Manual

Web-Thermograph
Web-Thermograph 2x
Web-Thermograph 8x

DE 1.09 08/2006 ML

W&T

Type	10/100BaseT, 12-24V
Model	57605, 57607, 57608
Release	1.09, Aug 2006

W&T

Introduction

The W&T Web-Thermograph includes all the function in one box for acquring, storing and displaying your temperature data. In addition, numerous alarm functions are provided which can be incorporated into your own applications or into existing systems.

In this manual you will find all the information you need to install, configure and operate the Web-Thermograph.
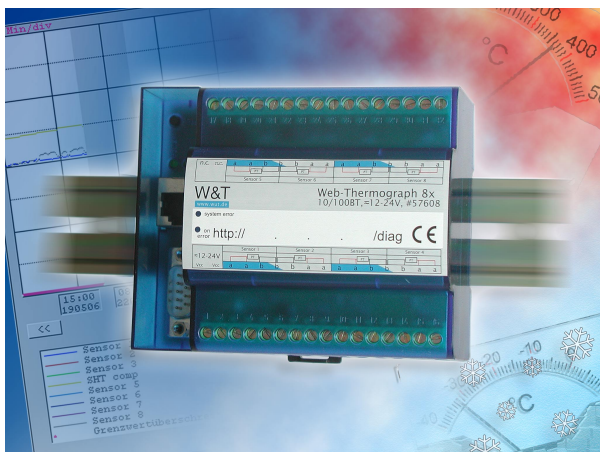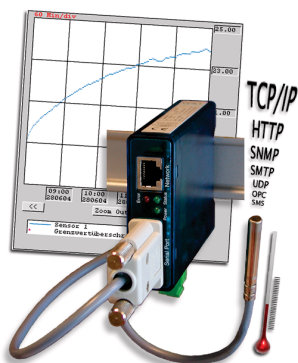
W&T

Contents

W&T

1 Quick start / start-up

Only a few steps are required to place the W&T Web-Thermograph into operation and make it appear in your network.

1.1.1 Connecting the power supply 57605

Bottom 57605

supply
voltage
12-24V =/~
screw terminal
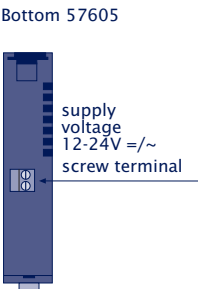
1.1.2 Connecting the power supply 57607/57608

Serial Port

≈12-24V
Vcc   Vcc   a   a
Sens

1 2 3 4
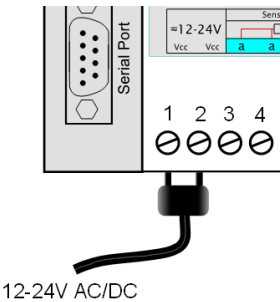
12-24V AC/DC

Connect the supply voltage of 12-24V AC/DC to the terminal provided using the AC adapter provided. Polarity does not need to be observed.

1.2.1 Connecting the NTC/PT100 temperature sensor 57605
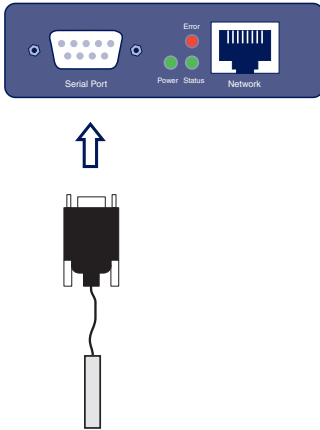
Plug the sensor provided into the 9-pin IO port on the unit.

1.2.2 Connecting the PT100/PT1000 sensors 57607/ 57608
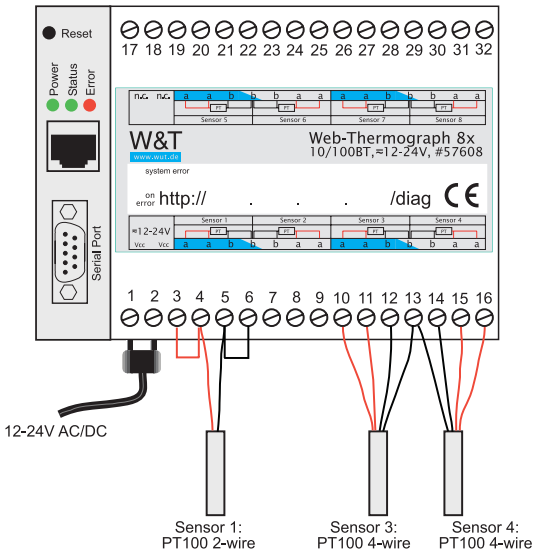
Die Zuleitung des PT100 4-wire sensor kann mit nahezu beliebiger Länge ausgelegt werden.

Connecting a PT100 3-wire sensor:

```
        3  4  5  6
        ⊖⊖⊖⊖
```
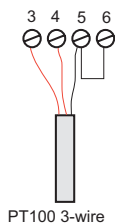
PT100 3-wire

When connecting a PT100 3-wire sensor the wire colors are matched with the color of the respective terminals. A jumper for the still unused terminal is needed for the individual wires.

Connecting a 2-wire sensor:

```
        3  4  5  6
        ⊖⊖⊖⊖
```
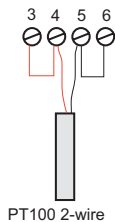
PT100 2-wire

When connecting a PT100 2-wire sensor one wire is connected to the red terminal and the other to the black terminal. Jumpers to the unused terminals must be put in place.

1.3 Assigning the IP address using „WuTility"

After the hardware has been connected to the power supply as described above, the IP address needed for operating in a TCP/IP network must be assigned. Ask your system administrator for the correct value of this parameter.

! *The IP address must be unique in the network.*

There are several ways of assigning the IP address. To make assignment as convenient as possible we have developed the tool „WuTIlity", which you can download from the WuT Homepage at *http://www.wut.de*. This procedure is described in the following. A summary of the alternate methods is found in the Annex to this manual under section 6.1.

Be sure that the PC you want to use for assigning the IP address is in the same subnet as the W&T device and that both the PC as well as the device are connected to the network.

- Start „WuTility" and click on the Scan symbol:

- Select your Web-Thermograph from the list shown based on the MAC address:

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 the label affixed to the W&T device:

```
5xxxx          [Typ]
EN=00c03d004a05         Ethernet-address
OK xxxxxx
```

- Click on the symbol „Assign IP Address":

- In the window that appears enter the desired IP address and confirm by clicking on „OK":
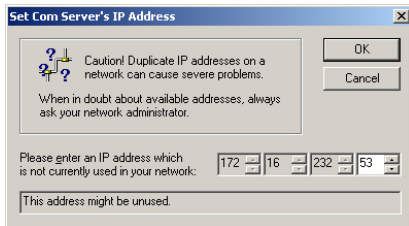
The device now has the assigned IP address. After clicking again on the Scan button it is displayed in WuTility.

