

Manual
MWS 55Y / MWS 88-2Y / MWS 10Y
Microprocessor Weather Station
and Sensors 55Y
with data logger (SD-card)
- with Yamaichi connectors -



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MWS 10



DFT 55 VY



GSS 55Y



RMS 55Y



MWS 55VY / WDS 55



MWS 88-2Y

1 Caution

1.1 Intended Use

REINHARDT-Weather stations MWS 55VY, MWS 88-2Y and MWS 10 and Sensors 55Y (hereinafter referred to as MWS 55VY) are exclusively built for stationary operation on a fixed 1" pipe for automatically collecting climatic parameters outside.

Any use other than described above may cause damage of the product or lead to other dangers. Do not mount the weather station in reach of children and pets. Carefully read the complete operating manual. It contains important information about the installation and operation.

If the MWS 55VY is not used for a longer period of time you should store it lying to prevent escaping the lubricant from the ball bearings!

1.1.1 Storage



CAUTION: If the MWS 55VY is not put into operation immediately after receipt, it must be stored in a well ventilated place! The MWS 55 must not be stored in a package for a longer time for all packing materials are emitting solvents which leads to drift of the humidity sensor and the humidity measurement drifts out of specification!!

See: [Sensirion Humidity Sensors Handling Instructions.pdf](#) or here: https://sensirion.com/resource/user_guide/sht/handling_instructions

Please also note that the internal backup battery for the clock discharges when the unit is not used for a longer time! See also here.

1.2 Safety Regulations

The instruments are manufactured according to modern technical standards and can be operated without danger when used as directed.



Damage caused by non-observance of this operating manual can lead to forfeiture of warranty. We shall not assume any liability for subsequent damage.



We shall not assume any liability for damage of items or persons caused by improper handling or non-observance of the safety instructions! In such cases any guarantee claims shall become null and void.



Dear customer, the following safety and hazard notices not only serve the protection of your health but also the protection of the appliance. Please read the following points carefully.



The [supply voltage](#) is converted by isolated transformers into voltages of maximum 24VDC. (The stations can be operated at voltages up to 28VDC). Please do only use the supplied power supply units.



The weather station includes pointed and sharp-edged parts (i.e. windvane and edges of the sensor's housing), which may cause injuries when handled without care.



Do not leave the packaging material lying around. These parts are dangerous toys in the hands of children.



Handle the product with care. Blows or impact, or dropping it even from a small height will damage it.

1.3 Mounting

The weather station is mounted on a 1" water-pipe. This pipe must be fixed very well to stand high wind speeds above 200 km/h when the weather station is mounted.

The weather station is to be fixed well onto the 1" pipe with the screws. The stability of the weather station on the pipe must be established. Really check this after mounting the weather station!



Please mount the weather station on a place you easy can reach for maintenance purposes for the station can not be guaranteed to be absolutely maintenance free, i.e. the precipitation sensor needs to be cleaned regularly (MWS10)!!!! Take care that no water can splash onto the MWS 55 from below. Otherwise water may soak into the MWS 55 and damage the weather station!!

You'll also find advice for mounting the weather station on your Weather-USB-Stick.

2 Setting Up the Weather Station

2.1 Installation of Hardware

MWS 55 Weather Station has been designed for measuring the most important weather parameters temperature, humidity, barometric pressure, wind direction, wind speed and precipitation and global solar radiation (MWS 10).

All parameters can be displayed graphically, digitally or as an "multiple display".

There is also a statistics and a history function.

Mount the weather station on a 1 " pipe. Orient the North-marker to North and clamp MWS 55 in place with the two pre-mounted high quality steel screws. Take care that the pipe is mounted as perpendicularly as possible, otherwise the windvane will not work properly and will preferably rotate in one direction.

N.B.

The wind vanes of the MWS 55 weather station are very sensitive sensory equipment which can easily be destroyed by mechanical influence.

Therefore do keep the packing of your weather station. Whenever you want to ship your weather station later, this packing guarantees that the weather station is not damaged in transport !! Time and again we have noticed that the units are damaged by wrong packing. This is very annoying for the customer because he has to pay for all costs that may arise.

Please ask for a quotation of an original packing if it is no longer available to you ([see packing MWS 55](#)).

The weather station must be set up at a place which is exposed to wind, because otherwise wind direction and wind speed cannot be measured correctly. (Please see "Directions of Deutscher Wetterdienst").



It is also important, that no water is splattering onto the MWS 55 from below!

Connect the [enclosed cable](#) as follows:

Connect the 9pole connector to a free serial interface of your PC or to an USB port with a suitable COM to USB converter (with driver software which creates a virtual COM port).

Plug the power supply into a power outlet 100-240VAC / 50-60Hz.

Another option is PoE which allows supplying the MWS 55 via the network cable.

Power supply with PoE does not supply the the optional heating device. The heating device is supplied with an extra cable and own power supply!

Note on Security

Please note that you must in any case use the power supplies which we have provided with your MWS 55 weather station or which are technically identical. Nominal value must be between 4 V and 28 V DC voltage; it must be possible to apply at least 100 mA (with optional heating element another 18 or 24VDC 1 A). Please note also that all the power supplies we provide are only made for use in dry rooms.

The 7 pole plug is connected to the Power / data socket of the weather station.

There are other sockets for additional sensors, for the power supply of a heating device and for an optional GPS-receiver. Power supply of the additional sensors can be provided by the weather station or by their own power supply. The output voltage of the additional sensors must not exceed +4.095 V, sensors with pulse output must be TTL-compatible.

To [pin assignments of MWS 55 connectors](#).

The current versions (since 10/2023) of the MWS 55 have a Y in the type designation as an extension, indicating that they are equipped with push-pull connectors from Yamaichi.



IMPORTANT !

When removing any additional cables from the weather station, please don't forget to protect the socket with the cap and don't leave the socket open. Otherwise the contacts of the socket will start corroding and be damaged within a short period of time!

Also don't forget to protect the plug of the cable from moisture by covering it when removing the weather station for calibration e.g. In this case also remove the wall adaptor of the power supply to ensure that no voltage is applied to the contacts of the weather station's plug when it is not used!

Otherwise the plug will start corroding due to moisture and the cable has to be replaced within a short period of time.

2.1.1 Overvoltage protection

The MWS 55 contains an integrated overvoltage protection (Suppressordiods) at it's supply- and data wires.



The power line is protected by a SMCJ26CA-diode. This diode breaks through at voltages above 31VDC and is able to carry up to 1500W for a few milli seconds.

CAUTION: If you connect voltages above 30VDC permanently to the power jack, this diode will be destroyed within a few seconds!

The data lines are protected by SMBJ15CA-diodes able to carry transients up to 600W.

Also the housing made of high quality steel is connected to system ground.

This protection is suitable for protecting the station from damage due to overvoltage at close lightning strikes.



For protection of the connected peripherals (computer, camera, e.g.) the customer has to take further precautions (line protection, opto couplers, e.g.). Also see here: [TCP/IP via fiber cable](#)

But please note that this protection is ineffective in case of direct lightning strike due to extremely high energy of lightning!

Currents of up to 200.000A can cause voltages up to 20.000V on the housing which leads to flashovers onto the internal electronic components and its destruction.

After installing the hardware you install the software.

2.2 Software Installation

Connect the Weather-USB-Stick CD to a USB port of your computer.
You need an HTML-capable browser (Netscape, Internet-Explorer or else).
Then execute STARTER.EXE in the Weather-USB-Stick's root directory.
Now you follow the further instructions.

Note



The weather 32 software creates the HKEY_CURRENT_USER\Software\ReinhardtGmbH\Wetter\... key in the registry which is only created when running and is not deleted when the software is uninstalled.

After the software has been installed you connect the 7-pole plug to the POWER connector of the MWS 55. To perform please loosen the 3 lateral screws and turn the radiation shield to the right. Now you can pull the radiation shield completely downwards to reach the connectors of the MWS 55. After connecting the cable please remount the radiation shield.

See also the mounting hints on the Weather-USB-Stick!

2.3 Starting the Software

Start the software by double-clicking the program icon.

After every start, the software checks the clock of MWS 55 and compares it to your computer clock. If it differs more than set in the file WEATHER32STATION.INI the software sets the MWS 55 clock automatically. Needless to say, the clock of the connected PC must give the correct time, as MWS 55 is set to the PC-clock.

Additionally the software sets the storage interval (!Zxx) and the reset hour for precipitation (!Rxx) at each start up. These values are also stored in the WEATHER32STATION.INI.

If your MWS 55 holds a GPS-receiver, it provides the correct time for MWS 55 (UTC time).

NOTE



In this case the weather station's clock CAN'T be set by the software! With the GPS receiver you start the software with the parameter -GPS (See software manual) for otherwise there may be problems showing and storing data due to wrong time synchronisation!

Data recording to hard disk is started in the selected time interval (60 seconds by default). The software should run for at least one memory interval so that at least one data file is stored on the hard disk. This is important for reading out the datalogger later. (If there is no data file on the hard disk, the datalogger cannot be read out as the software does not find a start date.)

NOTE



MWS 55 only starts recording data to its datalogger after the time has been set. This guarantees that the datalogger holds only data with the correct time. The clock of the weather station is preset to CET when delivered. If your local time is different please ensure to set the correct timezone when using a GPS-receiver at the first start!

(See commands under - Controlling the micro controller. (!ZZ)).

The MWS 55 has an internal Lithium cell supplying the clock so that storing of data is performed immediately after connecting a power supply without the need to set the clock before logging.

The MWS 10 contains an additional accu pack to ensure that measuring continues up to 4 hours without external power supply. This accu pack is reloaded automatically in normal operation.



CAUTION: When the MWS 10 is not used and no external power supply is applied it is essential to remove the power cable from the MWS 10 for otherwise the internal accu block is discharged completely and may be destroyed!

When using a GPS-receiver for setting the clock there may occur different problems, e.g. when the software tries to set the clock! (See FAQ on the weather-USB-Stick)

If the software is not started, there might be a faulty data file on the hard disk or not enough free memory. This causes an abort.

The manual for the latest software you'll find [here](#) or [on our WEB site](#).

3 Technical details

3.1 The data logger

The data logger of the MWS 55 has got an internal SD-Card with 32GB.

When storing data with an interval of 10 seconds the device stores 267840 data sets a month (31 days). With 15 active sensors (clock and date also counts as a sensor) the monthly data file has a size of app. 31.5 MB. So there are app. 375MB of data a year which allows storing of data for more than 20 years without the need of deleting any data.

The data files are stored on the SD-card in the folder "/log/data".

Each month a new data file is being created which contains the month and the year in it's name.

The file suffix is "mws".

The name of the data file of march 2015 therefore is 03_2015.mws.

