- **Battery**

  After setup, reset or after every outdoor data reception a low-battery detection is started by the software of the Weather Station. If the batteries run low, a low battery indication flag is shown on the display.

## S 9) STORAGE, MINIMUM/MAXIMUM VALUE

The Weather Station stores the minimum and maximum values of the indoor and outdoor temperatures/humidities along with time and date of their occurrence. This feature is especially useful for the display of the temperatures and humidities in those locations where the Sensors and the Weather Station are placed. All newly reached minimum and maximum temperatures are automatically stored and displayed on the LCD.

## S 10) TRANSMISSION CODE

At first setup of the Weather Station an automatic programming takes place which cannot be influenced by the user. It is this the learning of the various transmission codes of the Thermo Hygro Sensors and the Rain Gauge by the Weather Station. By this procedure a clear allocation of all parts of the system to each other takes place, serving the safety of signal transmission. This learning procedure takes place along with the reception of the first valid data and the update of data first displayed on the LCD. It can be recognized by a short sequential light-up of various display segments while being tested.
At the same time the radio controlled clock will start scanning for the DCF-77 signal. After all tests have been performed the data of the indoor and outdoor readings will be displayed. The transmission code learning mode can now be terminated by pressing any one key. The Weather Station is now fully operational.

## S 11) WEATHER SYMBOLS

For every sudden or definite change in air pressure, the weather symbols will update accordingly to represent this change. This means that the icons will not change if there is no noticable movement in the weather. If the symbols do not change it simply means that either

1. the weather has not changed or
2. the weather change has been so slow that is has not been possible to read when the actual change had taken place.

The sensitivity to air pressure changes reponsible for a change of the display of weather icons is programmable (2, 3 or 4 hPa). In areas where weather icons do not change easily because of almost stagnant air pressure, users may consider setting a lower hPa setting to allow for a more sensitive air pressure reading.

The weather icons displayed forecast the future weather in terms of getting better or worse and not necessarily sunny or rainy as each icon indicates. E.g., if the current weather is cloudy and the rain icon is displayed, it does not mean that the product is faulty because it is not raining. It simply means that the air pressure has dropped and the weather is expected to get worse but not necessarily raining.

## S 12) WEATHER TENDENCY

Because of the combination of weather icons and weather tendency arrows, the Weather Sation can also show how the weather has changed and is expected to change. E.g., if the tendency arrow pointing downwards is displayed along with the cloud and sun symbols then the last noticeable change in the weather was when it was sunny (sun icon only). This means that the next change in weather will show the rainy icon since the tendency indicator is pointing downwards.

The weather tendency indicator arrow will remain on the LCD regardless of the weather. E.g., if the current weather is raining and the indicator is pointing downwards, it means that the weather will remain poor. If the weather is sunny and the indicator is pointing upwards, it means that the weather is expected to continue being fine.

Does the air pressure drop at an extreme rate of 4 hPa or more in six hours the stormy cloud icon in Section 5 of the LCD will flash as an indication of possible storm. The flashing will cease only if the air pressure stays stable or starts to rise again.

recommended to get the currently valid Relative air pressure at your radio station or your local weather services.

For accurate reading of the barometric values the Weather Station should be kept at a constant altitude at all times. E.g. it should not be randomly moved from the ground level to the upper floors of a building. If this should be necessary, then a setup or reset should be performed and all weather readings should be discarded for the next 12 to 24 hours. This will allow sufficient time for the Weather Station to operate at a constant altitude and thus enable an accurate reading.

The display of the Weather Station bases on the average value of the last 10 air pressure measurements. The calculation of the average takes place after every reading. If the new pressure value has a difference of 1.0 hPa or more to the old average, it will be set to the new value.

### S 2) CLOCK, Radio Controlled
The time base for radio controlled time and date is a Cesium Atomic Clock operated by the Physikalisch Technische Bundesanstalt Braunschweig, which has a time deviation of less than one second in one million years. This signal is coded and transmitted from Mainflingen near Frankfurt via longwave frequency signal DCF-77 and has a transmission range of approximately 1,500km. The Weather Station receives this signal and converts it for display. So when within this range the time information received and displayed is absolutely accurate regardless of summer or wintertime.

### S 3) COMFORT LEVEL ICONS
With these icons the users can determine the effect of temperature and realtive humidity with regard to the comfort level within their current surroundings.

The Weather Station indicates the present comfort level by showing the icons ″**Bright**″ (″**J**″) or ″**Sad**″ (″**L**″). If the indoor temperature is in the range between +20°C and +26°C and the relative humidity between 45% and 65%, the ″**Bright**″ icon will be displayed. If either temperature or humidity is outside of this range, the ″**Sad**″ icon will be shown. Thus the symbol ″**J**″ will indicate a high, the symbol ″**L**″ a low comfort level.

If the ″**Sad**″ icon (″**L**″) is displayed simultaneously with the words ″**DRY**″ or ″**WET**″, then the relative humidity will be below or above the comfortable level. If only the termperature is outside of the comfortable range, non of these words will be displayed. The ″**Sad**″ icon (″**L**″) along with the word ″**DRY**″ will thus indicate a relative humidity below 45%, along with the word ″**WET**″ above 65%.

If the temperature is below 0°C or higher than +45°C then the result of the humidity measurement may differ from the real humiditiy value. The further the temperature is out of range, the bigger may be the difference to the real humidity. If the temperature is outside its measuring range (²**OFL**² display), the humidity can no longer be calculated and ²**- - -**² is shown on the display.

### S 4) DATA RECOVERY
It is assumed that the Weather Station has already been programmed and operating for some period of time, i.e. all important data had already been stored. Due to storage in a non-volatile EEPROM this data will stay available even in case of an unintentional power off. Therefore in case of any necessary setup or reset all relevant data such as the rain multiplicator etc. can easily be recovered.

### S 5) HISTORY, AIR PRESSURE/RAIN QUANTITY
Here the respective air pressure values of the past hours as well as the rain quantities of the past days are displayed in form of vertical bars of various lengths.

