

UNIKLIMA vario Documentation

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1 Introductory remarks about the weather station UNIKLIMA vario

The network capable weather station UNIKLIMA vario serves the registration of climatic data (e.g. air temperature, relative humidity, wind direction and wind speed). The data are recorded in the ASCII format into daily files, and in this way they can be imported and processed with other programs (e.g. MS Excel).

The data recording rate is freely definable (1 minute to 1 hour). Additionally daily means are recorded.

An Ethernet interface (RJ45) allows the imbedding of the weather station into a local network and retrieving the weather data over TCP/IP (FTP or Telnet), as described in the sections 5.3 and 5.4.

The weather station works as server for the weather data and can be accessed by different clients in the network.

Optionally the weather station can be equipped also with a modem (analog or GSM/GPRS radio modem) and be accessed by remote data transmission and the integrated PPP server. Extensive networking capabilities are available. The weather station UNIKLIMA vario is available in German and English language.

2 Important notes before putting the measuring station into operation

Please read this manual carefully before putting the measuring station into operation. Only by doing this a wrong use, possible malfunctions or destruction of parts of the measuring station can be avoided.

Choose the installation place so that the measuring device is protected from humidity and mechanical damage.

Sufficient precautions for protection against lightning and overvoltage have to be ensured by the customer! The current ISO, DIN and VDE standards apply.

The measuring station has to be operated by authorized and instructed staff only under supervision.

Opening the measuring device may be carried out only of authorized and instructed staff after previous separation from the mains voltage.

In order to protect the operator, all parts accessible on the outside are lead out touch-voltage-safe.

<p>Note: Before turning it off the weather station must be shut down analogous to a PC. Therefore the main program must always be exited by pressing the key "E" (by Telnet) before the separation of the weather station from the power supply. This avoids that at the moment of the separation from the power supply no data storage is on progress, whose interruption could damage the internal drive A:.</p>

3 Mechanical structure of the measuring station UNIKLIMA vario

The electronics of the measuring station UNIKLIMA vario is housed in a plastic case with protection degree IP65. A wall assembly is recommended for the installation of the device. It has to be made sure that a possible damage to the cables by a too strong bend is avoided.

The measuring station is supplied with energy by an external plug power supply unit. There is a corresponding voltage processing implemented in the measuring station which provides all voltage supplies necessary for the operation of the device.

A power supply of additional external devices which are not contained in the measuring station is not possible.

Each measuring station has the sensor configuration ordered by the respective customer. If your station has a TOSS sensor mast, attention is to pay to a correct fastening of the ropes. It is necessarily to tighten the ropes some days after the installation.

Note: The reliability of the measured values depends essentially on the correct fixing of the sensors at a representative measuring place!

A 50 m long connecting cable makes it possible to place the sensors apart from the measuring station. The distance to a building (radiation heat) should be at least 15 m. A rain shading has to be avoided and an undisturbed air circulation at the radiation protection must be possible. The connection of the connecting cable to the measuring station is made by a round plug which is saved by a thread against pulling out inadvertently. Therefore the laying of the cable is unproblematic and no additional clamping work is necessary. Attention must be paid that the wall-breakthrough for the cable is adapted to the diameter of the plug.

Important: At the installation of several devices careful attention must be paid to the fact that sensor groups are not interchangeable under each other. Generally the assignment of the delivery state always has to be re-established. Otherwise no correct measurement results are obtained. Sensor cables may not be pulled or plugged under voltage.

4 Measuring station UNIKLIMA vario - description of the hardware

4.1 On principle structure of the measuring station

The on principle structure of the electronic measuring station UNIKLIMA vario subdivides itself into three main modules:

CPU module

- 16 bit CPU 80186
- real time clock accumulator buffered (year, month, day, hour, minute, second)
- serial interface RS232 (MAX 232) (wind sensor)
- Ethernet interface RJ45
- internal modem (optionally)

Analog-digital module

- up to 8 analog measuring inputs can be processed and recorded
- each 6 digital inputs and outputs are maximally available, the first two outputs are led out potential-free as relay outputs
- input filter
- measuring signal processing

PC connection

- modem interface - remote data transmission over the telephone network analog, GSM, GPRS (optionally)
- Ethernet interface RJ 45 for HTTP, FTP transfer, TELNET, Email, time server...

Power supply

- 230 V/AC plug power supply (external)
- internal overvoltage protection

4.2 Setting up the modem connection

Provided that your measuring station is equipped with an internal modem, you must put the modem cable, which is led out on the underside of the device, into the left socket of your TAE connection. If you should have only a unipolar telephone socket, please contact an authorized telephone expert responsible for you in order to have installed a new telephone socket. Possibly necessary extension cords are available in corresponding stores in different lengths.

Note: If you buy an extension cord please take care of it that an N-coded cable is sold to you.

The communication between PC and UNIKLIMA vario over a modem connection is organized by the software package UK_TOSS.

4.3 Setting up the FTP connection

The RJ45 socket is on the left of the underside of the device. With the help of a connecting cable (order number 10131) the connection to the network card of a PC is directly done.

In order to be able to access your UNIKLIMA vario (IP address in the delivery state: 192.168.110.200) please consider the choice of a suitable IP address on your computer (e.g. IP address 192.168.110.105, subnet mask 255.255.255.0).

5 Operating manual for the measuring station UNIKLIMA vario

5.1 Putting the measuring station into operation

For putting the measuring station into operation the following prerequisites have to be fulfilled:

The sensors on the crossbeam are already correctly contacted with the delivery and must be fastened at a representative location. Air temperature and air humidity are then at the high-grade steel mast (order number 11001) in a height of 2 meters.

The soil temperature sensor has to be inserted into the ground. For hard grounds an appropriately deep hole should be prepared since the sensor can bear only limited strength.

The top edge of the precipitation gauge must be in 1 m of height over the ground and can be regulated by inserting depth of its stand base. The air pressure sensor is to adjust to the height of the location above sea level. The vectorial wind measuring system must be orientated (north/east) one.

Because of the numerous details to be taken into account we recommend the use of an authorized company for the installation!

Attention! Sensor cables may not be pulled or plugged under voltage.

Arrange the soil temperature sensors so that the connecting cables cannot be destroyed by inattentiveness or by vehicles.

If all installation activities are completed the measuring station can be switched on.

5.2 Description of the weather data memory structure

In principle it must be distinguished between 2 functional data areas which have nothing to do with each other both program-technically and regarding the time.

1st: fixed weather data area

- daily means

2nd: variable measuring data area

- flexible measure value memory (free registration interval: 1,2,5,10,15,20,30 or 60 min)

60 minutes (hourly means) are a usual setting for the registration of climatic data. Smaller measuring intervals are possible. The available memory in drive A:\DATEN is approximately 7 MB.

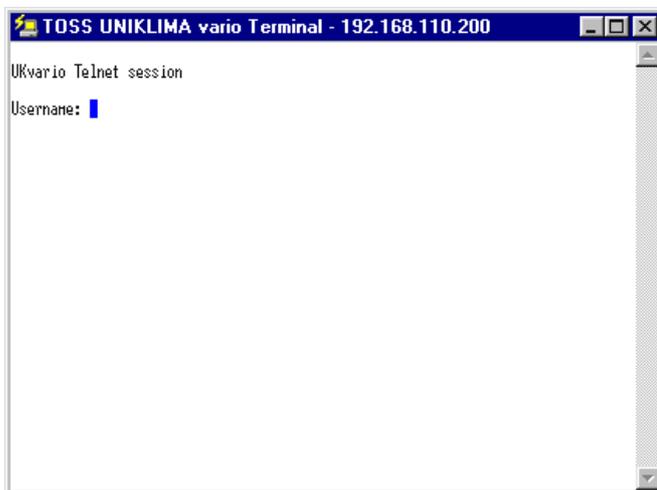
5.3 Terminal connection with the weather station UNIKLIMA vario

For example with the TOSS UNIKLIMA vario Terminal (<http://www.toss.de/download/tossterm.zip> or on CD-ROM), but also with any other Telnet program, a Telnet connection can be established between the weather station UNIKLIMA vario and a PC.

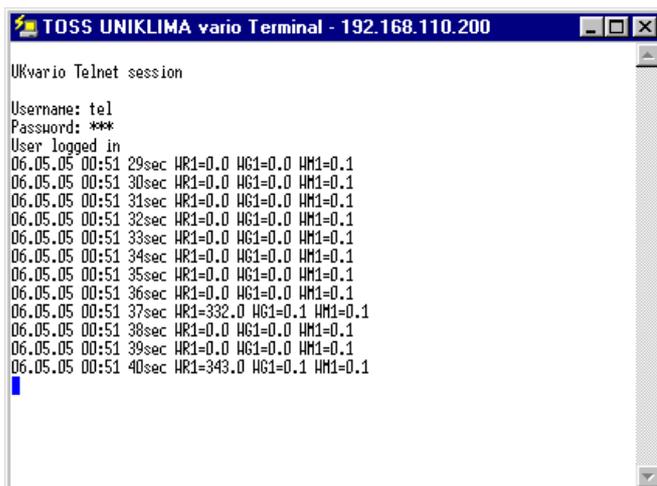
The TOSS UNIKLIMA vario Terminal needs the IP address of the weather station for connecting with it (IP address in the delivery state: 192.168.110.200), as well as the port number used. Both settings are read from the text file ukterm.ini which has the following structure:

```
[Telnet]
Host=192.168.110.200
Port=23
```

After the start of the TOSS UNIKLIMA vario Terminal the connection with the weather station is established automatically. You are asked to enter the user name and afterwards the password. Both of them are "tel". Complete your respective input with <ENTER>.



After the successful login you get the date, time and measured values displayed at every second.



5.3.1 Setting the station name / location [N]

In order to change the name / location of your UNIKLIMA vario station please press the key "N".



Confirm your wish to change, enter the desired name / location of the station and confirm again.

Geographic coordinates longitude / latitude / height above sea level of the location can be defined. It must be paid attention to it that eastern longitude has to be entered negatively [E -0...-180.0000°, W +0...+180.0000°]. The latitude on the northern hemisphere is positive [N +0...+90.0000°, S -0...-90.0000°].

Example for the conversion from arcmin / arcsec into degrees:

$$N 52^{\circ} 26' 21'' = 52.0 + 26.0/60.0 + 21.0/3600.0 = 52.43916667$$

$$E 13^{\circ} 00' 54'' = 13.0 + 0.0/60.0 + 54.0/3600.0 = 13.015$$

TOSS GmbH Potsdam, GEO coordinates: N52.4392° E13.0150° 45.0m above sea level

5.3.2 Changing the IP address [I]

Press "I" to change the IP parameters of the Ethernet access of the UNIKLIMA vario and the parameters of the PPP server.

Confirm your wish to change and enter new values for the IP address, the subnet mask and the gateway. If the station has a modem and therefore the PPP server is active, the PPP access data, IP address, RemIP address, the subnet mask and gateway can be changed, too. If the Ethernet settings IP address, subnet mask and gateway were defined new, expert settings are available to the experienced user.

[E] Ethernet or [P] PPP-Server settings?

```
set new IP configuration
Ethernet settings
IPadr:192.168.110.222
NMask:255.255.255.0
Gatew:192.168.110.1
Correct (Y/N) ?
```

Reorg.IP: OK : reorganization of the IP access data was successful

```
Ethernet settings
IPadr:192.168.110.222
NMask:255.255.255.0
Gatew:192.168.110.1
Note new IP parameters are binding
```

5.3.2.1 Expert settings

Only change expert settings if you are familiar with the matter. The UNIKLIMA vario has standard settings. Changes are usually not necessary.

Configuration for experts (TELNET, FTP, HTTP, ports, passwords)
Correct (Y/N) ?

Attention: Improper settings can cause that the user interface of the station is no longer available!
Really (Y/N) ?

```
Expert items set new -----
[01] TELNET port number =23
[02] TELNET user name   =tel
[03] TELNET password    =tel
[04] FTP   port number  =21
[05] FTP A: user name   =ftpadmin      : access to flash drive A: (historical data)
[06] FTP A: password    =ftpadmin
[07] FTP C: user name   =ftp           : access to RAM drive C: (current data)
[08] FTP C: password    =ftp
[09] HTTP  port number  =80
[10] Default Ports+PW's set           : set default values as shown here
[11] Menu access protect. set PW
[12] DHCP  settings     =0
[13] DHCP client name   =UKvario
```

With the menu item [11] the user can protect the access to various input menus by an own password. With it confidential access data are protected, such as for the mail server or FTP server

The menu access protection ensures the parameter settings from unauthorized access by a password
Current password=xxx
New password=yyy
Repeat password=yyy

Menu access protection expand on all relevant parameter menus (Y/N) ?

Items correct, save (Y/N) ?
save.. OK

Some expert items take effect only after reboot, => key[E]

The activation of the password protection for these expert settings can be expanded to all safety relevant input menus.

If no character is entered as password (only enter), the function is disabled.

DHCP (Dynamic Host Configuration Protocol) [12]

Using DHCP the UNIKLIMA vario automatically can be integrated into an existing network, i.e. an existing DHCP server assigns a dynamic IP address to the weather station. This IP address assignment is done after a request by the weather station. If there is not yet an IP address assigned, the weather station does approximately once per minute a concerning request to the DHCP server.

The menu item [12] of the expert settings allows to enable DHCP.

Attention: After enabling DHCP it is possible that the weather station is not anymore reachable for example by TELNET. This is the case if for example no IP address was assigned by the DHCP server or the newly assigned IP address is not known to the user, since there is no access to the current server data!

In such a case the weather station can regenerate the previously set static IP address (original delivery state 192.168.110.200) by a MASTER reset.

DHCP client name [13]

The weather station registers itself at the DHCP server with this name. The server saves the client name and the IP assigned to this device. The weather station is reachable by DNS through this

fixed name. The device name "UKvario9_V9.xxx" of the weather station, that contains the software version number, can be used for the registration at the DHCP server, too. The following option decides over these two possibilities. The default option is [1]Client_Name.

DHCP-Option: [1]Client_Name [2]Device_Name
DHCP-Option=

MASTER Reset

The reset button on the right outside of the housing must be pressed multiple times in order to initiate a normal reset (reboot of the station). This is recognizable on the strongly blinking LED in the cover. If the station is shut down the LED turns off for 5 seconds. If DHCP is active the LED turns on again for max. 1.5 seconds and must be deleted in this period of time by pressing the reset button once. This process is repeated three times. A conspicuously flashing sequence confirms the reset of DHCP.

5.3.3 Time setting and synchronising [T]

Please press the key "T" to set the date and time. There are two basic ways to set the system time and / or automatically and cyclically to synchronise it. The time base is realised by an internal accumulator buffered quartz clock, and it can be synchronized by calling a time server.