The data file are ASCII files (text files).

The SD-card contains other files important for operating the weather station. These files must not be deleted or edited.



Caution!

The storage interval should never be less than 10 seconds, because this makes the logger readout and general communication with the MWS 55 very slow! In addition, the data files become disproportionately large. Intervals ≥ 60 seconds are ideal!

3.2 In case of power failure

The datalogger of MWS 55 is kept up in case of power failure (EEPROMS), but no new data are stored.

The MWS 10 keeps running up to 4 hours after power loss if the internal accu block was fully charged.

In case of power failure, the clock of MWS 55 is kept running and doesn't need to be set when power is applied again!

Due to power failure there are data missing in the data files (time gaps). These gaps are filled with dummy values (-99999) by the weather32 software when reading the logger.

So missing data are indicated by measure values of -99999 in the datafile. The software then recognizes in the values of -99999 that data are missing and creates a gap in the graphical displays.

3.2.1 The internal clock (CAUTION!!)

The MWS 55 has a batterie powered clock eliminating the need to use a computer or GPS-receiver to start a measurement with data logging.

Please note that the batterie discharges when the MWS 55 is not used. When storing the MWS 55 without power supply for app. 9 months the batterie (Lithium cell CD3032) is empty and must be replaced!

To perform this the housing of the MWS 55 has to be opened. (See [3.2.4](#))

3.2.1.1 Deactivation of Lithium cell when storing the MWS 55VY for a longer time

Since board version 1.057 buffering the internal clock by the Lithium cell can be switched off to avoid discharging the Lithium cell.



This also is the delivered condition! That's why the clock needs to be set after the first start to ensure proper storage of data! When applying power to the unit the Lithium cell is activated automatically!

If you want to store the MWS 55VY for a longer time without power applied you should deactivate the Lithium cell!

The command for deactivation of the Lithium cell is: ***ADMIN POWER REMOVE**

To activate the Lithium cell use the command: ***ADMIN POWER MOUNT**

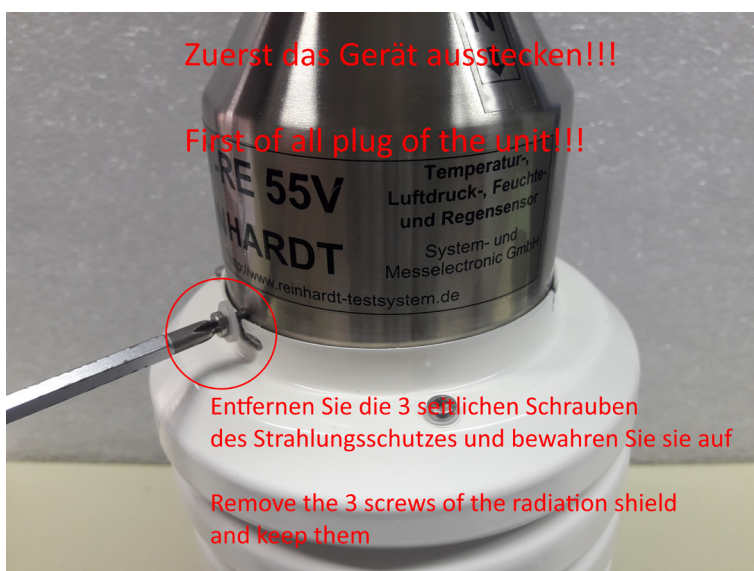
3.2.2 Special version with SuperCap instead of Lithium cell -SCO

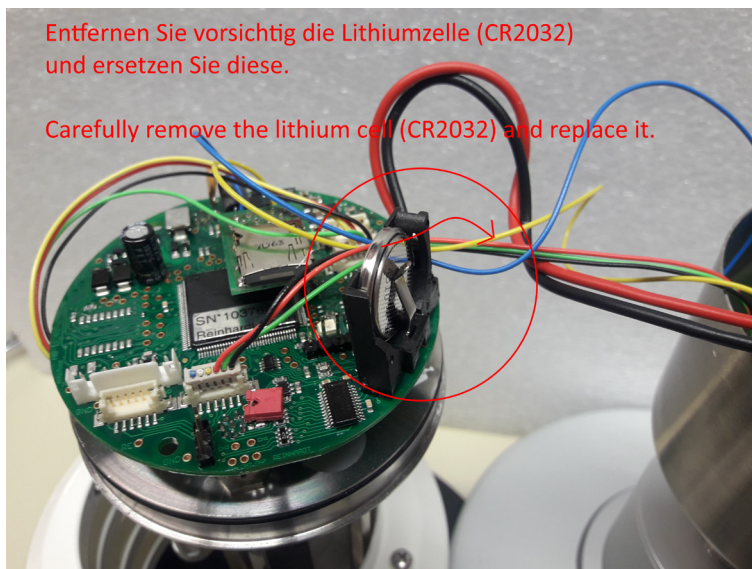
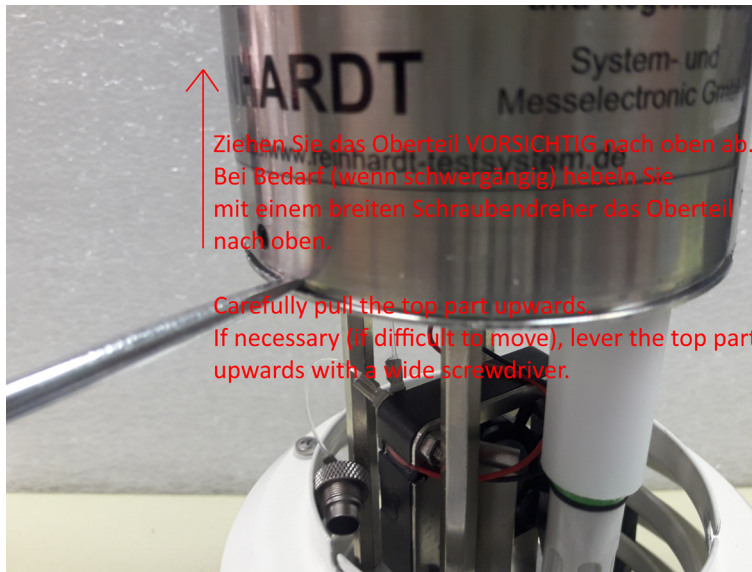
For the Lithium cell discharges within 9 months when the MWS 55VY is not used (storage without power supply) we offer a special version with SuperCap (5F) instead of the Lithium cell. This SuperCap is fully charged within 5 hours after power is applied to the MWS 55VY and then is able to buffer the internal clock of MWS 55VY up to 5 days without power applied to the MWS 55VY. **If the MWS 55VY was without power for more than 5 days, the SuperCap has discharged and the clock of MWS 55VY needs to be set after applying power for proper data storage into the logger (either manually or with the weather32 software).**

3.2.3 Option SuperCap additional to Lithium cell -SC

There is an option with additionally SuperCap parallel to the Lithium cell. Here the SuperCap is used to extend the lifetime of the Lithium cell when the MWS 55VY is used only sometimes and is not used at the weekends for example.

3.2.4 Replacing the Lithium cell (MWS 55 & MWS 88)





The lithium cell is a CR2032. Please don't use any other type!!

3.3 Maintenance

Because of its elaborated sensors, MWS 55 needs no maintenance. There are wear parts like the ball bearings and the fan which have to be replaced from time to time. These parts have got a life time of app. 5-6 years under normal environment conditions. Extreme conditions (operation directly at the sea, high mountain regions, extreme pollution, e.g.) may cause very reduced life time of these parts.



MWS 55 weather station has been developed for stationary use under normal climatic conditions (temperate zone). Use under extreme conditions such as e.g. on board of a ship, mobile use on a measuring vehicle etc. has not been tested. It is therefore not recommended to set up the weather station where it is exposed to salt or salt water (e.g. right at the coast etc.).

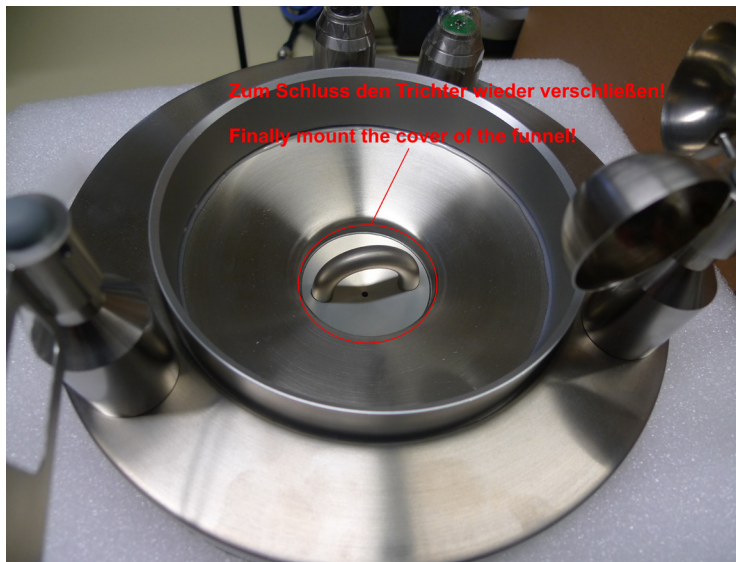
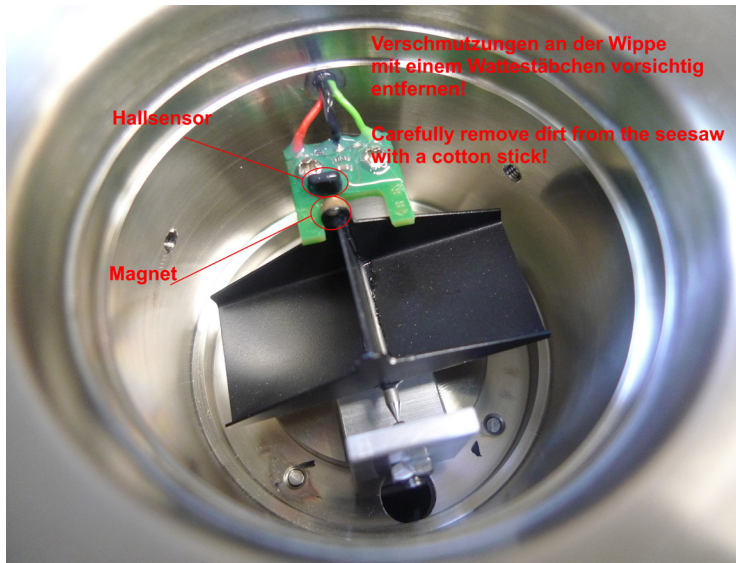
It can be used on a measuring car under certain conditions although the measured values of the wind sensors cannot be reproduced.

Our warranty ends if there is any intervention into hardware or software from your side.