**Air Pressure History**
The bar graph of the electronic barometer shows the air pressure history of the past 48 hours in 9 steps at the points 0, -1, -3, -6, -12, -18, -24, -36 and -48 hours. The bars are plotted at each of the 9 steps and give the trend over the recorded period. The scale on the right compares the result. The ″0″ in the middle of this scale determines the current air pressure. Each change (±1, ±3, ±5 und ±7) shows in Hekto-Pascal (hPa), how high or low the past air pressure was as compared to the current one. If the bars are rising it indicates that the weather is getting better due to an increase in air pressure. If the bars

go down it indicates a drop of the air pressure and the weather is expected to get worse from the present time ″0″.
At every full hour the current air pressure is used as a basis for the display of a new graph bar. The existing graph is then moved one bar to the left.

**Rain Quantity**
As with air pressure history the Weather Sation via Rain Gauge reads the rain quantity and provides a bar graph indicating the rain history over the stored time period. In case of the rain history this covers the past 7 days as well as the present day. A scale on the left compares the result. The ″0″ determines the current value. Each change shows in Millimeters (mm) the rain quantity as compared the current value. The scaling of the bar lengths covers in normal display mode a rain quantity of 100 Millimeters (0, 1, 2, 3, 5, 10, 20, 50 and 100mm).

### S 6) RAIN MULTIPLICATOR
The rain multiplicator is the one value determining the amount of water to be collected by the Rain Gauge leading to the transmission of one counting pulse from the rain level sensor to the Weather Station. Here "3.75" has proven to be the optimum value. I.e. the rain level sensor will transmit one pulse to be used for calculation of the rain quantity display upon reaching a smallest possible value of 0.267mm of rain.

The rain multiplicator is set to a default value of ″3.75″ by the manufacturer prior to shipment. There is no need for manual setting of those numbers. However, the rain multiplicator can easily be set by the user to any value between 0.00mm and 9.99mm ("3.75" recommended. Only the digits after the decimal point are shown). Since this value is stored in a non-volatile EEPROM it can be recovered and used as a reference even in case of an accidental power failure.

### S 7) SENSITIVITY (hPa)
This feature allows the Weather Station to be used more accurately by setting the hPa (Hekto Pascal) sensitivity to match the users external living environment such as maritime or high altitude areas where the changes in air pressure are very different to each other. In areas that experience frequent changes in air pressure (which does not necessarily reflect a change in the weather), the sensitivity level can be set higher compared to an area where the air pressure is stagnant. E.g. if the hPa sensitivity is set to 3 hPa, then there will be no change of weather symbols if the air pressure does not drop or increase by at least 3 hPa. For areas where the air pressure is stagnant, then the hPa sensitivity can be set lower.

### S 8) SOFTWARE OPERATIONS

- **DCF-77 Time Signal**
  Every full hour, after every setup or reset and after leaving the programming mode the software of the Weather Station will start a reception of the DCF-77 time signal.

- **Indoor Temperature and Humidity/Air Pressure**
  The software of the Weather Station will perform measurements of the current indoor temperature every 10 seconds, the current indoor humidity every 20 seconds and the current airpressure every 1 minute. During DCF-77 reception, reception of Thermo Hygro Sensor and Rain Gauge signals, in programming mode and while any one key is pressed no reception will take place.

- **Outdoor Temperature and Humidity/Rain Quantity**
  The software of the Weather Station will take readings of the current values from up to three Thermo Hygro Sensors and the Rain Gauge every 5 minutes. During DCF-77 reception, in programming mode and while any one key is pressed no reception will take place.
  If any one outdoor temperature or humidity or the rain quantity cannot be received 3 times in a row, the display will show ²**- - -**² for this particular value.
  In case the Weather Station receives a new rain value, it immediately starts a calculation of the three possible rain displays (i.e. rain of past hour, etc.).
  The rain since start of last rain resets to zero when it starts raining after 15 or more successful receptions with no new rain.

## 12    IMPORTANT NOTES

- Avoid placing the Weather Station where it can be exposed to sudden changes in temperature, i.e. direct sunlight, extreme cold and wet/moist conditions since the design of this product is for indoor use only. This will help to avoid any inaccurate readings and any possible damage to the unit.
- Should the Weather Station be exposed to extreme and sudden temperature changes, it will lead to rapid changes in its readings and thereby reduce its accuracy.
- Should the Weather Station be moved to another location that is significantly higher or lower than its initial standing point (e.g. from the ground floor to the upper floors of a house), then either reset the units or discard the readings of the weather forecast for the next 12 to 24 hours. By doing so, this will allow sufficient time for operation at a constant altitude and thus enabling a more accurate forecast.

## 13    CARE AND MAINTENANCE

- Avoid placing the units in places prone to extreme temperatures, vibration and shock as these may cause damage and inaccurate readings.
- When cleaning the Weather Station's display and casing, use a soft damp cloth only. Do not use solvents or scouring agents as they may mark the LCD and casing.
- Do not submerge the unit in water.
- Immediately remove all low powered batteries to avoid leakage and damage. Replace only with new batteries of the recommended size.
- Do not make any attempts to repair the units. Return them to ist original point of purchase for repair by a qualified engineer. Opening and tampering with the units may invalidate their guarantee.

## 14    BATTERY CHANGE

For best performance, batteries to all units should be replaced when the low battery indicator is displayed on the left of the transmission tower icon in Section 1 of the LCD or at least once a year to maintain maximum running accuracy.

**Please help in the preservation of the environment and return used up batteries only to an authorized depot.**

## 15    SPECIFICATIONS

| | | |
|---|---|---|
| Radio controlled time signal | : | DCF-77 |
| Recommended operating temperature | | |
| Weather Station | : | 0°C to +50°C |
| Thermo Hygro Sensor | : | -30°C to +60°C |
| Rain Gauge | : | 0°C to +50°C |
| LCD contrast | : | 8 levels |
| Temperature measuring range | | |
| Indoor | : | -9,9°C to +59,9°C with 0,1°C resolution |
| | | ("OFL" displayed if outside this range) |
| Outdoor (Thermo Hygro Sensor) | : | -29,9°C to +59,9°C with 0,1°C resolution |
| | | ("OFL" displayed if outside this range) |
| Relative humidity range | : | 20% to 95% with 1% resolution |
| (Indoor and outdoor) | | (Display "- - -" if outside this range) |
| Air pressure | | |
| Absolute hPa | : | 700 hPa to 1099 hPa |
| Relative hPa (selectable) | : | 970 hPa to 1030 hPa |
| Relative inHg (selectable) | : | 28,60 inHg to 30,45 inHg |
| Sensitivity setting hPa | : | 2, 3 and 4 hPa |
| Air pressure history | : | For the past 48 hours (0, -1, -3, -6, -12, -18, -24, -36 and -48) |
| Rain quantity history | : | For the past 7 days (0, -1, -2, -3, -4, -5, -6 and -7) |

