Hygrofox

Data logger to monitor and record humidity as well as air and object temperatures

- Stores 4,000 readings, optionally upgradeable to up to 64,000 readings
- Measuring interval: freely selectable between 1 second and 24 hours
- 2 x external sensors can be connected e.g. for surface and/or air temperature
- Large display (can be switched off)
- Min./max. detection for continuous monitoring/logging of extreme values
- Dew point (°C/°F) / aH (g/m3) available
- Operation with standard AAA batteries

Operating Instructions

Introduction to the Hygrofox & Co.

Dear customer,

Thank you for choosing the data logger *Hygrofox (Thermofox Universal incl. climate sensor)* from Scanntronik Mugrauer GmbH. This provides you with an extremely powerful data logger for the analysis of climate data.

The data logger consists of two basic components: The "Thermofox Universal" basis logger system and the attached Thermo-"Hygro" climate sensor. The measuring system has been specially developed for the display, recording and analysis of humidity and air temperature. In addition, up to two external temperature sensors can be connected to the left side of the basis logger system. These sensors can be used to also monitor the wall temperature, radiator temperature, outdoor temperature and much more. *The attached Thermo-"Hygro" sensor measures both the air temperature and humidity and can be separated from the basis logger system by means of an optional connecting cable, if required.* The system offers a clearly arranged display on which the various measured variables can be displayed. If desired, the display can be switched off completely. The two AAA micro batteries used in the data logger can be replaced quickly and easily, so that any measuring task can begin without delay. A regular calibration every 1 to 1.5 years is recommended and guarantees the successful use of the measuring system for many years even as e.g. appointed construction expert at court.

Within the scope of this manual we would like to give you a basic understanding of the use of the Hygrofox & Co. If you only want to use the basic logger system "Thermofox Universal" without the Thermo-"Hygro" climate sensor, you will also find all necessary information and explanations for its operation in this manual. Only the functions relating to the humidity measurement will not be available.

The core components used in the application of the measuring system are the data logger hardware, up to two optional external temperature sensors, possibly some heat-conducting paste and the PC analysis software. In addition, there are other components that can work together with the data logger. These components include e.g. the Remotefox extension for remote data transmission, an SMS alarming system, a portable mini printer and many more. However, these components are not described in detail in this manual.

In order to be able to configure the data logger for the next measurement task, the PC software must be installed on your computer. Among other things, the software gives you access to all collected measurement data stored in the data logger's memory.

For this reason, one of the next chapters deals with the installation of the PC analysis software.

Scope of delivery for a complete system

If you have decided for the complete "Hygrofox" system incl. PC - software, you will find the following components in the packaging or already installed in the system for you:

1. *Hygrofox* - Data logger hardware
2. Two AAA batteries (freshly inserted)
3. Short instructions for the *Hygrofox*

4. Data carrier (CD-ROM) of the PC software
5. PC interface cable incl. manual

6. Optional: External temperature sensors
7. Optional: Heat-conducting paste
8. Optional: Wall bracket
9. Optional: Calibration certificate

Installation of the PC software

Start your computer and wait until the operating system is fully loaded. This process may take a few minutes. If your computer is already switched on, please close all other applications to avoid possible conflicts during installation. You now have the desktop of your windows operating system in front of you.
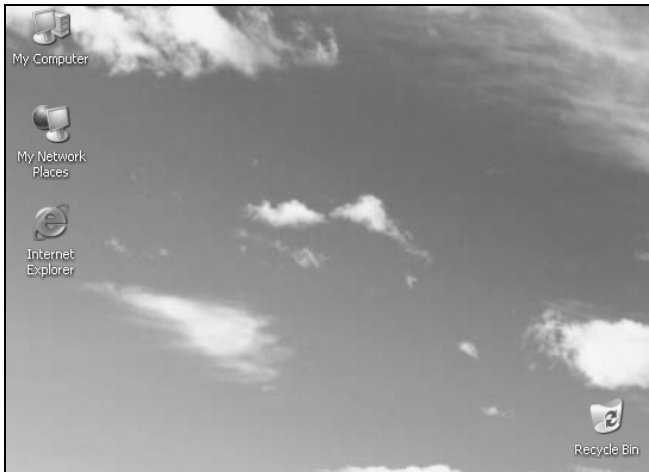

Figure 1: Desktop

It can be one of the following operating systems: Microsoft Windows® XP, Vista, 7, 8, 8.1, 10 or newer. Newer operating systems are also supported. Insert the CD with the data logger software into your CD drive. Normally, the installation wizard will start automatically, which will guide you through the following installation. If this is not the case, the automatic startup function of your CD drive has probably been disabled. In this case, double-click on the "My Computer" icon and it will open. Double-click on the icon of the CD drive in which the data logger software is located. The installation wizard is started.