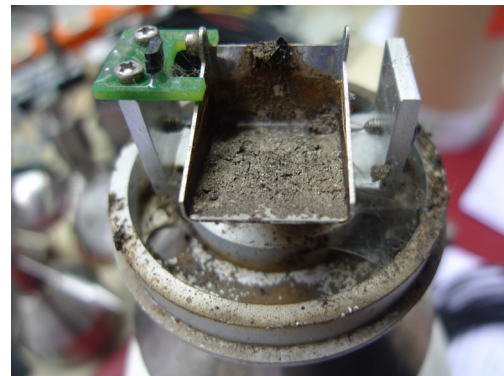
3.3.1 Cleaning the rain sensor

To clean the rain sensor remove dirt (leaves, bird dropping, e.g.) from the funnel. Make sure that the droplet outlet in the center of the funnel cover is not blocked! For cleaning the seesaw perform as shown in the following images.





The rain sensor should be checked regularly for dirt and insect infestation on the seesaw to ensure that it is working properly at all times! Depending on the surrounding vegetation and occurrence of spiders, wasps, etc., this should be done weekly, but at least monthly! Below you can see 2 examples of dirty rain sensors!



3.4 The sensors

3.4.1 The Temperature Sensor

Temperature measurement is based on a precision precalibrated sensor SHT25 from Sensirion. The values are read internally via a I²C bus. The resulting measured value is additionally linearised by the weather station.

By standard, the temperature sensor is mounted on the lower side of the weather station. A white lacquered pagoda protects against radiation and prevents a buildup of heat.

Range: from -40 °C to + 60 °C, measuring accuracy ± 0.3 °C, (display also possible in Kelvin or °Fahrenheit)

CAUTION: Compared to temperature measurements in big shielded cabins the measured values can be higher when the sun is shining. If the temperature measurements must correlate with the measurements in big shielded cabins you should measure temperature in the shadow or measure with an additional temperature sensor placed in the shadow or in a big shielded cabin!

Unit: [°C]

3.4.2 The Humidity Sensor

is also based on a precision precalibrated sensor SHT25/35 from Sensirion or HTE501 from E+E40 . The values are read internally via a I²C bus. The resulting measured value is additionally linearised and compensated by the weather station. The sensor is also mounted on the lower side of the weather station. A Gore-Tex cover protects it from pollution or destruction by dust or insects. The humidity sensor can be used in a temperature range between -40 °C to + 60 °C. It is linearized to an accuracy of 2 %.

Range: from 10 to 100 %, measuring accuracy ± 2 %, display also as dewpoint measurement in °C or °F

NOTE



*This sensor is very responsive to static charge and air pollution (dust, aggressive gases, but also salt). Please note that under unfavourable conditions (e.g. microbic stress caused by moulds, bacteria) this sensor ages faster than under normal conditions. **Also see: [here \(Storage\)](#)***

Unit: [%]

3.4.3 The Pressure Sensor

is a precalibrated digital sensor from Bosch (BMP390) which is read internally via a I²C bus. This sensor already is linearized to 4 hPa for the whole temperature range, the barometer is temperature compensated. Another temperature linearisation reduces the deviation to less than 2 hPa over the whole temperature range.

The sensor can be used in the temperature range of -40 °C to + 60 °C.

Measuring range: from 300 hPa to 1100 hPa with ± 0.8 hPa accuracy. Display can be reduced to 0 m above sea level (input of the local altitude in [m], display also in mm mercury column or Inch mercury column).

An additional output of barometric pressure (reduced to sea level) is possible. 3 different formulas are predefined within the weather station (simple formula, international barometric formula and barometric formula of DWD considering temperature and humidity).

Further formulas you may use within the weather32 software.

This sensor can be transported by air cargo!

Unit: [hPa]

3.4.4 The Wind Speed Sensor

is a three-shell anemometer with optical scanning. The wind speed is measured without contact via a hybrid light barrier using a serrated washer with 12 notches. A peak detector finds every wind peak and hands them on the measuring software. An average value is determined within the respective memory intervals.

Range: in km/h from 0 to 200 km/h with ± 2.5 km/h measuring accuracy, (display also in m/s, miles/h, Knot or Beaufort), starting speed < 0.8 m/s.

As we have a very comfortable, 3-fold way of measuring wind speed with current wind speed (WG), average wind speed (WD) and wind peaks (WS), you can conform your wind measurement to your very needs.

Please note that dependent on the current winds, the 3 different methods of measuring wind speed can result in very differing graphs: When measuring WG, only a current value is written in the selected measuring interval, when measuring WD and WS, there is continuous evaluation and the whole measuring period is monitored.

Unit: [km/h]

3.4.5 The Wind Direction Sensor

There is a weather vane with a precision magnetical encoder and a rotation angle of 360° for measuring wind direction. Wind direction is given in $^\circ$, with 90° being East, 180° being South, 270° being West and 0° being North.

Range: in 360° , measuring accuracy 5° , starting speed, < 0.8 m/s, hysteresis $< 8^\circ$.

Output is performed as WR (current wind direction) and WV (main wind direction within a storage interval). The value of WV at wind speed (WG) = 0 is -99997!

This indicates that a calculation of main wind direction is not possible, when wind speed is = 0.

Unit: [$^\circ$]

3.4.6 Rain / Precipitation Sensor (MWS 10, otherwise optionally)

A self-emptying bucket is tilted by the collected rain. All the water that has been collected on the normed area of 200 cm^2 is led through a funnel to the bucket. The bucket tilts whenever a certain quantity of water has been collected. The tilting creates pulses which are counted. Out of the pulses, the software calculates the rain that has fallen per m^2 . The current intensity of rain is also found and displayed. Unit: [mm] [l/m²]

Range: from 0 to 5000 ltr/m²,

Measuring accuracy ± 0.2 ltr/m²

3.3.7 Global Solar Radiation Sensor (MWS 10, otherwise optionally)

This is a pyranometer which absorbs radiation between 305 and 2800 nm. The temperature of a black and a reflecting element is subtracted and linearised by the software. The measuring sensor is a thermoelement.

The values are edited in W/m^2 .

The measured value reaches 90 % of its final value after about 90 seconds.

Unit [W/m^2]

Range: from 0 to 1300 W/m^2 with $\pm 40 \text{ W/m}^2$ accuracy at 25°C .

3.4.8 Light Intensity Sensor (Lux-Sensor) (Option)

measures light intensity in Lux. Measuring range is within the human eye response.

Range: from 0 to 220000 lx

Measuring resolution: 4 lux

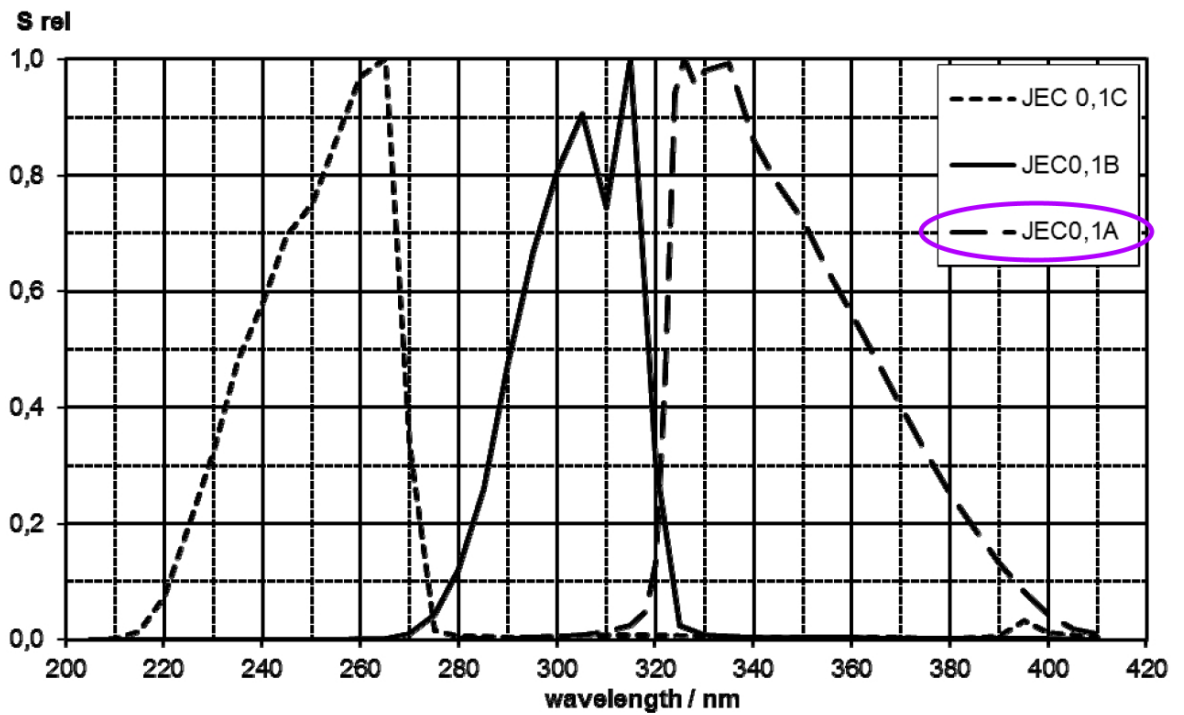
3.4.9 Ultraviolet-radiationsensor (UV-Sensor) (Option)

measures ultraviolet radiation (UV-A) in mW/m^2 . The spectral range is 320nm..395nm.

