



www.WuT.de

Manual

Installation, Startup and Applications

Web-Thermometer

valid for models:

#57107	Web-Thermometer 2x Pt100/Pt1000
#57113	Web-Thermo-Hygrobarometer
#57114	Web-Thermometer NTC
#57115	Web-Thermometer Pt100/Pt1000
#57120	Web-Thermo-Hygrometer
#57125	Web-Thermometer 1x Pt100/Pt1000
#57126	Web-Thermometer Relay
#57171	Web-Thermometer UV 1x
#57172	Web-Thermometer UV 2x

Release 1.81 07/2026

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Errors and changes reserved:

As we may make mistakes, none of our statements may be used without verification. Please report any errors or ambiguities to us so that we can identify and correct them as quickly as possible.

Only perform work on or with W&T products if it is described here and you have read and understood the instructions completely. Unauthorized actions can cause hazards. We are not liable for the consequences of unauthorized actions. If in doubt, please check with us or your dealer!

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1. Legal notices

Warning notice concept

These instructions contain information that must be observed for your personal safety and to prevent damage to property. The information is highlighted by a warning triangle. Depending on the level of danger, the warnings are displayed in descending order as follows:

DANGER

indicates a hazard that will result in death or serious injury if appropriate precautions are not taken.

WARNING

indicates a hazard that could result in death or serious injury if appropriate precautions are not taken.

CAUTION

indicates a hazard that may result in minor injury if appropriate precautions are not taken.

ATTENTION

indicates a hazard that may result in damage to property if appropriate precautions are not taken.

If there are several hazard levels, the warning label with the highest level always applies. If a warning label with a warning triangle warns of personal injury, a warning of damage to property may also be included in the same warning label.

Qualified personnel

The product described in this manual must only be installed and commissioned by personnel who are qualified for the task at hand.

The documentation relevant to the task at hand must be observed, in particular the

safety and warning instructions contained therein.

Qualified personnel are capable of recognizing risks and avoiding potential hazards when handling the products described due to their training and experience.

Disposal

Electronic devices must not be disposed of with household waste, but must be disposed of properly as electronic waste.

Symbols on the product

Symbol	Explanation
	CE labeling The product complies with the requirements of the applicable EU directives.
	WEEE labeling The product must not be disposed of with household waste, but must be disposed of in accordance with the disposal regulations for electrical waste applicable at the installation site.

2. Safety instructions

General information

These instructions are intended for the installer of the web thermometer described in the manual and must be read and understood before work begins. The devices may only be installed and commissioned by qualified personnel.

Intended use

DANGER

The web thermometers from Wiesemann & Theis are devices for monitoring temperature and climate via a network.

Any other use or modification of the described devices is not in accordance with their intended purpose.

Electrical safety

WARNING

Before starting any work on the web thermometer, the power supply must be completely disconnected by suitable means. Make sure that the device cannot be switched on again accidentally!

The web thermometer may only be used in closed and dry rooms.

The device should not be exposed to high ambient temperatures or direct sunlight, nor should it be operated near heat sources. Please observe the restrictions regarding the maximum ambient temperature.

Ventilation openings must be free of any obstructions. A distance of 10-15 cm should be maintained between the web thermometer and adjacent heat sources.

The input voltage must not exceed the nominal values specified in the specifications.

During installation, ensure that no loose wires protrude through the ventilation slots of the web thermometer into the interior of the housing. Ensure that no individual wires protrude from the stranded cable, that the entire stranded cable is located in the terminal, and that the screws of the connection terminals are tightened securely. Tighten the screws on unused connection terminals.

The power supply unit used to supply the web thermometer must ensure safe isolation of the low-voltage side from the mains supply in accordance with EN62368-1 and have "LPS" properties.

EMC

ATTENTION

The web thermometers comply with industrial interference immunity limits and the stricter emission limits for households and small businesses. Therefore, there are no EMC-related restrictions on the use of the devices in these environments.

The complete declarations of conformity for the devices described in the manual can be found on the respective Internet data sheet page on the W&T homepage at <http://www.wut.de>.

3 Quick start / Commissioning

Only a few steps are necessary to put the W&T web thermometer into operation and make it visible in your network.

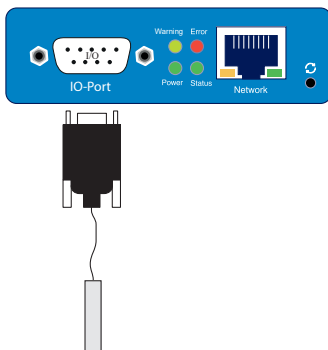
Power over Ethernet

The web thermometers can be supplied with power via the network interface in accordance with IEEE802.3af/Power over Ethernet. Power can be supplied via the data pairs or via the unused wire pairs in 10/100BaseT (see PoE power supply).



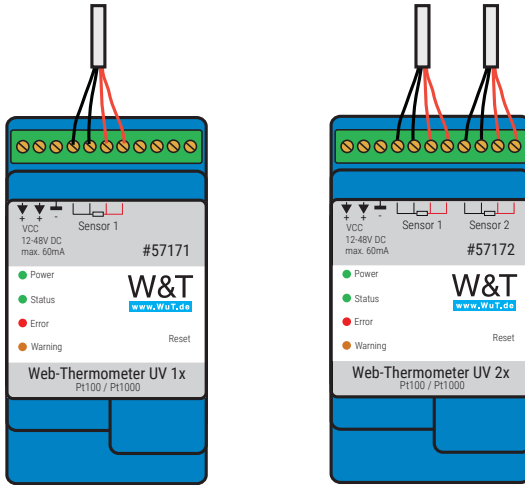
The web thermometers can also be used in networks without PoE supply. In this case, an external power supply must be used via the screw terminals, as described in the Power supply chapter. No further configuration or settings are necessary.

3.1 Connecting the sensor (#57113, #57114, #57115, #57120)



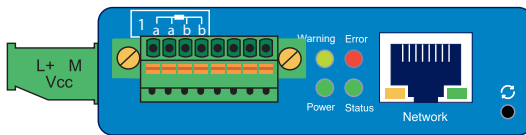
Plug the supplied sensor into the 9-pin IO interface on the device.

3.2 Connecting the PT100/PT1000 sensor (#57171, 57172)

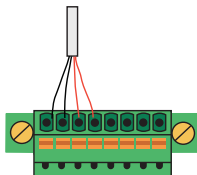


3.3 Connecting the PT100/PT1000 sensor (#57125, #57107) und output wiring (#57126)

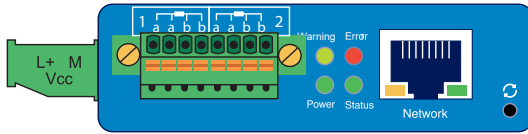
#57125 Web-Thermometer Pt100/Pt1000



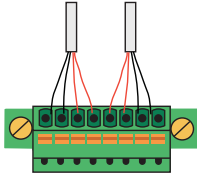
PT100 4 wire



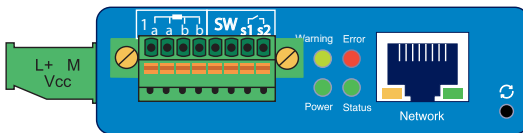
#57107 Web-Thermometer 2x:



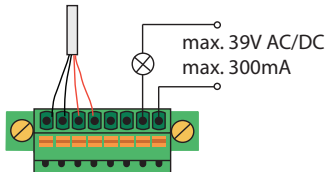
PT100 4 wire



#57126 Web-Thermometer Relais:



PT100 4 wire

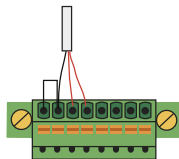


The output of the Web Thermometer Relay is switched internally via a relay contact (normally open contact). The consumer is connected via screw terminals 7 and 8. The maximum DC/AC voltage to be switched must not exceed 39V, with a maximum current flow of 300mA.

The temperature sensor (PT100 or PT1000) is connected to screw terminals 1, 2, 3, and 4, whereby the wires of the same color must be placed next to each other.

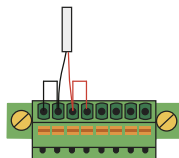
The supply line of the PT100 4-wire sensor can be designed to be almost any length.

Anschluss eines PT100 3-Draht Fühlers:



When connecting a PT100 3-wire sensor, connect the wires of the same color to the terminals marked with the same color. A bridge to the still free terminal is required for the single wire.

Connection of a PT100 2-wire sensor:

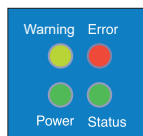


When connecting a PT100 2-wire sensor, one wire is connected to the terminal marked red and the other to the terminal marked black. Bridges must be set to the free terminals here.

3.4 Network connection

The web thermometer has an IEEE 802.3-compatible network connection on a shielded RJ45 connector. The assignment corresponds to an MDI interface, so that connection to the hub or switch is made with a 1:1 wired and shielded patch cable.

3.5 LED indicators



Power LED

OFF: No power supply voltage is present. Check that the power supply voltage is correctly connected via PoE or the external power supply unit.

ON: The power supply voltage via PoE or the external power supply unit is present.

Status-LED

Fast continuous flashing = booting, no IP

Fast continuous flashing (approx. 3x/s) indicates that the device is booting and/or has not yet been assigned an IP address. Please assign an IP address to the device, e.g. using WuTility.

Slow continuous flashing = ready for operation

Slow continuous flashing (approx. 1x/s) indicates that the device is ready for operation. After configuring the IP address, the device's start page can be accessed by entering the IP address in a web browser.

Error LED

The error LED indicates error states on the device.

All LEDs lit = self-test error

The self-test performed after each start or reset of the device could not be completed correctly. The device is no longer operational in this state.

This error can occur if a software update was interrupted prematurely and the operating software was not transferred completely. Repeat the software update via the network (see chapter Firmware update) and address the device with the assigned IP address.

If the error cannot be rectified, there may be a hardware problem.

Warning LED

Displays internal configuration errors or communication problems. To analyze errors, call up the page <http://xxx.xxx.xxx.xxx/diag> on the device.



Speed (yellow)

OFF: When the Link/Activity LED is lit/flashing, there is a link to a device with 10 Mbit/s (10BaseT).

ON: When the Link LED is lit/flashing, there is a link to a device with 100 Mbit/s (100BaseT).



Link/Activity (green)

OFF: The device does not detect a link pulse from a hub/switch. Check the cable or hub port.

ON: The device has a valid link to a hub/switch. In this case, the speed LED indicates the speed.

Flashing: The device is receiving/sending network packets.

4 Power supply

The web thermometer can be powered either via PoE or an external power supply.



The simultaneous connection of an external power supply and a PoE infrastructure is *not* permitted.

The power consumption can be found in the technical data in the appendix.

4.1 PoE supply

In PoE infrastructures (Power-over-Ethernet, IEEE802.3af), power is supplied via the network cabling. The web thermometer supports both phantom power supply via the data lines and power supply via the unused wire pairs 4/5 and 7/8.

