egnite

Querx

Network thermometer, hygrometer and data logger

User Guide

Querx TH
Querx WLAN TH
Querx THP
Querx WLAN THP
Querx PT
Querx WLAN PT

Handbook version 5.2
Firmware version 4.2

Table of Contents

1 Introduction

The Querx product line comprises smart sensors that gather and monitor temperature- and humidity-values.

This user manual will tell you how to configure, use and maintain the network-compatible devices.

Querx online

Current and further information on the Querx range of products can be found at www.egnite.de and sensors.egnite.de.

1.1 Safety Notices

Please read this manual carefully and take note of the following safety notices, in order to minimize the risk of damage or injury.

Intended purpose

Querx is intended to monitor and analyze climate data and make this data available via various interfaces.

Any other use of the devices is considered contrary to the designated use. The manufacturer takes no responsibility for consequences resulting out of any application that does not comply with the designated use.

Danger of death caused by electrical shocks

Please follow these safety notes, in order to minimize the risk of electrical accidents:

- Only use the device, cables and power supply in faultless condition.
- Disconnect the device from the power source before maintenance.
- Do not manipulate the device or its accessories.
- Only let qualified personnel carry out maintenance work.
- Do not submerge the device in water or any other liquid.

1.2 Symbols

The following symbols will be used throughout this manual:

⚠	**Danger** Indicates possible danger of injuries.
⚠	**Attention** Indicates issues that can damage the device.
⚠	**Information** Points out helpful hints and tips.

1.3 About Querx

Querx sensors gather climate data and make it accessible via network-interfaces. An alert function automatically sends notifications via email (TLS / StartTLS), SNMP and Syslog when limit values are exceeded.

The integrated data logger can track 36,864 (THP), 73,728 (TH / PT), or 4 Million (WLAN) entries. Depending on the rate at which the measurements are saved, Querx THP can thus save 25 days (1 entry / min) to 4.2 years (1 entry / h) worth of data. Querx TH and PT can record data for 51 days to 4.2 years, while the WLAN models can track data for 7.5 years to 350 years.

The gathered values are displayed in an interactive graph on the web-interface. The data can additionally be exported in various formats or accessed via an HTTP-interface.

Querx can be connected to the Internet of Things, using cloud services, making data accessible globally via the web and apps.

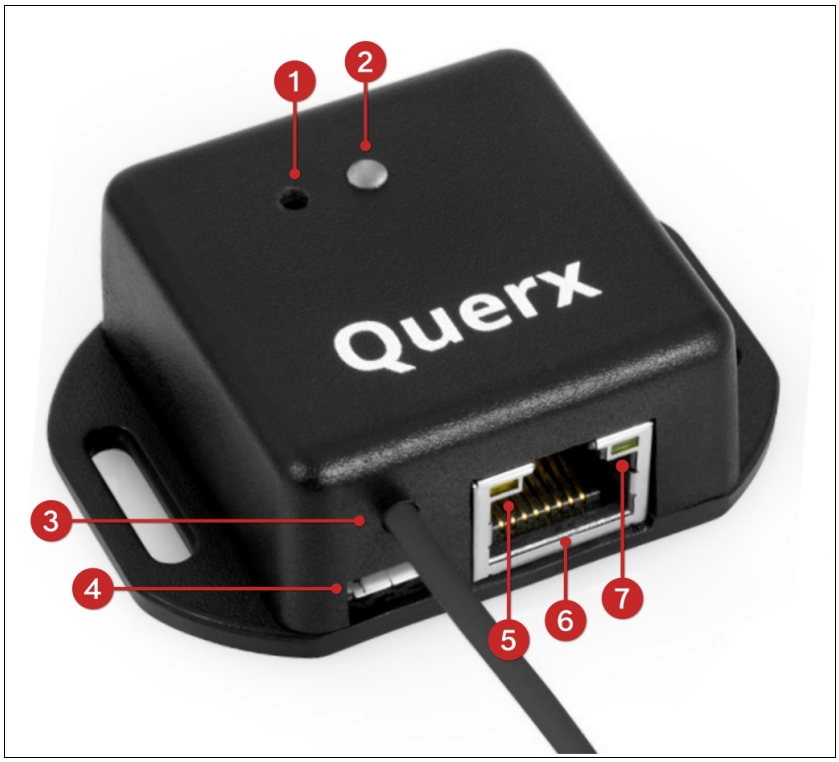
SNMP makes it possible to integrate the devices into network-management solutions, Modbus/TCP allows for the integration into industrial process control systems (SCADA). Status-, error- and alert-notifications can also be forwarded to a Syslog-server.

1.3.1 Querx at a Glance

Querx TH

Querx THP

Querx PT



1. Reset button

2. Status LED

3. Sensor-cable

4. Micro-USB socket for power supply

5. Link LED

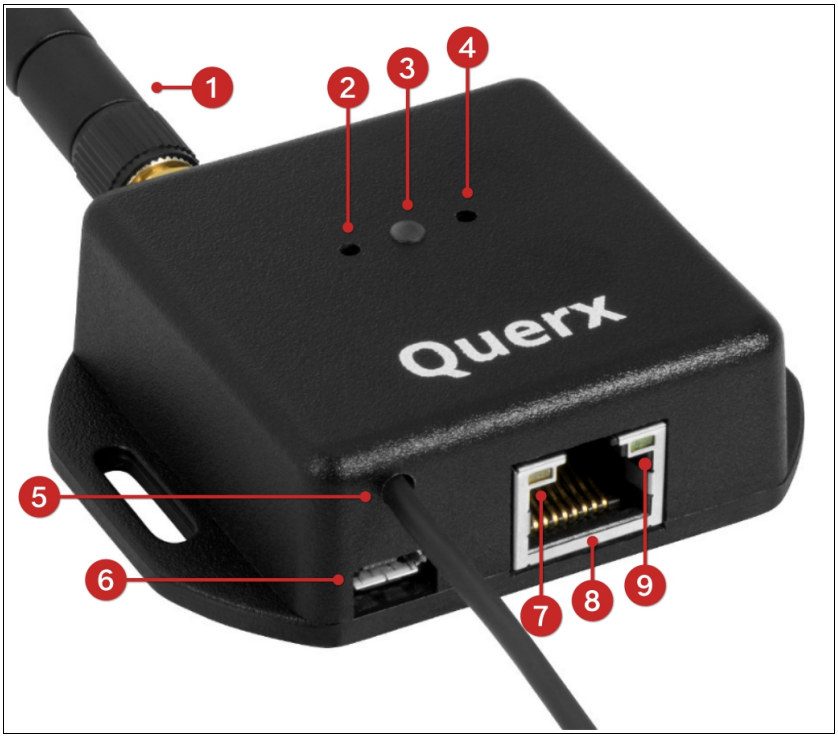
6. RJ45-socket for Ethernet connection

7. Network-activity LED

Querx WLAN TH

Querx WLAN THP

Querx WLAN PT



1. WiFi antenna

2. Button (currently without function)

3. Status LED

4. Reset button

5. Sensor-cable

6. Micro-USB socket for power supply

7. Link LED

8. RJ45-socket for Ethernet connection

9. Network-activity LED

1.3.2 Features

- Stand-alone device, no additional computer or software required for operation
- Sends alert notifications via e-mail, SNMP-trap and Syslog when limit values are exceeded
- Data logger with a capacity of 36,864 (Querx THP), 73,728 (Querx TH and PT) or 4 million (WLAN models) entries; equivalent to at least 25 days (Querx THP), 51 days (Querx TH and PT) or 7.5 years (WLAN models) at a rate of one entry per minute
- Data export in the CSV-, JSON- and XML-formats
- Current and logged values can be accessed via various interfaces
- Encrypted e-mails (StartTLS / TLS)
- Cloud-connectivity for global data access
- Compact footprint

1.3.3 Possible Application Areas

- Server room monitoring
- Pharmacies
- Hospitals
- Food hygiene
- Property monitoring
- Automated buildings
- Preventive stock conservation in museums, archives and warehouses
- Determining the cause of mould

1.3.4 Ships With

Querx TH

Querx TH Set (item number EGN600114)

- Querx TH with integrated temperature- and humidity-sensors
- Ethernet cable
- Micro-USB cable
- USB power adapter with interchangeable plugs for UK, EU, US and AU outlets
- CD with software and documentation

Querx TH (item number EGN 600214)

- Querx TH with integrated temperature- and humidity-sensors

Querx THP

Querx THP Set (item number EGN601216)

- Querx THP with integrated temperature-, humidity- and pressure-sensors
- Ethernet cable
- Micro-USB cable
- USB power adapter with interchangeable plugs for UK, EU, US and AU outlets
- CD with software and documentation

Querx THP (item number EGN 601116)

- Querx THP with integrated temperature-, humidity- and pressure-sensors

Querx PT

Querx PT100 Set (item number EGN600414)

- Querx PT 100
- Simple Pt100-sensor without pocket sleeve
- Ethernet cable
- Micro-USB cable
- USB power adapter with interchangeable plugs for UK, EU, US and AU outlets
- CD with software and documentation

Querx PT100 (item number EGN600514)

- Querx PT 100

- Simple Pt100-sensor without pocket sleeve

Querx PT1000 Set (item number EGN600714)

- Querx PT 1000
- Simple Pt1000-sensor without pocket sleeve
- Ethernet cable
- Micro-USB cable
- USB power adapter with interchangeable plugs for UK, EU, US and AU outlets
- CD with software and documentation

Querx PT1000 (item number EGN600814)

- Querx PT 1000
- Simple Pt1000-sensor without pocket sleeve

Querx WLAN TH

Querx WLAN TH Set (item number EGN601115)

- Querx WLAN TH with integrated temperature- and humidity-sensors
- WiFi antenna
- Ethernet cable
- Micro-USB cable
- USB power adapter with interchangeable plugs for UK, EU, US and AU outlets
- CD with software and documentation

Querx WLAN TH (item number EGN601215)

- Querx WLAN TH with integrated temperature- and humidity-sensors
- WiFi antenna

Querx THP

Querx WLAN THP Set (item number EGN602117)

- Querx WLAN THP with integrated temperature-, humidity- and pressure-sensors
- WiFi antenna
- Ethernet cable
- Micro-USB cable

- USB power adapter with interchangeable plugs for UK, EU, US and AU outlets
- CD with software and documentation

Querx WLAN THP (item number EGN 602217)

- Querx THP with integrated temperature-, humidity- and pressure-sensors
- WiFi antenna

Querx WLAN PT

Querx WLAN PT100 Set (item number EGN601315)

- Querx WLAN PT 100
- WiFi antenna
- Simple Pt100-sensor without pocket sleeve
- Ethernet cable
- Micro-USB cable
- USB power adapter with interchangeable plugs for UK, EU, US and AU outlets
- CD with software and documentation

Querx WLAN PT100 (item number EGN601415)

- Querx WLAN PT 100
- WiFi antenna
- Simple Pt100-sensor without pocket sleeve

Querx WLAN PT1000 Set (item number EGN601615)

- Querx WLAN PT 1000
- WiFi antenna
- Simple Pt1000-sensor without pocket sleeve
- Ethernet cable
- Micro-USB cable
- USB power adapter with interchangeable plugs for UK, EU, US and AU outlets
- CD with software and documentation

Querx WLAN PT1000 (item number EGN601715)

- Querx WLAN PT 1000

- WiFi antenna
- Simple Pt1000-sensor without pocket sleeve

1.3.5 Querx Accessories

The following accessories and spare parts can be purchased from the manufacturer egnite:

- WiFi antenna
- Ethernet cable
- Micro-USB cable
- USB power adapter with interchangeable plugs for UK, EU, US and AU outlets
- DAkkS-calibration certificate (German Accreditation Body)

A selection of Pt100- and Pt1000 sensors is available from shop.egnite.de.

2 First Use

2.1 Before Setup

If the device's temperature differs from the ambient climate, it should be left to acclimatize before setup.

In this case, wait for approximately two hours before connecting Querx to the power supply.

⚠	**Attention** Temperature differences between the smart sensor and its surroundings can lead to condensation, damaging the device.

⚠	**Information** Temperature differences between the smart sensor and its surroundings can lead to inaccurate measurements.

2.2 Mounting the Sensor

Querx sensors can be mounted using the latches on the case. They can alternatively be mounted using zip-ties to tie them to piping, for instance.

Please take note of the following points when mounting the device:

- Querx is designed for indoor use.
- Do not mount Querx in locations that are directly exposed to sunlight.
- **TH and THP Models:** The device should be exposed to a sufficient airflow. Measurements can be made in still air, but the results for humidity will be falsified.
- Do not mount Querx with the sensor cable pointing upward. The cable should point downward or toward either side of the device

2.3 Model PT: Connecting the Sensor Cable

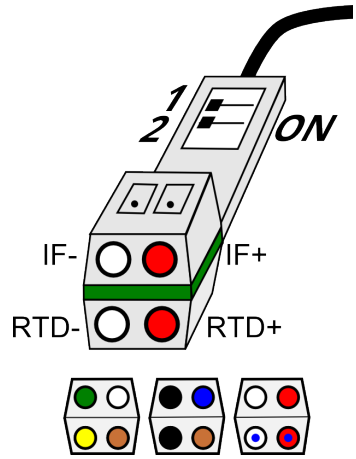
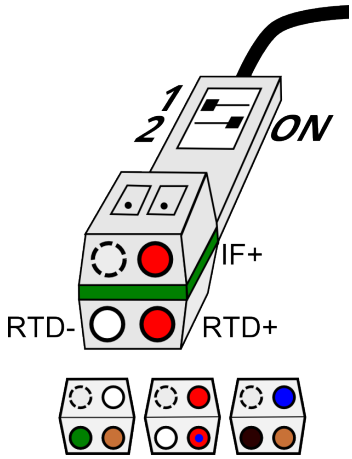
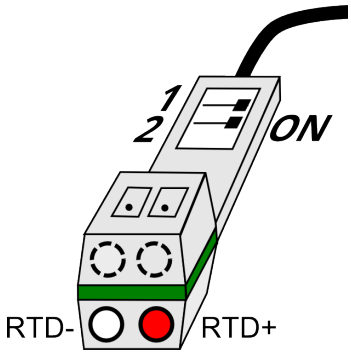
The Querx PT models support 2-, 3- or 4- wire Pt100 or Pt1000 sensors. Their color coding can vary, depending on the underlying standards.

You will require the following tools, in order to connect a sensor.

- A tool with a fine tip, e.g. a fine screwdriver or a pair of tweezers
- A biro
- Possibly a magnifying glass

2.3.1 Connecting a Sensor

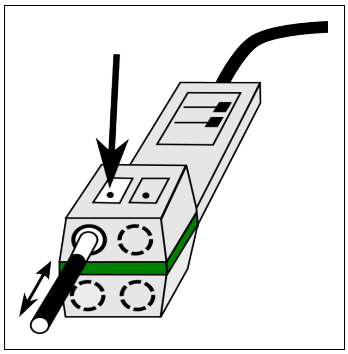
Two DIP switches located above the terminals for the cable cores are used to select whether the sensor is connected to Querx PT using two, three or four cable cores.

		
4-core Sensor	3-core Sensor	2-core Sensor

1. The above illustrations tell you which switch position your sensor requires.
2. Use a tool with a fine tip to set the DIP switches to the required position. If necessary, use a magnifying glass.
3. Proceed to connect the individual cable cores to the terminals as displayed in the images.

⚠	**Information** It might be that none of the displayed cable core colors correspond with your sensor, depending on the standard underlying the sensor. In this case, please consult the data sheet provided by the manufacturer.

2.3.2 Mounting Individual Cable Cores



1. Depress the fixture corresponding with the terminal to which you want to connect the cable core.
2. Insert the core into the terminal.
3. Release the fixture.
4. Test the connection by lightly pulling at the cable.

In order to remove the cable, depress the fixture again and pull the cable out.

2.4 Establishing the Network Connection

Connect Querx to your network or directly to the computer you intend to use to configure the device, using a network cable.

2.5 Power Supply

1. Prepare the power adapter by inserting the plug that is used in your country. An audible click indicates that the connection has been made.

Now connect Querx to the power adapter using a micro-USB cable and plug the power supply into a socket. The Querx status-LED will now light up yellow.

Danger

Never use the device with a defective power adapter! Risk of death from electrical shock!

Querx can alternatively be connected to a free USB-Port, if no free power outlet is available.

2.6 Network Configuration Via DHCP

Access the integrated web-interface via LAN, in order to configure Querx.

The network can be configured automatically, using DHCP. The status-LED will light up yellow if the device has received valid data.

The LED will flash yellow if a network error occurs. In this case, check that all wires are connected correctly.

Should the problem persist, talk to your network administrator or connect the device to your computer directly.

2.7 Manual Network Configuration

An Ethernet connection needs to be established, in order to configure Querx. This initial connection is normally configured automatically, which will let you access the device as described in chapter 3.1 *Accessing the Web Interface*. If your network does not support DHCP or the computer you wish to use for the configuration does not support mDNS, the network connection will need to be configured manually.

⚠	**Information** The steps detailed in the following section are not required by most users. Please continue reading at chapter 3 *Web Interface and Configuration Area* and chapter 4 *Basic Configuration*.

2.7.1 Installing the Device Discoverer

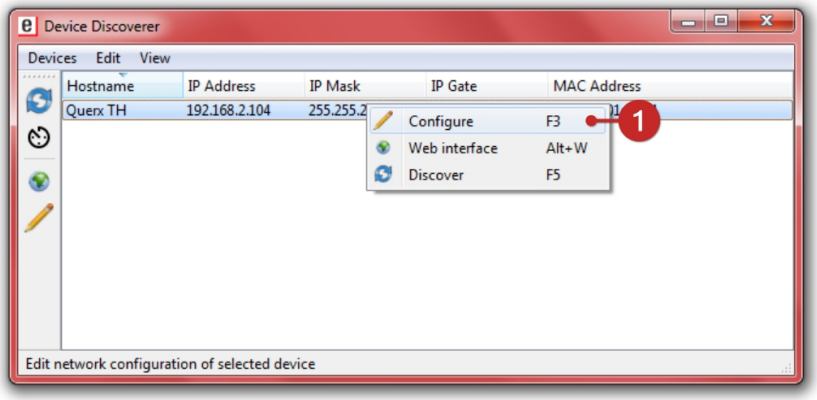
The **Device Discoverer** application can be found on the CD-ROM included in the package. It can also be downloaded from sensors.egnite.de. The application will help you set up Querx.

1. Open the **Device Discoverer** installation file.

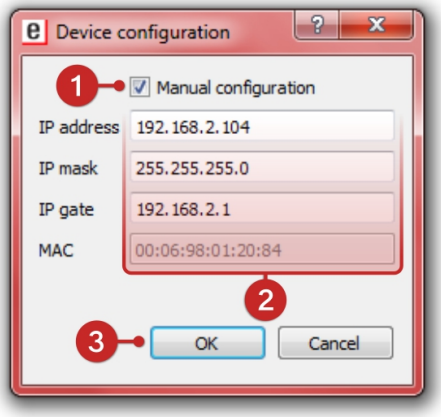
2. Follow the install wizard's instructions.

2.7.2 Configuring the Network Connection

Start the application **Device Discoverer**.



1. Right-click the device you wish to configure and click *Configure* in the drop-down menu.



1. Activate the checkbox *Manual configuration*.
2. Enter the *IP address*, the *IP mask* and the *IP gate*.
3. Save the changes by clicking *OK*.
4. Querx will apply the settings and then restart. The status-LED will light up yellow. The status-LED will flash green as soon as the device is operational.
5. Querx is now available on your network and can be accessed as described in chapter 3 W*eb Interface and Configuration Area*.

3 Web Interface and Configuration Area

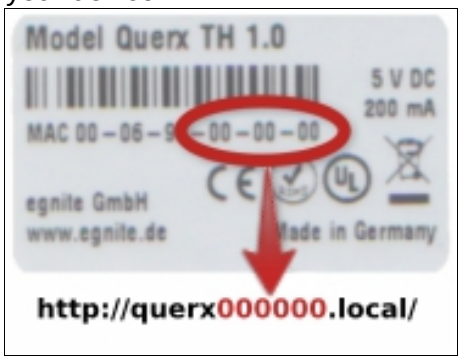
3.1 Accessing the Web Interface

Access via system name

Querx is accessible via mDNS, using the *system name*. You can later customize this name.

Open your web browser and enter the following URL:
http://<system name>.local/

The default system name is querx000000. The six zeros are placeholders for the last six digits of the device's MAC address. The MAC address can be found on the sticker on the back of your device.



The URL for the example in the illustration is
http://querx000000.local/

⚠	**Information** You may need to flush the DNS-Cache after changing the device's IP address. Simply enter the command "ipconfig /flushdns" into the command line.

Access via Bonjour

Querx can be accessed directly from the Safari web browser, using the Bonjour menu.

⚠	**Information** If you cannot access the web interface, the network settings need to be configured manually. See chapter *2.7 Manual Network Configuration* for a guide.

3.2 Home Page

The home page shows a graph that displays all the data gathered by Querx. The configuration of the display and data export are described in the chapters *7 Configuring the Interfaces* and *8 Data Access*.

The button that lets you log in users and access the configuration screen is located in the top right area of the home page.

3.3 Log in as a User

If you have set up users and assigned access rights to them, you will first need to log into the device.

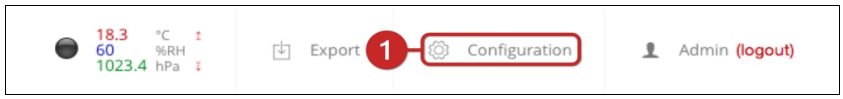
1. Enter the user name into the input field *User* and the password into the input field *Password*.

2. Click *Login*.

The default settings do not include any password-protected users. Chapter *4.3 User Administration* describes how to create and manage users.