Figure 2: Wizard for installing the PC software

Follow the instructions on the screen. First, you must specify a directory in which the software is to be installed. You can then specify a name for the folder that will be created in your start menu during installation. In the last step of the installation, you can create a shortcut on your desktop and in the start bar. Before the installation starts, you will receive another summary of the installation options you have selected.

After the installation has been completed, you can start the SoftFOX software via the new entry in the start menu. The welcome screen of the program will open. Press the "OK" button to start working with the software.

This manual explains the procedure for working with the Hygrofox in detail and gives an overview of the most important functions of the software. For more detailed information about all features and capabilities of the software, please open the online help of the program.
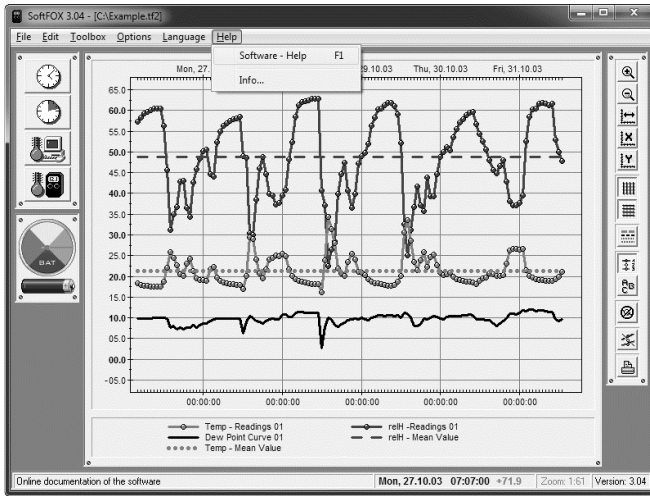
Figure 3: Accessing the online help function

This can be done either by pressing the "F1" key on your keyboard or by using the menu item "Software - Help" in the "Help" menu. In order to be able to use all functions of the software and the data logger it makes sense to take a quick look at the online help. In this way, you will learn how to use the features of the software and the data logger in a targeted manner.

Configuration of the PC software

Before the PC software can work together with your data logger hardware, you must connect the data logger to your computer. The connection is made via the PC interface cable, which is included in the scope of delivery of the software. This can be either a USB or RS232 interface cable.

When using a USB interface cable, please note that you must install the USB interface cable on your computer before using it for the first time! Please follow the installation instructions enclosed with the USB interface cable.

Connect the interface cable to an available USB port of your PC (when using a USB interface cable) or RS232 port (when using a RS232 interface cable) and connect the other end of the cable to your logger.

The interface cable must be connected to the "Computer/Switch" socket on the right side of the data logger. To do this, first disconnect the connection cable to the Thermo-"Hygro" climate sensor (if present) and then connect the PC interface. After the configuration of the data logger has been completed, the Thermo-"Hygro" climate sensor is reconnected via the connection cable to the "Computer/Switch" socket.

Now you have to set the right communication port in the PC software to establish a connection to the data logger. This is done via the "Program Settings…" menu item in the "Options" menu. Enter the corresponding port in the "Communication Ports" field.
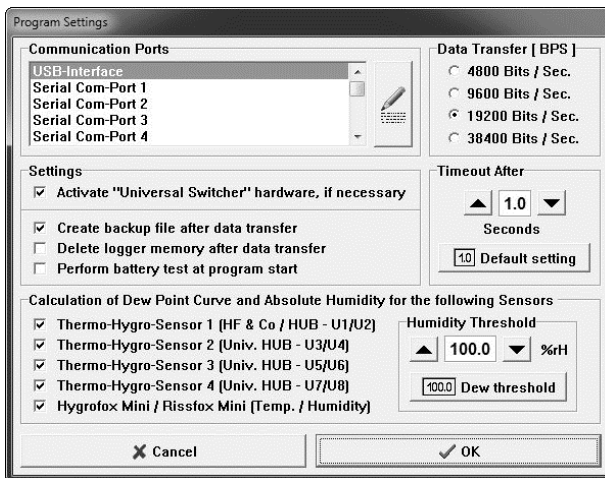

Figure 4: Configuration of the communication port

Save the setting with the "OK" button. In this way, you only have to specify the communication port once. The PC software is now ready for the configuration or readout of the data logger.