Range: 0 to 50000 mW/m^2

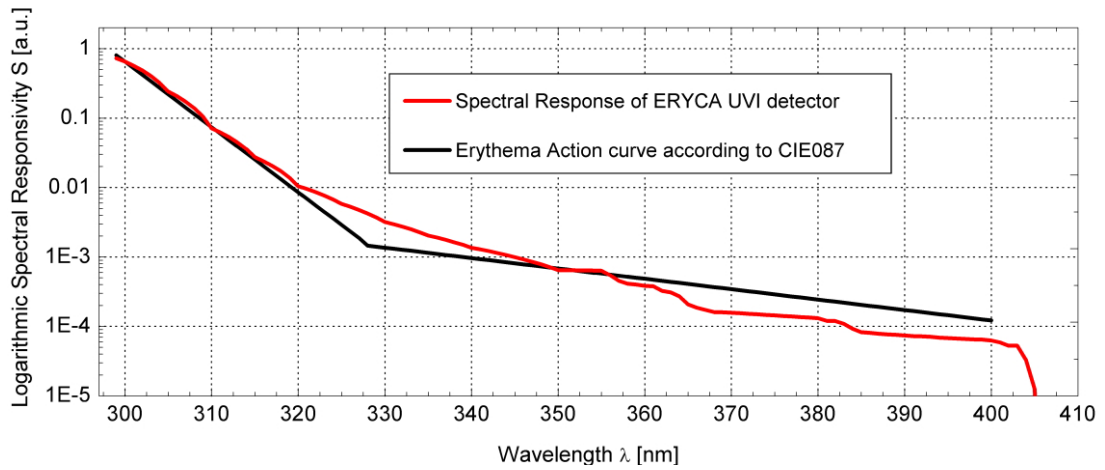
Measuring accuracy: +/-10%

The relative spectral sensitivity of the SiC photodiode used (JEC0.1A)

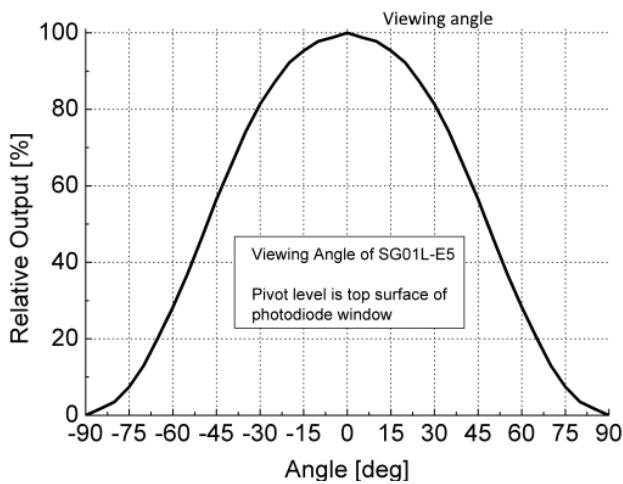


3.4.10 The UVI-radiation Sensor (UV-Index Sensor) (Option)

measures the UV index (ERYCA spectrum).



The viewing angle of the UVI sensor



3.4.11 Additional Sensor

Any kind of sensors can be integrated as additional sensors. The information signal must be applied as voltage in the range between 0 V and + 4.095 V or it has to be adapted to MWS 55 by a special amplifier. Negative or higher voltages are blocked, but out of security reasons, should be avoided in any case!

The signals are linearized with up to 8 programmable interpolation value pairs by the MWS 55. We can deliver a temperature sensor for measuring the soil or water temperature and a sensor for measuring the temperature of the road surface.

The MWS 55 can be equipped with an input for current signals (0..20mA). The signal of the current input is applied to pin6 and pin7 of the additional sensors socket. The sensors output has the sensor identifier ZC in that case sensor ZB can't be used in parallel to the current measurement!

Additional sensors can be voltage supplied by the weather station as long as their current consumption is below 100 mA.

NOTE

If current consumption exceeds this value, we cannot grant that MWS 55 weather station works properly !!!

If they need higher currents, the sensors must have an external power supply and its ground has to be connected to the MWS 55-ground (Pin 1 of the 9-pole connector socket).

You can call for adjustment instructions of the additional inputs at any time.

3.4.12 Connecting an Additional Sensor

Additional sensors are connected to MWS 55 at the 9-pole socket.

The socket is allocated as follows:

- Pin1 : GND
- Pin2 : Input for precipitation sensor (TTL-pulse) - MWS 55, MWS 88-2, Sensors 55
- Pin2 : Input for TTL-pulses - MWS 10
- Pin3 : Input for analog additional sensor 4 (0..4.095V)
- Pin4 : Input for analog additional sensor 5 (0..4.095V)
- Pin5 : Input for analog additional sensor 1 (0..4.095V)
- Pin6 : Input for analog additional sensor 2 (0..4.095V)
(option: I- for current input 0..20mA)
- Pin7 : Input for analog additional sensor 3 (0..4.095V)
(option: I+ for current input 0..20mA)
- Pin8 : Output operating voltage (9..28VDC) maximum 100mA
- Pin9 : not connected

3.5 Sensor Accuracy

Temperature:	$\pm 0.3 \text{ }^\circ\text{C}$
Humidity:	$\pm 2.0 \%$ (at $10^\circ\text{C}..35^\circ\text{C}$)
Pressure:	$\pm 0.8 \text{ hPa}$ (at $0^\circ\text{C}..50^\circ\text{C}$), $\pm 2 \text{ hPa}$ below 0°C
Rain/precipitation:	$\pm 0.2 \text{ mm}$
Wind direction:	$\pm 5^\circ$ (at $5^\circ\text{C}..50^\circ\text{C}$), hysteresis $< 8^\circ$
Start speed:	$< 0.5 \text{ m/s}$ (at $5^\circ\text{C}..50^\circ\text{C}$)
Wind speed:	$\pm 2.5 \text{ km/h}$ (at $5^\circ\text{C}..50^\circ\text{C}$)
Start speed:	$< 0.5 \text{ m/s}$ (at $5^\circ\text{C}..50^\circ\text{C}$)
Global radiation:	$\pm 40 \text{ W}$ (at 25°C)
UV-radiation:	$\pm 10\%$
Light intensity:	$\pm 6\%$
Additional analogue inputs:	$\pm 3 \text{ mV}$ (at $0^\circ\text{C}..50^\circ\text{C}$)

3.5.1 Measuring Ranges

Temperature:	from -40° to $+60^\circ$, resolution 0.01°
Relative humidity:	from 0 to 100 % resolution 0.03%
Dewpoint:	from -40° to $+60^\circ$, resolution 0.01°
Barometric pressure:	from 950 hPa to 1050 hPa in 0.01 hPa resolution
Absolute pressure:	from 300 hPa to 1100hPa in 0.01 hPa resolution <u>Absolute maximum pressure 2000 hPa</u> <u>(higher pressures will damage the sensor!!)</u>
Precipitation:	from 0 to 5000 mm with 0.1 mm resolution
Wind direction:	0 to 360° , resolution 0.025°
Wind speed:	in km/h from 0 to 200 km/h with 0.01 km/h resolution
Global radiaion	from 0 to 1300 W/m^2 (Spectral range $0.3..2.8\mu\text{m}$)
Light intensity:	from 0 to 220000 Lux (Spectral range: human eye response)
UV-radiation:	from 0 to 50000 mW/m^2 (Spectral range $320..395 \text{ nm}$)
Additional inputs:	0- 4.095 V
Supply	$4-28 \text{ V}$, 150 mA at 18 VDC , standard equipment

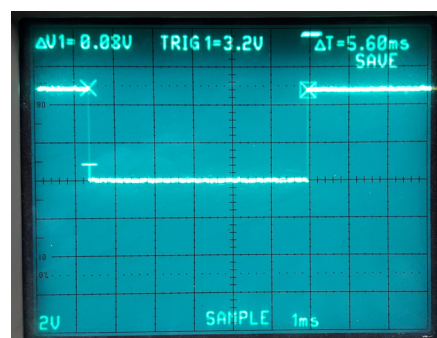
Dimensions

Size:	Outer diameter 90 mm, height 240 mm (MWS 55)
Size:	Outer diameter 240 mm, height 215 mm (MWS 10)
Weight:	app. 1.05 kg (MWS 55)
Weight:	app. 2.9 kg (MWS 10)
Weight:	app. 800 g (10m ready made cable with PSU)

The housing must be mounted centrally on a 1" pipe.
Standard cabling is 10 m - longer cabling on request.

3.5.2 Pulse output of RMS 55 TTL

The output pulses of RMS 55 TTL look like that:
Pulse width app. 5ms, lo pulse.
This sensor is also available with positive output pulses.



3.6 Adjustment of Additional Sensors

You will find the adjustment value pairs of your weather station in the MWS5M-10.XXX or MWS55M.XXX, with XXX a three-digit number.

These files are not in the scope of supply but you may get these files on request.

The additional sensor 1 ... 5 have got the identifiers ZA ... ZE.

By default the additional inputs are precalibrated in mV.

0mV cause an output of 0, 4095mV are a raw value of app. 65535.

Now you connect the additional sensor to the 9-pole socket.

Start a terminal program (e.g. Windows-terminal) and configure as follows: 9600 Baud, 8bit, no parity, 1 Stopbit.

You now change into the adjustment mode of the weather station with the command !W.

All sensors will be output with the internal measured raw values.

Here you can find out which raw value is created by your additional sensor at a respective analog value.

Example:

Expose a temperature sensor to 0°C aus, wait until the sensor has adapted to this temperature and then you see the respective raw value (e.g. 12500). You proceed with e.g. 30°C etc.

Note these pairs of values and replace the respective lines in the adjustment file. It is most important that the first pair of values (e.g. !L5,1,F...) must contain the lowest voltage and the last pair of values must contain the highest voltage.

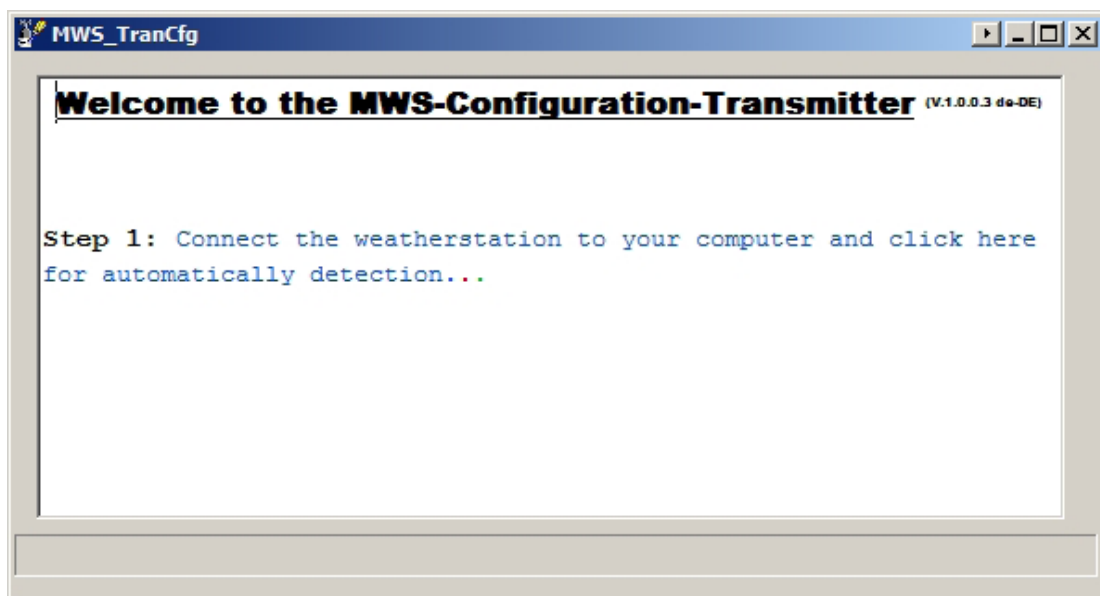
At least 2 pairs of values must be determined per sensor (e.g. !L5,1F,... to L5,2,W..).