3.4 Accessing the Configuration Area

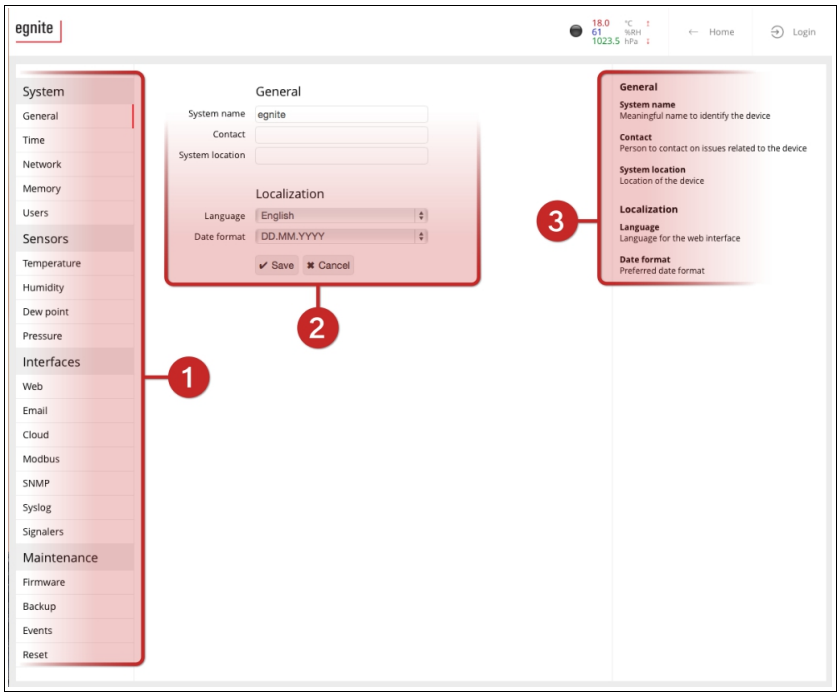
Now enter the configuration area.



1. Click the button *Configuration* in the top right screen area.

3.5 The Configuration Area

You are now viewing the home page of the configuration area. You can change all of the device's settings from here.



1. Setup menu
Navigate to all the setup options via this menu.

2. Settings
The middle area lets you change the corresponding settings.

3. Help section
The section on the right of the screen displays short explanations of all the parameters that can be found on each page.

4 Basic Configuration

4.1 General Settings

The following settings need to be configured for Querx to function correctly.

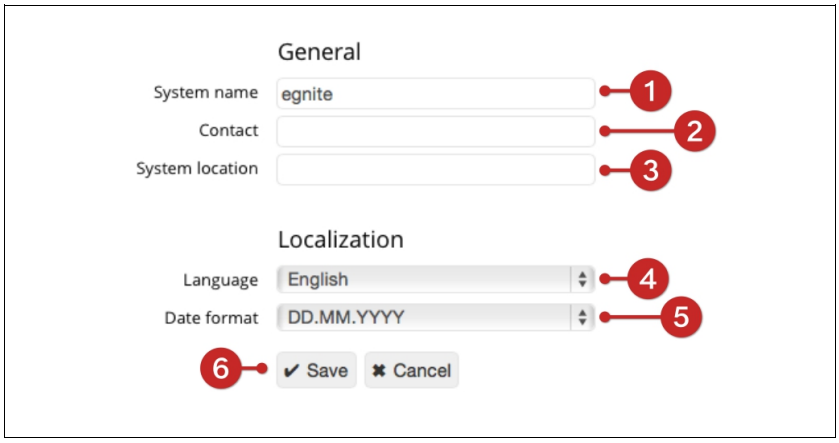
4.1.1 General Information, Language and Date

The page *System / General* lets you enter general information on the device.

The system name identifies the device whenever it sends alarms and when using M2M interfaces. It also serves as the host name which can be used to access Querx via a web browser (cf. section *3.1 Accessing the Web Interface*).

The *contact* and *location* parameters can be retrieved via SNMP (cf. section *7.5 SNMP*).

The *language* selection lets you set the web interface's language. The *date format* field is used to select the format in which calendar dates are displayed in the web interface and in exported files.

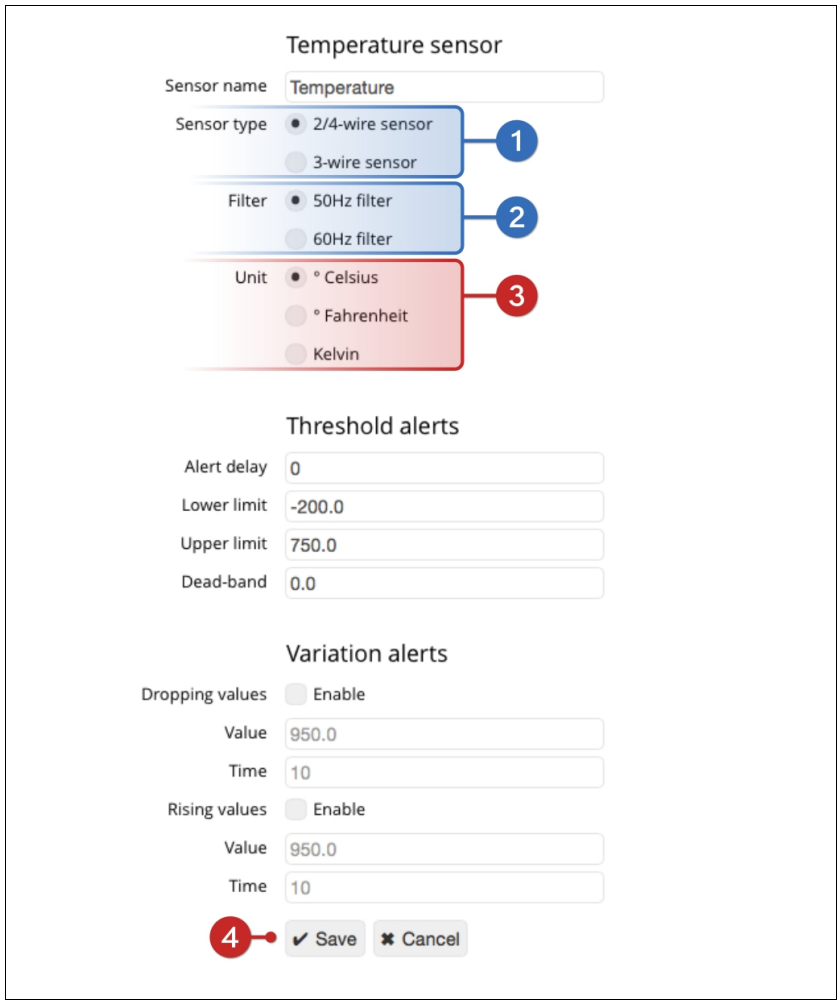


1. Enter the device's system name into the input field *System name*.
2. If you intend to use SNMP, enter the responsible contact person into the input field *Contact.*
3. If you intend to use SNMP, enter the device's location into the input field *System Location.*
4. Select the *Language* in which you want the web interface to be displayed.

5. Select the *Date format* for the web interface and exported files.
6. Click *Save* to apply your changes.

4.1.2 Configuring the Temperature Sensor

Open the page *Sensors / Temperature* in the configuration area, in order to configure the temperature sensor.

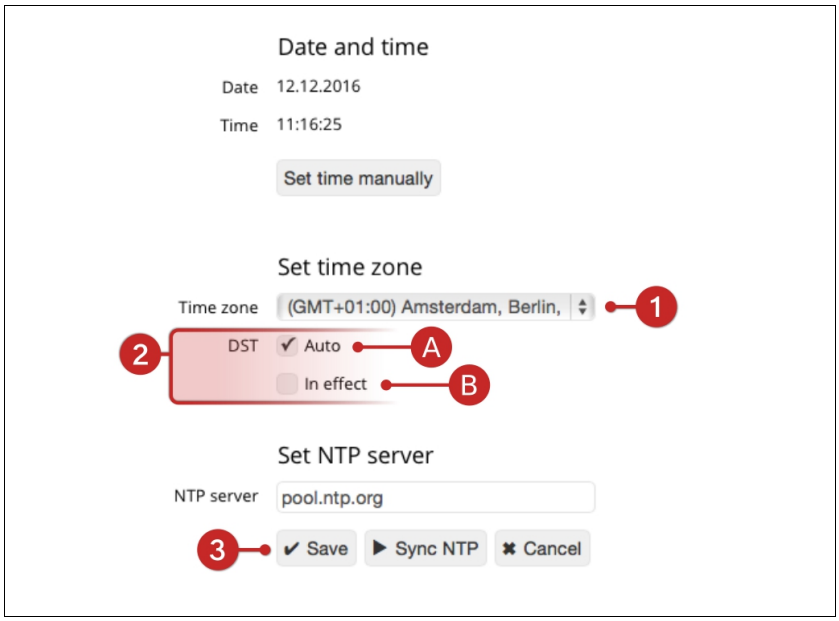


1. **PT Models:** Select whether you are going to use a 2-. 3- or 4-wire sensor in the input field *Sensor type*.
2. **PT Models:** Set the *Filter* to the mains frequency used in your country. In Europe this is 50 Hz.
3. Enter the physical *Unit* which you want Querx to use by selecting ° *Celsius*, ° *Fahrenheit* or *Kelvin*.
4. Click *Save* to apply your changes.

4.1.3 Setting the System Time

Open the page *System / Time*.

The time zone needs to be set up:



1. Select the correct time zone for your country from the drop down menu *Time zone*.

2. Select the settings for daylight saving time.

A. Select *Auto* in the *DST* settings, if your country uses daylight saving time and the clocks are changed on the last Sundays of March and October.

B. Deactivate the setting *Auto*, if your country uses daylight saving time but the clocks are not changed on the last Sundays of March and October. In this case, you will need to manually select whether daylight saving time is currently in effect, whenever the clocks are changed.

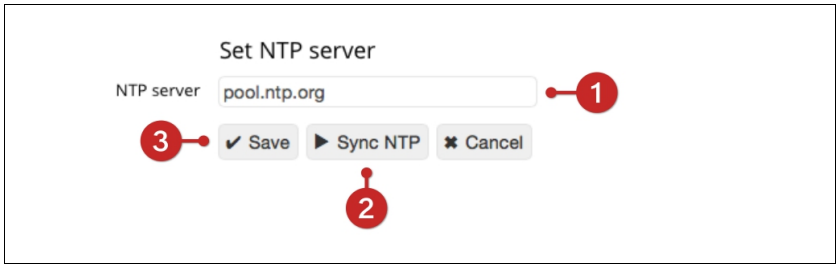
3. Click *Save* to apply your changes.

⚠	**Information** The following settings are recommended for users in the UK: Time zone: (GMT +00:00) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London) DST: automatic The settings for users in the US depend on the time zone you are in.

⚠	**Information** The following settings are recommended for users in central Europe:Time zone: (GMT +01:00) Amsterdam, Berlin […] DST: automatic

Updating date and time via the network

The automatic configuration of date and time via SNTP is advisable if the device is connected to the internet, or an NTP server is accessible on the local network.



1. Enter an *NTP-server*.

2. Click *Sync NTP* to update time and date.

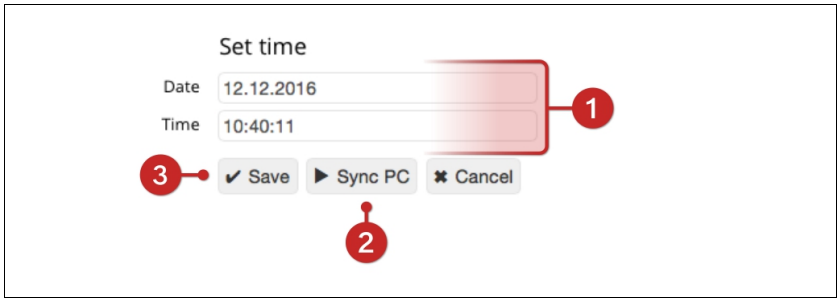
3. Click *Save* to apply your changes.

⚠	**Information** If a valid NTP-server is entered, time and date are automatically updated once an hour.

Setting time and date manually

Time and date can also be set manually, if no NTP-server is available. Querx includes a battery backed real-time clock, which lets it keep time if a power shortage should occur.

1. Click *Set time manually*.



1. Type the values into the input fields *Date* and *Time*. Please enter these in the format that you selected on the page *System / Basic* settings.

2. Alternatively, you can synchronize the date and time settings with the PC you are using to configure the device. Simply click *Sync PC* to do so.

3. Click *Save* to apply your changes.

4.1.4 Configuring the Data Logger

Querx features an integrated data logger that tracks the following data in configurable time intervals:

- Peak, minimum and average temperature values
- **TH and THP models:** Peak, minimum and average humidity values
- **THP models:** Peak, minimum and average pressure values

Querx THP can save up to 36,864 entries. Querx TH and PT have a capacity of 73,728 entries. The WLAN models can record 4 million entries. This means that Querx THP can store data for 25 days when logging one entry per minute. Querx TH and PT can track data for 51 days and the WLAN models can record data for 7.5 years, when using the same settings. Data compression can be activated, in order to increase the timespan that can be logged. If compression is activated, entries are only saved if any change has occurred since the last entry.

The memory is designed as a ring memory. If the memory's maximum capacity is reached, the oldest entries will be overwritten.

1. Set the interval between logged entries by entering the required number of minutes in the input field L*ogging interval*.
2. If required, activate data *Compression*.
3. Click *Save* to apply your changes.

⚠	**Information** Data compression can lead to noncritical display errors in the representation of measurements in the diagram.

4.1.5 Deactivating the Discovery Function

In delivery condition, Querx is accessible via the **Discovery Service**, in order to facilitate the manual configuration of its network settings using the Device Discoverer. It is advisable to deactivate this service once the device is configured to increase the system's security. For this purpose, open the page *System / Network*.

1. Deactivate the checkbox *Discovery*.

2. Click *Save* to apply your changes.

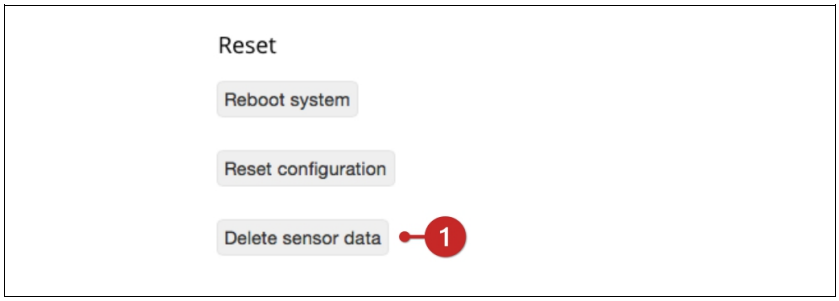
⚠	**Information** Querx will no longer be displayed in the **Device Discoverer** if the Discovery Service is deactivated.

4.1.6 Resetting the Internal Memory

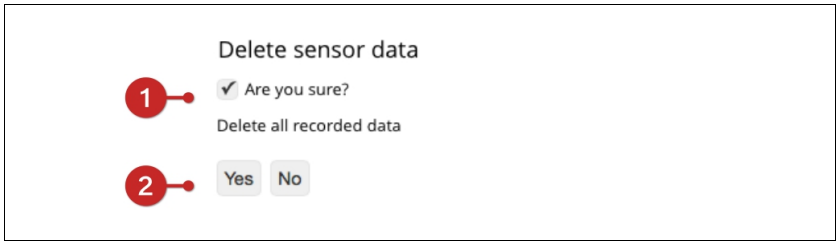
Querx begins logging data as soon as the device is taken into operation.

The previously logged data needs to be deleted, in order to begin logging data according to the basic settings you have configured.

Open the page *Maintenance / Reset*.



1. Click the button *Delete sensor data*.



1. Confirm that you wish to delete the data by clicking the checkbox *Are you sure?*

2. Click *Yes*.

Please be patient, as this process can take a little while. Querx will reboot after completion and then restart logging data.

4.2 Network Configuration

Querx can be connected to a network via an Ethernet LAN cable. The WLAN models can alternatively be connected to WiFi networks.

The Ethernet interface needs to detect a network connection, in order to activate the wired network interface. If no Ethernet connection is detected, or an existing one is disconnected, Querx WLAN will activate the WiFi interface.

4.2.1 Ethernet Interface

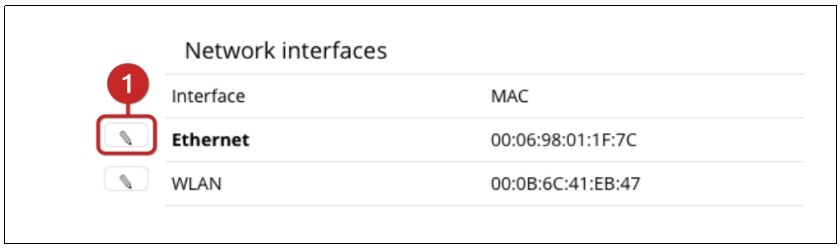
The factory settings let Querx configure the wired network connection automatically.

Alternatively, the network settings can be configured manually. Manually assigning a static IP-address to the device will make it boot more quickly and also make it accessible at the same IP-address at all times.

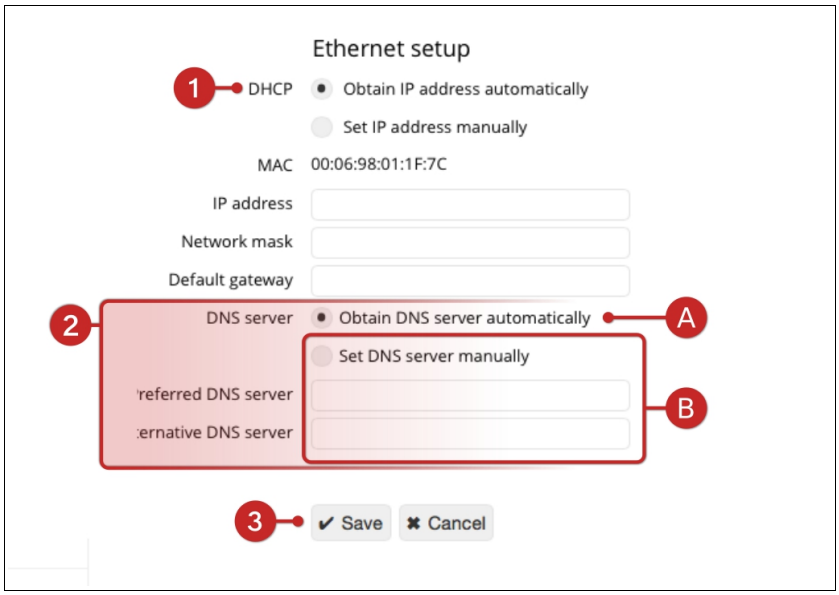
⚠	**Information** Changes to the network settings will only be applied after the device has rebooted.

4.2.1.1 Dynamic Network Configuration

Open the page *System / Network* in the configuration area to select the dynamic network configuration using DHCP or Zeroconf.



1. Click the *Edit* symbol next to the entry *Ethernet* to access the settings for this interface.



1. Select *Obtain IP address automatically*.

2. Choose whether you want to

A. *Obtain the DNS server automatically* or

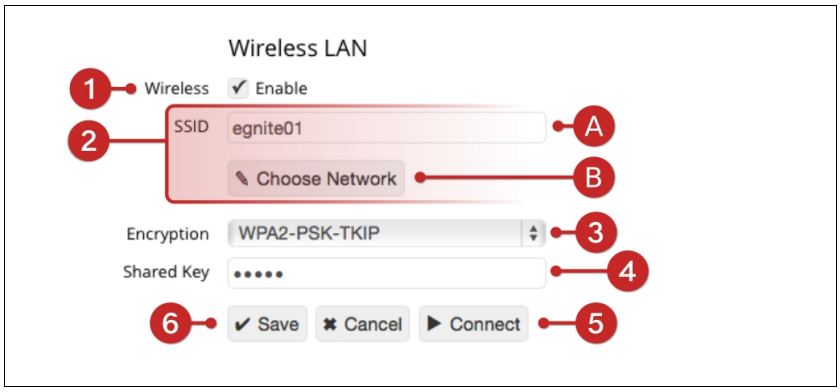
B. *Set the DNS server manually*.

3. Click *Save* to apply your settings.

⚠	**Information** Changes to the network settings will only be applied after the device has rebooted.

4.2.2 WLAN Models: WiFi Interface

Open the page *System / WiFi* in the configuration area to configure the WiFi interface.



1. Click *Enable*, in order to activate the WiFi interface.

2. Select a network.

A. Enter the selected network's SSID manually in the input field *SSID* or

B. click the button *Select network* to select the network from a list of available wireless networks.

3. Select the method of encryption from the drop down menu *Encryption*.

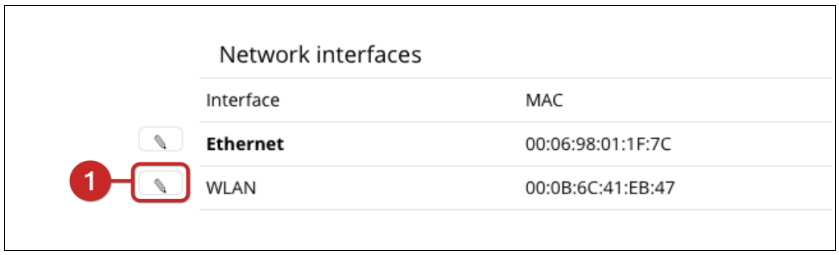
4. Enter the key in the input field *Shared key*.

5. Click *Connect* to test the connection with the entered parameters.

6. Click *Save* to apply your changes.

4.2.2.1 Dynamic and Static Network Configuration

Open the page *System / Network* in the configuration area to select the dynamic network configuration using DHCP or Zeroconf.



