

Manual

Web-Thermo-Hygrograph

US 1.07 11/2005 ML



Type
Model
Release

10/100BaseT, 12-24V
57606
1.07, Nov 2005

© 11/2005 by Wiesemann und Theis GmbH
Microsoft, MS-DOS, Windows, Winsock and Visual Basic
are registered trademarks of the Microsoft Corporation

Subject to errors and changes:

Since we can make mistakes, none of our statements should be used without checking. Please let us know of any mistakes or misunderstandings you are aware of, so that we can recognize and eliminate them quickly.

Perform work on and with W&T products only as described here and only if you have read and understood the manual fully. Unauthorized use can result in hazards. We are not liable for the consequences of unauthorized use. When in doubt, check with us or consult your dealer!

Introduction

The W&T Web-Thermo-Hygrograph includes all the functions in one box for measuring, storing and displaying your temperature and humidity data. Numerous alarm functions are also available which can be custom incorporated into your own applications or into existing systems.

This manual contains all the information you need to install, configure and operate the Web-Thermo-Hygrograph.



Content

- Introduction 3**

- 1 Quick-Start/Commissioning 6**
 - 1.1 Connecting the power supply 6
 - 1.2 Connecting the temperature-humidity sensor 6
 - 1.3 Assigning the IP address using „WuTility“ 7
 - 1.4 Assigning the basic network parameters 9

- 2 Additional basic settings 12**
 - 2.1 Configuring port and device name 12
 - 2.2 Setting local time 14
 - 2.3 Automatic time setting using a network service 17
 - 2.4 Configuration of the the data logger 18
 - 2.5 Configuration of the graphics settings 20
 - 2.6 Calibration 22
 - 2.7 Browser access 24
 - 2.8 Alarm via E-Mail 25
 - 2.9 SNMP incl. alarm via trap 33
 - 2.10 Alarm via TCP (client mode) 36
 - 2.11 Sending alarms via FTP (Client Mode) 37
 - 2.12 Syslog messages incl. alarm 41
 - 2.13 ASCII command strings via TCP Port 80 42
 - 2.14 ASCII command strings via UDP 43
 - 2.15 UP-/Download 44

- 3 Single querying of temperatures 46**
 - 3.1 Querying temperature via TCP/IP 46
 - 3.2 Temperature querying via UDP 46
 - 3.3 Temperature querying using SNMP 47

- 4 Placing the temperature into your own web page 49**

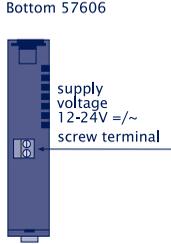
- 5 Data logger 51**

- 6 Appendix 52**
- 6.1 Alternate methods of IP address assignment 52
- 6.2 Example for creating your own Web pages 57
- 6.4 Firmware Update 65
 - 6.4.1 Where do I obtain the current firmware? 65
 - 6.4.2 Firmware-Update over the network
using Windows 65
 - 6.4.3 LED indicators 67
- 6.5 Emergency access 69
- 6.6 Technical Data 70
- 6.7 Declaration of Conformity 71

1 Quick-Start/Commissioning

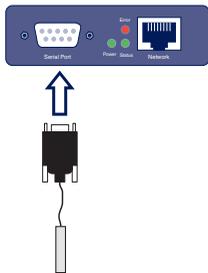
Just a few steps are required to start up your W&T Web-Thermo-Hygraph and to make it visible in your network.

1.1 Connecting the power supply



Connect the AC adaptor provided to the terminal provided for the 12-24V AC/DC operating power. Polarity does not need to be observed.

1.2 Connecting the temperature-humidity sensor



Plug the sensor included in the scope of delivery into the 9-pin IO terminal on the unit.

1.3 Assigning the IP address using „WuTility“

Once the hardware has been connected to the power supply as described above, you must assign the IP address needed for operating in a TCP/IP network.



The IP address must be unique network-wide.

There are several ways to assign the IP address. To make assignment as convenient as possible, we have developed the „WuTility“ tool, which you can download from the WuT homepage <http://www.wut.de>. This procedure is described below. A summary of alternative methods is contained in the appendix to this manual in Section 6.1.

Be sure that the PC you are using to assign the IP address is located in the same sub-net as the device and that both the PC and the device are connected to the network.

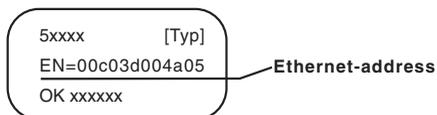
- Start „WuTility“ and click on the Scan icon:



- Using the MAC address, select your Ihr Web-Thermo-Hygrograph from the displayed list:

Ethernet ID	IP address	Host name	Product ID	Model
00c03d:017822	0.0.0.0			Com-Server Highspeed

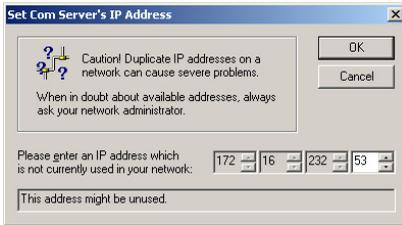
The MAC address can be found on this part label on the housing:



- Click on the „Assign IP Address“ icon:

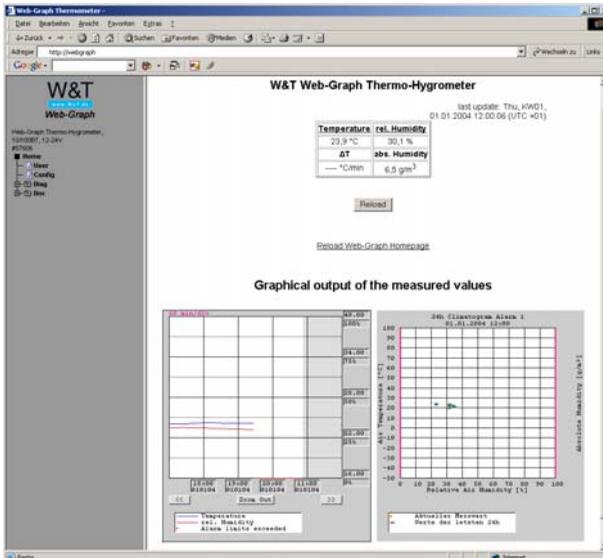


- In the window which opens enter the desired IP address for the device and confirm your entry with „OK“:



The device is given the assigned IP address. Clicking again on the Scan button displays this address in WuTility.

Clicking on the globe in the WuTility menu bar opens your standard browser, and you will see the start page of the device.

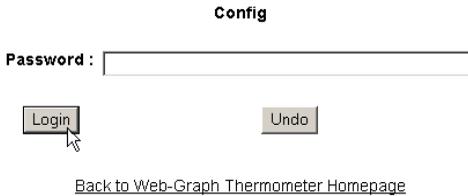


1.4 Assigning the basic network parameters

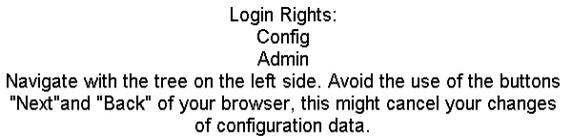
Select the menu item „Config“ to the left in the configuration tree.



You are now prompted to enter a password. As shipped, the unit does not require a password, so that you can simply click on the Login button without entering a password.



On the next screen use the profiles to select the configuration path.



The "profiles" provides an easy way to make the required modification step by step.



Select the „Basic network parameters“ profile and click on the „Highlight profile“ button.

- No profile (expert mode)

Basic configuration:

- Basic network parameter
- Configuration of port and device name
- Local clock settings
- Automatic clock settings with the network time service
- Configuration of the data logger
- Configuration of the graphics settings
- Calibration

Direct user control:

- HTTP access

Integration in existing systems:

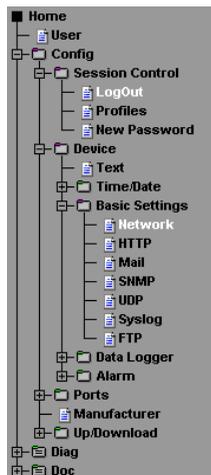
- Alarm via E-Mail
- SNMP incl. alarm via trap
- Alarm via TCP (client mode)
- Syslog messages incl. alarm
- Alarm via FTP (client mode)

Access from individual programmes:

- ASCII command strings via TCP port 80
- ASCII command strings via UDP



The device now automatically displays the necessary menu points for this profile. Click on „Network“ in the configuration menu.