Click on the globe in the WuTIlity menu bar to open your standard browser, and you will see the start page of the device.
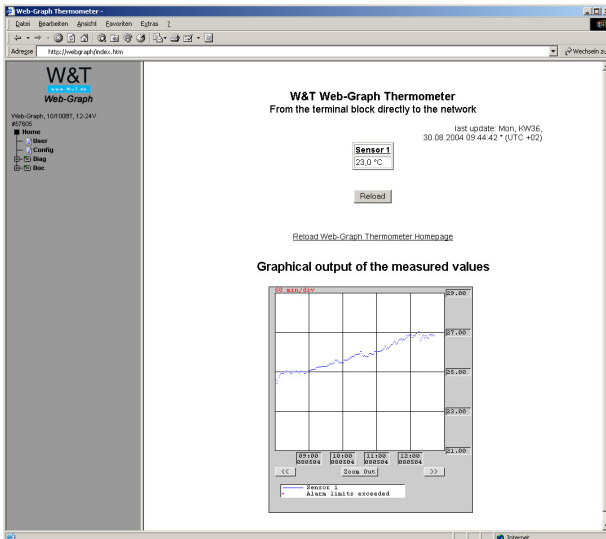
1.4 Assigning the basic network parameters

At left in the configuration tree select the menu item **„Config"**.
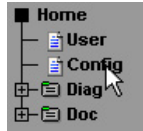
You are now prompted to enter a password. As shipped the unit requires no password, so that you can simply click on the Login button without entering any password.

On the next page select the configuration path with the help of the profiles.

Select the profile „Basic network parameters" and click on the „Show profile" button".

W&T

○ No profile (expert mode)

Basic configuartion:
◉ 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 exsisting 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 programms:
○ ASCII command strings via TCP port 80
○ ASCII command strings via UDP

[Highlight Profile]

Now the device automatically displays the necessary menu items for this profile. Therefore click on **„Network"** in the configuration menu.
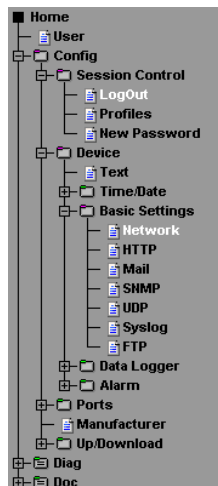
On the following page enter all the necessary network parameters and then click on the „Logout" button.

Finally clicking on the „Save" button stores the settings in the unit and quits your configuration session. After changing the network parameters the device automatically performs a restart.

The device is now ready for use in your network. For convenience, use the other profiles for adapting the unit to your specific needs and requirements.

W&T

2.1 Configuring the port and device names
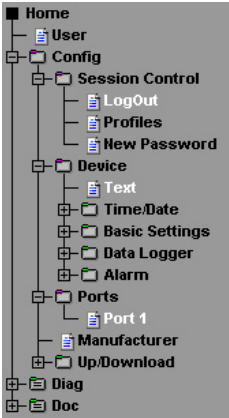
2.1.1 Text

Enter your personal data in the fields provided and then click on „Save".

2.1.2 Ports

Here you enter a name for the sensor and a descriptive text. Then click on „Logout" and save your configuration.

2.2 Local time setting
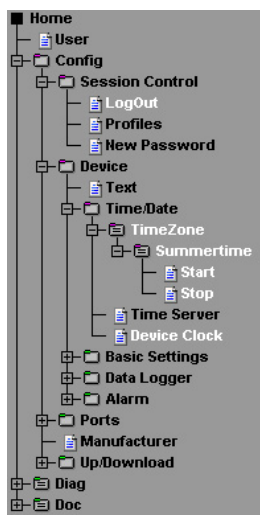
2.2.1 Time zone

Here you define the time zone in which the device is located. Your settings are referenced to UTC (Universal Time Coordinated). Then click on „Save".
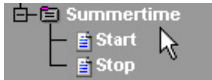
2.2.2 Summertime

If you would like your device to automatically compensate for summer time, first enter the offset to UTC. The standard value (including for Germany) is two hours. Activate this optoin by checking „Apply Summertime" and save your settings.

Start/Stop

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

Start:

Last Sunday in **March** at **2:00 a.m.**

Stop:

Last Sunday in **October** at **03:00 a.m.**

2.2.3 Device Clock

If you do not want to use a timeserver, here you can set the clock manually. Then click on „Logout" and save your settings.

W&T

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

Time :   10 : 30

Day :   30

Month :   08

Year :   2004

Free memory: 49421 bytes

[Temporary Storage]   [Undo]   [Logout]

i Models 57607 and 57608 (Web-Thermograph 2x and 8x) have an internal, battery-buffered clock, so that the time is retained even when the unit is turned off.

2.3 Automatic time setting using a network time service

[Highlight Profile]

■ Home
— User
Config
  Session Control
    LogOut
    Profiles
    New Password
  Device
    Text
    Time/Date
      TimeZone
        Summertime
          Start
          Stop
      Time Server
      Device Clock
    Basic Settings
    Data Logger
    Alarm
  Ports
  Manufacturer
  Up/Download
Diag
Doc

18
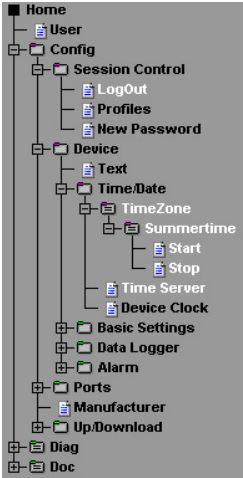
2.3.1 Time Server

If you want to compensate the time using a time server, enter here the necessary information.

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

> ❗ *If you want to enter a name as an 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 Configuring the data logger
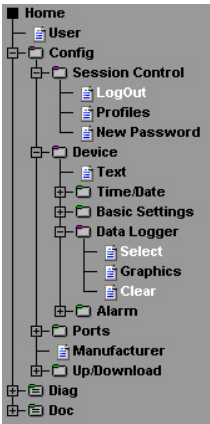
2.4.1 Select

Make the following settings:

Timebase: Defines at what time interval the measurements are stored in the data logger. The device itself measures one a minute.

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

Config >> Device >> Data Logger >> Select

Timebase : | 1 min ▼ |

Select Sensor :   ☑ Sensor 1

Graphics selection : ☑ Sensor 1

Color Sensor 1 : | 0000FF | 🔵

Memory size :   22 days, 18 hrs., 0 min.

                      Free memory: 49421 bytes

| Temporary Storage | | Undo | | Logout |

2.4.2 Clear
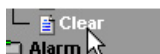
└ 📄 **Clear**
🗋 **Alarm**

Clicking on the „Clear memory" button clears the entire contents of the data logger.

Config >> Device >> Data Logger >> Clear

Erase all flash data.
| Erase Memory |

2.5 Configuring the graphics display
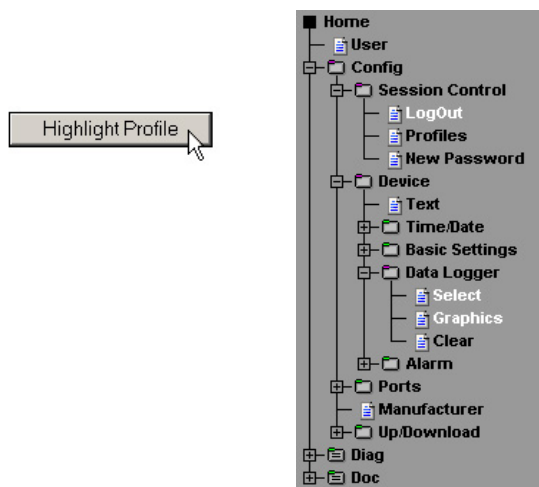
2.5.1 Select

Config >> Device >> Data Logger >> Select

Timebase : 1 min ▼

Select Sensor : ☑ Sensor 1

Graphics selection : ☑ Sensor 1

Color Sensor 1 : 0000FF 🔾

Memory size : 22 days, 18 hrs., 0 min.