Data checking intervals

| | | |
|---|---|---|
| Indoor Temperature | : | Every 10 seconds |
| Humiditiy | : | Every 20 seconds |
| Outdoor (Reception Weather Station) | | |
| Temperature | : | Every 5 minutes |
| Humidity | : | Every 5 minutes |
| Rain Quantity | : | Every 5 minutes |
| Air Pressure | : | Every 1 minute |
| Data reading update (Sensor) | | |
| Outdoor Temperature | : | Every 1 minute |
| Outdoor Humidity | : | Every 1 minute |
| Rain quantity update (Rain Gauge) | : | Depending on rain multiplicator (normally 3.75mm rain quantity) |
| Transmission Frequency | : | 433,92MHz |
| Transmission Range | : | up to 200 Meters |
| Transmission Power | : | -3dBm |
| Power Supply | | |
| Weather Station | : | 3 x AA, IEC LR6, 1.5V |
| Thermo Hygro Sensor | : | 2 x AA, IEC LR6, 1.5V |
| Rain Gauge | : | 2 x AA, IEC LR6, 1.5V |
| Dimensions (L x W x H) | | |
| Weather Station | : | 117 x 30 x 225 mm |
| Thermo Hygro Sensor | : | 60 x 73 x 121mm |
| Rain Gauge | : | 132mm Ø x 185mm high |

## 16    LIABILITY DISCLAIMER

- The manufacturer and supplier cannot accept any responsibility for any incorrect readings and any consequences that occur should any inaccurate reading take place.
- This product is not to be used for medical purposes or for public information.
- This product has been designed for strict use in the home as an indicator of the future weather and is not 100% accurate. Weather forecasts and barometric readings given by this product should be taken only as an indication and not as being totally accurate.
- The specifications of this product may change without prior notice.
- This product is not a toy. Keep out of the reach of children.
- No part of this manual may be reproduced without written consent of the manufacturer.

## 17    SUBJECT INDEX

**Here the interested user will find a number of additional informations regarding the function of this Weather Station. Their knowledge however is not necessary for efficient operation of this system.**

### S 1)    AIR PRESSURE, ABSOLUTE/RELATIVE

The display of the current air pressure on the Weather Station takes place in Absolute hPa (Hekto-Pascal) or inHg (Inch Column of Mercury) and Relative hPa or inHg. The setting in Absolute hPa or inHg gives the display of the true air pressure at the current time and location and cannot be calibrated, while the display of the Relative hPa or inHg bases on a manually programmable setting range.

Relative air pressure is the one value which is calculated back to sea level from the local Absolute air pressure and is thus valid as a reference for weather condition and weather development for the entire country (so an Absolute air pressure of 961 hPa in Munich at an approximate altitude of 600 Meters above sea level corresponds to a Relative air pressure of 1021 hPa at sea level). Relative air pressure also is the one value given by the various TV and radio broadcasting stations in their daily weather forecasts for their respective locations. If the Weather Station needs to be calibrated it is therefore

- Total rain quantity since last setup/reset of the Weather Station
- Rain quantity since start of last rain (″**Rainy cloud symbol**″)
- Rain quantity of the past hour (**1H**)
  (Default setting Total rain quantity, no symbol displayed).

**8.3.2    RESETTING TOTAL RAIN QUANTITY**
In normal display mode the total rain quantity stored can be reset to zero by pressing and holding the ²**RAIN**² key for at least 2 seconds.

**8.4    TIME AND DATE DISPLAY**
Pressing and holding the ²**+**² key for at least 2 seconds in normal display mode will toggle between the current time of day and the current date displays.

**9    DATA RECOVERY ^(S 4))**
Since all data is stored in a non-volatile EEPROM it can be recovered even in case of an accidental power failure.

**10    DATA TRANSMISSION AND RECEPTION**

**10.1    CRITERIA FOR RECEPTION**
The software of the Weather Station performs for reception and computing of displayed values a number of comprehensive operations ^(S 8)) which are not necessarily important for the user to know. There are only two items to be closely observed by the user:

1. In case the time is not correctly displayed in Section 1 of the LCD, then please see Item **10.2.1 DCF-77 Reception Check**.
2. If perceivably the reception of any one of the outdoor signals (rain history in Section 4 and rain quantity in Section 5, respectively outdoor temperature and humidity in Section 6 of the LCD) is disturbed, then see Item **10.2.2 433MHz Reception Check**.

**10.2    REMOTE CONTROL**

**10.2.1    DCF-77 RECEPTION CHECK**
The Weather Station will automatically start scanning for the DCF-77 frequency signal (time signal transmission) after the batteries are inserted. In normal surroundings (i.e. away from interferring sources such as TV sets), it takes between 3 to 5 minutes to receive the signal. If after 10 minutes of inserting the batteries the DCF-77 signal is not properly received then check the following list before manually setting the time (see Item **7.2.3 Time Setting Mode**).

1. The distance of the units should be at least 1.5 - 2.0 Meters away from interferring sources such as computer monitors or TV sets.
2. Avoid placing the units onto or in the immediate proximity of metal window frames.
3. Within thick concrete rooms such as basements and tower blocks, the DCF-77 frequency signal is naturally weaker for reception. In extreme cases, place the unit closer to a window and/or point its front or rear towards the Frankfurt transmitter (again avoid placing near metal frames or structures).

**Note:**
Users may be located in areas where atmospheric disturbances are the immediate cause for not receiving the DCF-77 frequency signal. During nighttime, atmospheric disturbances are usually less severe and reception is possible in most cases. With a single daily reception, it is adequate for the Weather Station to keep time accuracy deviation to below 0.5 seconds in a period of 24 hours.

When reception is successful, the DCF-77 transmission tower icon will start flashing on the LCD as a sign that the signal has been located and is about to be received. Once the signal has been locked, the DCF-77 tower icon will stay fixed on the LCD and the received time will then update and correct the manually set time.

