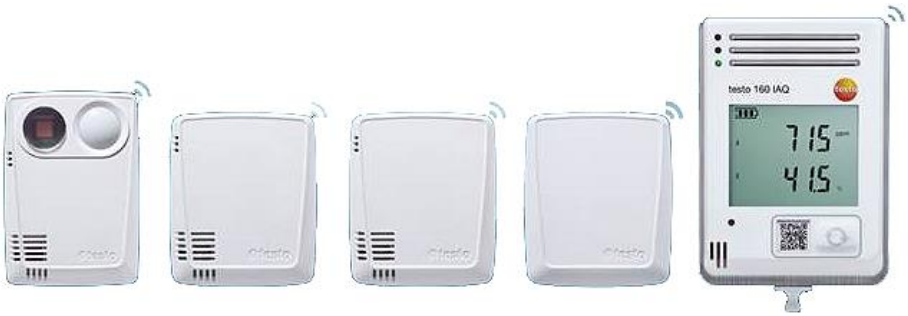
Data loggers
testo 160 TH
testo 160 THE
testo 160 THL
testo 160 IAQ
testo 160 E

Instruction manual



Contents

1 Safety and waste disposal

1.1 About this document

Use

- The instruction manual is an integral part of the instrument.
- Pay particular attention to the safety instructions and warning notices in order to prevent injuries or damage to the product.
- Keep this documentation to hand so that you can refer to it when necessary.
- Always use the complete original instruction manual.
- Hand this documentation on to any subsequent users of the product.

1.2 Symbols and writing standards

Display	Explanation
	Note: basic or further information
1. 2. …	Action: several steps, the sequence must be followed.
‣	Result of an action
✓	Requirement

1.3 Safety

General safety instructions

- Only operate the product properly, for its intended purpose, and within the parameters specified in the technical data. Do not apply any force.
- Do not operate the instrument if there are signs of damage on the housing.
- Dangers may also arise from the systems to be measured or from the measuring environment: Always comply with the locally valid safety regulations when carrying out measurements.
- Temperature information given on probes/sensors relates only to the measuring range of the sensor technology. Do not expose handles and feed lines to temperatures in excess of 70 °C (158°F), unless they are expressly authorised for use at higher temperatures.
- Do not carry out any contact measurements on uninsulated, live parts.
- Do not store the product together with solvents. Do not use any desiccants.

- Only perform that maintenance and repair work on this instrument which is described in the documentation. Follow the prescribed steps exactly when doing the work. Use only original spare parts from Testo.

Batteries

- Improper use of batteries may cause destruction of the batteries, injuries due to current surges, fire or the escape of chemicals.
- Only use the batteries supplied in accordance with the instructions in the instruction manual.
- Do not short-circuit the batteries.
- Do not take the batteries apart and do not modify them.
- Do not expose the batteries to heavy impacts, water, fire or temperatures in excess of 55 °C.
- Do not store the batteries near any metal objects.
- In the event of contact with battery acid: rinse affected areas thoroughly with water, and if necessary consult a doctor.
- Do not use any leaky or damaged batteries.

1.4 Warning notices

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

CAUTION

Indicates possible damage to equipment

1.5 Disposal

- Dispose of spent batteries in accordance with the relevant 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.

2 Description of the instrument

2.1 Using the testo 160

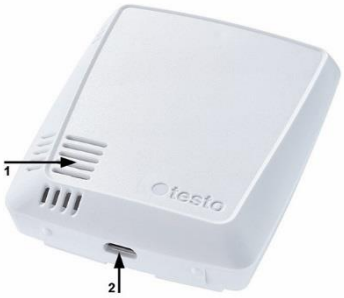
The testo 160 WiFi data logger system is a modern solution for monitoring the climate and lighting conditions, e.g. in museums, archives, galleries and libraries.

The system consists of WiFi data loggers, external probes and a Cloud data storage system. The testo 160 WiFi data loggers reliably record temperature and humidity, CO_2 levels, illuminance and UV radiation at adjustable intervals and transmit the readings directly to the Testo Cloud via WLAN. Via the web interface of this Cloud, the data can be analyzed at any time and anywhere, using an internet-ready smartphone, tablet or PC. The WiFi data loggers are programmed and reports are generated via this interface. Limit value violations are immediately reported via e-mail or optionally via SMS.

2.2 WiFi data loggers

2.2.1 testo 160 TH

You can use the testo 160 TH data logger to carry out temperature and humidity measurements.



	Element		Element
1	Internal sensors for temperature and relative humidity	**2**	Micro-USB port

2.2.2 testo 160 E

The external probes S-TH, S-LuxUV and S-Lux can be connected to the testo 160 E WiFi data logger.

	Element		Element
1	Connector socket for external sensor	**2**	USB connection
3	Connector socket for external sensor		

2.2.3 testo 160 THE

You can use the testo 160 THE WiFi data logger to carry out temperature and humidity measurements. The external probes S-TH, S-LuxUV or S-Lux can also be connected.

	Element		Element
1	Internal sensor for temperature and relative humidity	**2**	Connector socket for external sensor
3	USB connection	**4**	Connector socket for external sensor

2.2.4 testo 160 THL

You can use the testo 160 THL WiFi data logger to measure temperature, humidity, illuminance and UV radiation.

	Element		Element
1	UV sensor	**2**	Lux sensor
3	Internal sensor for temperature and relative humidity	**4**	USB connection

2.2.5 testo 160 IAQ

You can use the testo 160 IAQ WiFi data logger to carry out temperature, humidity, carbon dioxide concentration and atmospheric pressure measurements.

	Element		Element
1	Status LED	**2**	Display
3	Air quality light	**4**	CO_2 sensor
5	QR code	**6**	Button
7	USB connection	**8**	Internal sensor for temperature and relative humidity

If the WiFi data logger is in Continuous Mode (external power supply via USB mains unit), the air quality light stays on permanently. Temperature and humidity readings are displayed alternately.

If the WiFi data logger is in Single Mode (without external power supply via USB mains unit), the air quality light only comes on briefly during the measurement. Only the temperature is displayed. When switching to Single Mode, the WiFi data logger does not supply any readings for at least 10 min. “CAL” is shown on the display until the next measurement.