Free memory: 49421 bytes

Temporary Storage   Undo   Logout

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

Color Sensor X:

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

2.5.2 Graphics

Here you set the desired scaling for the displayed temperature curves:

Vertical Auto Scale: Activating this function sets the vertical scale based on the minimum and maximum measured value. All other settings listed below are then without meaning.

Vertical Upper Limit: Determines the maximum displayed temperature

Vertical Lower Limit: Determines the miminum displayed temperature

Horizontal Zoom: Sets the scaling for the time axis

2.6 Calibration
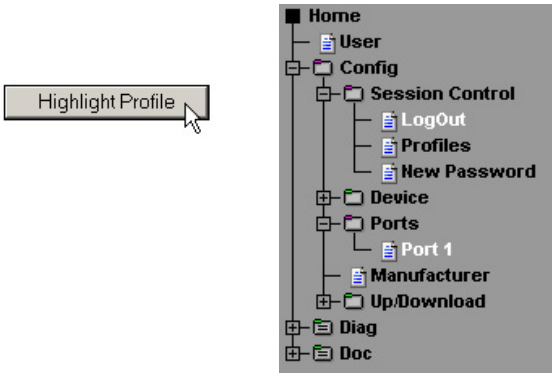
The sensor can be calibrated using single-point or two-point reference measurements and by making corresponding entries of offset values.

In single-point calibration the entered value is added to the measured temperature value, whereas in two-point compensation a straight line is calculated for compensating the entire measuring range. To note calibration procedures performed, the user can store a comment.

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 measure 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: 49421 bytes

> Temporary Storage   Undo   Logout

2.7 Access from a browser

2.7.1 HTTP

Startup: Here you specify which HTML page will be shown when the device starts up.

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, it may have to be explicitly specified when opening the page:

`http://webgraph:<PortNr>`

2.8 Sending alarma via e-mail

2.8.1 Basic Settings -> Mail

Here you make the basic settings for sending e-mail.

W&T

Config >> Device >> Basic Settings >> Mail

Name : Web-Thermo-Hygrograph

ReplyAddr : administrator@intranet.de

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

192.168.0.5

Authentication :
- ○ SMTP authentication off
- ○ ESMTP
- ◉ SMTP after POP3

User : administrator

Password : ⁎⁎⁎⁎⁎⁎⁎⁎

Retype Password : ⁎⁎⁎⁎⁎⁎⁎⁎

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

pop3.internet.de

Enable : ☑ Mail enable

Free memory: 48205 bytes

[Temporary Storage]   [Undo]   [Logout]

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 the e-mail recipient to see.

ReplyAddr: The reply address identifying the device.

MailServer: In the next step you set the IP address of your mail server and its host name (for a Configured DNS server) 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
```

Authentication: If the mail server requires authentication, set the corresponding procedure for user identification:

SMTP authentication off: No authentication

ESMTP: A user name and a password are required for logging in on the mail server.

SMTP after POP3: For an SMTP access it is necessary first to access through POP3, so that the user can be identified. For this setting enter also an associated POP3 server.

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

2.8.2 Alarm X

Here you configure the desired alarm conditions.

W&T

Trigger :
☑ Sensor 1
☐ Timer
☐ Cold Start
☐ Warm Start
☐ Sensor lost

Min : Grenzwert in °C (Form: xx.xx).
`15`

Max : Grenzwert in °C (Form: xx.xx).
`18`

Hysteresis : Hysterese in °C (Form: xx.xx).
` `

Delay Time : Der Alarm wird erst ausgelöst, wenn für die Dauer dieser Zeit die Alarmbedingungen erfüllt sind (Zeit in Minuten).
`1`

Interval : Sendeintervall in Minuten, 0 = Aus, E = Einmalig
`E`

Timer : Uhrzeitgesteuerte Ausgabe des Alarms

Feld	Eingabe [Zahl * , -]	möglicher Zahlenbereich
Minute	0,15,30,45	0-59
Stunde	8-17	0-23 (0 ist Mitternacht)
Monatstag	*	1-31
Monat	*	1-12
Wochentag	*	0-6 (0 ist Sonntag)

Enable :
☑ Mail enable
☐ SNMP Trap enable
☐ TCP Client enable
☐ Syslog Messages enable
☐ FTP Client enable

Freier Speicher: 46901 Bytes

[Zwischenspeichern]   [Rücksetzen]   [Logout]

30

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

For sending a message without an alarm state, check only the „Timer" box.

Min./Max.: Specifies the lower and upper limits. The range within these limits is considered „valid".

Hysteresis: You can also specify a hysteresis value which is used to reset the alarm state.

Example:

min. 10℃ / max. 18℃ / Hysteresis 2℃

After a limit is exceeded, the alarm state is reset when a value of 16℃ (18-2) is reached, and after the value falls below a limit the alarm state is reset at 12℃ (10+2).

This function also prevents „chattering" around the limit value.

Delay Time: Triggering of the alarm is delayed by this time (in Min.) to compensate for brief limit violations.

Interval: Enter here the send interval (in minutes) at which a message should be sent when there is an active alarm. To send only a single message, enter „E".

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

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

- : indicates a range of from...to. For example, „2-4" stands for Tuesday through Thursday, whereas an entry of „*" triggers the timer on all weekdays.

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

, : indicates an absolute value, e.g.: Minute 0, 15, 30 triggers the timer on the hour, on the quarter-hour and on the half-hour.

The „Timer" check box must be checked for this function.

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

2.8.3 Alarm X -> Mail

This menu item is used to specify the actual content of the e-mail.

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

E-Mail-Addr : support@wut.de

Subject : Temperature too high!

Mailtext : Actual temperture: <T1> °C <T2> °C

Options : ☑ Attach Thermo.csv enable
☑ CSV-Data since last report

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

Alarm Clear Text : Actual temperture: <T1> °C <T2> °C

Free memory: 45584 bytes

Temporary Storage   Undo   Logout

E-Mail-Addr: Here you enter the e-mail address of the recipient. To send the e-mail to multiple recipients, separate the addresses with a semicolon.

Subject: Enter the subject for the e-mail.

Mailtext: Here you enter the actual mail text. Only the following tags are accepted in this text box:

<T**x**> displays the current temperature at this location, where '**x**' is the number of the desired sensor. <Z> displays the current time and date.

Attach thermo.csv enable: With the option „Attach thermo.csv enable" you can attach the complete contents of the data logger in Semicolon Separated CSV format as a mail attachment. The time base for the output corresponds to the data logger pre-settings.

! *The file is generated in the device dynamically, so that in case the logger contents is large it may take up to 30 seconds to assemble the CSV file. During this time no*

other mails can be sent. Pending alarms are executed immediately after the mail with attachment has been sent.

CSV-Data since last report: This option causes that only the data is written into the CSV file, which is measured since the last transmission interval.

> **!** *This function only works properly if only the timer function is selected and no limit values are configured.*

Alarm Clear Text: In addition an Alarm Clear message is sent when the temperature resumes valid range. Here you can use the same tags as for the alarm message.

2.9 SNMP incl. sending alarms via trap
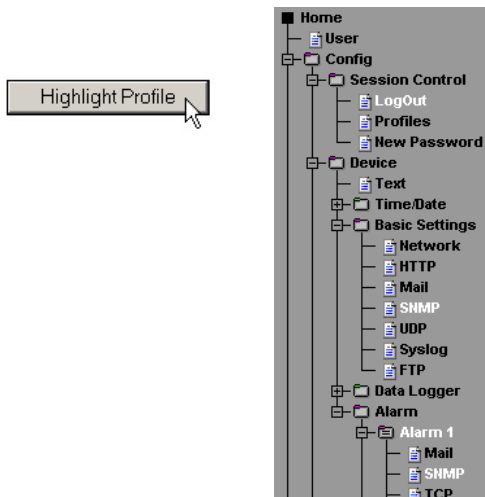
Send alarm messages as an SNMP trap.

W&T

2.9.1 Basic Settings -> SNMP

Here you define the basic settings needed for SNMP mode.

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

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

Manager IP: Contains the IP address of your SNMP manager. The W&T unit sends the SNMP messages to this address.

System Traps: Two system traps can be generated.

Cold Start: When power is disconnected or fails

Warm Start: For device reset

SNMP Enable: Check this box to enable SNMP functionality.

W&T

2.9.2 Alarm X -> SNMP

The actual contents of the SNMP trap is specified under this menu item.

Manager IP: Contains the IP address of your SNMP manager. The W&T unit sends the SNMP messages to this address.

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

<T1> displays here the current temperature. <Z> displays the current time and date.

Alarm Clear Text: In addition an Alarm Clear message is sent when the temperature resumes valid range. Here you can use the same tags as for the alarm message.

2.10 Sending alarms via TCP (Client Mode)

Send alarm messages as a TCP packet.

2.10.1 Alarm X -> TCP

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

Port: There must be a TCP server service at the recipient on this port which can accept incoming connections.

TCP Text: The text corresponds to the same specifications as are used for the other message types.

Alarm Clear Text: see above

W&T

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

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

192.168.4.56

Port :   8000

TCP Text :   Temperature too high! <T1>°C

Alarm Clear Text :

This messages will be send if alarm state is cleared.

Temperature OK! <T1>°C

Free memory: 49421 bytes

[Temporary Storage]   [Undo]   [Logout]

2.11 Sending alarms via FTP (Client Mode)

[Highlight Profile]