5.3.3.1 Setting the internal clock manually [1]

After pressing the key "1" you will be asked to enter the day of the week, the day, the month, the year, the hour, the minute and the second step by step. The day of the week is represented by a single digit. All other inputs must be done by two digits in each case. Finish each input by pressing <ENTER>.



```

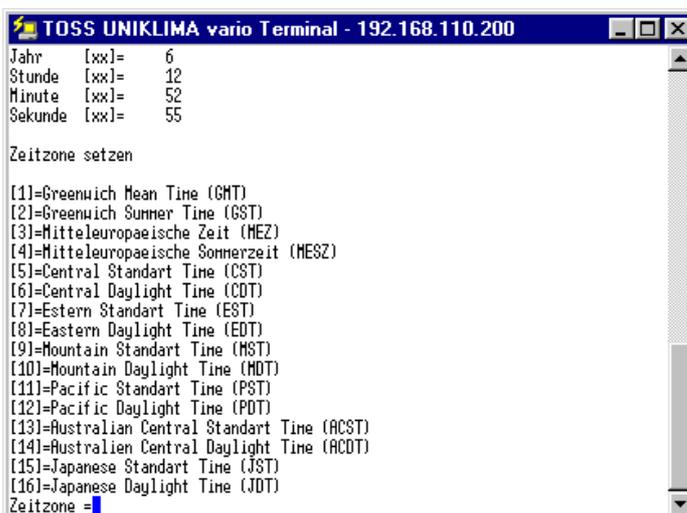
TOSS UNIKLIMA vario Terminal - 192.168.110.200
Datum: 07.01.05 15:04 57sec 152.0 0.4
Datum: 07.01.05 15:04 58sec 152.0 0.4

Datum und Zeit setzen

Mo=1,Di=2,Mi=3...So=7
Wochentag [x]= 5
Tag [xx]= 07
Monat [xx]= 01
Jahr [xx]= 05
Stunde [xx]= 15
Minute [xx]= 03
Sekunde [xx]= 10

```

Afterwards the local time zone has to be defined from 46 international defaults.



```

TOSS UNIKLIMA vario Terminal - 192.168.110.200
Jahr [xx]= 6
Stunde [xx]= 12
Minute [xx]= 52
Sekunde [xx]= 55

Zeitzone setzen

[1]=Greenwich Mean Time (GMT)
[2]=Greenwich Summer Time (GST)
[3]=Mittleuropaeische Zeit (MEZ)
[4]=Mittleuropaeische Sommerzeit (MESZ)
[5]=Central Standart Time (CST)
[6]=Central Daylight Time (CDT)
[7]=Eastern Standart Time (EST)
[8]=Eastern Daylight Time (EDT)
[9]=Mountain Standart Time (MST)
[10]=Mountain Daylight Time (MDT)
[11]=Pacific Standart Time (PST)
[12]=Pacific Daylight Time (PDT)
[13]=Australian Central Standart Time (ACST)
[14]=Australian Central Daylight Time (ACDT)
[15]=Japanese Standart Time (JST)
[16]=Japanese Daylight Time (JDT)
Zeitzone =

```

It is recommended always to keep the natural time (wintertime, e.g. CET) to avoid an overlapping of time periods when the clock is set from daylight saving time back to normal time (i.e. put back from 3 o'clock to 2 o'clock).

5.3.3.2 SNTP time server

The Simple Network Time Protocol (SNTP) is a TCP / IP based protocol. Using it the weather station can receive the current date and time from a public time server.

Prerequisite for doing this is the access to the Internet, e.g. by a DSL connection, and enabled SNTP port 123 in your DSL router.

5.3.3.2.1 Retrieval from time server [2]

This menu item is available only after parameterisation of the time server "3" and its activation.

The user manually starts a synchronization of the internal system clock regarding date and time by a retrieval from a registered time server.

5.3.3.2.2 Parameterising the time server [3]

The TCP/IP based SNTP protocol allows it automatically to set or to synchronize the system time by a time server. There can be entered up to 8 time server URL's or IP addresses. The corresponding servers are accessed one after another if no transmission from the previous time server was received.

[C] Clear URL/IP

The time servers selected by the user can be deleted here.

[S] Set time server IP's from list

There are 45 national and international time server addresses predefined in the UNIKLIMA vario. The user can select up to 8 time servers for retrieval according to his local preferences. Because the SNTP protocol must eliminate the data transfer times between the time normal of the server and the weather station, local servers should be given priority. The entries selected from the list can be inserted in the retrieval list at any position.

[E] / [A] Furthermore the retrieval can be switched on or off. On activation [E] the kind of access has to be defined. It is distinguished between a WWW access by GPRS or a LAN connection to a local time server.

[Z] Time zone is equal to the settings in chapter 5.3.3.1 "Setting the internal clock manually [1]". All time servers always give their time stamp in universal time (UTC), so the time zone is very important for the correct local time.

Every day after midnight the synchronization of the system clock starts automatically. In this automatic mode the time difference parameter [D] is of interest. This time information in minutes is the maximally allowed difference between system time and server time within which an automatic synchronization still is done. Greater, intentional differences or an erroneous time protocol therefore don't cause an update of the system time. Time difference = 0 is equal to: synchronise always.

Time server IP editing

[1] URL/IP1: 192.53.103.108

[2] URL/IP2: ptbtime2.ptb.de

[3] URL/IP3: ntps1-0.cs.tu-berlin.de

[4] URL/IP4: ntp.freestone.net

[5] URL/IP5: asynchronos.iiss.at

[6] URL/IP6: ntp2.ja.net

[7] URL/IP7: ntp2.inrim.it

[8] URL/IP8: tick.ucla.edu

[C] Clear URL/IP

[S] Set time server IP's from list

Time server call over GPRS is enable

[E] Enable

[A] Disable

[Z] Time zone

[D] Sync. difference

[R] Return

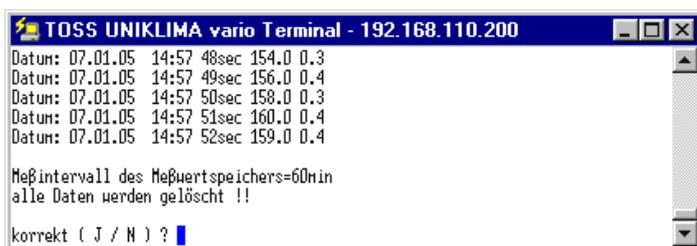
Of course all parameters are stored safely against power failure.

List of some public time servers in the WWW: (please test the current availability)

IP-Adresse	Standort
192.53.103.108	PTB1 Braunschweig, DE
ptbtime2.ptb.de	PTB2 Braunschweig, DE
ntp1-0.cs.tu-berlin.de	Tech. Uni. Berlin, DE
ntp.freestone.net	Zuerich, Switzerland
asynchronos.iiss.at	Wien, Austria
ntp2.ja.net	Uni. of London, UK
ntp2.inrim.it	Torino, Italy
tick.ucla.edu	Los Angeles, CA, USA

5.3.4 Programming the interval of the flexible measure value memory [M]

In order to change the interval of the flexible measure value memory please press "M".



```

TOSS UNIKLIMA vario Terminal - 192.168.110.200
Datum: 07.01.05 14:57 48sec 154.0 0.3
Datum: 07.01.05 14:57 49sec 156.0 0.4
Datum: 07.01.05 14:57 50sec 158.0 0.3
Datum: 07.01.05 14:57 51sec 160.0 0.4
Datum: 07.01.05 14:57 52sec 159.0 0.4

Meßintervall des Meßwertspeichers=60min
alle Daten werden gelöscht !!

korrekt ( J / N ) ?
  
```

Since this action deletes all measured data, a double safety query is carried out before its execution.



```

TOSS UNIKLIMA vario Terminal - 192.168.110.200

Meßintervall des Meßwertspeichers=60min
alle Daten werden gelöscht !!

korrekt ( J / N ) ? j
wirklich ( J / N ) ? j

Speicher nullen - OK.

Programmierung des Meßintervalls:
Eingabe(1,2,5,10,15,20,30,60):
  
```

Enter the desired value. 1, 2, 5, 10, 15, 20, 30 or 60 can be chosen.

You may have to wait some seconds until the start of the measuring process because the start can be done only at a full minute for reasons of the synchronization.

Expert settings

For the technically versed user there is the possibility to make particular system settings, which are hidden at this point. Incorrect settings can impair the proper functionality of the weather station and for this reason the expert settings are accessible a little bit difficult to find in the menu item for changing the measuring interval..

Access: [M] Measuring interval

The shown question must be answered with "N" and within a time window of 3 seconds the key "E" must be pressed.

```

TOSS UNIKLIMA vario Terminal - 192.168.110.222
Measurement interval set new (current 60min)
All data would be erased!

Correct (Y/N) ? N
Break

Configuration for experts
Correct (Y/N) ? Y

Attention: Improper settings can cause that the user interface of the station
is no longer works!
Really (Y/N) ? Y

[P] Power-Save-Modi
[M] Multi-Points-Linearization
?=

```

[P] Power-Save-Modi

In this menu item some settings can be made to reduce the power consumption of the weather station. This may for example be very helpful if the weather station is powered by a solar system with accumulator, and short day length in winter combined with a longer period of cloudy weather.

```

TOSS UNIKLIMA vario Terminal - 192.168.110.210
Attention: Improper settings can cause that the user interface of the station
is no longer works!
Really (Y/N) ? Y

[P] Power-Save-Modi
[M] Multi-Points-Linearization
[F] CHKDSK Flash Drive A:
?=

Power Save Modi
Status: CPU speed=50%, LAN-Connect-Detect, Modem only temporary on

[1]: Restore full CPU speed
[2]: Set 1/2 CPU speed mode
[3]: Ethernet driver always on (high power consumption)
[4]: Ethernet off until LAN-Connect-Detect
[5]: Modem always on
[6]: Modem only temporary on (Sys.Time from 12:00 to 12:30)
[7]: Modem On time
[8]: Modem Off time
[IR]: Return

```

- [1]: normal CPU clock frequency (default)
- [2]: halving of the CPU clock frequency
- [3]: Ethernet interface is always on (default)
- [4]: automatic shutdown of the Ethernet interface if no network cable is connected
- [5]: modem in normal operation mode (default)
- [6]: the modem will be switched on only temporarily, i.e. only then a communication with the weather station is possible!
- [7] definition of the modem switching on time for temporary modem operation mode
- [8] definition of the modem switching off time for temporary modem operation mode

It is recommended to use the settings marked with “(default)” as far as possible. If the weather station is reached via GPRS, the option [4] is recommended.

[M] Multi-Points-Linearization

A subsequent modification of the sensor curves after delivery by the factory is certainly only reasonable in exceptional cases and requires appropriate measuring-technical prerequisites by the user. The factory calibration is then no longer valid!

This menu item allows a sensor correction with 3 to 7 nodes per sensor.

A pair of nodes is composed of a sensor value and an associated sensor offset value. The currently measured sensor value plus the corresponding offset value then provides the displayed sensor value. It is therefore possible to linearize curves or to put them in a certain form. The intermediate values are interpolated. Sensor values outside of the nodes are not considered/calculated and

therefore it makes sense always to cover the entire measuring range of the sensor by the positions of the nodes. If all of a sensor offsets are = 0, the number of nodes will be reset to 0.

Note: Less nodes reduce the internal computational effort, i. e. always only as many nodes as necessary should be used.

```

TOSS UNIKLIMA vario Terminal - 192.168.110.222
Configuration for experts
Correct (Y/N) ? Y

Attention: Improper settings can cause that the user interface of the station
is no longer works!
Really (Y/N) ? Y

[P] Power-Save-Modi
[M] Multi-Points-Linearization
? =
Sensor[01]: Temperature 20cm with 0 linearization points
Sensor[02]: Relative humidity with 6 linearization points
P1:RH=+0.0% =>Offset=+1.0% P2:RH=+20.0% =>Offset=+0.5%
P3:RH=+40.0% =>Offset=-0.5% P4:RH=+60.0% =>Offset=+0.0%
P5:RH=+80.0% =>Offset=+0.5% P6:RH=+100.0% =>Offset=+1.0%
Sensor[03]: Barometric pressure with 0 linearization points
Sensor[04]: Wind1 speed with 0 linearization points
Sensor[05]: Wind1 maximum with 0 linearization points
Sensor[06]: Wind1 direction with 0 linearization points
Sensor[07]: Niederschlag with 0 linearization points

Linearization points set new
Sensor number=

```

Example: editing of the linearization points of the sensor 2 (relative humidity)

```

TOSS UNIKLIMA vario Terminal - 192.168.110.222

P1:RH=+0.0% =>Offset=+1.0% P2:RH=+20.0% =>Offset=+0.5%
P3:RH=+40.0% =>Offset=-0.5% P4:RH=+60.0% =>Offset=+0.0%
P5:RH=+80.0% =>Offset=+0.5% P6:RH=+100.0% =>Offset=+1.0%
p?=

Linearization points set new
Sensor number=2
Sensor[02]: Relative humidity with 6 linearization points
P1:RH=+0.0% =>Offset=+1.0% P2:RH=+20.0% =>Offset=+0.5%
P3:RH=+40.0% =>Offset=-0.5% P4:RH=+60.0% =>Offset=+0.0%
P5:RH=+80.0% =>Offset=+0.5% P6:RH=+100.0% =>Offset=+1.0%

Counts of points set new
Counts[0..7]=6
Sensor[02]: Relative humidity with 6 linearization points
P1:RH=+0.0% =>Offset=+1.0% P2:RH=+20.0% =>Offset=+0.5%
P3:RH=+40.0% =>Offset=-0.5% P4:RH=+60.0% =>Offset=+0.0%
P5:RH=+80.0% =>Offset=+0.5% P6:RH=+100.0% =>Offset=+1.0%
p?=1
P1:RH=+0.0% =>Offset=+1.0%
P1:RH=+0.0% =>Offset=0.8

```

[F] CHKDSK Flash Drive A:

Checks and if necessary corrects the file system of the flash drive A:. After that the weather station will be rebooted.

5.3.5 Set WEB Parameters [C]

The weather station has its own web server that generates the current minutely, hourly and daily averages including the tendency as a web page. The page refresh time in minutes determines how often the page is regenerated. Additionally the image of a network capable webcam can be integrated into the web page (see for example <http://tossweather.dyndns.biz>). The image of the webcam, with for example the file name webcam.jpg, will be imported from the address entered at the menu item WEBCAM Image URL (e. g. 192.168.110.250/webcam.jpg). The WEBCAM Interval in seconds sets the cycle time in which the webcam image is imported by the weather station.

- WEB Server On/Off : [1]=on, [0]=off
- WEB Page Refresh : sec (-1=Off)
- WEBCAM Img1 Pix.X : Pixel -> X
- WEBCAM Img1 Pix.Y : Pixel -> Y
- WEBCAM Table size : in %
- WEBCAM On/Off : [1]=on, [0]=off
- WEBCAM Interval : sec
- WEBCAM Image URL : xxxxxxxx max200Ch.
- WEBCAM Img2 Pix.X : Pixel -> X
- WEBCAM Img2 Pix.Y : Pixel -> Y

The image format parameters in pixel [x+y] define the image size in the web page independent of the real image dimensions fixed in the camera.
 „Img1“ configures the image in the „index.htm“, „Img2“ in the „webcam.htm“.

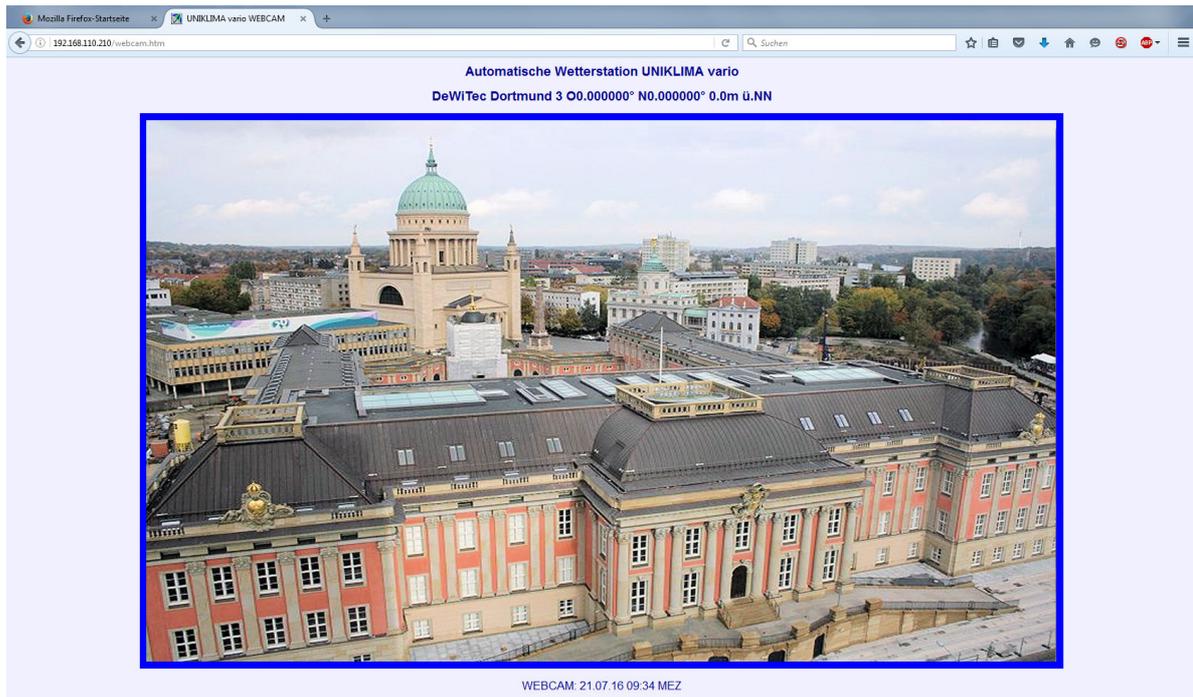
The table width in [%] divides the three-pieced table proportionally, as to see in the following image. Hereby the logos are left-aligned or right-aligned respectively, the webcam image is center-aligned.

