testo 162
Online data loggers

0572 1621 – testo 162 T1
0572 1622 – testo 162 T2
0572 1623 – testo 162 T3
0572 1624 – testo 162 H1
0572 1625 – testo 162 H2
0572 1626 – testo 162 IAQ

User manual

Contents

1 About this document

- The instruction manual is an integral part of the instrument.
- Keep this documentation at hand so that you can refer to it when necessary.
- Always use the complete original instruction manual.
- 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.

2 Safety and disposal

2.1 Security

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 to the housing or connected cables.
- Dangers may also arise from objects to be 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.
- Do not use any desiccants.
- Only perform maintenance and repair work on this instrument that is described in this documentation. Follow the prescribed steps exactly when doing the work.
- Use only original spare parts from Testo.

Batteries

- Improper use of batteries may cause the batteries to be destroyed, or lead to injury due to current surges, fire or escaping 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 60 °C.
- Do not store the batteries in the proximity of metal objects.
- Do not use any leaky or damaged batteries.
- 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.

Warnings

Always pay attention to any information denoted by the following warnings. Implement the precautionary measures specified!

⚠ DANGER

Risk of death!

⚠ WARNING

Indicates possible serious injury.

⚠ CAUTION

Indicates possible minor injury.

ATTENTION

Indicates possible damage to equipment.

2.2 Disposal

- Dispose of faulty rechargeable batteries 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

3 Intended use

The testo 162 online data loggers are used for storing and reading out individual readings and series of measurements.

The testo 162 online data loggers record measurement values (temperature and humidity, CO_2 concentration) and send them directly to the testo Smart Connect Cloud via a WLAN connection.

The humidity sensors testo 162 H1, testo 162 H2 and testo 162 IAQ may not be used in dust environment as the sensor could be polluted.

The sensor of testo 162 IAQ is susceptible to pollutants and must be protected from exposure to volatile chemicals, acids, bases and cleaning agents.

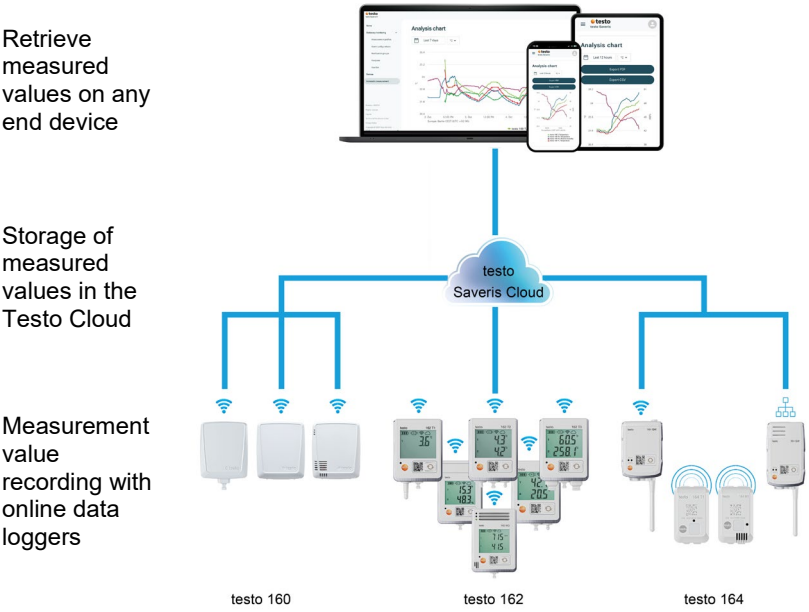
4 Product description

4.1 System overview

The testo 160 online data logger system is the modern solution for monitoring temperature and humidity values. Other measurement variables such as CO_2, atmospheric pressure, lux and UV can also be measured.

The testo 160 online data logger system consists of the hardware components (testo 160, testo 162, testo 164) as well as the testo Smart Connect Cloud (logins | Testo SE & Co. KGaA) and testo Smart App. The testo Smart Connect Cloud is the central data platform. Measurement values can be viewed and analyzed there.

