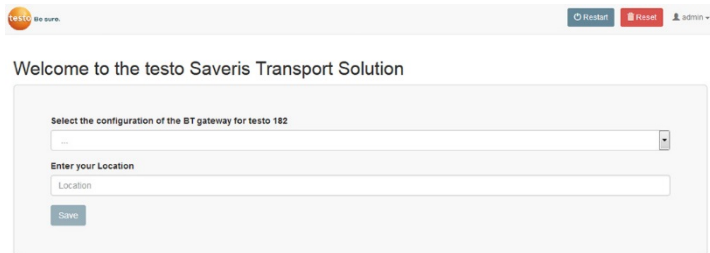
- 1 Insert the wireless stick into the USB 2 port.
- 2 Connect the gateway to the PC to USB 1 via the USB cable.
- 3 Connect the gateway and PC to the power supply (if the battery power is too low).
  - ▶ After a start time of approx. 30 seconds, the gateway is ready to use.

- ✓ If the status LED flashes green, the gateway is in configuration mode.
- 4 Check the network settings of your PC. The gateway must be detected as an RNDIS device (driver is loaded automatically).

### 6.6.3 Configuring the BT Gateway for testo 182

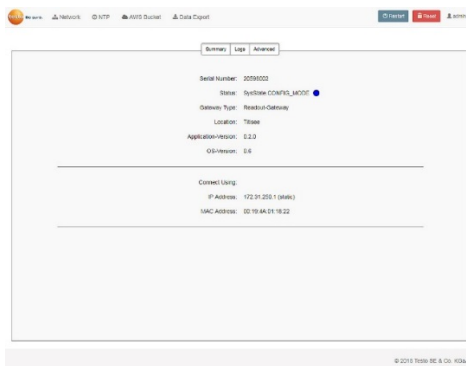
- 1 Open the configuration interface for the gateway via the browser.
- 2 Enter the default configuration IP address of the gateway (172.31.250.1) in the address line.

▶ The following window is displayed:



- 3 Select the **Gateway type** (registration or readout gateway) (**Select your testo Saveris Gateway BT configuration**) and enter your **Location**.
- 4 Save information: **[Save]**

▶ The following window is displayed:



5 Click on the **Network** tab to configure the network.



▶ A connection can be established via Ethernet or WLAN.



Only one connection type (WLAN or Ethernet) is possible at a time.

### 6.6.3.1 Configuring operation via WLAN

1 Select whether the gateway is to be operated via DHCP or manual IP configuration.

- ▶ DHCP selection: no further settings necessary.
- ▶ Manual IP selection: Enter the following data for a **static IP configuration**:
  - the required IP address
  - the subnet mask
  - the default gateway
  - DNS server (optional)

2 Enter the network name.

3 Select the security.

4 Fill in the remaining fields (if security is not set to 'None').

5 Confirm your settings for the **Network** tab with [**Save**].  
Optional: carry out NTP (time server) configuration.



The NTP servers transmit the date and time to the gateway. If necessary, the NTP servers already entered by Testo can be adjusted



Make a note of the gateway's newly assigned IP address.

6 Confirm changes to the NTP configuration by clicking on [**Save**].

### 6.6.3.2 Configuring operation via Ethernet / LAN

- 1 Select whether the gateway is to be operated via DHCP or manual IP configuration.

- ▶ DHCP selection: no further settings necessary.
- ▶ Manual IP selection: Enter the following data for a **static IP configuration**:
  - the required IP address
  - the subnet mask
  - the default gateway
  - DNS server (optional)

- 2 Confirm your settings for the **Network** tab with **[Save]**.

Optional: carry out NTP (time server) configuration.



The NTP servers transmit the date and time to the gateway. If necessary, the NTP servers already entered by Testo can be adjusted.



Make a note of the gateway's newly assigned IP address.

- 3 Confirm changes to the **NTP** configuration by clicking on **[Save]**.

### 6.6.3.3 Configuring the AWS Bucket

- 1 Click on the **AWS Bucket** tab at the top to configure your bucket.



A gateway configured as a registration gateway can only be assigned to one bucket. A gateway configured as a readout gateway can be connected to multiple buckets.

- 2 Confirm your settings for the **AWS Bucket** by clicking on **[Save]**. The access data are checked and if the connection was successful, confirmation is displayed.

- 3 Restart to confirm the settings



Network and AWS Bucket settings can later be changed at any time. Changing the gateway type and the location is only possible via a factory reset. To do this, press the Reset key for longer than 30 seconds.

- ▶ The gateway will now restart and the status LED will flash blue during the start-up process. As soon as the gateway is ready for operation, the status LED lights up solid green.

### 6.6.4 Carrying out firmware updates

- 1 Disconnect the BT Gateway for testo 182 from the power supply.
- 2 Remove USB wireless stick.
- 3 Insert USB flash drive with the firmware update package (at highest folder level) into USB 2.
- 4 Connect BT Gateway for testo 182 to the power supply.
  - ▶ Update is carried out automatically.
    - Update successful: LED flashes green 10 times and gateway shuts down
    - Update failed: LED flashes red 5 times
    - Error with update: repeat steps 1 to 4. Make sure that the firmware update package was correctly saved on the USB flash drive.
- 5 Remove USB flash drive with the firmware update package from the USB port.
- 5 Reinsert USB wireless stick into USB 2.
- 6 Restart BT Gateway for testo 182 with the new firmware: unplug and plug in the power supply.
  - ▶ The Gateway is now ready for operation.

## 6.7 Commissioning testo Saveris software

### 6.7.1 Installing testo Saveris software

- ✓ Before the installation: End all running programs.



Administrator rights are required for installation.

Log in directly as the administrator, not via **Execute as....**

---



If you are installing multiple clients in a network, make sure that no simultaneous changes are made to the system configuration by the clients during simultaneous operation of them.

---

- 1 Insert CD with the testo Saveris software into the CD-ROM drive. If the installation program does not start automatically, open Windows® Explorer and start the file **index.html** on the CD.



Once you have for instance received the installation file via e-mail, use the Setup.exe file at the highest level of the installation medium.

- 2 Select the required installation options.
- 3 Follow the installation wizard's instructions.



During installation, the version provided of the Microsoft® SQL Server® Express database environment is installed – if this is not already present.

The database is protected by the so-called SA password, the password for the database administrator, to prevent unintentional changes to the database.

When installing testo Saveris Client and testo Saveris Viewer, note that: the testo Saveris Professional Viewer has only limited functionality. This means you can for example analyze and process data sequences, but cannot configure alarms or carry out report settings.



During installation, you require the name or IP address of the computer on which the Saveris Professional Server is installed.



With the testo Saveris Professional Client, the USB driver for the connection of the base is installed for commissioning.

If the Saveris base is not detected as new hardware when connected to the computer, the driver must be installed manually.

- 4 After completing the installation, restart the computer and log in with the same user name as before.

## 6.7.2 Installing Saveris mail services

### 6.7.2.1 Installing MAPI mail



The installation of MAPI mail should only be carried out by a system administrator.

The following requirements must be met for the installation of MAPI mail:

- MS Outlook must be available or installed on the PC for Saveris MAPI mail.
- A Microsoft Exchange server must be available or installed.

## 6 Commissioning

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- An email account must be set up on the Microsoft Exchange server for the user account used for MAPI mail.
- The name of the Microsoft Exchange server must be known for the installation.
- MAPI mail must be installed on the Saveris server. The following applies to this PC:
  - A Microsoft Exchange server must be accessible.
  - The Exchange server must be located in the same domain as the Saveris server.
  - The connection data for the Exchange account must be set up on the PC. This is generally achieved by running MS Outlook once on this computer.



Lotus Notes can be used with an adapter that is available for purchase. Setup and configuration should be carried out by the respective IT manager.

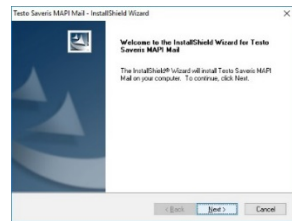
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- 1 Insert CD with Saveris software into the CD-ROM drive.

If the installation program does not start automatically, open Windows® Explorer and start the **index.html** file on the CD.

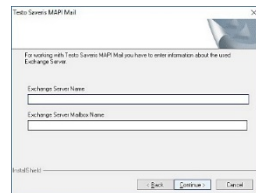
- 2 Select **Installation of a connector for the Microsoft Exchange mail server**.

- ▶ The installation wizard is started.



- 3 Click on **[Next]**.

- 4 Enter the Microsoft® **Exchange server name** and the **Exchange server mailbox name** on the Microsoft® Exchange Server.

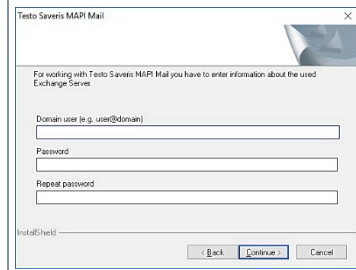


The name of the email mailbox is normally identical to the user name.

---



- 5 Click on **[Continue]**.
- 6 Enter the user name (**Domain user**) of the email mail box on the Microsoft Exchange server.  
Enter **Password** and **Repeat Password**.



- 7 Click on **[Continue]**.
- ▶ MAPI mail is installed.

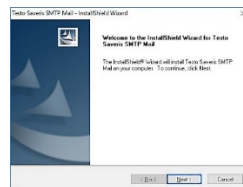
### 6.7.2.2 Installing SMTP mail

The following requirements must be met for the installation of SMTP mail:

- ✓ The name of the SMTP server must be known.
  - ✓ An email account with an Internet provider must be available or has to be set up.
  - ✓ The provider data (email address and mailbox) must be known.
- 1 Insert CD with Saveris software into the CD-ROM drive.

If the installation program does not start automatically, open Windows® Explorer and start the **index.html** file on the CD.

- 2 Select **Installation of a connector for an SMTP mail server**.
- ▶ The installation wizard is started.

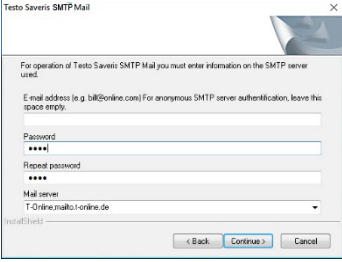


- 3 Click on **[Next]**.



Only enter your address and password if authentication is required in your application.

- 4 Select the mail server or enter the mail server.



- 5 Click on **[Continue]**.
  - ▶ SMTP mail is installed.

### 6.7.2.3 Installing testo Saveris CFR transport add-on

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Administrator rights are required for installation. Log in directly as the administrator, not via **Execute as...**

---



You need to install the testo Saveris Client software, the SQL database and the testo Saveris Viewer software to display the transport data. To do this, follow the installation instructions for the testo Saveris CFR software and then execute the Setup.exe file in the **TestoSaverisViewer** folder on the testo Saveris CFR CD.

---

- 1 Insert CD with the testo Saveris transport add-on into the CD-ROM drive.
- 2 Install it in the transport add-on of the SQL database by executing the Setup.exe file in the **TestoSaverisTransportPrerequisites** folder.
- 3 Activate the transport certificates by executing the RegTestoDevCerts.exe application in the **RegTestoDevCerts** folder.
- 4 Optional: If you are using the **testo 184** transport data logger, you can install the 3 software versions which are needed for different applications. To do this, run the relevant Windows installer in the sub-folders:
  1. t184cftmpl: Software for the creation of **configuration templates**.
  2. t184cfguser: Software for the **configuration** of **testo 184** transport data loggers when using previously created configuration templates.
  3. t184saveris: Software for the **readout** of **testo 184** transport data loggers.



Take into consideration that, if applicable, the **testo 184** software versions have to be installed on different computers, depending on the application.

- 5 After completing the installation, restart the computer and log in with the same user name as before.

### Setting up a connection to the AWS bucket in the testo Saveris CFR software

- 1 Start the testo Saveris Client software.



In order to be able to connect an AWS bucket, the required permissions first have to be granted via **21 CFR 11** → **Access Control** → **Admins**.

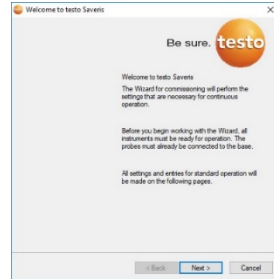
- 2 Select **System Information** → **AWS Settings**.
- 3 Enter the AWS bucket information into the mask.
- 4 Save the entry.

## 6.8 Initial commissioning of the hardware

The following preconditions must be fulfilled for the commissioning of the hardware:

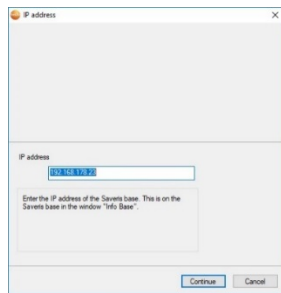
- ✓ The Saveris base is ready for operation.
  - ✓ All system components (data loggers, probes, etc.) are registered on the Saveris base.
  - ✓ The Saveris software is installed on the computer.
- 1 Connect the Saveris base to the computer via the USB cable or Ethernet.

- ▶ The startup wizard is launched.



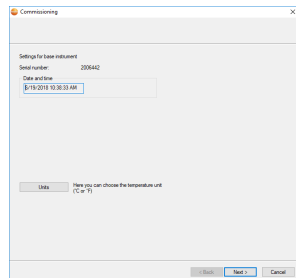
- 2 Click on **[Next >]**.

- 3 Enter the **IP address** of the Saveris base. This is located on the Saveris base in the **Info Base** window.



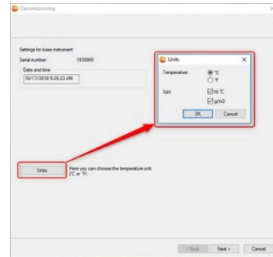
- 4 Click on **[Continue]**.

- ▶ The **Settings for base instrument** of the Saveris base are displayed.



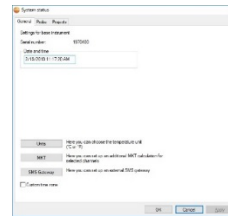
Date and time settings will be automatically adopted from the PC. The administrator must make sure that the system time is regularly compared with a reliable time source and adjusted if necessary, so as to ensure the authenticity of the measurement data.

- Click on **[Units]** to select the temperature unit for the system (Celsius °C or Fahrenheit °F).



For using the external SMS gateway RV50, the option **USE AN EXTERNAL GATEWAY** must be checked. In addition, the IP address and the ports (sending and receiving ports) need to be entered.

- Auf **[SMS Gateway]** klicken.
- Option **Use an external SMS Gateway** aktivieren, IP-Adresse und die Sende- und Empfänger Ports eingetragen.
- Auswahl mit **[OK]** bestätigen.



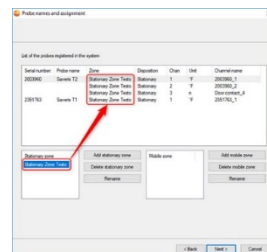
Bei Verwendung des internen GSM Moduls muss die Option **Use an external SMS Gateway** deaktiviert werden.

- Base neu starten.


- Confirm selection with **[OK]**.

- Click on **[Next >]**.

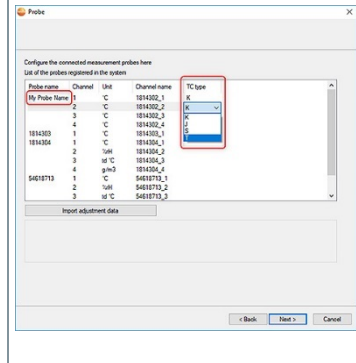
- The list of the data loggers registered on the Saveris base is shown.