All pairs of values which are not needed must contain a raw value of 999999!!

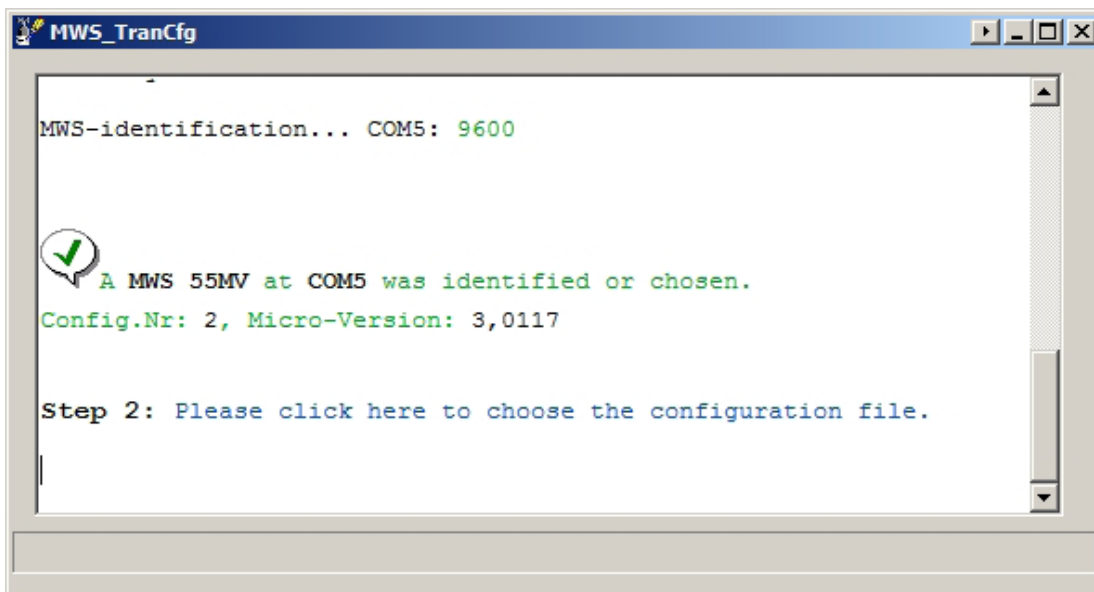
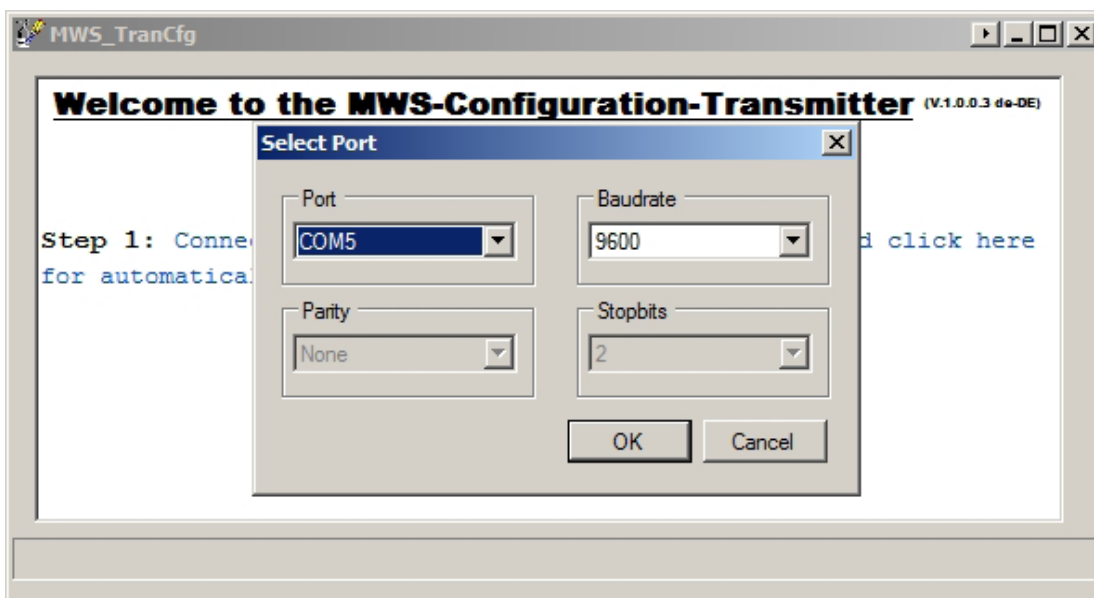
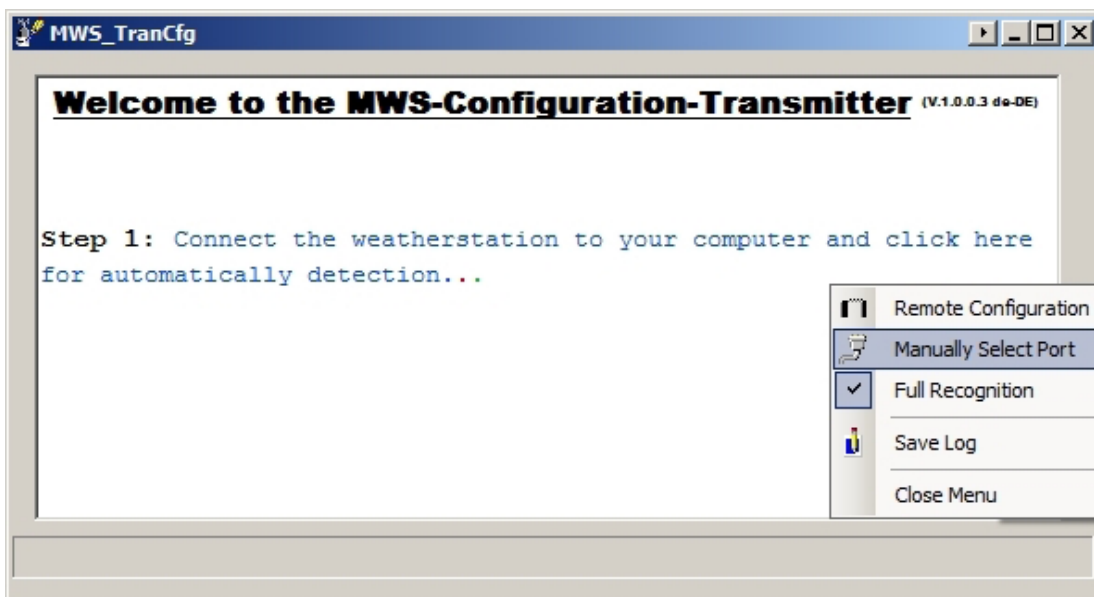
After you have determined the necessary adjustment values and entered them in the adjustment file, you can transmit the changed file to the weather station as follows:

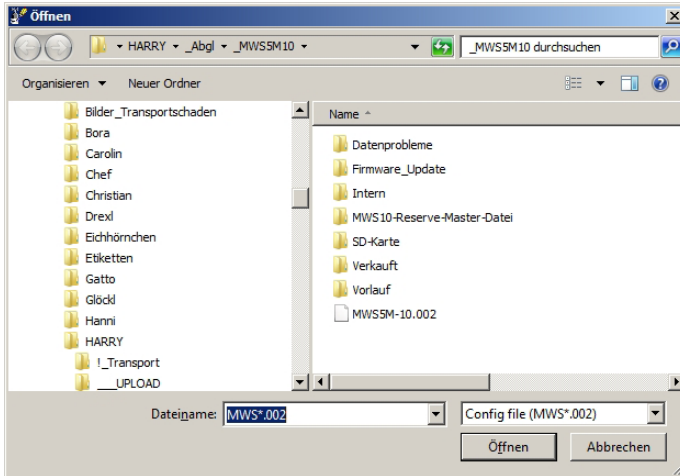
Start program MWS_TranCfg.exe and then chose the name of your adjustment file. The adjustment file contains many commands which are sent to the weather station.

Here you can see the steps of data transfer to your weather station with the tool MWS_Trancfg.exe. Transferring the data will need app. 5 minutes at 9600 baud.



Either click into the window for automatic detection of your weather station or select the COM port directly by right click as shown on the following pages:

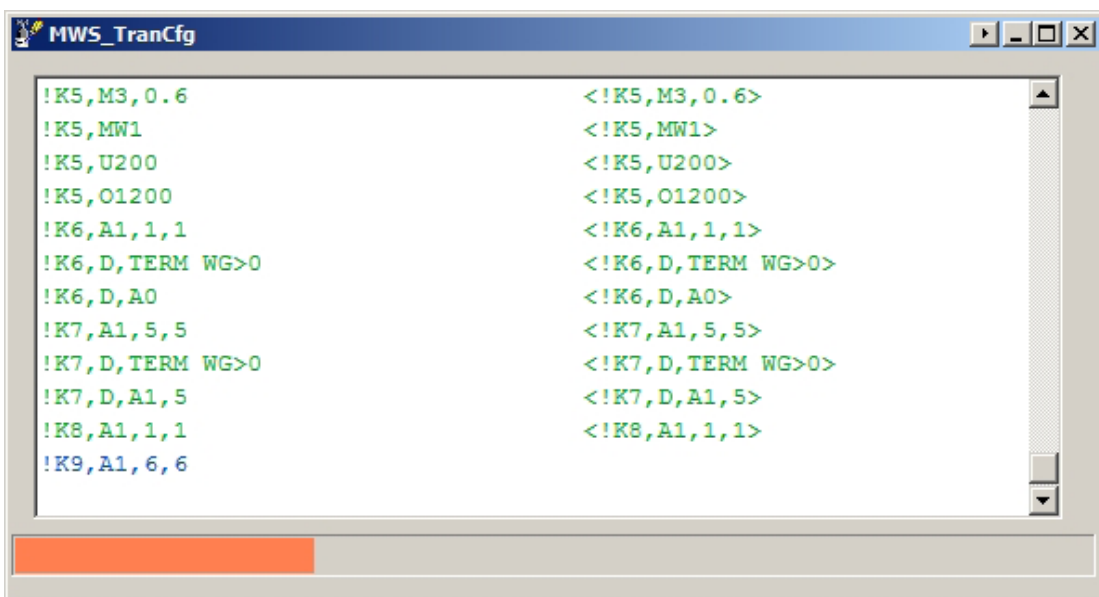
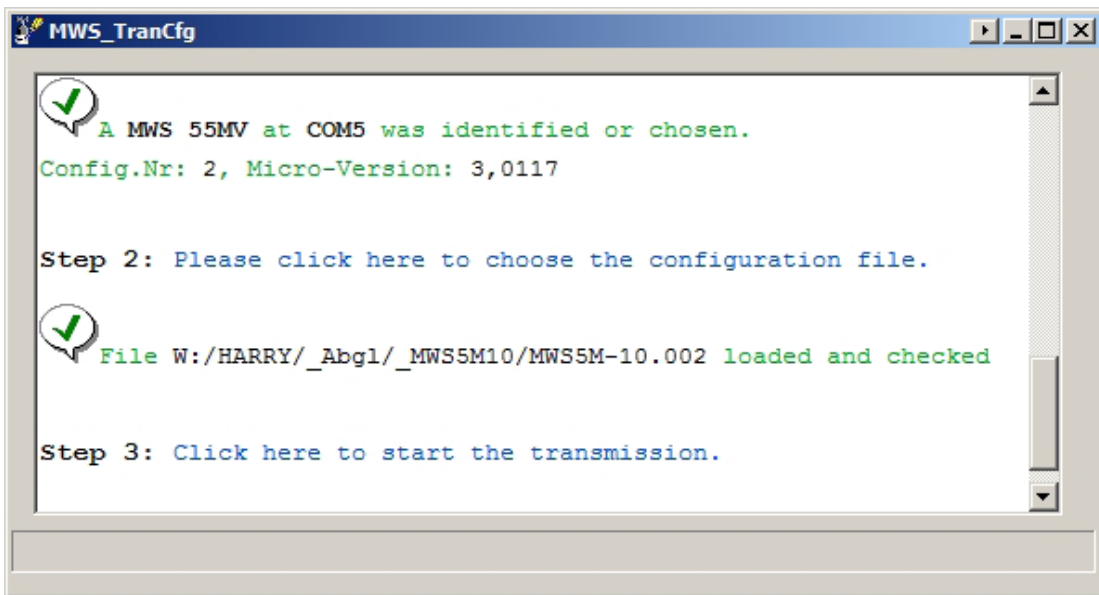