In the following screen enter all the necessary network parameters and then click on the „Logout“ button.

Config >> Device >> Basic Settings >> Network

IP Addr :

Subnet Mask :

Gateway :

BOOTP Client : BOOTP or DHCP can only be used if the respective entry on the DHCP server assigns a reserved IP address. Important: If you are in doubt, check 'BOOTP disable'.
 BOOTP disable

DnsServer1 : IP address of DNS server (format xxx.xxx.xxx.xxx)

DnsServer2 : IP address of DNS server (format xxx.xxx.xxx.xxx)

Free memory: 48592 bytes

By then clicking on the „Save“ button, all your settings are saved in the device and you quit your configuration session. After the network parameters are changed, the unit automatically performs a restart.

Config >> Session Control >> LogOut

Save new configuration

Exit without saving

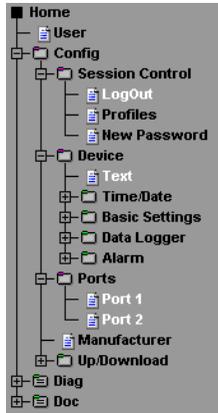
Restore Factory Defaults

The device is now ready to operate in your network. For easy handling, use the additional profiles for adapting the device to your needs.

2 Additional basic settings

2.1 Configuring port and device name

Highlight Profile



2.1.1 Text



Enter your personalized names and designations in the screen provided and then click on the „Temporary Storage“ button.

Config >> Device >> Text

Device Name: Name of device

Device Text: Description

(For a new line use
)

Location: Location of installation

Contact: Contact address

Free memory: 49421 bytes

2.1.2 Ports



Enter here a name for the sensor and a descriptive text. Then click on „Logout“ and save your configuration.

Port 1 (Temperature):

Config >> Ports >> Port 1

Name :

Text :
(For a new line use
)

Select Sensor : PT100
 PT1000

If you choose to use a sensor other than the one provided, enter here the sensor type (PT100 / PT1000 preset).

Port 2 (Humidity / Scalar):

Config >> Ports >> Port 2

Name :

Text :
(For a new line use
)

Select Sensor : Humidity
 Scalar
 Disconnect

The presetting is used for measuring relative humidity using the sensor provided.

This port can also be used to measure an analog value of 0 - 2.5 V.

W&T

To do this, set the port to „Scalar“. The measuring circuit is now always active and the measured voltage present on Pin 4 is compared with the internal reference voltage of 2.5V. This results in the following outputs:

0V = 0% ... 2.5V = 100%

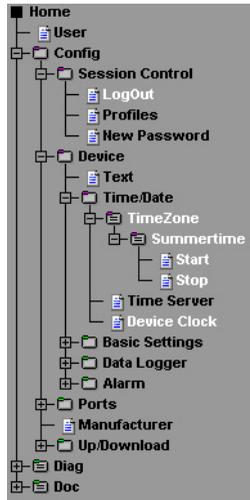
No conversion is done. Adjustments can however be made using the calibration function as long as they are linear.



The interface pinout can be found in the Technical Data (6.5).

2.2 Setting local time

Highlight Profile 



2.2.1 Timezone



Here is where you define the time zone where the device is located. The settings you make here are referenced to UTC (Coordinated Universal Time). Then click on the „Temporary Storage“ button.

Config >> Device >> Time/Date >> TimeZone

UTCOffset : Offset to UTC
 :

Enable : Apply Time Zone

Free memory: 48405 bytes



2.2.2 Summertime



If you wish the device to automatically switch to summer time, first enter the offset to UTC. The standard value (for Germany) is two hours. Use „Apply Summer time“ to activate this function and save the settings.

Config >> Device >> Time/Date >> TimeZone >> Summertime

UTCOffset : Offset to UTC
 :

Enable : Apply Summertime

Free memory: 48592 bytes



Start/Stop



Define when summer time begins and ends. The parameters are already pre-configured:

Start:

Last Sunday in March at 02:00 hours

Stop:

Last Sunday in October at 03:00 hours

Config >> Device >> Time/Date >> TimeZone >> Summertime >> Start

Month : Summer time starts in

Mode : on

Weekday :

Time : :

Free memory: 48592 bytes



2.2.3 Device Clock



If you do not wish to use a time server, you can manually set the clock here. Then click on „Logout“ and save your settings.

Config >> Device >> Time/Date >> Device Clock

Time : :

Day :

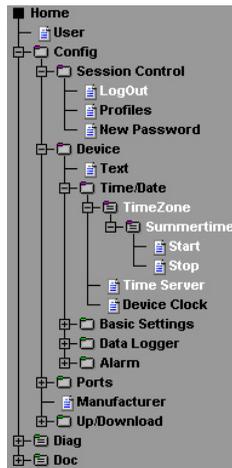
Month :

Year :

Free memory: 48592 bytes



2.3 Automatic time setting using a network service



2.3.1 Time Server



If you wish to have a time server adjust the time, enter the necessary information here.

The default addresses are only an example and do not have to be used.

Config >> Device >> Time/Date >> Time Server

UTC Server1 : Name or IP address of the time server (format xxx.xxx.xxx.xxx).

de.pool.ntp.org

UTC Server2 : Name or IP address of the time server (format xxx.xxx.xxx.xxx).

europe.pool.ntp.org

Sync.Time : Daily synchronisation time with the time server (hour: 0-23).

0

Enable : Apply TimeServer

Free memory: 48592 bytes

Temporary Storage Undo Logout

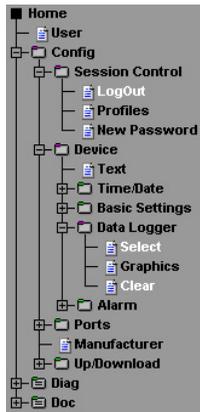


If you enter a name as the address, be sure that you have first configured the gateway and DNS server so that the device can resolve the addresses.

Click on the "Logout" button and save your settings.

2.4 Configuration of the the data logger

Highlight Profile



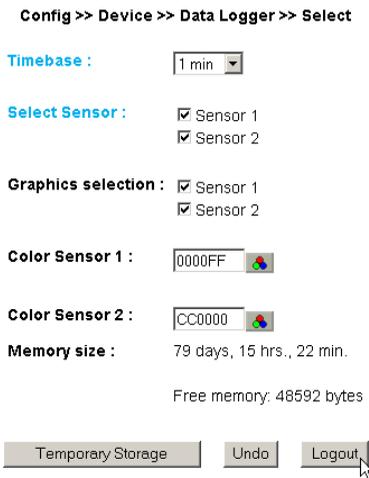
2.4.1 Select



Make the following settings:

Timebase: Defines at what time intervals the measured data are stored in the data logger. The device will in any case measure once a minute.

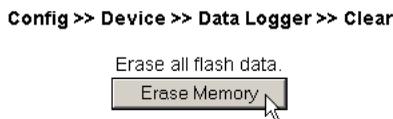
Select Sensor: The sensor selected here is used for saving the values in the data logger.



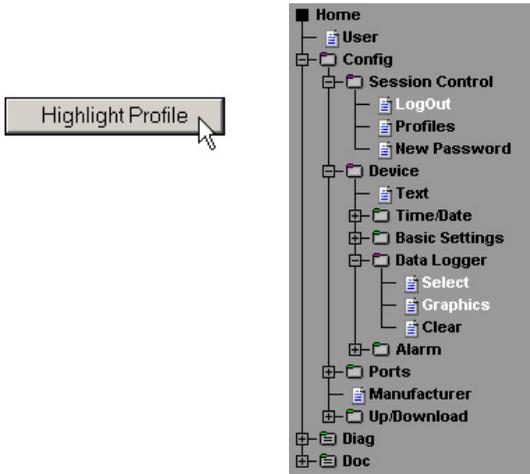
2.4.2 Clear



Clicking on the „Clear memory“ button deletes the entire contents of the data logger.