## 6 Commissioning

- To distribute the data loggers/probes already registered on the system to stationary or mobile zones (for Saveris mobile), depending on the purpose: Click on **[Add stationary zone]** or **[Add mobile zone]**.
- Open the selection list via the  button and select the zone which the data logger should be assigned to.
- Click on **[Next >]**.

- Click in the **TC type** field and enter the thermocouple element type (**K**, **J**, **T** or **S**), if this information is necessary for the instrument.



- If required, change the default values in the **Probe name** and **Channel name** fields.

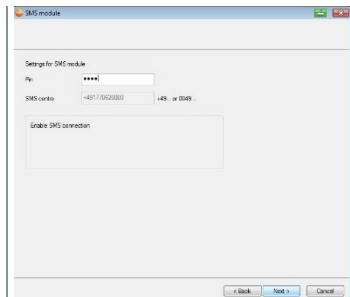


Assign channel names that are not longer than 20 characters.

- If required, import adjustment data for the individual probes: Click on **[Import adjustment data]**.
- Click on **[Next >]**.

- If the Saveris base is equipped with a GSM module, the dialogue for entering the basic settings for the SMS service (**Settings for SMS module**) is shown.

If there is no GSM module, continue as from step 13.



- 15 Enter the **PIN** in the field of the same name.



You can for example find the PIN in the documents for your SIM card. The number of the SMS centre can be read out from the SIM card.

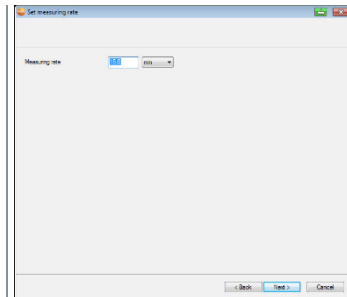


If the PIN entered is incorrect, the Saveris base must be shut down and started up again with a different SIM card. Until this is done, the original SIM card cannot be used and reconfigured.

To unblock a SIM card: insert the card into a mobile phone and unblock it by entering the PUK code.

- 16 Click on **[Next >]**.

- ▶ The settings for the measuring cycle are displayed



- 17 Enter **Measuring cycle** and define the unit for it.

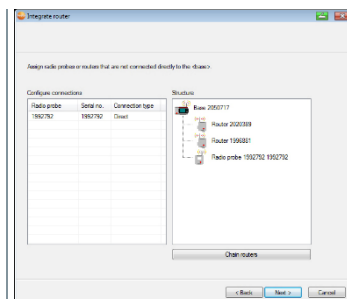


The measuring cycle determines the intervals at which a new reading is saved in the Saveris base.

At a later stage, the settings can be changed for every data logger/probe separately in the software.

- 18 Click on **[Next >]**.

- ▶ If a router is registered on the Saveris base, the configuration of the connection type (**Configure connections**) for the probes is shown. If you have not registered a Saveris router, continue as from step 24.



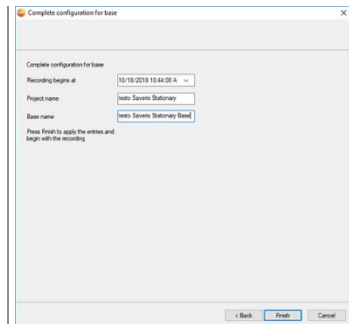
- 19 Click in the **Connection type** cell of the data logger which needs to be assigned to a Saveris router.
  - ▶ The cell is shown as a selection list.
- 20 Use the  button to open the selection list and select the Saveris router which the data logger needs to be assigned to.



Data loggers which are in a mobile zone cannot be assigned to a Saveris router.

- 21 Perform steps 16 and 17 for all other data loggers with measurement data that need to be transmitted to the Saveris base via a router.
- 22 Click on **[Next >]**.

- ▶ The information about the start of measurement and the project name are displayed.



- 23 Postpone start of measurement if necessary.
- 24 Change the **Project name** in the project name field.

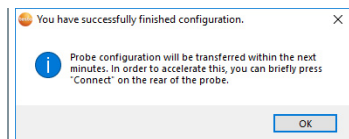


Think of a unique name for the project that you will be able to easily associate with the project later.

The project name cannot subsequently be changed.

- 25 Click on **[Finish]** to end the commissioning of the hardware.

- ▶ The dialogue for the conclusion of the commissioning is shown.





- 26 Press the **[Connect]** key on all data loggers and Saveris routers one after the other to synchronize the components.
- 27 Close the dialogue with **[OK]**.
  - ▶ The hardware is now ready for operation.



For how to mount the hardware on the wall for example, see section 6.10.3 **Wall mounting of data loggers**

## 6.9 Configuring hardware

Use the installation instructions for the initial commissioning of the system.

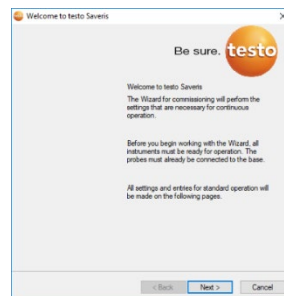
The following requirements must be fulfilled for the rest of the hardware commissioning process:

- ✓ The Saveris base is ready for operation.
  - ✓ All data loggers are registered on the Saveris base.
  - ✓ The Saveris software is installed.
  - ✓ A project has already been created.
  - ✓ Measurement operation has been ended.
- 1 Connect the Saveris base via the USB or network cable to a computer on which the Saveris Client is installed.



For continuous operation of the system, connection of the Saveris base to the computer via an Ethernet cable is recommended.

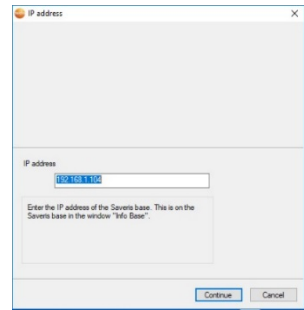
- ▶ The startup wizard is launched.



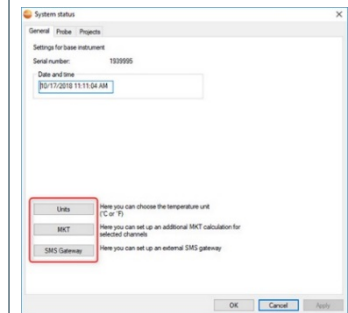
- 2 Click on **[Next >]**.

## 6 Commissioning

- 3 Enter the **IP address** of the Saveris base. This is located on the Saveris base in the **Info Base** window.

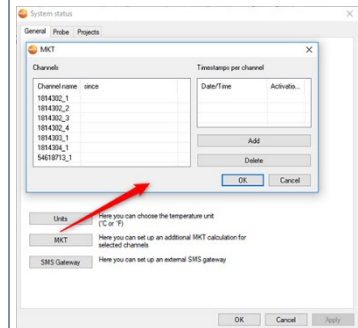


- 4 Click on **[Continue]**.
- 5 Click on **[Units]** to change the temperature unit for the system.



- 6 Click on **[MKT]** (Mean Kinetic Temperature) to simulate the effect of temperature fluctuations over a specific period of time.

1. Mark the channel.
2. Click **[Add]** to start the MKT calculation for the selected channel.



Several timestamps can be set for each channel.

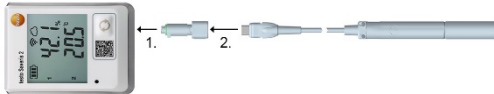
- 7 Click on **[OK]**.
- 8 Make any further changes to the existing system settings as required.

## 6.9.1 Integrating testo Saveris 2 H2 WLAN data logger



This section **only** describes the integration of the H2 WLAN data logger into a measurement system, not the integration of other WLAN data loggers.

1



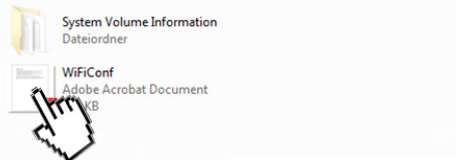
2

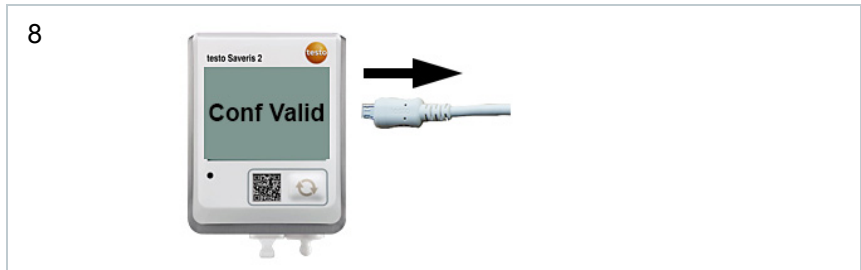
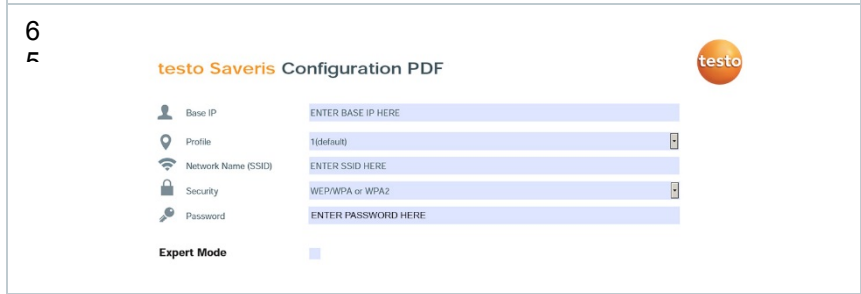
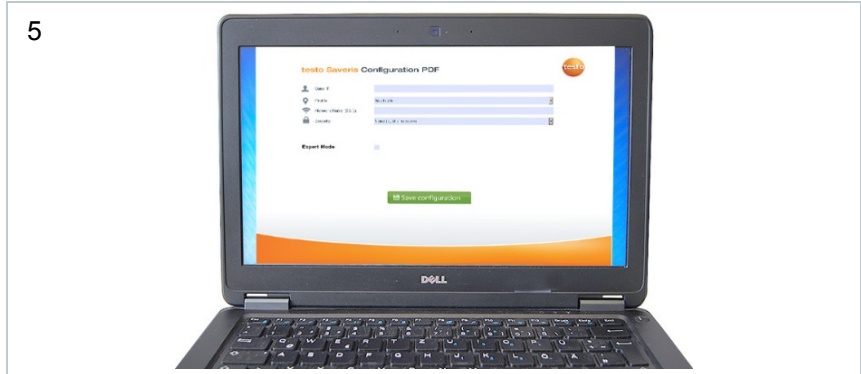


3



4





## 6.9.2 Integration of Ethernet data loggers into testo Saveris (optional)

In addition to the wireless Saveris data loggers, you can use data loggers that are connected to the Ethernet interface of the Saveris base. This enables data transfer from data loggers to the base even over long stretches if you do not wish to use a Saveris router or Saveris converter.

All Ethernet components (Saveris Ethernet data logger, Saveris converter, Saveris extender or base if applicable) must be assigned IP addresses by the programming adapter (0440 6723) via the Ethernet wizard.



If your computer has the Dynamic Host Configuration Protocol (DHCP), the Ethernet components automatically retrieve the IP address.

Because the DHCP address changes as standard following a certain period of time, the Saveris base should be assigned a fixed IP address. The IP address of the Saveris base must be manually assigned to the data loggers, extenders and converters by the programming adapter.

This section contains all the required information for this.



You can connect several Saveris Ethernet data loggers to the Saveris base using a so-called switch. In this connection, note that a maximum of 150 data loggers can be registered on the Saveris base or 450 measurement channels recorded there.

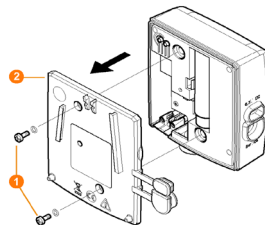
### 6.9.2.1 Connecting network cable



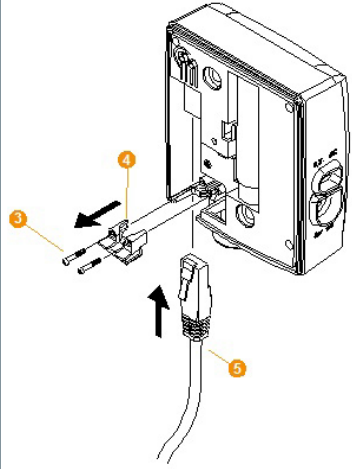
Only use high-quality network cables with a diameter between 5.8 mm and 6.8 mm to ensure leaktightness of the data logger housing.

Only use cables with an intact snap clip.

- 1 Undo screws **1** on the rear of the data logger and remove **2** housing cover.



- 2 Undo screws **3** on the panel **4** for the network cable and remove panel.



- 3 Slide network cable **5** with the tongue pointing up into the Ethernet port until it clicks into place.



If you wish to connect the Saveris Ethernet data logger to the power supply via the 24 V AC/DC plug-in/screw terminal and not via the mains adapter, do not screw on the housing cover until after connecting the power supply.

The procedure for connecting the power supply via the plug-in/screw terminal is the same as for the Saveris router; see section 6.9.5.1

**Connecting testo Saveris router to power supply (mains unit).**

- 4 Place the housing cover on the data logger and screw it down.



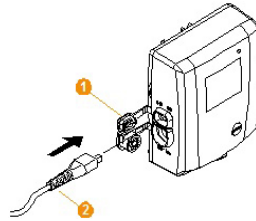
You can integrate the data logger into the network via a network switch.

### 6.9.2.2 Connecting testo Saveris Ethernet data logger to power supply (mains unit)



The procedure for connecting the power supply via the 24 V AC/DC plug-in/screw terminal is the same as for the Saveris router; see section 6.9.5.1 **Connecting testo Saveris router to power supply (mains unit).**

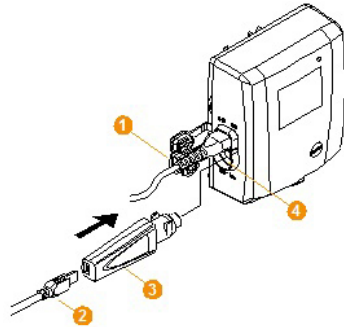
- 1 Open cover **1** for power supply.



- 2 Insert mains cable **2**.
- 3 Insert mains plug into a socket.

### 6.9.2.3 Connecting USB cable and installing driver (optional)

- 1 Open the cover **1** of the service interface on the Saveris Ethernet data logger.
- 2 Connect the USB cable **2** to the testo programming adapter (0440 6723) **3** and plug into the service interface **4**.



- ✓ With the H4E Saveris Ethernet data logger, the external humidity probe must be plugged in.
- 3 Connect the USB cable to the computer.
  - ▶ The driver installation wizard is started.
  - 4 Follow the installation wizard's instructions.

### 6.9.3 Integrating testo Saveris analog coupler (optional)

Using a Saveris analog coupler, you can integrate a transmitter with standardized current/voltage interfaces into the testo Saveris measurement data monitoring system and monitor it. This means the Saveris analog coupler thereby enables you to integrate additional measurement parameters other than temperature and humidity into the testo Saveris measurement data monitoring system.

Integration of a Saveris analog coupler involves three steps:

1. Connect transmitter to the Saveris analog coupler.
2. Register analog coupler on the Saveris base.
3. Parameterize analog coupler.

#### Connect transmitter to Saveris analog coupler

You can supply the transmitter with power via the Saveris analog coupler or select a separate power supply.