1. Click the *Edit* button next to the entry *WiFi*.

Proceed as described in section 4.2.1 *Ethernet Interface*.

4.2.3 WLAN Models: Selecting the Active Network Interface

Querx WLAN switches between the Ethernet and WiFi interfaces according to whether it can detect a wired Ethernet connection.

If a wired network connection is detected, Querx WLAN activates the Ethernet interface. If no wired connection is detected or an existing connection is disconnected, the device will activate the WiFi interface.

The device needs to reboot, in order to change the active network interface. This process can take a little while.

The status LED indicates which network interface is currently active. The LED flashes

- *green* when the Ethernet interface is active
- *blue* when the WiFi interface is active.

4.3 User Administration

The factory settings include an anonymous user, whose access is not password protected. Three additional, password-protected users can be set up. The following access privileges can be assigned to these users:

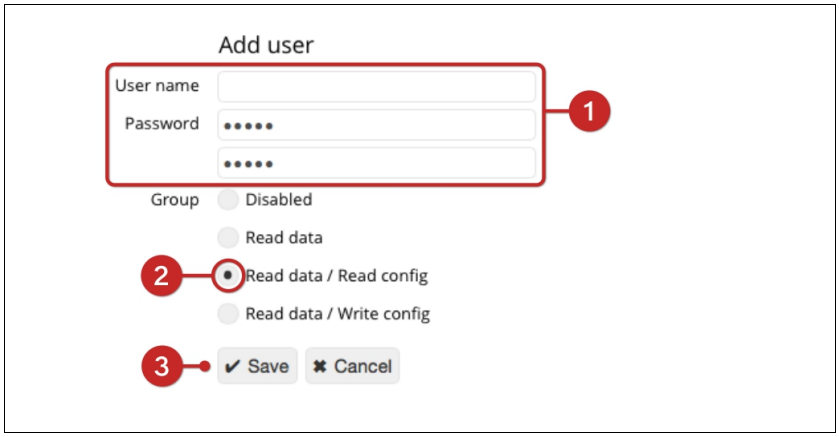
- *Deactivated*: The user can not access the device.
- *Read data*: The user can read the data tracked by Querx
- *Read data / Read config*: The user can read the data tracked by Querx and the device's settings.
- *Read data / Write config*: The user can read the data tracked by Querx and the device's settings. They can also change the settings.

The factory settings do not include a password-protected user, making the device's settings accessible to any user on the network. Therefore, it is advisable to set up users with password-protected access and then restrict the anonymous user's access.

4.3.1 Creating a New User Account

Open the page *System / Users* in the configuration area to change the user settings.

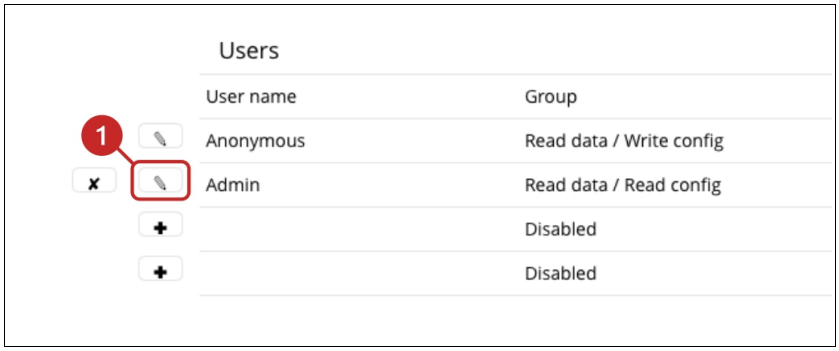
1. Click the *Add* button next to an empty line in the section *Users*.



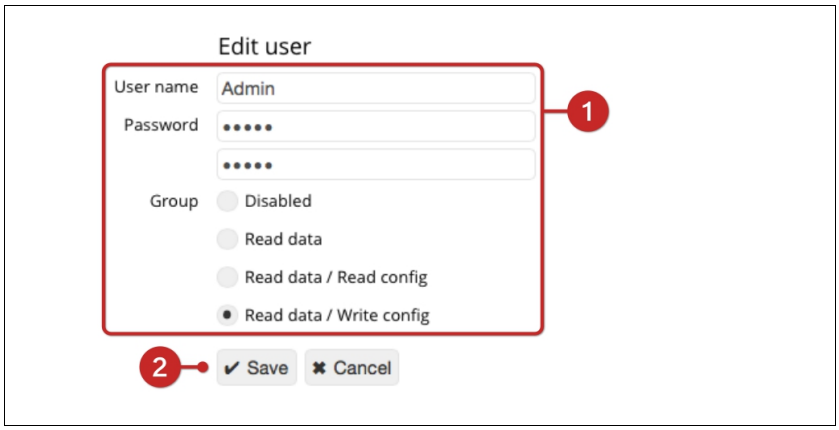
1. On the following page, enter a user name into the input field *User name* and a password into the input field *Password*.
2. Assign the user to a *Group* of access rights.
3. Click *Save* to apply your settings and create the user account.

4.3.2 Editing a User Account

Open the page *System / Users* in the configuration area.



1. Click the *Edit* symbol in the section *Users*.



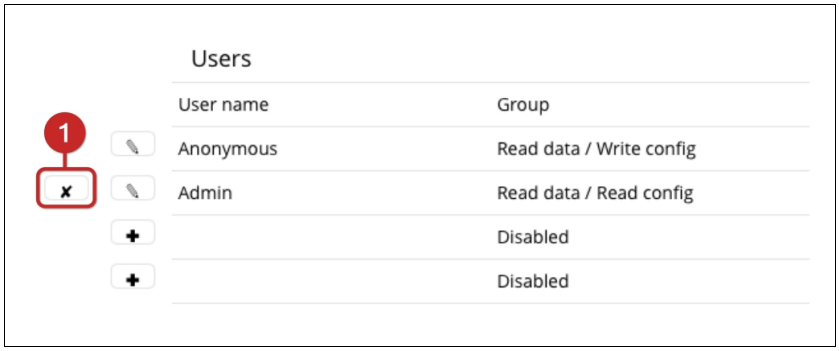
1. Make the required changes.

2. Click *Save* to apply your changes.

⚠	**Information** The access rights can only be edited if at least one further user with writing access has been set up.

4.3.3 Removing a User

Open the page *System / Users* in the configuration area.



1. Click the *Remove* button next to the user you wish to remove.

1. Confirm that you wish to remove this user by clicking *Yes*.

⚠	**Information** A user with access rights can only be removed if at least one further user with writing access has been set up.

4.3.4 Deactivating the Anonymous User

Once you have set up a user with writing access, you can restrict the anonymous user's access rights or deactivate this user entirely. To do this, open the page *System / Users* in the configuration area.

1. Click the *Edit* button next to the user *Anonymous*.

1. In order to restrict anonymous access to Querx entirely, assign the group of access rights *Disabled* to the user. To allow all network members restricted access to Querx, select the required group of access rights.

2. Click *Save* to apply your changes.

5 Adjustment and Calibration

Querx offers the possibility of calibrating the sensor's measurements, as well as adjusting them, if required.

In common practice, it may occur that Querx does not display the true, current values but diverges from them within certain limits. The feature *Adjustment and Calibration* serves to correct any data gathered by Querx that diverges from the actual values and make it correspond to the real measurements as closely as possible.

In order to determine these actual values, you will require a reference device whose measurements you can trust. Ideally, this should be a calibrated device with a known standard deviation.

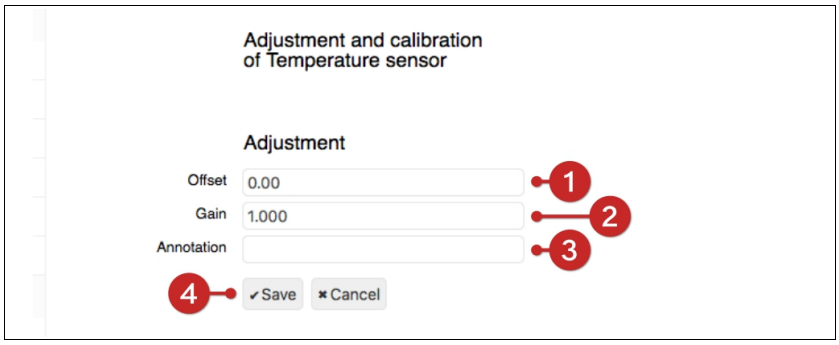
5.1 Manual Adjustment with Offset

In this case, a fixed correction value, the so-called offset, is determined in the configuration area. The offset is a fixed value that is added to any value measured by the sensor.

In order to adjust your Querx by this method, please take the following steps:

Establish the required offset to correct the measuring error. This value is determined by comparing the value displayed by Querx to that measured by the reference device and generating the difference between the two values (actual value – value displayed by Querx).

Open the page for the corresponding sensor in the Querx configuration area: *Sensors* > *Temperature / Humidity / Pressure*.



1. Enter the offset previously determined into the field *Offset*.

2. Leave the *Gain* value at the standard 1.000.

3. Leave the input field *Annotation* empty.

4. Click *Save* to apply the offset to all future measurements.

5.2 Manual Adjustment with Offset and Gain

In addition to adjusting the offset, a second parameter, gain, can be set. While the offset is a fixed value that is added to every measurement, the gain is a multiplication factor. It describes the ratio between the correct value and the potentially wrong value gathered by the sensor. A gain setting of 2 (for clarity's sake with an offset of 0) thus means that the correct value is always twice as high as the uncorrected, measured value.

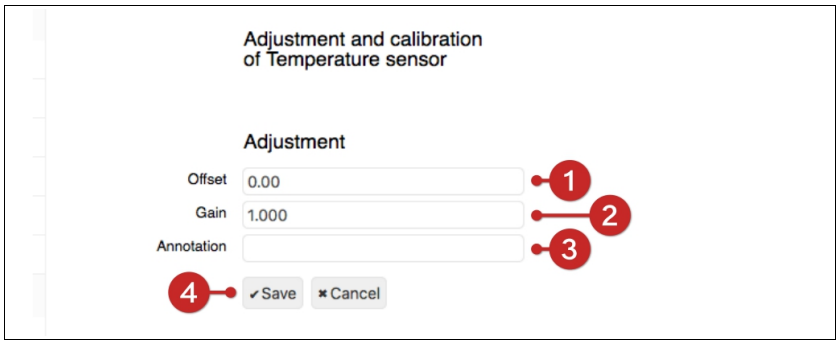
In order to calculate gain and offset, please apply the values of two measurement points to the following formulas:

Gain	(A1 – A2) / (M1 - M2)
Offset	A1 – Gain * M1

The variables are placeholders for the following values:

M1	Value measured and displayed by Querx, first measurement
M2	Value measured and displayed by Querx, second measurement
A1	Actual value (measured by reference device), first measurement
A2	Actual value (measured by reference device), second measurement

After calculating the required values for *Offset* and *Gain*, as described above, open the page for the corresponding sensor in the Querx configuration area: *Sensors* > *Temperature / Humidity / Air Pressure*.



1. Enter the calculated value into the input field *Offset*.

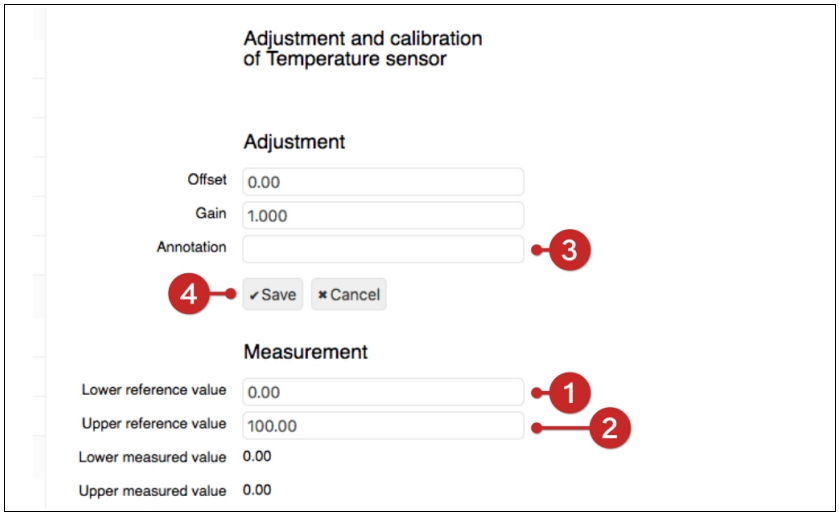
2. Enter the calculated value into the input field *Gain*.
3. Leave the input field *Annotation* empty.
4. Click *Save* to apply the offset and gain to all future measurements.

5.3 Automatic Adjustment with Offset and Gain

Querx can calculate offset and gain automatically, if two reference values, i.e. reliable measurements (see above), are known. The device applies the same formulas as detailed in the section *Manual Adjustment with Offset and Gain*.

In order to let Querx adjust offset and gain automatically, please proceed as follows:

Open the page *Sensors* > *Temperature / Humidity / Air Pressure* in the Querx configuration area.



1. Use a calibrated reference device to determine the lower reference value. Enter the measured value into the input field *Lower reference value*. Click the button *Measure*.
2. Raise the value measured by Querx to a higher level by increasing the measured parameter (i.e. temperature, humidity or air pressure) and measure it with the reference device. Enter the reference value into the input field *Upper reference value*. Click the button *Measure*.
3. Leave the input field *Annotation* empty.
4. Click *Save* to apply the offset and gain to all future measurements.

The Querx PT and Querx WLAN PT models can be calibrated without a reference device, if they are fitted with a waterproof sensor. The freezing point and boiling point of water can be used as reference values instead of determining them with a calibrated device. Dip the sensor into ice water and enter a reference value of 0, in order to adjust the lower reference value. Repeat the measurement after dipping the sensor into boiling water and entering a reference value of 100, in order to calibrate the upper reference value.

Attention

This option is only applicable for Querx variants equipped with a waterproof Pt100 sensor!

5.4 Calibration History

Querx further offers a history feature that logs past calibrations with the values for offset and gain, the date, as well as an annotation. This data can be saved in the *Calibration history* by entering any string of text into the input field *Annotation* before clicking *Save*. Since Querx can only save the data of up to 30 calibration processes, and it can not be deleted once saved, it is recommended to only use this feature after making sure that you will really require the data in the history permanently. If the calibration history is not used, the adjustment data is nonetheless saved and applied to all future measurements

6 Configuring Alerts

Querx can notify you of alerts via email, SNMP-trap and Syslog whenever defined value limits are exceeded.

6.1 Basic Alert Configuration

Querx can notify you of the following critical ambient conditions:

- Temperature above upper limit value
- Temperature below lower limit value
- Temperature rising too quickly
- Temperature falling too quickly

The **TH and THP models** additionally support the following alerts:

- Humidity above upper limit value
- Humidity below lower limit value
- Humidity rising too quickly
- Humidity falling too quickly
- Dew point above upper limit value
- Dew point below lower limit value

The **THP models** additionally support the following alerts:

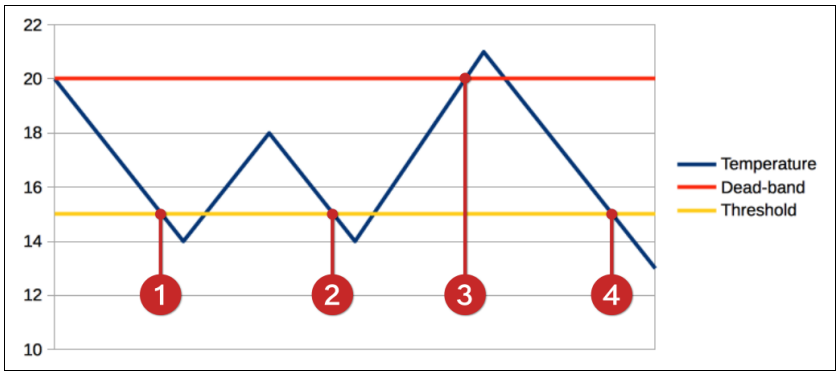
- Pressure above upper limit value
- Pressure below lower limit value
- Pressure rising too quickly
- Pressure falling too quickly

⚠	**Information** Alerts are only triggered when values rise above or fall below the limit values. They are not triggered if the limit values are merely reached.

6.1.1 Alerts and Dead-band

A dead-band value can be defined, in order to avoid the repetition of alerts that are based on limit transgressions.

If the dead-band feature is activated, a value that has triggered an alert will have to return towards its normal state by the dead-band value, before a further alert can be triggered.



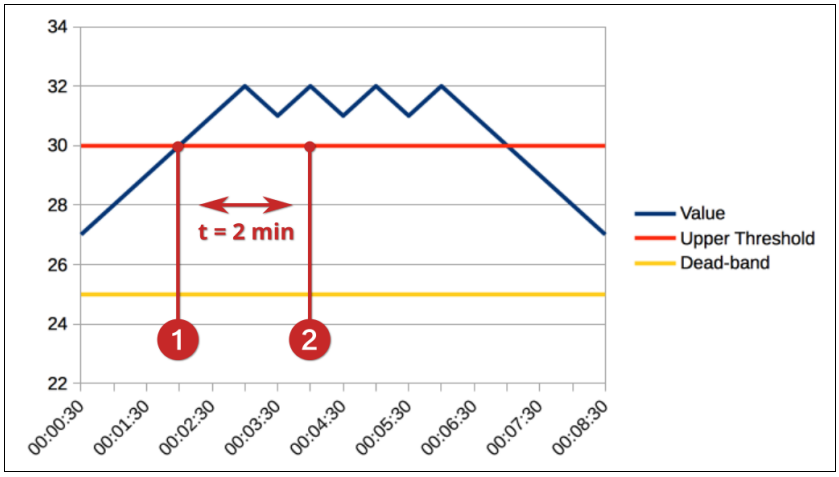
In the example depicted above, the minimum temperature is set to **15°C**. The dead-band is set to **5°C**.

An alert is triggered if the temperature falls below the minimum temperature **(1)**. If the temperature falls below this value again after having returned towards its normal state by less than the value assigned to the dead-band, no further alert is triggered **(2)**. A further alert is only triggered if the value has returned towards its normal state by more than the value of the dead-band **(3)** and then falls back down below the minimum value **(4)**.

6.1.2 Alert Delays

A delay can be configured for alerts that are based on limit value transgressions, if you wish to accept short-term fluctuations. This can, for instance, be useful to allow for a tolerated decline in temperature during ventilation.

This value determines how long a limit needs to be continuously transgressed, until an alert is triggered.



In this example, a delay of two minutes is configured. The limit value is exceeded at 1:30 **(1)**. However, the device only triggers an alert once the value is exceeded for the entirety of the configured delay, in this case two minutes **(2)**.

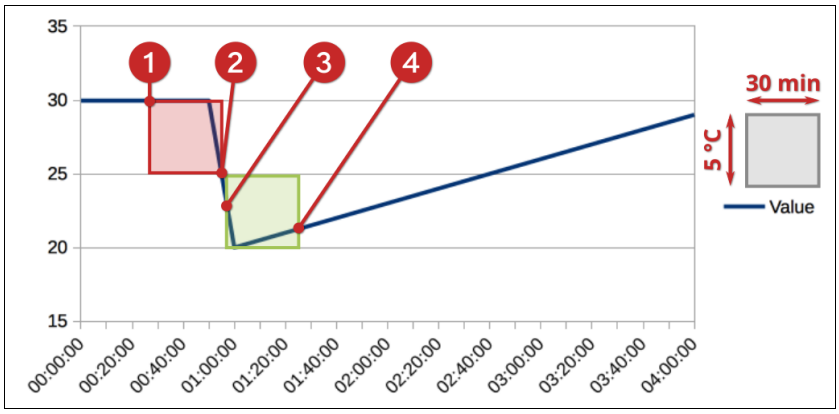
Please be aware that the dead-band also applies to the delay. This means that the value needs to return towards its normal state by the dead-band's value during the delay time, in order to cancel the alert. In this example, the sensor would therefore need to measure a value below 25 °C within two minutes of the first transgression, in order to cancel the alert.

6.1.3 Variation Alerts

Querx can notify you if values rise or drop more quickly than usual. In order to set this type of alert up, you will need to enter a value for the maximal accepted fluctuation between the highest and lowest values. Additionally, a value for the timespan, within which the specified fluctuation value is not to be exceeded, is required.

These alerts remain active until the values are stable again.

Individual values can be entered for falling and rising temperatures.



The graph depicted above shows Querx's reaction when a window is opened. The maximal rate at which the temperature may drop is set to 5 °C and the timespan is set to 30 minutes.

The sensor measures a temperature of 30 °C at 0:20 **(1)**. A window is opened at 0:50, causing the temperature to fall to 20 °C abruptly. The device registers a drop in temperature of more than 5 °C within the last 30 minutes, triggering an alert as soon as the temperature falls below 25 °C **(2)**.

The device notices that the difference between minimal and maximal value within the last 30 minutes **(3)** is less than 5 °C by approximately 1:30 **(4)**, causing it to deactivate the alert.

6.1.4 Responding to Alerts

Querx can perform various actions in response to triggered alerts, in order to notify you of critical conditions.

The various options are described in detail in chapter *7 Configuring the Interfaces*.