2.5 Configuration of the graphics settings



2.5.1 Select



Config >> Device >> Data Logger >> Select

Timebase : 1 min

Select Sensor : Sensor 1
 Sensor 2

Graphics selection : Sensor 1
 Sensor 2

Color Sensor 1 : 0000FF

Color Sensor 2 : CC0000

Memory size : 79 days, 15 hrs., 22 min.
Free memory: 48592 bytes



Graphics Selection: The selected sensor is shown in the graphics display.

Color Sensor X:



Defines the color curve of the sensor in the graphics display.

2.5.2 Graphics



Enter here the desired scaling for the displayed temperature curves:

Config >> Device >> Data Logger >> Graphics

Vertical auto scale : Auto scale enable

Vertical upper limit :

Vertical lower limit :

Horizontal zoom :

Free memory: 48592 bytes



Vertical Auto Scale: Activating this function sets the vertical scale using the minimum and maximum measured value. No other settings described below then have any effect.

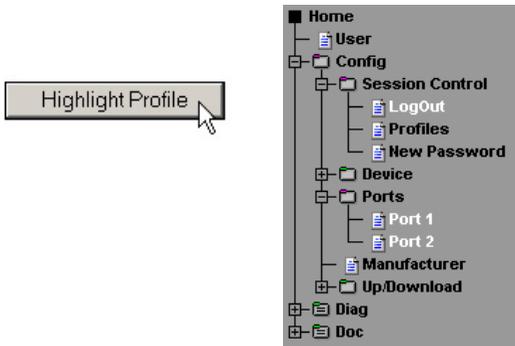
W&T

Vertical Upper Limit: Specifies the maximum displayed temperature

Vertical Lower Limit: Specifies the minimum displayed temperature

Horizontal Zoom: Specifies the time axis scale

2.6 Calibration



You can calibrate the sensor using single-point or two-point reference measurements and corresponding entry of offset values.

In single-point compensation the entered value is added to the measured temperature value, whereas two-point compensation calculates a straight line for compensating the entire measuring range. To remember calibration procedures, the user making the setting can add a comment.

Offset 1 :

Calibration Optionally, 1-point or 2-point calibration can be chosen.	
1 point compensation	Only Offset 1 is needed: this offset is added to every measured value.
2 point compensation	Offset 1 is the offset at temperature 1, Offset 2 is the offset at temperature 2. From these 2 offsets, a straight line will be interpolated, from which the offset for each measured value is calculated. The difference between the two temperatures entered here must be greater than 40° Celsius.
All values in °C in the form xx.xx .	

Temperature 1 :

Offset 2 :

Temperature 2 :

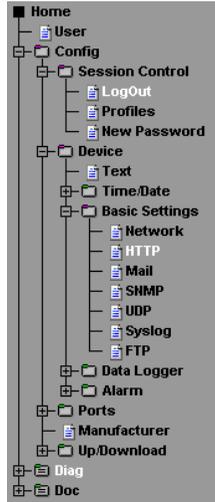
Comment :

Comments: date, name of operator, reference devices

Free memory: 48592 bytes

2.7 Browser access

Highlight Profile



2.7.1 HTTP access



Startup: Specify here which HTML page you want to display when the device is started up.

Config >> Device >> Basic Settings >> HTTP

Startup :

index.htm	Show navigation tree as well as page 'home'.
home.htm	Show page 'home' without navigation tree.
user.htm	Show page 'user' without navigation tree.

index.htm
 home.htm
 user.htm

Enable : Device will send header with IP address and its name before each reply to any GET requests which do not come from a browser.
 GET Header enable

HTTP Port : Default. Port 80
80

Free memory: 48592 bytes

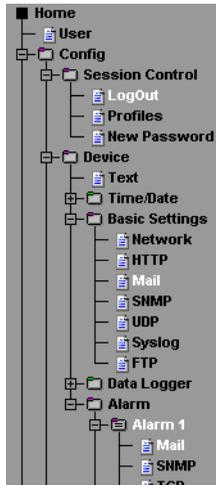
Temporary Storage Undo Logout

W&T

HTTP Port: You can access the device through this port. The default is standard HTTP Port 80. If you want to use a different port, this may have to be explicitly named when the page is opened:

`http://webgraph:<PortNr>`

2.8 Alarm via E-Mail



2.8.1 Basic Settings -> Mail



Here is where you make the basic settings for e-mail sending of alarms.

Config >> Device >> Basic Settings >> Mail

Name :

ReplyAddr :

MailServer : Name or IP address of the mail server (format xxx.xxx.xxx.xxx).
 

Authentication : SMTP authentication off
 ESMTP
 SMTP after POP3

User :

Password :

Retype Password :

POP3 Server : Name or IP address of the POP3 mailserver (format xxx.xxx.xxx.xxx) only for 'SMTP after POP3'
 

Enable : Mail enable

Free memory: 48205 bytes

The e-mail function allows you to send an information or alarm mail to one or more e-mail or SMS recipients.

Name: Enter the name you want to appear at the e-mail recipient.

ReplyAddr: The reply address with which the device is identified

MailServer: In the next step set the IP address of your mail server and its host name (for configured DNS servers) which you want the device to use. If the e-mail port is not the standard Port 25, you can append the port to the address with a colon:

mail.provider.de:476

W&T

Authentication: If a authentication for mail delivery is needed you can configure the user identification here:

SMTP authentication off: no authentication

ESMTP: a user-name and a password are needed to log in on the mail-server.

SMTP after POP3: for SMTP-sending a access to a POP3 server is necessary to identify the user. For this setting you also need to enter a valid POP3-server.

Enable: Be sure that the „Mail enable“ checkbox for sending e-mail is activated.

2.8.2 Alarm X



Here you configure the desired alarm conditions.

Config >> Device >> Alarm >> Alarm 1

- Trigger :**
- Sensor 1
 - Sensor 2
 - Timer
 - Cold Start
 - Warm Start
 - Sensor lost

Temperature

- Min :** Limit in °C (form: xx.xx).
- Max :** Limit in °C (form: xx.xx).
- Hysteresis :** Hysteresis in °C (form: xx.xx).
- Rate of change :** Limit in °C/min (form: xx.xx, average over a period of 5 min).

Relative Humidity/Scalar

- Min :** Limit in % (form: xx).
- Max :** Limit in % (form: xx).
- Hysteresis :** Hysteresis in % (form: xx.xx).

Absolute Humidity

- Min :** Limit in g/m³ (form: xx.xx).
- Max :** Limit in g/m³ (form: xx.xx).
-

Delay Time :

The alarm will be send after the alarm condition stay stable during this periode of time (time in minutes).

Interval :

Sending interval in minutes

Timer :

Field	Input [Number *, -]	Range of values
Minute	5,10,15,20	0-59
Hour	*	0-23 (0 is midnight)
Day_of_month	*	1-31
Month	*	1-12
Weekday	1-5	0-6 (0 is sunday)

Enable :

- Mail enable
- SNMP Trap enable
- TCP Client enable
- Syslog Messages enable
- FTP Client enable

Free memory: 45936 bytes



Trigger: Here you define the trigger for the alarm e-mail. Multiple selections are possible.

To send a message without alarm status, activate the „Timer“ checkbox only.

Temperature:

Min./Max.: Specifies the lower and upper limits. The range within these limits is understood to be „valid“.

Hysteresis: You can also specify a hysteresis value which is used to reset the alarm status. This function prevents ‚flickering‘ around the limit value.

Rate of change: Maximum allowed temperature change within five minutes.

W&T

Example:

min. 10°C / max. 18°C / Hysteresis 2°C

When a limit is exceeded the alarm status is reset when 16°C (18-2) is reached or when the value falls below 12°C (10+2). If the temperature rises or falls by more than 2°C in five minutes the alarm is also triggered.

Relative Humidity/Scalar / Absolute Humidity:

The settings made here have exactly the same function as the temperature settings.

Delay Time: The alarm is triggered with a delay of this time (in minutes) to compensate for short-term limit value violations.

Interval: Enter here the send interval (in minutes) for sending a message when there is an active alarm. If you want to send just a single message, enter an „E“ here.