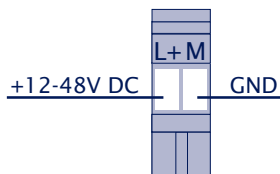
The web thermometer is a PoE power class 1 device (power consumption 0.44 to 3.84W).

4.2 External supply

As an alternative to PoE, the power supply can be provided externally via the plug-gable screw terminal located on the underside of the housing. The input is protected against reverse polarity by a one-way rectifier. DC voltages with the following limits can be used:

- DC voltage: 12V (-10%) - 48V (+10%)

When supplying DC voltage, the polarity must be observed:



5 IP Configuration

5.1 IP configuration via WuTility

WuTility is the central inventory and management tool for all W&T network devices. In addition to convenient IP parameter assignment, *WuTility* offers quick access to device configuration, the option to perform firmware updates, manage configuration profiles, and more.

The latest versions are always available on our website at <http://www.wut.de>. The easiest way to navigate is using the menu tree on the left-hand side.

Downloads -> Web-Thermometer -> WuTility

The installation is performed by double-clicking on the file `e-5www-22-swww-***.exe`. *WuTility* is started via

Start -> Programme -> W&T Software Toolkit -> WuTility

5.1.1 Possible applications and requirements

IP assignment with *WuTility* works independently of the current network parameters of the Web Thermometer and the computer used. This means that even if the device has IP parameters that do not match the respective network, these can be overwritten with *WuTility*. Similarly, any values that do not match the PC's network can also be assigned to the Web Thermometer with *WuTility*.

- PC and web thermometers must be located in the same physical network. This means that they cannot be assigned across routers.
- Any firewalls and network security packages installed on the PC must allow communication between *WuTility* and Web Thermometer based on UDP broadcasts. These may need to be configured accordingly or temporarily disabled.
- If the web thermometer is not set to its factory settings and has an administrator password, this password must be known to *WuTility* in order to make changes.

Step 1: Start the assignment dialog

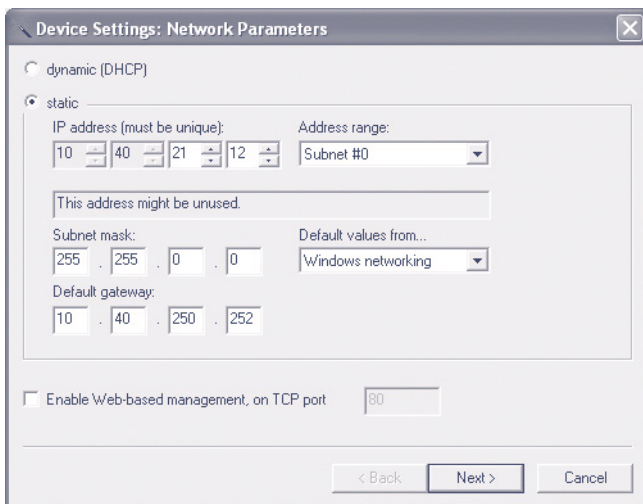
After starting, WuTility automatically searches the local network for connected W&T network devices. The search process can be repeated as often as desired by clicking the Scan button.



Identify the web thermometer in the inventory list using its MAC address. For initial installations, the IP address is 0.0.0.0.



Select the web thermometer and click the IP address button:



Step 2: Assigning the IP parameters

The *static* option allows you to assign fixed IP parameters while disabling the DHCP protocol. Enter the desired values for the IP address, subnet mask, and gateway address in the corresponding input fields. The DHCP option activates the DHCP protocol in the web thermometer and operation with a static IP address is no longer possible (detailed information on IP configuration via DHCP protocol).

The Continue button transfers the entered values to the web thermometer. If the assignment is successful, all columns in the WuTility inventory list are updated.

Further configuration of the web thermometer is carried out via web-based management. To do this, click the Browser button.



For more information, refer to the chapter Config. via Web based management.

5.2 IP configuration via DHCP protocol

With the factory settings, the DHCP protocol is enabled in the web thermometer, so that in DHCP environments it is sufficient to connect the device to the network. The following parameters are assigned using DHCP:

- IP address
- Subnet mask
- Gateway address
- DNS server

5.2.1 Manual activation of DHCP

To avoid unwanted address assignments or address changes, the DHCP protocol is automatically deactivated for all other methods of assigning IP parameters. The following methods are available for subsequently activating DHCP:

- Management tool WuTility
Select the desired web thermometer from the device list and click the IP address button. In the following dialog, activate the DHCP option and then click Continue.

- WBM configuration
The DHCP protocol can be activated in the menu branch Basic settings -> Network -> TCP/IP settings



A static IP address that has been set is deleted after DHCP activation and the associated automatic reset. The web thermometer automatically sets this to 0.0.0.0 and starts sending DHCP discover requests.

5.2.2 System name

To support a possible automated update of the DNS system by the DHCP server, the web thermometer identifies itself within the DHCP protocol with its system name. In the factory setting, this is WEBIO- followed by the last three digits of the Ethernet address. For example, the factory-set system name of a web thermometer with the Ethernet address 00:c0:3d:01:02:03 is WEBIO-010203. The system name of the web thermometer can be changed in the configuration. For more information, see the chapter Menu: Basic settings -> Language/Info.

5.2.3 Lease time

The lease time determined and transmitted by the DHCP server defines the validity period of the assigned IP address. After half of the lease time has expired, the web thermometer attempts to extend the validity or update the address with the assigning DHCP server. If this is not possible before the lease time expires (for example, the DHCP server is no longer accessible), the web thermometer deletes the IP address and starts a cyclical search for alternative DHCP servers in order to assign a new IP address.

The lease time associated with the current IP address is no longer available after a reset. After restarting, a corresponding update request is therefore sent to the original DHCP server. If this cannot be reached at this point, the web thermometer deletes the IP address and starts a cyclical search for alternative DHCP servers. Existing TCP/UDP connections between the web thermometer and other network participants are interrupted as a result.

The remaining lease time can be read out together with the current IP address in the Device Information menu branch (hh:mm:ss).

5.3 IP configuration using the ARP command

Requirements

The IP address can only be assigned using a static entry in the ARP cache of the computer if the current IP address is 0.0.0.0 (= factory setting). If the web thermometer has any other value, this access is disabled.

With the factory setting and after manually switching from static to DHCP, the method described in this chapter for assigning IP addresses only works with a delay of approx. 2 minutes after a reset or switching on.

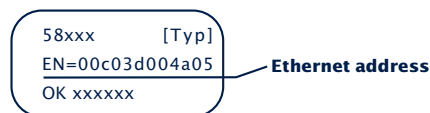
The method does not work across networks, e.g. across routers. This means that the PC used for assignment and the web thermometer must be connected to the same physical network segment. Only IP addresses whose Net ID is identical to that of the assigning computer can be assigned.



To prevent unwanted changes to the IP address, the DHCP client of the web thermometer is automatically deactivated during IP assignment with the help of a static ARP entry.

Step 1

Read the Ethernet address of the web thermometer from the sticker on the side of the housing.



Use the following command line to create a static entry in the ARP table of the computer.

```
arp -s [IP address] [MAC address]
```

Command line in Windows:

```
arp -s 172.16.231.10 00-C0-3D-00-12-FF
```

Command line under UNIX/Linux:

```
arp -s 172.16.231.10 00:C0:3D:00:12:FF
```



In Windows environments, IP addresses must be entered without leading zeros. Otherwise, the system will interpret the entry incorrectly and assign an incorrect IP address to the web thermometer. Starting with Windows Vista, the cmd.exe command prompt required to call the ARP command must be started with administrator rights.

Step 2

Start a ping to the web thermometer with the desired IP address using the following command line:

```
ping 10.40.21.12
```

```

C:\WINDOWS\system32\cmd.exe

C:\Documents and Settings\tc>arp -s 10.40.21.12 00-c0-3d-af-fe-01
C:\Documents and Settings\tc>arp -a
Interface: 10.40.21.3 --- 0x2
   Internet Address      Physical Address      Type
   10.40.21.12           00-c0-3d-af-fe-01    static
C:\Documents and Settings\tc>ping 10.40.21.12
Pinging 10.40.21.12 with 32 bytes of data:
Reply from 10.40.21.12: bytes=32 time=137ms TTL=64
Reply from 10.40.21.12: bytes=32 time<1ms TTL=64
Reply from 10.40.21.12: bytes=32 time=1ms TTL=64
Reply from 10.40.21.12: bytes=32 time=1ms TTL=64
Ping statistics for 10.40.21.12:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 137ms, Average = 34ms
C:\Documents and Settings\tc>_
  
```

The web thermometer adopts the target IP address of the first network packet addressed to it at MAC level as its own and stores it in non-volatile memory. The ping requests from the PC are then answered.

The subnet mask and gateway address cannot be configured using a static ARP entry. These must be configured subsequently via the device's web interface.

6 Ethernet connection

The web thermometer has an IEEE 802.3 compatible network connection.

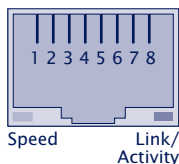
6.1 Link status

The link status is indicated by the two LEDs integrated in the RJ45 socket.

- Link/Activity (green)
ON indicates a valid link to a hub/switch port. The LED flashes when data is being transmitted.
- Speed (yellow)
ON indicates a 100 Mbit/s link (100BaseT). OFF corresponds to 10 Mbit/s (10BaseT).

6.2 10/100BaseT on RJ45

The web thermometer has a shielded RJ45 connector for network connection. The design corresponds to an Auto-MDI-X interface, allowing connection to the switch/hub with a shielded patch cable up to 100 m long.



The network connection is galvanically isolated from both the supply voltage and the measurement input with $1,5\text{kV}_{\text{rms}}$.

Auto Negotiation: 10/100BaseT, full/half duplex

The web thermometer operates in auto-negotiation mode ex works. Data transfer speed and duplex mode are automatically negotiated with the connected switch/hub and set accordingly.

7 Sensor connection and extension

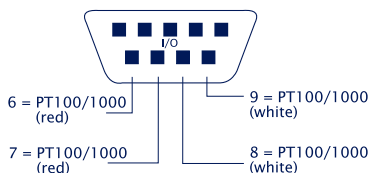
For all devices with Pt100/Pt1000 connection, the sensor cable can be extended as required, provided that it is implemented using 4-wire technology.

7.1 NTC sensor measurement input (#57114)

The sensor cable cannot be extended. Please use only the sensor supplied.