The circuit diagrams can be found in the Saveris analog coupler commissioning instructions which are supplied along with the Saveris analog coupler.

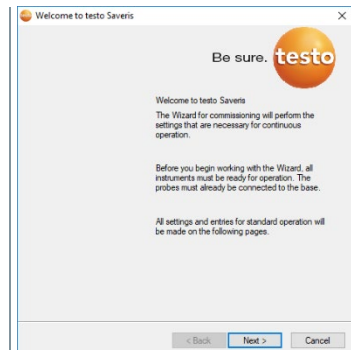
#### Register Saveris analog coupler on the Saveris base

The U1 Saveris analog coupler is registered on the Saveris base like a Saveris radio data logger, see section 6.9.2 **Integration of Ethernet data logger into testo Saveris (optional)**

The U1E Saveris analog coupler is commissioned and registered on the Saveris base like a Saveris Ethernet data logger, see section 6.9.2 **Integration of Ethernet data logger into testo Saveris (optional)**.

#### Parameterizing Saveris analog coupler with startup wizard

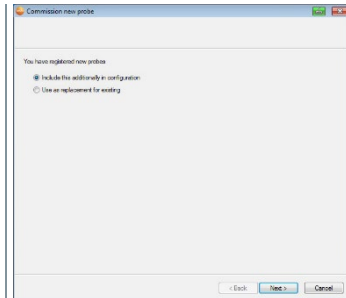
- 1 Under **Start | All programs | Testo**, click on **Testo Saveris startup wizard**.
  - ▶ The welcome dialogue for the startup wizard is displayed.





2 Click on **[Next >]**.

▶ The **Commission new data logger** dialogue is displayed.

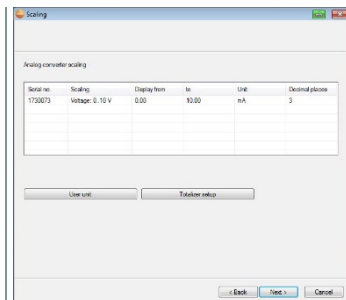


3 Leave default setting and click on **[Next >]**.



Saveris analog couplers can always only be included in the configuration as additional elements and cannot be used as replacements for existing ones.

▶ The **Scale** dialogue is displayed.



The fields of the **Scale**, **Display from**, **to**, **Unit** and **Decimal places** columns are initialized. These fields can be amended individually.

4 Select **Scale** (see type plate / transmitter operating manual).

5 Enter **Display from** and **to** (see type plate / transmitter operating manual).

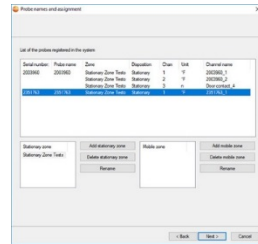
6 Select **Unit**. If the required unit is not available in the selection list: Add via **[User-defined unit]**.

7 Select number of **Decimal places**.


8 Click on **[Set up sum channel]**, if a specific unit needs to be totalized.

9 Click on **[Next >]**.

- ▶ The list of the data loggers recently registered on the Saveris base is shown.



10 Click on **[New stationary zone]**.

11 Open the selection list via the  button and select the zone which the data logger should be assigned to.

12 Click on **[Next >]**.

13 Click in the **TC type** field and enter the thermocouple element type (**K**, **J**, **T** or **S**), if this information is necessary for the instrument.

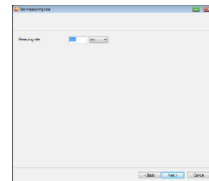
14 If required, change the preset values in the **Data logger name** and **Channel name** fields.



Assign channel names that are not longer than 20 characters.

15 Click on **[Next >]**.

- ▶ The settings for the measuring cycle are displayed.



16 Enter **Measuring cycle** and define the **unit** for it.



The measuring cycle determines the intervals at which a new reading is saved in the Saveris base.

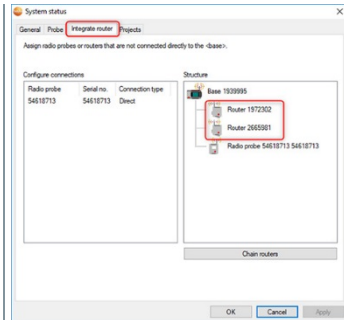
Possible settings for the unit:

- **sec** (second)
- **min** (minute)
- **h** (hour).

17 Click on **[Next >]**.

- ▶ If a Saveris router is registered on the Saveris base, the configuration of the connection type for the probes is shown.

If you have not registered a router, continue as from step 25.



18 Click in the **Connection type** cell of the data logger which needs to be assigned to a Saveris router.

- ▶ The cell is shown as a selection list.

19 Use the  button to open the selection list and select the Saveris router which the data logger needs to be assigned to.

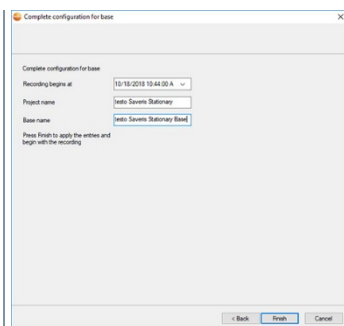


Data loggers which are in a mobile zone cannot be assigned to a Saveris router.

20 Perform steps 18 and 19 for all other data loggers with measurement data that need to be transmitted to the Saveris base via a Saveris router.

21 Click on **[Next >]**.

- ▶ The wizard is displayed with the setting for the start of measurement and with the list of newly registered data loggers.



22 Postpone start of measurement if necessary.

- 23 Click on **[Finish]** to end the commissioning of the hardware.
  - ▶ A message about the successful configuration of the hardware is displayed.
- 24 Confirm the message by clicking **[OK]**.
  - ▶ The new hardware is now ready for operation.

### 6.9.4 Integrating testo Saveris transmitter

Transmitters record readings from data loggers and transmit these via an optional additional component (Ethernet module) by Ethernet connection. You will find information about transmitters and the Ethernet module in the relevant instruction manuals for the transmitters. When using the Ethernet module, transmitters are integrated into testo Saveris in the same way as Ethernet data loggers, see section 6.9.2 **Integration of Ethernet data loggers into testo Saveris (optional)**.

### 6.9.5 Integrating testo Saveris router (optional)

You can use a Saveris router to optimize radio communication under poor structural conditions or to extend the radio path. The Saveris router receives the signals from the data loggers and forwards them to the Saveris base. Maximum extension of the radio path can be achieved by connecting three routers in series.



The measurement data of up to five radio data loggers can be transmitted to the Saveris base by each router or router cascade.

Up to 30 routers can be integrated into the measurement system. The Saveris base can communicate directly with a maximum of 15 routers.

Integration of a Saveris router involves three steps:

- 1 Connect the router to the power supply.
- 2 Register the router on the Saveris base.
- 3 Assign the radio probe to the Saveris router.



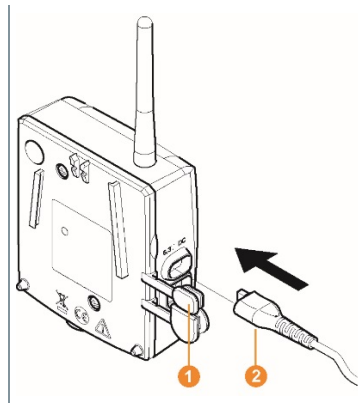
When positioning a testo Saveris router, please note the following points:

- When integrating several data loggers via a Saveris router, the data logger with the weakest radio link determines the position of the Saveris router. Mount the Saveris router in such a way that this data logger has an optimum radio link.

- Data loggers and Saveris router should be mounted so that the antennas are pointing upwards.
- The radio link between the data loggers and the testo Saveris router, as well as between the Saveris router and the Saveris base, should as far as possible not be impaired by structural conditions (walls, shelves, etc.). Mount the Saveris router and data loggers so that a "visual contact" exists for as many radio links as possible.

### 6.9.5.1 Connecting testo Saveris router to power supply (mains unit)

- 1 Open cover **1**.
- 2 Insert mains cable **2**.



- 3 Insert mains plug into a socket.

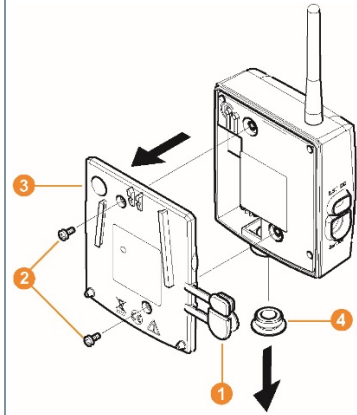


The procedure for wall mounting a router is the same as for a probe; see section 6.10. **Installation of the components** or section 6.10.4 **Wall mounting of Saveris T1/T1D/T2/T2D/Pt/PtD/H4D radio data loggers.**

### 6.9.5.2 Connecting testo Saveris router to power supply (mains unit)

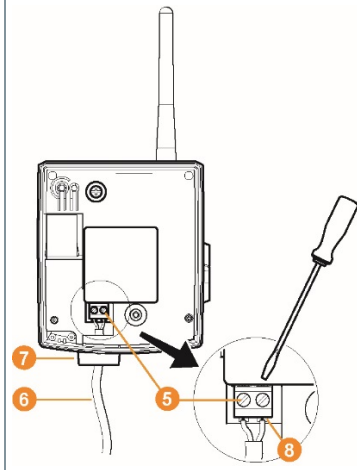
- 1 Remove protective cap **1**.
- 2 Undo screws **2** on the rear of the Saveris router.

- 3 Take housing cover **3** off router.



- 4 Unscrew and remove cover cap of cable opening **4**.

- 5 Loosen clamping screws **5**.



- 6 Feed cabling **6** through the cable opening **7** and insert into the clamps **8**.



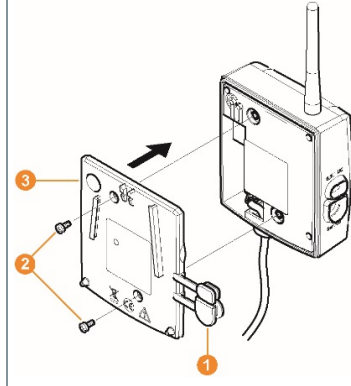
It is not necessary to note the polarity.

- 7 Tighten clamping screws.



Leaktightness and strain relief on the probe housing is only guaranteed when using a PG screw connection.

- 8 Place housing cover **3** on the Saveris router.



- 9 Screw on housing cover **2**.
- 10 Insert protective caps **1**.



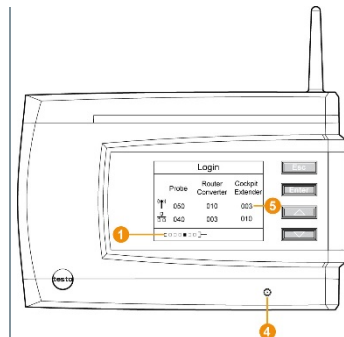
The procedure for wall mounting a Saveris router is the same as for a data logger, see section 6.10.4 **Wall mounting of testo Saveris T1/T1D/T2/T2D/Pt/PtD/H4D WiFi data loggers**

### 6.9.5.3 Registering testo Saveris router

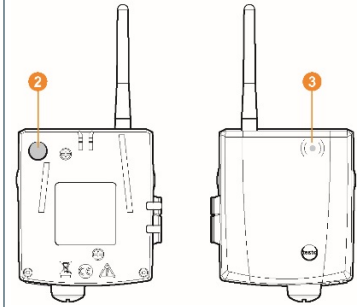


You can register a maximum of 30 Saveris routers to the Saveris base. The Saveris base can communicate directly with a maximum of 15 Saveris routers.

- 1 On the Saveris base, use the [**▼**] key to switch to the **Info System** menu.
  - 2 Press [**Enter**] to call up the **Login** function.
- ▶ The status bar **1** on the display indicates that the Saveris base is ready for Saveris router detection.



- 3 Hold the connect key **2** on the rear of the Saveris router pressed down until the LED **3** on the Saveris router starts to flash orange.



- ▶ The LED **3** on the Saveris router briefly turns green when this has been detected by the Saveris base.

The LED on the Saveris base **4** briefly flashes green and a prompt to register more data loggers or Saveris routers appears in the display of the base.



It is not possible to register multiple routers on the Saveris base at the same time. Multiple Saveris routers can only be registered one after the other.

- 4 Press the **[Esc]** key on the Saveris base if there are no other components to be registered. Information about the necessary execution of the startup wizard is shown on the display for about ten seconds. The Saveris base then switches to the **Info System** menu where the number of registered components **5** is now displayed.
- 5 Press the **[Enter]** key if there is another component to be registered; see previous step.

### 6.9.5.4 Assigning data loggers

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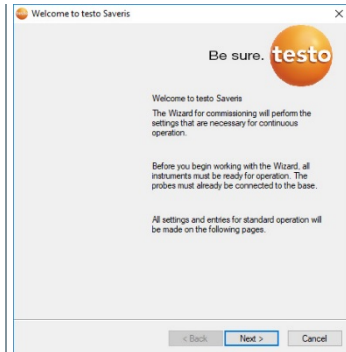


To assign a data logger to a Saveris router, both must be registered on the Saveris base.

- 1 Under **Start | All programs | Testo**, click on **Testo Saveris startup wizard**.



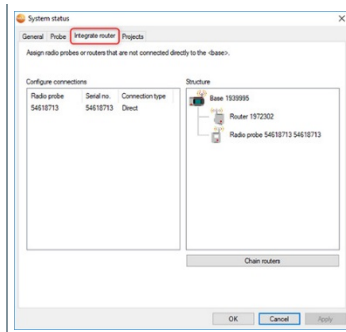
- ▶ The welcome dialogue for the startup wizard is displayed.



- 2 Click on [Next >].

- ▶ The **System status** dialogue is displayed with the **General** tab.

- 3 Switch to the **Integrate router** tab.



The **direct** connection type means that the data logger is directly registered on the Saveris base or a Saveris converter.

- 4 Click in the **Connection type** cell of the data logger which needs to be assigned to a Saveris router.
- ▶ The cell is shown as a selection list.
- 5 Use the  button to open the selection list and select the Saveris router which the data logger needs to be assigned to.
- 5.1 Perform steps 4 to 5 for all other data loggers with measurement data that need to be transmitted to the Saveris base via a Saveris router.
- 6 Position the data logger and Saveris router at their mounting locations to check the radio links.

- 7 Briefly press the **Connect** key on the rear of the Saveris router.
  - ▶ If the LED on the front of the router flashes
    - green, there is a radio link to the Saveris base.
    - red, there is no radio link to the Saveris base.
- 8 Briefly press the **Connect** key on the rear of the data logger.
  - ▶ If the LED on the front of the data logger flashes
    - green, there is a radio link to the Saveris router.
    - red, there is no radio link to the Saveris router.



If there is no radio link even after changing the location of the data logger and/or Saveris router, use a Saveris converter; see section 6.9.6 **Integrating Saveris converter (optional)**.

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If you want to use data loggers within a router cascade, see section 6.9.5.5 **Connecting Saveris routers in series**.

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### 6.9.5.5 Connecting Saveris routers in series

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In each case, a maximum of three Saveris routers can be connected in series, “cascaded”.