**10.2.2    433MHz RECEPTION CHECK**
Similar to the DCF-77 signal, the Weather Station will automatically start scanning for the Thermo Hygro Sensor's and the Rain Gauge's 433MHz signal after the batteries are inserted. If the outdoor temperature, outdoor relative humidity and rain quantity reading is not correctly displayed after about 30 seconds, then check the following list before resetting the units (see Item **6.2 Reset**).

1. The distance of the units should be at least 1.5 - 2.0 Meters away from interferring sources such as computer monitors or TV sets.
2. Avoid placing the units onto or in the immediate proximity of metal window frames.
3. Using other electrical products such as headphones or speakers that operate on the same frequency signal (433MHz) may prevent the transmission pick up.
4. Neighbours using electrical items operating on the 433MHz signal can also cause interferences.

**Note:**
When the 433MHz signal for the outdoor temperature and relative humidity has been received, do not reopen the battery cover to either Weather Station or Thermo Hygro Sensor as the batteries may accidentally spring free from the contacts and force a false reset. Should this happen then reset both units (see Item **6.2 Reset**) otherwise transmission problems may occur.

The transmission range from the Thermo Hygro Sensor and Rain Gauge to the Weather Station (433MHz) is up to appr. 200 Meters in open space, but again this depends on the surrounding environment and interference levels. If reception is still not possible, then reset all units (see Item **6.2 Reset**).

The Thermo Hygro Sensor's and Rain Gauge's transmission range may be affected by exposure to extreme cold conditions (e.g. -25°C) for long periods of time. Should this happen, the 433MHz signal may be weakened and therefore result in shorter transmission distances. The battery life may also be greatly reduced by exposure to such sub-zero temperature levels.

**11    POSITIONING**

**11.1    POSITIONING THE WEATHER STATION**
The Weather Station is shipped with a removable table stand. It can thus be used standing on a table or hung to a wall. To wall mount please do the following:

1. Fix a screw (not supplied) into the desired wall, leaving the head extended off the wall by about 5 mm.
2. Using the Weather Station's hanging hole on the back of the unit, carefully hang it onto the screw. Always ensure that the product securely locks onto the screw head before releasing.

**11.2    POSITIONING THE THERMO HYGRO SENSOR**
The Thermo Hygro is supplied with a mounting bracket and screws for wall mounting. Be sure to differentiate each of the Sensors since they are not numbered and have no specific order for setup (also see Part 3 of Item **6.1 Basic Setup**).

**11.3    POSITIONING THE RAIN GAUGE**
Simply place the Rain Gauge outdoors where it is free from obstruction to collect rain (e.g. your terrace or lawn). However, ensure that it cannot be easily blown over by the wind. Fixed mounting is also possible by means of two mounting screws (included).

**Note:**
**Users are recommended to check that the DCF-77 and 433MHz signals are properly received before permanent standing, hanging or mounting of Weather Station, Thermo Hygro Sensor(s) and Rain Gauge. Should the Weather Station not pick up either signal from the desired location, then relocate slightly. Once the signals are received, mount your system units permanently.**

### 7.2.7 SENSITIVITY [S 7)] OF WEATHER FORECAST (CHANGE IN HPA)

1. The hPa sensitivity will start flashing in the air pressure part of Section 5 of the LCD (Default setting 3). Using the ²**+**² key select the desired sensitivity level (2, 3 or 4 hPa) leading to a change of the forecast weather symbols.
2. Press the ²**SET**² key to enter the ²**Selection Mode Relative hPa/inHg or Absolute hPa/inHg**².

### 7.2.8 SELECTION MODE RELATIVE HPA/INHG OR ABSOLUTE HPA/INHG [S 1)]

1. The display Relative hPa/inHg or Absolute hPa/inHg will start flashing in Section 5 (Default setting rel. hPa). Using the ²**+**² key, select the air pressure reading mode required. Setting can be selected in the order rel. hPa, abs. hPa, rel. inHg, abs. inHg and so on.

**Note:**
The display of the Absolute air pressure cannot be changed by the user.
If the display of the Relative air pressure needs to be calibrated to the elevation of your location with regard to sea level then choose the display mode Relative hPa/inHg.

2. Press the ²**SET**² key to switch to the ²**Calibration Mode Relative hPa/inHg**².

### 7.2.9 CALIBRATION MODE RELATIVE HPA/INHG [S 1)]

1. The digits of the Relative hPa/inHg display (depending on the previous selection of display Relative hPa or Relative inHg) will start flashing in Section 5. Using the ²**+**² key select the desired setting in ″hPa″ (from 970 hPa to 1030 hPa) or in ″inHg″ (from 28.60 inHg to 30.45 inHg).
2. Press the ²**SET**² key to move to the ²**Selection Mode for Bar Graph Display**².

**Note:**
This calibration facility is useful for those users living at various elevations above sea level, but wanting their air pressure display based on sea level elevation.

### 7.2.10 SELECTION MODE FOR BAR GRAPH DISPLAY

1. The electronic barometer in form of a bar graph will start flashing in Section 4 of the LCD. Using the ²**+**² key select the desired setting for either the display of air pressure history (PRESSURE) or the display of rain history (RAIN) or the display of both histories constantly alternating (Default setting Alternating)
2. Now press the ²**SET**² key to return to the normal time display mode.

### 7.3 LEAVING THE PROGRAMMING MODE

- To return to the normal display mode from anywhere in programming mode simply press either the ²**INDOOR**² or the ²**OUTDOOR**² key at any time.
- Upon finishing the programming cycle (Items 7.2.1 thru 7.2.10) the programming mode is automatically exited by pressing the ²**SET**² key.
- If in programming mode no key is pressed for at least 20 seconds the Weather Station will automatically switch back to normal display mode.

### 7.4 CHANGE OF RAIN MULTIPLICATOR (IF NECESSARY)

In order to enter the change mode for the rain multiplicator it is necessary to press both the ²**RAIN**² and the ²**+**² keys simultaneously after basic setup or reset (after inserting the batteries) **while all segments of the LCD screens still light up**. The rain multiplicator in Section 1 can now be set as described in Item **7.1 Programming after Setup or Reset (Putting into Operation)**.

### 7.5 RESET OF ALL DATA

At first this is performed as described in Item **7.4 Change of Rain Multiplicator**. After the rain multiplicator has been set however (if at all necessary) the ²**SET**² key must be pressed and held for at least 5 seconds. This will reset all stored data to zero and again switch to Item **7.2.1 Setting of LCD Contrast** in programming mode.