Automatische Wetterstation UNIKLIMA
 DeWiTec Dortmund 3
 00.000000° N0.000000° 0.0m ü.NN

Aktuelle Wetterdaten 21.07.16 09:06 MEZ (→ Extremwerte → Winddaten)					
Sensor	Aktueller Messwert	Minutenmittel	Stundenmittel	Tagesmittel	Tendenz [Minute → Stunde]
Windgeschwindigkeit (K)	WGK=0.2 kts	WGK=0.2 kts	WGK=0.2 kts	WGK=0.1 kts	WGK=gleichbleibend
Windmaximum (K)	WMK=0.2 kts	WMK=0.2 kts	WMK=0.7 kts	WMK=1.0 kts	WMK=schwach fallend
Windrichtung	WR1=15.0 °	WR1=336.2 °	WR1=358.8 °	WR1=21.5 °	WR1=NNW

Mittelwerte sind gleitende Mittel der letzten 60 bzw. 24 Datenwerte, bei kumulativen Sensoren Summen im jeweiligen Zeitraster.
 E-Mail mit Fragen oder Kommentaren zu dieser Website an: [TOSS GmbH](mailto:TOSS@tooss.de)
 Copyright © TOSS GmbH Pörscham

The same webcam image in the dimensions „Img2“, 1280x768, in the „webcam.htm“:



5.3.6 Barometric altitude AMSL [D]

The respective air pressure (QFE on barometer height) depends on the height of the location. A standardization to sea level height (SL = sea level) must be done in order to allow a comparability of air pressure values. Since the air pressure of higher located places is lower than on SL the height of the measuring station, the barometric altitude, must be entered. The sub item "Barometric altitude AMSL", which is called with the key "D", allows the input and durable storage of this value. The correct conversion value from QFE to QNH is dependent on the altitude and the current air pressure and is calculated automatically. Approximated values are available in the altitude table of the appendix.

The user can always define how the pressure values are measured and saved as QFE or QNH.

5.3.7 Configuring the switch outputs [S]

The weather station has two digital, potential separated switch outputs (relay 1 and 2), coming out at a socket row (see appendix: connection reference) and 4 additional digital TTL outputs. According to the sensor values currently measured and predefined switching conditions switching processes can be triggered over these outputs.

For every switch output (relay) each 9 conditions for switching on and off can be chosen.

The 9 conditions are combined into 3 groups of each 3. Within a group the 3 switching conditions are logically 'AND' combined. The 3 groups are logically 'OR' combined. The result of the logical combination of this matrix of conditions (as far as defined by the user) decides whether the relay is switched 'ON' (result of the switching on conditions) or 'OFF' (result of the switching off conditions).

```

TOSS UNIKLIMA vario Terminal - 192.168.110.200
Schaltausgaenge bearbeiten (J/N)?
Messung stoppt...

[1] Relais1 , [2] Relais2 , [3] DigiOut3, [4] DigiOut4,
[5] DigiOut5, [6] DigiOut6,

[1...6] Schaltausgaenge anzeigen-----
[P] Schaltausgaenge programmieren-
[R] Return Grundmenue -----

Relais1 : logische Tabelle der EIN-Schaltbedingung
(((B1)=[n.def.]) & ((B2)=[n.def.]) & ((B3)=[n.def.])) oder
(((B4)=[n.def.]) & ((B5)=[n.def.]) & ((B6)=[n.def.])) oder
(((B7)=[n.def.]) & ((B8)=[n.def.]) & ((B9)=[n.def.]))
Relais1 : logische Tabelle der AUS-Schaltbedingung
(((B1)=[n.def.]) & ((B2)=[n.def.]) & ((B3)=[n.def.])) oder
(((B4)=[n.def.]) & ((B5)=[n.def.]) & ((B6)=[n.def.])) oder
(((B7)=[n.def.]) & ((B8)=[n.def.]) & ((B9)=[n.def.]))
-> Schaltausgang 'Relais1' ist AUS -> keine Schaltbedingungen!

```

A condition consists of the choice of a sensor (e.g. air temperature), a data type (range of time, e.g. hourly means), a switching threshold (e.g. 15°C) and the specification whether the sensor value should be greater [$>$] or small/equal [$<=$] to the switching threshold in order to fulfil the condition.

During the programming of these switching conditions the station does no registration of measured values. Therefore the subroutine has to be exited after the setting of the parameters!

```

TOSS UNIKLIMA vario Terminal - 192.168.110.200
Schaltausgänge bearbeiten (J/N)?

[1] Relais1 , [2] Relais2 , [3] DigiOut3, [4] DigiOut4,
[5] DigiOut5, [6] DigiOut6,

[1...6] Schaltausgänge anzeigen-----
[P] Schaltausgänge programmieren-----
[R] Return Grundmenü -----

Relais1 : logische Tabelle der EIN-Schaltbedingung
(((B1)=[n.def.]) & ((B2)=[n.def.]) & ((B3)=[n.def.])) oder
(((B4)=[n.def.]) & ((B5)=[n.def.]) & ((B6)=[n.def.])) oder
(((B7)=[n.def.]) & ((B8)=[n.def.]) & ((B9)=[n.def.]))
Relais1 : logische Tabelle der AUS-Schaltbedingung
(((B1)=[n.def.]) & ((B2)=[n.def.]) & ((B3)=[n.def.])) oder
(((B4)=[n.def.]) & ((B5)=[n.def.]) & ((B6)=[n.def.])) oder
(((B7)=[n.def.]) & ((B8)=[n.def.]) & ((B9)=[n.def.]))
-> Schaltausgang 'Relais1' ist AUS -> keine Schaltbedingungen!

[C] Bedingung löschen
[R] Return
[S] Sensor wählen
.....
Bedingung bezieht sich auf Sensor...
[1] Lufttemperatur
[2] Relative Luftfeuchte
[3] Luftdruck
[4] Windgeschwindigkeit
[5] Windmaximum
[6] Windrichtung
Sensor Nr.=1
Lufttemperatur

Welche Zeitbasis (aktuelles Mittel) verwenden?
[1]Sekunde, [2]Minuten, [3]Stunde, [4]Flex.Messwerte
[C] Bedingung löschen
[R] Return
Datentyp oder Operation wählen=(hour)
EIN wenn Lufttemperatur >] oder [<] ?
EIN wenn Lufttemperatur >?=15
EIN wenn Lufttemperatur > 15.0
Bedingung korrekt definiert (J/N) ? J

save.....OK

Relais1 : logische Tabelle der EIN-Schaltbedingung
(((B1)=[LT=(hour)>15.0]?) & ((B2)=[n.def.]) & ((B3)=[n.def.])) oder
(((B4)=[n.def.]) & ((B5)=[n.def.]) & ((B6)=[n.def.])) oder
(((B7)=[n.def.]) & ((B8)=[n.def.]) & ((B9)=[n.def.]))
-> Schaltausgang 'Relais1' ist AUS -> ACHTUNG! keine AUS-Schaltbedingungen!
[1] Relais1 , [2] Relais2 , [3] DigiOut3, [4] DigiOut4,
[5] DigiOut5, [6] DigiOut6,

[1...6] Schaltausgänge anzeigen-----
[P] Schaltausgänge programmieren-----
[R] Return Grundmenü -----

```

Attention has to be paid to it that always both conditions for switching on and off must be defined. In the order of processing the switching on conditions are tested at first. At fulfilment switching on is done, at no fulfilment no reaction is caused. Afterwards the switching off conditions are evaluated in analogous manner. Therefore it is also possible that no switching process is triggered because the switching on condition is not exceeded yet and the switching off condition has not fallen yet (hysteresis range).

Two examples are illustrated now with corresponding condition matrixes.

Example 1: Storm warning

siren over relay 1 (**attention:** note the maximal switching capacity of the relay, see appendix!)
 alarm at exceeding 10 m/s
 all-clear signal at falling short of 8 m/s
 using current values for 'ON' as gusts of wind shall be regarded as critical
 'OFF' if the 10 min average falls below the OFF condition
 (setting measuring interval to 10 min, see 5.3.4 Programming the interval of the flexible measure value memory [M])

```

TOSS UNIKLIMA vario Terminal - 192.168.110.200
[1...6] Schaltausgaenge anzeigen-----
[P]    Schaltausgaenge programmieren-
[R]    Return Grundmenue -----

Relais1 : logische Tabelle der EIN-Schaltbedingung
(((B1)=[HG1=(sec)]>10.01?[N]) & ((B2)=[n.def.]) & ((B3)=[n.def.])) oder
(((B4)=[n.def.]) & ((B5)=[n.def.]) & ((B6)=[n.def.])) oder
(((B7)=[n.def.]) & ((B8)=[n.def.]) & ((B9)=[n.def.]))
Relais1 : logische Tabelle der AUS-Schaltbedingung
(((B1)=[HG1=(flex)]<=8.01?[N]) & ((B2)=[n.def.]) & ((B3)=[n.def.])) oder
(((B4)=[n.def.]) & ((B5)=[n.def.]) & ((B6)=[n.def.])) oder
(((B7)=[n.def.]) & ((B8)=[n.def.]) & ((B9)=[n.def.]))
-> Schaltausgang 'Relais1' ist EIN
  
```

Example 2: Controlling a ventilator

minute means are the data base
 engine over relay 2 (**attention:** note the max. switching capacity of the relay, see appendix!)
 'ON' if air temperature > 30°C or
 if air temperature > 25°C but hardly wind, wind speed < 1 m/s
 or air humidity > 90%
 'OFF' if air temperature <= 25°C and air humidity <= 60%
 or if wind speed > 5 m/s
 special condition: engine may not run at frost, air temperature <= 0°C

```

TOSS UNIKLIMA vario Terminal - 192.168.110.200
[1...6] Schaltausgaenge anzeigen-----
[P]    Schaltausgaenge programmieren-
[R]    Return Grundmenue -----

Relais2 : logische Tabelle der EIN-Schaltbedingung
(((B1)=[LT=(min)]>30.01?[J]) & ((B2)=[n.def.]) & ((B3)=[n.def.])) oder
(((B4)=[LT=(min)]>25.01?[J]) & ((B5)=[HG1=(min)]<=0.91?[J]) & ((B6)=[n.def.])) oder
(((B7)=[RF=(min)]>90.01?[J]) & ((B8)=[n.def.]) & ((B9)=[n.def.]))
Relais2 : logische Tabelle der AUS-Schaltbedingung
(((B1)=[LT=(min)]<=25.01?[N]) & ((B2)=[RF=(min)]<=60.01?[N]) & ((B3)=[n.def.])) oder
(((B4)=[HG1=(min)]>5.01?[N]) & ((B5)=[n.def.]) & ((B6)=[n.def.])) oder
(((B7)=[LT=(min)]<=0.01?[N]) & ((B8)=[n.def.]) & ((B9)=[n.def.]))
-> Schaltausgang 'Relais2' ist EIN
  
```

5.3.7.1 Switching condition and SMS sending

If the weather station has a GSM/GPRS modem and a SMS licence, SMS messages can be defined parallel to the ON or OFF switching conditions. In this way critical states, warnings, alarm notifications or status reports are currently available over a mobile telephone.

The procedure of the SMS generation is described in the section: Set GSM modem SMS-Parameters [G]. The use of the keyword "DOUT" in a SMC command includes the current switching states and conditions into the SMS.

If phone number, text messages and SMC command are entered, the selected switching condition can be linked with the previously created SMC command (e.g. SMC6:NAME>TXT6>DOUT> TEL7):

[S] Digital Outputs

[P] Program digital outputs

Set [E] ON-condition, [A] OFF-condition, [S] SMS message=

[C] Clear condition, set new SMC no=6

If the respective switching condition is reached a SMS once is sent to the phone number assigned to TEL7, consisting of the name of the station followed by a text that was entered by the user as TXT6, the current measured values and the states of switching conditions.

5.3.8 Displaying version data [V]

With the key "V" the software version, the free memory and the respective sensor configuration of the weather station are displayed.

```

----Automatische Wetterstation-----
----UNIKLIMA vario (c) TOSS GmbH-----
Stationsname : TOSS LAN -----
Geog.Koord: N52.2650° O13.0100° 45.0m üNN ---
RTOS Version : V1.51 FULL SN:1AEEA-----
Konfiguration: UKvario9 V9.099 -----
Lizenzen: EMAIL+SNTP+FTPC+WEBCAM+FROST -----
Messintervall: 60min -----
Frostwarnung : aktiv -----
FTPC-Betrieb : Upload aktiv/über LAN -----
WEBCAM aktiv: Abrufintervall 015sec -----

Zeitsynchronisation durch Timeserver aktiv --
>free memory on Flash A: -----
>A:= 3761152(7012352) Byte -----
[01]Lufttemperatur in °C -----
[02]Relative Luftfeuchte in % -----
[03]Bodentemperatur in °C -----
[04]Luftdruck [QNH] in hPa -----
[05]Beleuchtungsstärke in Lux -----
[06]Niederschlag in mm -----
[07]Windgeschwindigkeit in m/s -----
[08]Windmaximum in m/s -----
[09]Windrichtung in ° -----
[10]Globalstrahlung CMP in W/m² -----
[11]UV-Strahlung in W/m² -----
[12]Ortsdosisleistung in nSv/h -----
[13]Sonnenscheindauer in min -----
[14]Wind Chill Index in °C -----
[15]Taupunkt-Temperat. in °C -----
[16]Nasstemperatur in °C -----
[17]Luftdichte in g/m3 -----
[18]Verdunstung (Haude) in mm -----

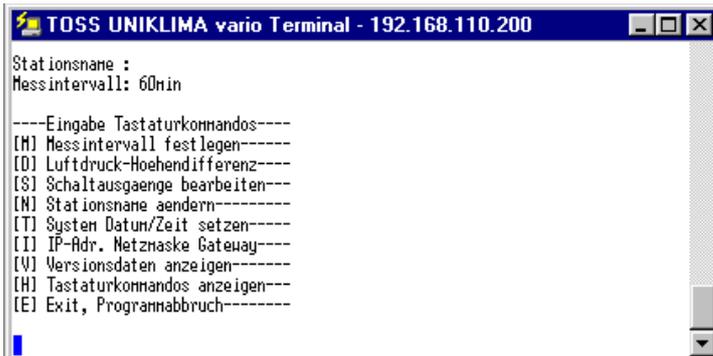
```

5.3.9 Displaying keyboard commands [H]

The key "H" shows the available commands "M", "D", "C", "F", "W", "K", "P", "S", "N", "T", "I", "V", "H" and "E".

A number of commands is activated only at existence of the respective sensor type or special software modules.

- [C] Set WEB Parameters
- [D] Barometric altitude AMSL
- [F] Frost warning parameters
- [K] Set Communication-Parameters
- [P] Set SYNOP-METAR-Parameters
- [R] Wind turbine rotor radius



5.3.10 Set Communication-Parameters [K]

The extensive possibilities of communication and ways of data transfer of the weather station are adapted to the different customer specific conditions and are completely based on the TCP/IP network technologies which currently are spreading.

The most stable form still is the cable-bound LAN connection over a patch cable. Different modem versions (analog, GSM, GPRS) or the WLAN connectivity are available for the network access and remote data transmission (dial-up network). Different network based services enlarge the functionality depending on the implemented network access.

For remote data transmission by radio a GSM modem can be integrated into the weather station. A thereby realizable PPP connection allows TCP/IP based services like FTP, HTTP, TELNET, SNTP and furthermore a SMS operation in different modes.

The parameter setting of the PPP server is done by the menu item [A]. Another menu section deals with the generation and the sending of SMS. Billing is here similar to a mobile phone call in time units, as long as the weather station is called, e.g. for data retrieval.