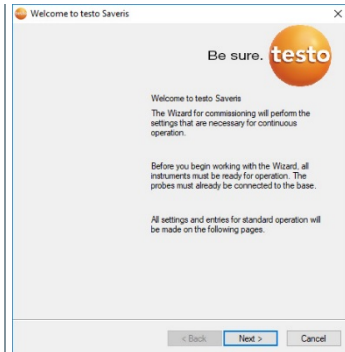
The measurement data of up to five Saveris radio data loggers can be transmitted to the Saveris base per router cascade. The five Saveris radio data loggers can be connected to any Saveris router in the cascade.

A Saveris converter can be connected upstream of the router cascade.

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- ✓ All Saveris routers are connected to the power supply and registered on the Saveris base.
- 1 Under **Start | All programs | Testo**, click on **Testo Saveris startup wizard**.

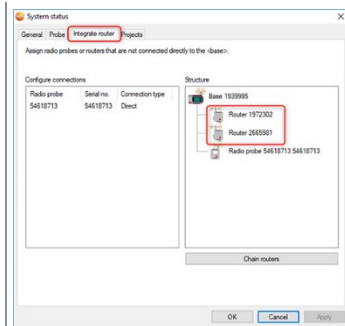
- ▶ The welcome dialogue for the startup wizard is displayed.



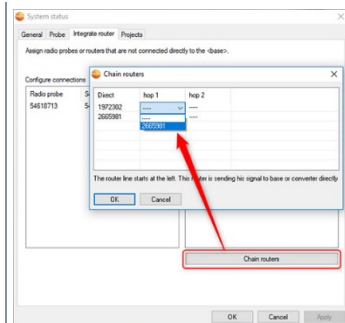
- 2 Click on [Next >].

- ▶ The **System status** dialogue is displayed with the **General** tab.

- 3 Switch to the **Integrate router** tab.

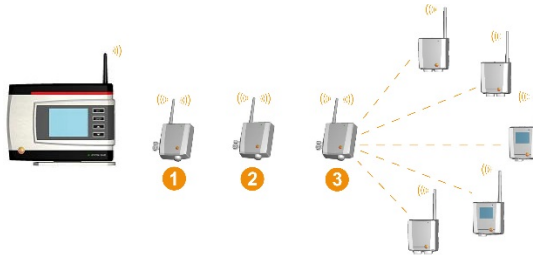


- 4 Click on [Chain routers].



- ▶ The **Chain routers** window is opened.

- 5 Select Saveris routers in the order in which they should be connected in series starting from the Saveris base (from left to right).



- 6 Click on **[OK]**.
- 7 Check assignment in the structure diagram and click on **[OK]**.
- 8 Position the Saveris routers in their mounting locations to check the radio links.
- 9 Briefly press the **Connect** key on the rear of the router that is nearest to the Saveris base in the series (router 1 in the image).
- ▶ If the LED on the front of the router flashes
    - green, there is a radio link to the Saveris base.
    - red, there is no radio link to the Saveris base.
- 10 Briefly press the **Connect** key on the rear of the Saveris router that is downstream from the first router in the series (router 2 in the image).
- ▶ If the LED on the front of the Saveris router flashes
    - green, there is a radio link to the Saveris router connected upstream of it in the series.
    - red, there is no radio link to the Saveris router connected upstream of it in the series.
- 11 Briefly press the **Connect** key on the rear of the Saveris router that is downstream from the second Saveris router in the series and is therefore the furthest from the Saveris base (router 3 in the image).
- ▶ If the LED on the front of the Saveris router flashes
    - green, there is a radio link to the Saveris router connected upstream of it in the series.
    - red, there is no radio link to the Saveris router connected upstream of it in the series.



If there is no radio link even after changing the location of the Saveris router, use a Saveris converter; see section 6.9.6 **Integrating Saveris converter (optional)**. If you would like to integrate data loggers into the router cascade, see section 6.9.5.4 **Assigning data loggers**.

## 6.9.6 Integrating Saveris converter (optional)

If the distance between the Saveris radio data logger or Saveris router is too large for a radio transmission, you can integrate a Saveris converter into the measurement system. The Saveris converter is connected to the Saveris base by means of an Ethernet cable and converts the radio signals to Ethernet signals.



The measurement data from up to 15 radio data loggers/Saveris routers can be transmitted to the Saveris base with a Saveris converter.

You can connect several Saveris converters to the Saveris base using a so-called switch. In this connection, note that a maximum of 150 data loggers can be registered on the Saveris base or 450 measurement channels recorded there.



The procedure for preparing the commissioning of a converter is the same as with a Saveris Ethernet data logger, see section 6.9.2 **Integrating Saveris Ethernet data logger (optional)**.

### Registering radio data logger or Saveris router on the Saveris converter

- 1 Briefly press the connect key on the rear of the Saveris converter.
  - ▶ The LED on the Saveris converter lights up green and the Saveris converter is ready to detect the radio data logger.
- 2 Press the connect key on the rear of the radio data logger/Saveris router until the LED on the radio data logger/Saveris router begins to flash orange.
  - ▶ The LED on the radio data logger/Saveris router briefly turns green when this has been detected by the Saveris converter. The radio data logger/Saveris router is registered on the Saveris converter and the latter transmits the measurement data to the Saveris base.

## 6.9.7 Integrating Saveris extender<sup>1</sup>

The Saveris extender communicates automatically with all radio data loggers in the system which are directly registered on the Saveris base or which have been assigned to a mobile zone on the PC that are in its vicinity (e.g. when the

<sup>1</sup> Component is only permitted for mobile monitoring in all countries with a radio frequency of 868 MHz.

truck is at the charging station). The mobile radio data logger must not be registered on any Saveris router or Saveris converter.

The Saveris extender is used to pass on the collected logger data to the Saveris base, along with data from the Saveris base to the Saveris cockpit unit.



The Saveris extender is designed for both mobile and stationary data monitoring. In comparison to the Saveris converter, the main difference is that the transmission paths of the components involved are not strictly defined in the case of the Saveris extender. The radio data loggers registered on the base each search for the best radio link and then communicate via the appropriate Saveris extender. This is a major advantage when the radio quality may change in terms of time or spatial conditions, e.g. in a warehouse.

In principle it is preferable to use the Saveris extender rather than the Saveris converter.

Please note that when using a stationary Saveris extender it is not possible to trace the transmission/communication path of the measurement data in the **System** software menu, because there is no 1 to 1 connection between the Saveris extender and the radio data loggers or routers.



The measurement data of up to 100 radio probes can be transmitted to the Saveris base using a Saveris extender. At least two cycles (30 min) are recommended for reliable data transfer as a minimum retention time for the mobile unit on the ramp.

As the mobile radio data loggers only have a limited internal memory, it is necessary to ensure that they come into radio contact with a Saveris extender on a regular basis, depending on the measuring cycle, in order to enable the measurement data to be transferred.

You can connect several Saveris extenders to the Saveris base via a switch. In this connection, note that up to 20 Saveris extenders can be registered on the Saveris base with a maximum number of 150 radio data loggers or 450 measurement channels. If the connection is to be made via VPN, please contact our support team.



The procedure for preparing the commissioning of a Saveris extender is the same as with an Ethernet data logger, see section 6.9.2 **Integrating testo Saveris Ethernet data logger (optional)**.

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### 6.9.8 Integrating Saveris cockpit unit (optional)<sup>2</sup>

The Saveris cockpit unit is used to start and stop tours manually and to display the readings of the assigned Saveris radio data loggers during transport. The driver is alerted about any violations of limit values by a red LED. In addition, the

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<sup>2</sup> Component is only permitted for mobile monitoring in all countries with a radio frequency of 868 MHz.

tour data can be printed out by a Testo printer via infrared (0554 0549). A cockpit unit can save several different tours with time marks.



A maximum of 50 Saveris cockpit units can be integrated into a testo Saveris measurement data monitoring system.

The Saveris cockpit unit can display the measurement data of 2 groups each comprising 4 radio data loggers (max. 32 channels). The data are transferred every 15 minutes. Alarm events are forwarded immediately to the Saveris cockpit unit.

The Saveris cockpit unit is only used to display the measurement data, not for permanent storage. It is therefore important to ensure that the mobile radio data loggers come into radio contact with a Saveris extender or the Saveris base on a regular basis, depending on the measuring cycle, in order to enable the measurement data to be transferred.

The reading output can be configured via the testo Saveris software.

The integration of a Saveris cockpit unit involves two steps:

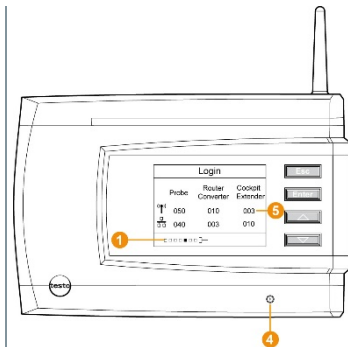
- 1 Register Saveris cockpit unit on the Saveris base.
- 2 Mount Saveris cockpit unit and supply with power.

### 6.9.8.1 Registering Saveris cockpit unit



You can register a maximum of 50 Saveris cockpit units on the Saveris base.

- 1 On the Saveris base, use the [▼] key to switch to the **Info System** menu.
  - 2 Press [Enter] to call up the **Login** function.
- ▶ The status bar ① on the display indicates that the Saveris base is ready to detect the Saveris cockpit unit.



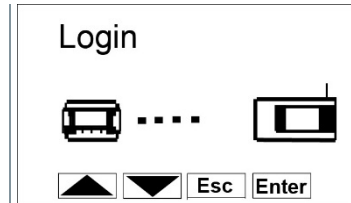


The Saveris cockpit unit can be connected briefly to the PC via the USB port for power supply while registering on the Saveris base. The driver search, which opens automatically on the PC, can be closed.

3 Use [ ▲ ] and [ ▼ ] to select the required language on the Saveris cockpit unit.

4 Press [Enter] to call up the **Login** function.

▶ The status bar on the display indicates that the Saveris cockpit unit is attempting to register on the Saveris base.



It is not possible to register multiple Saveris cockpit units on the Saveris base at the same time. Multiple Saveris cockpit units can only be registered one after the other.

▶ Once successfully registered, the Saveris cockpit unit displays a warning about use in traffic.

5 Press any key to confirm the information.

▶ Saveris cockpit unit menu is opened.

▶ The Saveris base transfers the tour descriptions and mobile zones created in the Saveris software to the Saveris cockpit unit.



Each time the mobile zones or tour descriptions are changed, the Saveris cockpit unit must have a radio link to the Saveris base or a Saveris extender to enable current data to be received.

6 On the Saveris base,

- Press the [Esc] key if there are no other components to be registered.

- ▶ Information about the necessary execution of the startup wizard shown on the display for about ten seconds. The Saveris base then switches to the **Info System** menu where the number of registered components **5** is now displayed.

- Press the [Enter] key if there is another component to be registered; see previous step.



### 6.9.8.2 Fitting Saveris cockpit unit in the driver's cab and connecting it to a power supply



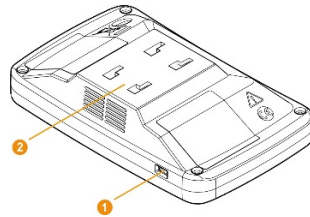
Do not fit the Saveris cockpit unit while driving.

Ensure that the Saveris cockpit unit does not obstruct your line of vision while driving.

Comply with road traffic regulations.

Always use the adapter supplied (order no. 0554 1038) for connection to the vehicle electrical system. We recommend connecting to a permanently supplied socket.

- 1 Push the mini USB cable into the connection port **1**.



- ✓ At below 15°C: warm the windscreen and sucker.
- ✓ If the windscreen is dirty: clean the windscreen with a suitable cleaning agent.

- 2 Secure the mount on the windscreen using the sucker.

- 3 Insert the mount into the guide **2** until you hear it click into place.



- 4 Connect adapter (order no. 0554 1038) to the USB cable and plug into the socket of the vehicle electrical system.

- ▶ Green LED lights up when the Saveris cockpit unit is supplied with power.
- ▶ Saveris cockpit unit is ready for use.



Before each trip, particularly when temperatures fluctuate, check that the mount is secure.

## 6.10 Installation of the components

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It is absolutely essential to follow the notes in section 2 **Safety and disposal** when installing the Saveris components.

Do not install the Saveris base and the data loggers at their locations until the measurement system is functioning as expected.

The Li-ion rechargeable batteries in the Saveris base and in the Saveris Ethernet data loggers cannot be charged at sub-zero temperatures.

Avoid installation sites for these components with sub-zero temperatures prevailing for extended periods of time.

After installation, perform another test run of the system; see section 6.11 **Performing test run**.

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### 6.10.1 Mounting the Saveris base on the wall

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When selecting the location for the Saveris base, please take into account that this must be positioned close enough to the computer used and a possible power supply in accordance with the cabling provided.

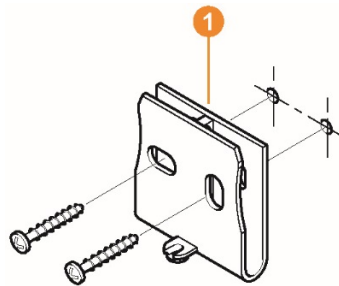
---



The mounting materials (screws, dowels, etc.) are not included in the scope of delivery.

---

- 1 Position wall bracket  at the required location.



- 2 Using a pen, mark the locations for the fastening screws.
- 

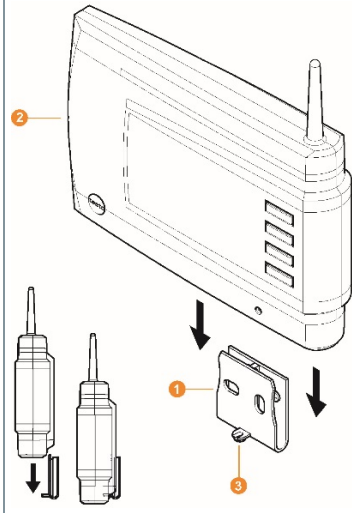


The distance between the fastening screws is 25 mm.

---

- 3 Prepare the fastening location for the attachment in accordance with the material (e.g. drill hole, insert dowel).
  - 4 Fasten wall bracket using appropriate screws.
-

- 5 Place Saveris base **2** on the wall bracket **1** and secure with screw **3**.



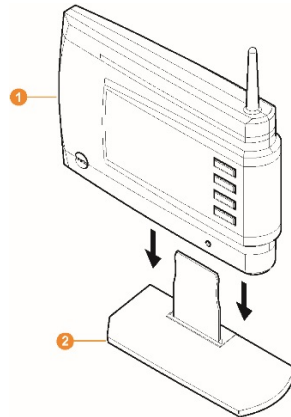
## 6.10.2 Setting up Saveris base with the stand



When selecting the location for the Saveris base, take into account the following points:

- The Saveris base must be on a level, non-slip surface.
- The Saveris base must be positioned close enough to the computer used and a possible power supply in accordance with the cabling provided.

- 1 Place the Saveris base **1** on the stand **2**.



- 2 Set up the Saveris base at the required location.

## 6.10.3 Wall mounting of data loggers

### 6.10.3.1 Wall mounting of T1/T1D/T2/T2D/Pt/PtD/H4D radio data loggers



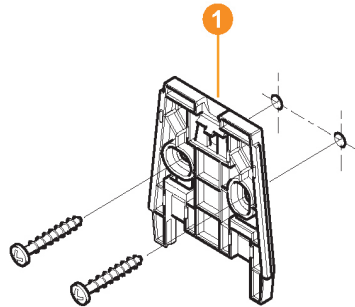
When selecting the location, take into account the following points:

- The range of the radio data logger must not be exceeded.
- Attach the radio data logger in such a way that the readings cannot be falsified, e.g. by exposure to direct solar radiation.