Timer: This timer interval is based on the CRON service such as is used in Linux/Unix systems. Valid characters are:

* : stands for all valid values in the respective input field (e.g. all minutes or all hours)

- : specifies a range of from ... to .. For example, weekday „2-4“ stands for Tuesday to Thursday, whereas entering a „*“ triggers the timer on all weekdays.

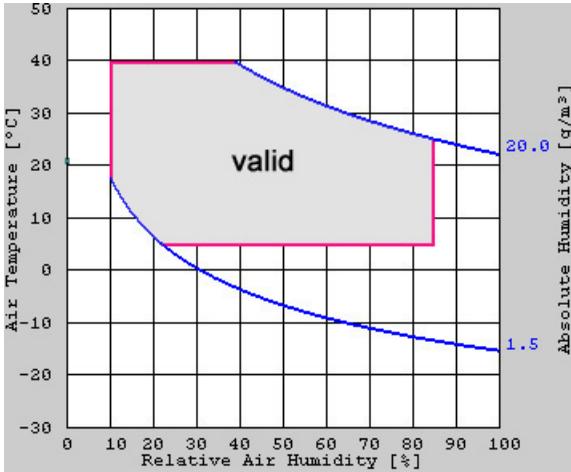
/ : Interval within the entered range , e.g. minute „0-45/2“ starts the timer in the range between the 0th and 45th minute every two minutes (0, 2, 4, 6 ,8, 10, ... , 44).

, : specifies an absolute value. For example minute 0, 15, 30 starts the timer on the hour, quarter-hour and half=hour.

This function requires that the „Timer“ box be checked.

Enable: Select the type of message. For an e-mail alarm, check the „Mail enable“ box.

The values in the example would result in the following definition for the climatogram:



2.8.3 Alarm X -> Mail



The actual content of the e-mail is specified under this menu point.

Config >> Device >> Alarm >> Alarm 1 >> Mail

E-Mail-Addr :

Subject :

Mailtext :

Options : Attach thermo.csv enable

Alarm Clear Subject : This messages will be send if alarm state is cleared.

Alarm Clear Text :

Free memory: 48592 bytes

E-Mail-Addr: Enter here the recipient’s e-mail address. To send the e-mail to multiple recipients, separate the addresses using a semicolon.

Subject: Specifies the subject line of the e-mail.

Mailtext: Here is where you enter the actual mail text. The following tags are also accepted in this text box:

- <T1> Displays the current temperature at this point.
- <H1> displays the current relative humidity.
- <AH> displays the current absolute humidity.
- <RC> displays the „Rate of change“ from the last 5 minutes.
- <Z> Displays the current date and time of day.

Attach thermo.csv enable: The „Attach thermo.csv enable“ option allows you to attach the complete contents of the data logger in semicolon-separated CVS format to the e-mail. The time base of the output corresponds to the data logger settings.



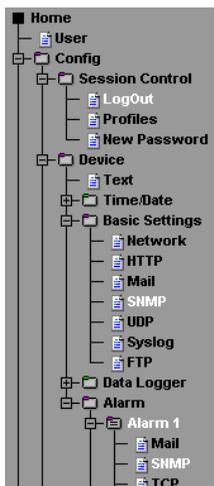
The file is generated dynamically in the device, so that when the logger content is large creation of the CSV file may take up to 30 seconds. During this time no

other e-mail can be sent. Pending alarms are send directly after the mail with attachment is sent.

Alarm Clear Text: An Alarm Clear message is also sent when the temperature rises or drops to the valid range. Here you can use the same tags as for the alarm message.

2.9 SNMP incl. alarm via trap

Highlight Profile



Send alarm messages as an SNMP trap.

2.9.1 Basic Settings -> SNMP



Here you define the basic settings needed for SNMP operation.

W&T

Community String: Read: By using this string you can access temperature values in read mode in your SNMP manager.

Community String: Write: By using this string you can access temperature values.in both read and write mode in your SNMP manager

Manager IP: Contains the IP address of your SNMP manager. The device sends the SNMP messages to this address.

System Traps: You can create two system traps.

Cold Start: When power fails or is disconnected

Warm Start: For device reset

SNMP Enable: Check this box to activate SNMP functionality.

Config >> Device >> Basic Settings >> SNMP

Community string: Read :

Community string: Read-Write :

Manager IP :
SNMP System Traps:
Name or IP address of the SNMP manager (format xxx.xxx.xxx.xxx)

System Traps : Cold Start
 Warm Start
 Diag Messages

Enable : SNMP enable

Free memory: 48592 bytes

2.9.2 Alarm X -> SNMP



The actual content of the SNMP trap is set under this menu point.

Config >> Device >> Alarm >> Alarm 1 >> SNMP

Manager IP : Name or IP address of the SNMP manager (format xxx.xxx.xxx.xxx)

Trap Text :

Alarm Clear Text : This messages will be send if alarm state is cleared.

Free memory: 48592 bytes



Manager IP: Contains the IP address of your SNMP manager. The device sends the SNMP messages to this address.

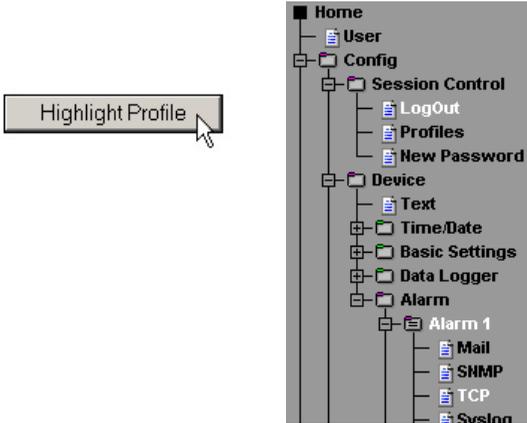
Trap Text: Here is where you enter the actual trap text. The following tags are also accepted in this text box:

- <T1> Displays the current temperature at this point.
- <H1> displays the current relative humidity.
- <AH> displays the current absolute humidity.
- <RC> displays the „Rate of change“ from the last 5 minutes.
- <Z> Displays the current date and time of day..

W&T

Alarm Clear Text: An Alarm Clear message is also sent when the temperature rises or drops to the valid range. Here you can use the same tags as for the alarm message.

2.10 Alarm via TCP (client mode)



Send the alarm messages as a TCP packet.

2.9.1 Alarm X -> TCP:



IP Addr: The IP address to which you want to send the message.

Port: The recipient must have a TCP server service on this port which can pick up incoming connections.

TCP Text: The text corresponds to the same specifications which apply to the other message types.

Alarm Clear Text: see above

Config >> Device >> Alarm >> Alarm 1 >> TCP

IP Addr : Name or IP address of the TCP server (format xxx.xxx.xxx.xxx)

Port :

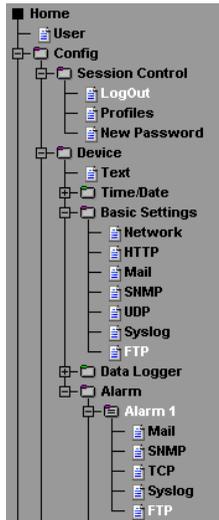
TCP Text :

Alarm Clear Text : This messages will send if alarm state is cleared.

Free memory: 48592 bytes



2.11 Sending alarms via FTP (Client Mode)



Write temperature values directly to an FTP server.

2.11.1 Basic Settings -> FTP



Here you will find the basic settings needed for FTP mode

FTP Server IP: Enter here the IP address or the host name of the FTP server you want to send the data to.

FTP Control Port: This is the port needed for the connection. The standard port for FTP access is 21. This port is already preset and should function on most systems at the first go. If you require a different port, please consult your network administrator.

User: Enter here the user name required for the FTP access.

Password: This is the password assigned to the user.

FTP Account: Some FTP servers require a special Account entry for the login. If this is the case with your server, enter the Account name here.

Options / PASV: If this option is enabled, the server is instructed to operate in passive mode. This means the data connection is opened by the Web-Thermograph. If this option is disabled, the FTP server takes over opening of the data connection. If the server is protected by a firewall, it is recommended that the PASV option be enabled, since otherwise connection attempts could be blocked.