```
■ Home
├ 📄 User
├ 🗁 Config
│  ├ 🗁 Session Control
│  │  ├ 📄 LogOut
│  │  ├ 📄 Profiles
│  │  └ 📄 New Password
│  ├ 🗁 Device
│  │  ├ 📄 Text
│  │  ├ 🗁 Time/Date
│  │  ├ 🗁 Basic Settings
│  │  │  ├ 📄 Network
│  │  │  ├ 📄 HTTP
│  │  │  ├ 📄 Mail
│  │  │  ├ 📄 SNMP
│  │  │  ├ 📄 UDP
│  │  │  ├ 📄 Syslog
│  │  │  └ 📄 FTP
│  │  ├ 🗁 Data Logger
│  │  └ 🗁 Alarm
│  │     └ 🗁 Alarm 1
│  │        ├ 📄 Mail
│  │        ├ 📄 SNMP
│  │        ├ 📄 TCP
│  │        ├ 📄 Syslog
│  │        └ 📄 FTP
```
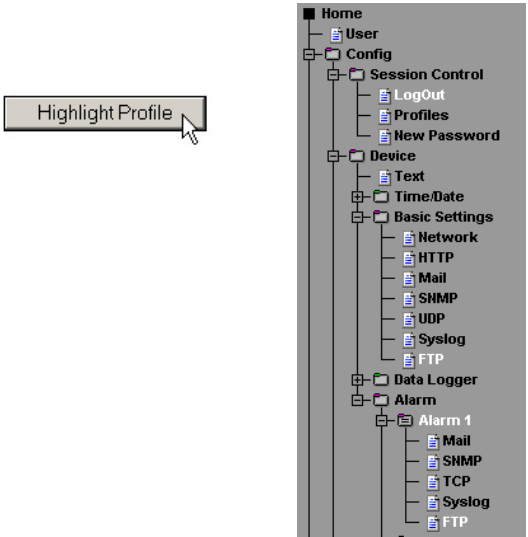
Write the temperature values directly to an FTP server.

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 your FTP server to which you want to send the data.

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 with no problem on most systems. If you require a different port, please notify your system administrator.

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

Password: This is the password assigned to the user.

FTP Account: Some FTP servers require a special account entry for login. If this is true of 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 that 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 with a firewall, you should enable the PASV option, since otherwise connection attempts may be blocked.

Enable: Check this box to enable FTP functionality.

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 port on the Web-Ther-mograph. Values between 1 and 65536 are valid. Entering „AUTO" causes the device to dynamically select the port.

File Name: Enter here the path to the file you want this device to access.

FTP Alarm Text: Define the cointent of the file. The folowing tags can be used:

$<T1>$ displays here the current temperature. $<Z>$ displays the current time and date.

If you want a line feed after each data transmission, insert a CRLF by pressing the RETURN key at the end of the line.

Alarm Clear Text: After ending the alarm state this message is sent. The above listed tags can be used here as well.

Options:

STORE: Stores 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.

2.12 Sending alarms via Syslog

IP Addr: The IP address where the message should be sent.

Port: The recipient must have a syslog server on this port which can accept incoming connections. (Standard: 514)

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

Alarm Clear Text: see above

2.13 ASCII command strings via TCP Port 80
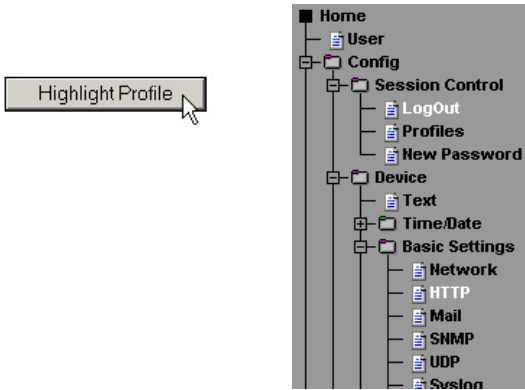
2.13.1 HTTP

When polled by an HTTP Get command, the device can also send a header with IP address and name of the device along with the temperature. To do this, check the corresponding box. If this function is disabled, only the temperature is sent.

Config >> Device >> Basic Settings >> HTTP

Startup :

Startup page	
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 requets which do not come from a browser.
    ☑ GET Header enable

HTTP Port : Default. Port 80
    [80]

    Free memory: 49421 bytes

    [Temporary Storage]   [Undo]   [Logout]

2.14 ASCII command strings via UDP

[Highlight Profile]

■ Home
— 📄 User
�⊟📁 Config
  ⊟📁 Session Control
    — 📄 LogOut
    — 📄 Profiles
    — 📄 New Password
  ⊟📁 Device
    — 📄 Text
   ⊞📁 Time/Date
   ⊟📁 Basic Settings
    — 📄 Network
    — 📄 HTTP
    — 📄 Mail
    — 📄 SNMP
    — 📄 UDP
    — 📄 Syslog
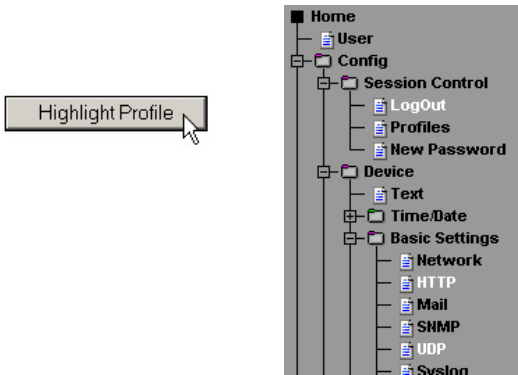
In addition to TCP/IP commands, the device can also reply to UDP datagrams. This requires setting the port the device should „listen" to. The default setting is 42279. The Enable function turns on UDP.

Config >> Device >> Basic Settings >> UDP

Port : Port No.: 1...65535

42279

Enable : ☑ UDP enable

Free memory: 49421 bytes

[Temporary Storage] [Undo] [Logout]

This also applies to the setting for the header, which can be attached to the temperature in messages.

2.15 UP-/Download

▣─ 🗀 Up/Download
  └─ 📄 Download
  └─ 📄 Upload
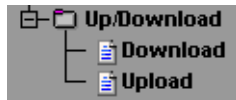
The Download area is where you can download the XML configuration as well as the three user pages (home.htm, user.htm, log.htm) for further editing.

In the case of **XML**-Download you can read the settings for the Web-Graph Thermometer, make any changes, and save them again in the unit using **XML Upload**.

i *With some Web browsers the correct code is output only using „View-> (Frame-) Show source text"- after the „XML-Download" button has been clicked.*

For the XML Upload you create or change a text file with the respective parameters and load this file into the device. The Web-Thermograph configuration must begin with the expression

`<io-AN1.3>`

and end with the expression

`</io-AN1.3>`

Configuration of the Web-Thernograph 8x must begin with the expression