2.3 External probes

The external probes S-TH, S-LuxUV and S-Lux extend the range of functions of the 160 THE WiFi data logger and, in conjunction with the 160 E WiFi data logger, form an extremely versatile measurement system.

The external probes are only approved in conjunction with the testo 160 THE and testo 160 E WiFi data loggers.

2.3.1 S-TH

The external probe S-TH can be connected to the following WiFi data loggers: testo 160 THE and testo 160 E. You can use the S-TH probe to carry out temperature and humidity measurements.

To make it easy to install, the probe can be pushed out of the wall bushing. The probe can also be used without this wall bushing.

	Element		Element
1	Sensor	**2**	Screw thread
3	Securing nut	**4**	Jack plug

2.3.2 S-LuxUV

The external probe S-LuxUV can be connected to the following WiFi data loggers: testo 160 THE and testo 160 E. You can use the S-LuxUV probe to carry out illuminance and UV measurements.

	Element		Element
1	Lux sensor	**2**	UV sensor
3	Jack plug		

2.3.3 S-Lux

The external probe S-Lux can be connected to the following WiFi data loggers: testo 160 THE and testo 160 E. You can use the S-Lux probe to carry out illuminance measurements.

	Element		Element
1	Lux sensor	**2**	Jack plug

2.3.4 Extension cable

The sensors are supplied with the 60 cm cable (0554 2004) as standard. A 2.5 m long cable is optionally available (0554 2005), to be able to adapt the measurement system to all measuring situations. Since these are digital probes, multiple extension cables can also be combined. The maximum total length is approx. 10 m.

2.4 Deco-covers

3 different deco-covers are optionally available. Cover 0554 2006 is intended for the testo 160 TH, testo 160 THE and testo 160 E WiFi data loggers. Cover 0554 2009 is intended for the testo 160 THL WiFi data logger and cover 0554 2012 for the testo 160 IAQ WiFi data logger.

3 Technical data

3.1 WiFi data loggers

Measurement-specific data

The humidity sensor attains the highest degree of accuracy in temperatures between + 5 °C and + 60 °C and 20% to 80% RH. If the instrument is exposed to higher humidity for a long period of time, this can falsify the readings by up to 3% RH. After 48 hours at 50% RH ± 10 % and +20 °C ± 5 °C, the sensor regenerates by itself.

CAUTION

Damage to the humidity probe

- The probe must never be exposed to a humidity level of 100 % RH for longer than 3 days.

WiFi data loggers	testo 160 TH	testo 160 THE	testo 160 E
Order number	0572 2021	0572 2023	0572 2022
Temperature measurement			
Measuring range	-10 °C to 50 °C		see ext. probes
Accuracy	± 0.5 °C		
Resolution	0.1 °C		
Humidity measurement			
Measuring range	0 to 100% RH (non-condensing)		see ext. probes
Accuracy	± 2% RH @ 25 °C & 20 to 80% RH ± 3% RH @ 25 °C & <20% RH & >80% RH ± 1% RH hysteresis ± 1% RH/year drift		
Resolution	0.1% RH		
Lux measurement			
Measuring range		see ext. probes	see ext. probes
Accuracy			
Resolution			
UV measurement			
Measuring range		see ext. probes	see ext. probes
Accuracy			
Resolution			

WiFi data loggers	testo 160 IAQ	testo 160 THL
Order number	0572 2014	0572 2024
Temperature measurement		
Measuring range	0 °C to 50 °C	-10 °C to 50 °C
Accuracy	± 0.5 °C	± 0.5 °C
Resolution	0.1 °C	0.1 °C
Humidity measurement		
Measuring range	0 to 100% RH (non-condensing)	0 to 100% RH (non-condensing)
Accuracy	± 2% RH @ 25 °C & 20 to 80% RH ± 3% RH @ 25 °C & <20% RH & >80% RH ± 1% RH hysteresis ± 1% RH / year drift	± 2% RH @ 25 °C & 20 to 80% RH ± 3% RH @ 25 °C & <20% RH & >80% RH ± 1% RH hysteresis ± 1% RH/year drift
Resolution	0.1% RH	0.1% RH
Lux measurement		
Measuring range		0 to 20,000 lux
Accuracy		DIN 5032-7 Class C-compliant or: ± 3 lux or ± 3% of the reading (based on the external reference DIN 5032-7 Class L)
Resolution		0.1 lux
UV measurement		
Measuring range		0 to 10,000 mW/m^2
Accuracy		± 5 mW/m^2 or 5% of the reading (based on the external reference at 22 °C)
Resolution		0.1 mW/m^2
CO_2 measurement		
Ambient humidity	0 to 99% RH (non-condensing)	
Measuring range	0 to 5,000 ppm	
Accuracy	± (50 ppm + 3% of the reading) (@ 25 °C) Battery-operated: ± (100 ppm + 3% of the reading) (@ 25 °C)	
Resolution	1 ppm	

WiFi data loggers	testo 160 IAQ	testo 160 THL
Pressure		
Measuring range	600 to 1100 mbar	
Accuracy	± 3 mbar @ 22 °C	
Resolution	1 mbar	

The time between the system warning "Battery almost discharged" and "Measurement data stop" is at the most one day during standard operation and a measuring cycle & communication cycle of 1 min (day & night) (battery type: Varta Industrial).

testo 160 WiFi data loggers come with a factory calibration protocol as standard. For museums, we recommend having an annual test carried out by Testo Customer Service. Moreover, there is an option of having ISO certificates created for the WiFi data loggers. These can be implemented by Testo Industrial Services (TIS) .