The mounting materials (screws, dowels, etc.) are not included in the scope of delivery.

- 1 Position wall bracket **1** at the required location.



- 2 Using a pen, mark the locations for the fastening screws.



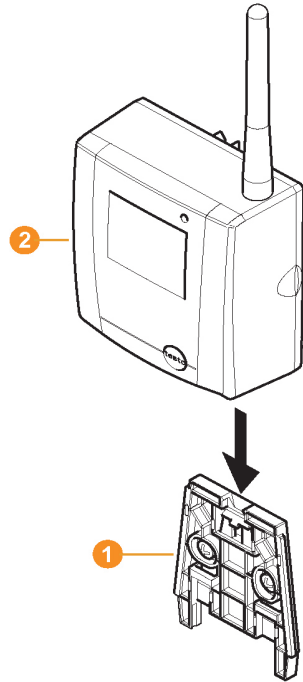
The distance between the fastening screws is 30 mm.

- 3 Prepare the fastening location for the attachment in accordance with the material (e.g. drill hole, insert dowel).
- 4 Fasten wall bracket using appropriate screws.



The wall bracket must be screwed on with the smooth surface facing the wall.

- 5 Push the radio data logger **2** onto the wall bracket **1** until it clicks into place.



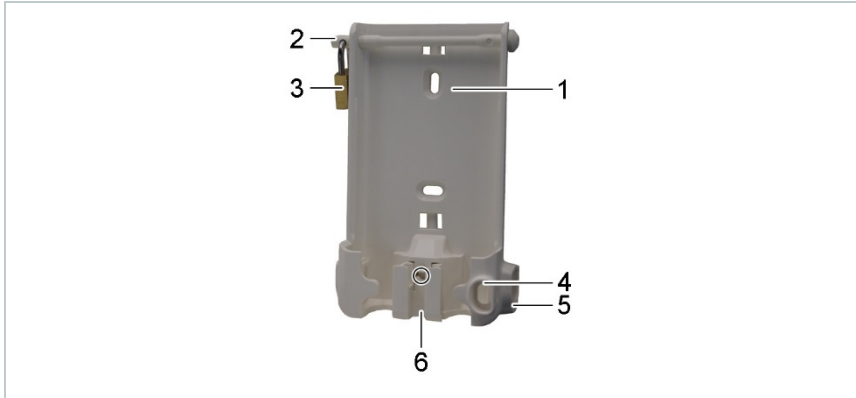
The Saveris T1/T1D/T2/T2D/Pt/PtD/H4D radio data loggers can be protected against impact or high-pressure cleaning with the Saveris protective housing (order no. 0572 0200).

The two halves of the protective housing are force fitted together, even if the screw connection has already been loosened. To loosen them, carefully use a screwdriver on the external screws. Do not damage the surrounding seal in the process.

When assembling the Saveris protective housing, the screws must be tightened and the unassigned connections must be sealed with the supplied plugs to ensure IP protection to IP 69 K.

### 6.10.3.2 Wall mounting of testo Saveris 2 H2 WLAN data loggers

The wall bracket ensures that the WLAN data logger is kept securely in place. Mounting materials are not included in the scope of delivery. Select appropriate mounting materials according to the required mounting location.



(Suitable for: 0572 2035 01)

1	Wall bracket with slots for mounting materials (screws or cable ties)	2	Securing pin
3	Padlock	4	Storage compartment for USB port sealing plug
5	Storage compartment for probe socket sealing plug (left/right)	6	USB cable holder, folding: push down on the spot marked with a circle using a screwdriver and slide cable holder downwards.

### 6.10.3.3 BT Gateway for testo 182 wall mounting

#### Mounting instructions

- The gateway must be positioned in such a way that the ambient conditions do not interfere with the radio signal (WLAN and Bluetooth®). Example: mounting in a highly metallic environment.
- For integration into a local WLAN, a minimum connection strength of 75 db is recommended.
- Live cables can lead to an impairment of the radio signal. The network infrastructure must ensure sufficient compliance with the required wireless standards.

- The maximum range of the reader in free field is at most 30 metres (Bluetooth®).
- The BT Gateway for testo 182 may only be operated inside buildings (protection class IP20).

### Wall mounting

- ✓ Make sure that the USB wireless stick is inserted into USB port 2.

2 Mount BT Gateway for testo 182

Option 1:

- Hang on the wall via the hook eyelet on the bottom of the gateway housing.

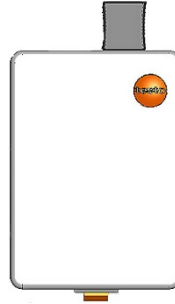
Option 2:

- Mount the top-hat rail (not included in the scope of delivery) and click the Gateway into place on the top-hat rail.

Option 3:

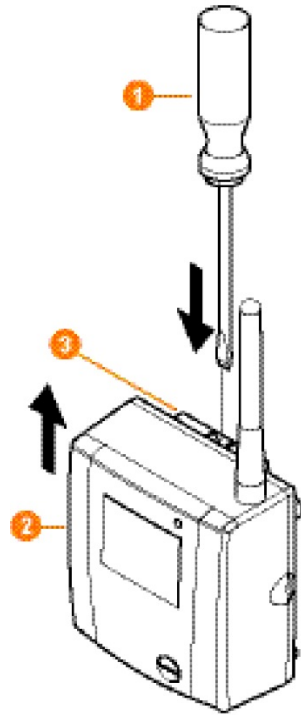
- Use double-sided adhesive tape to attach the Gateway to a clean surface.

3 Carry out the necessary wiring.



### 6.10.3.4 Removing components from the wall bracket

- 1 Using a narrow slotted screwdriver, **1** unlock the data logger **2** on the wall bracket **3**.



- 2 Remove data logger from the wall bracket by moving upwards as shown.

### 6.10.4 Checking the measurement system again

- 1 Perform another test run on the measurement system; see section 6.11 **Performing test run**.



After mounting the hardware, check the system again to test the measurement system is working perfectly.

This enables you to detect whether Saveris radioi data loggers are located outside of the range of the Saveris base, if applicable, or if there is interference to the radio link due to structural conditions.



## 6.11 Performing test run





The test run must be performed to ensure flawless operation of the measurement system.

### 6.11.1 Checking system availability



Wait for the first connection between the Saveris base and the data loggers to check the system availability.

- 1 In the navigation area click on **System**.
- ▶ In the data window, the following inputs are displayed in the tree structure:
  - **Base**
  - **radio data logger**
    -  radio data logger assigned to a stationary zone.
    -  radio data logger assigned to a mobile zone.
  - **Ethernet data logger**
  - **Router**
  - **Cockpit unit**
  - **Extender**
  - **Converter**



An asterisk (\*) after a component indicates that the synchronization of this component with the system is not yet complete (e.g. in the case of configuration changes).

- 2 Open the **radio data logger** input.
- ▶ The active channels of the radio data loggers registered on the system are displayed.
- 3 Click on a channel to open the settings and check the **Radio quality**.
- 4 Repeat step 3 for all other radio data loggers.



If no values have accumulated for a radio data logger for a considerable period of time, check whether a connection exists between the radio data logger and the Saveris base by briefly pressing the connect key on

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the Saveris radio data logger. The LED on the radio data logger displays the connection status.

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### 6.11.2 Performing system test

A simple system test includes the following:

- In the **System** main menu:
  - All data loggers are visible, synchronization of the radio data loggers is complete (none have an asterisk \* after the name)
  - All components have the current firmware version
  - Under operating data: the data logger's last data transfer was punctual
  - The communication statistics of the individual data loggers are good
- In the data view of the zones:
  - No noticeable alarms occurred during the maintenance period
  - In the graphic (selecting individual measuring points), the measuring point selections are regularly incorporated in the measuring cycle - without gaps
- Generate and acknowledge at least one SMS or email alarm
- Wait for an automatic report or create it for test purposes under **Options | System test**
- No open alarms in the overview window
- Where there is regulated user access: authorized employees have access to the system in accordance with their rights
- In the **Tours**<sup>3</sup> main menu:
  - Readings and duration of tours carried out are correctly displayed.
  - A tour blank can be generated from the data of the mobile zones via **[Define tour]** which is displayed under **Tours**.
- On the Saveris cockpit unit:
  - All mobile zones and tour descriptions configured in the software can be selected in the Saveris cockpit unit under **Tour settings**.
  - When the tour is active, limit value violations are shown on the display and indicated via the red LED. They can be acknowledged on the Saveris cockpit unit.
  - Create test printout: All readings are printed out in a 15-minute cycle. Additional lines and signature line appear on the printout as defined in the software in the **System** main menu.



A Saveris base backup is recommended after a successful system test, see section 7.1.2 **testo Saveris base backup**.

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<sup>3</sup> Only for mobile monitoring

# 7 Maintenance

## 7.1 Data backup

### 7.1.1 Creating backup

#### 7.1.1.1 Automatic backup of the Saveris data

The **Backup settings** function enables automatic cross-project backup of the readings which are in the database on a daily basis. The backup files can be imported into a new project using the **Restore database** function.



The destination directory for storage of the backup files must be enabled for network services. Otherwise data backup is **not** possible!



For security reasons, backup files should be saved/archived on a different PC to the Saveris database.

- 1 | On the **System** tab in the **System** main menu, click the **Backup settings** button.
  - ▶ | The **Backup settings** window opens.
- 2 | Activate **Create a daily backup** checkbox.
- 3 | Select destination directory via **Determine folder**.
- 4 | Click on **OK**.

#### 7.1.1.2 Manual backup of the Saveris data

The **Backup database** function enables cross-project backup of the readings which are in the database at any time. The backup files can be imported into a new project using the **Restore database** function.



The destination directory for storage of the backup files must be enabled for network services. Otherwise data backup is **not** possible!



For security reasons, backup files should be saved/archived on a different PC to the Saveris database.

- 1 | On the **System** tab in the System main menu, click the **Database backup** button.
  - ▶ | The **Save as** window opens.

- 2 | Select destination directory.
- 3 | Name file.
- 4 | Click on **Save**.

### 7.1.2 testo Saveris base backup

- ✓ Saveris base is started up and connected to the PC.
- 1 | Launch testo startup wizard.
- 2 | Enter IP address of the Saveris base.
- 3 | Click on the **Projects [Base backup]** tab.
- ▶ **For backup, the base must be restarted** message appears. Do **not** confirm message.
- 4 | Shut down the Saveris base: In the **Info Base** menu, briefly press **[Esc]** twice.
- 5 | Start up the Saveris base: press and hold down **[Esc]**.
- ▶ **Select language** menu appears.



Do not press any other keys on the Saveris base.

- 
- 6 | Confirm **For backup, the base must be restarted** software message with **[OK]**.
  - 7 | Select directory in which the backup file should be saved.
  - 8 | Click on **[Save]**.
  - ▶ \*bi2 file with backup data is saved.



The stored data can only be imported to a Saveris base with the same firmware version. The memory capacity of the target base must be larger than or equal to that of the source base. For memory size, see **Select language** window.

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To transfer the saved data to a Saveris base, please contact Customer Service.

### 7.1.3 Checking the database capacity



- The free Microsoft® SQL Server® 2017 R2 Express database environment is installed as standard with the testo Saveris software.
- The Microsoft® SQL Server® 2017 Express can manage databases up to a size of 10 GB.



- The possible duration of the recording is primarily determined by the measuring rate with a constant number of channels. If the Saveris base, for example, records the data from 20 channels with a measuring cycle of 2 minutes, then the database can save data for much longer than ten years in this configuration.
- Since the testo Saveris software does not generate an alarm when the database is full, the capacity of the database should be checked at regular intervals in the Saveris startup wizard under the **Projects** tab in order to enable the introduction of follow-up measures in good time.  
You can get help with this procedure from our support team.

## 7.2 System settings




In this menu, determine the settings for the Saveris base, the radio data loggers and – if installed in the measurement system – the Ethernet data loggers, Saveris routers, Saveris converters, Saveris analog couplers, Saveris extenders and Saveris cockpit units.

- 1 In the navigation area click on **System**.

- ▶ The following menus are displayed:

**System | Management** menu

Menu function	Description
<b>Projects</b>	Opens the dialogue for selecting a project
<b>Logs</b>	Opens a log file that you can send to our support team in the event of a problem.
<b>System test</b>	Use this function to test individual functions of the Saveris system. Please contact our support team.

<p><b>Database backup</b></p>	<p>Creates a backup file for all projects.</p> <p> Administrator rights are required and the directory where the backup file is to be saved must be enabled for the network service.</p>
<p><b>Restore database</b></p>	<p>Loads the previously saved backup file and thus enables access to the saved project data.</p> <p> Administrator rights and re-installation of the system are required. The startup wizard must not be launched before restoring the database.</p> <ol style="list-style-type: none"> <li>1   Open <b>Saveris Client</b>.</li> <li>2   Select <b>Project</b> in the dialogue and click on <b>[Cancel]</b>.</li> <li>3   Click on <b>Options   Management   Restore database</b>.</li> <li>4   Select the *.bak file containing the database backup.</li> <li>5   In the <b>Find folder</b> dialogue, select the directory for the backup (e.g. c:\Programs\Microsoft SQL Server\MSSQL.1\MSSQL\Data).</li> <li>6   Confirm the following messages with <b>[OK]</b>. The overview window of the projects is only for information purposes. - Database is being recovered.</li> <li>7   Close <b>Saveris Client</b>.</li> </ol>
<p><b>Backup settings</b></p>	<p>Opens the dialogue for configuring the automatic backup.</p> <p> For security reasons, backup files should be saved on a different PC to the Saveris database.</p>

## System | Security menu

Menu function	Description
Permissions	Limits zone access to certain user accounts.
Audit trail	Display, save or export audit trail file.
Hash code	Generates a hash code
Raw data export	Creates a vi2 file for each data logger with all measurement data from the Saveris base (not from the database) for verification of data integrity.

## System | Search menu

Menu function	Description
Search	Opens a search window where you can search through zones and channels using a text word search.

- ▶ In the data area, the following entries are displayed in the tree structure:
- **Base** with the general settings of the Saveris base and of the SMS module (if present), along with the operating data of the radio data loggers
  - **Radio data loggers** with the settings for the radio data loggers or wireless analog couplers which are registered on the Saveris base. Radio data loggers which are assigned to a mobile zone are marked with a tyre symbol.
  - **Ethernet data loggers** with the settings for the Ethernet data loggers or Ethernet analog couplers which are registered on the Saveris base.
  - **Routers** with the settings for the routers which are registered on the Saveris base.
  - **Converters** with the settings for the converters which are registered on the Saveris base.
  - **Extenders** with the settings for the extenders which are registered on the Saveris base.
  - **Cockpit units** with the settings for the cockpit units which are registered on the Saveris base.

## 7.3 Replacing components

You can shut down a component – Saveris radio data logger, Saveris converter or Saveris router – at any time, because it is temporarily not being used or, for example, in order to replace it with a new component in the event of a defect.

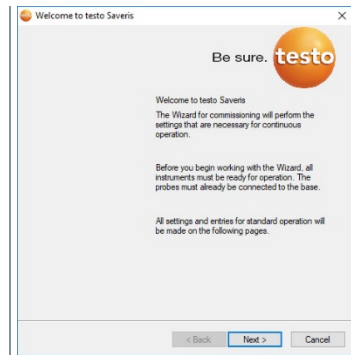


If the Saveris base is replaced, a new project must be created. If necessary, contact our support team.