Enable: To use the FTP functionality, check this box.

Config >> Device >> Basic Settings >> FTP

FTP Server IP : Name or IP address of the FTP server (format xxx.xxx.xxx.xxx)

192.168.0.5 

FTP Control Port : Port No.: 1...65536 (default 21)

21

User :

user

Password :

password

FTP Account :

account

Options :

Switch FTP server into Passiv Mode.
(possibly necessary in a firewall environment)

PASV

Enable :

FTP enable

Free memory: 49003 bytes

Temporary Storage 

Undo

Logout

2.11.2 Alarm X -> FTP

FTP Local Data Port: This is the local data port on the Web-Thermograph. Values between 1 and 65536 are valid. Entering „AUTO“ causes the device to select the port dynamically.

File Name: Enter here the path to the file which the device should access.

FTP Alarm Text: Here you define the content of the file. The following tags may be used::

<T1> displays the current temperature at this location.

<Z> displays the current time of day and date.

If you want a line break after each data transmission, enter a CRLF by prssing the RETURN key at the end of the line.

Alarm Clear Text: This message is sent after the alarm state is ended. The same tags as described above may be used.

Options:

STORE: Creates a file and writes the data to it. If this file already exists, it is overwritten.

APPEND: Appends the data to an existing file. If the file does not yet exist, it is created.

Config >> Device >> Alarm >> Alarm 1 >> FTP

FTP Local Data Port : Port No.: 1...65536 or AUTO = assign next free port number.

AUTO

File Name : /folder/temperature.txt

FTP Alarm Text : <Z>: <T1>°C

Alarm Clear Text : This messages will be send if alarm state is cleared.

Options :
 STORE
 APPEND
Free memory: 49003 bytes

Temporary Storage Undo Logout

2.12 Syslog messages incl. alarm



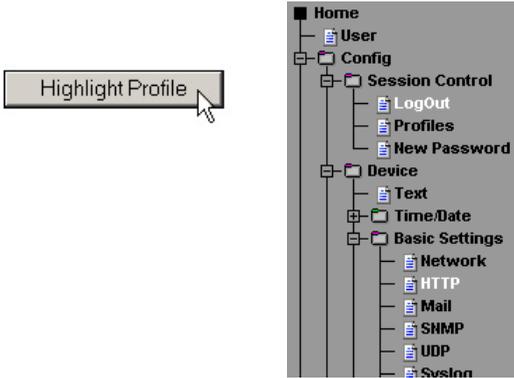
IP Addr: The IP address you want to send the message to.

Port: On this port the receiver must have a Syslog service installed which can pick up the incoming connections. (Standard: 514)

Syslog Text: The text corresponds to the same specifications as apply to the other message types.

Alarm Clear Text: see above

2.13 ASCII command strings via TCP Port 80



2.13.1 HTTP



When queried by means of an HTTP-Get command, the device can also send a header with IP address and device name in addition to the temperature. To do this, check the appropriate box. Only the temperature is sent if this function is deactivated.

Config >> Device >> Basic Settings >> HTTP

Startup :

index.htm	Show navigation tree as well as page 'home'.
home.htm	Show page 'home' without navigation tree.
user.htm	Show page 'user' without navigation tree.

index.htm
 home.htm
 user.htm

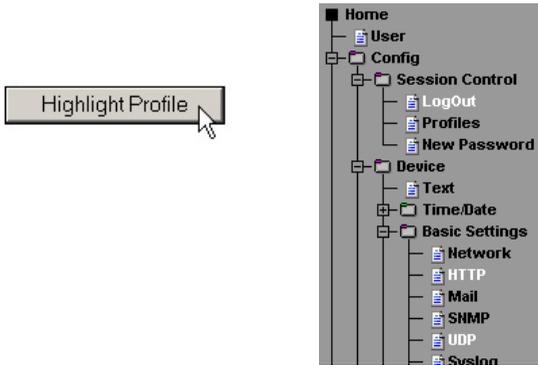
Enable : Device will send header with IP address and its name before each reply to any GET requests which do not come from a browser.
 GET Header enable

HTTP Port : Default, Port 80

Free memory: 48592 bytes



2.14 ASCII command strings via UDP



In addition to TCP/IP comands, the device can also reply to UDP datagrams. For this you must set the port you want the device to „listen“ to. The default setting is 42279. The enable function activates UDP.

Config >> Device >> Basic Settings >> UDP

Port : Port No.: 1...65535

Enable : UDP enable

Free memory: 48592 bytes



The setting of the header which can be appended to the temperature in messages applies here as well.

2.15 UP-/Download



In the download area you can download the XML configuration as well as the three user pages (home.htm, user.htm, log.htm) for further processing.

With **XML-Download** you can read out the settings of the Web-Thermo-Hygrograph and make any modifications, and **XML Upload** allows you to store the settings again in the device.



With some Web browsers the correct code is only output using the path „View-> Display (Frame-) Source text“ after the „XML Download“ button has been clicked.

For XML upload you create or modify a text file with the corresponding parameters and load this file into the device. The configuration of the 8x Thermometer must begin with the expression

```
<io-AN1.3>
```

and end with the expression

```
</io-AN1.3>.
```

The sequence of the parameters you set corresponds to the sequence of the configuration menu starting at „Device“.

The syntax for configuring via XML is as follows:

```
<Option>  
  <Parameter1> WERT </Parameter1>  
  <Parameter2> WERT </Parameter2>  
</Option>
```

The individual options and parameters correspond to the configuration items in the browser menu.



Please note, especially in the case of mass updates and configurations, that the IP address stored in the XML file is also sent, which only needs to be adapted.

In addition, you can exchange the user pages (user.htm, home.htm, log.htm) in the **Upload** area.

An example can be found in the Appendix (6.2).

Use the menu point „**Upload** -> **GIF**“ to replace the logo displayed in the menu and store it directly in the device.

3 Single querying of temperatures

3.1 Querying temperature via TCP/IP

It is possible to use a socket connection to manually query the current temperature values in CSV (comma-delineated data). This function is also used to query the individual data without the Web interface.

To do this, send the following string to Port 80:

```
GET /Thermo.csv
```

To query the individual, current temperature value, send the string:

```
GET /Single1
```

3.2 Temperature querying via UDP

Open a UDP connection to the device IP address or to the Net-ID as a broadcast and Port 42279 (default setting can be changed).

Then send the device one of the expressions given under 3.1 and the device will return the temperature to the port you are using.



When using multiple devices, it may be practical for broadcast transmissions to include the name and IP address of the device as well. To do this, activate „GET Header enable“ under „Config >> Device >> Basic Settings >> HTTP“.

3.3 Temperature querying using SNMP

The sensor can be queried directly using SNMP-Get requests. They reach the sensor via the following path:

<IP-address> 1.3.6.1.4.1.5040.1.2.8.1.3.1.1.1 = temperature as octet string

<IP-address> 1.3.6.1.4.1.5040.1.2.9.1.4.1.1.1 = temperature as 30digit integer value, without comma delineation.

<IP-address> 1.3.6.1.4.1.5040.1.2.9.1.3.1.1.2 = relative humidity as octet string

<IP-address> 1.3.6.1.4.1.5040.1.2.9.1.4.1.1.2 = relative humidity as a 3-digit integer value, without comma delineation.



For querying, specify the configured SNMP Read or Read/Write community.

An MIB for incorporation into management applications can be downloaded from the data sheet page for the device at the WuT homepage <http://www.wut.de>.

Wenn Sie via SNMP Einstellungen im Gerät ändern möchten (IP-Adresse, Subnet-Mask, u.s.w.), ist es notwendig, zuvor über Ihren SNMP-Manager eine Session auf dem Gerät zu starten.

 *If you have assigned an administrator password, you must enter it in your manager software as a „community string“!*

Entering the administrator password in the variable

```
wtWebioAN1graphSessCntrlPassword
```

opens a session. By reading out the variable

```
wtWebioAN1graphthermhygroSessCntrlConfigMode
```

W&T

you can check whether the session was successfully opened.