Another form of radio connectivity is possible by GPRS, and mostly it is much cheaper and more functional than GSM. In this case the weather station autonomously establishes the access to the Internet by a client connection. So the weather station is permanently reachable worldwide. Billing is done in this mode depending on the transmitted data volume (traffic). The IP address dynamically assigned by the provider can be linked to a static web address (URL) of your choice by the free services DynDNS.org or for example no-ip.com (free for up to 5 IP addresses).

TCP/IP based services such as FTP, HTTP, TELNET and SNTP (time server), E-mail sending and automatic FTP data upload to a server can be selected optionally. When selecting a suitable GPRS provider, make sure that the weather station as data end device is reachable from the outside via the Internet. Many providers allow for their GPRS rates the weather station to login into the Internet, but a provider's own firewall blocks the access from the outside onto the weather station. The retrieval of data or e.g. the weather station's internally generated website would not be given in this case. Please ask your preferred provider for "m2m" rates which allow both directions of communication. T-D1 (in Germany) currently allows both communication directions without m2m rate.

The establishing of a point-to-point connection over a secure VPN tunnel is another communication option of the weather station.

If a network connection (LAN / WLAN) to a DSL router is available the same functionality is given as for a GPRS client connection.

Overview of the available parameter settings:

Set GSM modem SMS-Parameters
 [O] Operation mode : [1]=Send SMS, [2]=Autoanswer
 [T] SMS Telephone numbers : store up to 10 phone numbers to be called
 [M] SMS Message strings : edit up to 10 messages to be sent
 [S] Create SMS command line : up to 10 different sending rules what/where
 [L] SMS Cost limit : max. allowed number of SMS per hour / day
 [Y] Send test SMS : process one sending rule
 [P] Set SIM-PIN of mobile phone card
 [G] Check credit of phone card

Network Management
 [N] SNMP parameter

GSM: Set PPP-server-parameters
 [A] Address, Remote, Netmask, Gateway, Status

GPRS:Set PPP-client-parameters
 [C] PPP-client-parameters
 [D] DynDNS parameters

Services over GPRS or LAN
 [E] Email parameters : sending of current or historical data as e-mail
 [U] FTP-client ⇒ Server Upload : 2 separate server parameterizations possible
 [V] VPN Tunnel Parameters : secure point-to-point connection for TCP/IP services

5.3.10.1 Operation mode [O]

5.3.10.1.1 Send SMS [1]

The sending of SMS is an additional software component (license) to extend the functionality. Each up to 10 different phone numbers "T" and text messages "M" can be entered by the user and then be saved. By the SMS sending command "S" is defined which text messages and which additional data shall be sent to which phone numbers. The additional data are selected by key words and can be combined with the text messages and phone numbers to sending commands in any way.

key words for additional, dynamically generated data

NAME : station name
 TXT n : freely editable text block, $n=0..9$
 TEL n : freely editable phone number, $n=0..9$
 DATA : current weather data of the station
 FROST : frost temperature, air temperature, rel. humidity
 SYNOP : weather data in SYNOP format (license)
 METAR : weather data in METAR format (license)
 DOUT : digital switching output

A ">" must be put as separator between the text messages, data and phone numbers. The phone number or numbers always have to be placed at the end of the sending command!
 Attention must be paid to the correct spelling. It is recommended to verify the edited sending command by sending a test SMS.

e.g. NAME>TXT0>DATA>TXT2>TEL0>TEL2

This command line sends the name of the station, followed by the text message stored as TXT0, the current weather data and the text message TXT2 to the phone numbers stored as TEL0 and TEL2.

If the automatically generated SMS exceeds the permissible number of 160 characters, it is divided into two SMS and both of them are sent to the phone numbers. The maximum number of characters per sending command therefore is limited to 320 characters.

5.3.10.1.2 Autoanswer [2]

This further SMS operation mode, which can be used alone or virtually parallel to the Mode1, realizes an automatic SMS inquiry/response regime.

If a SMS featuring the keyword "weather" is sent to the weather station by a user, the station answers an automatic SMS containing the current weather data. Since the GSM modem must cover both the PPP server and the two SMS modes of operation, it can last 2-5 min until the response can be sent. An established, i.e. existing, PPP connection for remote data transmission always has the highest priority so that SMS operation is not possible at this time. An existing GPRS connection to the WWW is temporarily interrupted for the SMS operation.

5.3.10.2 Telephone numbers [T]

Each up to 10 different phone numbers can be entered by the user. They represent a small phone book and are a prerequisite for the generation of SMS sending commands. These determine to which phone numbers which SMS will be sent. A telephone number can be up to 30 digits long.

5.3.10.3 Message strings [M]

Message texts are text blocks predefinable by the user, which at the occurrence of events (for example, frost warning, exceeding of switching thresholds, phone card limits, auto answer mode etc) are assembled with the help of a SMS sending command and the stored phone numbers. Up to 10 text blocks can be predefined.

5.3.10.4 Create SMS command line [S]

The SMS sending command "S" defines which text blocks and what additional data should be sent to which phone numbers. The additional data is selected by key words and arbitrarily joined together with the text blocks and the phone numbers to sending commands.

Key words of additional, dynamically generated data

NAME	: station name
TXTn	: freely editable text block, n=0..9
TELn	: freely editable phone number, n=0..9
DATA	: current weather data of the station
FROST	: frost temperature, air temperature, rel. humidity
SYNOP	: weather data in SYNOP format (licence)
METAR	: weather data in METAR format (licence)
DOUT	: digital switching output

As separator between the text messages, data and phone numbers a ">" must be used. The telephone number or numbers always must be placed at the end of the sending command! Attention must be paid to a correct spelling. It is recommended to verify the edited sending command by sending a test SMS.

e.g. NAME>TXT0>DATA>TXT2>TEL0>TEL2

It sends the name of the station, followed by the text message that was stored in TXT0, the current weather data and the text message TXT2 to the telephone numbers stored in TEL0 and TEL2.

If the number of characters of the automatically generated SMS exceeds the maximum of 160, it is divided into two SMS and sent to the phone numbers as usual. With it the maximum number of characters per sending command is limited to 320 characters.

5.3.10.5 SMS Cost limit [L]

For safety reasons, for limitation of SMS costs it is recommended to define a maximally allowed number of SMS per hour and per day (default is 10 per hour and 100 per day). If this limiting value is reached the sending of further SMS is stopped. After the time interval (hour or day) has elapsed the SMS sending counter is reset and possibly pending SMS are sent.

Attention! The deactivation of this service by setting the limit to zero is strongly not recommended. A too small value prevents the near real time sending of SMS messages. Own responsibility and a reasonable selection according to the incidence of SMS sending is needed here.

5.3.10.6 Send test SMS [Y]

It is recommended to verify an edited sending command by sending a test SMS.

5.3.10.7 Set SIM-PIN of mobile phone card [P]

The telephone card used in the radio modem can be protected by a four-digit PIN, as known from a cell phone. This menu item allows entering and permanent storage of the personal PIN in the weather station and authorizes it, to use the phone card and to login the radio modem into the GSM radio network of the provider. It is activated as sub menu item of "Set Communication-Parameters" by a single input of the key word "PIN1", and then is available in the menu if the customer has defined a SIM-PIN at least once in this way.

5.3.10.8 Check credit of phone card [G]

When prepaid phone cards are used, it is useful to know the remainder of the phone card or respectively to receive a SMS as information when it falls below a given limit.

5.3.10.9 PPP-Server, Address, Remote, Netmask, Gateway, Status [A]

The weather station has an own PPP server. IP address, remote address, net mask and gateway can be adapted to customer specific network requirements.

5.3.10.10 GPRS:Set PPP-client-parameters

The GPRS connection is an additional software module (GPRS licence) for the extension of the functionality.

At GPRS operation the weather station as client establishes a connection to the provider. The accessiblensness of the weather station over a fixed IP address is achieved by DynDNS.

5.3.10.10.1 PPP-client-parameters [C]

GPRS connection parameters set new

```

[1] Enable      =1                : 1=on, 0=off
[2] Authent.    =1                : authentication: PAP=1,CHAP=2,PAPfP=3,CHAPfP=4,No=0 (0<=4)
[3] APN         =internet.t-d1.de : APN of the provider
[4] Dialnumb.  =*99***1#         : GRPS phone number of the provider
[5] User name   =TOSS            : user name of the provider access
[6] Password   =t-d1            : password of the provider access
[7] Tracemode   =1                : 0 = off, 1 = GPRS, DynDNS, SNTP, 2 = 1 + RxLevel

```

The trace mode [7] logs events and writes them into the file msg_prot.txt located in the directory A:\daten\system. So problems of the login can be analyzed. The default setting is 0 = off.

When the weather station is logged in at the GPRS provider and in standby, an existing accessibleness ultimately can be checked only by a short data transmission. The ping command to one of three freely eligible servers realizes this.

PING IP for GPRS status check edit

```

[E] Ping Check On/Off : general enable or disable of this ping check
[1] IP1: 81.91.170.1  : IP's which are pinged
[2] IP2: 130.149.17.21
[3] IP3: 195.145.119.188
[T] Test Ping        : manual start of ping check
[D] Default Ping-IP's : set default ping IP's
[R] Return

```

5.3.10.10.2 DynDNS Parameter [D]

The accessibleness of the weather station over a fixed IP address is achieved by DynDNS. Hereby the weather station announces the temporary dynamic IP address assigned by the provider to a DNS server which links it to a fixed public URL (web address) of the customer.

This registration procedure is possible free of charge for the DNS servers DynDNS.org or no-ip.com and an own service at the manufacturer TOSS GmbH Potsdam.

```

DynDNS parameters set new : for DynDNS.org
[1] Enable      =1                : 1=on, 0=off
[2] URL         =members.dyndns.org/nic/update : URL for update of the dynamic IP address
[3] User name   =username         : customer name at DynDNS.org
[4] Password    =password         : customer password at DynDNS.org
[5] Host name   =customerwish.dyndns.biz : static URL of the weather station of the customer

```

```

DynDNS parameters set new : for no-ip.com
[1] Enable      =1                : 1=on, 0=off
[2] URL         = dynupdate.no-ip.com/nic/update : URL for update of the dynamic IP address
[3] User name   =username         : customer name at no-ip.com
[4] Password    =password         : customer password at no-ip.com
[5] Host name   =customerwish.hopto.org : static URL of the weather station of the customer

```

```

DynDNS parameters set new : for TOSS server
[1] Enable      =1                : 1=on, 0=off
[2] URL         =www.tosswetter.de : URL for update of the dynamic IP address
[3] User name   =customer         : customer name for TOSS server
[4] Password    =5-27755b165-m84   : customer password for TOSS server
[5] Host name   =www.tosswetter.de/kunde : static URL of the weather station of the customer
[6] http-upload =0                : 1=on, 0=off, upload of the web page onto the
                                   : TOSS server www.tosswetter.de/kunde/index.htm

```

In case the desired DNS service requires a special [2] URL update string, it can be generated by using predefined wildcards, as shown in the following example for "goip.de". Syntax of the necessary URL update string:

`http://www.goip.de/setip?username=xxxxxx&password=yyyyyy&subdomain=zzzzz.goip.de&ip=1.2.3.4&html=false`

The following wildcards are available for configured DynDNS parameters. The User name for example, that was defined at [3], is inserted at the corresponding position of the URL update string:

```
<username>   for [3] User name = xxxxxx
<password>   for [4] Password = yyyyyy
<subdomain>  for [5] Host name = zzzzzz.goip.de
<ip>         for internal dynamic IP address assigned by the provider = 1.2.3.4
```

At [2] URL the following string with wildcards accordingly has to be entered for "goip.de":

`http://www.goip.de/setip?username=<username>&password=<password>&subdomain=<subdomain>&ip=<ip>&html=false`

5.3.10.11 Services over GPRS or LAN

5.3.10.11.1 Email parameter [E]

The e-mail sending is an additional software module (e-mail license) to extend the functionality. It allows to send current or historical weather data as e-mail. The current weather data (second values, minutely, hourly and daily averages etc) that the weather station updates every second on its RAM Drive C: are embedded as separate text lines in the e-mail body. The historical weather data (flexible measured values and daily averages), that the weather station continuously saves on the flash drive A:, are sent as original files in the e-mail attachment because of their size. The number of the original files to be sent beginning from the historically most recent file is defined in "commands".

Enable	: [1]=on, [0]=off	activation of e-mail sending
Send over	: [1]=GPRS, [0]=LAN	sending of e-mail over an existing GPRS connection or LAN (corporate network and/or DSL connection)
Interval A:	: min, [-1]=off	sending interval in minutes for historical weather data (drive A:)
Interval C:	: min, [-1]=off	sending interval in minutes for current weather data (drive C:)
Email Server	: IP xxx.xxx.xxx.xxx	IP address of SMTP server
From @Address	: xxxx@xxxxx max50Ch.	e-mail address of sender
From Alias	: xxxxxxxxxx max50Ch.	name of the sender
To @Address	: xxxx@xxxxx max50Ch.	e-mail address of receiver
User name	: xxxxxxxxxx max50Ch.	user name for authentication at SMTP server
Password	: xxxxxxxxxx max50Ch.	password for authentication at SMTP server
Subject	: xxxxxxxxxx max100Ch.	subject of e-mail
Attachment A:	: edit.	defining of the e-mail attachments of historical weather data

Sent data as email attachment

[D] DAY=number	: Daily average	number of days [1..99] retroactively from current
[F] FLEX=number	: Flexible average	number of flex. data [1..99] retroactively from current
[S] STATUS	: Status information	uk_stat.txt, msg_prot.txt
[C]	clear command	

5.3.10.11.2 FTP-client -> Server Upload [U]

The FTP Uploader is an additional software module (FTPC licence) to extend the functionality. It allows cyclically to upload current or historical weather data at predefined intervals onto two separate FTP servers.

Enable	: [1]=on, [0]=off	upload activation
Upload	: over [1]=GPRS, [0]=LAN	upload over an existing GPRS connection or LAN (corporate network and/or DSL connection)
Interval	: min	upload interval in minutes
Data type	: [1]=historical, [2]=current	historical weather data (drive A:), current weather data (C:)
Server IP	: xxx.xxx.xxx.xxx	IP address of the des FTP server

Serv.Path	: .../.../.../	subdirectory on the FTP server with final „/“
User name	: xx50Ch.xxxxxxxxxxxxxx	access name on the FTP server
Password	: xx50Ch.xxxxxxxxxxxxxx	password on the FTP server
FTP Type	: [0]=binary(default), [1]=ascii	
FTP Mode	: [0]=passiv(default), [1]=active	
Commands	:	FTPC commands edit
TestTrace	: [0]=off [1..60]min on	enables the trace mode for xx minutes

For the first start of the upload commands the trace mode allows to observe the single steps of the upload process for testing purposes.

Commands

Depending on the selected data type ([1] = historical, [2] = current) the files for upload can be defined. When uploading up to 99 historical weather files it can be chosen between flexible, daily and status files. The current weather data (second, minute, hour and daily average etc), stored on the RAM drive, can be uploaded at Data type [2] with the help of the known FTP commands PUT, GET, DEL, REN, MKD, RMD, and CD as script execution. Previously all available files are displayed.