### 8 OPERATION

As described earlier in this manual (see Item **4 LCD Screen**), the various small sections of the LCD screen of the Weather Station are able to provide a number of additional informations besides their normal display functions. These can be reached from the normal display mode in the following way:

### 8.1 DISPLAY OF DATA OF SEVERAL THERMO HYGRO SENSORS

If you are operating all three possible Thermo Hygro Sensors, you are able to toggle between these three outdoor temperature and humidity readings by use of the ²**+**² key. In this case the flag in the lower center of Section 6 will indicate the sensor from which the signal originates by showing its assigned order number. If you own two sensors there will only be order numbers 1 or 2 displayed. If you are operating only one sensor, no sensor order number will be displayed.

### 8.2 MINIMUM/MAXIMUM DISPLAY [S 9)]

### 8.2.1 POLLING MINIMUM/MAXIMUM

By repeatedly pressing the ²**INDOOR**² or the ²**OUTDOOR**² key it is possible to sequentially display all stored minimum and maximum indoor temperatures/humidities and all stored minimum and maximum outdoor temperatures/humidities including their assigned respective times and dates of storage. This is performed in the following way:

### 8.2.1.1 POLLING INDOOR DATA (²INDOOR² KEY)

- Display of minimum indoor temperature on the left and minimum indoor humidity on the right of Section 2 (MIN display in the upper center) with display of time of storage in Section 1.
- Display of minimum indoor temperature on the left and minimum indoor humidity on the right of Section 2 (MIN display in the upper center) with display of date of storage in Section 1.
- Display of maximum indoor temperature on the left and maximum indoor humidity on the right of Section 2 (MAX display in the upper center) with display of time of storage in Section 1.
- Display of maximum indoor temperature on the left and maximum indoor humidity on the right of Section 2 (MAX display in the upper center) with display of date of storage in Section 1.
- Return to normal time display mode by pressing the ²**INDOOR**² key one more time.

### 8.2.1.2 POLLING OUTDOOR DATA (²OUTDOOR² KEY)

- Display of minimum outdoor temperature on the left and minimum outdoor humidity on the right of Section 6 (MIN display in the upper center) with display of time of storage in Section 1.
- Display of minimum outdoor temperature on the left and minimum outdoor humidity on the right of Section 6 (MIN display in the upper center) with display of date of storage in Section 1.
- Display of maximum outdoor temperature on the left and maximum outdoor humidity on the right of Section 6 (MAX display in the upper center) with display of time of storage in Section 1.
- Display of maximum outdoor temperature on the left and maximum outdoor humidity on the right of Section 6 (MAX display in the upper center) with display of date of storage in Section 1.
- Return to normal time display mode by pressing the ²**OUTDOOR**² key one more time.

### 8.2.2 RESET MINIMUM/MAXIMUM

By pressing and holding the ²**INDOOR**² as well as the ²**OUTDOOR**² key for at least 2 seconds all stored minimum and maximum indoor temperartures/humidities and all minimum and maximum outdoor temperatures/humidities as well as all respective times and dates of storage will be reset to their current values.

### 8.3 RAIN MODE

By pressing the ²**RAIN**² key the rain mode is entered. Display takes place on the far right side of Section 5 of the LCD.

### 8.3.1 CHANGE RAIN QUANTITY

By use of the ²**RAIN**² key it is possible to toggle between the displays of rain quantities accumulated over various time periods. The following readings can be selected:

**Note:**
Please keep in mind that, when resetting, **all** units have to be reset and to **always** reinsert the batteries into the Weather Station first. Always wait at least 30 seconds after removing the batteries before reinserting, otherwise start up and transmission problems may occur.

# 7 PROGRAMMING

## 7.1 PROGRAMMING AFTER SETUP OR RESET (PUTTING INTO OPERATION)

After the batteries are inserted (see Item **6 Putting into Operation**) into the Weather Station, Thermo Hygro Sensor(s) and Rain Gauge all segments in the LCD will light up for appr. 3 seconds. The Weather Station will then automatically switch to the programming mode and will in Section 1 of the LCD, display the figures ²**3.75**². Those preset numbers "3.75" by the manufacturer, is the most accurate programming code for the rain multiplicator. It is recommended not to assign another code. However the user can still manually assign another programming code to the rain multiplicator (see "**Manual Setting of the Rain Multiplicator**" below).

### 7.1.1 MANUAL SETTING OF THE RAIN MULTIPLICATOR (NOT NECESSARY) [S 6]

The rain multiplicator is preset to a value of ²**3.75**² by the manufacturer prior to shipment. There is no need for manual setting of those numbers. However, the users can set a different programming value, if desire, in the following way:

After insertion of the batteries into the Weather Station, all segments of the LCD will light up briefly. As soon as this happen:

1. Press simultaneously the "**RAIN**" and "**+**" key to get into the Rain Mode.
2. Using the ²**INDOOR**² (upcount) or ²**OUTDOOR**² key (downcount), assign a value to the flashing digit and press the ²**SET**² key for acknowledgement.
3. This causes the display to switch to the next digit which in turn starts to flash. The next digit now can be set using the same keys as above.
4. When all three digits of the rain multiplicator have been set, the value is stored in EEPROM (Weather Station memory) by pressing the ²**SET**² key one more time. This also will lead to the normal programming mode (see Item **7.2.1 Setting of LCD Contrast**) and on.

### 7.1.2 TRANSMISSION CODE [S 10]

When the Weather Station is put into operation for the first time one further programming takes place every time the unit has a power reset, i.e change of batteries. The user cannot influence this programming. Timout for this ("one further programming") 433MHz reception is about 20 minutes but under normal conditions, reception of all transmitters including the Rain Gauge should all be received well within this time. The completion of this programming is indicated by the eventual display of all indoor and outdoor data. The Weather Station is now fully operable.

## 7.2 PROGRAMMING FROM NORMAL DISPLAY MODE

In case the Weather Station has been in full operation once before, the above described Item **7.1 Programming after Setup or Reset** can completely be omitted. The programming mode can now directly be entered by pressing the ²**SET**² key for at least 2 seconds.
During programming all below listed modes (in numerical order) can be chosen and changed by the user by repeatedly pressing the ²**SET**² key.