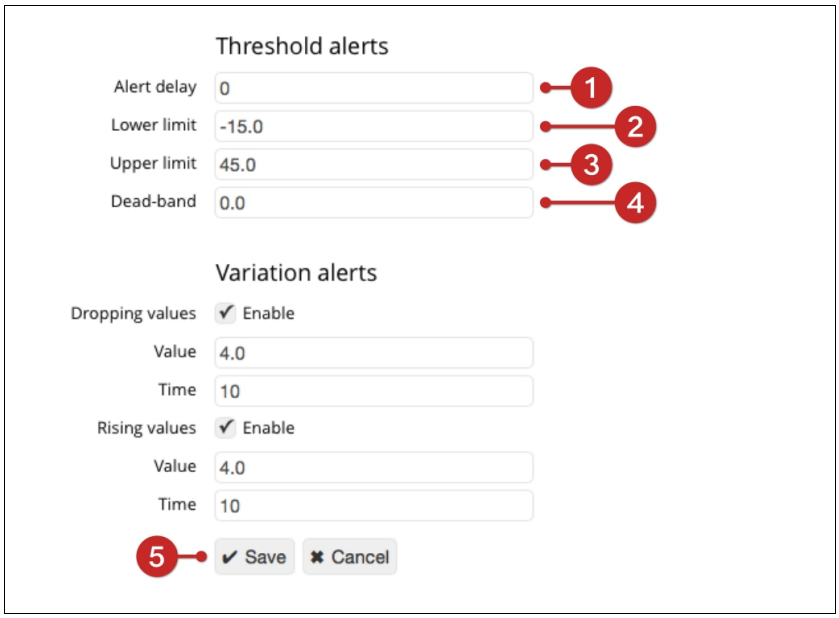
6.2 Configuring Alerts

6.2.1 Temperature Alerts

⚠	**Information** Please be sure to use a decimal point to separate the decimal digits when entering all the following values.

Alerts for limit transgressions

Open the page *Sensors / Temperature*.



Please enter the number of seconds after which an alert is triggered in the input field *Alert delay*, if you wish to allow for short-term transgressions.

1. Enter the *Lower limit* that will trigger an alert if values drop below this threshold.
2. Enter the *Upper limit* that will trigger an alert if values rise above this threshold.
3. Enter a reasonable value for the *Dead-band*, for instance 2.
4. Click *Save* to apply your changes.

Variation alerts

The configuration of variation alerts requires the specification of two values each for dropping and rising temperatures.

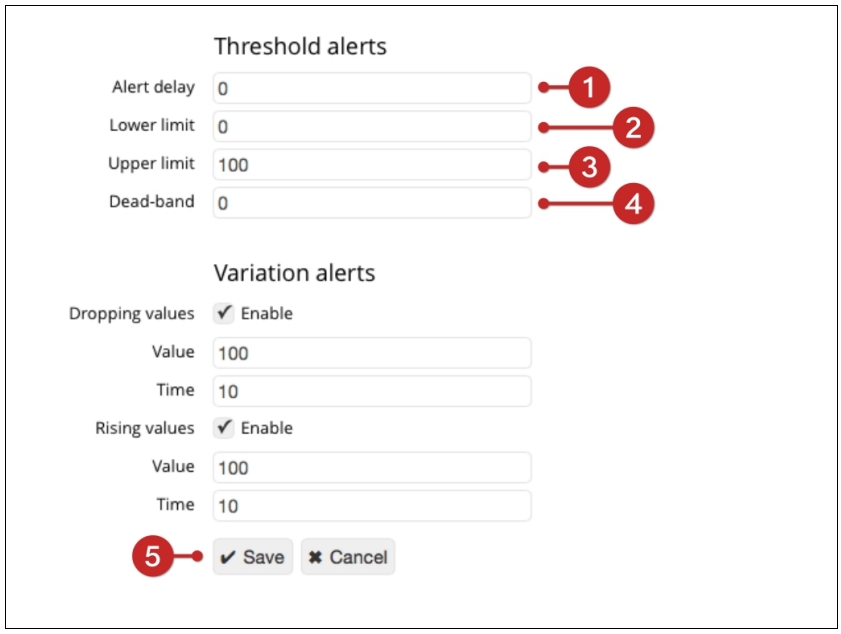
1. First, activate variation alerts by clicking *Enable*
2. Enter the *Value* by which the temperature is maximally permitted to drop
3. Enter the *Time* within which the temperature is maximally permitted to drop by previously specified value.
4. Repeat Steps **1** - **3** for *Rising Values*.
5. Click *Save* to apply your changes

6.2.2 TH and THP Models: Humidity Alerts

⚠	**Information** Please be sure to use a decimal point to separate the decimal digits when entering all the following values.

Alerts for limit transgressions

Open the page *Sensors / Humidity* in the configuration area to configure humidity alerts.



1. Please enter the number of seconds after which an alert is triggered in the input field *Alert delay*, if you wish to allow for short-term transgressions.
2. Enter the *Lower limit* that will trigger an alert if values drop below this threshold.
3. Enter the *Upper limit* that will trigger an alert if values rise above this threshold.
4. Enter a reasonable value for the *Dead-band*, for instance 2.
5. Click *Save* to apply your changes.

Variation alerts

The configuration of variation alerts requires the specification of two values each for dropping and rising humidity.

1. First, activate variation alerts by clicking *Enable*.

2. Enter the *Value* by which the humidity is maximally permitted to drop.

3. Enter the *Time* within which the humidity is maximally permitted to drop by the previously specified value.

4. Repeat steps **1** - **3** for *Rising values*.

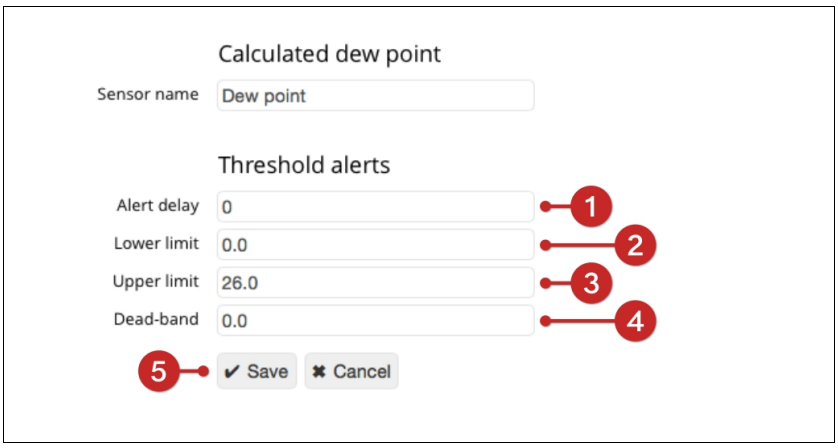
5. Click *Save* to apply your changes.

6.2.3 TH and THP Models: Dew Point Alerts

⚠	**Information** Please be sure to use a decimal point to separate the decimal digits when entering all the following values.

Alerts for limit transgressions

Dew point alerts are configured on the page *Sensors / Dew point*.



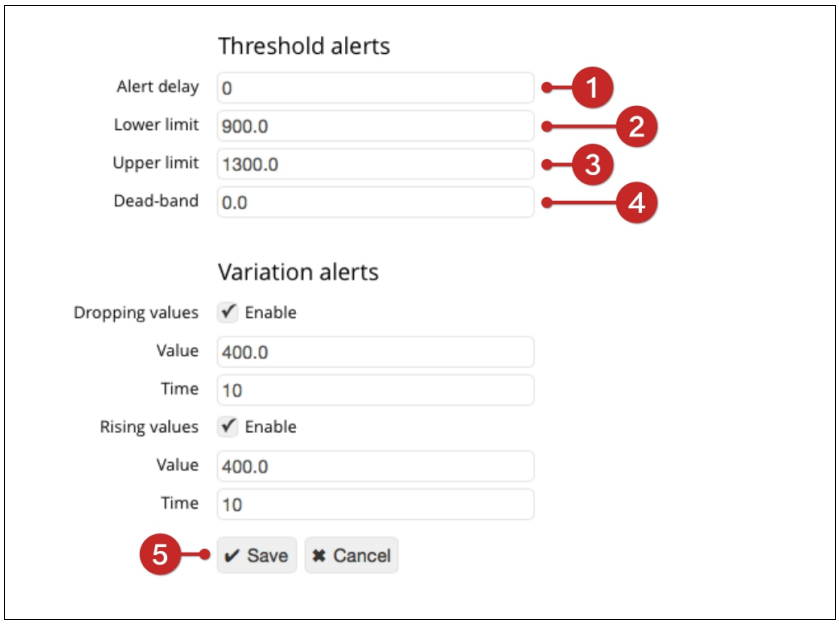
1. Please enter the number of seconds after which an alert is triggered in the input field *Alert delay*, if you wish to allow for short-term transgressions.
2. Enter the *Lower limit* that will trigger an alert if the dew point drops below this threshold.
3. Enter the *Upper limit* that will trigger an alert if the dew point rises above this threshold.
4. Enter a reasonable value for the *Dead-band*, for instance 2.
5. Click *Save* to apply your changes.

6.2.4 THP Models: Pressure Alerts

⚠	**Information** Please be sure to use a decimal point to separate the decimal digits when entering all the following values.

Alerts for limit transgressions

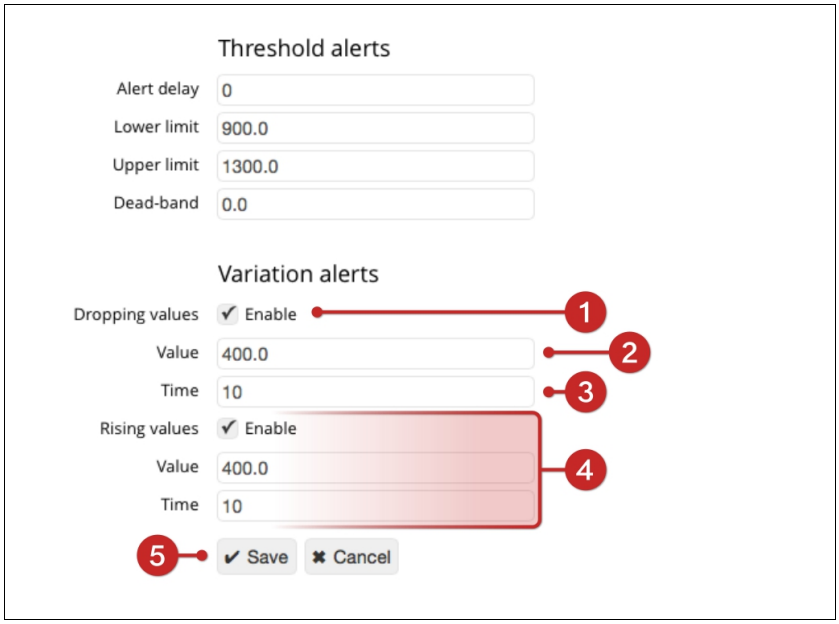
Open the page *Sensors / Pressure* in the configuration area to configure humidity alerts.



1. Please enter the number of seconds after which an alert is triggered in the input field *Alert delay*, if you wish to allow for short-term transgressions.
2. Enter the *Lower limit* that will trigger an alert if values drop below this threshold.
3. Enter the *Upper limit* that will trigger an alert if values rise above this threshold.
4. Enter a reasonable value for the *Dead-band*, for instance 2.
5. Click *Save* to apply your changes.

Variation alerts

The configuration of variation alerts requires the specification of two values each for dropping and rising humidity.



1. First, activate variation alerts by clicking *Enable*.
2. Enter the *Value* by which the humidity is maximally permitted to drop.
3. Enter the *Time* within which the humidity is maximally permitted to drop by the previously specified value.
4. Repeat steps **1** - **3** for *Rising values*.
5. Click *Save* to apply your changes.

7 Configuring the Interfaces

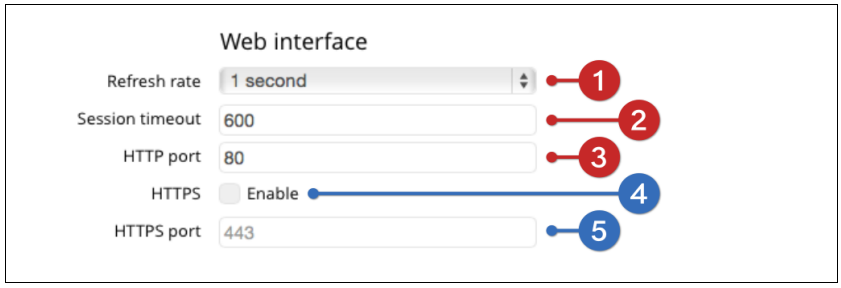
Querx offers a number of different interfaces that can be used to access the measured values and inform you of alerts.

7.1 The Web Interface

This section describes the basic configuration of the web interface and the diagram on the home page.

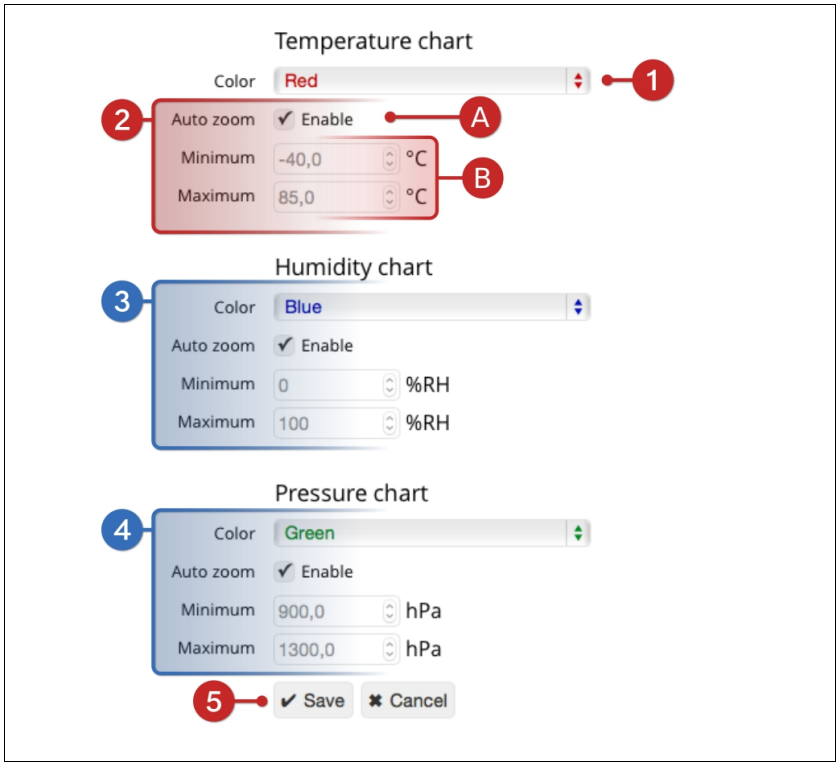
7.1.1 Basic Settings for the Web Interface

Open the page *Interfaces / Web* in the configuration area.



1. Enter the rate at which the dynamic values (e.g. the temperature) are to be updated in the web interface in the *Refresh rate* input field.
2. Enter the time after which an inactive user is logged out in the *Session timeout* input field.
3. Enter the *HTTP port* that is to be used for the unencrypted web interface (the standard port is 80).
4. **WLAN models:** Click *Activate* to use HTTPS to encrypt the transmission of the web interface.
5. **WLAN models:** Enter the *HTTPS port* via which the encrypted web interface is to be transmitted.

7.1.1.1 Configuring the Graph



1. Select the number of displayed measurements from the *Resolution* drop down menu.

2. Select a *Color* for the temperature chart.

3. Select the value range displayed in the diagram:

A. Enable *Auto zoom* to let Querx automatically adjust the displayed range to the tracked values.

B. Alternatively, static *Minimal* and *Maximal* values can be assigned to the displayed value range.

4. TH and THP models: Repeat steps **1** - **2** for the humidity curve.

5. THP models: Repeat steps **1** – **2** for the pressure curve.

6. Click *Save* to apply your changes.

7.2 The Email Interface

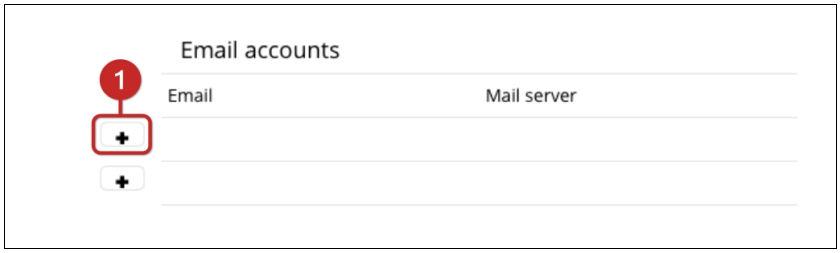
Querx can inform up to four email recipients of occurring alerts. Two email accounts from which the notifications are sent can be set up.

7.2.1 Managing Email Accounts

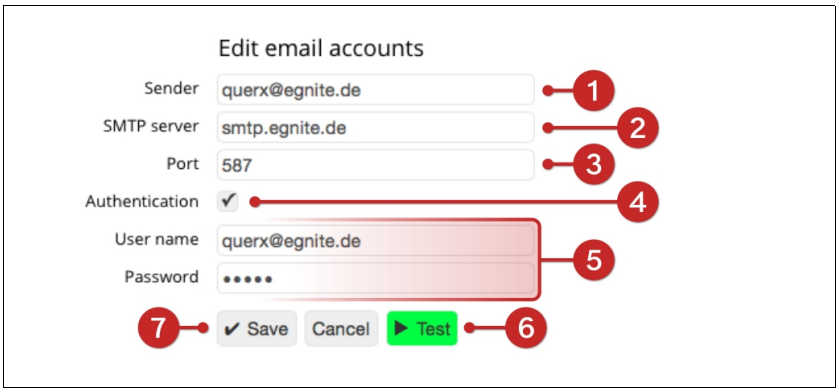
At least one email account needs to be set up, in order to send emails alerts. Setting a further account up makes sense if you wish to have a backup account in case a mail server is not accessible, or your network setup distinguishes between internal and external emails.

Adding an email account

Open the page *Interfaces / Email* in the configuration area.



1. Click the *Add* symbol next to a blank line in the email section.



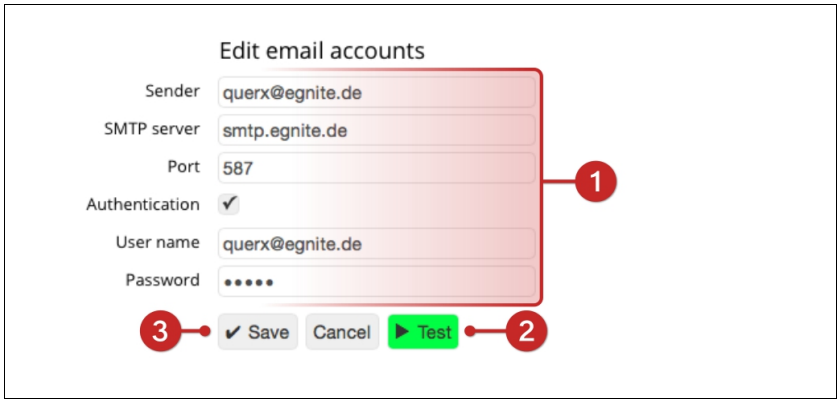
1. On the next page, enter the mail address for the account you wish to send email alerts from in the input field *Sender*.
2. Enter the hostname or IP-address for the mail-server used by the mail account in the input field *SMTP server*.
3. Enter the *Port* used by the email account.
4. If your mail account is password protected, activate the checkbox *Authentication*.
5. Enter the username in the input field *Username* and the password in the input field *Password*.
6. Click the button *Test* to check your settings. If the test is successful, the button will turn green. If any entries are wrong, the corresponding field will be highlighted in red. Where necessary, correct the data and click *Test* again.
7. Click *Save* to apply your changes.

⚠	**Information** Passwords are not encrypted on the device. Therefore, it is strongly advised that you do not use any email accounts that are used for sending confidential information or, if possible, to create a dedicated account for Querx.

Editing an email account

Open the page *Interfaces / Email*.

1. In the section *Email accounts*, click the *Edit* symbol next to the account you wish to edit.

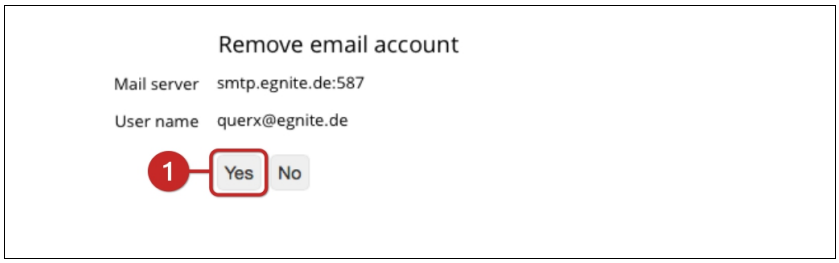


1. Make the required changes on the following page.
2. Click the button *Test* to check your settings. If the test is successful, the button will turn green. If any entries are wrong, the corresponding field will be highlighted in red. Where necessary, correct the data and click *Test* again.
3. Click *Save* to apply your changes.

Deleting an email account

Open the page *Interfaces / Email* in the configuration area.