The testo 160, testo 162 and testo 164 products offer you maximum flexibility thanks to their wide range of variants and can be easily combined and expanded in your testo account.



If limit values are exceeded, you can be alerted directly via push notification of limit value violations thanks to the testo Smart App. Alternatively, you can be notified by email or SMS.

You can access all measurement values and analysis functions anytime and anywhere using your internet-enabled smartphone, tablet or PC.

A valid license must be purchased to operate the online data logger in the cloud (Data Monitoring License).

4.2 testo Account

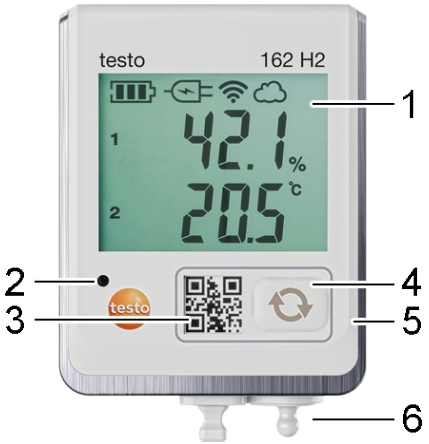
The online data loggers (testo 160, testo 162, testo 164) require an associated testo account to ensure operation.

Each data logger operated there requires a testo Data Monitoring license.

4.3 testo 162 T1 / T2 / T3 / H2

Temperature measurements can be carried out with the testo 162 T1 / T2 / T3 online data loggers. The testo 162 T2 and testo 162 T3 data loggers also each have two connections for external NTC or PD temperature probes.

With the testo 162 H2 online data logger, temperature and humidity measurements can be carried out via an external NTC probe. With the testo 162 T2 and the appropriate connection cable, the status of your door contact can also be monitored.



	Element		Element
1	Display	**2**	Alarm LED, flashes red in the event of an alarm

3	QR code for direct access to instrument data in testo cloud	**4**	Control button, for manually start of data transfer
5	Battery compartment (rear)	**6**	USB and sensor sockets (underside, device-specific)

4.4 testo 162 H1 / testo 162 IAQ

Temperature and humidity measurements can be carried out with the testo 162 H1 online data logger.

The testo 162 IAQ online data logger can be used to measure temperature, humidity, carbon dioxide concentration and atmospheric pressure.

	Element		Element
1	Air quality traffic light (testo 162 IAQ only)	**2**	Alarm LED, flashes red in the event of an alarm
3	QR code for direct access to instrument data in testo Smart Connect Cloud	**4**	Internal sensor for temperature and relative humidity
5	USB interface (underside)	**6**	Battery compartment (rear)
7	Control button, for manually start of data transfer	**8**	Display
9	CO_2 sensor (only testo 162 IAQ)		

4.5 Display symbols

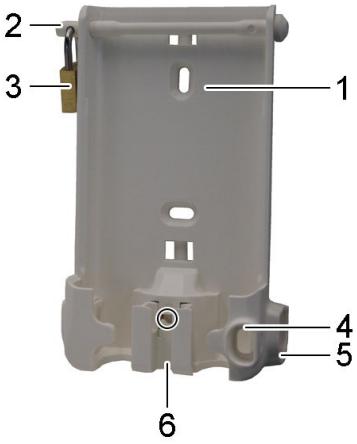
Symbol	Description
	Battery capacity 75% … 100%
	Battery capacity 50% … 74%
	Battery capacity 25% … 49%
	Battery capacity 5% … 24%, Symbol flashes: Battery capacity < 5%
	External power supply (via USB socket)
	WLAN signal strength 100%
	WLAN signal strength 75%
	WLAN signal strength 50%
	WLAN signal strength 25%
	Data connection to the cloud exists, Symbol flashes: Data connection to the cloud is being established
	Alarm message
	Measuring channel 1
	Measuring channel 2
	Alarm status: Upper limit value exceeded
	Alarm status: Lower limit value undershot

4.6 Wall brackets

The data loggers may only be mounted vertically. The connections must face downwards. For data loggers with a display, you must observe the reading direction. Otherwise the measurement accuracy may be distorted.