7.2 Pt100/1000 sensor measurement input (#57115)

The measuring sensor cable can be extended to almost any length. If an extension is required, we recommend using well-shielded cables to prevent interference. If you want to connect an alternative PT100/PT1000 measuring sensor to the 57715 device or extend the cable, the pin assignment is as follows:

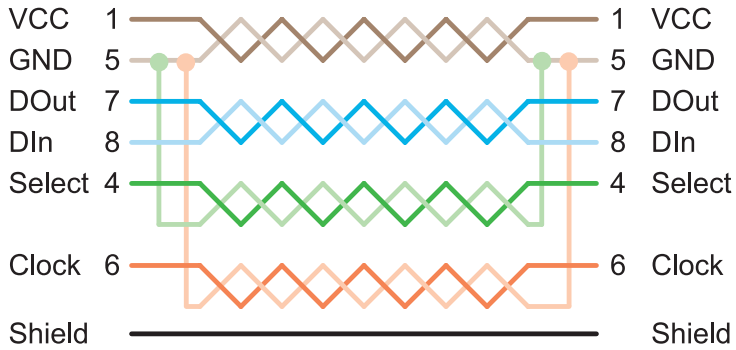
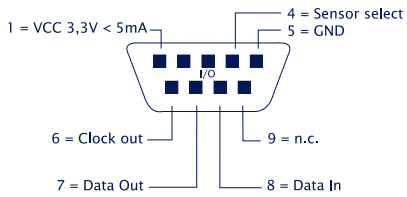


7.3 Combination sensor measurement input (#57113, #57120)

The supplied combination sensor uses digital measurement transmission. It can be extended to a total length of 20 m (2 m sensor cable + 18 m extension).

We recommend DB9 connectors as a transition from the supplied sensor to the extension.

We recommend using a data cable with a minimum specification of Cat.5 (shielded) or better and the following pin assignment:



8 Online measurement storage in the W&T Cloud

With its cloud service, W&T offers a comprehensive solution that, in addition to long-term documentation of measurement data in the internal data logger, also enables data to be backed up in online storage. Measurement data is transmitted directly from the measuring point to the cloud and is thus available online.

8.1 Automatic connection

The cloud functionality is enabled by default when the device is shipped. If the device receives its network parameters via DHCP or if you enable Internet access for the device by entering the network parameters, it will begin establishing contact with the cloud.

The measurement data transfer will only begin after the device has been assigned to a user account.

8.2 Create user account

To transfer the measured data, you must first create a user account for cloud access. To do this, go to the cloud homepage

<http://cloud.wut.de>

and click on the "Create account" link.

After entering your email address and a password, you will receive access to the cloud.

8.3 Assign measurement data to the cloud using a code

Log in with your access data at <http://cloud.wut.de> and enter the access code supplied with the device. The measurement data will now be transferred and can be used immediately.

Alternatively:

8.4 Assign measurement data from the device

After creating a cloud user account, open the configuration menu of your device and log in as an administrator user. Navigate to the

Communication channels -> Cloud

page and enter your user data for cloud access. After clicking on the "Bind" button, all measurement data from this device will be stored in your user account from this point onwards.

Clicking the "Unbind" button disconnects the measurement data from this point onwards and no further values will be added to your user account.

Clicking "Bind" again creates a new measurement series in the cloud for your user account.



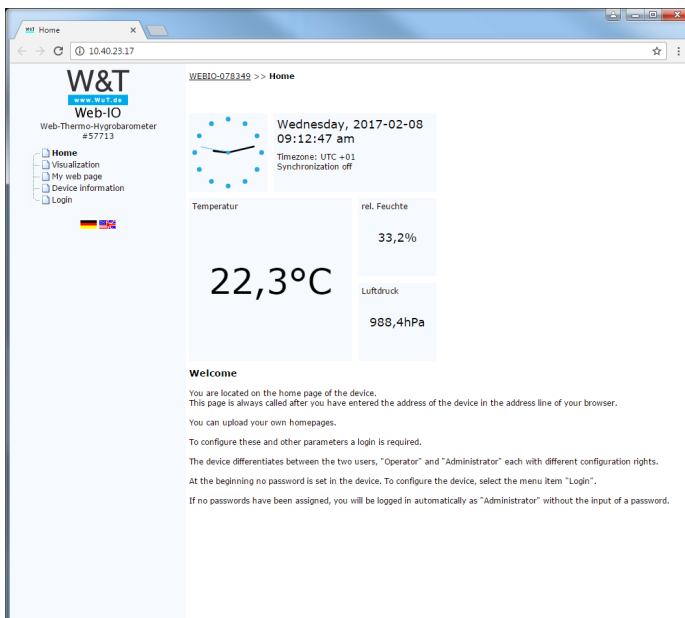
For further information on how to use the cloud functions, please refer to the instructions at <http://cloud.wut.de>.

9 Configuration via web-based management

Further configuration of the device is carried out via the device's web page. To access this, enter the assigned IP address in the address bar of your web browser:

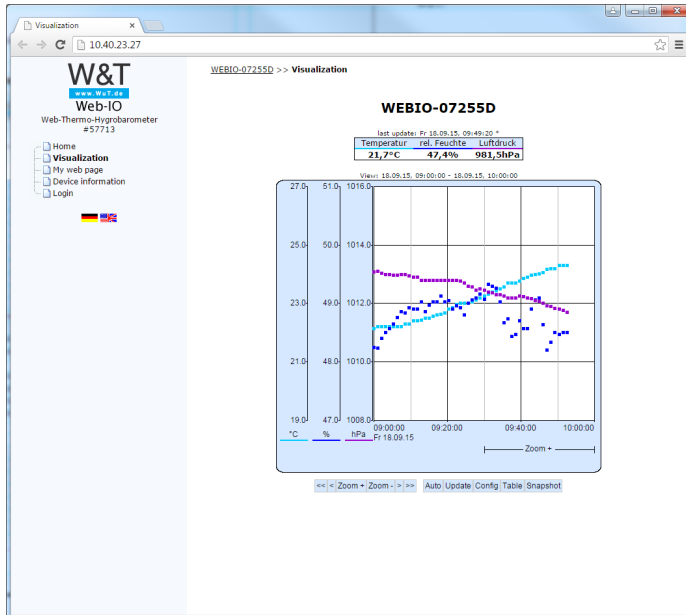
http://<IP address>

9.1 Home



The following pages are also available:

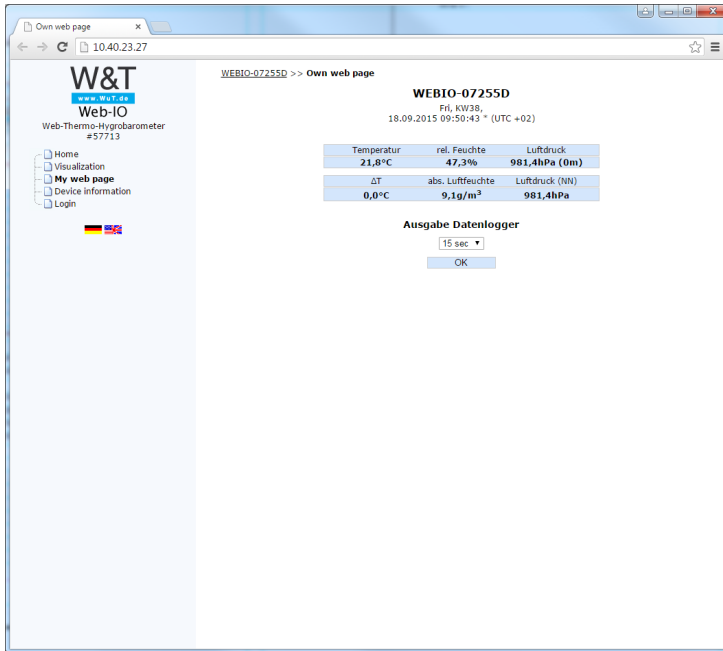
9.2 Visualization



This page shows you a graphical display of the stored measured values.

The controls displayed allow you to temporarily adjust this display while you are on this page. You can make permanent adjustments via the configuration menu (see Web pages -> Home).

9.3 My web page

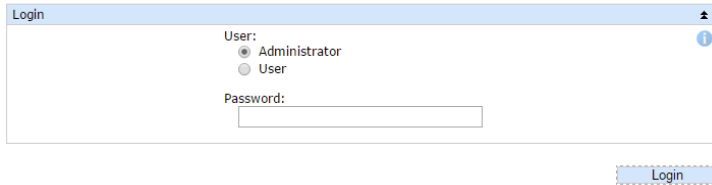


This page can be customized or replaced and serves as an example. Here you also have the opportunity to take a look at the device's data logger.

9.4 Log in

[WEBIO-07255D](#) >> **Login**

Login



The login dialog gives you access to the device configuration. The device distinguishes between an administrator and a standard user with different access rights.

No password is configured in the device initially. Select the administrator user and click “Login.”

The menu tree with all configuration parameters is now displayed.

For more information on the respective configuration parameter, click the info button on the right-hand side of the corresponding parameter.



10 Basic settings

In this section of the configuration, you can make all the settings required for the various operating modes.

[WEBIO-078349](#) >> **Basic-Settings**

Basic-Settings

Here you are able to set the basic configuration.

Network	Set the network basic parameters here.
Sensors	Here you will find all the sensor settings. For example, you can configure the name that appears, specify units, or adjust the measured value if necessary.
Date/time	The device time is necessary to create a time stamp for data storage of the measured values. Enter the time of day manually or use the convenience of automatic time compensation using a time server.
Language/infos	Select here the device language and enter additional device information such as its location or contact information. You may also upload your own logo.
Data storage	Select which sensors should be stored and configure the storage interval. The default interval is 15 seconds. Note that changing these settings results in a memory deletion.
Password	You may optionally set password protection for access to the configuration. You can set a password for an administrator user and for a standard user. The standard user has no access right to device system settings such as changing network parameters, etc.

10 Network

Set the network base parameters here. You can choose between automatic address assignment via DHCP and manual configuration of the parameters. If you want to configure communication parameters with names instead of IP addresses in the further configuration, you can configure additional DNS servers here, in addition to the DNS server assigned via DHCP, if applicable.

HTTP or HTTPS

By default, browser access for HTTP is enabled via port 80. To switch access to HTTPS or change the port, select Basic settings » Network in the navigation tree and then select Protocol in the Web service access section. All other settings relating to the display in the browser can be made under Web pages.

Setting the system ports and maintenance access

The ports activated here facilitate maintenance and configuration. The ports can be deactivated to meet special security requirements.

10.1 Sensors

Here you can configure the sensor designations and, for temperature sensors, the unit.

If you want to adjust the sensors, you can choose between 1-point compensation, where a correction value is added to or subtracted from the measured value, or 2-point compensation, where a straight line is calculated across the measuring range.

Alternatively, a compensation file in JSON format with a maximum of 10 correction points per sensor can be uploaded to the device. However, at least two reference points must be available. If this function is activated, all other compensation settings mentioned above will be ignored.

Create a json file, e.g., "senscomp.json," in a text editor:

```
{„Sensor1“:
    [
        {„x1“: „y1“} ,
        {„x2“: „y2“}
        {„x3“: „y3“}
    ] ,
```

```
„Sensor2“:
    [
        {„x1“: „y1“},
        {„x2“: „y2“}
        {„x3“: „y3“}
    ]
}
```

The keyword is “Sensor” followed by the sensor number. The order corresponds to the order of the configuration parameters specified on the website.

“x1-xx” corresponds to the measured value to be corrected. One decimal place (with a comma or period separator) is allowed. The values for x1-xx must be strictly monotonically increasing.

“y1-yy” corresponds to the correction value. This value is added to or subtracted from “x1-xx.”