1. Setting of LCD Contrast
2. Selection Mode 12/24 Hour Display
3. Time Setting Hours
4. Time Setting Minutes
5. Time Zone Setting
6. Calendar Setting Year
7. Calendar Setting Month
8. Calendar Setting Day
9. Temperature Reading in °C (degrees Celsius) or °F (degrees Fahrenheit)

10. Sensitivity of Weather Forecast (Change in hPa)
11. Selection Mode Relative hPa/inHg or Absolute hPa/inHg
12. Calibration Mode hPa or inHg
13. Selection Mode for Bar Graph Display

### 7.2.1 SETTING OF LCD CONTRAST

1. Upon pressing the ²**SET**² key for the first time the word ²**LCD 5**² will start flashing in Section 1 of the LCD (Default setting LCD 5).
2. Using the ²**+**² key choose the most convenient contrast (0 - 7 contrast levels) for the location of the Weather Station.
3. Press the ²**SET**² key to enter the ²**Selection Mode 12/24 Hours Display**².

### 7.2.2 SELECTION MODE 12/24 HOURS DISPLAY

1. The ²**12**² oder ²**24**² in Section 1 will be flashing (Default setting 24). Choose the desired time display mode by use of the ²**+**² key.
2. Press the ²**SET**² key to enter the ²**Time Setting Mode**² mode.

### 7.2.3 TIME SETTING MODE

1. The hour digits will start flashing in Section 1. Set the desired hours by pressing the ²**+**² key followed by pressing the ²**SET**² key.
2. Now the minute digits will start flashing. Set the desired minutes by pressing the ²**+**² key followed by pressing the ²**SET**² key to move to the ²**Time Zone Setting**².

**Note:**
If the DCF-77 time signal is already received by the Weather Station and is correctly displayed, then the time setting can be omitted.

### 7.2.4 TIME ZONE SETTING

1. The display ²**0**² will start flashing in Section 1 (Default setting 0). If you want to display a different time zone (e.g. British summer or winter time) then set the desired deviation ($\pm$ 9 hours) to the CET (Central European Time) display of the DCF-77 signal by use of the ²**+**² key.
2. Press the ²**SET**² key to move to the ²**Calendar Setting Mode**².

### 7.2.5 CALENDAR SETTING MODE

1. The year digits will start flashing in Section 1 of the LCD. Select the desired year by pressing the ²**+**² key followed by the ²**SET**² key. A range from 1998 through 2020 can be chosen.
2. The month will now start flashing. Select the desired month by pressing the ²**+**² key again followed by the ²**SET**² key.
3. The days now flashing can also be set by use of the ²**+**² key. Press the ²**SET**² key to enter the selection mode ²**Temperature Reading in °C/°F**².

**Note:**
If the DCF-77 time signal is already received by the Weather Station and is correctly displayed, then the calendar setting can be omitted.

### 7.2.6 TEMPERATURE READING IN °C/°F

1. The characters ²**C**² or ²**F**² will start flashing in Section 1 (Default setting C). Using the ²**+**² key select ²**C**² for temperature reading to be in degrees Celsius or ²**F**² for temperature reading to be in degrees Fahrenheit.
2. Now press the ²**SET**² key to enter the mode ²**Sensitivity of Weather Forecast (Change in hPa)**².

**Note:** Please observe that with the selection ″°C″ the rain quantity display will automatically be in ″mm″, with ″°F″ automatically in ″in.″

### 4.4.1 AIR PRESSURE HISTORY
The bar graph shows in Hekto Pascal (hPa) the air pressure history of the past 48 hours in 9 steps, at the points 0, -1, -3, -6, -12, -18, -24, -36 and -48 hours.

### 4.4.2 RAIN HISTORY
The bar graph shows in Millimeters (mm) the rain quantity of the past 7 days, at the points 0, -1, -2, -3, -4, -5, -6 and -7 days.

### 4.5 SECTION 5 - AIR PRESSURE AND RAIN QUANTITY
- On the left - depending on programming conditions - display of the current Absolute or Relative air pressure $^{S\,1)}$ in hPa (Hekto-Pascal) or inHg (Inch Column of Mercury).
- On the right - depending on programming conditions - display of the numerical value of the rain quantity of the past hour, since start of the last rain or since setup or reset of the Weather Station in Millimeters (mm).
- If the air pressure decreases at a faster rate than normal a stormy cloud symbol will flash above the air pressure display as an indication of possible storm. Flashing will stop when the air pressure stays stable or starts to increase.
- During rainfall a rainy cloud symbol will flash in the upper center.
- A number of additional small icons on the far right will inform about the rain display status.

### 4.6 SECTION 6 - TEMPERATURE AND HUMIDITY (OUTDOOR)
- In normal mode on the left display of the current outdoor temperature.
- In normal mode on the right display of the current outdoor relative humidity.
- By key stroke on the left display of the stored minimum and maximum outdoor temperatures by simultaneous display of a MIN or MAX symbol in the upper center.
- By key stroke on the right display of the stored minimum and maximum outdoor humidities by simultaneous display of a MIN or MAX symbol in the upper center.
- Since all these displays - depending on programming conditions and extent of the system - can be taken via key stroke from up to three outdoor sensors, a flag 1, 2 or 3 in the lower center will indicate the sensor from which the current reading originates.
- An antenna symbol in the upper center indicates that a signal is transmitted by the sensors.

### 5. FUNCTION KEYS

### 5.1 SET KEY
- Serves in normal mode to enter the programming mode and - once in programming mode - the selection of the various setting modes as well as the acknowledgements of the selected values.

### 5.2 INDOOR KEY
- Serves in normal mode the toggling display of the stored minimum and maximum indoor temperatures/humidities as well as their time and date of occurrence and storage.
- Serves - if pressed and held for at least 5 seconds - the reset of all stored minimum and maximum indoor values as well as time and date of occurrence and storage to their current values.
- Serves to exit the programming mode.

### 5.3 OUTDOOR KEY
- Serves in normal mode the toggling display of the stored minimum and maximum outdoor temperatures/humidities as well as their time and date of occurrence and storage.
- Serves - if pressed and held for at least 5 seconds - the reset of all stored minimum and maximum outdoor values as well as time and date of occurrence and storage to their current values.
- Serves to exit the programming mode.