### 7.3.1 Deleting components

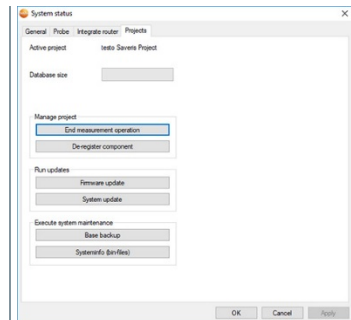
- 1 Under **Start | All programs | Testo**, click on **Testo Saveris startup wizard**.

- ▶ The welcome dialogue for the startup wizard is displayed.



- 2 Click on **[Next >]**.

- ▶ The **System status** dialogue is displayed with the **General** tab.

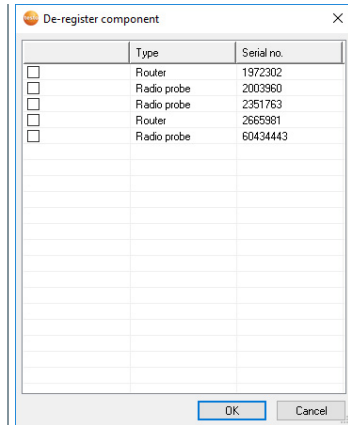


- 3 Switch to the **Projects** tab.



4 Click on **[De-register component]**.

▶ The **De-register component** dialogue is displayed.



5 Activate the checkbox in front of the component that needs to be de-registered from the system.



Before deleting a Saveris router, you should assign the assigned Saveris radio data loggers directly to the Saveris base to ensure data availability.

6 Click on **[OK]**.

▶ A prompt to remove the component from the configuration is displayed.

7 Confirm the prompt with **[Yes]**.

▶ The component is deleted from the configuration.

8 After deleting a probe, briefly press the Connect key on the rear of the Saveris radio data logger, so that the Saveris radio data logger no longer attempts to transmit measurement data.

## 7.3.2 Adding new components

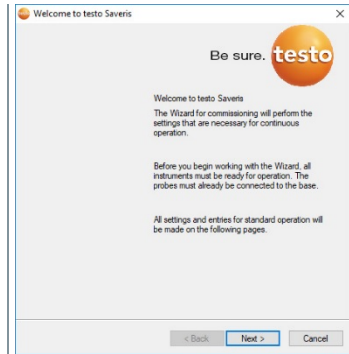


With the subsequent addition of a component, it may be the case that the measuring cycle is not synchronous with that of the components already present.

This results in readings seeming to be missing in the table view if readings are not input from all Saveris data loggers at a point in time.

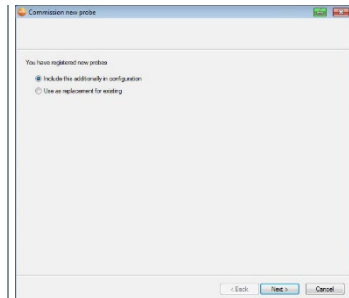
- 1 Register new Saveris radio data logger on the Saveris base.
- 2 Launch testo Saveris startup wizard.

- ▶ The startup wizard launches.



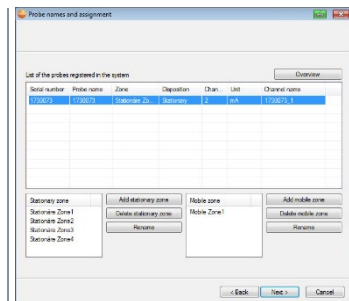
- 3 Click on [Next >].


- ▶ The **Commission new probe** dialog box is displayed.



- 4 Leave default setting and click on [Next >].

- ▶ The list of the Saveris radio data loggers recently registered on the Saveris base is shown.



- 5 To distribute the Saveris radio data loggers already registered on the system to stationary or mobile zones (for Saveris mobile) according to their purpose: click on **[Add stationary zone]** or **[Add mobile zone]**.
- 6 Open the selection list via the  button and select the zone which the Saveris WiFi data logger should be assigned to.



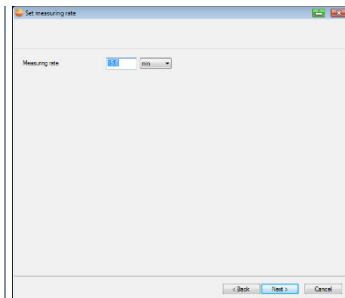
All channels of a Saveris radio data logger must be assigned to the same zone.

- 7 Click on **[Next >]**.
- 8 Click in the **TC type** field and enter the thermocouple element type (**K**, **J**, **T** or **S**) if this information is necessary for the instrument.
- 9 If required, change the default values in the **Logger name** and **Channel name** fields.



Assign channel names that are not longer than 20 characters.

- 10 Click on **[Next >]**.
  - ▶ The settings for the measuring cycle are displayed.



- 11 Enter **Measuring cycle** and define the **unit** for it.



The measuring cycle determines the intervals at which a new reading is saved in the Saveris base.

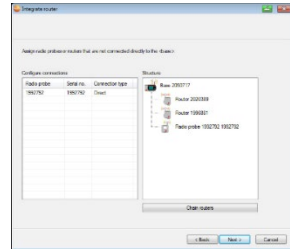
Possible settings for the unit:

- **sec** (second)
- **min** (minute)
- **h** (hour).

The smallest transfer rate for Saveris radio data loggers is one minute.

12 Click on **[Next >]**.

- ▶ If a Saveris router is registered on the Saveris base, the configuration of the connection type for the Saveris radio data loggers is shown.  
If you have not registered a Saveris router, continue as from step 17.



13 Click in the **Connection type** cell of the Saveris radio data logger which needs to be assigned to a Saveris router.

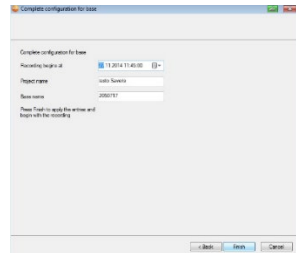
- ▶ The cell is shown as a selection list.

14 Use the  button to open the selection list and select the Saveris router which the Saveris radio data logger needs to be assigned to.

15 Perform steps 13 and 14 for all other Saveris radio data loggers with measurement data that need to be transmitted to the Saveris base via a Saveris router.

16 Click on **[Next >]**.

- ▶ The wizard is displayed with the setting for the start of measurement.



17 Postpone start of measurement if necessary.

18 Click on **[Finish]** to complete the commissioning of the hardware.

- ▶ A message about the successful configuration of the hardware is displayed.

19 Confirm the message by clicking **[OK]**.

- ▶ The new hardware is now ready for operation.

### 7.3.3 Re-registering components

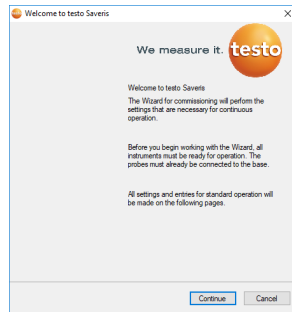


When re-registering components which were already registered in the current project, readings can be updated in the existing data column of the reading table or a new reading column can be set up.

1 Register new data logger on the Saveris base.

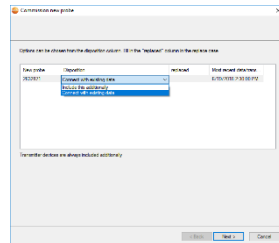
2 Launch testo Saveris startup wizard.

▶ The startup wizard launches.



3 Click on **[Next >]**.

▶ The software automatically detects whether the data logger was already registered and opens the **Commission New Probe** dialogue.



4 Select **Include this additionally** when the data logger's readings need to be displayed in a separate data column, or

5 In the **Disposition** column, select **Connect with existing data** if the data logger's readings need to be updated in the existing data column. In the "Last data transmission" column, you will see when this radio data logger had last transmitted data to the Saveris base before it was de-registered.



Further configuration is carried out in exactly the same way as section 7.3.2 **Adding new components**.

## 7.4 Calibration and adjustment

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### Calibration

Is the comparison of a reading with the correct value under specified conditions. This includes documentation of the deviation, calculation of the measurement uncertainty and creation of the certificate. Calibration does not include adjusting the measuring instrument.

### Adjustment

A measuring instrument is used to measure a correct, known value (confirmed by a superordinate body). The instrument is then adjusted to this value.

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All Saveris data loggers are adjusted in the factory, which is confirmed by the corresponding adjustment report. Calibration certificates can be ordered separately.

For consistently reliable data, we recommend carrying out data logger calibration and, if necessary, adjustment at regular intervals, e.g. once a year. This can be carried out on or off site.

### 7.4.1 On-site calibration and adjustment

The Saveris adjustment software (order no. 0572 0183) is required for this.

Advantages: calibration while the system is running and easy documentation by adding a note, along with importing of adjustment data

Disadvantages: accuracy or comparability of the reference system's measurement data.

After successful correction, the current adjustment data are stored in the data logger. At the same time, the adjustment software generates an adjustment file that can be imported into the testo Saveris software.



Ensure that an external humidity probe always remains attached to the Saveris radio or Saveris Ethernet data logger with which it was adjusted. Does not concern the testo Saveris 2 H2 data loggers.

### 7.4.2 External calibration and adjustment

Advantages: accuracy, through separate measurement as per a suitable calibration standard, e.g. in a climate cabinet.

Disadvantages: Saveris data logger must be removed from the system which is in operation.

Two different procedures may be used to carry out external calibration and adjustment.

This involves the Saveris data logger removed from the system not being replaced and no measurement data being recorded during the calibration and adjustment.

- 1 Press the connect key on the Saveris data logger once to enforce a final data transmission.
- 2 Send the Saveris data logger to the calibration laboratory, without removing it as a component in the startup wizard.
- 3 When the **Missing data logger connection** system alarm appears, acknowledge this once.
- 4 Once the Saveris data logger comes back following calibration, link it back up with the Saveris base or the Saveris converter.
- 5 The Saveris data logger automatically acquires its former configuration data and continues measuring.

## 7.5 Changing batteries

### 7.5.1 Changing the Saveris base batteries



The battery in the Saveris base is a wearing part which has to be replaced after approx. 2 years.

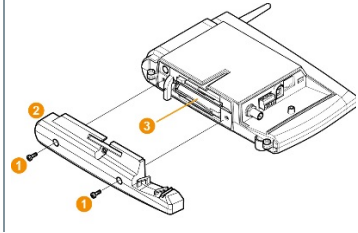
If the battery is faulty, it is not possible to guarantee full operability of the GSM module. In the event of a power failure, data loss cannot be ruled out for all components.

As soon as a component's battery is no longer fully functional, it triggers a **Defective battery** system alarm.

The battery (order no. 0515 5021) should then be replaced immediately to ensure full functionality and data security.

- 1 Switch off the Saveris base (with the **Info Base** view selected, press **[ESC]** briefly twice).
- 2 Disconnect Saveris base from the power supply.

- 3 Undo screw connection ① and remove base plate ② from the Saveris base.



- 4 Change battery ③.
- 5 Place the base plate on the Saveris base and screw it down.
- 6 Plug the Saveris base into the power supply.
- 7 Switch on Saveris base (hold down [ESC]).
  - ▶ Language selection appears.
- 8 Select the required language (press [Enter]).
  - ▶ Saveris base starts up and is ready for operation.

### 7.5.2 Changing the Saveris radio data logger batteries



Replace the batteries after 3 years of operation at the latest.



The battery life (with a measuring cycle of 15 minutes) is

- 3 years with standard AIMn batteries at +25°C and
- 3 years with Energizer batteries L91 photo lithium for freezer applications (for operation below -10°C).

You can check the status of the Saveris data logger's batteries via the testo Saveris software. To do this, select the Saveris data logger you would like to test under **System | radio data logger**. The current charge status is displayed for you in the **Battery status** field.

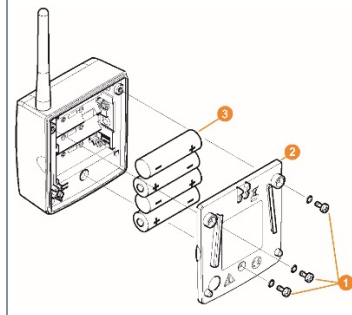
- 1 Remove Saveris data logger from the wall bracket; see section 6.10.4.3 **Removing components from the wall bracket**.



The Saveris data logger must be at room temperature when the batteries are changed, as otherwise a build-up of moisture may impair the measuring accuracy.



- 2 Undo screws **1** on the rear of the Saveris data logger.



- 3 Remove housing cover of the Saveris data logger **2**.
- 4 Change batteries **3**.



Ensure that you insert the batteries correctly.  
The correct polarity is illustrated in the respective battery compartment.

- 5 Place housing cover on the housing of the Saveris data logger.
- 6 Screw cover tightly onto the housing.



A control switch is located in the housing which is actuated through the cover. To this end, the cover must be screwed to the housing of the Saveris data logger without any gap.

If the control switch is not actuated through the cover, the Saveris data logger cannot be operated.

### **⚠ CAUTION**

#### **Unwanted residual discharge when disposing of old batteries.**

Mask the poles of the old batteries in order to prevent an unintended residual discharge due to short-circuits during disposal.



Transport tip: If the Saveris data loggers are to be sent via air freight, the batteries must be removed beforehand to avoid inadvertent radio communication.

### 7.5.2.1 Changing the Saveris Ethernet data logger / Saveris analog coupler batteries



The batteries in the Saveris Ethernet data loggers and the Saveris analog couplers are wearing parts which have to be replaced after approx. 2 years.

In the event of a power failure, data loss cannot be ruled out for all components.

As soon as a component's batteries are no longer fully functional, it triggers a **Defective battery** system alarm.

The batteries (order no. 0515 5021) should then be replaced immediately to ensure full functionality and data security.



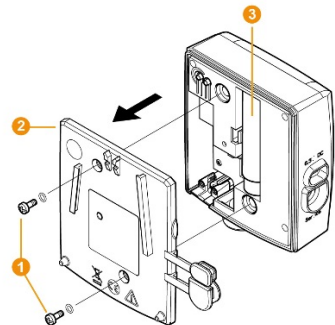
While the batteries are being replaced, no readings can be recorded.

- 1 Remove component from the wall bracket; see section 6.10.4.3 **Removing components from the wall bracket.**



The component must be at room temperature when the batteries are changed, as otherwise a build-up of moisture may impair the measuring accuracy.

- 2 Disconnect the component from the power supply (mains plug / 24 V AC/DC plug-in/screw terminal / Ethernet cable (PoE)).
- 3 Undo screws **1** on the rear.



- 4 Remove housing cover **2**.
- 5 Change batteries **3**.
- 6 Place cover on the housing.

- 7 | Screw cover tightly onto the housing.
  - 8 | Restore the power supply to the component (mains plug / 24 V AC/DC plug-in/screw terminal / Ethernet cable (PoE)).
- ▶ Component is ready for operation.



A control switch is located in the housing which is actuated through the cover. The cover must be screwed to the housing without a gap.

If the control switch is not actuated through the cover, the component cannot be operated.

## 7.6 Update



- To make the most of the performance of the testo Saveris measurement data monitoring system, the system should be updated regularly.
- Software and firmware updates should always be carried out together. In this respect, always begin with the software update for updates to versions up to 4.2. Always begin with the firmware update for updates to versions 4.3 and above.