A correction line is calculated between the successive measuring points. Example:

```
{„Sensor1“:
    [
        {„15“: „0.2“},
        {„25“: „-0.1“}
    ],
„Sensor2“:
    [
        {„50“: „-0.8“},
        {„75“: „0.2“}
    ]
}
```

10.2 Date/Time

The device time is necessary to obtain plausible time stamps for storing the measured values.

Enter the time manually or use the convenient automatic time synchronization feature with a time server.

Daylight saving time can also be enabled or disabled here.

10.3 Language/Info

Here you can configure the default language of the device. This language will be used automatically when the device pages are called up. The default language can be changed dynamically during operation using the flags below the configuration menu. This change is temporary and will not be saved.

On this page, you can change information and device names and upload a custom logo, which will be displayed above the configuration menu.

10.4 Data logger

Configure the time interval at which the measurement data is to be stored in the internal data logger and which sensors are to be included in the storage.



Changing these settings will delete the entire data logger and measurement recording will start again from the beginning.

Furthermore, you have the option of downloading the contents of the data logger as a CSV file for further processing. The data logger can also be deleted on this page.

10.5 Password

Optionally, set up password protection for access to the configuration.

You can specify a password for an administrator user and for an operator user.

The operator user does not have access rights to the device's system settings, such as changing the network parameters, etc.



If you assign an administrator password, it must be stored when changing the IP address via WuTility or firmware updates.

10.6 Certificates

HTTPS is based on the TLS protocol, which encrypts communication and authenticates communication partners using certificates.

The device is identified ex works with a self-signed default certificate, which is generally considered a security risk by browsers. If the application requires secure authentication, the device must be equipped with an individual certificate signed by a trusted certification authority.

Certificate signing request (CSR)

Certificate Signing Request (CSR)	
Specification for CSR:	in the installed certificate:
Common name:	webIO
Organization name:	Wiesemann & Theis
Organizational unit:	
City or Locality:	
State or province:	
Country code (2 letters):	DE
Email address:	
Alternative name:	webIO
Add OPC UA application URI:	☐
Copy content of the installed certificate	
CSR:	Generates a private key and checks the information.
	Check

Here you can generate a CSR (Certificate Signing Request) with a new key pair and custom content.

Click the Check button to formally check the values entered and generate the new key. The new CSR can be downloaded by clicking the Download CSR button.

Self-signed certificate

Self-signed certificate
Creates and installs a self-signed certificate. Install and reset now:
<input type="button" value="Install"/>

A previously generated individual CSR can be self-signed by the device using the private key associated with the CSR.

Upload certificate/Upload certificate chain

Upload certificate
Loaded certificate:
The certificate must be DER/Pem encoded:
<input type="button" value="Datei auswählen"/> <input type="button" value="Keine ausgewählt"/>
Load certificate:
<input type="button" value="Upload"/>

Upload certificate chain
Loaded certificate chain:
The certificate chain must be DER/Pem encoded:
<input type="button" value="Datei auswählen"/> <input type="button" value="Keine ausgewählt"/>
Load certificate chain:
<input type="button" value="Upload"/>

A CSR that has been generated and downloaded can be loaded onto the device as a certificate after it has been signed by an external certification authority. If a certificate chain belonging to the certificate is not already part of the certificate file, it can be uploaded separately. The files can be in PEM or DER format.

Install certificate/certificate chain

Install certificate/chain
The device will reset after leaving this session. Install and reset now:
<input type="button" value="Install"/>

A previously uploaded certificate, including the associated certificate chain, is installed on the device and used as a certificate within TLS connections after being saved.

11 Websites

This device has three preset pages that can be selected as the start page.

The default home page shows you the current values of the individual sensors, which are updated cyclically.

The visualization page allows you to display the measured values graphically.

11.1 Browser access

Here you can disable browser access and select the start page.



Please note that you will no longer be able to make any configurations via the web interface if you disable browser access. To reactivate it, you must first re-set the device to factory settings using the jumper.

11.2 Home

Here you can customize the appearance and access rights of the home page.

11.3 My website

The user page can be customized. To do this, it can be downloaded from the device, edited by you, and uploaded again.

To display the measured values on the user.htm page, you can use the following tags in the source code, which are replaced with the corresponding values when the page is called up:

```
<w&t_tags=t1>
```

Displays the current temperature (°C) of the first temperature sensor. If there are multiple sensors, this index is numbered consecutively.

```
<w&t_tags=h1>
```

Displays the current relative humidity (%) on models 57113 and 57120.

`<w&t_tags=ah>`

Displays the current absolute humidity (g/m³) on models 57113 and 57120.

`<w&t_tags=pa>`

Displays the absolute air pressure (hPa) on model 57113.

`<w&t_tags=pNN>`

Displays the calculated air pressure (hPa) above normal zero for model 57113 (meteorological value).

`<w&t_tags=al>`

Indicates the set height of the device's installation location on model 57113. (m)

`<w&t_tags=time>`

Inserts the current time.

Background color:

For values displayed in tables, corresponding background colors can be used depending on the sensor status:

`<w&t_tag=bct>`

describes a background color (BGColor) that depends on the alarm status of the temperature sensor. If a limit value is exceeded, this color is red. Otherwise, the tag does not describe an explicit color. This tag is required, for example, to display limit value violations in red in the log table. (°C)

`<w&t_tag=bch>`

Hintergrundfarbe für den relativen Luftfeuchtigkeitswert

`<w&t_tag=bcah>`

Hintergrundfarbe für den absoluten Luftfeuchtigkeitswert

`<w&t_tag=brcr>`

Hintergrundfarbe für die aktuelle Änderungsrate

`<w&t_tags=sensorx>`

Inserts the name of sensor x into the page.

`<w&t_tags=device_name>`

Inserts the assigned device name.

`<w&t_tags=device_text>`

Inserts the freely configurable descriptive text for the device.

`<w&t_tags=location>`

`<w&t_tags=contact>`

Inserts the respective text modules, which can be configured under Language/Info.

This configuration page also contains the parameters for customizing the visualization.

12 Communication paths

This device can communicate via various network protocols and services. Configure all necessary parameters here.

[WEBIO-078349](#) >> **Communication paths**

Communication paths

Here you will find the settings for the network services used for enabling the device to communicate.

Mail	The e-mail function allows you to forward messages to one or more recipients. Here you configure the access parameters for your mail server. SSL/TLS encrypted connections are usual.
MQTT	The Web-Thermometer can send the measured values to an MQTT broker when there is a change or cyclically via MQTT as a topic.
REST	The measured values as well as the device status can be queried using REST (Representational State Transfer). In the Rest query you specify whether the reply should be in JSON or XML format or as a raw text.
Cloud	With the cloud service W&T offers a comprehensive solution that enables the backup of data in online storage in addition to the long-term documentation of temperature and humidity measurement data in the internal data logger. The measurement data will be sent directly from the measuring point to the cloud, and is available online.
Web API	Here you specify whether access is permitted to device status and measurement values via HTTP requests (e.g. for dynamic websites that use AJAX but also to give third-party equipment such as web cameras access to the measurement values).
RSS	The device provides an RSS feed that feed readers can subscribe to. Here you can configure the necessary channel settings.
SNMP	Make the SNMP basic settings here. The device can be incorporated into your existing automation system via SNMP. Use corresponding OIDs to query device and sensor data, or send messages via SNMP trap. An MIB can be downloaded directly in the device at <a href="http://<ip-adresse/mib.zip>">http://<ip-adresse/mib.zip> .
Syslog	Make the syslog basic settings here. The device can be incorporated into your existing automation system via syslog.
FTP	Messages can be stored directly on an FTP server for archiving and control. Here you configure the basic settings of the FTP client.
Socket API	You can directly retrieve the measured data on a socket access from the device. In the simplest case, send the command "GET /Single" to the unit to get back the current measurement data from the device. The ASCII modes use readable GET commands based on HTTP protocol.

12.1 Mail

The email function allows you to send messages to one or more email recipients. Configure the access parameters for your mail server here.

12.2 MQTT

After activating MQTT and configuring it in the menu branch Communication channels » MQTT, the web thermometer supports the following options:

Transfer of individual measured values as MQTT topics to an MQTT broker via MQTT publish.

This function is managed in the Web Thermometer as an alarm/message. A detailed description of the action philosophy used in the Web Thermometer can be found in the chapter Alarms/Messages.

Publish measured values

To create a new MQTT publish, click the Add button under Alarms/Messages. The input mask for a new message appears.

Here you can specify the name of the message and what should trigger it.

For example, specify the temperature sensor as the trigger.

Select MQTT Publish as the action. In the following menu, enter the path where the topic should be written to the broker.

You can freely determine the text content of the topic, using the placeholders described in the info text.

12.3 REST

With REST (Representational State Transfer), the Web Thermometer provides another web-based communication channel.

Communication takes place via specific HTTP requests via the HTTP or HTTPS port entered under Basic settings » Network » Browser access.

To exchange data via REST, access must first be enabled via Communication channels » Rest.

If you want to protect REST access against unauthorized access, you can activate digest authentication. Requests must then be made as user "Admin" with the administrator password or as user "User" with the user password.

Read access

REST uses the HTTP command GET for read access.

The web thermometer supports three formats for responses to REST requests:

- JSON
- XML
- Text

The format of the response can be specified in the request. With

```
http://<ip-adresse>/rest/json
```

for example, the entire process image of the web thermometer can be retrieved in JSON format. The response then looks like this:

```
{
  „info“: {
    „request“: „/rest/json“,
    „time“:    „2017-01-01,12:30:25“,
    „ip“:    „10.40.23.73“,
    „devicename“: „WEBIO-077ECF“
  },
  „iostate“: {
    „sensor“: [{
      „name“: „Temperatur“,
      „number“: 0,
      „unit“: „C“,
      „value“: 23.2
    }, {
      „name“: „rel. Feuchte“,
      „number“: 1,
```

```

        „unit“: „%“,
        „value“: 35.4
    ]]
},
„system“: {
    „time“: „2017-01-01,12:30:25“,
    „diagnosis“: [{
        „time“: „19.01.2017 12:30:25“,
        „msg“: „Gerätestatus: OK“
    }],
    „diagarchive“: [{
        „time“: „19.01.2017 12:30:25“,
        „msg“: „Gerätestatus: OK“
    }]
}
}

```

To query only individual areas or points, the request can be formulated in more detail:

`http://<ip-adresse>/rest/json/iostate`

This causes the web thermometer to return the status of all sensors:

```

{
    „iostate“: {
        „sensor“: [{
            „name“: „Temperatur“,
            „number“: 0,
            „unit“: „C“,
            „value“: 23.2
        }, {
            „name“: „rel. Feuchte“,
            „number“: 1,
            „unit“: „%“,
            „value“: 35.2
        }]
    }
}

```

With

```
http://<ip-adresse>/rest/json/iostate/sensor/0
```

the status of the first sensor can be queried specifically.

```
{
  „iostate“: {
    „sensor“: [{
      „name“: „Temperatur“,
      „number“: 0,
      „unit“: „C“,
      „value“: 23.2
    }]
  }
}
```

12.4 Cloud

With its cloud service, W&T offers a comprehensive solution that, in addition to long-term documentation of measurement data in the internal data logger, also enables data to be backed up in online storage.