Example for historical weather data: upload of the status file as third command

```

Commands: UKvario FTP-Client -> FTP-Server(80.237.132.91)
FTPC[1]: PUT FLEX=2      : the 2 most recent files of the flexible measured memory are uploaded
FTPC[2]: PUT DAY=2      : the 2 most recent files of the daily averages are uploaded
FTPC[3]:
FTPC[4]:
FTPC[5]:
FTPC[6]:
FTPC[7]:
FTPC[8]:
FTPC[9]:
FTPC[10]:
FTPC-Command[1..10] Nr.=3

PUT FLEX=xx, PUT DAY=xx,(xx=[1..99])
PUT STATUS
FTPC[3]=====
PUT STATUS

```

Example for current weather data: upload of the flexible measured memory as third command

```

Commands: UKvario FTP-Client -> FTP-Server(80.237.132.91)
FTPC[1]: PUT tag.txt
FTPC[2]: PUT stunde.txt
FTPC[3]:
FTPC[4]:
FTPC[5]:
FTPC[6]:
FTPC[7]:
FTPC[8]:
FTPC[9]:
FTPC[10]:
FTPC-Command [1..10] Nr.=3

== DIR: c:\daten\ =====
SEKUNDE.TXT
DAYMAX.TXT
DAYMIN.TXT
MINUTE.TXT
STUNDE.TXT
TAG.TXT
FLEX60.TXT
FROST.TXT

```

```
PUT, GET, DEL, REN, MKD, RMD, CD
FTPC[3]=====
PUT FLEX60.TXT
```

5.3.10.11.3 VPN Tunnel Parameters [V]

The VPN (Virtual Private Network) allows the creation of a confidential and secure network over public and insecure networks. This is recommended if the weather station for example is in the public Internet over GPRS and a secure access to the station is wanted, security-related parameter settings must be made or the firewall of the provider for an external access from outside must be overcome. The establishing of a connection through a firewall must be initiated by the UNIKLIMA vario, as it is not yet visible for the external PC. For VPN a tunnel is built between VPN client and VPN server. The IP packets of the different applications (http, ftp, telnet, ...) are coded and exchanged not visible from the outside through a secure virtual tunnel between two endpoints. There are several ways to do this.

Alternatively UDP or TCP protocols and different encryption and authentication methods (pre-shared key or certificate based authentication with PKI, SSL/TLS) are used. Pre-shared keys are suitable for single VPN connections with few participants, all using the same key that previously was exchanged confidentially. Certificates are a much more secure method of authentication. A client needs a valid certificate to logon at the VPN server. The creation of own certificates requires some effort and is not easy (easy-rsa).

Virtual interfaces (TUN/TAP) with own local IP (Ifconfig) are used as tunnel endpoints. The establishing of a connection begins with "pinging at" of the other tunnel partner. When put into operation the first time trace mode = 9 (0=off) gives useful additional information on the TELNET console.

The VPN tunnel is an additional software module (VPN license) pre-installed in the protected system directory of the UNIKLIMA vario. A VPN software driver (www.OpenVPN.net, version 2.1.1) is required on the PC at the other end of the tunnel, as well. All parameters necessary for the tunnel setup are stored in a configuration file which the user has to create or to adapt. With the menu item "Set Communication-Parameters [K]" → "VPN Tunnel Parameters [V]" this configuration file "vario.vpn" for the side of the weather station can be edited.

The default setting (factory setting) is a point to point connection with pre-shared key exchanged both sides, a 2048 bit sized encryption file called "static.key".

The remote IP of the PC within public reach can be entered individually at "Connect to".

Enable	: [1]=on, [0]=off	VPN tunnel activation
Protocol	: udp, tcp-client, tcp-server	UDP = standard protocol
Connect to	: xxx.xxx.xxx.xxx max50Ch.	public IP address of the remote PC
Port number	: 1194, 1..65535	1194 = standard VPN port
Device type	: tun, tap	virtual interfaces tun = standard
tun-mtu	: 1500	
Ifconfig	: 10.1.1.2 10.1.1.1	internal private, local tunnel address of both partners
Ping	: 10, 1..100	sends every 10 seconds a ping to the remote partner
Pingrestart	: 15, 1..600	reconnection after 15 seconds without ping answer
Trace mode	: verb[0..9]	trace mode activation (verbose 0..9)
ExtUserParm	: Import Secret.key SSL/TLS	import of a custom security key or SSL/TLS certificates and a VPN configuration file

The VPN tunnel is predefined with the previous default settings. With the menu item "ExtUserParm" more complex, individually customized configuration settings, encryption files and certificates can be imported into the weather station. The import of the customized files is done from a subdirectory "/update" from the flash drive a: of the UNIKLIMA vario. This subdirectory must be created using the FTP access (user name: "ftpadmin", password: "ftpadmin") and the desired files with predetermined names must be copied there. A submenu described next allows all further necessary sequences:

- Import external VPN user configurations:
- [1] Available parameters und options (help)
 - [2] Load user secret (VPN Secret: static.key + Config.File: vario.vpn)

[3] Load user cert (SSL/TLS: ca.crt, vario.crt, vario.key, dh1024.pem + Config: vario.vpn)
 [4] Back to default configurations (TOSS Secret: static.key + Config: vario.vpn)
 [0] Return

An overview of the available tunnel settings and options, and a listing of the currently valid configuration file "vario.vpn" gives the menu item [1].

Menu item [2] allows the user to import an own security key (pre-shared key) named "static.key" and an externally created configuration file "vario.vpn", and to store them in a non-volatile memory. Analogously, certificate based authentication files for SSL/TLS connections can be loaded using menu item [3]. Attention must be paid to the fixed names of the necessary files in order to be imported (CA certificate: "ca.crt", vario certificate: "vario.crt", vario key: "vario.key", Diffie-Hellman-Encryption: "dh1024.pem"). The Diffie-Hellman file is required only on the VPN server side.

Menu item [4] sets the UNIKLIMA vario back into the TOSS delivery status. The files TOSS standard security key: "static.key" and standard configuration file: "vario.vpn" are generated. The tunnel parameters such as "Connect to" and "Ifconfig" must be checked.

Example 1: pre-shared key, UNIKLIMA vario operates tunnel sided as server configuration file "vario.vpn" on a:/openvpn/ looks as follows:

```
# OpenVPN TOSS GmbH Potsdam (c) 2011
# Config file: 'vario.vpn' & 'static.key'
# 01.12.10 11:42 MEZ
verb 0
proto udp
remote tosswetter.dyndns.biz
port 1194
dev tun
tun_mtu 1500
ifconfig 10.1.0.2 10.1.0.1
ping 10
ping-restart 15
secret a:/openvpn/static.key
configuration file WINDOWS-PC side as client:
```

```
# TOSS-Config-Static-Key.ovpn - Config file for PC side as client1
# TOSS GmbH Potsdam (c) 2011
#
verb 0
proto udp
dev tun
remote 192.168.110.222
ifconfig 10.1.0.1 10.1.0.2
ping 10
ping-restart 15
secret "C:/Programme/OpenVPN/config/static.key"
```

The encryption files on the UNIKLIMA vario in the directory "a:/openvpn/static.key" and on the PC in "C:/Programme /OpenVPN/config/static.key" must be identical.

Example:

```
#
# 2048 bit OpenVPN static key
#
-----BEGIN OpenVPN Static key V1-----
c2c841562b5c29a0c9d6f21d99075604
c9f297552908697b7272df21f3f55534
a5634ca291fc620830a827331bd4b36e
5c0a7a9aadbf9c917f3653085e4f2b14
7e4d2188ed11e2a53bf4791752cab28e
772fc2542fd88484b00ca71ecd589ff0
08a0446cce5961a30d6fc97c8c6031a4
513c9c4bade5e865ee50234a34012e79
```

```
a5634caf91fc620830a827331bd4b36e
8e4e2d61771708fa603f8facdd08069c
1d1a046abba6aa57aaa700dc67f3bdf0
6c096aad3990ea869a4670c97529eb8e
a4787729c906fb9c43a9ec10fa55d079
86fc4ebdfd51ea27f90c4b0d8d148dc3
a86b32122fd1bdebe66616b52d864863
e1cadddfc11504feb8445f61bcb9f626
-----END OpenVPN Static key V1-----
```

Example 2: certificate based authentication SSL/TLS, UNIKLIMA vario operates tunnel sided as server
configuration file "vario.vpn" on a:/openvpn/ looks like this:

```
# OpenVPN TOSS GmbH Potsdam (c) 2011
# Config file: 'vario.vpn' TLS/SSL
# 01.12.11 11:42 MEZ
#
verb 0
proto tcp-client
remote 192.168.110.74
port 1194
dev tap
tun-mtu 1500
ifconfig 10.1.0.100 255.255.255.0
ping 10
ping-restart 15
cipher AES-256-CBC
# SSL/TLS parms.
tls-server
ca A:/OpenVPN/ca.crt
cert A:/OpenVPN/vario.crt
key A:/OpenVPN/vario.key
dh A:/OpenVPN/dh1024.pem
```

Configuration file WINDOWS-PC as client side with certificate based authentication SSL/TLS:

```
# TOSS-Config-TSL-SSL-Client.ovpn - Config file for PC side as client1
# TOSS GmbH Potsdam (c) 2011
#
dev tap
ifconfig 10.1.0.1 255.255.255.0
cipher AES-256-CBC
ping 10
ping-restart 15
proto tcp-server
# SSL/TLS parms.
tls-client
ca C:/Programme/OpenVPN/config/ca.crt
cert C:/Programme/OpenVPN/config/client1.crt
key C:/Programme/OpenVPN/config/client1.key
```

The following encoding methods are available, whereas "Blowfish" is the default:

```
cipher AES-128-CBC           // AES-128
cipher AES-192-CBC          // AES-192
cipher AES-256-CBC          // AES-256
cipher DES-CBC               // DES
cipher DES-EDE3-CBC         // 3-DES
cipher none                  // no encryption
```

The VPN technology is too complex to describe all details here. Please inform yourself comprehensively in advance, for example at "<http://openvpn.net/index.php/open->

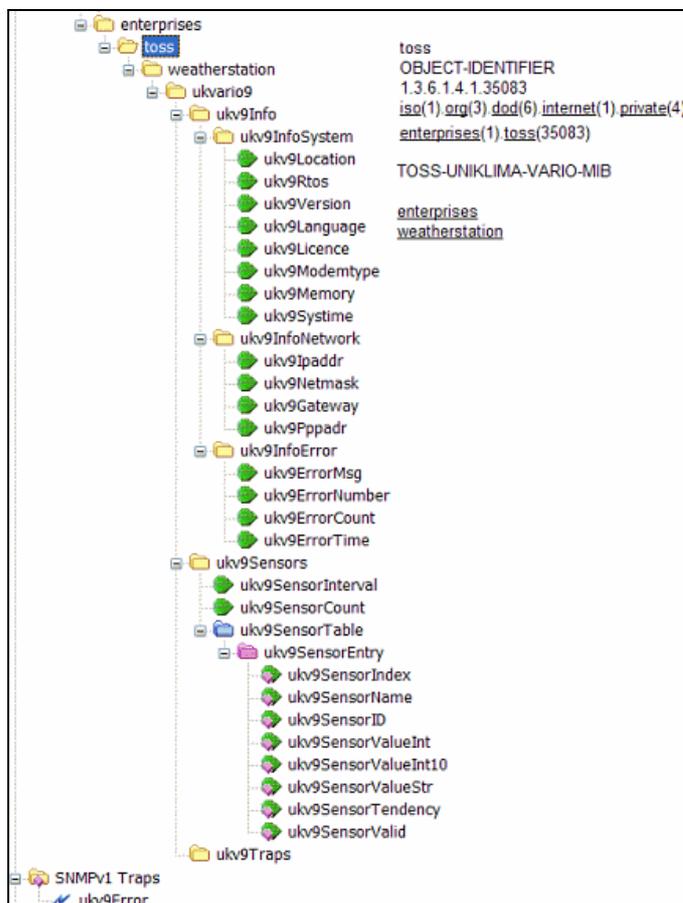
source/documentation/manuals". For a custom installation, we will gladly help you. Please do not hesitate to ask us.

5.3.10.12 Network Management - SNMP parameters [N]

The Simple Network Management Protocol is a network protocol in order to can control and monitor various network-able devices centrally. Within the scope of a network management different components (sensors, printers, routers etc) can be read, monitored, remote controlled and parameterised, but also independent error messages can be generated and error notification be sent to the control room. UNIKLIMA vario with a great selection of various climatic sensors works as independent SNMP agent and makes the measured values available in the net in standardized way. The SNMP agent in the UNIKLIMA vario realizes the following functionality:

- GET:** request for a management data record
GETNEXT: retrieval of the successional data record, customer specific sensor equipment and parameter records such as system time, location, IP address, measuring interval etc (see MIB)
SET: modification of parameter records by the center
RESPONSE: answer to one of the previous packages
TRAP: UNIKLIMA vario independently sends error messages such as sensor, exceeding of measuring range

The managed objects which are realized in the UNIKLIMA vario are available for download in the Management Information Base (MIB) and thus allow a short-term and smooth integration in the management system of the user. The specific structures like name, data type, access rights (read-only, read-write, not-accessible), status (Mandatory, Optional, Deprecated, Obsolete), description and OID can be taken from the MIB (<http://www.toss.de/content/download/toss-uniklima-vario.mib>).



```

Enable                : [1]=on, [0]=off
AgentName             : default: TOSS-UKvario-SNMP-Agent
Traps ON              : [1]=on, [0]=off
Trap->IP              : IP xxx.xxx.xxx.xxx
Trap-Community        : xx20Ch.xxxxxxxxxxxxxx, default: trap
Write-Community       : xx20Ch.xxxxxxxxxxxxxx, default: private
Read-Community        : xx20Ch.xxxxxxxxxxxxxx, default: public

```

The access over the object identifier (OID) is explained by the following examples. Since the sensors are structured in an index table, the index number of the sensor must be added to the respective OID.

```

Basis OID of the weather station: 1.3.6.1.4.1.35083.1.1
OID of ukv9Location:             1.3.6.1.4.1.35083.1.1.1.1.1
OID of ukv9Ipaddr:               1.3.6.1.4.1.35083.1.1.1.2.1
OID of ukv9SensorInterval:       1.3.6.1.4.1.35083.1.1.2.1
OID of ukv9SensorName[i]:        1.3.6.1.4.1.35083.1.1.2.3.1.2.i    (i = sensor index 1...n)
                                   (e.g. 1.3.6.1.4.1.35083.1.1.2.3.1.2.3 for sensor 3)

```

5.3.11 Facility Management - KNX parameters [X]

In the field of building management the KNX standard has been established worldwide. This bus system, as unifying platform for facility management applications, requires hardware and software technical components adjusted to each other, which are available for the UNIKLIMA vario, too. The already from the EIB standard coming two wire field bus (TP) and the modern network based KNX NetIP protocol allow the integration of all climate sensors, the digital switching outputs and the status information of the weather station in a KNX project (ETS) over a database entry "ukvario_tp.pr4" or "ukvario_netip.pr4" respectively. A TP bus connection is done by an integrated KNX-SIM plug-in module (SIM 250, company Tapko). KNX NetIP runs over the already existing network connection (RJ45). The KNX functionality must be purchased optionally.

The settings concerning the weather station can be configured in this menu item [X].