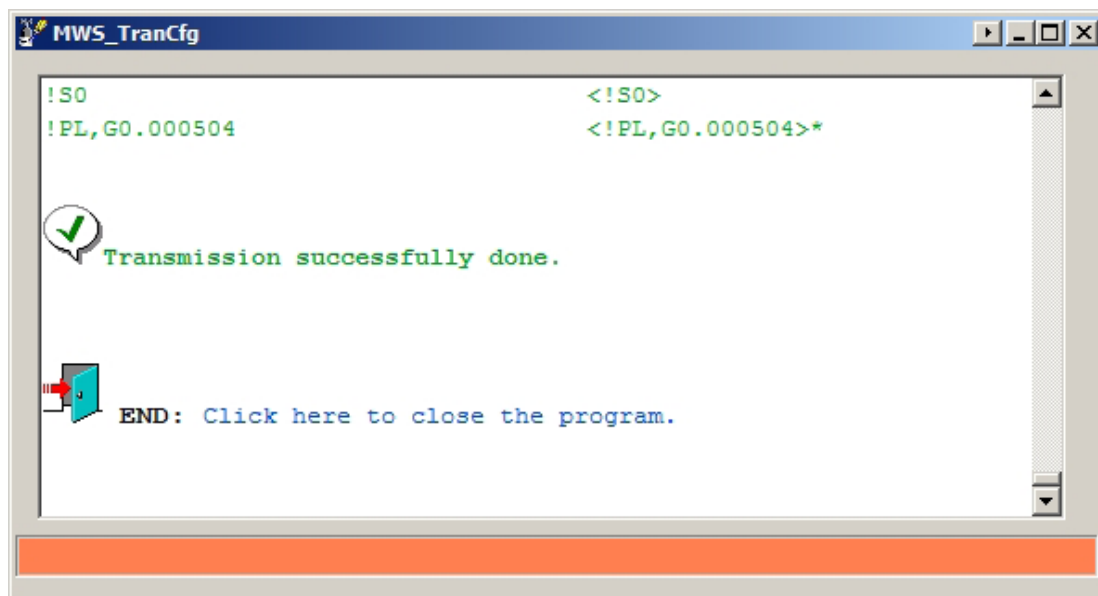


Chose the file for transfer to the weather station.

After choosing the file click into the window to start the transfer.

Sending the file to the weather station now is running. When errors occur the error codes will be highlighted in red text color.





Do not in any case change the pairs of values of the other sensors as this would lead to wrong measurements of your weather station.

Example for a value calculation:

Additional temperature sensor at ZA with linear output of 10mV / °C, 0V at -40°C and a maximum value of +200°C.

The calibration value pairs for the first basic value are (raw value 0 and temperature -40°C):

!L5,1,F0 und !L5,1,W-40

The calibration value pairs for the second basic value must be in between the min and max values. (e.g. raw value 500mV and temperature +10°C):

!L5,2,F8002 und !L5,2,W10

The calibration value pairs for the last basic value are (raw value 2400mV and temperature +200°C):

!L5,3,F38409 und !L5,3,W200

Between these basic values the real measured values are calculated by simple cross multiplication. E.g. if the raw value is 19500 you'll need the calibration value pairs 2 and 3.

Calculation:

$(38409-8002)/(200-10)$ results in 160/°C.

Then $(19500-8002)/160$ leads to 71.9.

At last you add the value of basic value 2 to 71.9 ($71.9 + 10$).

The temperature at a raw value 19500 therefore is 81.9°C.

3.6.1 Save settings after change

If you changed calibration data or config settings, you should save these changed settings with the command ***ADMIN SAVE CONFIG** to the internal SD-card!

So it is possible to restore these settings when the station has been set to factory defaults (e.g. after a firmware update or repair works)

3.7 Firmware Update

The MWS 55 allows updating the firmware via the serial port.

Start the tool "MWS_WUpda.exe" to perform.
(On the WeatherCD under SOFTWARE/MWS_WUpda)
In this folder also the current firmware version is stored.
You can download the current firmware [here](#).

Updating the firmware is quite the same as transferring calibration files described above.
Updating the firmware takes app. 2 minutes at 115200 baud, app. 25 minutes at 9600 baud.



CAUTION: Errors while updating the firmware will lead to complete malfunction of the weather station!!

Following procedures are required for updating the firmware depending on the current version:

- from V3.0200 and older

- first of all save the station's configuration!
- This is performed with the command *ADMIN SAVE CONFIG within a terminal program.
- Then execute a update with "Defines". (MWS_DEFV3_0230.hex)
- After updating with Defines the previously saved configuration needs to be recovered !

This is performed with the command *ADMIN LOAD CONFIG. This takes app. 20 minutes.

- Now a Bootloader-update must be performed! (MWS_BOOTV3_0230.hex)

- At last send following commands to the station (Appendix command):

```
!XW0007c9e0,504b39bb06c1507e22aa37b6000000000
```

```
!ER10,0 CLEAR
```

These commands are contained in the file "MWS_APPENDIXV3_0230.hex".

Open this file with a text editor, copy the respective complete command and send it to the station with a terminal program.

- from V3.0200 to V3.0220

- "normal" update (MWS_UPV3_0230.hex)
- then a Bootloader-update (MWS_BOOTV3_0230.hex)
- and at last also the Appendix commands from "MWS_APPENDIXV3_0230.hex".

- from versions 3.0221 and newer

- "normal" update (MWS_UPV3_0230.hex)
- and at last also the Appendix commands from "MWS_APPENDIXV3_0230.hex".

- from versions 3.0230 and newer

- "normal" update (MWS_UPV3_0232.hex)

- since version 3.0240 and newer

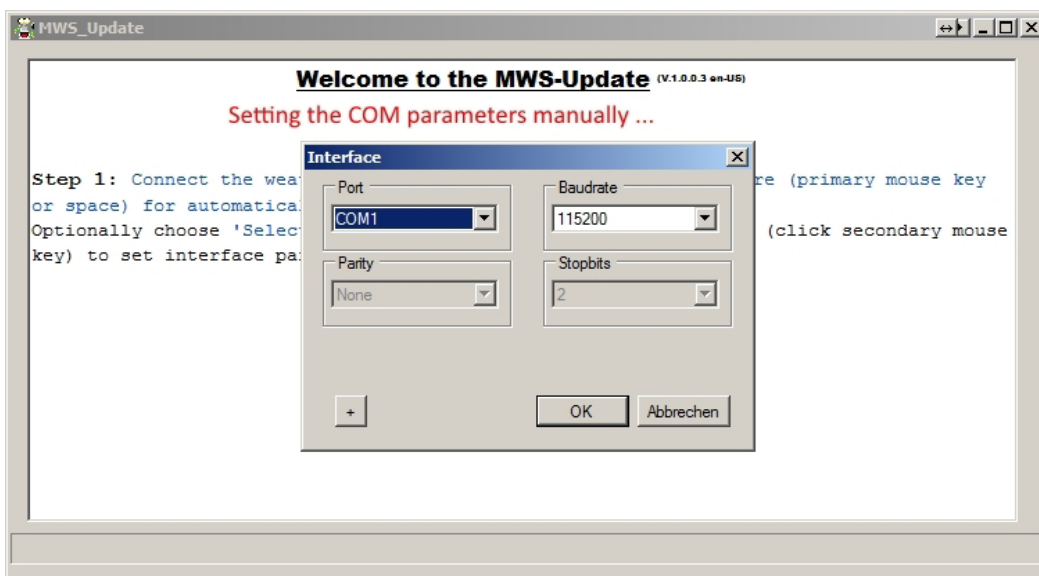
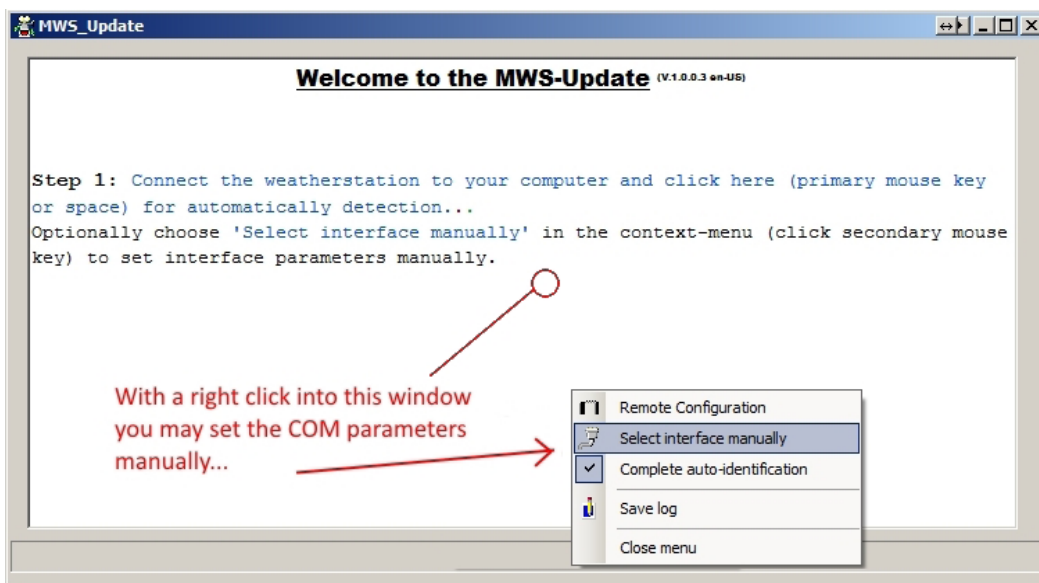
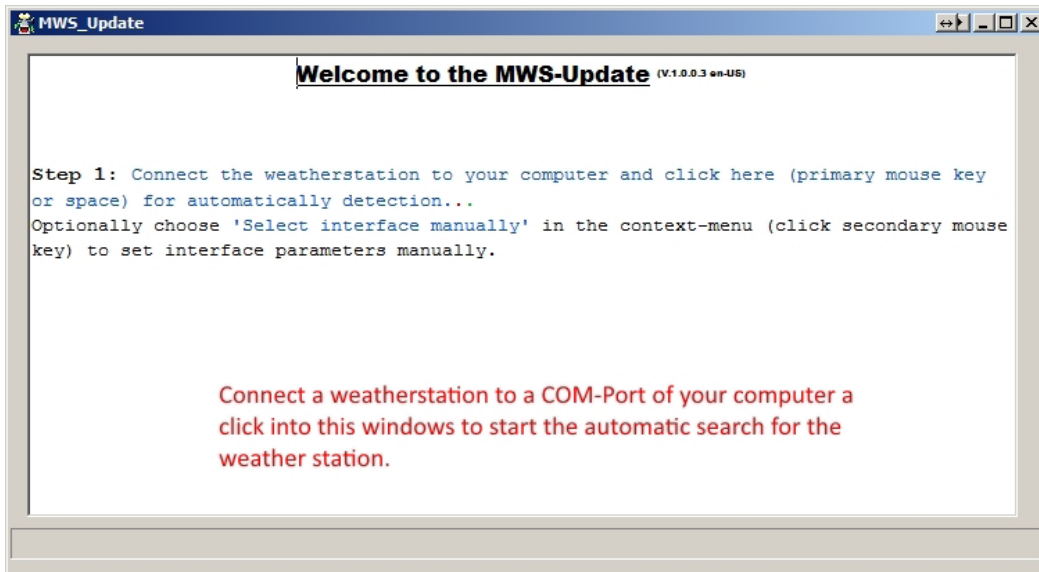
- only one update file (MWS_UPV3_0240.hex)