Tutorial for the Hygrofox & Co.

After you have successfully installed the PC software and two AAA micro batteries have been inserted into the data logger (these are already freshly installed by us shortly before delivery), the typical procedure for the use of the Hygrofox (or Thermofox Universal) is explained below.

Each measurement task starts with the configuration and testing of the measuring system, i.e. the data logger. The first step is to test the battery status of the data logger. This is particularly important if the data logger is to record measurement data over a long period of time.

There are two ways to check the condition of the batteries. Either select the "Battery Test" menu item in the "Options" menu or click with the left mouse button on the battery symbol to the left of the diagram window. The battery indicator is then updated and gives you a guide value for the condition of the batteries.

Figure 5: Battery indicator of the data logger

Depending on the set measuring rhythm, the number of active sensors, the ambient temperature and the frequency of PC communication, we recommend that you replace the batteries of the data logger system at regular intervals (e.g. every 12 months).

The next step is to set the internal clock and calendar of the data logger. These two components give the data logger the "feeling of time" that enables it to record measurement values at regular intervals and store them in the memory with a time stamp. The clock of the data logger is set via the menu item "Configure Time…" in the "Toolbox" menu or via the clock symbol in the toolbox to the left of the diagram window (1st symbol).
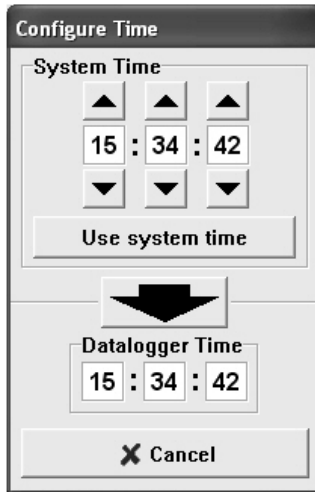

Figure 6: Setting the internal data logger clock

To transfer the current time to the data logger, just click on the big black arrow in the middle of the window. This transfers the computer's current system time to the data logger. Please make sure that the system time of your computer is set correctly.

Next, the data logger calendar is set. This is done via the "Configure Date…" menu item in the "Options" menu.
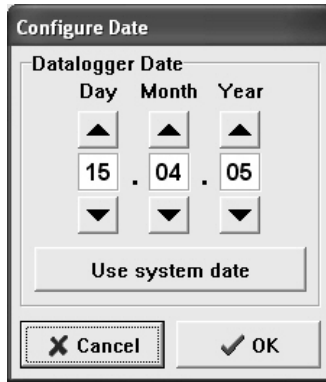
Figure 7: Setting the internal data logger calendar

You can use the "Use system date" button to transfer your current system date directly to the three date fields. The new date is not transferred to the data logger until you press the "OK" button.

After the two time-determining components of the data logger have been configured, the sensors of interest during the following measurement task are selected. The sensor selection is made via the menu item "Configure Sensors…" in the "Options" menu.
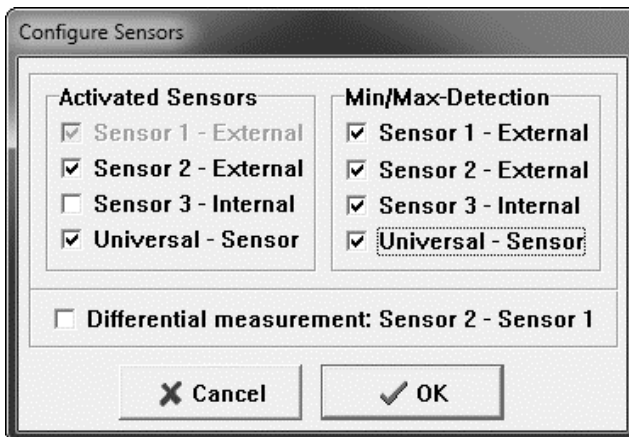

Figure 8: Selecting the active sensors

The configuration window is divided into two main areas. In the left area, the sensors to be recorded during the next measurement task are selected. In the right-hand area, the sensors for which the min/max detection is to be active are defined.