Set new: UKvario KNX parameters-----

```

[1] Enable KNX =1                // global activation (on=1/off=0) of the KNX functionality
[2] Phys.Addr =1.0.16            // physical device address of the KNX weather station
[3] SIM_Modul =1                 // TP plug-in module enable (on=1/off=0)
[4] SIM_Read                     // retrieve data objects of the TP plug-in module and display them
[5] KNX-NetIP =0                // KNX-NetIP application enable (on=1/off=0)
[6] Trace Mode =0               // track communication events for testing purposes (on=1/off=0)
[7] Return                       // exit submenu

```

- an example of mapped data objects of the UNIKLIMA vario follows

```

KNX-SIM: Data point read-----
KNX-SIM: UKvario-Informatons-----
KNX-SIM: Location =TOSS Potsdam
KNX-SIM: Oper.System=FULL_V1.51
KNX-SIM: Version =V9.099
KNX-SIM: Language =DEUTSCH
KNX-SIM: Licence = SNTP+SNMP+KNX
KNX-SIM: Modultype =KNX
KNX-SIM: Memory =A:4194K B:0K
KNX-SIM: SytemDate =15.12.11
KNX-SIM: SystemTime =16:04 25
KNX-SIM: IPAddress =192.168.222
KNX-SIM: Netmask =255.255.0
KNX-SIM: Gateway =192.168.1
KNX-SIM: PPPaddress =192.168.220
KNX-SIM: ErrorMessage =ERROR[54]
KNX-SIM: ErrorNumber=54
KNX-SIM: ErrorCount =30
KNX-SIM: ErrorDate =15.12.11
KNX-SIM: ErrorTime =14:54 26
KNX-SIM: SenInterval=15

```

KNX-SIM: SensorCount=12

KNX-SIM: Current-Secondly-Values-----

KNX-SIM: LT=	0.1 °C
KNX-SIM: RF=	32.0 %
KNX-SIM: LD=	1004.3 hPa
KNX-SIM: WG1=	0.2 m/s
KNX-SIM: WM1=	0.3 m/s
KNX-SIM: WR1=	177.9 °
KNX-SIM: I01=	0.0 µA
KNX-SIM: NR=	1.0 mm
KNX-SIM: SGP=	0.0 W/m ²
KNX-SIM: LDW=	0.0 hPa
KNX-SIM: SDC=	0.0 min
KNX-SIM: LAD=	0.0 g/m ³

KNX-SIM: Minute-Average-Values-----

KNX-SIM: LT=	-0.1 °C
KNX-SIM: RF=	32.0 %
KNX-SIM: LD=	1003.5 hPa
KNX-SIM: WG1=	0.2 m/s
KNX-SIM: WM1=	0.2 m/s
KNX-SIM: WR1=	179.3 °
KNX-SIM: I01=	0.0 µA
KNX-SIM: NR=	10.0 mm
KNX-SIM: SGP=	0.0 W/m ²
KNX-SIM: LDW=	0.0 hPa
KNX-SIM: SDC=	0.2 min
KNX-SIM: LAD=	0.0 g/m ³

KNX-SIM: Hourly-Average-Values-----

KNX-SIM: LT=	0.4 °C
KNX-SIM: RF=	32.1 %
KNX-SIM: LD=	1006.0 hPa
KNX-SIM: WG1=	0.2 m/s
KNX-SIM: WM1=	0.3 m/s
KNX-SIM: WR1=	179.3 °
KNX-SIM: I01=	0.0 µA
KNX-SIM: NR=	249.9 mm
KNX-SIM: SGP=	0.0 W/m ²
KNX-SIM: LDW=	0.0 hPa
KNX-SIM: SDC=	4.2 min
KNX-SIM: LAD=	0.0 g/m ³

KNX-SIM: Daily-Average-Values-----

KNX-SIM: LT=	-1.8 °C
KNX-SIM: RF=	31.8 %
KNX-SIM: LD=	997.8 hPa
KNX-SIM: WG1=	0.2 m/s
KNX-SIM: WM1=	2.2 m/s
KNX-SIM: WR1=	177.9 °
KNX-SIM: I01=	0.0 µA
KNX-SIM: NR=	53493.0 mm
KNX-SIM: SGP=	0.0 W/m ²
KNX-SIM: LDW=	0.0 hPa
KNX-SIM: SDC=	69.2 min
KNX-SIM: LAD=	0.0 g/m ³

KNX-SIM: Flex.-Average-Values-----15min Interval--

KNX-SIM: LT=	0.4 °C
KNX-SIM: RF=	32.1 %
KNX-SIM: LD=	1006.0 hPa
KNX-SIM: WG1=	0.2 m/s
KNX-SIM: WM1=	0.4 m/s
KNX-SIM: WR1=	179.3 °

```

KNX-SIM: I01=          0.0 µA
KNX-SIM: NR=          249.9 mm
KNX-SIM: SGP=          0.0 W/m²
KNX-SIM: LDW=          0.0 hPa
KNX-SIM: SDC=          4.2 min
KNX-SIM: LAD=          0.0 g/m³

```

```

KNX-SIM: Inputs I[1]=0 I[2]=0 I[3]=1 I[4]=1 I[5]=1 I[6]=1
KNX-SIM: Outputs O[1]=1 O[2]=0 O[3]=1 O[4]=0 O[5]=0 O[6]=0

```

5.3.12 Check wind sensor system [W]

The ultrasonic wind sensor systems which are used have an autonomic processor and communicate with the UNIKLIMA vario over a serial data bus. Since each wind sensor has its own device address several wind measuring systems can be run on the same data bus. This program function allows a check of the wind measuring system.

5.3.13 Optional software modules

5.3.13.1 SYNOP-METAR-Parameters [P]

Standardized protocols are used for the exchange of weather data of manned and automatic weather stations between national and international institutions and in the flying weather service. If corresponding optional protocols are integrated in the SYNOP and METAR format they can be adapted to the location conditions and weather station equipment. For manned stations a terminal software is available (Windows over FTP). It allows the input of various weather observations which are included at the automatic generation of protocols at the synoptic main, minor and intermediate times. 180 national (DWD = German Weather Service) and international groups of the following sections are realized.

```

Section 0 - Identification and Location (global groups)
Section 1 - Land Observations (global groups)
Section 2 - Sea Surface Observations (maritime global groups)
Section 3 - Climatological Data (regional groups)
Section 4 - Clouds below Station Level (national groups)
Section 5 - Complemental Climatological Data (national groups)

```

The description of the protocols is extremely extensive and can not be subject of this documentation. Please use appropriate specialized literature and standards.
(e.g. www.met.fu-berlin.de/~stefan/fm12.html, author: Jochen Wichmann)

Overview of the available parameter settings:

```

--- Set SYNOP-Parameter -----
[0] SYNOP-Protocol with 1..5 sections, 0=disable-----[5]--      : activates SYNOP generation up to
the                                                                desired section
[1] Protocol type -- FM12, FM13, FM14 -----(0_MiMiMjMj)--[AAXX]--  : use of protocol type FM12 (AAXX)
[2] Wind indicator i=0..4 -----(0_YYGGggi)-[4]--
[3] WMO number of the station -----(1_IIiii)---[68110]--
[4] Precipitation indicator, Station type -(1_iRiXhVV)--[16//]--
[5] QNH(1_4PPP:hPa) o. Geopotential(1_48PPP,1_47PPP:gpm)[4////]-- : geo potential pressure area for
                                                                    mountain stations possible
[6] Set SYNOP-SMS-command line number SMC0..9 -----[6]--      : SMS command for SYNOP SMS
                                                                    sending, see GSM modem
                                                                    SMS-Parameters

--- Set METAR-Parameter -----
[7] METAR-Protocol -- enable=1 -- disable=0 -----[1]--
[8] WMO-ID of the station -----(CCCC)-----[FYWW]--
[9] Set METAR-SMS-command line number SMC0..9 -----[7]--
[A] True altitude AMSL, Barometric altitude (meter) ---[0000.0]-- : for QFE/QNH conversion
[B] SYNOP-Header1=                                                : header1, e.g. ZCZC 002

```

[C] SYNOP-Header2= "ZEIT"	: header2, e.g. <i>SNNM01</i> "WMO-ID"
[D] SYNOP-End of text=	: end of protocol, e.g. <i>NNNN</i>
[E] METAR-Header1=	
[F] METAR-Header2=	
[G] METAR-End of text=	
[H] Send SYNOP-METAR as SMS -- 1=on -- 0=off -----[0]-- sending	: SMS command for METAR SMS see GSM modem SMS-Parameters
[I] Set trace mode ----- 1=on -- 0=off -----[0]--	: trace mode on/off, reset at midnight
[R] Return -----	

5.3.13.2 Wind turbine rotor radius [R]

For the calculation of the wind power of wind power facilities the wind speed, the air density (air temperature, relative humidity, air pressure) and the volume stream are required. A parameter required for these calculations is the wind turbine rotor radius which has to be defined here.

5.3.13.3 Frost warning parameters [F]

Based on the wet temperature and the gradient of its change a frost warning or all-clear signal is generated which can be sent by SMS and/or Email to up to 10 users (SMS / Email licence required). see section: GSM modem SMS-Parameters, GSM modem required

For the warning or all-clear signal respectively the setting of the frost warning temperature limits / warnlimits is important. Each one warning is generated if these limits are exceeded. A frost warning cycle consists as follows:

- the temperature goes down until the frost warning temperature limit, e. g. Warnlimit On = 0.5°C, is reached
⇒ frost warning by SMS
- the temperature rises until the frost all-clear temperature limit, e. g. Warnlimit Off = 1.0°C, is reached
⇒ frost all-clear by SMS

Attention: It is recommended to choose the frost all-clear temperature limit close but not equal to the frost warning temperature limit, in order not permanently to generate SMS if the values swing around the warning / all-clear limits. A too big difference, e. g. Warnlimit On = 0.5°C and Warnlimit Off = 20.0°C, causes that only after the all-clear limit is exceeded the cycle is finished by an all-clear SMS and only now a new warning is possible again.

Additionally the user can activate the option „Gradient“. It involves the speed of the drop of temperature (temperature T) and in this way triggers an earlier warning for extreme weather conditions. From the sliding minutely average (T) and the sliding hourly average (T) the difference is calculated. This difference, limited to 0...-3°C, is added to the frost temperature (= wet temperature) by weight factor 0.5, i. e. maximally -1.5°C at a drop of temperature of 3°C in one hour. The gradient option can be deactivated, too.

The temperature gradient, which is calculated as difference from hourly average minus minutely average, describes how fast the temperature is falling per unit of time. In connection with the wet temperature this leads to an earlier warning at extreme weather conditions. The consideration of the gradient can be deactivated (frost warning temperature).

Overview of the available parameter settings:

Enable	: switching the frost warning on (1) and off (0)
Warnlimit On	: frost warning temperature limit in °C, warning if below
Warnlimit Off	: frost all-clear temperature limit in °C, all-clear if exceeded
Temp.Gradient	: 1 = with temperature gradient, 0 = temperature gradient off
WarnOn command	: SMS sending command for warn message (SMC8)
WarnOff command	: SMS sending command for all-clear message (SMC9)

SMS On/Off : SMS sending on/off (SMS licence required)
 Send TestSMS : check of settings, sending of test SMS (SMS licence required)
 Email On/Off : Email sending on/off (Email licence required)
 Send test Email : check of settings, sending of test Email (Email licence required)

factory settings

Warnlimit On =0.5
 Warnlimit Off =1.0
 Temp.Gradient =1
 WarnOn command =SMC8
 WarnOff command =SMC9
 SMS On/Off =1
 Email On/Off =1

corresponding factory settings (see section: GSM modem SMS-Parameters)

TXT8=ATTENTION: FROST WARNING!

TXT9=Frost danger has passed OK.

SMC8=NAME>TXT8>FROST>TEL9

SMC9=NAME>TXT9>FROST>TEL9

Frost warning configuration by SMS commands

The above described configuration using the telnet console can partly be done by SMS commands, too. In this regard, the user transfers the keywords and parameters described in the following by SMS to the weather station, which then acknowledges the current status of the frost warning parameters as response SMS. In this way, for example, the frost warning limits or mobile phone numbers of the participants to be notified can be modified.

The parameter SMS must contain at least the keyword "Frostwarn". Keywords must be separated by a space. If there are no more parameters, the current frost warning parameter set is sent as response.

available keywords:

Frostwarn : main keyword, basic component of the SMS message
 Start : switches the frost warning module and the SMS sending on
 Stop : switches the frost warning module and the SMS sending off
 Ton=0.5 : frost warning temperature limit in °C, warning if below
 Toff=1.0 : frost all-clear temperature limit in °C, all-clear if exceeded
 Gradient=1 : 1 = with temperature gradient, 0 = temperature gradient off
 Tel[x]=01... : the up to 10 mobile phone numbers [0..9], which are notified of an alarm / all clear, if the equal sign is not followed by a digit (Tel5=) the entry is deleted

Example of a SMS that is sent to the phone number of the weather station:

```
Frostwarn Start Ton=0.5
Toff=1.0 Gradient=1
Tel1=0123456789
Tel3=
Tel6=00491561234567
Tel9=0987654321
```

SMS response from the weather station

```

Stationname Frostactiv =1
Ton=0.5C Toff=1.0C
Gradient=1
Tel0=0151754767
Tel1=0123456789
Tel2=0153868689

Tel4=0156452892
Tel5=0152493474
Tel6=00931561234567
Tel7=0159446623
Tel8=0159148257
Tel9=0987654321

```

In the response SMS the correctness of the settings can be checked.

5.3.14 Licence Master Key [L]

Each weather station has its own unlock code which authorizes the single software modules (licences) after the fabrication of this product. If the customer acquires further software such as the SMS sending or the FTP upload at a later date, the renewal of the Licence Master Key is necessary. An unauthorized use of software modules leads to a locking of the main functions of the weather station. The [L] command therefore only is available if the software modules of the weather station don't match the licence specification anymore. In this case ask the manufacturer for a new licence key and enter it over this command.

SN: xxxxxx	: serial number of the device
GPRS+SMS+SNTP	: assigned software licences
Licence Master Key old=xxxxxxxxxxxxxxxxxxxxxxxx	: old Licence Master Key
Licence Master Key new=	: new Licence Master Key

5.3.15 Exiting the program [E]

By pressing the key "E" the main program of the weather station can be exited. The same can be achieved by shortly pressing the reset button three times (on the right side of the UNIKLIMA vario box).

Note:	Before turning it off the weather station must be shut down analogous to a PC. Therefore the main program must always be exited by pressing the key "E" (by Telnet) before the separation of the weather station from the power supply. This avoids that at the moment of the separation from the power supply no data storage is on progress, whose interruption could damage the internal drive A:.
--------------	---

5.4 Showing measured values

5.4.1 Retrieving data by FTP

The data can be retrieved with any FTP tool according to the access conditions described next. The enclosed CD-ROM contains a FTP program that is freely available on the Internet.

There are two different user names and passwords for the FTP login which allow to access the two separate areas of the weather station.

The drive A: is a program memory and safe against power failure. Drive C: is organized as a RAM drive and therefore it loses its content if power is switched off, but it is updated every second.

Note: The weather station UNIKLIMA vario has a single FTP server, i.e. two different users cannot access the internal FTP server at the same time.

User	Password	Access to
ftpadmin	ftpadmin	<ul style="list-style-type: none"> data of the flexible measure value memory and the daily means A:\DATEN template of the web page incl. banners and style sheet A:\DATEN\WEB
ftp	ftp	<ul style="list-style-type: none"> current weather data C:\DATEN <ul style="list-style-type: none"> – SEKUNDE.TXT current values – MINUTE.TXT last sliding minutely average – MINUTE00.TXT last sliding minutely average since passing 00sec – FLEXnn.TXT last value of flexible measure value memory, (nn = intervall, e.g. 60) – STUNDE.TXT last sliding hourly average – STUNDE00.TXT last sliding hourly average since passing 00min – TAG.TXT last sliding daily average – TAG00.TXT last daily average since midnight 00h – DAYMAX.TXT maximums since 00:00 hours – DAYMIN.TXT minimums since 00:00 hours – SYNOP.TXT last SYNOP message (as far as implemented) – MEATR.TXT last METAR message (as far as implemented) web page with current weather data C:\WEB <ul style="list-style-type: none"> – INDEX.HTM (is generated from the template in A:\DATEN\WEB)

The file names of the data files are put to together as follows:

flexible measure value memory: JJMMTTFF.TXT

The meaning of the letters is:

JJ: the year
 MM: the month
 TT: the day
 FF: the interval of the flexible measure value memory

All four declarations are made with two digits - if necessary with a leading zero.

For example the file name of the measured values from the October 20th, 2004 at an interval of the flexible measure value memory of 60 minutes would be "04102060th TXT".

The structure of the data files is defined as follows:

The data records are created as a table. The columns' names are in the header line. All data are separated by a semicolon and therefore they can be read with MS Excel without problems.

head: **date;time;time zone;sensor1;sensor2;sensor3;**

data: **TT.MM.JJ;HH:mm;ZZZ;value1;value2;value3**

The meaning of the abbreviations is:

HH: the hour (two digits)
 MM: the minute (two digits)
 ZZZ: time zones (GMT, MEZ, MESZ, ...)
 value: a number with one digit after the decimal point (if necessary 0),
 the decimal delimiter is the comma

The number of measured values corresponds to the number of sensors in the weather station UNIKLIMA vario.

Example with flexible measure value memory 5 min:

date;time;time zone;air temperature [°C];relative humidity [%];air pressure [hPa];

27.11.05;14:02;MEZ;22,3;45,9;999,3;
 27.11.05;14:05;MEZ;22,3;45,8;999,1;
 27.11.05;14:10;MEZ;22,4;45,6;999,7;
 27.11.05;14:15;MEZ;22,4;45,6;1000,7;

daily means: JJMMDAY.TXT

The meaning of the abbreviations is:

JJ: the year
 MM: the month

All declarations are made with two digits - if necessary with a leading zero.