The wall brackets ensure that the online data loggers are held securely.

Mounting materials are not included in the scope of delivery. Select suitable mounting materials according to the desired mounting location (e.g. screws or cable ties).



	Element		Element
1	Wall bracket with cut-outs for fastening materials	**2**	Safety bolt
3	Lock	**4**	Storage compartment Locking plug USB socket
5	Storage compartment Locking plug for probe socket (left / right)	**6**	Cable holder for USB cable, can be opened: press on the point marked with a circle using a screwdriver and slide the cable holder downwards.

Can be used for: testo 162 T1 (0572 1621), testo 162 T2 (0572 1622), testo 162 T3 (0572 1623) and testo 162 H2 (0572 1625)

	Element		Element
1	Online data logger	**2**	Wall bracket
3	Unlocking tool	**4**	Magnetic plate (can be ordered as an option, order number: 0554 2001)

Can be used for: testo 162 H1 (0572 1624) and testo 162 IAQ (0572 1626)

1 Insert the unlocking tool into the unlocking opening..

2 Pull the data logger upwards out of the wall bracket.

5 First steps

5.1 Creating a testo Account

If you do not yet have a testo account, register at:
https://www.testo.com/en/login/logins

Registration is also possible via the testo Smart App.

The testo Smart App is available for iOS devices in the AppStore or for Android devices in the Play Store.

Compatibility:

Requires iOS 13.0 or newer / Android 8.0 or newer, requires Bluetooth® 4.2.2.

5.2 Commissioning data loggers

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

CAUTION

Damage to online data loggers!

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

CAUTION

Potential damage to the optical components (testo 162 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.

1. Remove the data logger from the packaging.
2. Remove the screen protector.
3. Remove the data logger from the wall bracket.
4. For data loggers with external sensors:
   Connect the sensor to the designated position.
5. For testo 162 T1 / T2 / T3 / H2:
   Loosen the battery cover by slightly loosening the screws on the back of the housing.
   For testo 162 H1 and testo 162 IAQ:
   Open the battery compartment cover.
6. Remove the battery fuse strip.

If the data logger is to be used at temperatures below +10 °C, replace the existing batteries with lithium batteries (0515 0572).

- The data logger is now activated.

7. Tighten the screws on the back of the housing or close the battery compartment cover again.
8. For 162 IAQ: Finally, remove the rubber plug on the back of the housing.

Optional mains operation

The IAQ data logger has an increased energy requirement. This reduces the minimum measuring cycle in battery operation to 5 minutes. The use of the mains adapter included in the scope of delivery is therefore recommended.

The testo 162 online data loggers can also be supplied with power via the USB interface instead of batteries. However, the online data loggers do not have a charging function, i.e. no rechargeable batteries can be charged in the online data logger via the USB interface. When you connect the online data logger to the USB port of your PC, the online data logger automatically switches to mass storage and configuration mode. A computer is therefore not suitable as a power source for logger operation.

Symbol explanation

	Do not allow children under 6 years of age to play with batteries.
	Do not throw batteries in the trash.
	Do not charge batteries.
	Do not place batteries near fire.
	Batteries are recyclable.

5.3 Integrating data loggers into testo Account

There are several ways to integrate the online data loggers into your network and into your testo account:

- Commissioning via testo Smart App (via WLAN hotspot)
- Commissioning via desktop computer and testo Smart Connect Cloud (via USB cable)
- Offline commissioning via PDF (via USB cable)

In networks with WPA2 Enterprise encryption, commissioning via the testo Smart App is not possible.

5.3.1 Commissioning via testo Smart App

To establish a connection via WiFi hotspot, you need a tablet or smartphone with the Testo Smart App already installed on it.