1. In the section *Email accounts*, click the *Delete* button next to the account you wish to delete.



1. Confirm that you want to remove the account by clicking *Yes*.

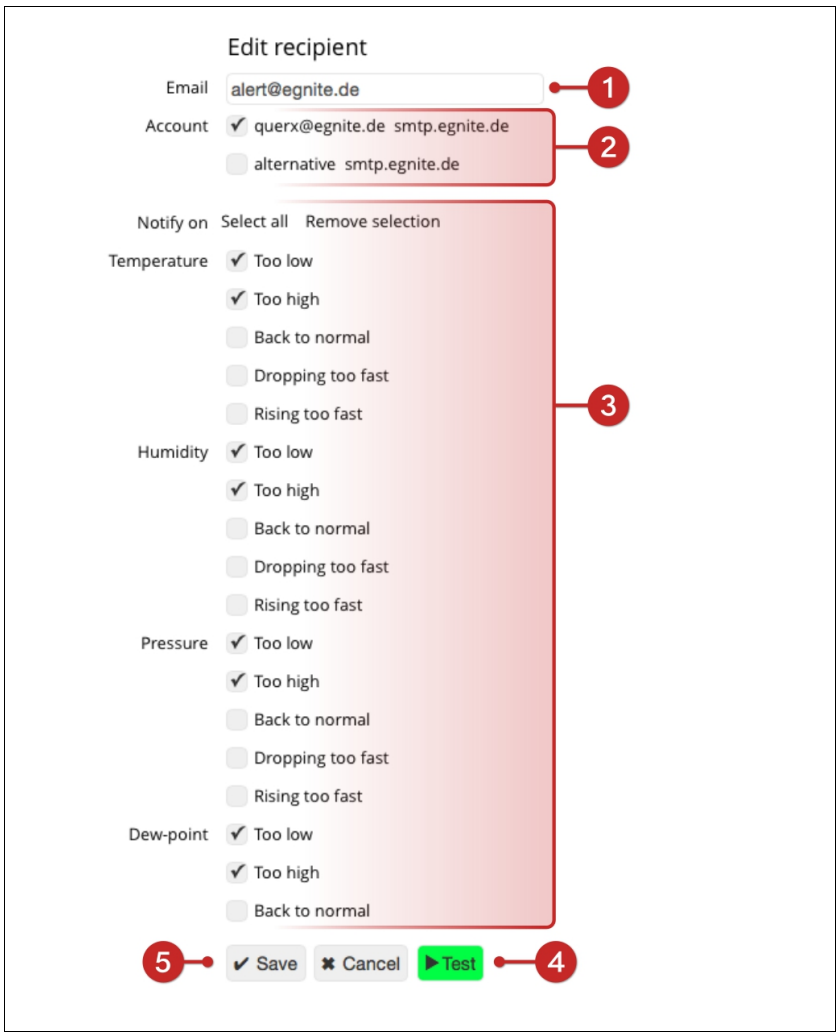
7.2.2 Managing Email Recipients

Adding email recipients

The configured email servers can be used to send email notifications to up to four recipients. You can select which events each recipient is notified of.

Open the page *Interfaces / Email* in the configuration area.

1. Click the *Add* symbol next to a blank line in the *Recipients* section.



1. On the next page, enter a recipient in the input field *Email* and assign the mail *Account* you want to set as the standard account to send notifications from.

2. Select which email account to send emails to this recipient from.

A. Activate both accounts if you want to use one as a backup account.

B. If you separate internal and external emails, only activate the required mail server.

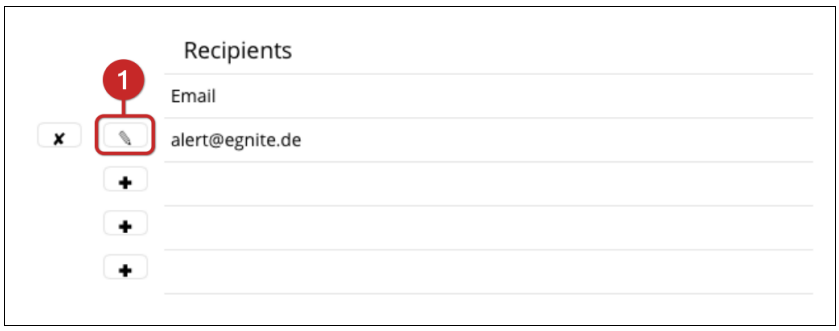
3. Select which alerts the recipient is notified of in the *Notify on* section.

4. Click *Test* to check your settings.

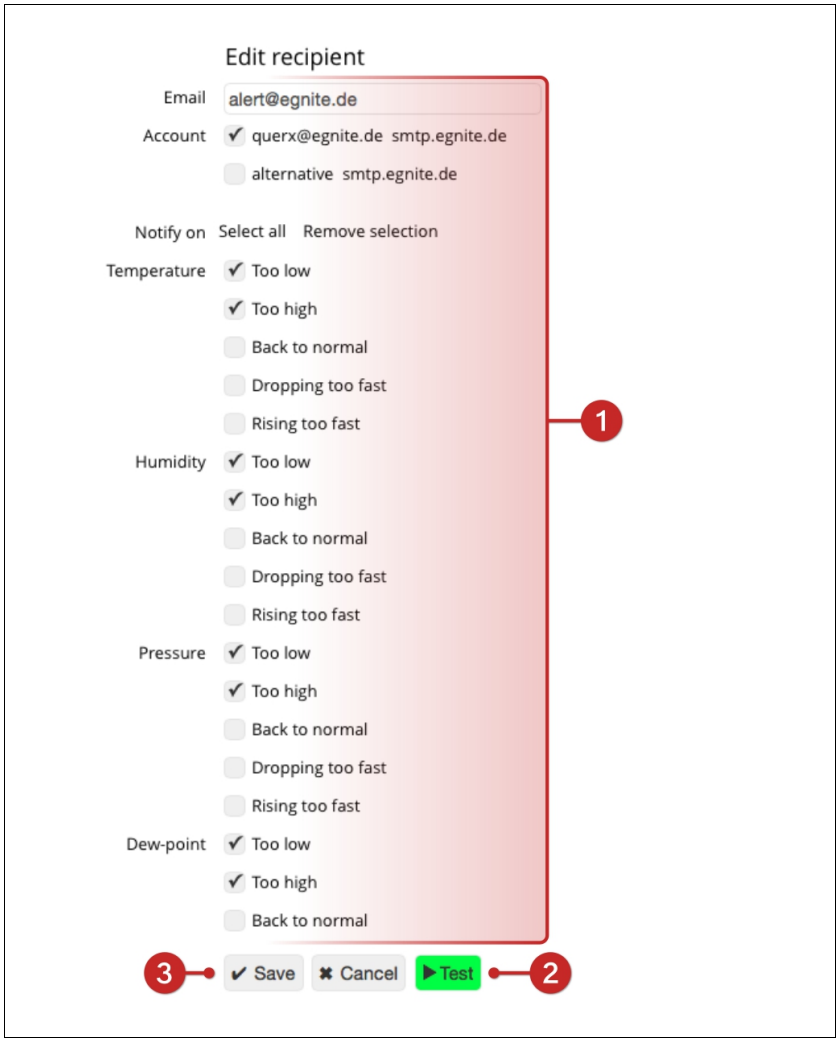
5. Click *Save* to apply your changes.

Editing email recipients

Open the page *Interfaces / Email* in the configuration area.



1. In the *Recipients* section, click the *Edit* symbol next to the entry for the account you wish to edit.



1. Make the required changes on the following page.

2. Click *Test* to check your settings.

3. Click *Save* to apply your changes.

Deleting email recipients

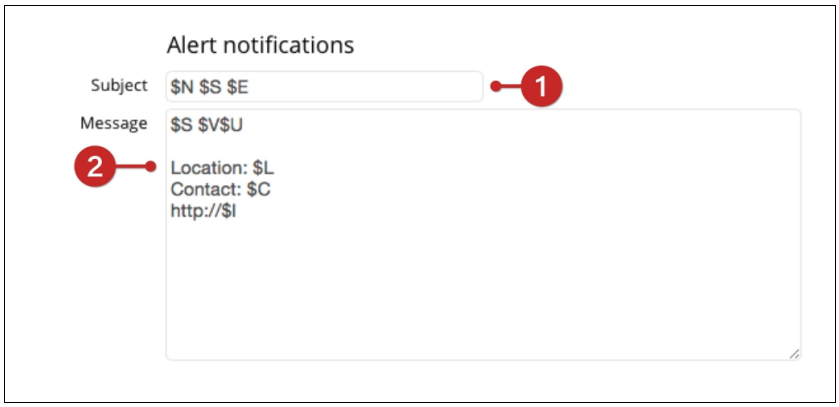
Open the page *Interfaces / Email* in the configuration area.

1. In the *Recipients* section, click the *Remove* symbol next to the entry for the account you wish to delete.

1. Confirm that you want to remove the recipient by clicking *Yes*.

7.2.3 Email Templates

Querx sends email notifications when alerts occur and when the values return to their normal state. Open the page *Interfaces / Email* in the configuration area to configure the format of these email notifications.



1. Enter a *Subject* for the email notifications in the section *Alert notifications*.
2. Enter the contents of the email in the input field *Message*.

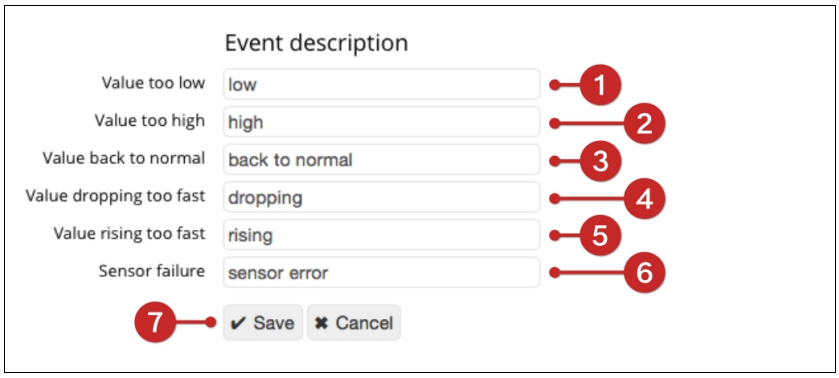
You can use the following placeholders in the notifications' subject and main body. The placeholders are dynamically replaced by the current values when notifications are sent.

$N	Name of the system that triggered the alert
$S	Name of the sensor that triggered the alert
$U	The measured value's physical unit
$I	The device's IP-address
$L	The device's location
$V	The value measured by the sensor that triggered the alert
$E	Description of the event
$D	The date on which the event occurred
$T	The time at which the event occurred
$C	The contact person for the device

Enter the event descriptions before saving.

7.2.4 Event Descriptions

You can enter descriptions of occurring events on the page *Interfaces / Email*. These descriptions are also used in the event table (located on the page *Maintenance / Events*) and by Syslog notifications.



1. Enter a description for the event that values fall *below the lower limit*.
2. Enter a description for the event that values *rise above the upper limit*.
3. Enter a description for the event that values *return to their normal state*.
4. Enter a description for the event that values are *falling too quickly*.
5. Enter a description for the event that values are *rising too quickly*.
6. Enter a description for the event that a *sensor failure* occurs.
7. Click *Save* to apply your changes.

7.3 HTTP-Push with Templates

The page *HTTP-Push* in the configuration area lets you set up up to two cloud services that can be supplied with your Querx's data simultaneously. The structure in which a cloud service expects any data depends on the provider. Therefore, Querx features a template system which lets you output and transmit data saved on your device to a cloud service in various structures and file formats (JSON, XML, CSV…).

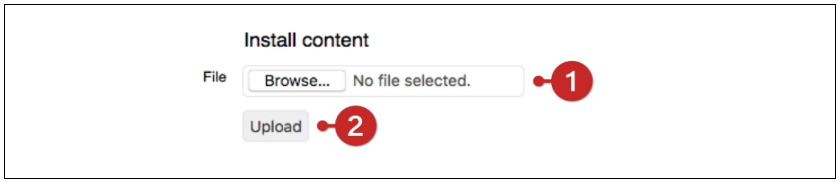
7.3.1 Generating Templates

Template files can be generated in any text editor. A tutorial is available at sensors.egnite.de. Alternatively, you can also download ready-made templates for the most commonly used cloud services at sensors.egnite.de.

7.3.2 Installing Templates

After generating or downloading a template from sensors.egnite.de, it needs to be installed on the device.

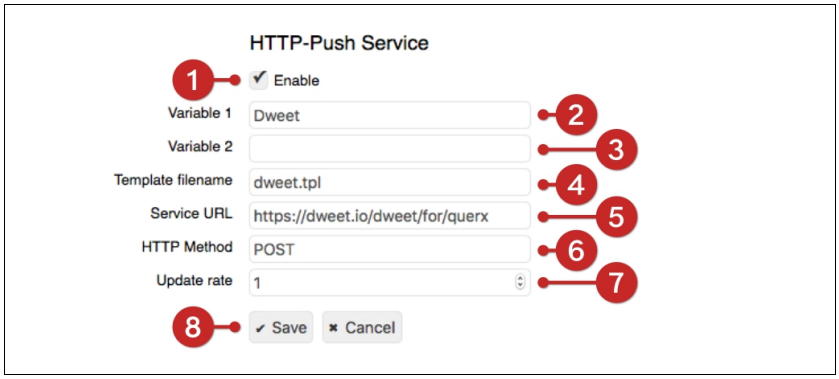
Open the page *Firmware* in the configuration area.



1. Select the required template file in the section *Install content*.
2. Click the button *Send*, to save the file in the device's internal memory.

7.3.3 Setting up HTTP-Push

Open the page *HTTP-Push* in the configuration area to set up the installed template for use with the HTTP-Push feature.



1. Click the button *Enable*.
2. Enter an optional, selectable Variable. The value you enter here will be available as {{pushtab_var1}} in the template, as well as in the URL with “$1”.
3. Enter an optional, selectable Variable. The value you enter here will be available as {{pushtab_var2}} in the template, as well as in the URL with “$2”.
4. Enter the *Template filename*, which is saved in the previously installed template’s header line.
5. Enter the URL for the HTTP-endpoint of the cloud service to which you want to transfer your data. You will usually find this in the cloud service’s online documentation.
6. Select the *HTTP method* that you want to use for data transmission. You will usually find this in the cloud service’s online documentation.
7. Enter the *Update rate*. This value determines how often Querx sends new data to the cloud service (in minutes). If this value is set to 0, Querx will transmit data whenever any values have changed.
8. Click *Save* to apply your configuration and begin data transmission.

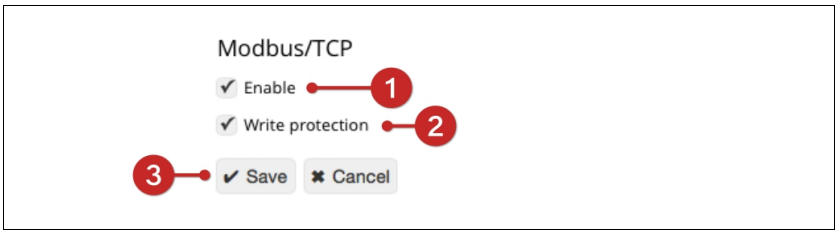
7.4 Modbus/TCP

Querx can transfer data via Modbus/TCP, making it suitable for industrial process monitoring (SCADA) amongst other possible application areas.

An overview of the addressable registers can be found in appendix *10.5 Modbus registers*. Practical examples of the application of Modbus/TCP can be found on the product page at sensors.egnite.de.

7.4.1 Activating Modbus/TCP

Open the page *Interfaces / Modbus* in the configuration area.



1. Activate Modbus/TCP by clicking the checkbox *Enable*.
2. If you want to allow changes to the Modbus/TCP configuration, uncheck the checkbox *Write protection*.
3. Click *Save* to apply your changes.

⚠	**Information** Please note that Querx only supports a single Modbus connection. If you intend to use Querx with several masters, the connection to one master needs to be interrupted, in order to vacate the connection for the other masters.

7.5 SNMP

Querx can be integrated into network management systems such as Nagios, OpenNMS or Zabbix via the Simple Network Management Protocol (SNMP). Querx supports SNMPv1. The most important Object Identifiers (OIDs) can be found in appendix 10.6 *SNMP Object Identifiers*. The Management Information Database (MIB) is saved on the device and can be downloaded from the web interface.

Practical examples of the application of SNMP can be found on the product page at sensors.egnite.de.

7.5.1 General Data

Open the page *System / General* in the configuration area to enter the data concerning the device's system name, contact person and location.

7.5.2 Activating SNMP

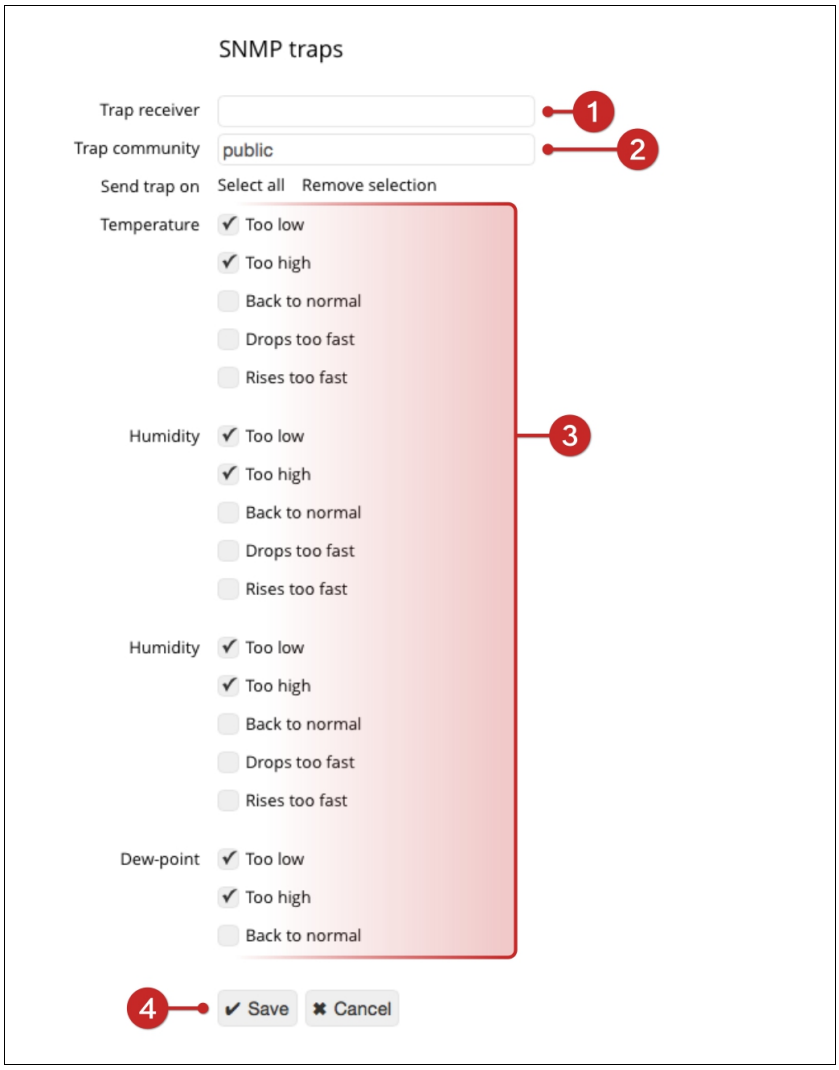
Open the page *Interfaces / SNMP*.

1. Activate SNMP by clicking the checkbox *Enable*.
2. Check the *Read community* and make any required changes.
3. Click *Save* at the bottom of the screen to apply your changes.
4. Restart the device via the web interface as detailed in chapter *9.1 Reboot*.

⚠	**Information** Please note that Querx needs to reboot after enabling or deactivating the SNMP-agent.

7.5.3 Activating SNMP Traps

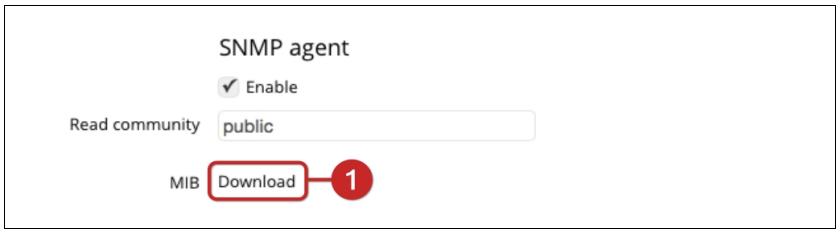
Open the page *Interfaces / SNMP* in the configuration area.



1. Enter the IP-address or hostname for the host who is to receive the SNMP traps in the input field *Trap receiver* in the *SNMP* section.
2. Check the *Trap community* and make any required changes.
3. Select which events will trigger SNMP traps in the section *Send trap on*.
4. Click *Save* to apply your changes.

7.5.4 Downloading the MIB

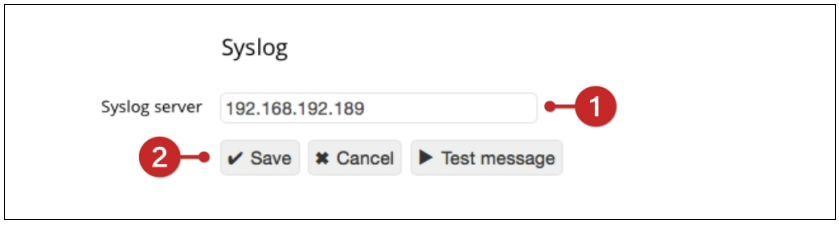
Open the page *Interfaces / SNMP* in the configuration area.



1. Click the *Download* button next to *MIB* in the *SNMP agent* section to download the Management Information Database.

7.6 Syslog

Open the page *Interfaces / Syslog* to send notifications and error reports to a syslog server.