For example the file name of the measured values from October 2004 is "0410 DAY.TXT".

The structure of the data files is defined as follows:

The data records are created as a table. The columns' names are in the header line. All data are separated by a semicolon and therefore they can be read with MS Excel without problems.

For the daily means each sensor value is followed by its maximum and the time of its occurrence (HH:MM) and its minimum and the time of its occurrence (HH:MM).

head: date;time;time zone;sensor1;max1;timemax1;min1;timemin1;sensor2;max2;timemax2;min2;...
 data: TT.MM.JJ;HH:MM;ZZZ;value1;maximum1;HH:MM;minimum1;HH:MM;value2;maximum2;HH:MM;...

The meaning of the abbreviations is:

HH: the hour (two digits)
 MM: the minute (two digits)
 ZZZ: time zones (GMT, MEZ, MESZ, ...)
 value: a number with one digit after the decimal point (if necessary 0),
 the decimal delimiter is the comma

The number of measured values with maximums and minimums corresponds to the number of sensors in the weather station UNIKLIMA vario.

Example for daily means

date;time;time zone;air temperature[°C];Max[°C];t-Max;Min[°C];t-Min;relative humidity[%];Max[%];t-Max;Min[%];t-Min;
 01.10.05;00:00;MEZ;10,5;18,7;12:38;5,0;01:45;58,7;92,3;05:36;72,1;12:48

Current data on the RAM drive

The current data in C:\DATEN (see above table) have the same structure.

Since they are momentary single values, means or current extreme values they contain only one current data line.

The data retrieval can be done using a FTP tool (e.g. WS-FTP, Perfect FTP), but also by Windows' own FTP command line tool. For it the following script just needs to be saved in a text file SCRIPT.TXT:

```
open 192.168.110.200           // IP address
ftp                           // user name
ftp                           // password
cd daten
get SEKUNDE.TXT
get MINUTE.TXT
get FLEX60.TXT                // if interval = 60 min
get STUNDE.TXT
get TAG.TXT
```

```
get DAYMAX.TXT
get DAYMIN.TXT
bye
```

The script is started under WINDOS with this command:

FTP-s:SCRIPT.TXT

Two data transfer tools on the enclosed CD-ROM can be used for the data retrieval, as well. Both programs must be started with at least 3 parameters. These are the IP address of the UNIKLIMA vario, the FTP user name and the respective FTP password. The program start, for example, can be done in a batch file.

get_dat_a.exe 192.168.110.200 ftpadmin ftpadmin retrieves all data from drive A: of the weather station UNIKLIMA vario
get_dat_c.exe 192.168.110.200 ftp ftp retrieves all data from RAM drive C: of the weather station UNIKLIMA vario

If required an optional fourth command line parameter can be used to specify the number of months to retrieve.

get_dat_a.exe 192.168.110.200 ftpadmin ftpadmin 2 retrieves only the data of the last 2 months from drive A: of the weather station UNIKLIMA vario

Note: If you have changed the IP address of your UNIKLIMA vario, you must properly replace the 192.168.110.200.

The data files fetched from the UNIKLIMA vario are stored in the working directory of the programs GET_DAT_A.EXE and GET_DAT_C.EXE. Files already existing there are overwritten without any warning.

The most convenient way to retrieve the data automatically, to display and evaluate them, is the use of the optional PC software UK_TOSS Basic, order number 30300, see appendix.

5.4.2 Displaying data with a web browser

The weather station UNIKLIMA vario generates its own web pages with the measured weather data which can be retrieved from the integrated web server. Simply enter "http://" followed by the IP address into the address line of your browser. In the delivery state the IP address of the weather station is http://192.168.110.200.

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Automatische Wetterstation UNIKLIMA TOSS LAN
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Sensor	Aktueller Messwert	Minutenmittel	Stundenmittel	Tagesmittel	Tendenz (Minute - Stunde)
Lufttemperatur	LT=6.5 °C	LT=6.5 °C	LT=6.9 °C	LT=2.5 °C	LT=schwach fallend
Relative Luftfeuchte	RF=90.1 %	RF=90.0 %	RF=81.2 %	RF=86.0 %	RF=steigend
Bodentemperatur	BT=3.7 °C	BT=3.7 °C	BT=3.7 °C	BT=3.4 °C	BT=gleichbleibend
Luftdruck (QNH)	LD=1005.0 hPa	LD=1005.0 hPa	LD=1004.7 hPa	LD=1010.1 hPa	LD=schwach steigend
Beleuchtungsstärke	SBS=90.7 Lux	SBS=84.6 Lux	SBS=389.6 Lux	SBS=1403.0 Lux	SBS=schwach fallend
Niederschlag	NR=0.0 mm	NR=0.0 mm	NR=0.0 mm	NR=0.0 mm	NR=gleichbleibend
Windgeschwindigkeit	WG1=1.6 m/s	WG1=2.6 m/s	WG1=2.3 m/s	WG1=1.8 m/s	WG1=schwach steigend
Windmaximum	WMI=1.6 m/s	WMI=2.6 m/s	WMI=6.5 m/s	WMI=8.7 m/s	WMI=schwach steigend
Windrichtung	WRI=219.0 °	WRI=219.6 °	WRI=197.7 °	WRI=192.8 °	WRI=SW
Globalstrahlung CMP	SGP=0.0 W/m²	SGP=0.0 W/m²	SGP=1.5 W/m²	SGP=13.4 W/m²	SGP=schwach fallend
UV-Strahlung	SUV=0.0 W/m²	SUV=0.0 W/m²	SUV=0.0 W/m²	SUV=0.0 W/m²	SUV=gleichbleibend
Ozonsäuleleistung	ODL=75.5 nSwh	ODL=75.3 nSwh	ODL=71.2 nSwh	ODL=72.2 nSwh	ODL=steigend
Sonnenscheindauer	SDC=0.0 min	SDC=0.0 min	SDC=0.0 min	SDC=0.0 min	SDC=gleichbleibend
Wind Chill Index	WCC=6.5 °C	WCC=4.7 °C	WCC=6.5 °C	WCC=0.9 °C	WCC=schwach fallend
Taupunkttemperatur	TT=4.0 °C	TT=4.0 °C	TT=3.9 °C	TT=4.3 °C	TT=steigend
Nasspunkttemperatur	LTF=5.8 °C	LTF=5.8 °C	LTF=4.5 °C	LTF=1.6 °C	LTF=schwach steigend
Luftdichte	LAD=1241.2 g/m³	LAD=1241.1 g/m³	LAD=1239.1 g/m³	LAD=1267.1 g/m³	LAD=schwach steigend
Verdunstung (Haude)	VH=0.4 mm	VH=0.4 mm	VH=0.4 mm	VH=0.4 mm	VH=gleichbleibend Tageswert[14.30]

Messwerte sind geltende Mittel der letzten 60 bzw. 24 Datenreize, bei kumulativen Sensoren Summen im jeweiligen Zeitspanne.
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In addition to the current measured values also the extreme values can be displayed.

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Sensor	Tagesmittel vom 11.12.11	Max. vom 11.12.11	Max. Zeit	Min. vom 11.12.11	Min. Zeit	Maximum [seit 00:00]	Max. Zeit	Minimum [seit 00:00]	Min. Zeit
Lufttemperatur	LT=1.9 °C	LT=4.5 °C	14.20 MEZ	LT=-0.9 °C	09.07 MEZ	LT=7.2 °C	15.19 MEZ	LT=-1.2 °C	09.55 MEZ
Relative Luftfeuchte	RF=79.1 %	RF=88.7 %	08.12 MEZ	RF=61.5 %	14.25 MEZ	RF=96.5 %	04.03 MEZ	RF=75.6 %	14.56 MEZ
Bodentemperatur	BT=3.8 °C	BT=4.5 °C	00.00 MEZ	BT=3.5 °C	23.59 MEZ	BT=3.8 °C	00.00 MEZ	BT=3.1 °C	07.48 MEZ
Luftdruck	LD=1015.9 hPa	LD=1017.6 hPa	10.46 MEZ	LD=1010.0 hPa	00.00 MEZ	LD=1015.9 hPa	00.00 MEZ	LD=1004.3 hPa	14.27 MEZ
Beleuchtungsstärke	SBS=2324.6 Lux	SBS=16907.3 Lux	12.04 MEZ	SBS=0.0 Lux	00.00 MEZ	SBS=8664.6 Lux	10.57 MEZ	SBS=0.0 Lux	00.00 MEZ
Niederschlag	NR=0.0 mm	NR=0.0 mm	01.03 MEZ	NR=0.0 mm	00.00 MEZ	NR=0.0 mm	01.00 MEZ	NR=0.0 mm	00.00 MEZ
Windgeschwindigkeit	WG1=2.1 m/s	WG1=8.3 m/s	00.55 MEZ	WG1=0.0 m/s	06.13 MEZ	WG1=8.7 m/s	09.36 MEZ	WG1=0.0 m/s	01.39 MEZ
Windmaximum	WMI=8.3 m/s	WMI=8.3 m/s	00.55 MEZ	WMI=0.0 m/s	18.23 MEZ	WMI=8.7 m/s	09.36 MEZ	WMI=0.1 m/s	06.06 MEZ
Windrichtung	WRI=229.8 °	WRI=359.0 °	08.08 MEZ	WRI=0.0 °	06.13 MEZ	WRI=359.2 °	04.03 MEZ	WRI=0.0 °	00.31 MEZ
Globalstrahlung CMP	SGP=23.9 W/m²	SGP=181.0 W/m²	12.04 MEZ	SGP=0.0 W/m²	00.00 MEZ	SGP=101.9 W/m²	10.59 MEZ	SGP=0.0 W/m²	00.00 MEZ
UV-Strahlung	SUV=1.3 W/m²	SUV=7.5 W/m²	12.07 MEZ	SUV=0.0 W/m²	00.00 MEZ	SUV=5.6 W/m²	10.57 MEZ	SUV=0.0 W/m²	00.00 MEZ
Ozonsäuleleistung	ODL=71.8 nSwh	ODL=79.5 nSwh	12.34 MEZ	ODL=65.3 nSwh	21.16 MEZ	ODL=80.7 nSwh	07.18 MEZ	ODL=62.7 nSwh	00.33 MEZ
Sonnenscheindauer	SDC=110.1 min	SDC=53.6 min	14.53 MEZ	SDC=0.0 min	00.00 MEZ	SDC=0.0 min	01.00 MEZ	SDC=0.0 min	00.00 MEZ
Wind Chill Index	WCC=0.1 °C	WCC=4.6 °C	14.24 MEZ	WCC=-5.0 °C	22.50 MEZ	WCC=7.2 °C	15.19 MEZ	WCC=-6.0 °C	04.18 MEZ
Taupunkttemperatur	TT=4.4 °C	TT=0.2 °C	02.51 MEZ	TT=-2.4 °C	15.01 MEZ	TT=4.6 °C	15.37 MEZ	TT=-2.3 °C	02.00 MEZ
Nasspunkttemperatur	LTF=9.7 °C	LTF=2.2 °C	14.21 MEZ	LTF=0.3 °C	09.07 MEZ	LTF=6.8 °C	15.37 MEZ	LTF=1.4 °C	00.55 MEZ
Luftdichte	LAD=1277.2 g/m³	LAD=1266.0 g/m³	08.08 MEZ	LAD=1264.1 g/m³	00.00 MEZ	LAD=1265.2 g/m³	02.08 MEZ	LAD=1286.2 g/m³	15.18 MEZ
Verdunstung (Haude)	VH=0.6 mm	VH=0.6 mm	14.30 MEZ	VH=0.6 mm	14.30 MEZ	VH=0.4 mm	14.30 MEZ	VH=0.4 mm	14.30 MEZ

Datenreize sind zwei Datenreize innerhalb eines Tages, bei kumulativen Sensoren Stundenreize.
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If the weather station is equipped with wind sensors, an own wind overview page is provided with numerical values and a graphical wind-direction-velocity-diagram. The current measured values, the 1 minute, 2 minutes, 10 minutes, hourly and daily averages as well as the corresponding extreme values are available. The wind situation, i.e. the last 60 minutely and 24 hourly averages are displayed as cloud of points in the graphic.



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013.01451° N52.43919° 45.0m üNN

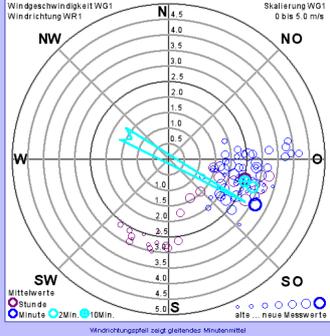


Winddaten 16.12.11 14:43 MEZ (→ Aktuelle Wetterdaten, → Extremwerte)

Aktuelle Messwerte	Windrichtung	Windgeschwindigkeit
Aktueller Messwert	WRI=65.0 *	WGI=2.5 m/s
Minutenmittel	WRI=119.4 *	WGI=2.8 m/s
02_Minutenmittel	WRI=108.0 *	WGI=2.8 m/s
10_Minutenmittel	WRI=106.0 *	WGI=2.5 m/s
Stundenmittel	WRI=104.3 *	WGI=2.5 m/s
Tagesmittel	WRI=165.3 *	WGI=2.5 m/s
Tagesmittel vom 15.12.11	WRI=197.9 *	WGI=2.7 m/s

Extremwerte	Windrichtung	Zeit	Windgeschwindigkeit	Zeit
akt. Minuten-Maximum	WRI=204.0 *	40sec MEZ	WGI=4.6 m/s	23sec MEZ
akt. Minuten-Minimum	WRI=39.0 *	44sec MEZ	WGI=0.7 m/s	23sec MEZ
akt. Stunden-Maximum	WRI=369.0 *	14.27 MEZ	WGI=9.1 m/s	14.25 MEZ
akt. Stunden-Minimum	WRI=0.0 *	14.08 MEZ	WGI=0.0 m/s	14.22 MEZ
Maximum [seit 00.00]	WRI=369.0 *	06.16 MEZ	WGI=11.8 m/s	11.39 MEZ
Minimum [seit 00.00]	WRI=0.0 *	06.07 MEZ	WGI=0.0 m/s	07.12 MEZ
Maximum vom 15.12.11	WRI=369.0 *	09.16 MEZ	WGI=9.0 m/s	04.07 MEZ
Minimum vom 15.12.11	WRI=0.0 *	01.22 MEZ	WGI=0.0 m/s	01.22 MEZ

Windrichtungs-Geschwindigkeits-Diagramm



Windgeschwindigkeit WGI
Windrichtung WRI

Skalierung WGI
0 bis 5.0 m/s

Mittelwerte
○ Stunde
○ Minute ○ 2Min. ○ 10Min.
○ alle ... ○ neue Messwerte

Windrichtungspfeil zeigt geltendes Minutenmittel

Mittelwerte sind geltende Mittel der letzten 60 bis 24 Datenwerte, bei kumulativen Sessonen Summen im jeweiligen Zeitraumbereich. Extremwerte sind zwei Einzelmessungen innerhalb eines Zeitraumbereichs.
 Einzel mit Pfeilen oder Kommentaren zu dieser Meldung an: [TOSS_Link](#)
 Copyright © TOSS GmbH Potsdam

The HTML pages in A:\DATENWEB can be modified on own responsibility. For example the integrated image files (LOGO.GIF and LEISTE.JPG as well as toss.css and copyright.htm) can be adapted to own design wishes, i.e. they can be replaced. The web pages index.htm, max_min.htm und wind.htm (only if sensors are present) are automatically generated by the weather station on the base of the sensor configuration. If called by a browser they are newly generated. A page refresh, the automatic reload of the page by the browser, can be configured in the UNIKLIMA vario.

The integration of a WEBCAM over a link, from where the picture is gotten, is optionally possible. If it is not present a custom still picture/photo with the file name FIXIMG.JPG can be inserted instead. For this purpose it must be copied into the web directory A:\DATENWEB. A restart [E] is necessary for the integration and display.