Measurement data is transmitted directly from the measuring point to the cloud and is thus available online.

A user account is required to use the W&T Cloud. You can create this on the cloud website at:

```
http://cloud.wut.de
```

12.5 Web-API

Another possible action is to send an HTTP request, as required by some devices, such as cameras, to query measured values, for example.

Enter the complete URL with all parameters expected by the receiving device as the HTTP request.

For example:

```
http://<IP/Hostname>/single
```

12.6 Modbus-TCP

If this function is activated and a communication port is configured (default: 502), the device can be accessed using a Modbus TCP client.

The following memory areas are provided for this purpose:

Address (hexadec.)	Description	Memory modell	Length (Byte)	Register read with FC	Register write with FC
2004	Alarm state	16-Bit	2	0x03, 0x04	-
2006	Diagnosis error count	16-Bit	2	0x03, 0x04	-
2007	Diagnosis state 0-15	16-Bit	2	0x03, 0x04	-
2008	Diagnosis state 16-31	16-Bit	2	0x03, 0x04	-
2009	Diagnosis state 32-47	16-Bit	2	0x03, 0x04	-
200A	Diagnosis state 48-63	16-Bit	2	0x03, 0x04	-
200B	Diagnosis state 64-79	16-Bit	2	0x03, 0x04	-
200C	Diagnosis state 80-95	16-Bit	2	0x03, 0x04	-
200D	Error LED state	16-Bit	2	0x03, 0x04	-
5004	Alarm state	32-Bit	4	0x03, 0x04	-
5036	Measurement channel 1 (T)	32-Bit	4	0x03, 0x04	-
5038	Measurement channel 2 (rH)	32-Bit	4	0x03, 0x04	-
503A	Measurement channel 3 (hPa)	32-Bit	4	0x03, 0x04	-
503C	Measurement channel 4	32-Bit	4	0x03, 0x04	-
503E	Measurement channel 5	32-Bit	4	0x03, 0x04	-
5040	Measurement channel 6	32-Bit	4	0x03, 0x04	-
5042	Measurement channel 7	32-Bit	4	0x03, 0x04	-
5044	Measurement channel 8	32-Bit	4	0x03, 0x04	-
504B	Diagnosis error count	32-Bit	4	0x03, 0x04	-
504C	Diagnosis state 0-31	32-Bit	4	0x03, 0x04	-
504E	Diagnosis state 32-63	32-Bit	4	0x03, 0x04	-
5050	Diagnosis state 64-95	32-Bit	4	0x03, 0x04	-
6000-03	Serial number	32-Bit	4	0x03, 0x04	-
6004-07	MAC address	32-Bit	4	0x03, 0x04	-
7000	virtual register 0	32-Bit	4	0x03, 0x04	0x06, 0x10
7002	virtual register 1	32-Bit	4	0x03, 0x04	0x06, 0x10
....		32-Bit	4	0x03, 0x04	0x06, 0x10
703E	virtual register 31	32-Bit	4	0x03, 0x04	0x06, 0x10

57113 and 57120 only

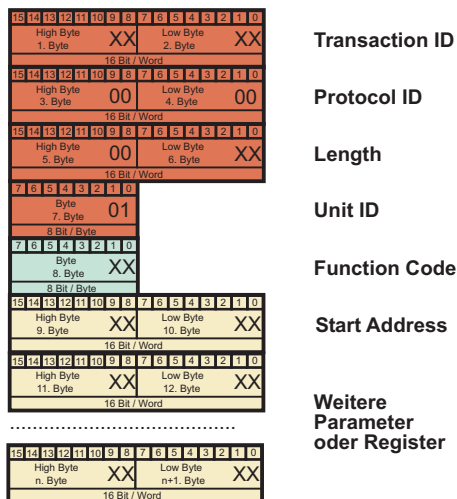
5600	abs. Humidity (g/m³)	32-Bit	4	0x03, 0x04	-
5602	Dewpoint (°C)	32-Bit	4	0x03, 0x04	-
5604	Mixing ratio (g/kg)	32-Bit	4	0x03, 0x04	-
5606	Enthalpy (kJ/kg)	32-Bit	4	0x03, 0x04	-

When reading data (memory areas) that have not been defined for the device, the device returns "0".

The Modbus data packets always consist of a header, the function code, the start

address, and other parameters or registers.

The values are output in 1/10°C (or 1/10%rH or 1/10hPa). The MSB of the WORDS or DWORDS determines whether the value is positive (0) or negative (1).



Transaction Identifier

Used to assign the response of the Web Thermometer to the client's request. The client normally increments the ID by 1 with each new data transmission. The Web Thermometer always returns the received value 1:1.

Protocol Identifier

Not relevant for communication with the Web Thermometer and always 0x0000.

Length

Number of bytes sent after Length (total bytes sent).

Unit identifier

Always 0x01 for Modbus TCP

Function code

The function code determines how the Modbus memory of the web thermometer is accessed.

Function Code 0x03 Read Holding Registers

Function code 0x03 is intended for reading multiple registers (16-bit values). Depending on the start address used, FC 0x03 can be used to query the values of various measurement inputs on the Web Thermometer.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Transaction ID
High Byte 1. Byte								Low Byte 2. Byte								
XX																Protocol ID
16 Bit / Word																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Length
High Byte 3. Byte								Low Byte 4. Byte								
00																Unit ID
16 Bit / Word																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Function Code
High Byte 5. Byte								Low Byte 6. Byte								
00																Start Address
16 Bit / Word																
7	6	5	4	3	2	1	0									Number of Registers
Byte 7. Byte																
01																
7	6	5	4	3	2	1	0									
Byte 8. Byte																
03																
8 Bit / Byte																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
High Byte 9. Byte								Low Byte 10. Byte								
20																
16 Bit / Word																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
High Byte 11. Byte								Low Byte 12. Byte								
XX																
16 Bit / Word																

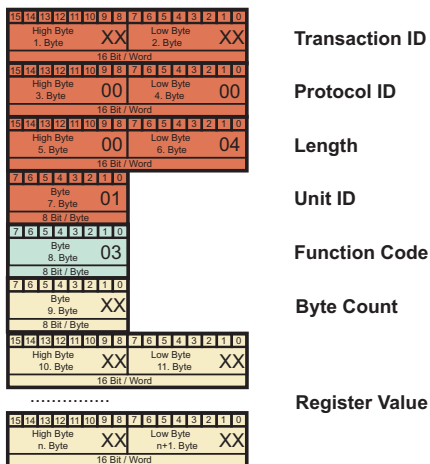
Start Address

Specifies the memory location from which registers are to be read.

Number of Registers

The number of registers to be read is transferred here.

The web thermometer responds with the following packet:

**Transaction ID****Protocol ID****Length****Unit ID****Function Code****Byte Count****Register Value**

Bytes Count

Contains the number of bytes transferred as registers (2 bytes per 16-bit register).

Register Value

One or more 16-bit register values. The first 16-bit register begins with the high byte at the position of the 10th byte.

Depending on the start address (from 0x5000), two 16-bit values – i.e. 4 bytes – are transferred for a requested 32-bit register. In this case, too, the value begins with the highest byte at the position of the 10th byte and the first low byte is at the position of the 13th byte of the data packet.

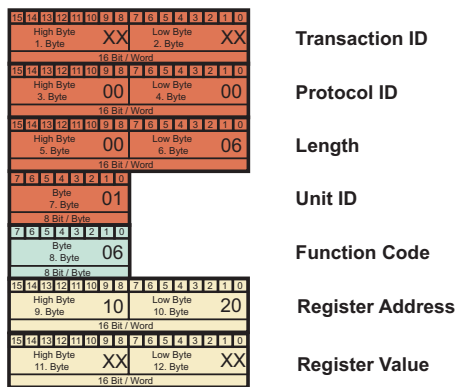
Function Code 0x04 Read Input Registers

Function code 0x04 is specifically intended for reading the status of measured values as a 16-bit register.

The packet structure of the request and response with function code 0x04 is identical to that of function code 0x03.

Function Code 0x06 Write Single Register

Function code 0x06 is intended for setting any register (from address 0x7000).



Register Address

Register Address determines where in memory the data should be written.

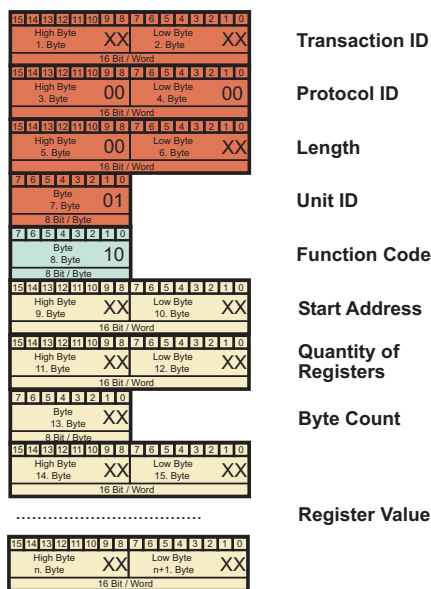
Register Value

is a 16-bit register value that is written to the Modbus memory of the web thermometer.

The web thermometer responds with a data packet that is structured exactly the same.

Function Code 0x10 Write Multiple Registers

Function code 0x0F is intended for writing multiple 16-bit register values.



Start Address

Specifies the memory location from which registers are to be written.

Quantity of Registers

This is where the number of 16-bit registers to be written is transferred. When writing to the 32-bit area of the web thermometer, two 16-bit registers must be calculated for each 32-bit value.

Bytes Count

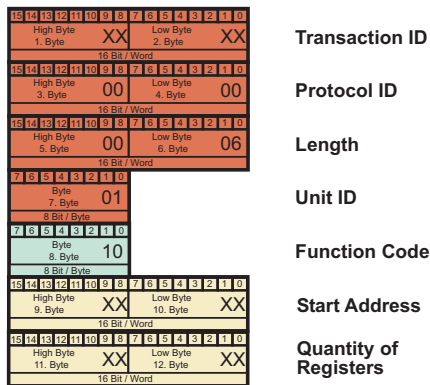
Contains the number of bytes to be transferred. Two bytes are calculated for each 16-bit register to be sent.

Register Value

This is where the 16-bit registers are transferred. The first high byte is placed as the 14th byte in the data packet. The first low byte is placed as the 15th byte, and so on.

When writing to the 32-bit area of the web thermometer (from address 0x7000), two 16-bit registers must be written for every 32-bit value, starting with the highest byte of the 32-bit value.

The web thermometer responds with a data packet with the following structure:



Start Address

Specifies the memory location from which the 16-bit registers were written.

Quantity of Outputs

The number of 16-bit registers written is transferred here.

12.7 Socket-API

You can retrieve measurement data directly from the device via socket access.

In the simplest case, send the command “GET /Single” to the device to receive all measurement data from the device.

Configure the settings for access via HTTP and UDP here.