1. Enter the *Syslog server's* IP address or hostname.

2. Click *Save* to apply your settings.

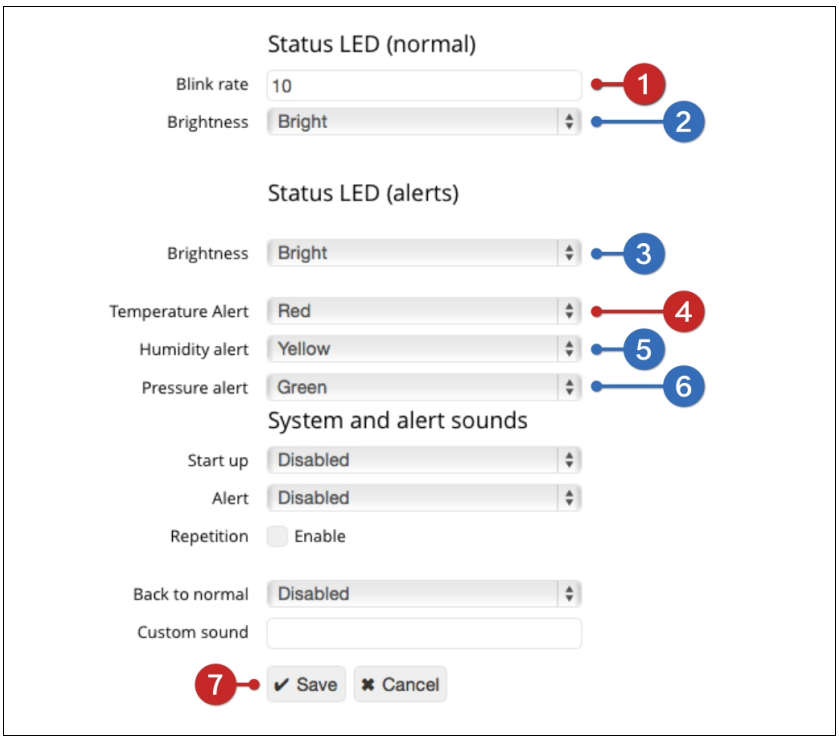
The application **Device Discoverer** includes an integrated Syslog server which can receive error reports from Querx. Detailed troubleshooting instructions can be found in the *Services / Tutorials* section at sensors.egnite.de.

7.7 Signalers

Querx is fitted with an LED that can notify you of occurring alerts. The WLAN models additionally feature a tone generator.

7.7.1 Optical Signals

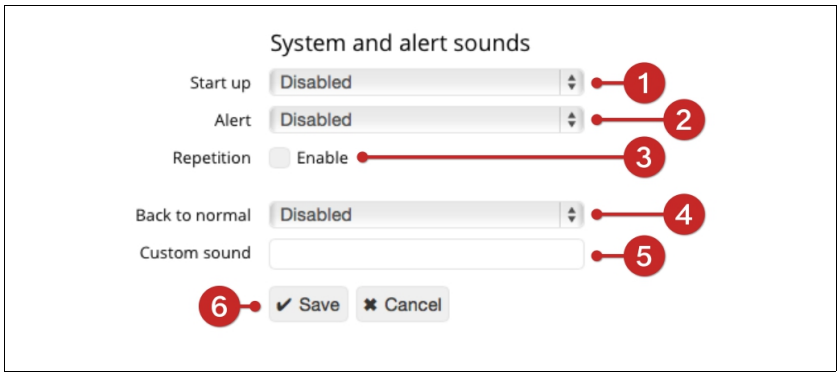
Open the page *Interfaces / Signalers* to configure alerts displayed on the device itself.



1. Set the number of seconds for the *Rate* at which Querx blinks under normal conditions.
2. **WLAN models:** Select the LED's *Brightness* under normal conditions.
3. **WLAN models:** Select the LED's *Brightness* when signaling an alert.
4. Select the LED's *Color* when signaling a temperature alert.
5. **TH and THP models:** Select the LED's *Color* when signaling a humidity alert. This includes dew point alerts.
6. **THP models:** Select the LED's *Color* when signaling a pressure alert.
7. Click *Save* to apply your settings.

7.7.2 Acoustic Signals

Acoustic signals are only available on **WLAN models**.



1. Select a *Startup* signal sound.
2. Select an *Alert* signal sound.
3. Specify whether the signal for alerts is to be *Repeated*.
4. Select a sound to signal that the values are *Back to normal*.
5. If desired, specify a personalized signal sound using the “scientific pitch notation”.
   https://en.wikipedia.org/wiki/Scientific_pitch_notation
6. Click *Save* to apply your changes.

8 Data Access

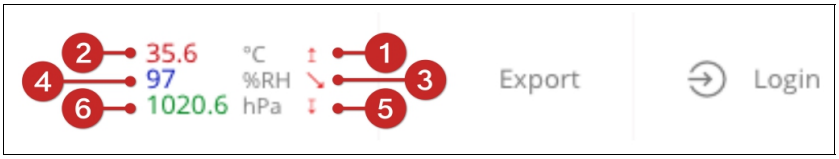
Querx offers various interfaces for manual and automated data access.

8.1 Web Interface

The web interface displays current values and alerts. An interactive diagram on the home page additionally lets you view logged data.

8.1.1 Viewing Current Values and Alerts

The current values and alerts are displayed in the upper right corner of the web interface.



The image above shows:

1. an alert (↕) for a temperature that has risen above the upper limit
2. at a current temperature of 35.6 °C, as well as
3. an alert (↘) for a humidity value that is falling too quickly
4. at a current humidity of 97 %RH
5. an alert (↧) for a pressure value that has fallen below the lower limit
6. at a current pressure of 1020.6 hPa.

The corresponding symbol is displayed when an alert occurs. The following symbols can be shown:

Alert	Symbol
Value above upper limit	↕
Value below lower limit	↧
Value rising too quickly	↗
Value falling too quickly	↘
Sensor failure	✖

8.1.2 Viewing Recent Sensor Events

The 16 most recent events, such as alerts, values returning to their normal state or sensor failures, can be viewed in the configuration area.

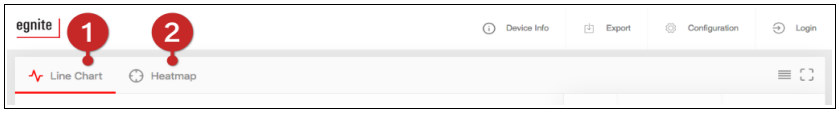
Open the page *Maintenance / Events*.

Last events

Date / Time	Event	Value
14.12.2016 / 09:32:28	Dew point back to normal	25.8°C
14.12.2016 / 09:31:37	Dew point high	31.5°C
14.12.2016 / 09:29:26	Dew point back to normal	25.6°C
14.12.2016 / 09:29:03	Dew point high	26.4°C
14.12.2016 / 09:23:02	Humidity dropping	50%RH

8.1.3 Viewing Logged Data

The chart on the home page displays the values that have been tracked up until the present moment.

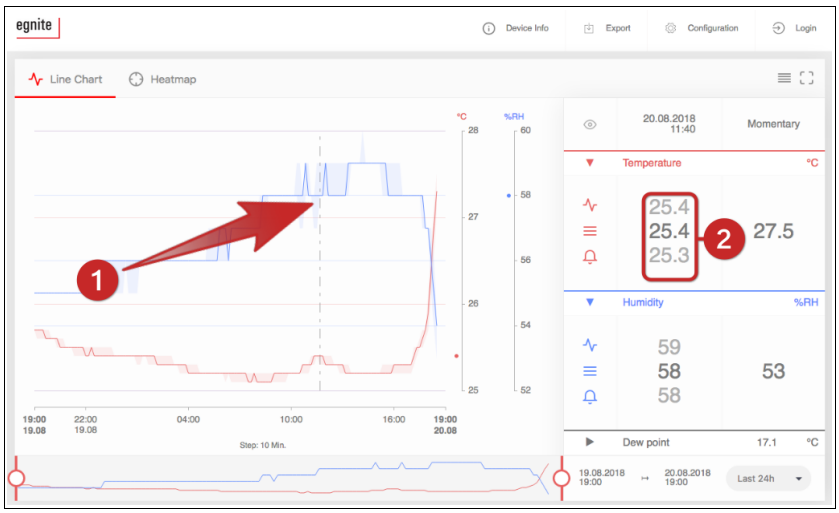


You can select between two display modes: *Line Chart* **(1)** and *Heatmap* **(2)**.

8.1.3.1 Line Chart

The lines displayed in full color show the logged average values. The lighter areas around the lines represent the minimum and maximum values recorded in the specific timeframe.

The horizontal bars represent the limit values at which alerts are triggered. Their width corresponds to the specified dead-band.



When you move the cursor along the graph **(1)**, the exact values for a specific point of time are displayed in the upper right corner **(2)**.

Display settings

The sidebar offers various display options. The following settings can be adjusted for each sensor:

1. Display limit values.

2. Display grid lines.

3. Display graph. If this option is deactivated, both the limit values and grid lines will also not be displayed.

These options let you customize the line chart to suit your specific requirements.

8.1.3.2 Selecting the Display Period

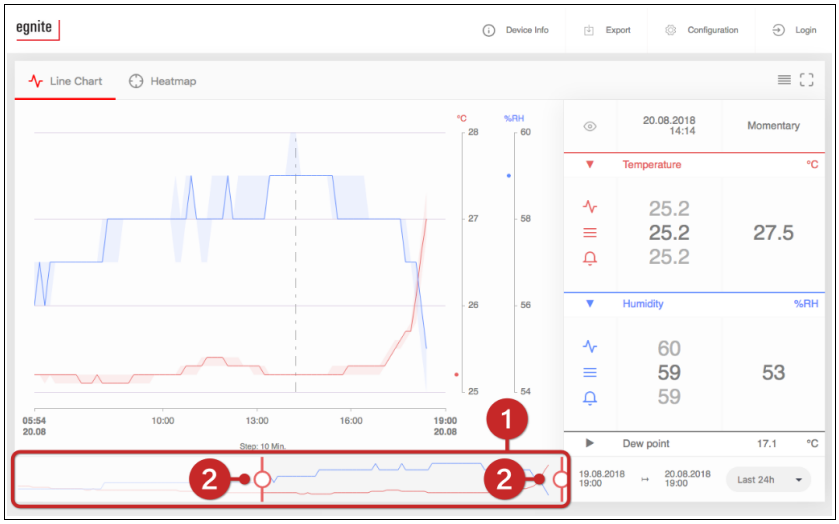
Setting the display period

The display period can be set via a calendar or a drop-down menu.

A. Click the left date in the sidebar to open the *pop-up calendar* and select the start date. Repeat this procedure for the end date.

B. You can select to view the last 24 hrs, the last 7 days, the last month or the last year from the *drop-down menu*.

Increasing or decreasing the display period



The *bar* **(1)** below the graph corresponds to the selected display period. You can move the slider controls **(2)** with your cursor to increase or decrease the display period. If the slider controls are set to the bar's outer edges, the entire selected time period is displayed.

Moving the display period

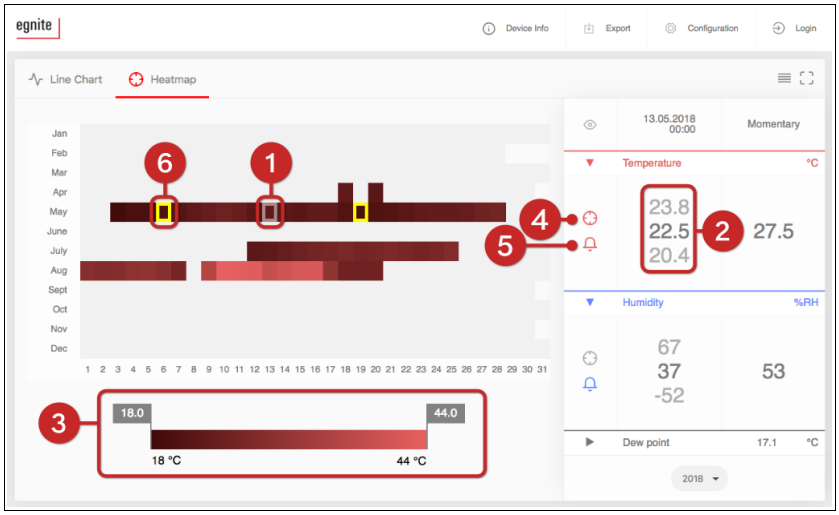
Once you have set the display period's resolution, you can move the highlighted area with your cursor to move the time period you want to display.

If the right slider control touches the bar's right edge, both sliders will turn red. In this case, *auto-update mode* is activated and the graph will continuously display the current values. If the

Auto-Update mode

right slider does not touch the bar's right edge, the sliders are grey and the graph will only display the exact time period that is selected.

8.1.3.3 Heatmap



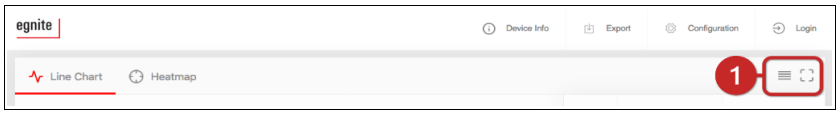
The *heatmap* displays an annual overview in the form of a calendar. Each day's median values are color-coded. Hovering the cursor over a date **(1)** displays the *maximal*, *minimal* and *median* values **(2)** for the selected day in the sidebar.

Customizing the display options

The heatmap's color settings can be customized above the slider at the screen's lower edge **(3)**. The shade of color at the left end of the slider corresponds to the year's lowest value and the shade on the right corresponds to the highest value. All values in between are automatically allocated to the corresponding shades.

You can select which sensor's values you want to view by clicking the corresponding *crosshair button* **(4)** in the sidebar. The display of alerts that were recorded by the respective sensor can be toggled via the *bell buttons* **(5)**. If this feature is active, all dates on which alerts were triggered are highlighted by a yellow border **(6)**.

8.1.3.4 Customizing the Layout



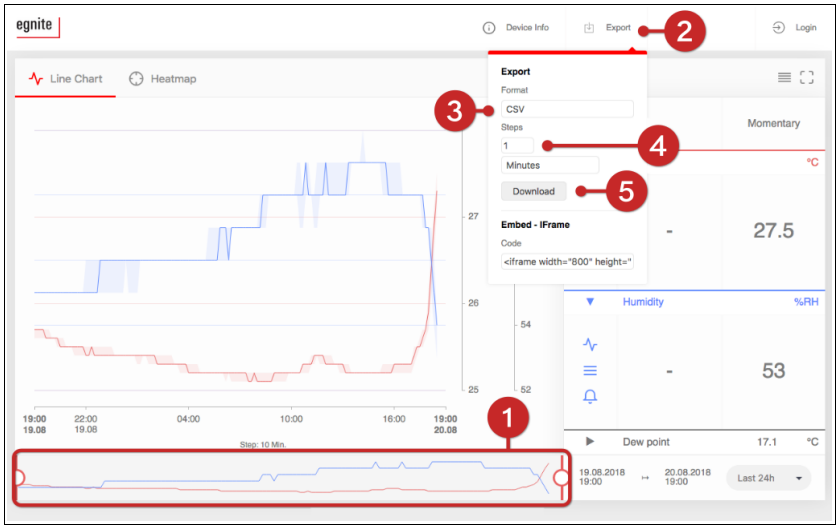
The home page's *layout* can be customized via two buttons **(1)**. The left button toggles the side bar on and off, if the browser window's width is 900 pixels or more. If the window is less than 900 pixels wide, the button toggles between the graph and the side bar. This ensures that the most relevant data is always displayed clearly.

The right button lets you switch into full screen mode, which hides the task bar at the top and the info bar at the lower edge of the browser window.

8.1.4 Exporting Data

The values measured by Querx can be exported via the web interface. The formats CSV and XML are supported.[1]

Open the Querx *Web interface*.



1. Set the *Timeframe* to the period of which you want to export the data, as described in the previous section.
2. Click *Export*.
3. Select the format you want to export the data in from the drop down menu *Format*.
4. Set the time interval between individual exported values in the input field *Steps*.
5. Click *Download*.

The exported files include the average-, minimum- and maximum-values, as well as a timestamp for each measurement of the selected timeframe.

1 Data can also be exported in the JSON format via the HTML interface.

8.1.5 Embedding Graphs Into Other Sites

Iframe can be used to embed the graph from the Querx home page into any other site that can access the device via a network.

Open the Querx *home page*.

1. Click *Export*.
2. Copy the displayed *HTML source-code* to the clipboard.
3. Paste the HTML source-code into the site on which you want to display the graph.

8.2 The HTTP Interface

The data logged by Querx and the current measurements can be accessed via the HTTP interface. This lets you integrate the data into existing systems or create your own solutions.

8.2.1 Exporting Current Values

URL	**http://<IP>/tpl/document.cgi?tpl/j/current.tpl**	
URL-parameters:		
format	xml	Returns the current values in the XML format.
	json	Returns the current values in the JSON format.
fname	Filename	Sets the returned file's name.

Example: Exporting current values in the XML format (Querx PT)	
URL	**http://192.168.1.100/tpl/document.cgi?tpl/j/current.tpl&format=xml**
Output	

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE querx PUBLIC "-//egnite//DTD Querx 1.0//EN"
  "http://www.egnite.de/dtds/querx.dtd">
<querx version="1.0">
 <hostname>querx011f30</hostname>
 <ip>192.168.1.100</ip>
 <port>80</port>
 <date_gmt>Tue, 26 Apr 2016 12:55:48</date_gmt>
 <date_local>Tue, 26 Apr 2016 13:55:48</date_local>
 <contact></contact>
 <location></location>
 <sensors>

  <sensor id="sensor_1"
       name="Temperature"
       unit="°C"
       status="0"
       uplim="85.0"
       lolim="-40.0"/>

  <sensor id="sensor_2"
       name="Humidity"
       unit="%RH"
       status="0"
       uplim="100"
       lolim="0"/>

  <sensor id="sensor_3"
       name="Dew point"
       unit="°C"
       status="0"
       uplim="26.0"
       lolim="0.0"/>
  </sensors>
```

```
 <data>
  <record>
   <entry sensorid="sensor_1" name="value" value="23.7" trend="0"/>
   <entry sensorid="sensor_2" name="value" value="29" trend="0"/>
   <entry sensorid="sensor_3" name="value" value="23.7" trend="0"/>
  </record>
 </data>
</querx>
```

Example: Exporting current values in the JSON format (Querx TH)

URL	**http://192.168.1.100/tpl/document.cgi?tpl/j/current.tpl&format=json**

Output

```
{
 "querx":
 {
  "version": 1.0,
  "hostname": "querx011f30",
  "ip": "192.168.1.100",
  "port": 80,
  "date_gmt": "Tue, 26 Apr 2016 12:54:50",
  "date_local": "Tue, 26 Apr 2016 13:54:50",
  "contact": "",
  "location": "location",
  "sensors":
  [
   {"sensor":
   {
    "id": "sensor_1",
    "name": "Temperature",
    "unit": "&deg;C",
    "status":"0",
    "uplim":"85.0",
    "lolim":"-40.0"
   }}
   ,
   {"sensor":
   {
    "id": "sensor_1",
    "name": "Humidity",
    "unit": "%RH",
    "status":"0",
    "uplim":"100",
    "lolim":"0"
   }}
   ,
   {"sensor":
   {
    "id": "sensor_1",
    "name": "Dew point",
    "unit": "&deg;C",
    "status":"0",
    "uplim":"26.0",
    "lolim":"0.0"
   }}

  ],
  "data":
  [
   {"record": {
    "timestamp": "1461675290",
```

```
    "date": "26.04.2016",
    "time": "13:54:50",
    "entry": [


    { "sensorid": "sensor_1",
     "name": "value",
     "value": 23.7,
     "trend":0
    }

   ,
    { "sensorid": "sensor_2",
     "name": "value",
     "value": 33,
     "trend":0
    }

   ,
    { "sensorid": "sensor_3",
     "name": "value",
     "value": 23.7,
     "trend":0
    }

    ]
   }
  }
  ]
 }
}
```


8.2.2 Exporting Logged Values

URL	**http://<IP>/tpl/document.cgi?tpl/j/datalogger.tpl**	
URL parameters:		
format	*xml*	Returns logged values in the XML format.
	json	Returns logged values in the JSON format.
	csv	Returns logged values in the CSV format.
fname	Filename	Sets the returned file's name.
start	UNIX-Timestamp (e.g. *1459461600* for 04/01/2015, 00:00:00)	Exports data starting from the time specified in the Unix timestamp format
	Negative whole number (e.g. *-3600)*	Exports data starting from the current time minus the specified number of seconds
end	UNIX-Timestamp (e.g. *1459461600* for 04/01/2015, 00:00:00)	Exports data up until the time specified in the Unix timestamp format
	Negative whole number (e.g. *-60*)	Exports data up until the current time minus the specified number of seconds
	0 or blank	Exports data up until the current time

step	Whole number	Sets the time interval between values
	0 or blank	Sets the time interval between values to 60 seconds

Example: Exporting values from the last 24 hours with an interval of 2 hours as "yesterday.csv" (Querx TH)	
URL	**http://192.168.1.100/tpl/document.cgi?tpl/j/datalogger.tpl** **&format=csv** **&start=86400** **&step=7200**
Output	Date/Time;Temperature low;Temperature avg;Temperature high;Humidity low;Humidity avg;Humidity high 13.04.2016 18:00:00;23.6;23.9;24.0;31;32;32 13.04.2016 20:00:00;24.1;24.2;24.2;32;32;32 13.04.2016 22:00:00;24.2;24.2;24.3;32;33;33 14.04.2016 00:00:00;24.2;24.2;24.3;33;33;33 14.04.2016 02:00:00;24.2;24.2;24.3;33;33;33 14.04.2016 04:00:00;24.2;24.2;24.3;33;33;33 14.04.2016 06:00:00;24.1;24.2;24.2;33;33;33 14.04.2016 08:00:00;23.8;24.1;24.2;33;33;34 14.04.2016 10:00:00;23.7;23.8;23.9;32;33;33 14.04.2016 12:00:00;24.1;24.2;24.3;31;32;33 14.04.2016 14:00:00;24.2;24.4;24.7;30;30;31

Example: Exporting the values from the 5th of April 2016 with an interval of one hour in the XML format (Querx PT)	
URL	**http://192.168.1.100/tpl/document.cgi?tpl/j/datalogger.tpl** **&format=xml** **&start=1459854000** **&end=1459864800** **&step=3600**
Output	<?xml version="1.0" encoding="UTF-8"?> <!DOCTYPE querx PUBLIC "-//egnite//DTD Querx 1.0//EN" "http://www.egnite.de/dtds/querx.dtd"> <querx version="1.0"> <hostname>querxwlan</hostname> <ip>**192.168.1.100**</ip> <port>80</port> <date_gmt>Tue, 26 Apr 2016 10:48:41</date_gmt> <date_local>Tue, 26 Apr 2016 11:48:41</date_local> <contact></contact> <location></location> <sensors> <sensor id="sensor_1" name="Temperature" unit="°C"></sensor> </sensors> <data> <record timestamp="1459857600" date="05.04.2016" time="13:00:00"> <entry sensorid="sensor_1" name="minimum" value="25.3"/> <entry sensorid="sensor_1" name="average" value="25.4"/> <entry sensorid="sensor_1" name="maximum" value="25.5"/> </record> <record timestamp="1459861200" date="05.04.2016" time="14:00:00"> <entry sensorid="sensor_1" name="minimum" value="25.3"/>