General data

WiFi data loggers	testo 160 TH	testo 160 THE	testo 160 THL
Order number	0572 2021	0572 2023	0572 2024
Operating temperature	-10 °C to 50 °C		
Storage temperature	-20 °C to 50 °C		
Protection class	IP20		
Measuring cycle	Depends on the Cloud licence Basic: 15 min to 24 h / Advanced 1 min to 24 h flexible		
Communication cycle	Depends on the Cloud licence Basic: 15 min to 24 h / Advanced 1 min to 24 h flexible		
Memory	32,000 readings (sum of all channels)		
Voltage supply	4 x AAA batteries 1.5 V Alternatively mains unit via USB connection		
Battery life	18 months At +25 °C, 15-minute measuring cycle and 6-hour communication cycle (depending on the WLAN structure)		
Dimensions	64 x 76 x 22 mm	64 x 76 x 22 mm	64 x 92 x 24 mm
Weight including batteries	94 g	94 g	113 g

WiFi data loggers	testo 160 IAQ	testo 160 E
Order number	0572 2014	0572 2022
Operating temperature	0 °C to 50 °C	-10 °C to 50 °C
Storage temperature	0 °C to 50 °C	-20 °C to 50 °C
Protection class	IP20	
Measuring cycle	Depends on the Cloud licence Basic: 15 min to 24 h / Advanced 1 min to 24 h flexible (mains operation) Advanced 5 min to 24 h flexible (battery operation)	Depends on the Cloud licence Basic: 15 min to 24 h / Advanced 1 min to 24 h flexible
Communication cycle	Depends on the Cloud licence Basic: 15 min to 24 h / Advanced 1 min to 24 h flexible	
Memory	32,000 readings (sum of all channels)	
Voltage supply	4 x AA batteries Alternatively mains unit via USB connection	4 x AAA batteries 1.5V Alternatively mains unit via USB connection
Battery life	12 months at +25 °C, 15-minute measuring cycle and 8-hour communication cycle (depending on the WLAN reception quality)	18 months at +25 °C, 15-minute measuring cycle and 6-hour communication cycle (depending on the WLAN reception quality)
Dimensions	82 x 117 x 32 mm	64 x 76 x 22 mm
Weight including batteries	269 g	96 g

WiFi-specific data

WiFi data loggers	testo 160 TH	testo 160 THE	testo 160 THL
Order number	0572 2021	0572 2023	0572 2024
WLAN			
Standard	802.11 b/g/n		
Security	WPA2 Enterprise: EAP-TLS, EAP-TTLS-TLS, EAP-TTLS-MSCHAPv2, EAP-TTLS-PSK, EAP-PEAP0-TLS, EAP-PEAP0-MSCHAPv2, EAP-PEAP0-PSK, EAP-PEAP1-TLS, EAP-PEAP1-MSCHAPv2, EAP-PEAP1-PSK; WPA Personal, WPA2 (AES), WPA (TKIP), WEP		

WiFi data loggers	testo 160 IAQ	testo 160 E
Order number	0572 2014	0572 2022
WLAN		
Standard	802.11 b/g/n	
Security	WPA2 Enterprise: EAP-TLS, EAP-TTLS-TLS, EAP-TTLS-MSCHAPv2, EAP-TTLS-PSK, EAP-PEAP0-TLS, EAP-PEAP0-MSCHAPv2, EAP-PEAP0-PSK, EAP-PEAP1-TLS, EAP-PEAP1-MSCHAPv2, EAP-PEAP1-PSK; WPA Personal, WPA2 (AES), WPA (TKIP), WEP	

Technical data for a secure wireless LAN

Ports

The testo 160 WiFi data loggers use the MQTT protocol, which communicates via port TCP 1883 and 8883.
These UDP port approvals are also required:

- Port 53 (DNS name resolution)
- Port 123 (NTP time synchronisation)

All ports only have to be able to communicate externally to the Cloud. No bi-directional port approvals are necessary.

During the initial configuration, it is possible to select whether DHCP or Static IP is used (select Expert mode for the corresponding information). (Not possible in the Setup assistant.)

testo 160 application

The testo 160 application is accessible via a normal, up-to-date browser (www). The standard TCP ports http (80) and https (443) are used.

3.2 External probes

Measurement-specific data

Probes	S-TH	S-LuxUV	S-Lux
Order number	0572 2156	0572 2157	0572 2158
Temperature measurement			
Measuring range	-10 °C to 50 °C		
Accuracy	± 0.5 °C		
Resolution	0.1 °C		
Humidity measurement			
Measuring range	0 to 100 % RH (non-condensing)		
Accuracy	± 2% RH @ 25 °C & 20 to 80% RH ± 3% RH @ 25 °C & <20 % RH & >80% RH ± 1% RH hysteresis ± 1 % RH / year drift		
Resolution	0.1 % RH		
Lux measurement			
Measuring range		0 to 20,000 Lux	
Accuracy		DIN 5032-7 Class C-compliant. or: ± 3 lux or ± 3% of the reading (based on the external reference DIN 5032-7 Class L)	
Resolution		0.1 lux	
UV measurement			
Measuring range		0 to 10,000 mW/m²	
Accuracy		± 5 mW / m² or ± 5 % of the reading (based on the external reference at 22 °C)	
Resolution		0.1 mW/m²	

General data

Probes	S-TH	S-Lux UV	S-Lux
Order number	0572 2156	0572 2157	0572 2158
Operating temperature	-10 °C to 50 °C		
Storage temperature	-20 °C to 50 °C		
Dimensions	38 x 16 mm	28 x 56 x 15 mm	28 x 56 x 15 mm
Weight	13 g	15 g	13 g

3.3 Deco-covers

General data

Cover			
Order number	0554 2006	0554 2009	0554 2012
Use	testo 160 TH / THE / E	testo 160 THL	testo 160 IAQ
Dimensions	82 x 69 x 23 mm	97 x 69 x 23 mm	121 x 88 x 32 mm
Weight	22 g	18 g	41 g

4 Operation

4.1 Commissioning

The external probes must be connected to the WiFi data logger **before** logging into the Cloud for the first time. If an additional probe is to be connected at a later stage, the WiFi data logger must first be logged out of the Cloud. The external probe can then be connected and the WiFi data logger logged in again.

CAUTION

Damage to WiFi data loggers!

- Do not place near any solvents.
- Do not clean using solvents.

CAUTION

Potential damage to the optical surfaces (THL, S-Lux and S-LuxUV)

- Do not use sharp objects.
- Only use soft cleaning cloths.
- Do not use aggressive cleaning agents.

CAUTION

Potential damage to the optical components (IAQ)

- Avoid any vibrations, the factory calibration may be altered. Check the readings in fresh air 350 to 450 ppm CO_2 (urban air up to 700 ppm CO_2).
- Prevent condensation. This can result in elevated CO_2 readings.
- Do not use aggressive cleaning agents.