12.8 RSS

The device provides an RSS feed that can be subscribed to by feed readers. Configure the necessary channel settings here.

12.9 OPC DA

The web thermometer is preset for OPC DA operation at the factory. If you want to use OPC DA, you only need to activate the Web API function under Communication paths.

The W&T OPC server must be installed so that your OPC DA client can communicate with the web thermometer. Access via third-party OPC servers is not provided.

In the OPC server, select the menu item Devices » New I/O device. Enter the IP address and password of your web thermometer and select the device type. Confirm with OK. Finally, you must apply the new entries via the menu item File » Save as active configuration.

The measured values are then made available as OPC DA items.

12.10 OPC UA

The device provides OPC UA via a binary TCP protocol. The default port for the server service is the standard port for this application: 4840.

The connection to your client is established with the following call:

```
opc.tcp://<ip-address>:4840
```

The device provides several authentication methods with corresponding security guidelines. You can choose between:

- No authentication

No security policy

- Sign

Security guidelines:

Basic128 - RSA15

Basic265

Basic265-SHA256

AES128-SHA256 RsaOaep

- Sign & Encrypt

Security guidelines:

Basic128 - RSA15

Basic265

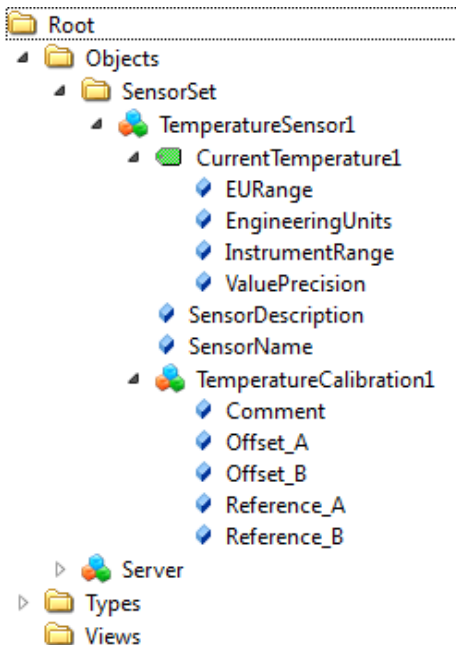
Basic265-SHA256

AES128-SHA256 RsaOaep

Also configure a UPC UA user name and password. This is not necessary if you select “No authentication”.

The device provides you with the variable “EURange” for each sensor. With the help of this variable, you can assign preconfigured min. and max. values to display instruments in your UPC UA client within which the display moves. You can configure these values separately for each sensor in the device.

The device provides you with the following OPC UA tree (here using the example of a single-channel web thermometer):



Historizing

The device supports historizing via OPC UA, i.e., in addition to the current measured value, the measured values stored in the device can be retrieved.

The device can process four parallel OPC UA connections.

Customer-specific numbering of NodeIDs

The NodeIDs configured at the factory for the OPC UA endpoints can be changed to suit customer requirements.

To do this, download the list of preconfigured IDs from the OPC UA configuration page using the "Download" button.

Node ID configuration	
Save Node ID configuration:	Download ⓘ
Restore Node ID configuration:	Select File none selected ⓘ

You will receive a file named "nodecfg.json," which you can open in a text editor.

This file contains the preconfigured NodeID in JSON format, one empty entry for alternative numbering, and the display name of the OPC UA node, named with the letter "T," in each line.

To assign an alternative number, enter your desired NodeID in the free field instead of the placeholder.

Example:

Original entry:

```
{„15013“:““,“T“:“CurrentTemperature“},
```

modified entry:

```
{„15013“: “12345“, “T”: “CurrentTemperature”},
```

The NodeID of the entry “CurrentTemperature” is changed from the original ID 15013 to 12345.

Save the file and upload it back to the device using the “Upload” button on the OPC UA configuration page.

After clicking “Apply,” all changed IDs will be adopted.

You will then need to rebrowse the nodes in your OPC UA client.

12.11 SNMP/Syslog

Configure the basic SNMP or Syslog settings here.

The device can be integrated into your existing automation system via SNMP or Syslog.

Use the corresponding OIDs to query device and sensor data, or send messages via SNMP trap or Syslog. A MIB can be downloaded directly from the device at

<http://<ip-address>/mib.zip>.

12.12 FTP

For archiving and monitoring purposes, measurement data can be stored directly on an FTP server. Configure the basic settings for the FTP server here.

13 Alarms/messages

Notifications keep you up to date via e-mail or SNMP trap when limit values are exceeded or not reached. Select the desired trigger here and configure the desired notification type. You can configure up to 12 different notifications.

Alarms/Messages

Notifications keep you up to date e.g. by e-mail or SNMP trap over limit value overruns/underruns. Select the desired trigger and configure the desired notification type. You can configure up to 12 different messages.

Add		
Alert E-Mail	Trigger	Delete
FTP Report	Trigger	Delete
SNMP Trap	Trigger	Delete

Via the button **Add** a new message is generated. Enter the desired parameters and select the type of message. After creating the message using the button **Apply** the monitoring of the triggering condition is immediately active.

You will now find the message you created in the configuration menu and on the message overview page. Here you also have the option of testing messages by clicking the **Trigger** button. The configured message is then triggered exactly once.

With the button **Delete** The message is deleted. The change takes effect immediately after a security prompt.

W&T tag measured value		Function
Comma notation (##,##)	Dot notation (##.##)	
<T1>	<t1>	<i>Temperature</i> : Displays the current temperature of channel 1.
<H1>	<h1>	<i>Humidity</i> : Displays the current relative humidity (#57113, #57120).
<AH>	<ah>	<i>Absolute humidity</i> : Displays the current absolute humidity (#57113, #57120).
<RC>	<rc>	<i>Rate of change</i> : Displays the rate of change over the last 5 minutes.
<PA>	<pa>	<i>Absolute air pressure</i> : Shows the absolute air pressure (#57713).
<PN>	<pn>	<i>Sea-Level air pressure</i> : Displays the air pressure converted back to sea level (meteorological value). (#57113)
<AA>		<i>Alarm active</i> : Outputs all alarms (numbers, comma-separated) that are currently active
<AN>		<i>Alarm sensor number</i> : Outputs all sensors (numbers, comma-separated) that fulfill the set alarm conditions for the configured alarm.
<AS>		<i>Alarm sensor name</i> : Same as above, but with sensor names (separated by commas)
<DN>		<i>Device Name</i> : Displays the device name.
W&T tag date & time		
<Z>		Displays the current time and date as a string.
<\$y>		<i>Year (####)</i> : Displays the year.
<\$m>		<i>Month (##)</i> : Displays the month
<\$d>		<i>Day (##)</i> : Displays the day
<\$h>		<i>Hour (##)</i> : Displays the hour
<\$i>		<i>Minute (##)</i> : Displays the minute
<\$s>		<i>Second (##)</i> : Displays the second

14 Diagnosis

Here you will find all runtime error messages generated by the device.

WEBIO-07255D >> **Diagnosis**

Diagnosis

18.09.2015 10:18:07: DNS: server reply not recognized

Diagnosis Archive

18.09.2015 10:17:46: System: Network malfunction or bad configuration.

18.09.2015 10:17:46: Time Server synchronisation not successful

Clear Report

Errors that have occurred but are no longer relevant can be found in the diagnosis archive.

Errors that occur during the entry of parameters do not appear on this page, but are displayed directly on the parameter.

Invalid value
Alert name:

15 Device information

Here you will find descriptive information about your device and manufacturer details. You can change the content of this information in the basic settings under Language/Info.

[WEBIO-07255D](#) >> **Device information**

Device information

Manufacturer and hardware information

Web-Thermo-Hygrobarometer	
Hersteller:	Wiesemann & Theis GmbH
Address:	Porschestr. 12 42279 Wuppertal Germany
Support Hotline:	+49-(0)202-2680-0
Internet:	http://www.wut.de
Type:	Web-Thermo-Hygrobarometer
Article Number:	#57713
System Name:	WEBIO-07255D
Description:	
IP-address:	10.40.23.27
Datasheet:	http://www.wut.de/57713
Software revision:	1.0
Sensor type temperature:	W&T Temp
Sensor type humidity:	W&T rH
Sensor type air pressure:	W&T hPa
MAC address:	00:C0:3D:07:25:5D
DHCP: DNS Server:	0.0.0.0
DHCP: Lease Time:	00:00:00

16 Maintenance

WEBIO-078349 >> **Maintenance**

Maintenance

Device reboot, reset, backup and restore.

Maintenance		⬆
Reboot device:	<input type="button" value="Reboot"/>	
Restore device:	<input type="button" value="Factory defaults"/>	
Config		⬆
Save configuration:	<input type="button" value="Download"/>	
Restore configuration:	<input type="button" value="Datei auswählen"/> <input type="button" value="Keine ausgewählt"/>	

16.1 Reboot device

The device will restart and all network connections will be reset.

16.2 Restore device

The device is reset to factory settings. All configuration parameters and passwords are deleted. After the reset, you must start again with assigning IP addresses.

16.3 Save configuration

After clicking on the download button, a file containing the entire configuration of the device will be downloaded. This can be edited in a text editor.

16.4 Restore configuration

Select a configuration file and upload it to the device. After restarting, all configuration parameters will be adopted by the device.

17 Single query of measured values

17.1 Query via TCP/IP socket API

It is possible to manually query the current measured values in CSV format (comma-separated data) via a socket connection. This function is used to query individual data without using the web interface.

To do this, activate the TCP ASCII sockets function under Communication channels -> Socket API and enter the desired server port (default: 42280).

Open a TCP connection to the IP address and port number and then send one of the following commands to the device:

```
GET /Thermo.csv
```

The printout can also be specified with additional parameters that determine the content:

```
start=ttmmjjjjThhmmss
```

Start date and time of the measurement data to be loaded

```
end=ttmmjjjjThhmmss
```

End date and time of the measurement data to be loaded

```
DTb=x&
```

Interval to be output, where x =

- 1 -> 15 sec
- 2 -> 30 sec
- 3 -> 1 min
- 4 -> 5 min
- 5 -> 15 min
- 6 -> 60 min

The expression must begin with "?" after the file name, with the individual variables separated by "&"

Example:

```
http://<ip-adresse>/thermo.csv?start=01012010T123000&end=30032010T200000&D  
Tb=3&
```

The above printout generates a CSV file containing the measurement data from January 1, 2010, 12:30 p.m. to March 30, 2010, 8:00 p.m. in 1-minute intervals.

To query the individual, current measured value, send:

```
GET /Single1  
for the first measuring channel.
```

```
GET /Single2  
for the second measuring channel, etc.
```

To obtain an output of all measurement channels, send:

```
GET /Single  
without index.
```

17.2 Query via UDP socket API

To do this, activate the UDP sockets function under Communication channels > Socket API and enter the desired server port (default: 42279).

Open a UDP connection to the IP address of the device or to the Net ID as a broadcast and this port.

Then send one of the GET /Single expressions specified above to the device and the device will return the measured values to the port you are using.