```
    <entry sensorid="sensor_1" name="average" value="25.4"/>
    <entry sensorid="sensor_1" name="maximum" value="25.6"/>
   </record>

   <record timestamp="1459864800" date="05.04.2016" time="15:00:00">
    <entry sensorid="sensor_1" name="minimum" value="20.2"/>
    <entry sensorid="sensor_1" name="average" value="22.7"/>
    <entry sensorid="sensor_1" name="maximum" value="26.3"/>
   </record>

  </data>
 </querx>
```

8.2.3 TLS and User-login

The examples provided above work for unencrypted access to the web interface and when no password protection has been set up. In order to retrieve data as an authorized, password-protected user, you need to log into the web interface and save the session.

WLAN models: Saving the session is also advisable if you need to repeatedly access data via TLS, as the TLS-initialization only needs to be performed once.

URL	**https://<IP>/login.cgi**
POST-Parameters	
login_user	Username
login_pass	Password

Example: User registration	
URL	`https://192.168.1.100/login.cgi`
Postdata	`login_user: querx` `login_pass: verysecure`
Output	**Ignore the output but save the session!**

8.2.4 Application Examples

Application examples for various coding languages can be found in the tutorials section on the product page at sensors.egnite.de.

9 Maintenance, Tips and Troubleshooting

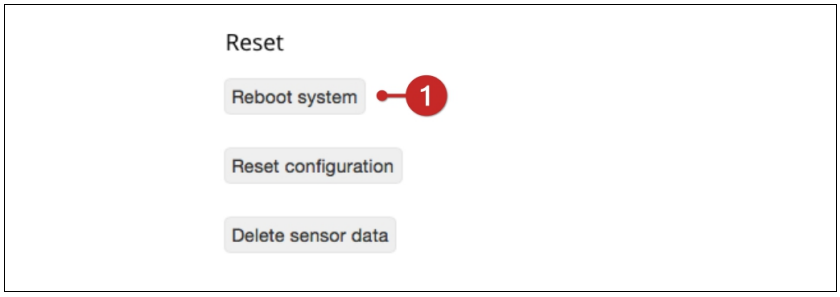
9.1 Reboot

There are two different ways of rebooting Querx.

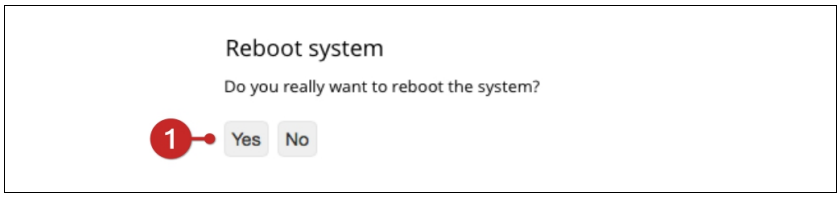
9.1.1 Soft Boot

A restart is sometimes required after changing the device's configuration.

Open the page *Maintenance / Reset* in the configuration area.



1. Click the button *Reboot system*.



1. Confirm the soft boot by clicking *Yes* on the following page.

9.1.2 Cold Boot

A cold boot may be necessary if the device should cease to respond.

1. Disconnect Querx from the power supply.

2. Wait for several seconds.

3. Reconnect Querx to the power supply.

9.2 Saving the Configuration

The configuration can be exported, in order to save it or apply the same settings to several devices. The following settings are ignored when exporting the configuration:

1. Manual network settings
2. Email accounts and passwords

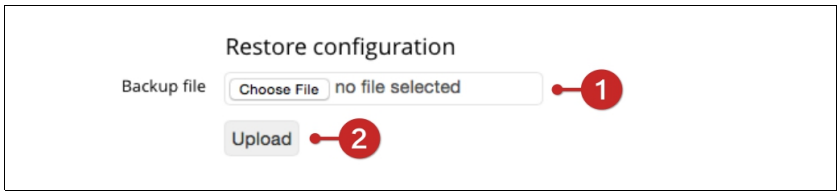
9.2.1 Exporting the Configuration

Open the page *Maintenance / Backup* in the configuration area.

1. Click the *Download* link labelled *Configuration* in the *Configuration backup* section.
2. Save the file by clicking *OK*.

9.2.2 Restoring the Configuration

Open the page *Maintenance / Backup* in the configuration area.



1. Click the *Choose File* button labelled *Backup file* in the *Restore configuration* section and select the configuration file that you intend to activate in the dialog box.
2. Click *Upload*.

Finally, restart Querx via the web interface as detailed in section *9.1 Reboot*.

⚠	**Information** Please note that Querx needs to be rebooted after uploading a configuration file.

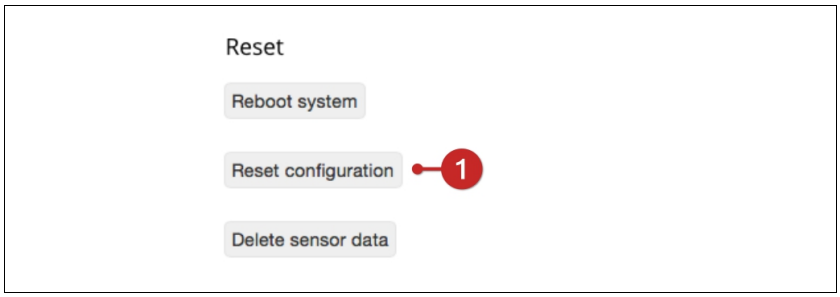
9.3 Resetting the Configuration

There are two ways of resetting the configuration to the factory settings.

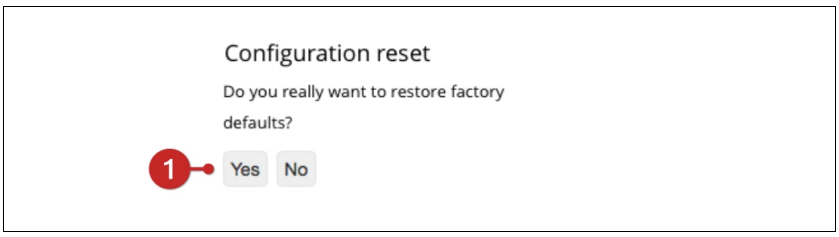
9.3.1 Resetting the Configuration Via the Web Interface

The network settings will not be changed when resetting the configuration via the web interface.

Open the page *Maintenance / Reset* in the configuration area.



1. Click the button *Reset configuration*.



1. Confirm that you want to reset the configuration by clicking *Yes* on the following page.

9.3.2 Performing a Hardware Reset

Querx can be returned to the factory settings via a hardware reset, if you can not enter the configuration area, for instance because you do not have the access data at hand.

The network settings will be discarded and the device will be fully returned to the factory settings, when performing a hardware reset.

You will need:

- a biro

Querx TH / THP / PT

Querx WLAN TH / THP / PT

1. Use the biro to press the reset switch while the device is turned on (see image). The status LED will start to flash red.
2. Keep the switch pressed until the LED stops flashing.
3. Querx will now reboot with the factory settings.

⚠	**Attention** Do not use a pencil to reset the configuration, as the pencil lead might break and pieces of graphite can damage the device.

9.4 Firmware-Updates

The manufacturer occasionally makes new firmware available, in order to expand the functionality of the Querx product range. If required, these firmware updates can be saved on your device and activated.

Querx can store two firmware images in two separate buffers. The software is copied into the internal memory and implemented when one of the buffers is activated.

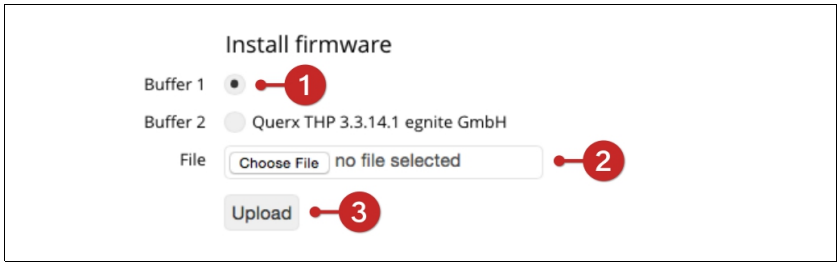
9.4.1 Installing Firmware Images

Open the page *Maintenance / Firmware* in the configuration area.

The firmware that your device is currently running is displayed in the *Firmware* field of the *Version* section. An update may be advisable, if this version of the firmware is older than the one available for download at sensor.egnite.de.

Installing firmware

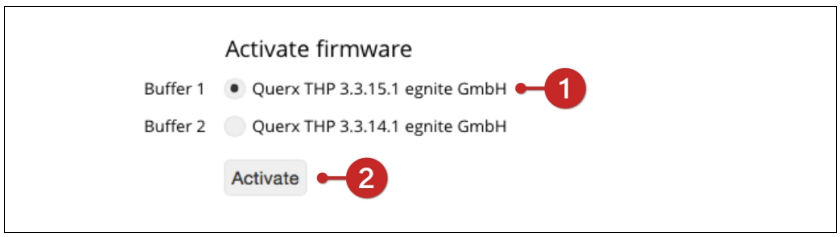
Download the current version of the firmware from the website. Open the page *Maintenance / Firmware* in the configuration area.



1. Select the *Buffer* in which you want to save the firmware image in the section *Install firmware*. It is advised to choose either an empty buffer, or the one with the oldest firmware version.
2. Click *Choose File* and select the firmware image that you want to install.
3. Click *Send* to save the firmware image in the selected buffer.

9.4.2 Activating a Firmware Image

The new firmware version needs to be activated after being installed. Open the page *Maintenance / Firmware*.



1. Select the *Buffer* containing the firmware image you want to activate in the section *Activate firmware*.
2. Click the button *Activate* to activate the new firmware.

Querx will now copy the buffer's contents into its internal memory and then reboot.

Attention

Do not disconnect Querx from the power supply while a firmware image is being activated. If an image is copied incompletely, the device can no longer be used and needs to be sent to the manufacturer to be serviced.

9.4.3 Activating an Alternate Firmware Image

Querx can activate the firmware image stored in the second buffer, if you encounter any unexpected problems after updating the firmware.

You will need:

- a biro

Querx TH / THP / PT

Querx WLAN TH / THP / PT

1. Unplug the micro-USB cable to disconnect Querx from the power supply.
2. Use the biro to press the switch (see image).
3. Keep the switch pressed while reconnecting Querx to the micro-USB cable.
4. The status-LED will start to flash red. It will stop flashing and remain red after a few seconds.
5. The firmware image stored in the secondary buffer will be loaded into the internal memory once you release the switch. The device will then reboot with the changed firmware.

⚠	**Attention** Do not use a pencil to reset the configuration, as the pencil lead might break and pieces of graphite can damage the device.

⚠	**Attention** Do not disconnect Querx from the power supply while a firmware image is being activated. If an image is copied incompletely, the device can no longer be used and needs to be sent to the manufacturer to be serviced.

9.5 Changing the Battery

Querx is fitted with a battery that is used to operate the internal clock in the case of a power shortage. A notification appears in the lower left corner of the web interface if the battery's charge reaches critical levels.

The battery can be changed as detailed in the following section. However, we recommend sending the device in for maintenance.

⚠	**Information** Querx is operational without a battery. The battery does not need to be changed if the device is in ongoing operation under normal operating conditions (at a temperature of approx. 23 degrees centigrade). The battery should be changed every five years if the device is not connected to a power source, e.g. during storage.

In order to change the battery you will need:

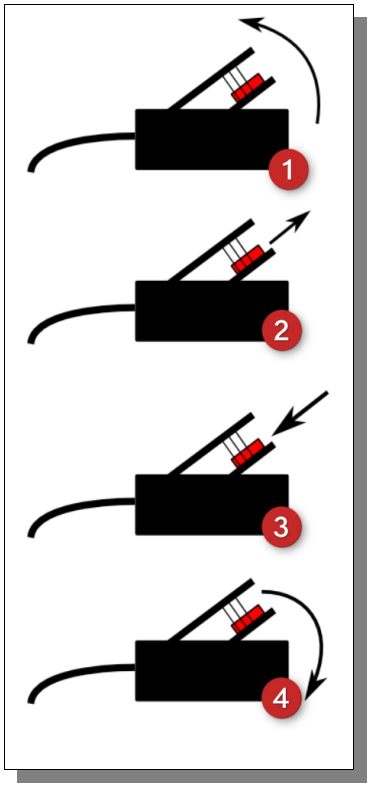
- Two Phillips screwdrivers, sizes PH0 and PH1
- A replacement battery, type Renata CR1225

⚠	**Attention** Take care not to touch any electrical contacts while changing the battery. Electrostatic discharges (ESD) can damage the device immediately or in the long run.

9.5.1 Opening the Casing

1. Unscrew the screws marked red in the image, using the PH0 screwdriver. Then remove the back cover of the casing.
2. A second screw is located inside the casing. It is marked red in the image. Undo this screw using the PH1 screwdriver.

9.5.2 Changing the Battery



1. Carefully lift the circuit board up at the edge opposite the sensor cable.
2. Press the old battery out of the fixture using one of the screwdrivers.
3. Press the new battery into the fixture. If required, use the screwdriver to push the battery into place.
4. Place the circuit board back into the casing.
5. Tighten the screw inside the casing as well as the two screws that fix the back cover.

9.6 Troubleshooting

Problem	Solution	Chapter
No network connection	Configure the network settings manually.	2.7
	Or: Determine whether a problem with the network exists. If necessary, talk to the network administrator.	
Querx reacts slowly	Check the *Memory usage* value on the page *Maintenance / Firmware*. If this is above 70%, please close redundant browser tabs.	
Forgotten user password	Reset the configuration	9.3
Network configuration unknown	Configure the network settings manually.	2.7
	Or: Reset the network settings	9.3
NTP / Email / Cloud not working	Ensure that you have configured a valid DNS server	4.2
I need to log into the web interface regularly to configure the device	Increase the value for *Session timeout* in the user management section.	4.3
The system no longer works after a firmware update	If you have saved a second firmware image on the device, activate it.	9.4

If you encounter any problems not discussed in this manual, please contact the manufacturer egnite directly. The contact details can be found in chapter *10.12 Manufacturer and Contact Details*.

Furthermore, a tutorial that will help you narrow down possible issues is available at sensors.egnite.de.

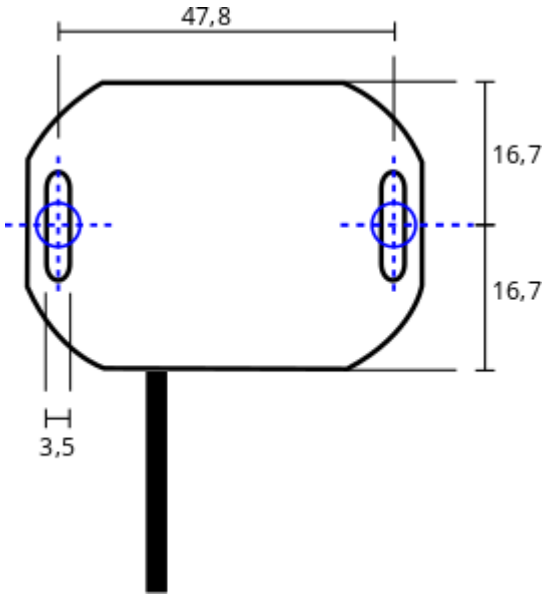
10 Appendix

10.1 Drill Templates

Querx TH

Querx THP

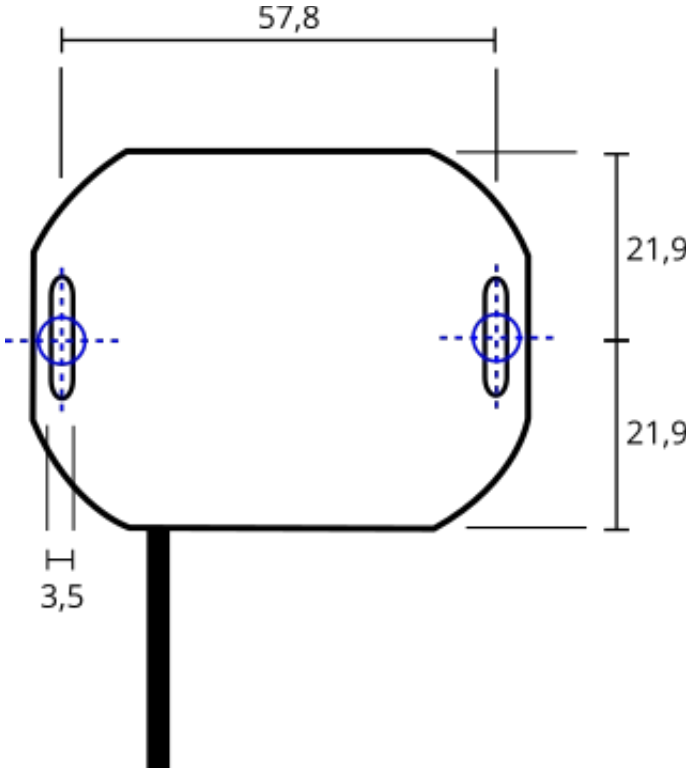
Querx PT



Querx WLAN TH

Querx WLAN THP

Querx WLAN PT



10.2 Specifications

10.2.1 Querx TH

Specifications	
Temperature sensor	
Measurement range	-40 °C to 85 °C -40 °F to 185 °F
Accuracy	±0,4°C (10 to 85°C) / ±1,0°C (-40 to -10°C) ±0,7°F (14 to 185°F) / ±1,8°F (40°F to 14°F)
Resolution	0,1 °C 0.2 °F
Long-term stability	≤0,01 °C / year (typically)
Humidity sensor	
Measurement range	0 % to 95 % rF
Accuracy	±2,0% rF (0 to 80% rF, 30°C/86°F) ±4,0% rF (80 % to 95 % rF, 30°C/86 °F)
Resolution	1 % rF
Long-term stability	≤0,25 / year (typically)
Sensor type	CMOS-IC with polymer film
Hardware and interfaces	
Interval between measurements	1 second
Calibration	Factory-calibrated, DakkS certificate available (German Accreditation Body)
Sensor heater	Integrated
Ethernet	10/100 Mbit RJ45, HP Auto-MDIX Static or dynamic IP (DHCP client)
Operating system	Nut/OS 5
Firmware updates	Via web interface, rescue function
Logging interval	Configurable
M2M	HTTP (XML, CSV, JSON), Syslog, Modbus/TCP, SNMP
Data logger capacity	73,728 entries ≙51 days (1 entry/min) to 8.4 years (1 entry/year)
Web interface	Interactive diagram, live update, HTML5, CSS3, JSON und SVG
Security	StartTLS / TLS, password protection, user management (3 users / 3 groups)
Email	Up to 4 recipients and 2 SMTP servers (StartTLS / TLS)
SNMP	SNMPv1 agent and traps
Status LED	3 colors: red, green, yellow
Time / date	Real-time clock with battery backup and SNTP update
Power supply	5 V DC to 5.5 V DC
Power consumption	120 mA 0.6W (typically), 200 mA 1W (maximally)
Ambient conditions	
Operation	-40 °C to 85 °C, max. 95 % rF -40 °F to 185 °F, max. 95 % rF
Storage	-40 °C to 85 °C, max. 95 % rF -40 °F to 185 °F, max. 95 % rF
Mechanical data	
Casing material	ABS plastic
Casing color	Black RAL 9011
Casing dimensions	2.2 x 1.6 x 0.8 in (56,3 x 40 x 21 mm)

Sensor cable length	13.4 in (340 mm)
Weight	0.07 lb (35 g)
Sockets	RJ45 (Ethernet), Micro-USB
Mounting	Wall mounting
Conformity	
European Union	CE-compliant
UL, USA / Canada	UL94V-0
Protection class	IP20

10.2.2 Querx THP

Specifications	
Temperature sensor	
Measurement range	-40 °C to 85 °C -40 °F to 185 °F
Accuracy	±0,4°C (10 to 85°C) / ±1,0°C (-40 to -10°C) ±0,7°F (14 to 185°F) / ±1,8°F (40°F to 14°F)
Resolution	0,1 °C 0.2 °F
Long-term stability	≤0,01 °C / year (typically)
Humidity sensor	
Measurement range	0 % to 95 % rF
Accuracy	±2,0% rF (0 to 80% rF, 30°C/86°F) ±4,0% rF (80 % to 95 % rF, 30°C/86 °F)
Resolution	1 % rF
Long-term stability	≤0,25 / year (typically)
Sensor type	CMOS-IC with polymer film
Pressure sensor	
Measurement range	300 – 1100 hPa
Absolute accuracy	±1 hPa
Relative accuracy	±0,12 hPa
Resolution	0,18 Pa
Long-term stability	±1 hPa / Jahr
Hardware and interfaces	
Interval between measurements	1 second
Calibration	Factory-calibrated, DakkS certificate available (German Accreditation Body)
Sensor heater	Integrated
Ethernet	10/100 Mbit RJ45, HP Auto-MDIX Static or dynamic IP (DHCP client)
Operating system	Nut/OS 5
Firmware updates	Via web interface, rescue function
Logging interval	Configurable
M2M	HTTP (XML, CSV, JSON), Syslog, Modbus/TCP, SNMP
Data logger capacity	36864 entries ≙ 25 days (1 entry/min) to 4.2 years (1 entry/h)
Web interface	Interactive diagram, live update, HTML5, CSS3, JSON und SVG
Security	StartTLS / TLS, password protection, user management (3 users / 3 groups)

Email	Up to 4 recipients and 2 SMTP servers (StartTLS / TLS)
SNMP	SNMPv1 agent and traps
Status LED	3 colors: red, green, yellow