The data loggers must only be mounted vertically. Here, the connections must point downwards. The rubber cover on the back of the testo 160 IAQ must not be removed.

1 - Mount the wall bracket at the designated location using suitable mounting materials (screws, cable ties or the supplied 3M adhesive strips).

2 - Open battery compartment cover.

3 - Remove battery safety strips.

4 - Close the battery compartment.

5 - Insert the data logger into the wall bracket.

The IAQ data logger has a higher energy requirement. This reduces the minimum measuring cycle to 5 minutes when battery-operated. Operation via mains unit is therefore recommended. An appropriate USB cable can also be purchased as an accessory.

Only for testo 160 E and testo 160 THE:

The external probes must be connected **before** logging into the Cloud for the first time. If an additional probe is to be connected at a later stage, the data logger must first be logged out of the Cloud. The external probe can then be connected and the data logger logged in again.

The testo 160 WiFi data loggers can also be powered via the USB port instead of being run on batteries. However, the WiFi data loggers do not have a charging function, i.e. no rechargeable batteries in the WiFi data logger can be charged up via the USB port. If you connect the WiFi data logger to the USB port on your PC, the WiFi data logger automatically switches to mass storage and configuration mode. A PC is therefore not suitable as a voltage source for logger operation.

4.2 Logging into the Testo Cloud

You need an account for the Testo Cloud. If you have not yet set this up, please sign up at https://www.museum.saveris.net.

For your new testo 160 WiFi data logger to be able to connect to your account in the Testo Cloud, it requires the three following pieces of information at minimum:

1. The ID of your account in the Cloud. You will find this in your account under the menu item **Configuration - Account ID**.
2. The network name of your WLAN (SSID), which the WiFi data logger will use to connect to the internet.
3. The password for this network.

Storage of this information on the WiFi data logger is called “Configuring the WiFi data logger". Four different options are available for this process.

4.2.1 Configuration via the Setup assistant

The Setup assistant in the web interface of the Testo Cloud is provided to assist you when you take your first steps with commissioning the testo 160. It can help you with logging in WiFi data loggers.

To be able to carry out the configuration, you need to be logged into the web interface at https://www.museum.saveris.net.

1 - Click on the  symbol above the menu bar.

▸ The Setup assistant launches and assists you with the configuration. Follow the instructions there.

4.2.2 Configuration via the web interface (WPA2 Personal)

✓ - Data logger has not been configured yet, the LED on the side of the data logger flashes once after the batteries are inserted.

1 - Briefly press the button on the side of the data logger. (On the testo 160 IAQ, the button is on the front.)

▸ Data logger switches into configuration mode (LED flashes at one-second intervals).

or

✓ - Data logger has already been configured (logger is in sleep mode)

1 - Press and hold down the button on the side of the data logger for more than 3 s.

▸ Data logger switches into configuration mode (LED flashes at one-second intervals)

The WiFi data loggers can also be set up for the WPA2 Enterprise security standard via the web-based configuration. In this mode, the WiFi data logger functions as a web server on which you can log in via WLAN with the IP address 192.168.1.1 via smartphone, tablet or PC.

When configuring for WPA2 Enterprise, pay attention to the correct spelling and suffixes of certificate names. Depending on the encryption method, the following 3 certificates must be available: ca.pem, client.pem, private.key.
The certificates must be available either in the PEM or BASE64 format. In addition, they must be available individually and not in a bundle.

✓ - The WiFi data logger is already in configuration mode and flashes at one-second intervals.

1 - Select the network name of the WiFi data logger you wish to configure under network settings on the PC/tablet (e.g. testo 160 Sn: 12345678).

▸ PC/tablet is connected to the WLAN hotspot of the WiFi data logger.

2 - Open web browser on the PC, tablet, smartphone, etc.

3 - Enter IP address 192.168.1.1 in the web browser.

▸ Website of the WLAN configuration opens.

4 - Enter the testo Account ID (shown in the web interface of the Testo Cloud under account information).

5 - Enter network name (SSID).

6 - Enter configuration slot.

The testo 160 WiFi data loggers can be configured for up to three WLAN networks. Network name (SSID), password and security settings can be stored for each profile.

7 - The security standard can be selected under “Security”. (Depending on the selection, further input options appear.)

8 - Enter password for the network.

9 - Confirm the configuration via “Configure”.

▸ WiFi data logger is fully configured and connected to the Cloud. The LED flashes green twice. The WiFi data logger then switches to measuring mode.

4.2.3 Configuration via PDF form

As an alternative to creating the configuration file in the Quick Start Guide with subsequent download of the XML configuration file, the WiFi data logger can also be configured via a PDF form.

You need the Adobe Reader program (version 10 or later) to use the PDF form correctly. If you have not installed Adobe Reader, you can go to the following address to download it free of charge: http://get.adobe.com/reader/.

✓ - Make sure that the batteries are inserted.

1 - Connect the data logger to the PC via USB connection.

2 - Open the file **WiFiConf.pdf** on the external drive testo 160.

3 - Copy your Account ID and paste it into the relevant field on the PDF form. You will find the Account ID in the web interface of the Testo Cloud under **Configuration -> Account ID**.

4 - Enter configuration slot.

The testo 160 WiFi data loggers can be configured for up to three WLAN networks. Network name (SSID), password and security settings can be stored for each profile.

5 - Enter the **Network name (SSID)** and, if necessary, your **WLAN password** in the relevant fields on the PDF form.

6 - Click on the **Save configuration** button.

▸ A dialogue opens for exporting the form data.

7 - Select the external drive testo 160 as the storage location and save the form data (configuration file **WiFiConf_Daten.xml**) on it.

▸ The green and red LEDs light up simultaneously until the PDF document is completely generated.

8 - Disconnect the USB connection to the PC to complete the configuration of the data logger.

You can also save the configuration file locally on your computer. Other WiFi data loggers can be configured even faster by simply copying the XML configuration file onto the external drive testo 160.

4.3 Logging WiFi data loggers out of the Testo Cloud

It may be necessary to log the WiFi data logger out of the Cloud again. A logger cannot be operated in two different accounts simultaneously, therefore it must be logged out before switching accounts.
Similarly, any technical changes to the WiFi data logger, e.g. due to adding or removing external sensors, can only be registered by logging back into the Cloud.