You can get the App for iOS instruments in the App Store or for Android instruments in the Play Store.

Compatibility:

Requires iOS 13.0 or later / Android 8.0 or later.

1 Open testo Smart App.

2 Select the application **Monitoring**.

3 Login or register in the testo account.

4 Select **Commissioning**.

5 Follow the step-by-step instructions.

5.3.2 Commissioning via testo Smart Connect Cloud (via USB cable)

1 Open testo Smart Connect Cloud: www.smartconnect.testo.com

2 Log in to your testo account or register again.

3 Select **Register online data logger**.

4 Follow the step-by-step instructions.

5.3.3 Offline configuration via PDF (via USB-cable)

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 online 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 **Account and settings**.

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

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

5 Click on the **Save configuration** button.

▸ A dialogue opens for exporting the form data.

6 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.

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

8 Check whether the online data logger is shown within 15 min in your could account in **Online Data Logger**.

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

5.4 License

After successfully commissioning the data loggers, you must book a valid license for operating the data loggers in the testo Smart Connect Cloud.

Make sure that you have a valid license for each data logger.

1 Open testo Cloud Account (in the testo Smart App or directly in the testo Smart Connect Cloud).

2 Open **testo Subscription Portal**.

5.5 Configuration and operation of online-data loggers

The testo 160, testo 162 and testo 164 online data loggers can only be used and operated in conjunction with the testo Smart Connect Cloud.

Information on operating the data loggers (configuration, limit values, alarms, etc.) can be found in the notes and info boxes in the testo Smart Connect Cloud.

6 Maintaining the product

6.1 Cleaning the instrument

1 If the housing of the instrument is dirty, clean it with a damp cloth.

Do not use any aggressive cleaning agents or solvents! Mild household cleaning agents and soap suds may be used.

6.1.1 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 For testo 162 T1 / T2 / T3 / H2: Remove the battery cover by opening the screws on the back of the housing.

For testo 162 H1 and testo 162 IAQ: Open the battery compartment cover.

2 Change batteries. Observe polarity.

3 Tighten the screws on the back of the housing or close the battery compartment cover again..

7 Technical data

7.1 Online 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. This process can be shortened to 12 hours by storing the sensor in a well-ventilated place at > 30°C and < 20% RH.

online data loggers	testo 162 T1	testo 162 T2	testo 162 T3
Order number	0572 1621	0572 1622	0572 1623
Temperature measurement			
Sensor type	NTC internal	NTC	Thermo element Type K, Type J, Type T
Measuring range	-30°C … +50°C	-50°C … +150°C	Type K: -195 ... +1350 °C Type J: -100 ... +750 °C Type T: -200 ... +400 °C
Accuracy	± 0,5 °C ± 1 digit	± 0,3 °C	±(0,5 °C + 0,5 % of m.v.)
Resolution	0.1 °C		
Response time	t90 (20K): < 20 min	t90 (20K): < 20 min	

online data loggers	testo 162 H1	testo 162 H2	testo 162 IAQ
Order number	0572 1624	0572 1625	0572 1626
Temperature measurement			
Sensor type	NTC intern	s. ext. probe	Capacitive
Measuring range	-30°C … +50°C		0°C … +50°C
Accuracy	± 0,5 °C ± 1 digit		± 0,5 °C ± 1 digit
Resolution	0,1°C		
Humidity measurement			
Sensor type	Capacitive	s. ext. probe	Capacitive
Measuring range	0 to 100% RH (non-condensing)		0 to 100% RH (non-condensing)

online data loggers	testo 162 H1	testo 162 H2	testo 162 IAQ
Accuracy	±2.0 %RH (0 … 90 %RH @ 25 °C) ±1 %RH hysteresis ±1 %RH/year drift ±0.03 %RH/K (k=1)		±2.0 %RH (20 … 80 %RH @ 25 °C) ±3.0 %RH (@ 25 °C & < 20 %RH & > 80 %RH) ±1 %RH hysteresis ±1 %RH/year drift
Resolution	0.1% RH		
CO_2 measurement			
Measuring range			0 … 5000 ppm
Accuracy			± (50 ppm + 3% of m.v.) (@ 25 °C) Battery-operated: ± (100 ppm + 3% of m.v.) (@ 25 °C)
Resolution			1 ppm
Atmospheric pressure measurement			
Measuring range	600 to 1100 mbar		600 … 1100 mbar
Accuracy	± 3 mbar @ 22 °C		±3 mbar bei +22 °C
Resolution	1 mbar		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).