### 7.6.1 Carrying out software update



- The Saveris measurement and configuration data are retained during this process, as they are stored on the SQL Server®.
- If MAPI or SMTP Mail is installed, the settings should be documented in the registry under HKeylocalmachine\software\testo\comsoft\tdasmail and the email components under software should be uninstalled before the Saveris server uninstallation and reinstalled after the Saveris server installation.
- If the storage path for your automated reports have been updated in the registry, these settings should be updated again in the registry.
- After a testo Saveris CFR software update, the security settings in the software must be reconfigured. To do this, please remove the old configuration settings, close the software, open it again and execute the security settings in the 3 Testo groups again.

Uninstall the older version of the Saveris Client (CFR version) without uninstalling the database and then install the current server.

### 7.6.1.1 Uninstalling software

- 1 In Windows, switch to **System control - Programs and functions**.
  - 2 In **Programs and functions**, click on **Testo Saveris Professional server**.
  - 3 Right mouse click and select **Uninstall**.
  - 4 Confirm dialogue window with **Yes**.
- ▶ The software is uninstalled
- 5 Restart the PC.

### 7.6.1.2 Installing software

- 1 Switch to the **Testo Saveris Prerequisites** directory on the Saveris CD.
  - 2 Run the **setup.exe** file.
  - 3 Restart the PC.
- ▶ Software has been updated.



If you are not carrying out the update from a CD but rather from a downloaded directory, copy the TestoSaverisPrerequisites directly under a root directory (e.g. C:\ or D:\) for this, so that the call-up path of the setup file is as follows: C:\TestoSaverisPrerequisites or D:\TestoSaverisPrerequisites.

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### 7.6.1.3 Installing server

- 1 Switch to the **TestoSaverisServer** directory on the Saveris CD or in the directory tree.
  - 2 Run the **setup.exe** file.
  - 3 Restart the PC.
- ▶ Server has been updated.

## 7.6.2 Performing firmware system update



The firmware system update enables all Saveris components (with the exception of the Saveris cockpit unit) in your system to be automatically updated to the latest firmware version. This ensures that all components in your system have the current firmware version. Please note that a firmware update of Saveris cockpit units must be carried out separately.

### Important information on the firmware system update

- Please note that two firmware system updates (**V1.X and V2.X**) are available with the testo Saveris measurement data monitoring system. First check exactly which firmware update is valid for your system. You can check the compatibility of the firmware versions via the order number on your Saveris base's type plate
  - **Firmware system update V1.X**  
valid for testo Saveris systems with Saveris base order no. 0572 0120, 0572 0121, 0572 0160, 0572 0161
  - **Firmware system update V2.X**  
valid for testo Saveris systems with base order no. 0572 0220, 0572 0221, 0572 0260, 0572 0261
- The time taken for the firmware system update depends on the number of Saveris components in the system. Automatic distribution of the firmware to:
  - **Saveris converters and Saveris extenders** require at least 3 minutes for the standard communication cycle + 2 minutes per component.
  - **Saveris Ethernet data loggers** require at least 3 minutes for the standard communication cycle + 2 minutes per component.
  - **Saveris routers** require at least 6.5 hours (all registered routers are updated in parallel).
  - **Saveris radio data loggers** in stationary use require at least 16 hours (all registered Saveris radio data loggers are updated in parallel).
- The Saveris base must be connected to the computer via USB or Ethernet cable.
- All Saveris components must have at least firmware version 1.12 for the update. System components with firmware version < V 1.12 can only be updated via service interface.
- For an update to version 4.6 SP1, the components must have the following firmware version as a minimum requirement:
  - For V1.x systems: testo Saveris software 4.6 SP1, Saveris base and Saveris radio data logger V1.90, Saveris router, Saveris converter and Saveris extender V2.59, Saveris Ethernet data logger V1.47
  - For V2.x systems: testo Saveris software 4.6 SP1, Saveris base and Saveris radio data logger V2.59, Saveris router, Saveris converter and Saveris extender V2.59, Saveris Ethernet data logger V1.47

## 7 Maintenance

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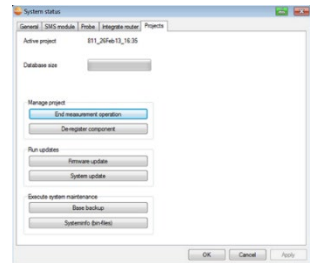
- You must acknowledge all outstanding alarms before a firmware system update.
- **ATTENTION:** During the firmware update process, never disconnect the power supply/network supply or the PC connection.
- During the update, measurements, data storage and data communication are continued so there is no data loss.
- Configuration changes during the firmware system update should not be carried out to ensure the process is not slowed down.
- Since there is heavy radio traffic during the update, alarms relating to interrupted radio links may occur temporarily.
- Once a probe has been updated, the reboot phase takes approx. 1-2 minutes. During this brief time, no readings can be recorded.



Please note that the entire update process may take several hours. During this time, no configuration changes or network/power supply interruptions should occur.

1 | Unpack the firmware file folder and save it to your PC.

2 | Open the **Saveris Start-up Wizard** and click on the **System update** button in the **Projects** tab.



▶ | A Windows® Explorer **Find folder** window opens.

3 | Select the destination directory where you saved the downloaded file folder.

4 | Confirm with **[OK]**.

▶ | **The process has been completed successfully** message is displayed after approx. 1 min.

5 | Confirm with **[OK]**.

▶ | The Saveris startup wizard closes automatically.

▶ | The firmware update for the Saveris base is installed.

- 6 The update process is completed as soon as the Saveris base starts up again and **Select language** appears in the menu.
  - 7 Select the language on the Saveris base and confirm this with **[Enter]** or
    - 7.1 Wait approx. 10 minutes until the Saveris base automatically starts up.
- ▶ The Saveris base firmware has been updated.
  - ▶ The update process for all other Saveris components in the system begins.



After the system update, the new firmware version is shown for each component in the Saveris software under the System menu item. The firmware version view is only updated when the software is restarted.

### 7.6.3 Carrying out a testo Saveris cockpit unit firmware update

- Before a firmware update, all outstanding alarms must be acknowledged on the Saveris cockpit unit.
- End any tours that are running on the Saveris cockpit unit.
- Disconnect the cockpit unit from the power supply and switch it off, or wait until it switches off automatically.
  - 1 Plug the USB cable into the Saveris cockpit unit.
  - 2 Press and hold down the Scroll up button on the Saveris cockpit unit.
  - 3 Connect to a PC/notebook using the USB cable.
    - ▶ Status LED on the Saveris cockpit unit lights up red.
    - ▶ The cockpit unit is displayed as a removable medium (**FWUPDATE**) in Windows® Explorer.
  - 4 Release the Scroll up button on the Saveris cockpit unit.

- 5 | Open Windows® Explorer and click on **FWUPDATE**.
  - 6 | Remove the file included under **FWUPDATE**.
  - 7 | Switch to the destination directory where you saved the new firmware file you downloaded.
  - 8 | Copy the new firmware file of the Saveris cockpit unit into the **FWUPDATE** directory.
- ▶ The Saveris cockpit unit firmware update is completed.



## 8 Technical data

### 8.1 testo Saveris base

Feature	Value
Memory	40,000 values per channel (total max. 18,000,000 values)
Dimensions	225 x 150 x 49 mm
Weight	Approx. 1510 g
Protection class	IP42
Housing material	Die-cast zinc / plastic
Radio frequency	868 MHz / 2.4 GHz
Power supply	6.3 V DC mains unit; alternatively via 24 V AC/DC plug-in/screw terminals, power consumption < 4 W.
Batteries <sup>4</sup>	Li-ion rechargeable battery The battery is used only for backing up data and for an emergency SMS in the event of a failure of the power supply, not for power supply during operation.
Operating temperature	+5 to +45°C
Storage temperature	-20 to +60°C
Display	Graphical LCD, 4 control keys
Interfaces	USB, radio, Ethernet
Number of Saveris radio data loggers	Max. 15 probes can be connected directly via radio interfaces, Max. 150 in total via radio / router / converter / extender and Ethernet, Max. 450 channels.
Alarm relay	Max. 1 A, max. 30 W, max. 60/25 V DC/AC, NC or NO contact
GSM module	850 / 900 / 1800 / 1900 MHz
Mounting	Table base and wall bracket included

<sup>4</sup> Wearing part

## 8.2 Radio data loggers for testo Saveris

### 8.2.1 General

The technical data specified in the following table are valid for all Saveris radio data loggers. Special data for the individual data logger types can be found in the following sections.

Feature	Value
Housing dimensions (W x H x D)	80 x 85 x 38 mm
Antenna length	81 mm
Weight	Approx. 220 g
Type of batteries	4 AA batteries
Battery life	Typical values with a 15-minute measuring cycle: 3 years at +25°C 3 years with Energizer L91 photo lithium batteries for freezer applications
Housing material	Plastic
Radio frequency	868 MHz / 2.4 GHz
Measuring cycle	Standard 15 min (can be set from 1 min up to 24 h)
Storage temperature	-40 to +55°C (including batteries)
Display (optional)	2-line LCD; 7 segments with symbols
Transmission distance	Approx. 300 m with no obstructions at 868 MHz, Approx. 100 m with no obstructions at 2.4 GHz
Wall bracket	Included

### 8.2.2 testo Saveris T1 / T1D



Feature	Value
Probe type	NTC
Measuring range	-35 to +50°C
Accuracy	±0.4°C (-25 to +50°C) ± 0.8°C (remaining measuring range)
Resolution	0.1°C

Feature	Value
Protection class	IP68
Conformity with standards	DIN EN 12830
Operating temperature	-35 to +50°C

### 8.2.3 testo Saveris T2 / T2D

Saveris radio data logger with external probe connection and internal NTC, door contact.



Feature	Value
Probe type (internal)	NTC
Measuring range (internal)	-35 to +50°C
Accuracy (internal)	±0.4°C (-25 to +50°C) ± 0.8°C (remaining measuring range)
Resolution (internal)	0.1°C
Probe type (external)	NTC
Measuring range (external)	-50 to +150°C
Accuracy (external)	±0.2°C (-25 to +70°C) ± 0.4°C (remaining measuring range)
Resolution (external)	0.1°C
Connection	NTC via mini-DIN socket, door contact connection cable included in the scope of delivery (1.80 m). The setting of the door contact switch affects the service life.
Protection class	IP68 (with probe inserted or connection socket sealed with rubber plug)
Conformity with standards	DIN EN 12830
Operating temperature	-35 to +50°C

### 8.2.4 testo Saveris T3 / T3D

2-channel radio data logger with two external TC probe connections (TC characteristics can be selected).



Feature	Value
Probe type	TC
Measuring range	
TC type J	-100 to +750°C
TC type K	-195 to +1350°C
TC type S	0 to +1760°C
TC type T	-200 to +400°C
Accuracy	±0.5°C or 0.5% of measured value (25°C)
Resolution	0.1°C / TC type S 1°C
Connection	2 TCs via TC socket, max. difference in potential 2 V
Protection class	IP 54 (with probe inserted or connection socket sealed with rubber plug)
Operating temperature	-20 to +50°C



The probe inputs are not galvanically isolated from one another. Take this into account when using probes with a non-isolated thermocouple.

### 8.2.5 testo Saveris Pt / PtD

Radio data logger with an external Pt100 probe connection.



Feature	Value
Probe type	Pt100
Measuring range	-200 to +600°C

Feature	Value
Accuracy	±0.1°C (0 to +60°C) ±0.2°C (-100 to +200°C) ±0.5°C (remaining measuring range) at 25°C
Resolution	0.01°C
Connection	1 x Pt100 via mini-DIN socket
Protection class	IP 68
Operating temperature	-20 to +50°C

## 8.2.6 testo Saveris H3 / H3D

Humidity radio data logger



Feature	Value	
Probe type	NTC	Humidity sensor
Measuring range	-20 to +50°C	0 to 100% RH <sup>5</sup>
Accuracy	±0.5°C	±3% RH at +25°C ±0.03% RH/K ±1 digit
Resolution	0.1°C / 0.1°Ctd	0.1%
Protection class	IP 42	
Operating temperature	-20 to +50°C	

<sup>5</sup> Not for condensing atmospheres. For constant use in high humidity (>80% RH at ≤30°C for >12 h, >60% RH at >30°C for >12 h), please contact us at [www.testo.com](http://www.testo.com)

## 8.2.7 testo Saveris H2D

Humidity radio data logger



Feature	Value	
Probe type	Humidity sensor	NTC
Measuring range	0 to 100% RH	-20 to +50°C
Accuracy	<90% RH: ±2% RH at +25°C >90% RH: ±3% RH at +25°C ±0.03% RH/K ±1 digit	±0.5°C
Resolution	0.1% / 0.1°Ctd	0.1°C
Protection class	IP 54	
Weight	Approx. 256 g	

## 8.2.8 testo Saveris H4D

Humidity radio data logger



Feature	Value	
Probe type	Humidity sensor	NTC
Measuring range	0 to 100% RH	-20 to +70°C
Accuracy	See external probes	±0.2°C
Resolution	0.1% / 0.1°Ctd	0.1°C
Protection class	IP 54	
Weight	Approx. 254 g	
Connection	1 x humidity/temperature probe (∅ 12 mm or ∅ 4 mm) via mini-DIN socket	

## 8.2.9 testo Saveris 2 H2

WLAN data logger

Feature	Value
Sensor type	1 x NTC / humidity external
Measuring range	Probe-specific

Feature	Value
Accuracy $\pm 1$ digit	Probe-specific
Resolution	0.1% / 0.1°C
Operating temperature	-30 to +50°C
Storage temperature (including batteries)	-40 to +70°C
Protection class	IP 54
Measuring cycle	1 min to 24 h (15 minutes default)
Communication cycle	1 min to 24 h (15 minutes default)
Memory	10,000 readings / channel
Battery life	24 months (typical value, depending on the WLAN infrastructure) at +25°C, 15-minute measuring cycle, 15-minute communication cycle at -30°C and 15-minute measuring cycle, 15-minute communication cycle (with Energizer batteries 0515 0572)
Power supply	4 x AA AIMn batteries Mains unit optional for temperatures below -10°C please use Energizer batteries 0515 0572.
Dimensions	95 x 75 x 30.5 mm
Weight (including batteries)	Approx. 240 g
EN 12830-compliant	No
Door contact	No
Wall bracket	Included in the scope of delivery

#### External probes (digital) for testo Saveris 2 H2

Feature	0572 2162	0572 2163 <sup>6</sup>	0572 2164	0572 2165
Measurement parameters	°C/°F		°C/°F, %RH (+ °Ctd, g/m3)	
Operating temperature	-30 to +50 °C (86 to 122 °F)			
Storage temperature	-30 to +60 °C (86 to 140 °F)			
Measuring range	-30 to +50 °C (86 to 122 °F)	-85 to +150 °C <sup>7</sup> (185 to 302 °F)	-30 to +50 °C (86 to 122 °F)/0 to 100% RH (non-condensing)	
System accuracy	$\pm 0.5$ °C	$\pm(0,25$ °C (0.5 °F) + 0,3% of m.v.)	$\pm 0,5$ °C (1 °F) $\pm 2,0$ %rF for 0 to 90 %RH at 25 °C (77 °F)	
Resolution	0.1 °C	0,01	0.1 °C / 0.1 %RH	

<sup>6</sup> Pt100 accuracy class A.

<sup>7</sup> Temperature range applies to the sensor tip as well as the cable of the Pt100 probe. In the case of the TUC connector, the temperature range specified as „operating temperature“ applies.