✓ - The WiFi data logger is logged into the Testo Cloud.

1 - Select **Configuration ->WiFi data logger** in the web interface.

▸ All WiFi data loggers logged in are displayed.

2 - Select the WiFi data logger you require.

3 - Press **Details.**

4 - At the bottom of the menu, select the button **Remove data logger**.

▸ The WiFi data logger is removed.

The log-out still needs to also be transmitted to the WiFi data logger. This happens automatically the next time the WiFi data logger communicates with the Cloud. Depending on the communication cycle selected, this may take some time. You can instruct the WiFi data logger to establish a connection with the Cloud right away by briefly pressing the button. This process is indicated by the green LED flashing briefly. The WiFi data logger is logged out. After logging out of the Cloud, press the buttons once briefly so that the WiFi data logger receives the log-out.

4.4 Status LED signals

The following table provides an overview of the meaning of the various status LED signals of the testo 160 WiFi data logger.

Signal	Description
LED does not flash (TH, E, THE, THL)	Sleep mode
LED flashes green every 30 seconds (IAQ)	Normal state
LED flashes green at one-second intervals (for 5 min, then 1 long red flash)	Configuration mode (hotspot) - press button > 3 sec
LED gives 2 red flashes	Connection to WLAN failed (incorrect SSID, incorrect SSID password, incorrect account ID or incorrect account password, attempt to log the testo 160 E into the Cloud without any external probes connected.)
If XML is correct, LED gives 1 long green flash If XML is incorrect, LED gives 3 red flashes	Configuration via USB/PDF
LED gives 2 green flashes	Connection to WLAN and Cloud successful
LED gives 1 long red flash	Alarm activated due to limit value violation
LED gives 5 green flashes	Reset WiFi data logger to factory settings Press key > 20 sec
LED gives 1 green flash (measurement data collected) LED gives 2 short green flashes (measurement data transmitted)	Send measurement data to the Testo Cloud (website): press key < 3 sec Measurement data transmitted successfully
LED gives 4 red flashes	Batteries spent
LED flashes alternately green and red	Firmware update via USB or wireless

4.5 Inserting into/removing from the wall bracket

1 - Insert the unlocking tool into the unlocking opening.

2 - Push back the locking pin using the unlocking tool.

3 - Pull the data logger up and out of the wall bracket.

4.5.1 Installing the probe on the data logger

The external probes must be connected to the WiFi data logger **before** logging into the Cloud for the first time. If an additional probe is to be connected at a later stage, the data logger must first be logged out of the Cloud. The external probe can then be connected and the data logger logged in again.

1 - Connect the probe plug to the designated jack on the data logger.

▸ The external probe is ready for use.

4.5.2 Changing batteries

A battery change stops a measurement that is currently running. However, stored data is preserved.

CAUTION

Incorrectly inserted batteries!
The instrument may be damaged!

- Pay attention to the polarity when inserting the batteries.

Only use new branded batteries. If a partially exhausted battery is inserted, the battery capacity will not be calculated correctly.

1 - Open battery compartment cover.

2 - Change batteries. Pay attention to polarity.

3 - Close the battery compartment.

4.5.3 Deco-cover installation

1 - Break out the required, pre-punched knock-out points on the deco-cover.

2 - Place the deco-cover onto the data logger from the side and press it into place.

3	- Always make sure that the deco-cover is positioned correctly so as not to obscure sensors.	
4	- Then connect external probes or the external voltage supply once again.	

CAUTION

Incorrect readings!

- Make sure that the deco-cover is positioned correctly.

CAUTION

Damage to the sensor!

- Let painted or varnished deco-covers dry out and out-gas sufficiently before fitting.

4.5.4 Wall bracket

The wall bracket supplied, which comes with an adhesive pad, is only intended for testo 160 loggers and ensures that the loggers stay securely in place. Any other use is not deemed appropriate and may result in the wall bracket being damaged.

Apart from the adhesive pad, no other mounting materials are included in the delivery. Please select suitable mounting materials (cable ties or screws) that are appropriate for the required mounting location.

4.6 Analysis and reports (web)

According to the settings specified by the user (Report settings), reports are regularly generated automatically by the system (Generated reports).

1 - Click on the “Automatic reports” button.

2 - Enter the data required to create an automatic report.

The following settings can be defined and edited:

- Name of the report: Designation of the automatic report.
- Measuring points for the report: Measuring points that are to be covered in the report. Click on the checkbox in front of the channel designation.
- How often is the report to be created?: Interval at which the reports are to be generated. Select a report cycle from the drop-down menu.
- File format: File format in which the reports are to be generated. Select a file format from the drop-down menu.
- Data views: Data views in which the data in the report is to be displayed. Click on the checkbox in front of the data view designation.
- Also send report via e-mail: as well as saving reports under Generated reports, these can also be sent as e-mails. Click on the checkbox to open the input screen for e-mail addresses.

Only users created with a supplied e-mail address are listed as possible e-mail recipients. It is not possible to directly input an e-mail address.

3 - Click on the “Create an automatic report” button.

▸ The first report will be created on the following day.

Generated reports

✓ - A summary of the reports already generated is displayed.

1 - Click on the arrow symbol to open the tab.

▸ More information is displayed.

2 - Click on the "Download" button.

▸ The report is downloaded.

3 - “Edit this report series” button.

▸ Settings are displayed and can be edited.

Report settings

Automatic reports which have already been created are displayed in a table.

1 - Click on the "Actions" button.

2 - Click “Edit”

▸ Settings are displayed and can be edited.

1 - Click on the "Actions" button.

2 - Click “Delete”

▸ Automatic report is deleted.

4.7 Alarms

4.7.1 Alarm list

Display of alarms

A summary of all triggered alarms and system warnings is displayed. Unread alarms and system warnings are shown in **bold**.

The display can be filtered according to the following characteristics:

1 - Click on the checkbox in front of the measuring point group/measuring point.

▸ The alarms are sorted and displayed by measuring point group/measuring point.

1.1 - Click on the start date/end date.

1.2 - Select the start date/start time or end date/end time.

▸ The alarms are sorted and displayed by start or end date.

Detailed information on alarms

1 - Click on the arrow to open the tab and display more information.