The online data loggers come with a factory calibration protocol as standard. For many application areas it is recommend to do a re-calibration every 12 months.

General data

online data loggers	testo 162 T1	testo 162 T2	testo 162 T3
Order number	0572 1621	0572 1622	0572 1623
Operating temperature	-30°C…+50°C		
Storage temperature	Without batteries: -40°C … +70°C With supplied batteries: +10°C … +50°C With Energizer lithium batteries: -40°C … +60°C		
Protection class	IP65	IP65	IP54

online data loggers	testo 162 T1	testo 162 T2	testo 162 T3
Measuring and communication cycle	1 min to 24 h flexible		
Memory	10,000 readings per channel		
Voltage supply	4 x AA AlMn batteries optional mains adapter for temperatures below +10 °C please use lithium batteries (0515 0572)		
Battery life	12 months [1] at +25 °C, 15-minute measuring cycle and 30 min communication cycle (8 h / day) and 120 min communication cycle at night[2] (16 h / day) at -30 °C, 15-minute measuring cycle and 30 min communication cycle (8 h / day) and 120 min communication cycle at night (16 h / day) with lithium batteries (0515 0572)		
Dimensions	123 x 75 x 31 mm	95 x 75 x 31 mm	
Weight including batteries	240 g		

online data loggers	testo 162 H1	testo 162 H2	testo 162 IAQ
Order number	0572 1624	0572 1625	0572 1626
Operating temperature	-30°C…+50°C		0°C…+50°C
Storage temperature	Without batteriesrien: -40°C … +70°C With batteries included: +10°C … +50°C With Energizer lithium batteries: -40°C … +60°C		
Protection class	IP30	IP54	IP20
Measuring and communication cycle	1 min to 24 h flexible		Mains operation: 1 min … 24 h flexible Battery operation: 5 min … 24 h flexible
Memory	10,000 readings per channel		32,000 readings (total of all channels)

[1] Typical value, depending on the WLAN infrastructure
[2] Energy saving mode

online data loggers	testo 162 H1	testo 162 H2	testo 162 IAQ
Voltage supply	4 x AA AlMn batteries optional mains adapter for temperatures below +10 °C please use lithium batteries (0515 0572)		
Battery life	12 months [3] at +25 °C, 15-minute measuring cycle and 30 min communication cycle (8 h / day) and 120 min communication cycle at night[4] (16 h / day) at -30 °C, 15-minute measuring cycle and 30 min communication cycle (8 h / day) and 120 min communication cycle at night (16 h / day) with lithium batteries (0515 0572)		Mains operation recommended
Dimensions	117 x 82 x 32 mm	95 x 75 x 31 mm	117 x 82 x 32 mm
Weight including batteries	250 g	240 g	269 g

WiFi-specific data

online data loggers	testo 162 T1	testo 162 T2	testo 162 T3
Order number	0572 1621	0572 1622	0572 1623
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		

online data loggers	testo 162 H1	testo 162 H2	testo 162 IAQ
Order number	0572 1624	0572 1625	0572 1626
WLAN			
Standard	802.11 b/g/n		

[3] Typical value, depending on the WLAN infrastructure
[4] Energy saving mode

online data loggers	testo 162 H1	testo 162 H2	testo 162 IAQ
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 online data loggers use the MQTT protocol, which communicates via port TCP 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 Smart Connect Cloud

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

8 Tips and assistance

8.1 Questions and answers

- **Can the online data logger be connected to the PC using any USB cable?**
  We recommend that you use the USB cable supplied with the online data logger to guarantee stable data transmission. Longer USB cables are suitable for the power supply only.
- **Can the online data logger also be used in networks with WPA2 Enterprise encryption?**
  testo 162 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 online data logger will only be fully transferred once the USB connector has been removed.