Time / date	Real-time clock with battery backup and SNTP update
Power supply	5 V DC to 5.5 V DC
Power consumption	120 mA 0.6W (typically), 200 mA 1W (maximally)
Ambient conditions	
Operation	-40 °C to 85 °C, max. 95 % rF -40 °F to 185 °F, max. 95 % rF
Storage	-40 °C to 85 °C, max. 95 % rF -40 °F to 185 °F, max. 95 % rF
Mechanical data	
Casing material	ABS plastic
Casing color	Black RAL 9011
Casing dimensions	2.2 x 1.6 x 0.8 in (56,3 x 40 x 21 mm)
Sensor cable length	13.4 in (340 mm)
Weight	0.07 lb (35 g)
Sockets	RJ45 (Ethernet), Micro-USB
Mounting	Wall mounting
Conformity	
European Union	CE-compliant
UL, USA / Canada	UL94V-0
Protection class	IP20

10.2.3 Querx WLAN TH

Specifications	
Temperature sensor	
Measurement range	-40 °C to 85 °C -40 °F to 185 °F
Accuracy	±0,4°C (10 to 85°C) / ±1,0°C (-40 to -10°C) ±0,7°F (14 to 185°F) / ±1,8°F (40°F to 14°F)
Resolution	0,1 °C 0.2 °F
Long-term stability	≤0,01 °C / year (typically)
Humidity sensor	
Measurement range	0 % to 95 % rF
Accuracy	±2,0% rF (0 to 80% rF, 30°C/86°F) ±4,0% rF (80 % to 95 % rF, 30°C/86 °F)
Resolution	1 % rF
Long-term stability	≤0,25 / year (typically)
Sensor type	CMOS-IC with polymer film
Hardware and interfaces	
Interval between measurements	1 second
Calibration	Factory-calibrated, DakkS certificate available (German Accreditation Body)
Sensor heater	Integrated
Ethernet	10/100 Mbit RJ45, HP Auto-MDIX Static or dynamic IP (DHCP client)
WiFi	2.4 GHz IEEE 802.11 b/g/n
WiFi encryption	WEP, WPA, WPA2
Operating system	Nut/OS 5
Firmware updates	Via web interface, rescue function
Logging interval	Configurable
M2M	HTTP (XML, CSV, JSON), Syslog, Modbus/TCP, SNMP
Data logger capacity	At least 7.5 years of internal memory (4 million entries)
Web interface	Interactive diagram, live update, HTML5, CSS3, JSON und SVG
Security	StartTLS / TLS, password protection, user management (3 users / 3 groups)
Email	Up to 4 recipients and 2 SMTP servers (StartTLS / TLS)
SNMP	SNMPv1 agent and traps
Status LED	RGB
Acoustic signaler	Beeper
Time / date	Real time clock with battery backup and SNTP update
Power supply	5 V DC to 5.5 V DC
Power consumption	200 mA 1 W (typically) / 300 mA 1,5 W (maximally)
Ambient conditions	
Operation	-40 °C to 85 °C, max. 95 % rF -40 °F to 185 °F, max. 95 % rF
Storage	-40 °C to 85 °C, max. 95 % rF -40 °F to 185 °F, max. 95 % rF
Mechanical data	
Casing material	ABS plastic
Casing color	Black RAL 9011

Casing dimensions	2.6 x 2 x 0.8 in (66,3 x 50 x 20 mm)
Sensor cable length	13.4 in (340 mm)
Weight	0.2 lb (63 g)
Sockets	RJ45 (Ethernet), micro-USB
Mounting	Wall mounting
Conformity	
European Union	CE-compliant
UL, USA / Canada	UL94V-0
Protection class	IP20

10.2.4 Querx PT100 / Querx PT1000

Specifications	
Temperature sensor	
Measuring range	Sensor-dependent -200 °C to 750 °C -328 °F to 1382 °F
Accuracy	Sensor-dependent 0,5 °C 0.9 °F
Resolution	0,1 °C 0.2 °F Pt
Pt100/Pt1000-connection	2-, 3- and 4-core
Hardware and interfaces	
Interval between measurements	1 second
Calibration	DakkS-calibration available (German Accreditation Body)
Ethernet	10/100 Mbit RJ45, HP Auto-MDIX Static or dynamic IP (DHCP client)
Operating system	Nut/OS 5
Firmware updates	Via web interface, rescue function
Data logger capacity	73,728 entries ≙51 days (1 entry/min) to 8.4 years (1 entry/h)
Logging interval	Configurable
M2M	HTTP (XML, CSV, JSON), Syslog, Modbus/TCP, SNMP
Web interface	Interactive diagram, live update, HTML5, CSS3, JSON and SVG
Security	StartTLS / TLS, password protection, user management (3 users / 3 groups)
E-Mail	Up to 4 recipients and 2 SMTP servers (StartTLS / TLS)
SNMP	SNMPv1 agent and traps
Status LED	3 colors: red, green, yellow
Time / date	Real time clock with battery-backup and SNTP-update
Power supply	5 V DC ... 5.5 VDC via Micro-USB
Power consumption	120 mA 0.6W (typically), 200 mA 1W (maximally)
Ambient conditions	
Operation	-40 °F bis 185 °F, max. 95 % rF -40 °C bis 85 °C, max. 95 % rF
Storage	-40 °C bis 85 °C, max. 95 % rF -40 °F bis 185 °F, max. 95 % rF
Mechanical data	
Casing material	ABS plastic
Casing color	Black RAL 9011
Casing dimensions	2.2 x 1.6 x 0.8 in (56,3 x 40 x 21 mm)
Sensor cable length	13.8 in (340 mm)
Weight	0.07 lb (35 g)
Sockets	RJ45 (Ethernet), Micro-USB
Mounting	Wall mounting
Conformity	
European Union	CE-compliant
UL, USA / Canada	UL94V-0
Protection class	IP20

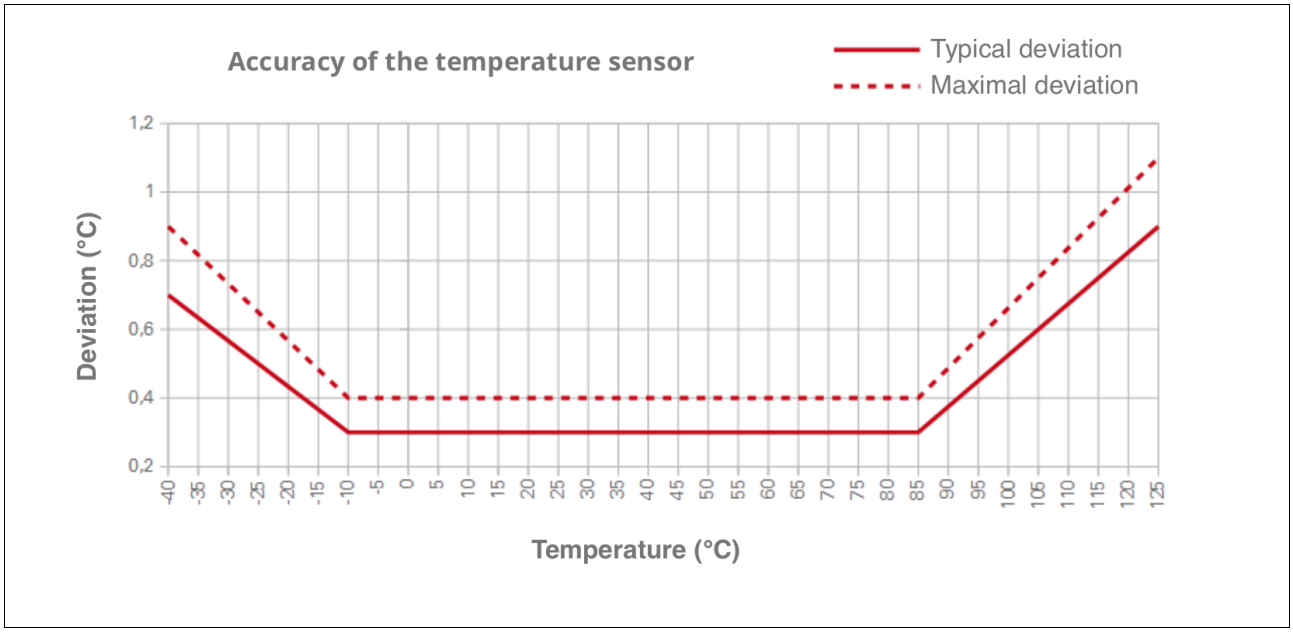
10.2.5 Querx WLAN PT100 / Querx WLAN PT1000

Specifications	
Temperature sensor	
Measuring range	Sensor-dependent -200 °C bis 750 °C -328 °F bis 1382 °F
Accuracy	Sensor-dependent 0,5 °C 0.9 °F
Resolution	0,1 °C 0.2 °F Pt
Pt100/Pt1000-connection	2-, 3- and 4-core
Hardware and interfaces	
Interval between measurements	1 second
Calibration	DakkS-calibration available
Ethernet	10/100 Mbit RJ45, HP Auto-MDIX Static or dynamic IP (DHCP client)
WiFi	2.4 GHz IEEE 802.11 b/g/n
WiFi encryption	WEP, WPA, WPA2
Operating system	Nut/OS 5
Firmware updates	Via web interface, rescue function
Data logger capacity	At least 7.5 years of internal memory (4 million entries)
Logging interval	Configurable
M2M	HTTP (XML, CSV, JSON), Syslog, Modbus/TCP, SNMP
Web interface	Interactive diagram, live update, HTML5, CSS3, JSON and SVG
Security	StartTLS / TLS, password protection, user management (3 users / 3 groups)
E-Mail	Up to 4 recipients and 2 SMTP servers (StartTLS / TLS)
SNMP	SNMPv1 agent and traps
Status LED	3 colors: red, green, yellow
Time / date	Real time clock with battery-backup and SNTP-update
Power supply	5 V DC ... 5.5 VDC via USB
Power consumption	200 mA 1 W (typically) / 300 mA 1,5 W (maximally)
Ambient conditions	
Operation	-40 °F bis 185 °F, max. 95 % rF -40 °C bis 85 °C, max. 95 % rF
Storage	-40 °C bis 85 °C, max. 95 % rF -40 °F bis 185 °F, max. 95 % rF
Mechanical data	
Casing material	ABS plastic
Casing color	Black RAL 9011
Casing dimensions	2.6 x 2 x 0.8 in (66,3 x 50 x 20 mm)
Sensor cable length	13.8 in (340 mm)
Weight	0.2 lb (63 g)
Sockets	RJ45 (Ethernet), Micro-USB
Mounting	Wall mounting
Conformity	
European Union	CE-compliant
UL, USA / Canada	UL94V-0
Protection class	IP20

10.2.6 Sensor Details

10.2.6.1 TH Models: Temperature Sensor

	Measuring range	Typical	Maximal	Unit
Accuracy	-10 – 85	± 0.3	± 0.4	°C
	-40 – 100	See illustration		°C
	14 – 185	± 0.54	± 0.7	°F
	-40 – 212	See illustration		°F
Long-term stability		≤0.01		°C / year
		≤0.02		°F / year

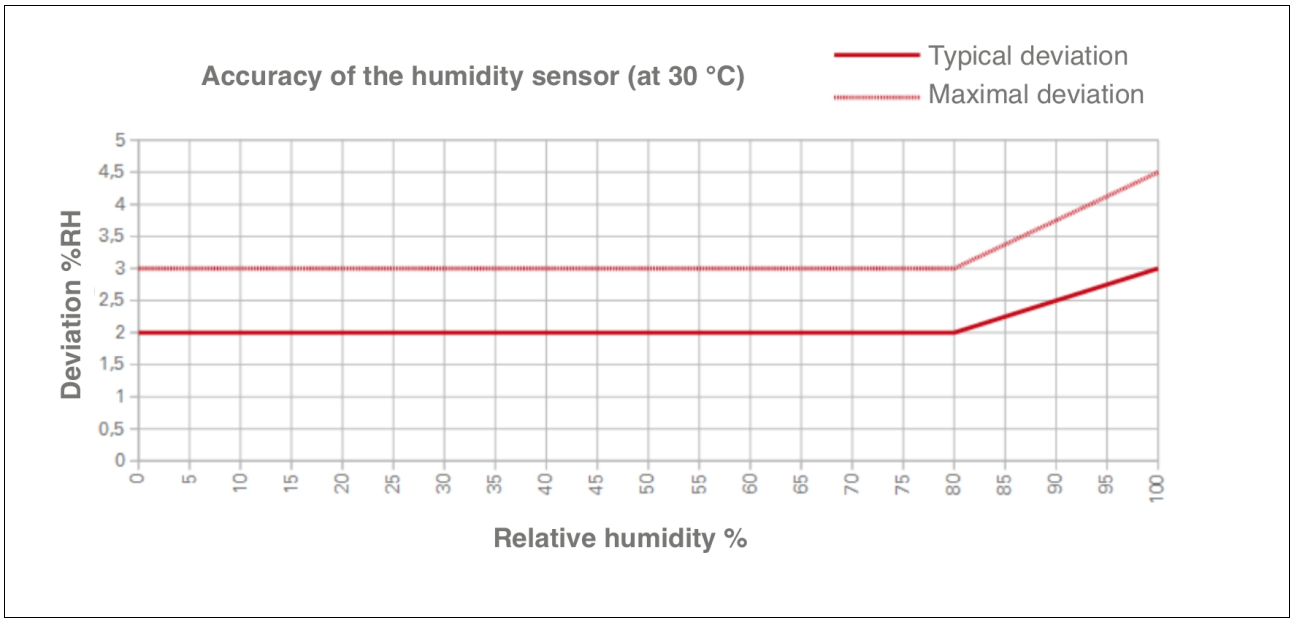


10.2.6.2 THP Models: Temperature Sensor

	Measuring range	Typical	Unit
Accuracy	25	± 0.5	°C
	0 – 65	± 1.0	°C

10.2.6.3 TH Models: Humidity Sensor

	Measuring range	Typical	Maximal	Unit
Accuracy	0 – 80	± 2	± 3	%
	80 – 100	See illustration		%
Long-term stability		≤0.25		% / year



10.2.6.4 THP Models: Humidity Sensor

	Measuring range	Typical	Unit
Accuracy	20 – 80	± 3	%rH
Long-term stability	at 10 – 90 %rH, 25 °C	0.5	%rH / year

10.2.6.5 THP Models: Pressure Sensor

	Measuring range	Typical	Unit
Accuracy	300 – 1100	± 1	hPa
Long-term stability	at 0 - 60 °C	± 1	hPa / year

10.2.6.6 Inaccuracies in Extreme Conditions

The capacitive humidity sensor is made of a thin polymer film that is located between two electrodes. Depending on the humidity, the polymer absorbs or releases vapor contained in the surrounding air. This changes the polymer film's dielectric properties and thus the sensor's capacitance. This has the following advantages over other types of sensors:

- quick response
- wide measuring range with an almost linear characteristic curve
- high accuracy and long-term stability

If the sensors are continuously exposed to extreme conditions such as high temperatures, high aridity or high humidity, the sensor film can become too dry or too moist.

This will lead to a temporary inaccuracy in the humidity and dew point values.

10.2.6.7 Dew Point Calculation

The dew point is calculated by applying the following formula to the current temperature and humidity values:

$$T_{DC} = (T_C - (14.55 + 0.114 * T_C) * (1 - (0.01 * RH)) - ((2.5 + 0.007 * T_C) * (1 - (0.01 * RH)))^3 - (15.9 + 0.11 * T_C) * (1 - (0.01 * RH))^{14})$$

Cf.: H. Dean Parry, 1969: "The semiautomatic computation of rawinsondes", T*echnical memorandum WBTM EDL 10, U.S. Department of Commerce, Environmental Science Services Administration*, Weather Bureau, Silver Spring, MD (October), page 9 and page ii-4, line 460.

Please note that inaccuracies in the temperature and humidity values influence the accuracy of the dew point calculation.

10.3 Conformity

Querx fulfills the following EU-regulations:

Interference immunity:

- EN 61326-1:2013 Class A
- EN 61000-4-2:2009
- EN 61000-4-3:2011
- EN 61000-4-4:2013
- EN 61000-4-6:2009
- EN 61000-4-8:2010

Interference emission:

- EN 61326-1:2013 Class B
- EN 55011:2011

RoHS:

- EU Directive 2011/65/EU

WLAN Models:

ETSI:

- EN300 328, Ver. 1.8.1
- EN301.489 – 17

The EC-conformity declaration can be requested from the manufacturer. Technical changes reserved.

10.4 Sensor Calibration

Integrated sensors such as those used in the TH and THP models usually have high tolerances. Therefore, these sensors are factory-calibrated, in order to ensure precise measurements.

Platinum temperature sensors, which are used with the PT models, are manufactured according to accuracy classes and do not need to be calibrated.

A DAkkS certificate (German Accreditation Body) is available for all products, if the intended use requires exact documentation for quality control purposes.

Further information concerning this can be found on the product page at sensors.egnite.de. Please feel free to contact us if you require personal assistance.

10.5 Modbus Registers

Read Registers			
Address	**Offset**	**Format**	**Contents**
30011	10	int16	Temperature Celsius * 10
30012	11	int16	Relative humidity %
30013	12	int16	Temperature Fahrenheit * 10
30014	13	int16	Temperature Kelvin * 10
30015	14	int16	Dew point Celsius * 10
30016	15	int16	Dew point Fahrenheit * 10
30017	16	int16	Dew point Kelvin * 10
30020	19	int16	Pressure hPa * 10

Holding Registers			
Address	**Offset**	**Format**	**Contents**
40021	20	int16	Lower temperature limit Celsius * 10
40022	21	int16	Upper temperature limit Celsius * 10
40023	22	int16	Temperature dead band Kelvin / Celsius * 10
40024	23	int16	Lower temperature limit Fahrenheit * 10
40025	24	int16	Upper temperature limit Fahrenheit * 10
40026	25	int16	Temperature dead band Fahrenheit * 10
40027	26	int16	Lower temperature limit Kelvin * 10
40028	27	int16	Upper temperature limit Kelvin * 10
40031	30	int16	Lower humidity limit
40032	31	int16	Upper humidity limit
40033	32	int16	Humidity dead band
40051	50	int16	Lower dew point limit Celsius * 10
40052	51	int16	Upper dew point limit Celsius * 10
40053	52	int16	Dew point dead band Celsius * 10
40054	53	int16	Lower dew point limit Fahrenheit * 10
40055	54	int16	Upper dew point limit Fahrenheit * 10
40056	55	int16	Dew point dead band Fahrenheit * 10
40057	56	int16	Lower dew point limit Kelvin * 10
40058	57	int16	Upper dew point limit Kelvin * 10
40061	60	Int16	Lower pressure limit in hPa * 10
40062	61	Int16	Upper pressure limit in hPa * 10
40063	62	Int16	Pressure dead band in hPa * 10

10.6 SNMP Object Identifiers

OID	Description
1.3.6.1.4.1.3444.1.14.1.2.1.5.1	Temperature sensor
1.3.6.1.4.1.3444.1.14.1.2.1.5.2	Humidity sensor
1.3.6.1.4.1.3444.1.14.1.2.1.5.3	Calculated dew point
1.3.6.1.4.1.3444.1.14.2.0.101	Trap-code for normal conditions
1.3.6.1.4.1.3444.1.14.2.0.102	Trap-code for alerts
The complete MIB is saved on the device and can be downloaded from the site *Interfaces / SNMP* in the configuration area.	

10.7 The Measuring and Data-Logging Processes

Querx measures the current values once per second. The measurements can be accessed via SNMP, Modbus and the web interface.

The integrated data logger saves the measured minimum-, maximum-, and median-values once a minute and adds the corresponding time and date to each entry.

When retrieving or exporting data, the interval between entries should not be set to a smaller value than the interval between logged entries.

10.8 Supported Export Data Formats

Querx can export data in the following three formats:

- CSV
  Data that is exported in the CSV format can be opened in any spreadsheet application.
- XML
  The transport data format XML is suited to the export and further processing of data in various applications.
- JSON
  JSON is a Java-based format that has been gaining importance, especially with regards to the internet of things.

10.9 Technical Support

If you encounter any problems with one of our products, the team at egnite will be glad to assist and advise you.

Please keep the following information at hand when contacting us, in order to make it as easy as possible for us to help you:

- Name and model number of your product
- Serial number or MAC address
- Currently activated firmware
- If readily available: Date of purchase and the distributor who you purchased the product from

You can also find instructions that will help you narrow down the causes for your problem using a Syslog application in the *Querx Tutorials* section at sensors.egnite.de.

Please work through this manual and send us the recorded log files.

10.10 Notes on Storage

Do not store the devices in polyethylene bags. The emitted gasses can harm the sensor.

Substances that contain bleach, hydrogen peroxide or ammonia can also be harmful.

10.11 Environmentally Appropriate Disposal

Please dispose of the devices in accordance with the valid laws and environmental regulations.

The devices contain electrical components as well as a battery and must therefore be disposed of separately from household waste. Hand the devices in at an official collection point.

10.12 Manufacturer and Contact Information

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10.13 Disclaimer

egnite can not be held responsible for technical or typographical mistakes. We reserve the right to alter the documentation without further announcements.