On displaying the detailed information, the alarm message/system warning is marked as "read" and the alarm counter is reduced.

1 - Click on the “Mark all as read” button.

▸ All alarm messages are marked as “read”.

4.7.2 Alarm settings

4.7.2.1 Creating and displaying alarm settings

1 - Click on the "+ New alarm setting” button.

▸ New alarm setting can be set.

Existing alarm settings are displayed below the button.

1 - Click on the title of an alarm setting.

▸ An existing setting is displayed.

4.7.2.2 Configuring and editing a displayed alarm setting

The following settings can be defined and edited.

Setting	Description
Title	Designation of the alarm setting (required field)
Measuring points	Measuring point group/measuring point which is to be monitored. Click on the checkbox in front of the measuring point group/measuring point.
Alarm thresholds 1 and 2	Different limit value ranges which can be defined for different periods.
Lower limit, upper limit	Values which are to be monitored
Alarm delay	Minimum duration of a limit value violation before an alarm is triggered. The time intervals between measurements (measuring cycle) should be lower than the alarm delay (e.g. measuring cycle = 5 minutes, alarm delay = 15 minutes).
Time control	Define individual alarm periods for which the alarm limit values 1 and 2, or no alarm limit value at all, apply. To define the alarm value 1 and 2, double-click on a time point in the table or pull open the desired time period with the mouse. During periods in which the table is left empty, you receive no alarm. If you have not defined alarm periods, the alarm limits will be active 24 hours a day. If alarm periods have been defined, the limit value alarms are active only in the marked period.
Channel alarms	Alarms in the event of a defective sensor.
E-mail recipient	Addressees who are informed when an alarm occurs. Click on the checkbox in front of the recipient or enter the name and e-mail address of other recipients and click on the + Add button.
SMS recipient	Addressees who are informed when an alarm occurs. Click on the checkbox in front of the recipient or enter the name and mobile phone number of other recipients and click on the + Add button.
Save	The settings are saved.
Delete	The alarm settings are deleted.

4.8 System warnings

4.8.1 Creating and displaying system warnings

1 - Click on the "+ New system warning” button.

▸ A new system warning is created.

Existing system warnings are displayed below the button.

1 - Click on the title of a system warning.

▸ An existing setting is displayed.

4.8.2 Configuring and editing a displayed system warning

The following settings can be defined and edited.

Settings	Description
Title	Designation of the system warning (required field)
Battery almost discharged	Monitor the WiFi data logger for discharged battery.
Power supply interrupted	Monitor the external power supply of the WiFi data logger for interruptions.
WiFi data logger is not responding	Monitor the WiFi data logger for data transmission failure. Click on the “Activate” button and configure the monitoring cycle using the slide control. The set time should be greater than the WiFi data logger's communication cycle.
WiFi data logger	WiFi data logger that needs to be monitored. Click on the checkbox in front of the WiFi data logger.
E-mail recipient	Addressees who are informed when an alarm occurs. Click on the checkbox in front of the recipient or enter the names and e-mail addresses of other recipients and click on the + Add button.
SMS recipient	Addressees who are informed when an alarm occurs. Click on the checkbox in front of the recipient or enter the name and mobile phone number of other recipients and click on the + Add button.
Save	The settings are saved.
Delete	The alarm settings are deleted.

4.9 Configuration

4.9.1 Standard users

By default, two users are created in the system:

- Account Owner (name can be changed), with Administrator user role (role cannot be changed)
- Support Testo (name can be changed), with Testo User Support user role (role cannot be changed)

4.9.2 Creating and editing new users

Other users with different roles can be created and edited.

1 - Click on the “Add a new user” button to create a new user.

▸ Existing users are displayed in a list.

2 - Click on the name of a user to display the settings.

3 - Click on the “Edit” button to change the settings.

The following settings can be defined and edited:

Settings	Description
Title	Title of the user.
First name	First name of the user (required field).
Second name	Second name of the user.
Surname	Surname of the user (required field).
Password and Repeat password	User password. The user password can be changed by the user at a later stage.
User role	Defines the user permissions within the system.
E-mail address & login	E-mail address of the user. The e-mail address is also the login name. The e-mail address is also used for system notifications (alarms, system warnings).
Change e-mail address & login	The field is only available when editing the user account of the account holder. Enter a new e-mail address. Entering a new e-mail address also changes the login name.
Mobile number	Phone number of the user. This is used for system notifications (alarms and system warnings).

Settings	Description
Active from	Date from which the user is active.
Active to	Date up to which the user is active.
Details	Text field for entering other user-specific information.
Save	The settings can be saved.

4.9.3 User roles

A description of the available user roles can be displayed.

1 - Click on the title of a user role to display a description of it

Users have different permissions depending on their allocated user role.

Permissions	Admin	Analyst	Auditor	Operator
Display created users	X	X	X	X
Create, edit and delete users	X	-	-	-
Display Account ID	X	-	-	X
Login WiFi data loggers	X	-	-	X
Configure and deactivate WiFi data loggers	X	-	-	X
Create, edit and delete areas	X	-	-	X
Display, create, edit and delete alarm settings and system warnings	X	-	-	X
Read and analyze readings	X	X	X	X
Display details about alarms and system warnings (= mark as read)	X	X	X	X
Create automatic areas	X	-	-	X

X = available, - = not available

4.9.4 User management

The user management provides information and settings options for the user account.

1 - Click on **User** to open the user menu.

4.9.4.1 User settings

The following user-specific settings can be made:

Setting	Description
Language	Language of the user interface.
Time zone	Time zone for the date and time display.
Unit	Measurement parameters
Save	Settings can be saved.

4.9.4.2 Account information

Information about your testo 160 account is displayed.

4.9.4.3 Change password

1 - Enter the new password in both text fields ("New password" and "New password (repeat)".

2 - Click on the “Save” button to save the new password.

4.9.4.4 Logoff

1 - Click on the “Logoff” button to log off.

4.9.5 Account ID

The Account ID is the unique address of your user account in the Testo Cloud. This is needed to configure the WiFi data loggers in order to ensure that they send your data to the correct user account.