However, connections between the online data loggers and the testo Smart App are not possible in networks with WPA2 Enterprise encryption.

- **The XML configuration file is not being applied by the online 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 online data logger's wireless connection to the access point was interrupted, what can I do?**
  1. Press the control key on the online data logger to start searching for a WLAN connection manually.
  2. Change the alignment or position of the online data logger or the access point (WLAN router).
  The error codes can be exported pressing the probe button for > 3 seconds. Then connect the data logger to the PC via USB cable. You can open or export the error report as CSV file.
- **The humidity measurement seems to provide incorrect readings. What can I do?**

  The logger may have been exposed to too high an ambient humidity (>80 % RH) for too long. Especially in combination with high temperatures, this can affect the measurement signal of the humidity sensor. The sensor requires a longer period of time to regenerate. This process can be accelerated by storing the sensor well ventilated at high temperature (> 30°C) and low humidity (< 20 % rH) for at least 12 hours.
- **The CO_2 measurement seems to provide incorrect readings. What can I do?**

  The CO_2 sensor is a precision optical measuring device. Vibrations and shocks may have changed the factory calibration. Recalibration can be

carried out by Testo Industrial Services (TIS) or other certified service providers.

- **The calibration of the humidity sensor has failed. What can I do?**

  When calibrating humidity sensors, ensure sufficiently long adjustment times and sufficient air circulation. You can find more information in the download area of the testo 162 series.

- **The online data logger is displaying the error code E03, E04, E05 or E09, what can I do?**

  An error has occurred in the online data logger. The error will automatically be corrected by the firmware of the online data logger. After a few seconds the error code should no longer be displayed, you do not need to do anything.

- **The online data logger is displaying the 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 onto the online data logger.

- **The online data logger is displaying error code E20, what can I do?**

  A WPA2 Enterprise EAP connection needs to be configured, but no CA certificate could be found. A CA certificate is essential.

  Save the CA certificate in PEM format under the name “ca.pem” together with the XML file or upload it in the web config.

- **The online data logger is displaying error code E21, what can I do?**

  Incorrect format of the ca.pem certificate. Check whether the ca.pem certificate is available in a PEM or BASE64 format. To do so, open the certificate using a text editor and check that you can see the string “-----BEGIN CERTIFICATE-----”. If you cannot see this string, the IT department or the user must explicitly export the certificate from the Radius server using BASE64, or convert it using openssl. There must be one certificate only, not a bundle, inside the file.

- **The online data logger is displaying error code E22, what can I do?**

  A WPA2 Enterprise EAP-TLS connection needs to be configured, but no user certificate could be found. Save the user certificate in PEM format under the name “client.pem” together with the XML file or upload it in the web config.

- **The online data logger is displaying error code E23, what can I do?**

  Incorrect format of the client.pem user certificate. Check whether the client.pem user certificate is available in a PEM or BASE64 format. To do so, open the certificate using a text editor and check that you can see the string “-----BEGIN CERTIFICATE-----”. If you cannot see this string, the IT department or the user must explicitly export the certificate from the Radius server using BASE64, or convert it using openssl. There must be one certificate only, not a bundle, inside the file.

- **The online data logger is displaying error code E24, what can I do?**

  A WPA2 Enterprise EAP-TLS connection needs to be configured, but no private key could be found. Save the private key in PEM format under the name “private.key” together with the XML file or upload it in the web config.