Software	Display	Description
Sensor 1 - External	$t1$ (=t1)	**1. External temperature sensor** Input „Sensor 1" of the data logger
Sensor 2 - External	$t2$ (=t2)	**2. External temperature sensor** Input „Sensor 2" of the data logger
Sensor 3 - Internal	$t3$ (=t3)	Air temperature sensor, integrated in the „Thermofox Universal" basis logger system
Universal - Sensor	$U1$ $U2$ (=U1) (=U2) etc.	"Universal – Sensor" connected to the "Computer/Switch" socket, e.g. Thermo-"Hygro" climate sensor **U1 = Air temperature of the sensor** **U2 = Humidity of the sensor**

Table 1: Available sensors and their description

Activate all sensors you want to use, one after the other. If there is a check mark in the corresponding selection box, this sensor is active, even if the check mark is grayed out or hidden. This only ensures that the sensors are activated in the correct sequence.

Without active min/max detection, only one measurement value per sensor is recorded at each measurement time. With very slow measuring rhythms (e.g. several hours) this can lead to overlooking extremely short-term extremums, i.e. these extremums will not be recorded. With active min/max detection, the Hygrofox regularly analyses the state of the sensors at short intervals (typically every 5 seconds).

If the data logger detects an extremum, i.e. a short-term peak value which would not be registered by the normal long-term recording, it is additionally stored in the memory.

Please note that the data logger does not necessarily always record an additional extreme value at every time of measurement! If the climate surrounding the data logger is relatively constant or changes only slowly, it is possible that even with activated recording of extreme values no minima or maxima occur i.e. are recorded. This saves a lot of data memory and work during the later evaluation of the measured data.

When the "Differential measurement: Sensor 2 - Sensor 1" is active, both external temperature sensors ("Sensor 1 - External" and "Sensor 2 - External") are always used and automatically activated. The input "Sensor 1" ("t1") registers the temperature of the connected sensor as usual. However, the input "Sensor 2" ("t2") registers the difference between "Sensor 2" and "Sensor 1", i.e. "Sensor 2" minus "Sensor 1". By this means, for example, the temperature difference between the flow temperature and the return flow temperature of heating systems can be monitored very easily.

The last step is to define the rhythm (the measurement interval) at which the data logger is to record measurement values. This is done either via the menu item "Configure Logging Interval…" in the "Toolbox" menu or via the second clock symbol (with the green section) in the toolbox to the left of the diagram window.

In the "Logging Interval" area you can define the time intervals at which the Hygrofox should regularly store measured values of the selected sensors in the memory. After you have made the desired settings, start the measurement process by pressing the "Start Logger" button. Please note that all values stored in the data logger's memory at this time will be deleted. Confirm this warning. Depending on the memory configuration of the system, the active sensors as well as the

selected measuring rhythm, the maximum possible measuring duration is determined. Here some examples:

Memory	Active Sensors	Rhythm	Duration
4000 Readings	Air Temperature (U1) Air Humidity (U2)	15 Minutes	**21 Days**
4000 Readings	Air Temperature (U1) Air Humidity (U2) 1. External Sensor (t1)	15 Minutes	**14 Days**
4000 Readings	Air Temperature (U1) Air Humidity (U2) 1. External Sensor (t1) 2. External Sensor (t2)	15 Minutes	**10 Days**
16000 Readings	Air Temperature (U1) Air Humidity (U2)	15 Minutes	**83 Days**
16000 Readings	Air Temperature (U1) Air Humidity (U2) 1. External Sensor (t1)	15 Minutes	**56 Days**
16000 Readings	Air Temperature (U1) Air Humidity (U2) 1. External Sensor (t1) 2. External Sensor (t2)	15 Minutes	**42 Days**
64000 Readings	Air Temperature (U1) Air Humidity (U2)	15 Minutes	**333 Days**
64000 Readings	Air Temperature (U1) Air Humidity (U2) 1. External Sensor (t1)	15 Minutes	**222 Days**
64000 Readings	Air Temperature (U1) Air Humidity (U2) 1. External Sensor (t1) 2. External Sensor (t2)	15 Minutes	**167 Days**

Table 2: Dependency of the measuring duration on different parameters

If you have also activated the min/max detection, the maximum recording/measuring duration is reduced by approx. 10%, depending on the fluctuation intensity of the climate.