- 1 = Session opened, device in configuration mode.
- 0 = Opening of the session failed. Check whether you entered the password incorrectly.

After successfully opening the session, you can use the variables defined in the private MIB to make any configuration changes.

Once you have finished with configuration, write the variable

```
wtWebioAN1graphSessCntrlLogout
```

to close the session.

```
wtWebioAN1graphSessCntrlLogout =
```

- 1 All changes are saved
- 2 Quit without saving

If no SNMP communication takes place over a period of 5 minutes during an open session, the device unilaterally ends the session and all changes are cancelled.



Opening an SNMP session has priority over an HTTP login. This means: A user with Config or Administrator rights loses his browser access as soon as an SNMP session is opened.

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

4 Placing the temperature into your own web page

It is possible to use an implemented Java applet to integrate the temperature on your own Web page. The applet is refreshed every 60s. An example for this applet is already contained in the device:

`http://172.0.0.10/app.htm`

To incorporate the applet for temperature monitoring into the HTML page, the following HTML tag must be inserted at the location where the applet is incorporated:

```
<Applet Archive="A.jar" Code="A.class" Codebase="Http://WebTherm/"
Width="width" Height="height">
```

Now you can optionally specify the following parameters:

Background color:

```
<Param Name="BGColor" Value="#RGB-value">
```

Font color:

```
<Param Name="FGColor" Value="#RGB-value">
```



*The RGB value is specified as a 24-bit hex value.
e.g.: Value="#2F3C09" The value is not case sensitive.*

Specifying the text alignment:

```
<Param Name="Align" Value="const">
```

const must be one of the following constants:

- Left
- Center
- Right

This specification is not case sensitive.

If a parameter is omitted or incorrectly set, the following default values are used:

BGColor	#FFFFFF (white)
FGColor	#000000 (black)
Align	Right

The sensor is selected using the parameter

```
<Param Name="Sensor" VALUE="1">
```

When all the parameters are specified, the HTML tag must be finished with `</Applet>` .

Example:

```
<Applet Archive="A.jar" CODE="A.class"  
Codebase="http://127.0.0.1" Width="300" Height="100">  
<Param Name="BGColor" Value="#0000FF">  
<Param Name="FGColor" Value="#FF0000">  
<Param Name="Align" Value="Center">  
<Param Name="Sensor" Value="1">  
</Applet>
```

The font size is automatically determined by the size of the applet.

5 Data logger

The Web-Graph 1x Thermo-Hygrometer stores all the measured values in a non-volatile ring memory, so that they are retained even after loss of power or actuating the reset button.



The measured data in the data logger are recalled through the user page of the device (Home -> User or <http://xxx.xxx.xxx.xxx/user.htm>).

Under *Config -> Device -> Data Logger -> Memory* you can clear the memory.

An interruption of the timeline, caused for example by a reset or subsequent time server synchronization, is shown on the data logger page as a yellow line.

14.10.2003	Di	08:47	23,1
14.10.2003	Di	08:46	23,1
14.10.2003	Di	08:45	23,0
01.01.2002	Di	12:08	23,0
01.01.2002	Di	12:07	23,0
01.01.2002	Di	12:06	22,9
01.01.2002	Di	12:05	22,9

time line interruption:
yellow marked line



When alarm limit values are set, temperatures which are not within the valid range are highlighted in red.

6 Appendix

6.1 Alternate methods of IP address assignment

6.1.1 Using DHCP-/BOOTP protocol

Many network use DHCP (Dynamic Host Configuration Protocol) or BOOTP. for centralized and dynamic assignment of IP addresses. Which of the two protocols is used in a given situation makes no difference as far as the Web-Graph devices are concerned, since DHCP is simply an upward compatible expansion of BOOTP. DHCP servers therefore also use requests from BOOTP clients.

The following parameters can be assigned to the Web-Graph 1x Thermo-Hygrometer using these protocols:

- IP-Address
- Subnet-Mask
- Gateway-Address

It is not possible to assign other parameters or lease time.

Functionality

To obtain an IP address, the device sends a corresponding BOOTP request as a broadcast to the network after each new start. The reply then generated by the DHCP/BOOTP server contains not just the IP address, but also the subnet mask and gateway address. The Web-Graph 1x Thermo-Hygrometer immediately stores this information in its non-volatile memory.

Please consult with the responsible systems administrator when starting up the device in DHCP/BOOT networks. If you are using DHCP to assign addresses, you must also indicate that a reserved IP address is required. To update the respective address database, the systems administrator needs the Ethernet address of the Web-Graph Thermometer, which can be found on the nameplate attached to the housing.

Once the necessary entries have been made, the device automatically retrieves the desired IP address after every reset. To ensure availability of the Web-Graph 1x Thermo-Hygrometer even if the DHCP/BOOTP server fails, the previous IP address is used if no reply is forthcoming.



In DHCP environments the IP address you want to assign must be reserved by means of a fixed-connection to the Ethernet address of the Web-Graph 1x Thermo-Hygrometer. Under Windows NT this is done in the DHCP manager under the menu point „Reservations“. Linux makes available the file „dhcpd.conf“ available for this purpose, in which you must make a corresponding entry.

6.1.2 ...Using ARP command

The prerequisite is a PC which is located in the same network segment as the Web-Graph 1x Thermo-Hygrometer and on which TCP/IP protocol is installed. Read off the MAC address of the device from the nameplate (e.g. EN=00C03D0012FF). Under Windows you will first ping another network station and then use the command line described below to make a static entry in the computer's ARP table:

```
arp -s <IP-Adresse> <MAC-Adresse>
```

e.g. under Windows:

```
arp -s 172.0.0.10 00-C0-3D-00-12-FF
```

e.g. under SCO UNIX:

```
arp -s 172.0.0.10 00:C0:3D:00:12:FF
```

Now ping the device again (in our example, ping 172.0.0.10). The IP address is now stored in non-volatile memory.



This method can only be used if no IP address has as yet been assigned to the Web-Graph 1x Thermo-Hygrometer, in other words the entry is 0.0.0.0. To change an already existing IP address, you must open the configuration menu from your browser or use the serial method (see below).

6.1.3 ...Using a serial interface

In contrast to the procedure described above, you can use the serial port to change an already existing IP address for the Web-Graph 1x Thermo-Hygrometer.

Connect the RS232 port on the device to a PC (null modem cable, with the Web-Graph 1x Thermo-Hygrometer only pins 2, 3 and 5 are allowed to be connected) and start a terminal program (e.g., Hyperterminal). Establish a direct connection in the program through your COM port and set the serial properties to *9600 baud, no parity, 8 bits, 1 stop bit, no protocol*. Force a reset by interrupting power while holding down the „x“ key until the reply „*IPno.+<Enter>*“ appears. Enter the IP address using conventional notation (xxx.xxx.xxx.xxx) and finish the entry with *<Enter>*. You can also enter the subnet mask and gateway and turn the BOOTP client off directly by using the following syntax after the entry prompt (*IPno.+<Enter>*):

<IP-Adresse>, <subnetmask>, <gateway>-0



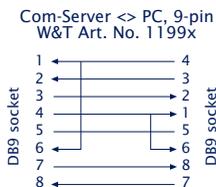
If you make a typing error when entering, the text cannot be corrected using the Backspace key. The procedure must be repeated.

If the entry was correct, this is acknowledged by the assigned parameters, otherwise the monitor displays the current IP address together with the message „Fail“. This procedure may be repeated as often as desired.

To turn off the BOOTP (DHCP) functionality directly, enter the expression „-0“ directly following the parameters (e.g. 192.168.1.2-0)

```
xxx                                     -> Web-Thermo-Hygrograph
IP no. +<ENTER>:                       <- Web-Graph Thermo-Hygroeter
172.17.231.99,255.255.255.0,172.17.231.1-0 -> Web-Thermo-Hygrograph
172.17.231.99,255.255.255.0,172.17.231.1-0 <- Web-Thermo-Hygrograph
```

To connect to a terminal, you will need a null modem cable:



For the Web-Graph 1x Thermo-Hygrometer only pins 2, 3 and 5 are allowed to be connected.