When using multiple devices, it may be useful to include the name and IP address of the device in broadcast transmissions. To do this, activate the "Prepend IP address and system name" option under "Communication paths >> Socket API."

17.3 Query via SNMP

The sensors can be queried directly via SNMP Get commands.

The paths for the different model variants are as follows:

#57113 Web-Thermo-Hygrobarmeter:

1.3.6.1.4.1.5040.1.2.**37**....

#57114 Web-Thermometer NTC:

1.3.6.1.4.1.5040.1.2.**38**....

#57115/57171 Web-Thermometer Pt100/Pt1000, Web-Thermometer UV 1x

1.3.6.1.4.1.5040.1.2.**39**....

#57120 Web-Thermo-Hygrometer

1.3.6.1.4.1.5040.1.2.**42**....

#57172 Web-Thermometer UV 2x

1.3.6.1.4.1.5040.1.2.**43**....

You can access the sensors via the following path:

<IP address> 1.3.6.1.4.1.5040.1.2.**X**.1.3.1.1.**1** = First channel with one decimal place separated by a comma

<IP address> 1.3.6.1.4.1.5040.1.2.**X**.1.4.1.1.**1** = First channel as a three-digit integer value, without decimal separation

<IP address> 1.3.6.1.4.1.5040.1.2.**X**.1.8.1.1.**1** = First channel with one decimal place separated by a period.

The last index describes the channel number to be queried.



Select the configured SNMP read or read/write community for the query.

A MIB for integration into management applications is available for download on the device's data sheet page on the WuT homepage <http://www.wut.de>, or in the device itself under <ip address>/mib.zip.

If you want to change settings in the device via SNMP (IP address, subnet mask, etc.), you must first start a session on the device using your SNMP manager.

By entering the administrator password in the variable

```
wtWebGraphThermoBaroSessCntrlPassword
```

a session is opened. By reading the variable

```
wtWebGraphThermoBaroSessCntrlConfigMode
```

can be used to check whether the session was opened successfully.

- 1 = Session open, device is in configuration mode.
- 0 = Opening the session failed. Check whether the password has been entered correctly.

After successfully opening the session, any configuration changes can be made using the variables defined in the Private MIB.

Once the configuration has been completed, the variables are written to

```
wtWebGraphThermoBaroSessCntrlLogout
```

the session is closed.

```
wtWebGraphThermoBaroSessCntrlLogout =
```

- 1 All changes are saved.
- 2 Exit without saving

If no SNMP communication takes place over a period of 5 minutes while the sessi-

on is open, the device terminates the session and all changes are discarded.



Opening an SNMP session takes precedence over an HTTP login. This means that a user with operator or administrator rights loses browser access as soon as an SNMP session is opened.

The description of the individual SNMP variables, OIDs, etc. can be found in the Private MIB.

18 Firmware update

The operating software of the Web Thermometer is constantly being developed. The following chapter therefore describes the procedure for uploading the firmware.

■ Where can I get the latest firmware?

■ Firmware update via the network under Windows

18.1 Where can I get the latest firmware?

The latest firmware, including the available update tools and a revision list, is published on our website at the following address:

<http://www.wut.de>

Before downloading, please note the 5-digit type designation on the web thermometer. From the homepage, you can now access the product overview sorted by item numbers, which will take you directly to the data sheet for the device. Follow the link to the current version of the firmware.

18.2 Firmware update via the network under Windows

You will need a PC running Windows XP/Vista/7/8/8.1/10/11 with a network connection and TCP/IP stack enabled. For the update process, you will need two files, which can be downloaded from the homepage <http://www.wut.de> as described above:

- The executable WuTility tool for transferring the firmware to the web thermometer
- The file with the new firmware to be transferred to the device

No special preparation of the web thermometer is required for the firmware update.

The WuTility used for the update recognizes all WuT devices in your network and is largely self-explanatory. If you have any questions or uncertainties, please refer to the accompanying documentation or online help.



Never interrupt the update process yourself by disconnecting the power supply or pressing the reset button, if available. The web thermometer will be inoperable after an incomplete update.

Never mix files with different version numbers in the file name. This will cause the device to malfunction.

The web thermometer automatically detects when the transfer of the new operating software is complete and then performs a reset automatically.

19 Security information

The following sections contain information and recommendations relevant to IT security for commissioning, configuration, operation, and maintenance of the Web Thermometer.

19.1 Function and typical application

Wiesemann & Theis web thermometers are devices for temperature and climate monitoring via a network.

Measurement data is transmitted via the network as TCP payload and optionally also within higher protocol instances.

Web thermometers are designed for operation in a secure network environment. The factory settings are focused on ensuring the most convenient transmission of measurement data possible, as well as uncomplicated commissioning and configuration. In unsecure network environments and/or in the event of increased security requirements, additional measures must be taken to prevent unauthorized access.

19.2 Requirements for integrators and operators

Depending on the individual network environment and security requirements, the factory settings must be checked from a security perspective for operational use. Changes and/or additional measures may be necessary by the integrator or operator. These include in particular:

- Choosing a secure password in terms of length and composition.
- Deactivation of unnecessary services and/or access restrictions through an upstream external firewall.

19.3 Installation location

The installation location of the web thermometer must ensure that no unauthorized physical access is possible (e.g., suitably secured room, control cabinet, etc.). Physical access to the web thermometer carries the following risks, for example:

- Device shutdown (removal of power supply, etc.) and loss of all connections to communication partners.

19.4 Commissioning

The commissioning of the Web Thermometer is divided into the web configuration and the subsequent assignment of the IP address (DHCP, WuTility), as well as the subsequent further configuration via Web Based Management. With the factory settings, all configuration services are freely accessible. Commissioning must therefore be carried out in such a way that no unauthorized access is possible until the system password has been assigned and a secure configuration has been established.

19.5 IP assignment

During initial commissioning and until a system password has been assigned, ensure that no unauthorized access to the web thermometer is possible. A suitable measure is, for example, commissioning via a point-to-point connection. Only then should the web thermometer be connected to the actual target network.

19.6 Password

The Web Thermometer should not be used without a password. The password is the central protection against unauthorized access to the configuration and management of the Web Thermometer. We recommend using a secure password with a length of at least 15 characters, consisting of upper and lower case letters, numbers, and special characters.

During normal operation, the system password is not transmitted to the Web Thermometer in plain text. For password-protected access from supposedly unsecure or public networks, additional measures such as the use of a VPN tunnel must be taken.

19.7 Registration for safety-related information

Devices can be registered with W&T using the WuTility inventory tool. In the event of security-related updates and/or information, we will notify you immediately by email. In addition to the personal data provided, device-specific data is also stored during registration.

19.8 Operation and configuration

All access points and communication channels are disabled ex works, with the exception of browser access.

We recommend only enabling the communication channels and services that are actually required for operation.

The following table provides an overview of the available communication channels.

Communication path/protocol	Connection type	Active by default	Local port	Configurable	Remote port	Configurable	Password protected	Plain text transmission
Utility inventory	UDP	X	8513	X	dynamic			
Utility IP assignment	UDP	X	68		67		X	X
DHCP	UDP	X	68		67			
HTTP	TCP-Server	X	80	X	dynamic		X	X
HTTPS	TCP-Server		443	X	dynamic		X	
DNS	UDP	X	dynamisch		53			
NTP	UDP	X	dynamisch		123			
Geräte-Reset	TCP-Server	X	8888	X	dynamic		X	X
Device update initialization	TCP-Server	X	8002	X	dynamic		X	X
Device update Firmware data	UDP		69		dynamic		X	X
Mail	TCP-Client		dynamisch		587	X	X	
MQTT	TCP-Client		dynamisch		1883	X	X	X
SMQTT	TCP-Client		dynamisch		8883	X	X	
REST (HTTP)	TCP-Server		80	X	dynamic		X	X
REST (HTTPS)	TCP-Server		443	X	dynamic		X	
Web-API (HTTP)	TCP-Server		80	X	dynamic		X	X
Web-API (HTTPS)	TCP-Server		443	X	dynamic		X	
TCP-ASCII-Socket Server	TCP-Server		42280	X	dynamic		X	X
UDP-ASCII-Socket Peer	UDP-Peer		42279	X	dynamic	X	X	X
Modbus-TCP	TCP-Server		502	X	dynamic			

Communication path/protocol	Connection type	Active by default	Local port	Configurable	Remote port	Configurable	Password protected	Plain text transmission
OPC UA	TCP-Server		4840	X	dynamic		X	
SNMP V1	UDP-Peer		161		dynamic		X	X
SNMP V2	UDP-Peer		161		dynamic		X	X
SNMP V3	UDP-Peer		161		dynamic		X	
SNMP-Trap	UDP-Peer		161		162	X		
SYSLOG	UDP-Peer		dynamic		514	X		
FTP control connection	TCP-Client		dynamic		21	X	X	X
FTP data connection (active)	TCP-Server		dynamic		dynamic			
FTP data connection (passive)	TCP-Client		dynamic		dynamic			
HTTP request (action)	TCP-Client		dynamic		80	X	X	X
HTTPS request (action)	TCP-Client		dynamic		443	X	X	
TCP message (action)	TCP-Cleint		dynamic		8000	X		
UDP message (action)	UDO-Peer		dynamic		8500	X		
W&T Cloud	TCP-Client	X	dynamic		443			

20.8.1 Configuration via HTTPS / PKI environments if possible

The TLS protocol used by HTTPS provides encrypted and authenticated access to the web interface of the web thermometer. This also applies to access via the web API and REST access. To protect the configuration data, commands, and system password that are exchanged, we recommend activating HTTPS, especially in unsecure network environments. To protect against man-in-the-middle attacks, the self-signed default certificate should also be replaced with an individual, custom certificate.

20.8.2 Encrypted communication

The hardware platform of the Web Thermometer combines low latency with low power consumption. This limits the key length of possible certificates to 2048 bits. The Web Thermometer supports TLS1.2 at most. In applications with higher requirements, additional measures may be necessary (e.g., VPN).

TLS-encrypted communication is possible in the following operating modes:

- HTTPS (browser)
- HTTPS (web API)
- HTTPS (REST)
- MQTT (SMQTT)
- Mail delivery
- OPC UA

The computationally intensive TLS encryption functions can affect data transfer latencies. For time-critical switching and detection tasks, compatibility with HTTPS access should therefore be tested. This includes, in particular, any security scans in the network. These sometimes open a large number of TLS connections within a short period of time and can therefore lead to interruptions or timeouts in data traffic.

19.8.3 Isolation of the subnetwork via router/firewall

For applications that communicate with the Web Thermometer without encryption, the communication partners (e.g., Web Thermometer and PC) should be isolated in a separate network segment via a firewall to protect them from espionage. With the help of a W&T Microwall, for example, the communication partners are also protected from harmful events (broadcast storms, overload, etc.) in the main network.

Appropriate firewall rules restrict cross-network access to the minimum necessary.

19.8.4 Updating the firmware

W&T releases firmware updates for the web thermometers to fix functional errors, any vulnerabilities that may have been discovered, or to extend functionality.