```
<io-AN8.3>
```

and end with the expression

```
</io-AN8.3>
```

The sequence of the parameters you set corresponds to the order of the configuration menu starting with the item „Device".

The syntax of the configuration using XML is as follows:

```
<Option>
    <Parameter1> VALUE </Parameter1>
    <Parameter2> VALUE </Parameter2>
</Option>
```

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

! *Plese note, especially for mass updates and configura-tions, that the IP address saved in the XML file is also sent and must only then be adapted.*

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

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

Use the menu item „**Upload -> GIF**" to replace the logo shown in the menu and save it directly in the unit.

W&T

3 Single polling of temperatures

3.1 Temperature polling via TCP/IP

It is possible to manually poll current temperature values in CSV format using a socket connection. This function as well is sued to poll the individual data without the Web interface.

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

```
GET /Thermo.csv
```

To get the single, current temperature value, send:

```
GET /Singlex (x = Sensornumber)
```

To poll all temperatures at the same time, send:

```
GET /Single
```

3.2 Temperature polling via UDP

Open a UDP connection to the IP address of the unit or to the Net-ID as a broadcast and Port 42279 (setting variable).

Then send the unit one of the expressions listed under 3.1 and the device will return the temperature on the port you are using.

When using multiple units it may be helpful to have the name and IP address of the device output as well. To do this, activate „GET Header enable" under „Config >> Device >> Basic Settings >> HTTP".

3.3 Temperature polling via SNMP

SNMP-Get instructions can be used to directly poll the sensor. You reach the sensors through the following path:

Web-Thermograph:

<IP-Address> 1.3.6.1.4.1.5040.1.2.**8**.1.3.1.1.**1**

<IP-Address> 1.3.6.1.4.1.5040.1.2.**8**.1.4.1.1.**1** = Temperature value as 3-digit integer value, without comma separation.

Web-Thermograph 2x:

<IP-Address> 1.3.6.1.4.1.5040.1.2.**7**.1.3.1.1.**1 (last place = sensor number)**

<IP-Address> 1.3.6.1.4.1.5040.1.2.**7**.1.4.1.1.**1** = Temperature value as 3-digit integer value, without comma separation.

Web-Thermograph 8x:

<IP-Address> 1.3.6.1.4.1.5040.1.2.**6**.1.3.1.1.**1**

<IP-Address> 1.3.6.1.4.1.5040.1.2.**6**.1.4.1.1.**1** = Temperature value as 3-digit integer value, without comma separation.

! *For polling, give the configured SNMP Read or Rea/Write Community.*

An MIB for incorporating into management applications is available for downloading on the datasheet page for the device at the WuT Homepage http://www.wut.de.

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

☎ *If you have assigned an Administrator password, you must enter this in your manager software as „community string"!*

Entering the Administrator password in the variable

`wtWebioAN1graphSessCntrlPassword`

opens a session. Reading the variable

`wtWebioAN1graphSessCntrlConfigMode`

allows you to check whether the session was successfully opened.

1   = Session opened, device in configuration mode.
0   = Opening of the session failed. Check whether a password may have been entered incorrectly.

After successful opening of the session you can use the variables defined in the private MIB to make any desired configuration changes.

Once the configuration has been completed, write the variable

`wtWebioAN1graphSessCntrlLogout`

to close the session.

`wtWebioAN1graphSessCntrlLogout =`

1   All changes are saved
2   Quit without saving

If there is no SNMP communication in an open session during a period of 5 minutes, the device quits 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 Incorporating the temperature into your own Web site

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 in the device:

`http://172.0.0.10/app.htm`

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

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

Now the following parameters may be optionally specified:

Background color:

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

Font color:

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

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

Specifying text alignment:

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

const must be one of the following constants:

■ Left
■ Center
■ Right

This is not case-sensitive.

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

BGColor	#FFFFFF (weiß)
FGColor	#000000 (schwarz)
Align	Right

The sensor is selected using the parameter

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

The unit (for example for the humidity sensor) is specified by the parameter

```
<Param Name="unit" VALUE="% rel.">
```

The parameter is a string type. If it is not specified, a „C" is automatically set.

If you want to use your own Java functions which access multiple device applets, you can use the parameter

```
<Param Name="device" VALUE="0">
```

to number the applets for each device begining with 0.

Turning polling of the sensors off and on is accomplished using the parameter

```
<Param Name="sensorpolling" VALUE="on">
```

or „off". The default setting is „on".

If you use a different polling rate than the default 60 seconds, use the parameter

```
<Param Name="pollingrate" VALUE="60000">
```

in units of ms. Note that no sooner than every 60 seconds for the Web-Thermograph and every 4 seconds for the Web-THermograph 2x/8x a new value is available.

To output an error message when there are problems opening a connection, use the parameter