6.1.4 ...Using an RARP-Server (UNIX only)

Working with an RARP server activated under UNIX is based on entries in the configuration files */etc/ethers* and */etc/hosts*. First expand */etc/ethers* by one line with the assignment of the Ethernet address of the Web-Graph 1x Thermo-Hygrometer to the desired IP address. In */etc/hosts* the link with an alias is then specified. After you have connected the device in the network segment of the RARP server, you can assign the desired IP address to the device over the network.

Example:

Your Web-Graph 1x Thermo-Hygrometer has MAC address EN=00C03D0012FF (sticker on the housing). You want it to have IP-Address 172.0.0.10 and the alias WT_1 .

Entry in the file */etc/hosts*: 172.0.0.10 WT_1

Entry in the file */etc/ethers*: 00:C0:3D:00:12:FF WT_1

If the RARP daemon is not yet activated, you must start it using the command „*rarpd -a*“.

6.2 Example for creating your own Web pages

You can freely configure the standard display pages of the device (user.htm, home.htm, log.htm). Special control elements let you insert tags into the page. The following shows an example for creating the „user.htm“ page.

Create an HTML file which must begin with the expression

```
<user.htm> (or log.htm oder home.htm)
```

Then enter the HTML code.

You can display the following parameters on your pages:

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

Displays the current temperature (°C)

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

Displays the current relative humidity (%)

```
<w&t_tags=ah>
```

Displays the current relative humidity (g/m³)

```
<w&t_tags=rc>
```

Displays the „Rate of change“ over the last 5 minutes (°C)

```
<w&t_tags=time>
```

Inserts the current time of day.

```
<w&t_tags=steps>
```

Inserts a list box for selecting the times you want to display.

```
<w&t_tags=ok_button>
```

Inserts an „OK“ button which sends the selected parameters to the device.

W&T

`<w&t_tags=session>`

Inserts a hidden session control so that the use is not logged out of the device when leaving the page. The expression is only needed if you want to design your own button for sending. In that case insert this expression between `<form action>` and `</form>`.

Background color:

Background colors which vary according to the sensor state can be used for values shown in tables:

`<w&t_tag=bct>`

Describes a background color (BGColor) which varies with the alarm status of the sensor. If there is a limit violation, this color is red. Otherwise the tag does not describe an explicit color. This tag is needed for example to show limit violations in red in the log table. (°C)

`<w&t_tag=bch>`

Background color for the relative humidity value.

`<w&t_tag=bcah>`

Background color for the absolute humidity value.

`<w&t_tag=berc>`

Background color for the current „Rate of change“.

W&T

```
<w&t_tags=sensorx>
```

Inserts the name of sensor x (1: Temperature, 2: Humidity) into the page and contains a link for the complete sensor description.

```
<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=reload_button>
```

Inserts a „Reload“ button which reloads the current page.

```
<w&t_tags=previous_button>
```

```
<w&t_tags=next_button>
```

Inserts a button for moving forward or backward in the measurement table.



The „Previous“ button and the „Next“ button only have a function in the „log.htm“ file.

```
<w&t_tags=logtable>
```

Inserts a table with the current measured values. This table can be navigated only on the „log-page“ using the „Next“ and „Previous“ buttons (see above). Only the current temperature values can be displayed on the two other pages (user.htm and home.htm).

Example for setting a background color in a table:

```
<tr>
```

W&T

```
<td colspan="3" align="center">
<table border="2">
  <tr>
    <th><w&t_tags=sensor1></th>
  </tr>
  <tr>
    <td <w&t_tags=bct><w&t_tags=t1> &deg;C</td>
  </tr>
</table></td>
</tr>
```

If there is a limit violation, the temperature is shown on a red background.

To specify the output format of the data, insert the following line in your document:

```
<form action="log.htm" method="POST" >
....
</form>
```

You can specify CSV output by using the expression

```
<form action="thermo.csv" method="POST" >
....
</form>
```



Resetting the device to its factory default values restores the original HTML pages.

Sample user.htm:

```
<user.htm>
<html>
<head>
<title>Untitled Document</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

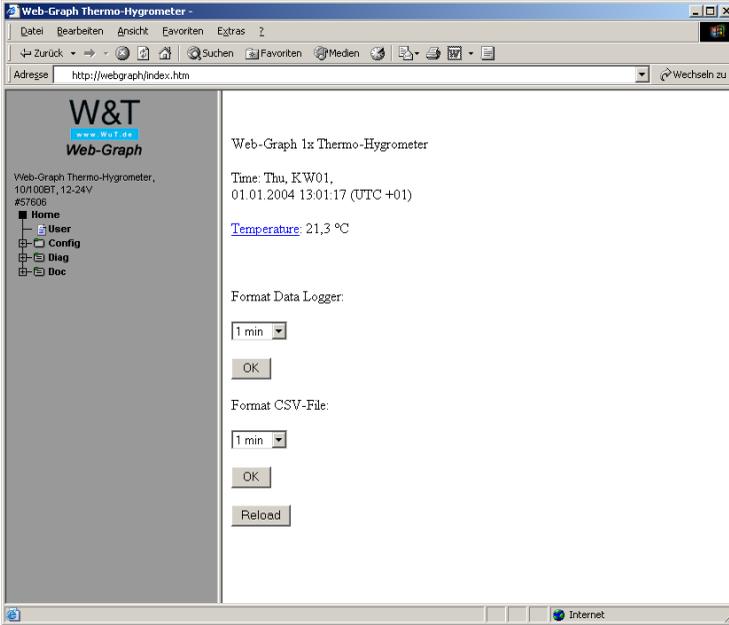
<body bgcolor="#FFFFFF" text="#000000">
<p>Web-Graph 1x Thermo-Hygrometer</p>
<p>Zeit: <w&t_tags=time></p>
<p><w&t_tags=sensor1>: <w&t_tags=t1> °C</p>
<p>&nbsp;</p>

<form action="log.htm" method="POST">
  <p>Ausgabeformat Data Logger:</p>
  <p><w&t_tags=steps></p>
  <p><w&t_tags=ok_button></p>
</form>

<form action="thermo.csv" method="POST">
  <p>Ausgabeformat CSV-Ausgabe:</p>
  <p><w&t_tags=steps></p>
  <p><w&t_tags=ok_button></p>
</form>

<form action="user.htm" method="GET">
  <p><w&t_tags=reload_button></p>
</form>
</body>
</html>
```

The Web-Graph 1x Thermo-Hygrometer displays this page in the Web browser as follows:



Sample log.htm:

```
<log.htm>
<html>
<head>
<title>Untitled Document</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

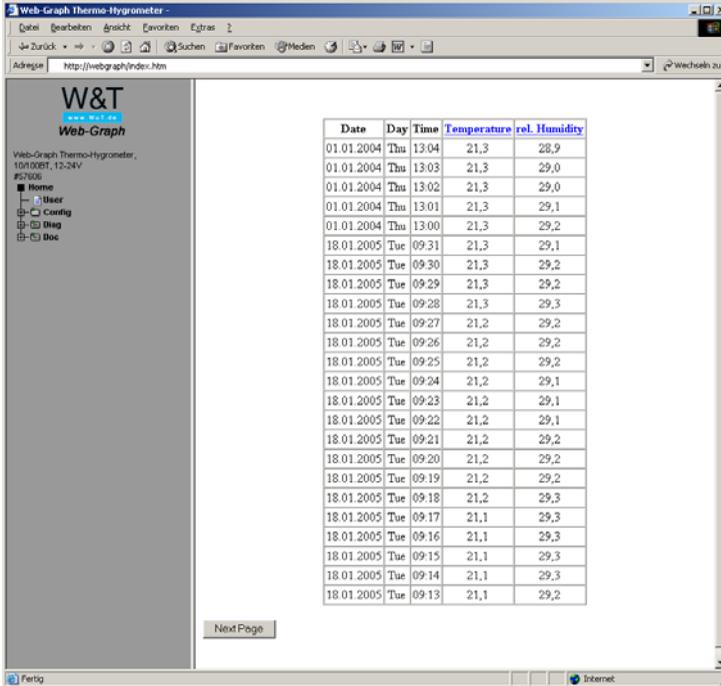
<body bgcolor="#FFFFFF" text="#000000">

<form action="log.htm" method="POST">
  <w&t_tags=previous_button>
</form>

<w&t_tags=logtable>

<form action="log.htm" method="POST">
  <w&t_tags=next_button>
</form>
</body>
</html>
```

The Web-Graph 1x Thermo-Hygrometer displays this page in the Web browser as follows:



6.4 Firmware Update

The Web-Graph 1x Thermo-Hygrometer firmware is under continuous development. The following section describes the procedure for uploading new firmware as it becomes available.