4.9.6 Creating and editing a measuring point group

Measuring points can be organized into measuring point groups. Allocating measuring points to a measuring point group (e.g. Room 1, Room 2, etc.) makes the administration of multiple measuring points easier.

For higher-level grouping, measuring point groups can be allocated to an area (e.g. ground floor, first floor, etc.).

1 - Click on the “New measuring point group” button to create a new measuring point group.

▸ Measuring point groups that already exist are displayed in a list.

The following settings can be defined and edited:

Settings	Description
Title	Designation of the measuring point group (required field).
Description	Description of the measuring point group.
Area	Area that the measuring point group is to be allocated to.
Measuring points	Measuring points that are available and those allocated to the measuring point group are displayed. Click on the **arrow** to allocate a measuring point to the group. Click on the **cross** to delete a measuring point from the group.
Save	The settings can be saved.
Delete	The settings can be deleted.

4.9.7 Areas

Measuring point groups can be organized into areas. Allocating measuring point groups to an area (e.g. ground floor, first floor, etc.) makes the administration of multiple measuring point groups easier.

4.9.7.1 Creating and editing areas

1 - Click on the “New area” button to create a new measuring point group.

▸ Areas already created are displayed in a list.

2 - Click on the "Actions” button and then “Edit”.

▸ The settings are displayed and can be edited.

The following settings can be defined and edited:

Setting	Description
Display name	Designation of the area (required field).
Description	Description of the area.
Area	Area that the measuring point group is to be allocated to.
Save	The settings can be saved.
Delete	The settings can be deleted.

4.9.7.2 Deleting an area

1 - Click on the "Actions" button.

2 - Click on the "Delete" button to delete the area.

4.9.8 WiFi data loggers

A summary of all logged on WiFi data loggers is displayed.

1 - Click on the "Details" button to display more information.

2 - Click on the "Deactivate" or "Activate" button to deactivate or activate WiFi data loggers.

If a logger is deactivated, the measurement and alarm system are switched off. The logger remains logged into the Cloud.

Configuring a WiFi data logger

1 - Click on the "Configure" button to change the configuration.

The following settings can be defined and edited:

Setting	Description
Name of the WiFi data logger	Designation of the WiFi data logger (required field). Condition at delivery: "Model_Serial number".
Description	Description of the WiFi data logger.
Select battery type	Set the battery type used. For the battery capacity to be displayed correctly, the correct battery type must be selected.
Display	Switch the display of the WiFi data logger on or off. (if present)
Name of the measuring point	Specify the designation of the measuring points.

Setting	Description
Measuring cycle	Interval at which readings are obtained. Set the measuring cycle using the slide control.
Day communication cycle and energy-saving mode	Interval at which readings are transmitted to the Testo Cloud. Select the start time for the day communication cycle and the energy-saving mode. Set the communication cycle using the slide control.
Select unit	Unit in which the readings are displayed.
Save	The settings can be saved.
Deactivate or Activate	Measurement channels or WiFi data loggers can be deactivated or activated.
Remove	The WiFi data loggers can be logged off the system.

4.9.9 Firmware updates

A list of available firmware updates for the WiFi data loggers is displayed. Firmware updates can be installed on the data loggers via WiFi.

1 - Click on the “Activate” button to install a firmware update, if this update is available as an optional update. Otherwise, the button is activated automatically.

4.10 Command bar

4.10.1 Opening the Setup assistant

The Setup assistant can help you log in WiFi data loggers.

1 - Click on the  icon to open the Setup assistant.

▸ The Setup assistant takes you through the menu step by step.

4.10.2 Opening the Online Help

The Online Help (this document) provides you with support for issues related to the product components.

1 - Click on the **question mark icon** to open the Online Help.

4.10.3 Opening system messages

The system messages contain important information relating to the product.

1 - Click on the **envelope icon** to open the system messages.

▸ The number of unread system messages is displayed above the icon.

▸ A summary of all system messages is displayed.

▸ Unread system messages are shown in bold.

2 - Click on the title of a system message to display more information.

▸ On displaying the detailed information, the system message is marked as "read" and the message counter is reduced.

4.11 System and status information

Unacknowledged alarms (green checkmark): no alarms active.

Unacknowledged alarms (alarm bell): alarms active, number of unread alarms is displayed.

1 - Click on the **green checkmark** or the **alarm bell** to open the Alarm list.

5 FAQ

- **Can the WiFi data logger be connected to the PC using any USB cable?**
  We recommend that you use the USB cable supplied with the WiFi data logger to guarantee stable data transmission. Longer USB cables are suitable for the power supply only.
- **Can the WiFi data logger also be used in networks with WPA2 Enterprise encryption?**
  testo 160 data loggers can be used in networks with the following WPA2 Enterprise encryption methods.
  WPA2 Enterprise: EAP-TLS, EAP-TTLS-TLS, EAP-TTLS-MSCHAPv2, EAP-TTLS-PSK, EAP-PEAP0-TLS, EAP-PEAP0-MSCHAPv2, EAP-PEAP0-PSK, EAP-PEAP1-TLS, EAP-PEAP1-MSCHAPv2, EAP-PEAP1-PSK, WPA Personal, WPA2 (AES), WPA (TKIP), WEP

  To integrate the loggers into the WPA2 Enterprise network, proceed as follows:
  1. Open the PDF file stored on the logger and generate a corresponding XML file by selecting the programming options step by step.
  2. Copy your company-specific WPA2 Enterprise certificates and the generated .XML file to the logger's mass storage via USB using drag & drop.
  3. Please note that the configuration of the WiFi data logger will only be fully transferred once the USB connector has been removed.
- **The XML configuration file is not being applied by the WiFi data logger, what can I do?**
  Depending on the operating system, there may be difficulties with the data transfer if the configuration file name has been changed. Leave the default file name.
- **The humidity sensor has been stored at a high temperature (> 30 °C) and in very high humidity (> 80% RH) for a long period of time, what can I do?**
  The sensor requires a long period of time to regenerate itself again. This process can be accelerated by storing the sensor in a well-ventilated location at a high temperature (> 30 °C) and in low humidity (< 20% RH) for at least 12 hours.
- **The WiFi data logger's wireless connection to the access point was interrupted, what can I do?**
  1. Press the control key on the WiFi data logger to start searching for a WLAN connection manually.
  2. Change the alignment or position of the WiFi data logger or the access point (WLAN router).
  The error codes can be read out using a web browser via a smartphone/tablet or PC. Press the probe button for 3 seconds. Then enter the following IP address 192.168.1.1 in the web browser.