```
<Param        Name="showerrors"        VALUE="on">
```

or „off" to turn this on or off. The default value is „off".

Once all the parameters are defined, you must close the HTMP tag with </Applet>.

Example:

```
<Applet Archive="A.jar" CODE="A.class"
Codebase="http://192.168.0.10" Width="300" Height="100">
<Param Name="unit" VALUE="% rel.">
<Param Name="device" VALUE="0">
<Param Name="BGColor" Value="#0000FF">
<Param Name="FGColor" Value="#FF0000">
<Param Name="Align" Value="Center">
<Param Name="Sensor" Value="2">
</Applet>
```

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

4.1 Controlling the Java applet with JavaScript

To be able to use control of the Java applet with JavaScript, the addition „mayscript" must be specified in invoking the applet:

```
<Applet Archive="A.jar" CODE="A.class"
Codebase="http://192.168.0.10" Width="300" Height="100"
mayscript>
```

In order to work with the applet the corresponding JavaScript function must be declared in the header of the Web page.

The following reading function is used for this:

```
function sensorChanged( iDevice, iSensor, iVal )
{   Program code run when there is a change on the inputs
```

The above function is invoked by the applet when a temperature change on the sensors is detected. *iDevice* specifies for which Web-Thermograph a value changed. *iSensor* is used to indicate which sensor changed. The variable *iVal* transmits the current temperature value.

! *Please note that the names of the functions are case-sensitive*

The following source text shows a small example for dynamic display of Sensor 1.

```
<html>
<head>
<script language="JavaScript" type="text/javascript">
          function Temp (iVal, iSensor)
        {
            document.getElementById('temptab').firstChild.data = iVal+'°C';
            }

            function sensorChanged( iDevice, iSensor, iVal )
            {
            Temp (iVal, iSensor);
            }
</script>
</head>
<body style="background-color: #79ACDF;
font-family: Arial, Helvetica, sans-serif;">

<div align="center"><noscript> JavaScript is not activated
or not supported </noscript>

  <p><applet name="Analog" archive="A.jar" code="A.class"
    codebase="http://192.168.0.5" height="0" width="0" mayscript>
```

```
    <param name="device" value="0">
    <param name="showerrors" value="off">
    <param name="sensorpolling" value="on">
    <param name="pollingrate" value="4000">
   Java is not activated or is not supported
  </applet></p>

  <table width="200" cellspacing="0" cellpadding="0" bordercolor="#FFFFFF"          align="center">
   <tr bgcolor="#CCCCCC">
    <td id="temptab" align="center">0</td>
  </tr>
   <tr bgcolor="#999999">
    <td>
       <div align="center"><font size="2" color="#FFFFFF">Sensor 1</font></div>
    </td>
  </tr>
 </table>
</div>
</body>
</html>
```

i   *A more complete example for use of the Java*
       applet is on the Web page app.htm, which can be
       opened in the Web-IO.

Open: http://<IP-Address>/app.htm

5 Data logger

The Web-Thermograph saves all measured values to a permanent ring memory so that they remain even after disconnecting the power or pressing the Reset button.

The measured data on the data logger are acquired through the user page of the device (Home -> User or

xxx.xxx.xxx.xxx/user.htm).

Under *Config -> Device -> Data Logger -> Memory* you are given the opportunity to clear the memory.

An interruptoin of the timeline, such as after a reset or a subsequent time server synchronization is shown on the data logger page as a yellow line.

14.10.2003	Di	08:48	23,1
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
01.01.2002	Di	12:04	23,0

Zeitliche Unterbrechung:
Zeile gelb markiert

If alarm limits are set, temperatures which do not lie in the valid range are highlighted in red.

6 Appendix

6.1 Alternate methods of assigning the IP address

6.1.1 Using DHCP-/BOOTP protocol

Many network use DHCP (Dynamic Host Configuration Protocol) or BOOTP for centralized and dynamic assigning of the IP addresses. For Web-Graph devices it makes no difference which of the two protocols is used, since DHCP is simply a downward-compatible extension of BOOTP. DHCP servers thus also make use of requests from BOOTP clients.

The following parameters can be assigned to the Web-Thermograph using these protocols:

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

It is not possible to transmit additional parameters or a lease time.

Function

To obtain an IP address, the device sends a corresponding BOOTP request as a broadcast to the network after each restart. The reply then generated by the DHCP/BOOTP server contains the IP address as well as the subnet mask and gateway address. The Web-Thermograph immediately stores this information in its non-volatile memory.

For starting up the device in DHCP/BOOTP networks, please consult with your system administrator. If the address is assigned using DHCP, you must also note that a reserved IP address is needed. To update the respective address database, the administrator will need the Ethernet address of the Web-Graph Thermometer, which can be found on the part label on the housing of the device.

After the necessary entries have been made, the device automatically gets the desired IP address after each reset. To ensure that the Web-Thermograph is also available should the DHCP/BOOTP server fail, the previous IP address is retained if a reply is not forthcoming.

! *In DHCP environments the IP address you assign must be reserved by means of a fixed link to the Ethernet-address of the Web-Thermograph. Under Windows NT his is done in the DHCP Manager under menu item „Reservations". Linux provides the file „dhcpd.conf" .*

6.1.2 ...Using ARP command

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

```
arp -s <IP-Address> <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
```

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

! *This method works only if no IP address has been assigned to the Web-Thermograph yet, which means the entry is 0.0.0.0. To change an already existing IP address hyou must open the configuration menu using your browser or use the serial method (see below).*

6.1.3 ...Using the serial port

In contrast to the procedure described above, you can use the serial port to change an already existing IP address for the Web-Thermograph.

Connect the RS232 port on the device to a PC (null modem cable; in the case of the Web-Thermograph (57605) only pins 2, 3 and 5 are connected) and start a terminal program (e.g. Hyperterminal). Create 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.* Perform a reset by disconnecting power while holding down the „x" key until the reply *„IPno.+<Enter>"* appears. Now enter the IP address in dotted decimal notation (xxx.xxx.xxx.xxx) and finish your entry with *<Enter>.* You may also enter the subnet mask and gateway and turn off the BOOTP client directly if you use the following syntax after the input prompt (*IPno.+<Enter>*):

W&T

```
<IP-Address>,<subnetmask>,<gateway>-0
```

> **!** *If you make a typing mistake during your entry you cannot correct it with Backspace. The procedure must be repeated.*

If the entry was correct, the assigned parameters serve as the acknowledgement; otherwise the monitor shows the current IP address with the message „*FAIL*". This procedure can be repeated as often as necessary.

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

```
xxx                                   -> Web-Thermograph
IP no.+<ENTER>:               <-  Web-Thermograph
172.17.231.99,255.255.255.0,172.17.231.1-0      ->  Web-Thermograph
172.17.231.99,255.255.255.0,172.17.231.1-0      <-  Web-Thermograph
```

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

Com-Server <> PC, 9pol.
W&T Art. Nr. 1199x