- **The online data logger is displaying error code E25, what can I do?**

  Incorrect format of the private.key certificate. Check whether private.key is available in a PEM or BASE64 format. To do so, open the certificate using a text editor and check that you can see the string “-----BEGIN CERTIFICATE-----”. If you cannot see this string, the IT department or the user must explicitly export the certificate from the Radius server using BASE64, or convert it using openssl. There must be one certificate only, not a bundle, inside the file.

- **The online data logger is displaying the error code E26, what can I do?**

  There are 3 possible reasons for this error:

  1. The access point (WLAN router) is outside the wireless range or is switched off. Check whether the access point is available. If necessary, change the location of the online data logger.

  2. The network name (SSID) stored in the online data logger is incorrect. Check the network name of the WLAN network. Use the Quick Start Guide to create a new configuration file with the correct network name and save this onto the online data logger.

  3. The access point of the WLAN network does not use one of the following encryption methods: WEP, WPA (TKIP), WPA2 (AES, CCMP). Configure the access point so that one of the supported encryption methods is used.

- **The online data logger is displaying the error code E32, what can I do?**

  The online 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 onto the online 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 online data logger is displaying the error code E35, what can I do?**

  The online 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 online data logger is displaying error code E36, what can I do?**

  The DNS could not be resolved:

  1. The access point (WLAN router) has no connection to the internet. Check the access point's internet connection.

  or

2. The routing within the network infrastructure is not working. Check whether too many terminal devices are logged into the access point.

- **The online data logger is displaying the error code E41, what can I do?**

  The online 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 online data logger is displaying the error code E51, what can I do?**

  The online data logger was not able to connect to the Testo Cloud.

  1. If the online 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 online 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 online data logger is displaying error code E52, what can I do?**

  The data logger could not log into the Cloud because it is already logged into another account. Please log the data logger out of the existing account first.

- **The online data logger is displaying the error code E63, what can I do?**

  The online 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 online 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 online 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 online data logger is displaying the error code E75, what can I do?**

  A firmware update for the online data logger failed.

  The internet connection was interrupted during the transmission or the data was not received intact by the online data logger for other reasons. Check whether there is a stable connection from the online 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 online data logger.

- **The online data logger 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 onto the online data logger.
- **The online data logger 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 onto the online data logger.
- **The online data logger is displaying the warning message no License, what can I do?**

  The online data logger cannot be logged on because the number of online data loggers permitted to log on has been exceeded or your testo Smart Connect Cloud licence has expired.

  Log off another online data logger, extend or renew your testo Smart Connect Cloud licence.
- **The online data logger is displaying the warning message not Active, what can I do?**

  The online data logger has been deactivated. It is not storing, and therefore not sending, any measurement data to the Testo Cloud.

  Activate the online data logger (under Configuration --> online data logger) when the online data logger needs to store and send measurement data again.

8.2 Signals of status LED

The following table provides an overview of the meaning of the various status LED signals of the testo 162 online data logger.

Signal	Description
LED does not flash	Sleep mode
LED flashes green at one-second intervals (for 5 min, then 1 long red flash)	Configuration mode (hotspot) (key press > 6 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 162 H2 into the Cloud without any external probes connected.)
LED gives 1 long green flash	Configuration via USB/PDF successful (XML is correct)

Signal	Description
LED gives 3 red flashes	Configuration via USB/PDF failed (XML is incorrect)
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 online data logger to factory settings (key pressed > 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 flashes alternately green and red	Firmware update via USB or wireless
LED flashes red 4 times for a long time.	Press the button on the front of the logger briefly (< 1 sec). If the online data logger flashes red 4 times again, the batteries are exhausted and must be replaced.

8.2.1 Key functions

The key on the online data logger has different functions depending on how long it is pressed:

Key operation	Function
Press the key > 1 s	- Not configured data logger: start configurationn mode - Configured data logger: start measurement and communication mode
Press the key > 3 s	Start recording of log file, to export this via USB cable.
Press the key > 6 s	Restart configuration mode (for already configured data loggers)
Press the key > 20 s	Reset the online data logger to factory settings.

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