## 8 Technical data

Feature	0572 2162	0572 2163 <sup>8</sup>	0572 2164	0572 2165
Temperature coefficient = type (k=1)			± 0.03 %RH/K	
Dimensions (l*w*h in mm)	Length: 120 mm Ø: 20 mm	Length: 90 mm Ø: 3 mm	Length: 105 mm / Ø: 12 mm	
Ø cable		5 mm		5 mm
Cable length		1.3 m		1.3 m
Protection class (in the data logger/probe system)	IP 42			
Weight	17.2 g	23.8 g	17.4 g	40.8 g

## 8.3 Ethernet data loggers for testo Saveris

### 8.3.1 General

The technical data specified in the following table are valid for all Saveris Ethernet data loggers. Special data for the individual data logger types can be found in the following sections.

Feature	Value
Housing dimensions (W x H x D)	85 x 100 x 38 mm
Power supply	6.3 V DC mains unit; alternatively via 24 V AC/DC plug-in/screw terminals, PoE
Buffer rechargeable battery <sup>8</sup>	Li-ion
Housing material	Plastic
Protection class	IP54
Measuring cycle	2 sec to 24 h
Operating temperature	+5 to +45°C
Display (optional)	2-line LCD; 7 segments with symbols
Wall bracket	Included
Power consumption	PoE class 0 (typically ≤ 3 W)

<sup>8</sup> Wearing part



### 8.3.2 testo Saveris PtE

Ethernet data logger with external Pt100 probe connection.



Feature	Value
Probe type	Pt100
Measuring range	-200 to +600°C
Accuracy	±0.1°C (0 to +60°C) ±0.2°C (-100 to +200°C) ± 0.5°C (remaining measuring range) at 25°C
Resolution	0.01°C
Connection	Mini-DIN service interface is accessible externally 1 x Pt100 via mini-DIN socket
Weight	Approx. 220 g

### 8.3.3 testo Saveris T1E

Ethernet data logger with external NTC probe connection



Feature	Value
Probe type	NTC
Measuring range	-50 to +150°C
Accuracy	±0.2°C (-25 to +70°C) ± 0.4°C (remaining measuring range)
Resolution	0.1°C
Connection	Mini-DIN service interface is accessible externally 1 x NTC via mini-DIN socket
Weight	Approx. 220 g

### 8.3.4 testo Saveris H4E

Humidity Ethernet data logger



Feature	Value	
Probe type	Humidity sensor	NTC
Measuring range	0 to 100% RH <sup>9</sup>	-20 to +70°C
Accuracy	See external probe	±0.2°C
Resolution	0.1% / 0.1°Ctd	0.1°C
Protection class	IP 54	
Weight	Approx. 254 g	
Connection	1 x humidity/temperature probe (∅ 12 mm or ∅ 4 mm) via mini-DIN socket	

### 8.3.5 External probes

Feature	Value	
Probe type	Humidity/temperature probe ∅ 12 mm	Humidity/temperature probe ∅ 4 mm
Measuring range	-20 to +70°C 0 to +100% RH	0 to +40°C 0 to +100% RH
Accuracy	±0.3°C ±2% RH at +25°C (2 to 98% RH) ±0.03% RH/K ±1 digit	±0.3°C ±2% RH at +25°C (2 to 98% RH) ±0.08% RH/K ±1 digit

<sup>9</sup> Not for condensing atmospheres. For constant use in high humidity (>80% RH at ≤30°C for >12 h, >60% RH at >30°C for >12 h), please contact us at [www.testo.com](http://www.testo.com)

### 8.3.6 testo Saveris T4E

4-channel Ethernet data logger with 4 external TC probe connections.



Feature	Value
Probe type	TC
Measuring range	
TC type S	0 to +1760°C
TC type T	-200 to +400°C
TC type J	-100 to +750°C
TC type K	-195 to +1350°C
Accuracy	±0.5°C or 0.5% of measured value
Resolution	0.1°C / TC type S 1°C
Connection	Mini-DIN service interface is accessible externally 4 x TCs via TC socket max. difference in potential 50 V
Weight	Approx. 220 g



The technical data refer to the data logger in a stable, stationary operating mode. To obtain a stable measurement, the data logger must have been in operation for one to two hours.



The use of isolated thermocouples is recommended for supplying the Ethernet data logger. Otherwise discrepancies in readings of up to 0.6°C may occur due to leakage flows.

### 8.3.7 testo Saveris H2E

Humidity Ethernet data logger 2%



Feature	Value	
Probe type	Humidity sensor	NTC
Measuring range	0 to 100% RH <sup>10</sup>	-20 to +70°C

<sup>10</sup> Not for condensing atmospheres. For constant use in high humidity (>80% RH at ≤30°C for >12 h, >60% RH at >30°C for >12 h), please contact us at [www.testo.com](http://www.testo.com)

Feature	Value	
Accuracy	<90% RH: $\pm 2\%$ RH at +25°C >90% RH: $\pm 3\%$ RH at +25°C $\pm 0.03\%$ RH/K $\pm 1$ digit	$\pm 0.5^\circ\text{C}$
Resolution	0.1% RH / 0.1°Ctd	0.1°C
Connection	Mini-DIN service interface is accessible externally	
Weight	Approx. 230 g	

### 8.3.8 testo Saveris H1E

Humidity Ethernet data logger 1%



Feature	Value	
Probe type	Humidity sensor	NTC
Measuring range	0 to 100% RH <sup>11</sup>	-20 to +70°C
Accuracy	< 90% RH: $\pm 1\%$ RH (+0.7% of measured value) at 25°C > 90% RH: $\pm 1.4\%$ RH (+0.7% of measured value) at 25°C $\pm 0.03\%$ RH/ K $\pm 1$ digit	$\pm 0.2^\circ\text{C}$ (0 to +30°C) $\pm 0.5^\circ\text{C}$ (remaining measuring range)
Resolution	0.1% RH / 0.1°Ctd	0.1°C
Connection	Mini-DIN service interface is accessible externally	
Weight	Approx. 230 g	

<sup>11</sup> Not for condensing atmospheres. For constant use in high humidity (>80% RH at  $\leq 30^\circ\text{C}$  for >12 h, >60% RH at  $> 30^\circ\text{C}$  for >12 h), please contact us at [www.testo.com](http://www.testo.com)

## 8.4 Analog couplers for testo Saveris

### 8.4.1 Saveris wireless analog coupler U1



Feature	Value
Measuring range	2-wire: 4 to 20 mA 4-wire: 0/4 to 20 mA, 0 to 1/5/10 V
Accuracy / resolution (max. 15 bit / typ. 12 bit)	Current accuracy: $\pm 0.03$ mA (min. $0.75$ $\mu$ A / typ. $5$ $\mu$ A) Voltage 0 to 1 V $\pm 1.5$ mV (min. $39$ $\mu$ V / typ. $250$ $\mu$ V) Voltage 0 to 5 V $\pm 7.5$ mV (min. $0.17$ mV / typ. $1.25$ mV) Voltage 0 to 10 V $\pm 15$ mV (min. $0.34$ mV / typ. $2.50$ mV) $\pm 0.02\%$ of m.v. / K (deviation from nominal temperature $22^{\circ}$ C)
Input	2- or 4-conductor current/voltage input
Channels	1 channel
Max. load (24 V DC)	$160$ $\Omega$
Protection class	IP54
Power supply	Mains unit $6.3$ V DC, 20 to 30 V DC max. 25 V AC
Buffer rechargeable battery <sup>12</sup>	Li-ion
Operating temperature	$+5$ to $+45^{\circ}$ C
Housing dimensions (W x H x D)	$85$ x $100$ x $38$ mm
Weight	Approx. $240$ g
Housing material	Plastic
Radio frequency	$868$ MHz / $2.4$ GHz
Measuring cycle	Can be set from 1 min to 24 h

<sup>12</sup> Wearing part

## 8.4.2 Saveris Ethernet analog coupler U1E



Feature	Value
Measuring range	2-wire: 4 to 20 mA 4-wire: 0/4 to 20 mA, 0 to 1/5/10 V
Accuracy / resolution (max. 15 bit / typ. 12 bit)	Current accuracy: $\pm 0.03$ mA (min. $0.75$ $\mu$ A / typ. $5$ $\mu$ A) Voltage 0 to 1 V $\pm 1.5$ mV (min. $39$ $\mu$ V / typ. $250$ $\mu$ V) Voltage 0 to 5 V $\pm 7.5$ mV (min. $0.17$ mV / typ. $1.25$ mV) Voltage 0 to 10 V $\pm 15$ mV (min. $0.34$ mV / typ. $2.50$ mV) $\pm 0.02\%$ of m.v. / K (deviation from nominal temperature $22^{\circ}$ C)
Input	2- or 4-conductor current/voltage input
Channels	1 channel
Max. load (24 V DC)	160 $\Omega$
Protection class	IP54
Power supply	Mains unit 6.3 V DC, 20 to 30 V DC max. 25 V AC, PoE
Buffer rechargeable battery <sup>13</sup>	Li-ion
Operating temperature	+5 to +45 $^{\circ}$ C
Housing dimensions (W x H x D)	85 x 100 x 38 mm
Weight	Approx. 240 g
Housing material	Plastic
Measuring cycle	Can be set from 2 sec to 24 h

<sup>13</sup> Wearing part

## 8.5 Transport data loggers for testo Saveris

### 8.5.1 testo 182 – BT transport data logger

Feature	Value
Measuring range	-30°C to +50°C
Accuracy	± 0.5°C
Resolution	0.1°C
Sensor type	Digital temperature sensor (semi-conductor basis)
Measurement channels	1 (internal)
Measurement parameters	Temperature (°C, °F)
Storage temperature	-40°C to +85°C
Operating temperature	-40°C to +70°C
Storage time	Up to 1 year before activation (see activation note on the instrument)
Battery type (cannot be replaced)	CR2032
Battery life (CR 2032)	24 days with 15-minute measuring cycle over the full measuring range
Protection class	IP 67
Measuring interval	1 min to 24 h
Memory	4,096 readings
Dimensions	95 mm x 65 mm x 6.7 mm
Weight	30 g
Transmission	Bluetooth® low energy (BLE) 4.0 specification (2.4 GHz)
Bluetooth® range	Up to 30 m with no obstructions
Directives, standards, certificates	EMC 2014/30/EU RED 2014/53/EU Regulation 1935/2004

### 8.5.2 testo 184 · USB Transport data logger

testo 184 T1, T2, T3, T4

Feature	Value
Display	T1, T4: no T2, T3: yes

## 8 Technical data

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Feature	Value
Probe type	T1, T2, T3: internal NTC temperature sensor T4: internal PT1000 temperature sensor
Measurement channels	1 internal
Measurement parameters [unit]	Temperature [°C, °F]
Measuring range	T1, T2, T3: -35 to 70°C T4: -80 to 70°C
Accuracy	T1, T2, T3: ±0.5 K T4: ±0.8 K (-80 to -35.1°C), ±0.5 K (-35.0 to 70°C)
Resolution	0.1°C
Operating temperature	T1, T2, T3: -35 to 70°C T4: -80 to 70°C
Storage temperature	T1, T2, T3: -35 to 70°C T4: -80 to 70°C
Battery type	T1: internal, non-replaceable T2: internal, non-replaceable T3: CR2450, replaceable T4: TLH-2450, replaceable
Battery life (reusable data logger)	T3: 500 days (15-minute measuring cycle, 25°C) T4: 100 days (15-minute measuring cycle, -80°C)
Operating time (single-use data logger)	T1: 90 days from first program start (5-minute measuring cycle, -35°C) T2: 150 days from first program start (5-minute measuring cycle, -35°C)
Protection class	IP67
Measuring interval	1 minute to 24 hours
Memory	T1: 16,000 readings T2, T3, T4: 40,000 readings



Feature	Value
Dimensions	T1: 33 x 9 x 74 mm T2, T3, T4: 44 x 12 x 97 mm
Weight	T1: 25 g T2, T3, T4: 45 g
Directives, standards, certificates	EN 12830, HACCP-certified, temperature calibration certificate traceable according to ISO 17025, RTCA/DO-160G
Probe type	T1, T2, T3: internal NTC temperature sensor T4: internal PT1000 temperature sensor

## 8.6 testo Saveris router



Feature	Value
Housing dimensions (W x H x D)	80 x 100 x 38 mm
Antenna length	81 mm
Weight	Approx. 180 g
Power supply	6.3 V DC mains unit; alternatively via 24 V AC/DC plug-in/screw terminals, power consumption < 5 W
Housing material	Plastic
Protection class	IP54
Operating temperature	-20 to +50°C
Storage temperature	-40 to +60°C
Interfaces	Radio
Number of radio probes	Max. 5; in a router cascade of max. 3 routers
Wall bracket	Included

## 8.7 testo Saveris converter



Feature	Value
Housing dimensions (W x H x D)	80 x 100 x 35 mm
Antenna length	81 mm
Weight	Approx. 190 g
Power supply	6.3 V DC mains unit; alternatively via 24 V AC/DC plug-in/screw terminals, PoE, power consumption < 2 W
Housing material	Plastic
Protection class	IP54
Operating temperature	-20 to +50°C
Storage temperature	-40 to +60°C
Interfaces	Radio, Ethernet
Number of radio probes	Max. 15
Wall bracket	Included

## 8.8 testo Saveris extender<sup>14</sup>



Feature	Value
Housing dimensions (W x H x D)	80 x 100 x 35 mm
Antenna length	81 mm
Weight	Approx. 190 g

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<sup>14</sup> Component is only permitted for mobile monitoring in all countries with a radio frequency of 868 MHz.

Feature	Value
Power supply	6.3 V DC mains unit; alternatively via 24 V AC/DC plug-in/screw terminals, PoE, power consumption < 2 W
Housing material	Plastic
Protection class	IP54
Operating temperature	-20 to +50°C
Storage temperature	-40 to +60°C
Interfaces	Radio, Ethernet
Number of radio probes	Max. 100
Radio frequency	868 MHz
Wall bracket	Included

## 8.9 BT Gateway for testo 182

Feature	Value
Housing material	PC ABS
Dimensions (W x H x D)	Approx. 95 x 68 x 48 mm
Weight	90 g
Protection class	IP20
Storage temperature	-20°C to +70°C
Operating temperature	0°C to +50°C
Humidity	0 to 95% (non-condensing)
Power supply	Mains adapter 5 VDC (USB) / PoE
Interfaces	LAN / USB
Memory capacity	1500 data records (BTLE data logger)
Recording interval	The gateway constantly searches for data loggers (BTLE)

## 8.10 testo Saveris cockpit unit<sup>15</sup>



Feature	Value
Memory	20,000 readings
Dimensions	150 x 90 x 40 mm
Weight	Approx. 210 g
Protection class	IP30
Housing material	Plastic
Radio frequency	868 MHz
Power supply	Mini USB cable, including adapter for 12/24 V DC power supply via the cigarette lighter
Rechargeable battery <sup>16</sup>	NiMH rechargeable battery The rechargeable battery is only intended to be used for backing up data in the event of a power failure, not as a power supply during operation.
Operating temperature	-30 to +65°C
Storage temperature	-40 to +85°C
Display	Graphical LCD
Interfaces	USB, radio, infrared for Testo printers
Number of radio probes	Max. 2 zones each with 4 radio probes (max. 32 channels)
Mounting	Wall bracket with sucker and telescopic function included

<sup>15</sup> Component is only permitted for mobile monitoring in all countries with a radio frequency of 868 MHz.

<sup>16</sup> Wearing part









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