The updates are uploaded to the device using the WuTility management tool.

Update files always contain the entire firmware or the entire system of the web thermometer. For this reason, firmware updates always require a restart of the web thermometer and thus also an interruption of operation. Individual configuration data (IP parameters, firewall rules, etc.) are not affected by a firmware update and are retained.

The web thermometers are based on W&T's own operating system and do not contain any third-party components (e.g., Linux, external TCP stacks, etc.). Compromise

with common malware existing for these systems is therefore not possible.

The firmware is uploaded via TFTP (UDP) and the system password is transmitted in plain text on the network side. In unsecure networks or in environments with increased security requirements, additional external measures are therefore necessary (e.g., VPN).

Further details on firmware updates can be found in the Firmware Update chapter.

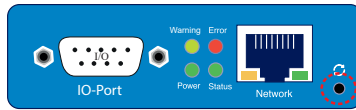
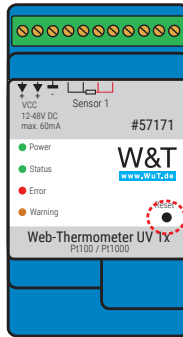
19.8.5 Service, maintenance, and decommissioning

Despite high quality standards, electronics can fail at any time, e.g. due to external events. Depending on the availability requirements of the respective application, we recommend taking appropriate precautions.

- Backup/storage of the device configuration
- If necessary, provision of a replacement device
- Documentation of the procedure for replacing the device

When taking the device out of service, the web thermometer should be reset to the factory settings to protect all confidential information stored in the device (IP ranges, external access data, etc.). This can be done either via web-based management or via hardware by pressing and holding the reset button.

19.9 Emergency access and factory settings



The reset button, which is recessed in the device, is used for emergency access.

Delete password

Press the reset button recessed into the front of the web thermometer 8 times with a pointed object. Hold down the reset button until the status, warning, and error LEDs begin to flash slowly. Now release the reset button. Enter the IP address of the web thermometer as the URL in your browser to be taken to an emergency access web page where you can reset the passwords.

Reset to factory settings

Press the reset button recessed into the front of the web thermometer 8 times with a pointed object. Hold down the reset button until the status, warning, and error LEDs begin to flash slowly and then rapidly after a while. Now release the reset button.

As soon as the power and status LEDs are lit steadily, press the reset button again to restart the device.

The web thermometer is now configured as it was when delivered.

20 Technical data

20.1 Technical data for items 57114 and 57115

Network:	10/100BaseT autosensing
Supply voltage	Power over Ethernet or 12-48V DC (+/-10%) via screw terminal
Measuring unit 57714	
Sensor	NTC 10k
Measuring range	-45°C...75°C
Resolution	1/10°C
Measurement error	±0,3°C, ±5,1%
Storage frequency	15, 30 sec, 1, 5, 15, 60 min
Storage depth	min. 16 weeks, max. 20 years
Deviation of the internal clock	max. 1 min. / month
Measuring unit 57715	
Sensor	Pt100/Pt1000 connection, 2-, 3-, or 4-wire technology
Measuring range	W&T sensor: -50°C...180°C Pt100/Pt1000 measuring input: -200°C...650°C
Resolution	1/10°C
Measurement error	±0,3°C, ±0,2%
Storage frequency	15, 30 sec, 1, 5, 15, 60 min
Storage depth	min. 16 weeks, max. 20 years
Deviation of the internal clock	max. 1 min. / month
Power supply	
Current consumption	typ. 69mA @24VDC max. 80mA @24VDC, PoE Class 1 (0,44 - 3,84W)
Housing	Small plastic housing, 105x75x22mm (lwxhx)
Weight	ca. 200g
Ambient temperature storage	-40...+70°C
Ambient temperature during operation	Non-in-line installation: 0 .. +60°C In-line installation: 0 .. +50°C

20.2 Technical data for items 57113 and 57120

Thermo-hygro sensor:	I2C connector
Air pressure sensor (57113 only)	SPI
Network:	10/100BaseT autosensing
Supply voltage	Power over Ethernet or 12-48V DC (+/-10%) via screw terminal
Measuring unit	
Measuring range	-40°C...+85°C, 0...100% rF, 10-1100 hPa (57113 only)
Resolution	1/10 °C, 1/10% rF, 0,1 hPa (57113 only)
Measurement error	<p>Temperature: typ. @ 25°C ±0,3°C max. @ -40...85°C ±1,5°C</p> <p>Humidity: typ. @ -20...60°C (normal range) ±1,8%rH (10-90%rH) max. @ -20...60°C (normal range) ±4%rH (0-100%rH) temporary @ -40...85°C (max range) +3%rH nach 60h Operation outside normal range Long-term stability: typically <0.5% RH/year</p> <p>Air pressure (57113 only): typ. @ 25°C ±0,8hPa (750..1100hPa) max. @ 25°C ±2,5hPa (750..1100hPa) max. @ -40...85°C: ±3,5hPa (300..1100hPa) Long-term stability: typically -1 hPa/year</p>
Storage frequency	15, 30 sek, 1, 5, 15, 60 min
Storage depth	min. 7 weeks, max. 20 years (57113) min. 12 weeks, max. 20 years (57120)
Deviation of the internal clock	max. 1 min. / month
Power supply	
Current consumption	typ. 69mA @24VDC max. 80mA @24VDC, PoE Class 1 (0,44 - 3,84W)
Housing	Small plastic housing, 105x75x22mm (lxwxh)
Weight	ca. 200g
Ambient temperature storage	-40...+70°C
Ambient temperature during operation	Non-in-line installation: 0 .. +60°C In-line installation: 0 .. +50°C

20.3 Technical data for items 57171 and 57172

Network:	10/100BaseT autosensing
Supply voltage	Power over Ethernet or 12-48V DC (+/-10%) via screw terminal
Measuring unit	
Sensor	1x Pt100/Pt1000 measurement input (57171) 2x Pt100/Pt1000 measurement input (57172) Cable length W&T sensor: 2m (freely extendable) Protection class IP67
Measuring range	W&T sensor: -50°C...180°C PT100/PT1000 measuring input: -200°C...650°C
Resolution	1/10°C
Measurement error	±0,3°C, ±0,2%
Storage frequency	15, 30 sec, 1, 5, 15, 60 min
Storage depth	min. 16 weeks, max. 20 years
Deviation of the internal clock	max. 1 min. / month
Power supply	
Current consumption	typ. 69mA @24VDC max. 80mA @24VDC, PoE Class 1 (0,44 - 3,84W)
Housing	Small plastic housing for DIN rail mounting Precisely fitted for sub-distribution 90x45x56mm (lxbxh)
Weight	ca. 100g
Ambient temperature storage	-40...+70°C
Ambient temperature during operation	Non-in-line installation: 0 ... +60°C In-line installation: 0 ... +50°C

20.3 Technical data for items 57125, 57126 and 57107

Network:	10/100BaseT autosensing
Supply voltage	Power over Ethernet or 12-48V DC (+/-10%) via screw terminal
Measuring unit 57125 and 57107	
Sensor	Pt100/Pt1000 measurement input, 2-,3- or 4-wire connection 57125: 1x measurement input 57107: 2x measurement inputk
Measuring range	-45°C...75°C
Resolution	1/10°C
Measurement error	±0,3°C, ±5,1%
Storage frequency	15, 30 sec, 1, 5, 15, 60 min
Storage depth	min. 16 weeks, max. 20 years
Deviation of the internal clock	max. 1 min. / month
Relay output (57126 only)	
Relay output	1 potential-free contact in semiconductor relay technology Wire cross-section 0.2-1.3 mm² Stripping length 6-8 mm
Max switching current	typ. 300mA AC/DC (peak 500mA)
Max switching voltage	39V AC/DC
Max switching power	11,7W AC/DC
Power supply	
Current consumption	typ. 69mA @24VDC max. 80mA @24VDC, PoE Class 1 (0,44 - 3,84W)
Housing	Small plastic housing, 105x75x22mm (lxwxh)
Weight	ca. 200g
Ambient temperature storage	-40...+70°C
Ambient temperature during operation	Non-in-line installation: 0 .. +60°C In-line installation: 0 .. +50°C

21 Battery replacement and disposal

The web thermometer contains a 3V lithium manganese dioxide button cell battery (type CR 1632) for buffering the internal clock. This battery has a service life of 10 years and may only be replaced with a battery of the same type.

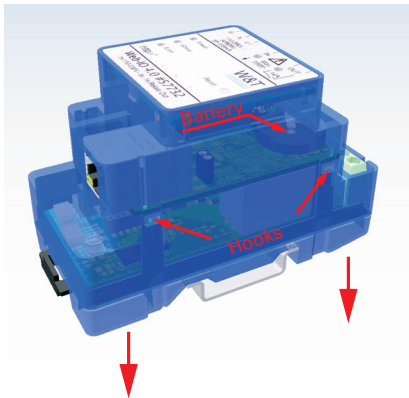
When operating the web thermometer in a network environment with access to a time server, the battery is not essential for the correct functioning of the device and can be removed.

ATTENTION

The battery must only be replaced or removed by a qualified electrician. Disconnect the power supply before opening.

To remove the battery, open the device housing as follows:

#57171, 57172



Press down on the side latches of the housing with a pointed object and simultaneously pull the housing base out of the upper shell.

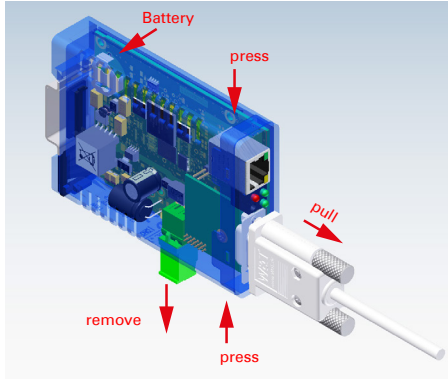
Then remove the stack of circuit boards from the housing by pulling it downwards.

The buffer battery for the clock module is located in a holder on the upper circuit

board.

After replacing/removing the battery, reassemble the device in reverse order.

#57107, 57113, 57114, 57115, 57120. 57125, 57126



Screw the DB9 connector or the IO terminal firmly to the device.

First remove the green power supply terminal. Press the narrow sides of the housing together slightly to create a small gap and pull out the circuit board at the DB9 connector or the green IO terminal.

The battery is located on the side opposite the network connection.

Note according to the Battery Act (BattG):

Batteries and rechargeable batteries must not be disposed of in household waste. You are legally obliged to return used batteries and rechargeable batteries. Old batteries may contain harmful substances that can damage the environment or your health if not stored or disposed of properly.

However, batteries also contain important raw materials such as iron, zinc, manganese, or nickel and are recycled. After use, you can either return the batteries to us or return them free of charge in your immediate vicinity (e.g., in stores or municipal collection points). Returns to retail outlets are limited to quantities that are normal for end users and to used batteries that the distributor sells or has sold as new batteries.

The complete declaration of conformity for the device described can be found on the Internet data sheet page on the W&T homepage at <http://www.wut.de/<item number>..>



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