The error codes below are only displayed on the testo 160 IAQ.

- **The WiFi data logger (160 IAQ) is displaying error code E03, E04, E05 or E09, what can I do?**
  An error has occurred in the WiFi data logger. The error will automatically be corrected by the firmware of the WiFi data logger. After a few seconds the error code should no longer be displayed, you do not need to do anything.
- **The WiFi data logger (160 IAQ) is displaying error code E12, what can I do?**
  The configuration file WifiConfig.xml indicates an error. Use the Quick Start Guide to create a new configuration file and save this on the WiFi data logger.
- **The WiFi data logger (160 IAQ) is displaying error code E23, what can I do?**
  The most common reason for this error is low battery. Insert new batteries into the WiFi data logger.
  If this does not solve the problem: Reset the WiFi data logger to its factory settings. To do this, press and hold down the control key for > 20 s until the display goes blank.
  If the error code continues to be displayed, then there is a hardware problem. Please contact our Customer Service.
- **The WiFi data logger (160 IAQ) is displaying error code E26, what can I do?**
  1. The access point (WLAN router) has no connection to the internet. Check the access point's internet connection.
  2. The routing within the network infrastructure is not working, check whether too many terminal devices are logged into the access point.
- **The WiFi data logger (160 IAQ) is displaying error code E32, what can I do?**
  The WiFi data logger has not obtained an IP address. There are 2 possible reasons for this error:
  1. The network password is incorrect. Check the password of the WLAN network. Use the Quick Start Guide to create a new configuration file with the correct password and save this on the WiFi data logger.
  2. The access point (WLAN router) has a MAC filter or does not permit the integration of new devices. Check the settings for the access point.
- **The WiFi data logger (160 IAQ) is displaying error code E35, what can I do?**
  The WiFi data logger has not received any reply to its test ping from the access point (WLAN router). Make sure that a ping to the gateway is allowed within the access point configuration.
- **The WiFi data logger is displaying error code E36, what can I do?**
  No DNS available or accessible. Contact the operator of the WLAN network.

- **The WiFi data logger is displaying error code E41, what can I do?**
  The WiFi data logger cannot obtain any current time from a time server (pool.ntp.org).
  1. The access point (WLAN router) has no connection to the internet. Check the access point's internet connection.
  2. The NTP port (123/UDP) of the access point (WLAN router) is not open. Check whether the NTP port (123/UDP) is opened.
- **The WiFi data logger (160 IAQ) is displaying error code E51, what can I do?**
  The WiFi data logger was not able to connect to the Testo Cloud.
  1. If the WiFi data logger has already been connected to the Testo Cloud and this connection is suddenly no longer possible: The Testo Cloud servers are not currently accessible. The servers will be monitored and should be accessible again within a few hours.
  2. If the WiFi data logger has not yet been connected to the Testo Cloud: The TCP ports (1883 or 8883) of the access point (WLAN router) are not open. Check whether the TCP ports (1883 or 8883) are open in both directions.
- **The WiFi data logger is displaying error code E52, what can I do?**
  The WiFi data logger could not log into the Cloud because it is already logged into another account. Please log the WiFi data logger out of the existing account first.
- **The WiFi data logger (160 IAQ) is displaying error code E63, what can I do?**
  The WiFi data logger could not send any data to the Testo Cloud.
  1. The internet connection was interrupted during the transmission. Check whether there is a stable connection from the WiFi data logger to the access point (WLAN router). Check the access point's internet connection. The data will be transferred during the next communication cycle. Alternatively: Initiate data transmission manually by pressing the control key on the WiFi data logger.
  2. The Testo Cloud server was not able to process the request for data storage. The servers will be monitored and should be accessible again within a few hours.
- **The WiFi data logger is displaying error code E69, what can I do?**
  1. The Account ID contained in the configuration file is missing or is not valid. Create a new configuration file and save this on the WiFi data logger.
  2. An attempt was made to log the testo 160 E WiFi data logger into the Cloud without any external probes connected. Connect the required external probes before logging in.
- **The WiFi data logger (160 IAQ) is displaying error code E75, what can I do?**
  A firmware update for the WiFi data logger failed.
  The internet connection was interrupted during the transmission or the data was not received intact by the WiFi data logger for other reasons. Check

whether there is a stable connection from the WiFi data logger to the access point (WLAN router). Check the access point's internet connection. The data will be transferred during the next communication cycle. Alternatively: Initiate data transmission manually by pressing the control key on the WiFi data logger.

- **The WiFi data logger (160 IAQ) is displaying the warning message Err AccountID, what can I do?**
  The AccountID contained in the configuration file is not valid.
  Use the Quick Start Guide to create a new configuration file and save this on the WiFi data logger.
- **The WiFi data logger (160 IAQ) is displaying the warning message no AccountID, what can I do?**
  There is no AccountID in the configuration file.
  Use the Quick Start Guide to create a new configuration file and save this on the WiFi data logger.
- **The WiFi data logger is displaying the warning message no License, what can I do?**
  The WiFi data logger cannot be logged in because the number of WiFi data loggers permitted to log in has been exceeded or your testo 160 licence has expired.
  Log off another WiFi data logger, extend or renew your testo 160 licence.
- **The WiFi data logger (160 IAQ) is displaying the warning message not Active, what can I do?**
  The WiFi data logger has been deactivated. It is not storing, and therefore not sending, any measurement data to the Testo Cloud.
  Activate the WiFi data logger (under Configuration --> WiFi data logger) when the WiFi data logger needs to store and send measurement data again.

6 Cloud licences

When you purchase the testo 160 system, you receive a free basic licence.

Some measuring functions displayed in the testo 160 system are inactive. Upgrade your licence in order to activate and use these functions.

In the header you can see which licence you are currently using.

Purchasing a licence

Click on the licence display in the header to be redirected to the licence shop. Here you can choose and purchase your licence upgrade.
Or
Click on the “Upgrade” symbol next to the inactive measuring function. This also opens the licence shop for you to upgrade your licence.

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