```
         1 ←――――――――― 4
         2 ←――――――――― 3
DB9/Buchse 3 ――――――――→ 2  DB9/Buchse
         4 ――――――――→ 1
         5 ―――――――――― 5
         6 ←――――――――― 6
         7 ――――――――→ 8
         8 ←――――――――― 7
```
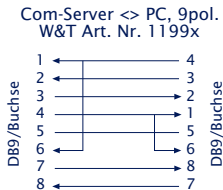
For a Web-Thermograph only pins 2, 3 and 5 are connected.

6.1.4 ...Using an RARP server (UNIX only)

Working with an RARP server activated under UNIX is based on entries in the configuraiton files */etc/ethers* and */etc/hosts*. First expand */etc/ethers* by one line with the assignment of the Ethernet address of the Web-Thermnograph to the desired IP address. In */etc/hosts* the link with an alias is then determined. Once you have connected the device in the network segment of the RARP server, you can use the network to assign the desired IP address to the device.

Example:

Your Web-Thermograph has MAC address EN=00C03D0012FF (sticker on the housing). You want to give it IP address 172.0.0.10 and the alias WT_1.
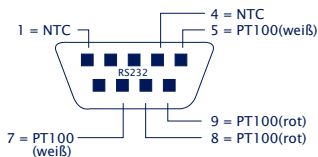
Entry in the file */etc/hosts:* 172.0.0.10 WT_1

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 now using the command *„rarpd -a".*

6.2 Connecting PT100 sensors (Web-Thermograph 57605)

If you want to connect a sensor other than a PT100, the pin assignments are as follows:

6.2 Example for creating your own Web pages

You have the ability to freely configure the standard display pages of the device (user.htm, home.htm, log.htm). Special control elements can be inserted into the page with the help of „tags". In the following you will find an example for creating the page „user.htm".

Create an HTML page that must begin with the expression

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

Then you enter the HTML code.

You have the ability to display the following parameters on your pages:

`<w&t_tags=tx>`

displays the current temperature, where **x** is the number of the sensor. (°C)

`<w&t_tags=time>`

inserts the current time.

`<w&t_tags=steps>`

inserts a list box for selecting the time intervals for display.

`<w&t_tags=ok_button>`

inserts an „OK" button which sends the selected parameters to the unit.

`<w&t_tags=session>`

inserts an invisible session control so that when the user leaves the page he is not logged out from the device. The expression is only needed if you want to design your own button for sending. Then insert this expression between *<form action>* and *</form>*.

Background color:

Background colors representing the sensor state can be used for the values shown in tables:

`< w & t _ t a g = b c t >`

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

`<w&t_tags=sensorx>`

inserts the name of Sensor x into the page and contains a link to 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 _ t a g s = l o c a t i o n >`
`< w & t _ t a g s = c o n t a c t >`

inserts the respective text elements, which are configured under **Config >> Device >> Text**.

`<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 scrolling up or down respectively in the table.

> ❗ *The „Previous" button and the „Next" button function only in the „log.htm" file.*

`<w&t_tags=logtable>`

inserts a table with the current measured values. You can navigate forward and backward in this table using the „Next" and „Previous" buttons only on the „log-page" (see above). On both the other pages (user.htm and home.htm) only the current measured values can be displayed.

Example for setting a background color in a table:

```
<tr>
    <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>
```

When there is a limit violation the temperature is highlighted in red.

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

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

CSV output can be specified by using the expression

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

Resetting the device to the factory defaults restores the original HTML pages.

Example for user.htm:

```
< u s e r . h t m >
<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-Thermograph</p>
<p>Zeit: <w&t_tags=time></p>
<p><w&t_tags=sensor1>: <w&t_tags=t1> °C</p>
<p> </p>

<form action="log.htm" method="POST">
    <p>Output format Data Logger:</p>
    <p><w&t_tags=steps></p>
    <p><w&t_tags=ok_button></p>
</form>
<form action="thermo.csv" method="POST">
    <p>Output format CSV-output:</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>
```
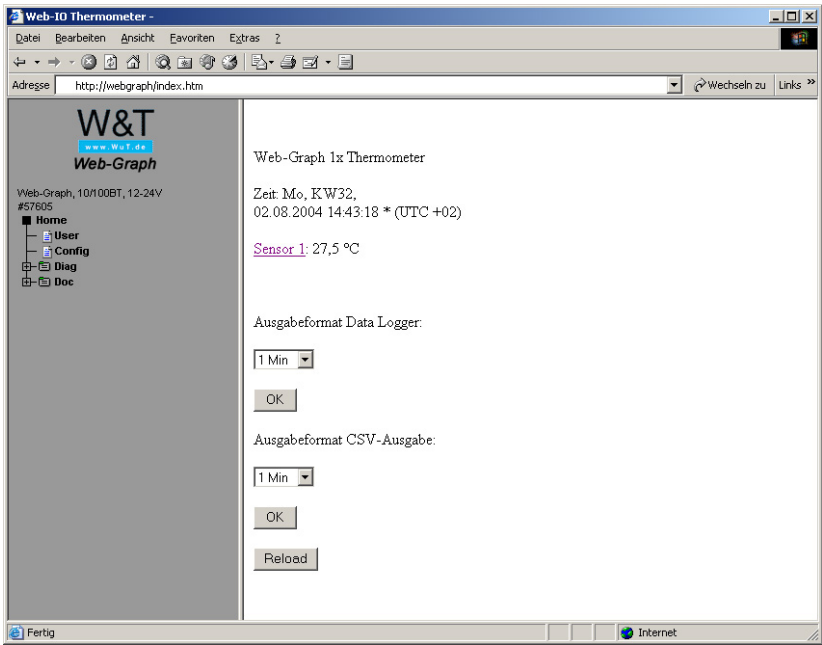
W&T

Example for 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>
```
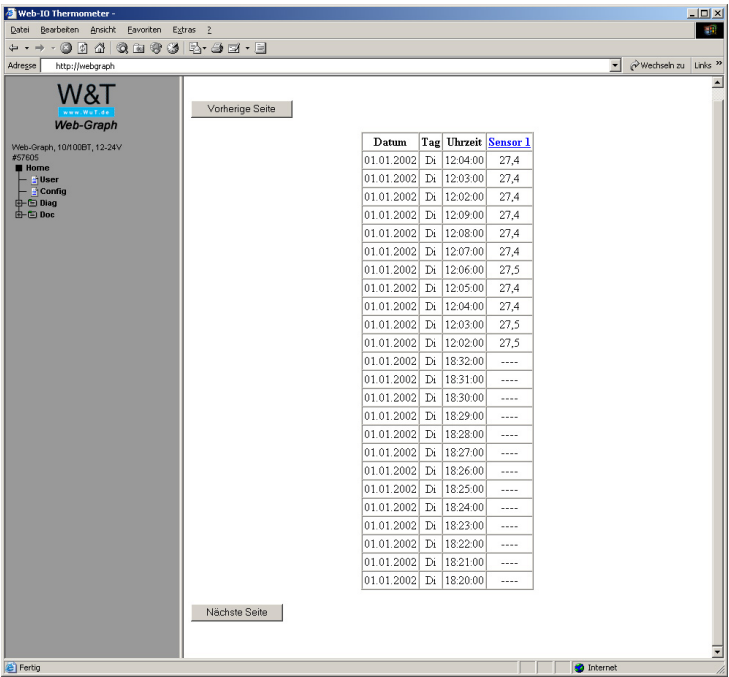
W&T

The Web-Thermograph displays this page in the Web browser as follows:

6.3 Firmware Update

We are continuously improving the Web-Thermograph operating software. The following section describes how to upload a new version of the firmware.