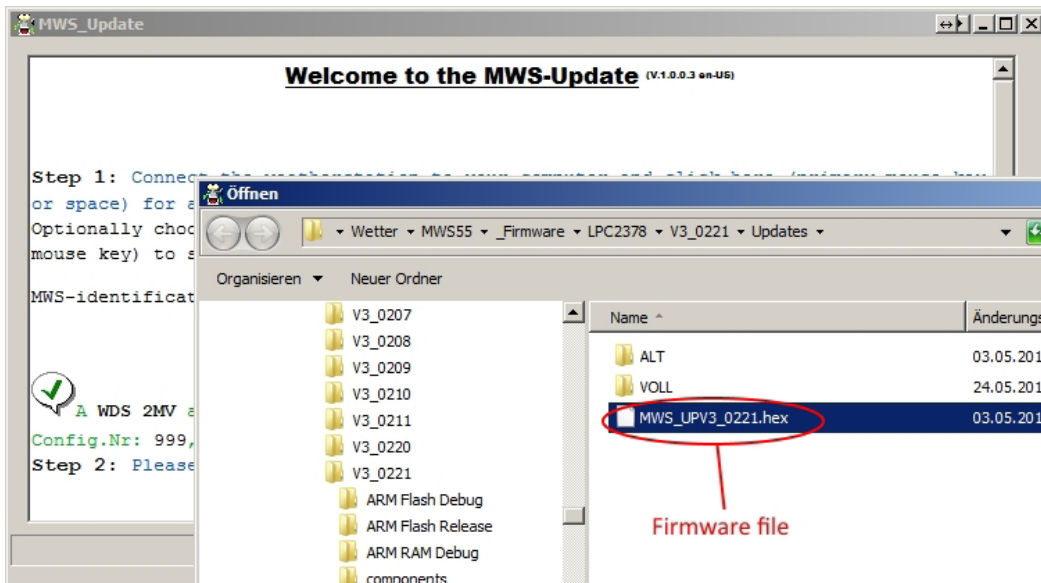
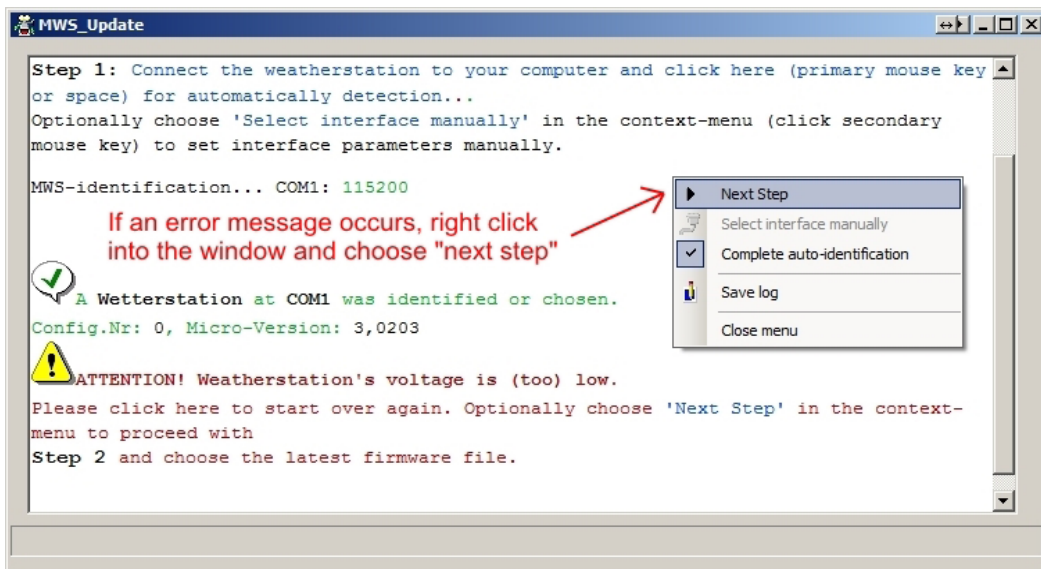
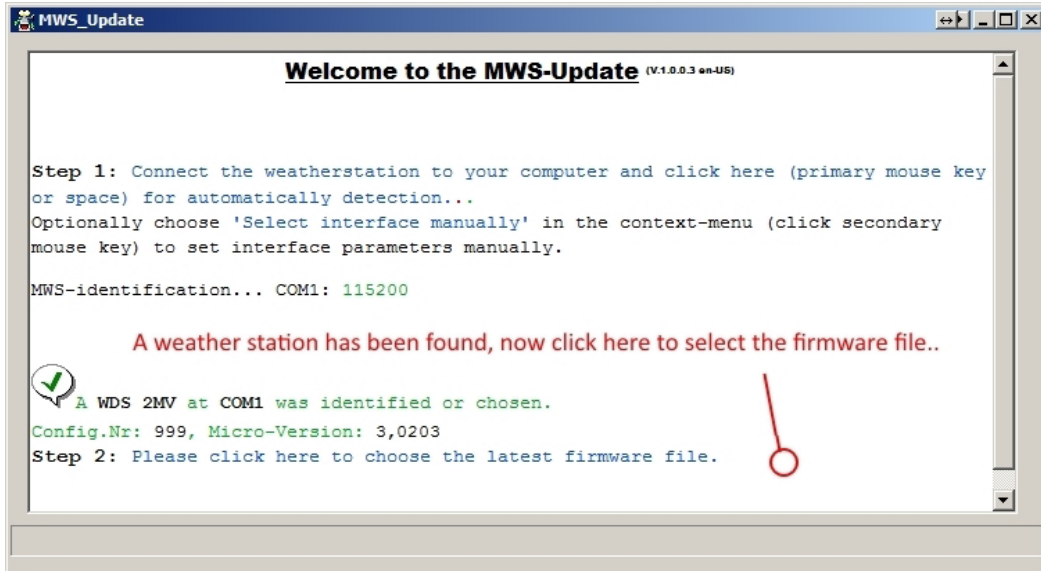
The necessary handling is performed by the program MWS_WUpda.exe (V1.0.0.5).