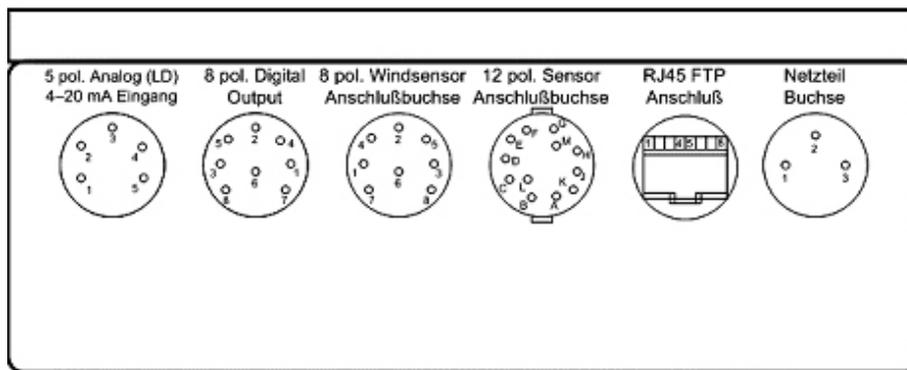
6 Technical data and parameter of the UNIKLIMA vario

6.1 Technical parameters

- power supply: 230V AC / 50 Hz
- degree of protection: IP 65
- processor: 80186
- PC/COM interface: RS-232 / V24 standard
- PC/Ethernet interface: RJ45

6.2 Connection reference

- relay switch contacts (changer): max. 42VDC, 12W



Reset button

shortly press
3 times →
UNIKLIMA vario is
shut down
if LED is off → pull
power plug

5 pol. Analog (LD) 4–20 mA Eingang

Pin 1 = Meßeingang
Pin 2 = + 12 V
Pin 3 = GND
Pin 4 = NC
Pin 5 = NC

8 pol. Windsensor Anschlußbuchse

Pin 1 = GND
Pin 2 = V-
Pin 3 = V+
Pin 4 = V-
Pin 5 = RXD
Pin 6 = GND
Pin 7 = TXD
Pin 8 = V+

RJ45 FTP Anschluß

Pin 1 = TPTX+
Pin 2 = TPTX-
Pin 3 = TPRX+
Pin 4 = Pin 5
Pin 5 = Pin 4
Pin 6 = TPRX-
Pin 7 = Pin 8
Pin 8 = Pin 7

Netzteil Buchse

Pin 1 = +18V DC
Pin 2 = NC
Pin 3 = GND

8 pol. Digital Output Einbaustecker

Pin 8 = Relais 1 > normal offen
Pin 3 = Relais 1 > Schaltkontakt
Pin 5 = Relais 1 > normal geschlossen
Pin 2 = GND
Pin 6 = GND
Pin 4 = Relais 2 > normal geschlossen
Pin 1 = Relais 2 > Schaltkontakt
Pin 7 = Relais 2 > normal offen

12 pol. Sensor Anschlußbuchse

Pin A = Temp. Sensor	„LT“
Pin B = Feuchte Sensor	„RF“
Pin C = B. Temp. Sensor	„BT“
Pin D = Blattnässe Sensor	„BN“
Pin E = Regenmesser	„RM“
Pin F = Lux Sensor Input	„GS“
Pin G = Lux S0 Umschalt.	„S0“
Pin H = Lux S1 Umschalt.	„S1“
Pin J = GND	„GND“
Pin K = + 5V DC	„5V“
Pin L = + 5V DC	„5V“
Pin M = GND	„GND“
Schirm = Gehäuse Masse	„Erde“

9 pol. Direkt am Windsensor Anschlußstecker RS232

Pin 1 = Signal GND
Pin 2 = V- 9 – 30 V DC
Pin 3 = V+ 9 – 30 V DC
Pin 4 = NC
Pin 5 = TXD
Pin 6 = NC
Pin 7 = RXD
Pin 9 = NC

Customer specific use of the digital inputs/outputs

Relay 1		DigiInput 1	
Relay 2		DigiInput 2	
DigiOut 3		DigiInput 3	
DigiOut 4		DigiInput 4	
DigiOut 5		DigiInput 5	
DigiOut 6		DigiInput 6	

6.3 Characteristics of optionally available sensors

A wide selection of standard sensors is available for connection to the UNIKLIMA vario. We will gladly take care of the integration of customer specific requirements. Please just ask us. The concrete sensor specifications are detailed described at www.toss.de.

10103	Sensor air temperature
10104	Sensor relative humidity
10106	Soil inserting thermometer, inserting depth 0...30cm
10108	Soil thermometer for burying
10187	Water temperature, 15m cable
xxxx	Soil humidity TRIME-EZ (TDR measuring principle)
10109	Density of light sensor
10114	Rain-gauge without heating, resolution 0.1mm, with double tipping balance
10116	Rain-gauge with heating, resolution 0.1mm, with double tipping balance
10117	Rain-gauge with heating, resolution 0.1mm, with double tipping balance, analogue intensity output 4..20mA
10180	Ultrasonic wind measuring system (wind direction, wind velocity)
10128	Leaf wetness-dew-sensor BLN1
10146	Pyranometer CMP3 including measuring amplifier
10148	Pyranometer LP2 including measuring amplifier
10143	Phar sensor 400...7000nm, 0...2000µmd/m²s
10141	Global radiation sensor GBV
M10141.1	UV broadband radiometer CUV3 including measuring amplifier
10151	Air pressure sensor BARO2
10155	Difference pressure sensor BARO Diff with standard output 4..20mA
20901	calculated sensor: Air density / specific volume [m³/kg]
20902	calculated sensor: Wind power
20903	calculated sensor: Wind volume stream
20904	calculated sensor: Satiation vapor pressure over water
20905	calculated sensor: Satiation vapor pressure over ice
20906	special sensor: Evaporation module according to Penman-Monteith
20907	special sensor: Evaporation module according to Turc-Wendling
20908	special sensor: Evaporation module according to Haude
20909	calculated sensor: Sunshine duration
20910	calculated sensor: Wind chill
20911	calculated sensor: Wet temperature, frost temperature
20912	calculated sensor: Dew point temperature
20913	special sensor: Hop index module
20914	calculated sensor: Sun position (azimuth, altitude)
20915	calculated sensor: Absolute humidity
20924	SNMP application for UNIKLIMA vario (network management)
30101	SMS sending and auto answer
30102	SYNOP generation
30103	METAR generation
30104	Email sending by UNIKLIMA vario
30105	FTP upload by UNIKLIMA vario onto customer specific server
30106	Time synchronization by time server
30107	Frost warning module UKvario including SMS sending
30108	Frost warning module UKvario without SMS sending

Air pressure sensor BARO2

Characteristics

- registration of the atmospheric air pressure from 900hPa to 1100hPa
- laser-trimmed measuring sensor
- compensation of the temperature dependence between -40°C and +60°C by a separate signal processor in steps of 1,5 degrees

The primary pressure absorber is based on a silicon absolute pressure sensor element, whose function is based on the piezo resistive effect. It is measured against a vacuum as reference. It has an internal active temperature compensation for a wide temperature range.

The electrical measuring signal is changed into a standardized output signal by a signal processor. After putting the sensor into operation an adaptation time of 30 minutes should be given.

The measured air pressure depends on the height of the location above sea level. For this reason in the meteorology all air pressure values are referred to sea level. For the delivery the sensor is calibrated on 0 meters above sea level.

A sub item "Air pressure height difference" in the system menu allows the addition of an offset value (see barometric height formula), which corresponds to the height of the measuring place above sea level. This setting for your location's height can be done in two ways.

1. Barometric height formula

For example your measuring place is 40 m above sea level (Potsdam). According to the barometric table 40 m correspond to an offset of 4.8 hPa. This value has to be entered as the air pressure height difference.

Accordingly, an original air pressure value of e.g. 950.0 hPa would result in 954.8 hPa.

2. The current air pressure is known

The value for the `air_pressure_height_difference` has to be defined so that the correct air pressure is shown.

$\text{air pressure (location)} + \text{air_pressure_height_difference} = \text{air pressure (sea level)}$

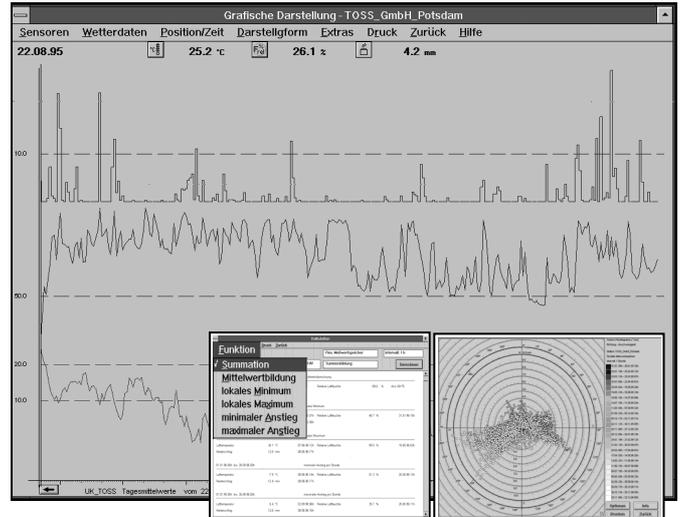
Barometric height table according to barometric height formula for sensor Baro2

height above sea level in m	+ offset in hPa	+ offset in V	height above sea level in m	+ offset in hPa	+ offset in V	height above sea level in m	+ offset in hPa	+ offset in V
0	0,0	0,00	500	58,6	0,488	1000	114,5	0,954
10	1,2	0,01	510	59,8	0,498	1010	115,6	0,963
20	2,4	0,02	520	60,9	0,507	1020	116,7	0,972
30	3,6	0,03	530	62,1	0,517	1030	117,8	0,981
40	4,8	0,04	540	63,2	0,526	1040	118,9	0,991
50	6,0	0,05	550	64,4	0,536	1050	119,9	0,999
60	7,2	0,06	560	65,5	0,546	1060	121,0	1,008
70	8,4	0,07	570	66,6	0,555	1070	122,1	1,017
80	9,6	0,08	580	67,8	0,565	1080	123,2	1,026
90	10,8	0,09	590	68,9	0,574	1090	124,3	1,036
100	12,0	0,10	600	70,0	0,583	1100	125,4	1,045
110	13,1	0,109	610	71,2	0,593	1110	126,4	1,053
120	14,3	0,119	620	72,3	0,602	1120	127,5	1,062
130	15,5	0,139	630	73,4	0,611	1130	128,6	1,071
140	16,7	0,139	640	74,6	0,621	1140	129,7	1,08
150	17,9	0,149	650	75,7	0,631	1150	130,7	1,089
160	19,1	0,159	660	76,8	0,64	1160	131,8	1,098
170	20,3	0,169	670	77,9	0,649	1170	132,9	1,107
180	21,4	0,178	680	79,1	0,659	1180	134,0	1,116
190	22,6	0,188	690	80,2	0,668	1190	135,0	1,125
200	23,8	0,198	700	81,3	0,677	1200	136,1	1,134
210	25,0	0,208	710	82,4	0,686	1210	137,2	1,143
220	26,2	0,218	720	83,6	0,696	1220	138,2	1,151
230	27,3	0,227	730	84,7	0,705	1230	139,3	1,161
240	28,5	0,237	740	85,8	0,715	1240	140,4	1,17
250	29,7	0,247	750	86,9	0,724	1250	141,4	1,178
260	30,8	0,256	760	88,0	0,733	1260	142,5	1,187
270	32,0	0,266	770	89,1	0,742	1270	143,6	1,196
280	33,2	0,276	780	90,3	0,752	1280	144,6	1,205
290	34,4	0,286	790	91,4	0,761	1290	145,7	1,214
300	35,5	0,296	800	92,5	0,771	1300	146,7	1,222
310	36,7	0,305	810	93,6	0,78	1310	147,8	1,231
320	37,9	0,316	820	94,7	0,789	1320	148,8	1,24
330	39,0	0,325	830	95,8	0,798	1330	149,9	1,249
340	40,2	0,335	840	96,9	0,807	1340	151,0	1,258
350	41,3	0,344	850	98,0	0,816	1350	152,0	1,266
360	42,5	0,354	860	99,1	0,826	1360	153,1	1,276
370	43,7	0,364	870	100,2	0,835	1370	154,1	1,284
380	44,8	0,373	880	101,3	0,844	1380	155,2	1,293
390	46,0	0,383	890	102,4	0,853	1390	156,2	1,301
400	47,1	0,392	900	103,5	0,862	1400	157,3	1,311
410	48,3	0,402	910	104,6	0,871	1410	158,3	1,319
420	49,4	0,41	920	105,7	0,881	1420	159,4	1,328
430	50,6	0,42	930	106,8	0,89	1430	160,4	1,336
440	51,8	0,43	940	107,9	0,899	1440	161,4	1,345
450	52,9	0,44	950	109,0	0,908	1450	162,5	1,354
460	54,1	0,45	960	110,1	0,917	1460	163,5	1,362
470	55,2	0,46	970	111,2	0,926	1470	164,6	1,371
480	56,4	0,47	980	112,3	0,936	1480	165,6	1,38
490	57,5	0,479	990	113,4	0,945	1490	166,7	1,389

PC software UK_TOSS Basic (optionally)

Characteristics

- extensive analysis, communication and archiving program for MS Windows 9x, NT, 2000, XP
- fully automatic retrieval of meteorological data with detailed logging: serial, modem, GSM/GPRS, Ethernet-FTP
- graphic and numeric representation
- mathematical analysis functions, summation, local extreme values, smoothing etc
- special wind diagrams
- possibility of keyboard input for meteorological data
- conversion functions
- manual Excel export
- mailbox system
- software programming of UNIKLIMA



Order number: 30300

UK_TOSS Basic is a software for the retrieval and representation of the weather data from the weather stations UNIKLIMA 7, UNIKLIMA net, UNIKLIMA vario and UNIKLIMA frost. The main difference between UK_TOSS Standard and UK_TOSS Basic is that only UK_TOSS Standard offers the various interfaces for the use of further software modules.

The software UK_TOSS Basic for **MS Windows 9x/NT/2000/XP** offers a variety of possibilities for representation, analysis and handling of meteorological data, including organisation of data acquisition and communication with the automatic weather station **UNIKLIMA**.

The data retrieval from the weather station **UNIKLIMA** is alternatively carried out via modem (telephone network) GSM/GPRS (radio), Ethernet-FTP or via a serial cable on the spot. The program offers the possibility to retrieve the data fully automatic or manually at fixed times and in arbitrary time intervals.

Archiving takes place in 7 different time intervals (values per minute, hour and day, as well as one freely selectable interval), whereby each data pool can be edited manually by **keyboard input**.

The **data representation** takes place **graphically and numerically**. The sensor-time-diagram offers extensive positioning and adaptation possibilities, such as:

- representation starting from certain point in time
- graphic zoom / selectable graph shape
- separate / overlapping graph plotting
- sensor representation with min/max graphs
- dynamic graph adaptation to screen size

The numeric representation covers the display in data records starting from any point in time, as well as the alternative sorting by sensors or time.

The **print out** is realised in colour or black & white using different line types.

UK_TOSS Basic **covers mathematical analysis functions** for any periods:

- totals / mean values
- local extreme values / graph rises
- mathematical smoothing.

For the representation of wind data, a special **wind direction / velocity diagram** and a **3D-diagram** for wind direction / wind height are offered.

A **mailbox function** enables information exchange (letters, files) via modem / telephone, including

- automatic and manual retrieval of mailbox head offices
- possibility to self-create as a mailbox head office
- sending and receiving data
- telephone directory
- text editor

UK_TOSS Basic offers the possibility of **software programming of UNIKLIMA stations** by serial interface or modem (only compulsively necessary for UNIKLIMA-logger without display and keyboard). This covers setting of date, time-of-day and device code, as well as modem initialisation, device test and boot information.

A detailed **help function** (program description) facilitates the first steps and work with UK_TOSS.

System requirements

- at least IBM 486 (or compatible)
- MS Windows 9x/NT/2000/XP/Windows 7
- 64 MB RAM
- at least 20 MB free hard disk memory
- free RS-232 interface for modem or direct connection to UNIKLIMA
- or Ethernet adapter FTP