■ Where can I get the newest firmware version?

■ Firmware update over the network running under Windows

6.3.1 Where can I get the newest firmware version?

The most up-to-date firmware including the available update tools and a revision list is available on our Web site at: *http://www.wut.de*

Before downloading, please first write down the 5-digit type number printed on the Web-Thermograph label. From the Homepage you can access a product overview sorted by article numbers, which takes you directly to the datasheet for the respective device. Here you follow the link to the current version of the firmware.

6.3.2 Firmware update over the network using Windows

The prerequisite is a PC running 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 mentioned are available for downloading from our Homepage *http://www.wut.de*.

· The executable update tool for loading the firmware into the Web-Thermograph

· The file with the new firmware for loading into the Web-Graph 1x Thermometer

No specialy preparation of the Web-Thermograph is necessary for the firmware update.

The *WuTility* program used for the update recognizes the WuT devices already in your network and is for the most part self-explanatory. If you do have any questions or something is unclear, please refer to the accompanying documentation or use our online help.

! *Never intentionally interrupt the update process by disconnecting the power or pressing the Reset button.- After an incomplete update the Web-Graph Thermometer will be inoperable.*

Never mix files with different version numbers in their file names. This will result in malfunction of the device.

The Web-Thermograph automatically recognizes when transmission of the new firmware is complete and then carries out its own reset.

6.3.3 LED indicators

■ **Power-LED:** Indicates that the power is on. If the LED does not come on, please check for proper connection of the power supply.
■ **Status-LED:** Flashes when there is network activity by the Web-Thermometer. Periodic flashing indicates a ready state.
■ **Error-LED:** The Error LED uses various flashing codes to indicate error conditions on the device or network port.

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

2x or 3x flashing of the Error-LED = Force a reset by interrupting power. If this does not resolve the issue, reset the device to its factory defaults. Since all network settings will also be reset, you should write down your network settings before doing this.

```
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 on = Self-test error

The self-test performed after every start or reset of the Web-Graph Thermometer may not have been correctly finished - sometimes due to an incomplete firmware update. The device is no longer operational in this state. Please return it for service.

Additional LEDs (internal for model 57605)

■ **on error http://xxx.xxx.xxx.xxx/diag -LED:** Indicates internal errors in configuration. For troubleshooting, open the page http://xxx.xxx.xxx.xx/diag in the device.

■ **system error:** Serious hardware error. Try to restart the device by interrupting the supply voltage. If the condition persists, return the unit to us for inspection.

! *If the Web-Thermograph has no IP address or if the address is 0.0.0.0, the LEDs remain on error and system error after a reset or new start! The system error LED flashes 3x after a short time. Only when an IP address is assigned do the LEDs turn off.*
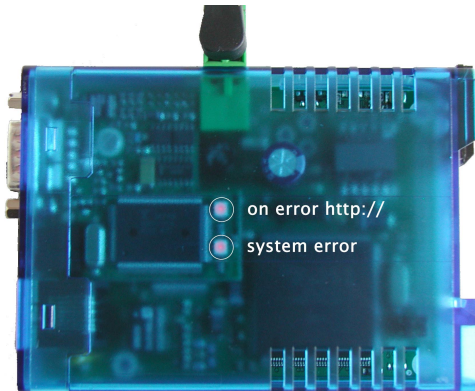
6.4 Emergency access

An emergency access function is available using the serial terminal (DTE). This is activated as follows:

Use a serial cable to connect the device to a PC (null modem cable; use only pins 2, 3, 5) and start a serial terminal program. Configure the program settings for

9600,8,N,1,no handshake

Interrupt the supply voltage. Press the following letters in your keyboard 3x for the individual accesses:

3x „u"   Opens the update port. A firmware update can now be performed.

3x „f"   Restores the device to its default settings. All configuration setting made previously (incl. IP address) are lost.

3x „p"   Deletes all assigned passwords.

By way of confirmation the **system error** and the **on error http** LEDs turn on multiple times one after the other.

3x „x"   (Directly after pressing the Reset key, enter before the audible tone) Assigning/changing the IP address. Enter the desired IP address when prompted.

6.5 Technical Data

Prod. No.:	**57605, 57607, 57608**
Network:	10/100BaseT autosensing
Supply voltage:	12-24V AC / DC with screw terminals
Measuring unit (57605)	
Sensor:	NTC 10k, PT100-sensor, 2-,3- or 4-conductor
Measuring range:	-45°C...105°C (PT100)
	-45°C...75°C (NTC)
Resolution:	1/10°C
Measuring error:	±0,3°C, ±5% (NTC) ±0,3°C, ±2% (PT100)
Storage frequency:	1, 5, 15, 60 min
Memory depth (64k):	min. 14 weeks, max. 16 years
Deviation of the internal clock:	max. 4,32 min. / month
Measuring unit (57607, 57608)	
Sensor:	PT1000, PT100 connection, 2-, 3- or 4-conductor
Measuring range:	W&T sensor: -50°C...180°C
	PT100/PT1000 measuring input: -200°C...650°C
Resolution:	1/10°C
Measuring error:	±0,3°C, ±2% (PT100)
Storage frequency:	1, 5, 15, 60 min
Memory depth (832k):	min. 4 weeks, max. 4. (57608) or 8 (57607) years
Deviation of the internal clock:	max. 4,32 min. / month
Power supply:	Supplied power adapter
	or 12..24 V DC/AC
Configuration interface:	serieller Port RS232, 9600 Baud, 8 Datenbit, 1 Stopbit, no Parity
Housing:	Compact plastic housing, 106.8mm x 87.8mm x 62.6mm (l x w x h)
Weight:	approx. 200g
Ambient storage temperature:	-40..+70°C
Ambient operating temperature:	0 .. +60°C

W&T
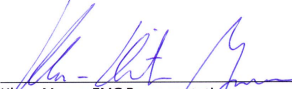
6.6 Declaration of conformity

W&T

www.WuT.de

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	**Model 57601**
Web-IO 2x Thermometer	**Model 57603**
Web-IO 8x Thermometer	**Model 57604**
Web-Thermograph	**Model 57605**
Web-Thermograph 2x	**Model 57607**
Web-Thermograph 8x	**Model 57608**
Web-Thermo-Hygrograph	**Model 57606**
Web-IO Analog-In 0..20mA / 0..10V	**Model 57641**
Web-IO Analog-In 2x 0..20mA	**Model 57642**
Web-IO Analog-In 2x 0..10V	**Model 57643**

fulfill the requirements of the directives / regulations specified below:

1. Emission according to

    1.1. EN 55022 Cl. B (1998) +A1 +A2
    1.2. EN 61000-3-2 (2000)
    1.3. EN 61000-3-3 (1995) + A1

2. Noise Immunity according to EN 61000-6-2 (2001):

    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 (2003)

Klaus Meyer, EMC Representative

Wuppertal, 05/31/2006

Dipl.-Ing. Rüdiger Theis, Managing Director

Subject to errors and changes