- Where to I obtain the current firmware?
- Firmware update over the network using Windows

6.4.1 Where do I obtain the current firmware?

The most up-to-date firmware including the necessary update tools and a revision history are published on our Web pages under the following address: <http://www.wut.de>

Before downloading, write down the 50digit type number for the Web-Graph 1x Thermo-Hygrometer found on the part label. From the homepage you go to the product overview, which is sorted by article number and from which you can get directly to the data sheet for your unit. From there follow the link to the current firmware version.

6.4.2 Firmware-Update over the network using Windows

The prerequisite is a PC running under Windows 9x/NT/2000/XP with a network connection and activated TCP/IP stack. For the update process you will need two files which, as already described, can be downloaded from the homepage <http://www.wut.de>.

- The executable update tool for sending the firmware to the Web-Graph 1x Thermo-Hygrometer
- The file with the new firmware which you want to send to the Web-Graph 1x Thermo-Hygrometer

No special preparation of the Web-Graph 1x Thermo-Hygrometer is necessary to perform the firmware update.

The *WuTility* used for the update detects all the WuT devices in your network and is essentially self-explanatory. If you do have any questions or if anything is unclear, please use the associated documentation or our online help.



Never intentionally interrupt the update process by disconnecting the supply voltage or pressing the Reset button. After an incomplete update the Web-Graph Thermo-Hygrometer will be incapable of functioning.

Never mix files having different version numbers in the file name. This will result in malfunction of the device.

The Web-Graph 1x Thermo-Hygrometer automatically recognizes when transmission of the new firmware is complete and automatically performs a reset.

6.4.3 LED indicators

- **Power-LED:** Indicates presence of supply voltage. If the LED does not come on, please check that the power supply is properly connected.
- **Status-LED:** Flashes whenever there is network activity of the Web-Thermo-Hygrometer. Periodic flashing indicates that the unit is ready.
- **Error-LED:** The Error LED uses various flash codes to indicate error conditions on the device or network port.

1x flashing of the Error-LED = Check network connection. The Web-Thermo-Hygrograph is not receiving a link pulse from a hub or switch. Check the cable or the hub/switch port.

2x bzw. 3x flashing of the Error-LED = Perform a reset by interrupting power. If the error cannot be cleared, reset the device to its factory defaults. Since this resets all network settings, you should first write down the existing network settings.

Config -> Session Control -> LogOut -> Restore Defaults

After a reset the device is restored to its factory defaults. Reconfigure your network settings.

Power-LED +Status-LED +Error-LED an = Self-test error

The self-test which is performed after every start or reset of the Web-Thermo-Hygrograph could not be correctly finished, for example due to an incomplete update of the firmware. When in this state the device is no longer operational. Please return the unit for service.

Auxiliary LEDs (internal)

- **on error <http://xxx.xxx.xxx.xxx/diag> -LED:** Indicates internal configuration errors. For troubleshooting, please open the page <http://xxx.xxx.xxx.xxx/diag> in the device.
- **system error:** Serious hardware error. Attempt to start the device up again by interrupting supply voltage. If the condition persists, please return the unit for inspection.



If the Web-Thermo-Hygrograph has no IP address or Address 0.0.0.0, the on error and system error LEDs remain on! The system error LED flashes 3x after a brief time. The LEDs do not turn off until an IP address has been assigned.



6.5 Emergency access

The serial connection (DTE) of the device provides emergency access. This is activated as follows:

Use a serial cable (null modem cable: pins 2, 3 5 only) to connect the unit to a PC and start a serial terminal program. Make the program settings as follows:

9600,8,N,1,no handshake

Disconnect the supply voltage. Press the following letters on your keyboard 3 times for the respective access:

3x „u“ Opens the update port. You can now load a firmware update.

3x „f“ Resets the device to the factory defaults. All previous configuration settings (including IP address) are lost.

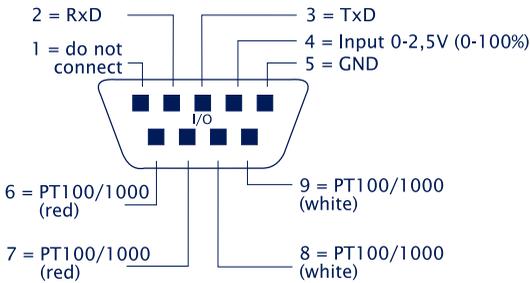
3x „p“ Deletes all assigned passwords.

For confirmation the **system error** and the **on error http** LEDs flash several times one after the other.

3x „x“ (Directly after pressing the Reset button, before the audible tone). Used for assigning/changing the IP address. When prompted, enter the desired IP address.

6.6 Technical Data

Prod. No.:	#57606
Temperature sensors:	PT1000 / PT100 connection
Humidity sensor:	W&T sensor, scalar 0 - 2,5V
Network:	10/100BaseT autosensing
Power Supply:	12-24V AC / DC via terminal screw
Measurement unit:	
Sensor:	PT1000, PT100 connection, 2-,3- or 4-wire
Measuring range:	W&T sensor: -40°C - 85°C, 0..100% rH
Measuring error:	PT1000/PT100-measuring input: -200°C - 650°C ±0,3°C, ±2% (PT1000, PT100) ± 2,5% abs. ± 5% rH, ± 2% in preparation
Saving frequency:	1, 5, 15, 60 min
Memory (832kB):	min. 10 weeks, max. 12 years
Additional infos:	
Galvanic isolation:	Inputs vs. Network: min. 500 Volt
Mail function:	Mail for sending alarm or reports
Power supply:	DC 12V (-5%) - 34V (+5%) AC 9Veff (-5%) - 24Veff (+5%)
Current consumption:	AVG: 200mA @ 12VDC, 100mA @ 24VDC, 100mA @ 20VAC Max: 240mA @ 12VDC
Emergency entry:	Serial port RS232, 9600 baud, 8 databit, 1 stopbit, no parity
Housing:	Plastic housing, 105 x 75 x 22 (l x b x h)
Weight:	approx. 200g
Storage temperature:	-40..+70°C
Operating ambient temperature:	non-cascaded: 0 .. +60°C cascaded: 0 .. 50°C



6.7 Declaration of Conformity



Declaration of conformity according to paragraph 10.1 of directive 89/336/EWG

Wiesemann & Theis GmbH hereby confirms that the products

Web-IO 1x Thermometer	Typ 57601
Web-IO 2x Thermometer	Typ 57603
Web-IO 8x Thermometer	Typ 57604
Web-Thermograph	Typ 57605
Web-Thermo-Hygrograph	Typ 57606

fulfill the requirements of the directives / regulations specified below:

1. Emission according to
 - 1.1. EN 55022-B (1997)
 - 1.2. EN 61000-3-2 (1996)
 - 1.3. EN 61000-3-3 (1996)
2. Noise Immunity according to EN 61000-6-2 (1999):
 - 2.1. EN 61000-4-2 ESD
 - 2.2. EN 61000-4-3 Radiated Immunity
 - 2.3. EN 61000-4-4 Burst
 - 2.4. EN 61000-4-5 Surge
 - 2.5. EN 61000-4-6 Conducted Immunity
 - 2.6. EN 61000-4-8 H-Field
 - 2.7. EN 61000-4-11 Supply Voltage Dips and Interruptions
3. Product-specific Low-Voltage Directive for communications technology
 - 3.1. EN 60950 (1997)

Wuppertal, 02/10/2005



Klaus Meyer



Dipl.-Ing. Rüdiger Theis, Managing Director

Interfaces
für
Netzwerke.



serielle
Schritt-
stellen



und
Drucker-
schritt-
stellen