Figure 9: Setting the measurement interval of the data logger

The data logger now measures continuously and stores the measured values in the internal memory. Disconnect the Hygrofox from the PC and connect the Thermo-"Hygro" climate sensor to the "Computer/Switch" socket via the connection cable. Next, connect the external temperature sensors to the inputs "Sensor 1" and "Sensor 2".

You can now place the data logger anywhere you like and use it in your measuring task. To achieve an optimal result when measuring surface temperatures, please proceed as follows:

Apply a small amount of heat-conducting paste (approximately the size of a pea) on the surface to be measured and embed the front part of the temperature sensor in it. Then use a wide enough fabric tape (e.g. from "Tesa" or "Scotch") to attach the sensor firmly to the surface together with the heat conducting paste.

Please also make sure, that the sensor cable running to the data logger does not weigh down or loosen the measuring point.

After completion of the installation work, we recommend that you briefly check the function of the individual sensors. To do this, select each sensor separately in the display by pressing the left "MAX" button of the data logger.

First press the "MAX" button for approx. 3 seconds to bring the data logger into its initial state. Afterwards, a short push on the "MAX" button switches through the individual sensors. For further information on operating the Hygrofox with the help of the buttons, please refer to the enclosed quick guide.

At the end of the measurement task, reconnect the data logger to the computer and readout the collected measurement data. The data can be transferred to the PC using the menu item "Transfer Data…" in the "Toolbox" menu.
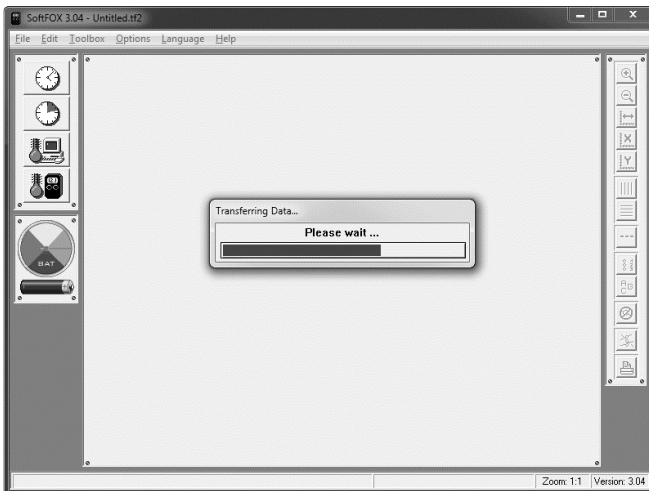

Figure 10: Reading out the collected measurement data

After the measurement values have been transferred to the computer, they are displayed directly as a diagram. You can use the diagram tools on the right-hand side of the diagram window to change the appearance of the diagram. To save the data, use the menu item "Save Project As…" in the "File" menu.
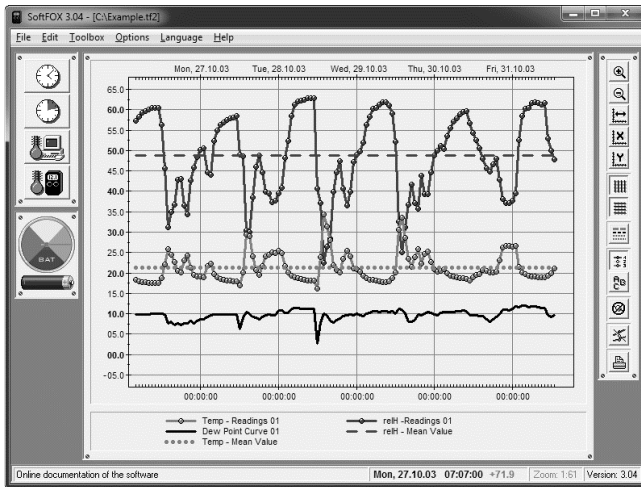

Figure 11: Read out measurement data

For more information on operating the software and configuring your data logger, please refer to the online help.

Warranty Information and Liability

The company Scanntronik Mugrauer GmbH grants a warranty of 24 months on all of their data loggers. Re-calibration, battery replacement or shipping costs are not covered by the warranty (this list does not claim to be exhaustive). We assume no liability for direct or indirect damage caused by improper use or application of our devices.

Notes

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