### 5.4 RAIN KEY
- Serves the toggling display of the rain quantity of the past hour, since start of last rain or since setup of the Weather Station.

### 5.5 + KEY
- Serves in normal mode - if pressed and held for appr. 2 seconds - to toggle the displays of current time and date in Section 1 of the LCD.
- Serves in programming mode the change/selection of all changeable/selectable values and displays.

### 6 PUTTING INTO OPERATION

### 6.1 BASIC SETUP
1. Open the battery cover of the Weather Station and - checking the correct polarities - insert 3 x Mignon AA, IEC LR6 1.5V batteries into the battery compartment as indicated in Item **1.1 Weather Station** and replace the cover.
2. Open the battery cover of the Thermo Hygro Sensor and - checking the correct polarities - insert 2 x Mignon AA, IEC LR6 1.5V batteries into the battery compartment as indicated in Item **1.2a Thermo Hygro Sensor** and replace the cover.
3. If you have purchased more than one sensor (up to three), sequentially repeat the above step (2) with your other sensors, but only after each one of the sensor's 433MHz signals has been received by the Weather Station. Here an order number will also be sequentially issued to the sensor.
4. Using a coin or other appropriate tool, open the battery cover on the base of the Rain Gauge and - checking the correct polarities - insert 2 x Mignon AA, IEC LR6 1.5V batteries into the battery compartment as indicated in Item **1.3 Rain Gauge** and replace the cover.
5. Now hold the body of the Rain Gauge in upright position, twist the base counter-clockwise to unlock and carefully separate the base from the body.
   **Important note for installation of the rain gauge:**
   **After inserting batteries into the rain gauge, please wait at least 5 seconds, before proceeding to the testing of the tipping bucket of the rain gauge.**
   **Note:**
   Hold the seesaw and make sure it stays without movement for at least another five seconds after inserting batteries into the rain gauge since this may cause false readings and bad signal transmission.
6. When you lightly touch the rocker switch several times with the finger make sure that it can move freely. Then put body and base of the rain gauge sensor together again.
7. Your Weather Station, Thermo Hygro Sensor(s) and Rain Gauge are now operational.

**Note:**
Now that the batteries are properly installed in the Weather Station, Sensor(s) and Rain Gauge, check that the frequency signals are correctly received and displayed in the appropriate sections of the LCD screen. Should any one signal not be received then see Items **10.2.1 DCF-77 Reception Check** and **10.2.2 433MHz Reception Check** below.

When doing a basic setup or reset, always remember to insert the batteries into the Weather Station **first** as this will prepare the reception mode for the Sensor(s) and Rain Gauge when they are activated. Further ensure that batteries being used are new and of correct type and size.

When replacing the battery covers, ensure that the batteries do not spring free from the contacts as this may cause start up and transmission problems.

### 6.2 RESET
1. Remove the batteries from Weather Station, Thermo Hygro Sensor(s) and Rain Gauge.
2. Wait at least 30 seconds and then repeat the procedures specified in Item **6.1 Basic Setup** above.

and functional explanations. For use and operation of this product however the knowledge of this index is not necessary.

All subjects listed in the subject index are marked by an index sign[S x)] on their respective positions in this manual.

## 4  LCD SCREEN

The large LCD display of your remote controlled Weather Station is for better distinction separated into six smaller sections. These display sections will provide the informations given in following list. For a more detailed description of the functions please see Items 4.1 thru 4.6 in this manual.
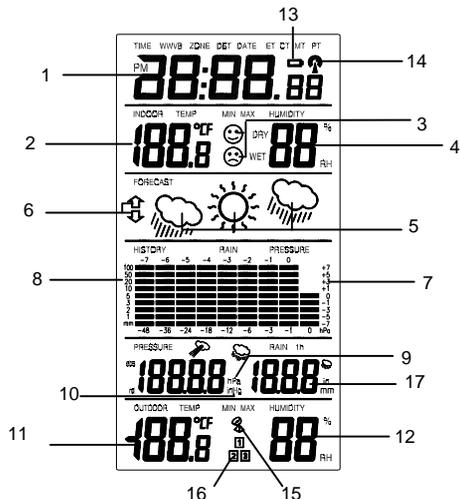


1. DCF-77 controlled time and date display
2. Display of current indoor temperature with min and max recordings and time and date of recording
3. "J" smiling or "L" sad face icon display for comfort level reading
4. Display of current indoor relative humidity with min and max recordings and time and date of recording
5. Three weather icons for weather forecasting
6. Weather tendency indicator
7. Air pressure history for the past 48 hours in hPa
8. Rain history for the past 7 days in mm
9. Absolute or Relative air pressure in hPa with calibration facility
10. Display of Relative air pressure in inHg with calibration facility
11. Display of current outdoor temperature with min and max recordings and time and date of recording
12. Display of current outdoor relative humidity with min and max recordings and time and date of recording
13. Low battery indicator
14. DCF-77 transmission tower icon
15. Antenna icon
16. Thermo Hygro Sensor identification flag
17. Total rain quantity display

### 4.1  SECTION 1  -  DCF-77 CONTROLLED CLOCK [S 2)]
- In normal mode display of radio controlled, highly accurate time.
- By key stroke display of current date.
- By key stroke display of time of occurrence and storing [S 9)] of the respective min and max indoor and outdoor temperatures/humidities.
- A transmission tower symbol in the upper right hand corner of Section 1 of the display indicates that the DCF-77 time signal is scanned for (flashing) or received (steady).
- A small battery symbol to the left of the transmission tower indicates low running batteries.
- In programming mode display of a variety of references and setting values.

### 4.2  SECTION 2  -  TEMPERATURE AND HUMIDITY (INDOOR)
- In normal mode on the left display of the current indoor temperature.
- In normal mode on the right display of the current indoor relative humidity.
- By key stroke on the left display of the stored min and max indoor temperatures by simultaneous display of a MIN or MAX symbol in the upper center.
- By key stroke on the right display of the stored min and max indoor humidities by simultaneous display of a MIN or MAX symbol in the upper center.
- The comfort symbols [S 3)] ²J ² or ²L² in the center inform about the comfort level of the current temperature/humidity combination.
- Underrun and overrun of a comfortable humidity level is additionally indicated next to the comfort symbols by the symbols ²**DRY**² or ²**WET**².

### 4.3  SECTION 3  -  WEATHER FORECAST
- Display of the weather to be expected in form of three weather symbols and - on the left - two weather tendency indicators in form of an arrow, which change their appearance depending on the air pressure development.

### 4.3.1  WEATHER SYMBOLS [S 11)]
The three weather symbols will in the following combinations provide a weather forecast upon reading any sudden changes in air pressure:



| Sunny | Cloudy with sunny intervals | Rainy |
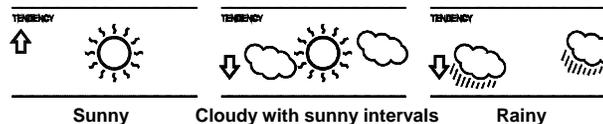
Common to weather forecasting, absolute accuracy cannot be guaranteed. The weather forecasting feature is estimated to have an accuracy level of about 75% due to the various areas it has been designed to be used in.

### 4.3.2  WEATHER TENDENCY INDICATORS [S 12)]
The weather tendency indicator arrows are located to the left of the weather symbols. They indicate the air pressure development and thus, also provide a forecast of the weather to be expected.
The tendency arrows can be displayed as follows:

- **Tendency arrow pointing upwards:**
  This means that the air pressure is increasing and the weather is expected to improve.

- **Tendency arrow pointing downwards:**
  This means that the air pressure is decreasing and the weather is expected to become worse.

### 4.4  SECTION 4  -  BAR GRAPH DISPLAY OF AIR PRESSURE AND RAIN HISTORIES [S 5)]
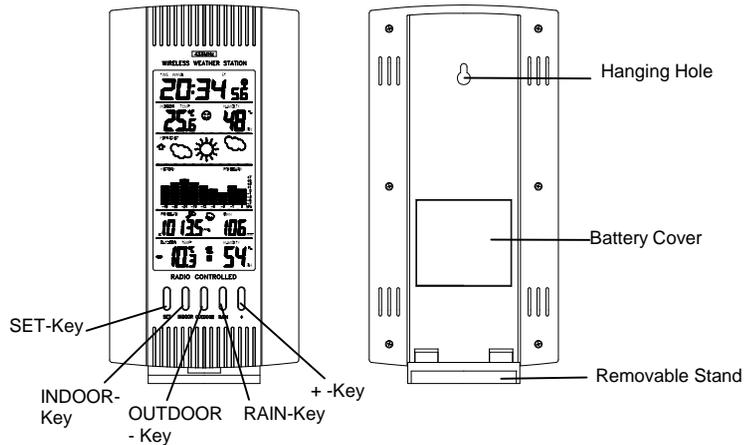- Depending on programming conditions, display of the history of air pressure or rainfall in the past in form of a graph consisting of vertical bars.

# REMOTE CONTROLLED WEATHER STATION
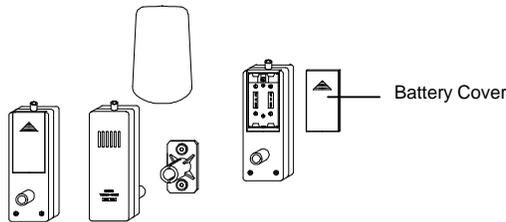# WITH THERMO HYGRO SENSOR AND RAIN GAUGE

## 1      INTRODUCTION

Congratulations on purchasing this state-of-the-art Weather Station as an example of superior design and engineering. Providing radio controlled time, remote controlled temperature, humidity and rain volume display, this unit will never keep you guessing on current and future weather conditions. Operation of this product is simple and straightforward. By reading this operating manual, the user will however receive a better understanding of the Weather Station together with the optimum benefit of all its features.
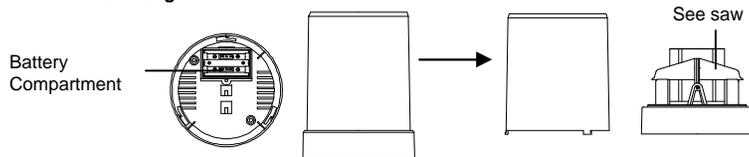
### 1.1      WEATHER STATION



Hanging Hole

Battery Cover

Removable Stand

SET-Key

INDOOR-Key

OUTDOOR - Key

RAIN-Key

+ -Key

### 1.2      Thermo Hygro Sensor



Battery Cover

### 1.3      Rain Gauge



See saw

Battery Compartment

## 2      FEATURES

### 2.1      WEATHER STATION

- Radio controlled time display with manual setting option
- 12/24 hour display
- Time zone selectable
- Date display
- Display of current indoor temperature with min and max recordings and time and date of recording
- Display of current indoor relative humidity with min and max recordings and time and date of recording
- ″J″ smiling or ″L″ sad face icon display for comfort level reading
- Three weather icons for weather forecasting
- Weather tendency indicators
- Storm warning
- Graphic display of air pressure history for the past 48 hours
- Graphic display of rain history for the past 7 days
- Display of Absolute air pressure in hPa/inHg
- Display of Relative air pressure in hPa/inHg with calibration facility
- Display of current outdoor temperature with min and max recordings and time and date of recording
- Display of current outdoor relative humidity with min and max recordings and time and date of recording
- °C or °F temperature display selectable
- LCD contrast changeable to 8 different tones
- Low battery indicator
- Wall mounting or table standing

### 2.2      THERMO HYGRO SENSOR

- 433MHz remote transmission of outdoor temperature and humidity to the Weather Station
- Immediate transmission of temperature and humidity changes
- Shower proof casing
- Simple mounting

### 2.3      RAIN GAUGE

- 433MHz remote transmission of rain quantity to the Weather Station
- Immediate transmission of rain level changes

## 3      GETTING STARTED

Remove all parts from the packaging and place onto a table in front of you. Ensure that the following parts are included:

1. Weather Station
2. Thermo Hygro Sensor with wall mounting bracket and two mounting screws (up to three sensors possible)
3. Rain Protector for Thermo Hygro Sensor
4. Rain Gauge with two mounting screws
5. Operating Manual

If any one of the above mentioned parts is missing please contact your supplier.
Please follow all further explanations and descriptions in this manual in order to ensure that your new Weather Station works correctly together with the Thermo Hygro Sensor and Rain Gauge.

**Important Note:**
**For all users wanting to get additional informations on the function of the Weather Station there is an alphabetically sorted subject index at the end of this manual offering a number of technical**