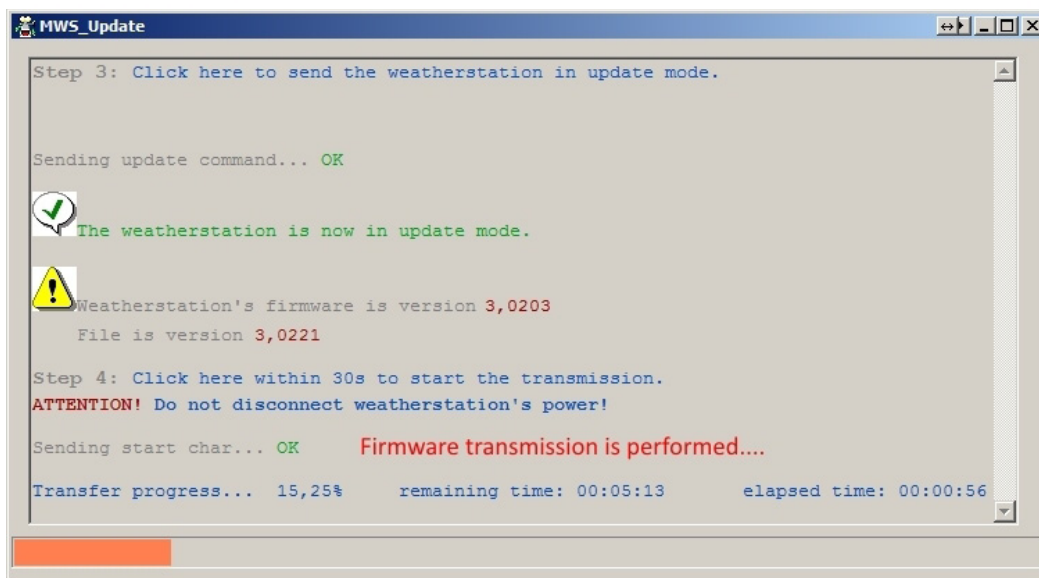
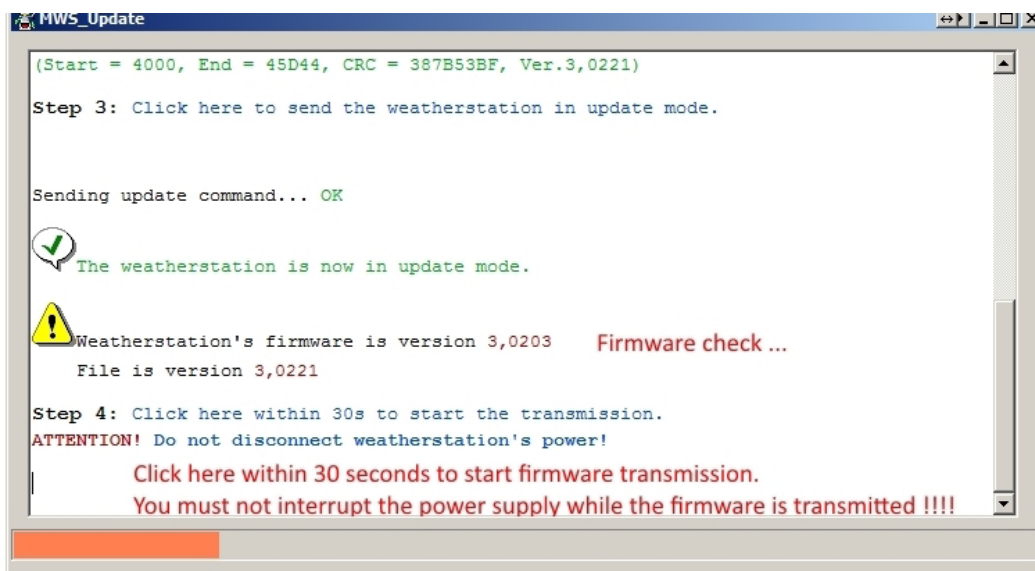
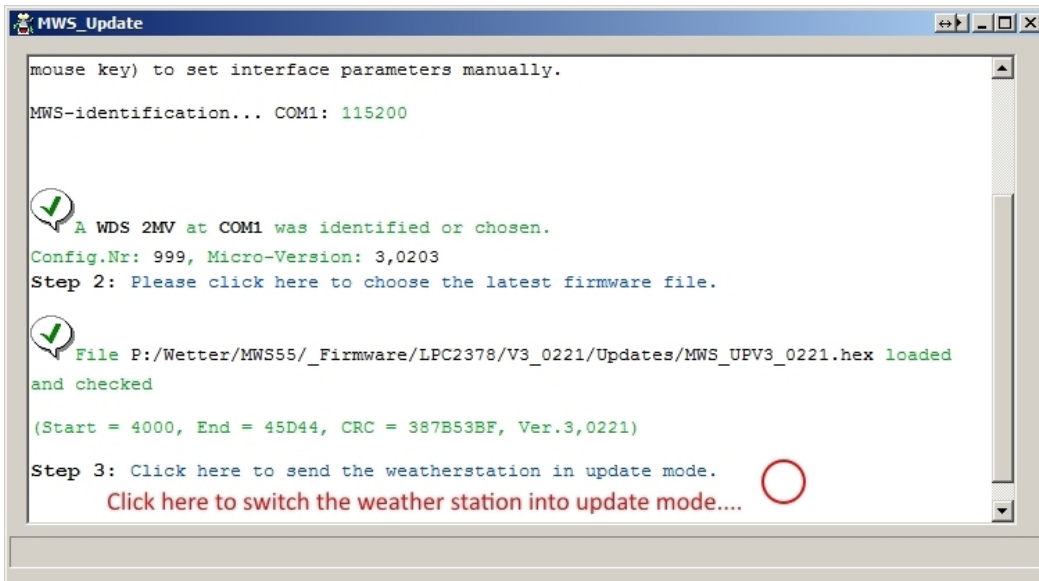
The following pictures show how to perform a firmware-update. (Pictures can deviate !!)

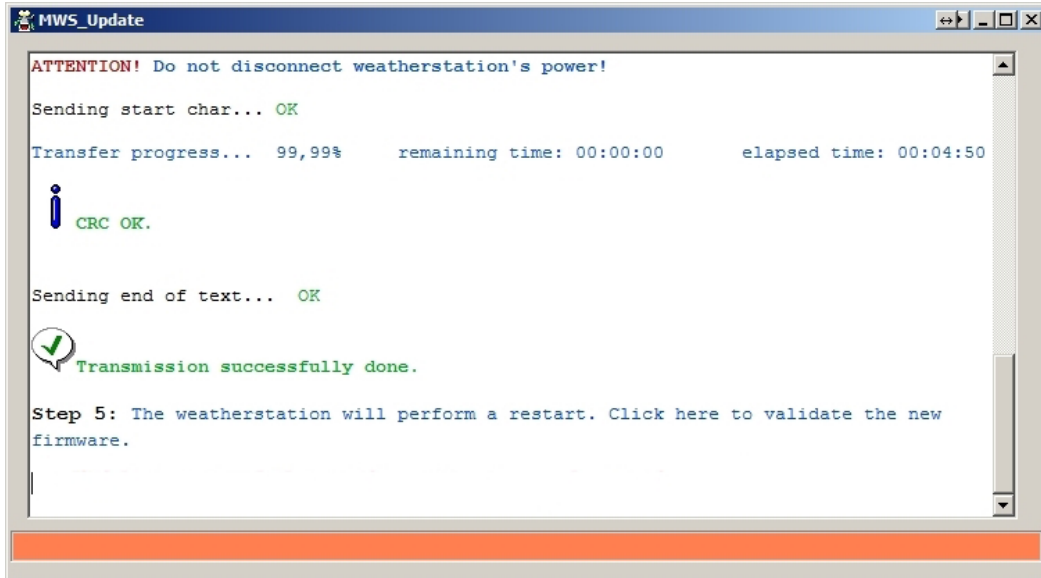
CAUTION!

During the update process the percentage display and the progress bar will pause a few times for some seconds. Please do not cancel the update process for otherwise the firmware will be destroyed.









3.8 Power Supply

4-28 VDC, app. 70mA at 18VDC. 18VDC PSU with 10m ready made cable is standard equipment.

When connecting any additional sensors, please note, that the supply voltage for the additional sensors is lead via a reverse polarity protection diode from the weather station's PSU.

Caution: Some additional sensors (LUX-sensor, Rain detector;..) need at least 9 VDC for proper operation!



CAUTION: Never connect two power sources (e.g. standard RS-232 cable with PSU and network cable with PoE) at the same time to the MWS 55VY!!

This will lead to shorts between the power sources and may damage your MWS 55VY!! Damages as a result of this are not covered by warranty!!

3.8.1 Power consumption with RS-232

Typical power consumption of MWS 55 with / without fan but without additional sensors at different voltages:

Current at 4VDC	: 370 / 140mA,	power consumption: 1.48 / 0.56W
Current at 5VDC	: 255 / 106mA,	power consumption: 1.28 / 0.53W
Current at 8VDC	: 145 / 72mA,	power consumption: 1.16 / 0.58W
Current at 10VDC	: 110 / 59mA,	power consumption: 1.10 / 0.59W
Current at 12VDC	: 100 / 51mA,	power consumption: 1.20 / 0.61W
Current at 15VDC	: 83 / 43mA,	power consumption: 1.25 / 0.65W
Current at 18VDC	: 70 / 37mA,	power consumption: 1.26 / 0.67W
Current at 24VDC	: 56 / 32mA,	power consumption: 1.34 / 0.77W

Typical power consumption of MWS 10 with fan but without additional sensors and with fully charged accu pack at different voltages:

Current at 4VDC	: 240mA,	power consumption: 960mW
Current at 5VDC	: 183mA,	power consumption: 915mW
Current at 8VDC	: 118mA,	power consumption: 944mW
Current at 10VDC	: 96mA,	power consumption: 960mW
Current at 12VDC	: 82mA,	power consumption: 984mW
Current at 15VDC	: 71mA,	power consumption: 1.02W
Current at 18VDC	: 60mA,	power consumption: 1.08W
Current at 24VDC	: 48mA,	power consumption: 1.15W

The standard cable used has a total resistance of app. 14 Ω per 100m, which means a voltage loss of app. 1.4V with a current of 100mA for 100m cable.

3.8.2. Power supply with PoE

An AG9912MT module from Silvertel is installed for power supply via PoE.

This module is specified according to IEEE802.3af and supplies 12.5VDC and up to 1A current (max. 12W).

The maximum cable length for the PoE option is 100m.

3.9 Heating device

For operation in winter a heating device is available as an option for MWS 55, MWS 10 and wind and precipitation sensors series 55.

The heating device operates at a power of 20W at 18VDC.

The heating device is switched on automatically when the internal temperature of the weather station drops below 7°C. This happens at external temperatures between 1°C..5°C, depending on the wind conditions.

This turn-on-threshold may be changed by commands via the interface (for details please contact us). Note that at temperatures around freezing, the heating switches on and off frequently. This can cause the temperature to fluctuate by up to +/- 0.3°C when there is no wind or low wind speeds.

3.10 Data Format

The data format of the transmitted data looks like this:

Example of a datastring :

15:24:32, 15.09.03, TE24.62, FE43.75, TD31.32, DR940.14, WR78.91, WV80.79, WG1.20, WS4.11, WD2.29, DB1013.32, TP11.47, WC24.62,

Each second MWS 55 transmits a data string starting with time and date. Separated by comma, the single measured values with sensor identification come in the following order:

Temperature (TE), humidity (FE), internal temperature (TD), absolute pressure (DR), wind direction (WR), prevailing wind direction (WV), wind speed (WG), wind peak (WS), average wind (WD), barometric pressure (DB), dewpoint (TP), windchill (WC).

You may change the order of the sensors by changing the positions of the sensors in the string (!Kxx). The commands to perform you'll find in the appendix.

By default, the data are transmitted with 9600BAUD, 8bit, no parity and one stopbit. (For evaluation with your own software, you can set several output modi - see appendix)

CAUTION: When changing the order of sensors there may special sensor properties to be changed additionally! If you don't perform in the right way this may result in wrong data output or wrong measurement!



The datastring ends with <CR><LF>, each datastring which is written in the internal logger includes an additional ASCII #31 in front of <CR><LF> for data-synchronisation with the software.

Each data string which is read from the logger has an ASCII #8 (TAB) in front of <CR><LF>.

All Reinhardt weather stations will send back each received command in brackets with CF and LF before processing the command, e.g. <?U>, to verify that the command has been received.

On harddisk, a data file is created every month with a format which is similar to that of the transmitted data. The data files receive the extension .MWS

Example : The file of March 2015 is named 03_2015.MWS.

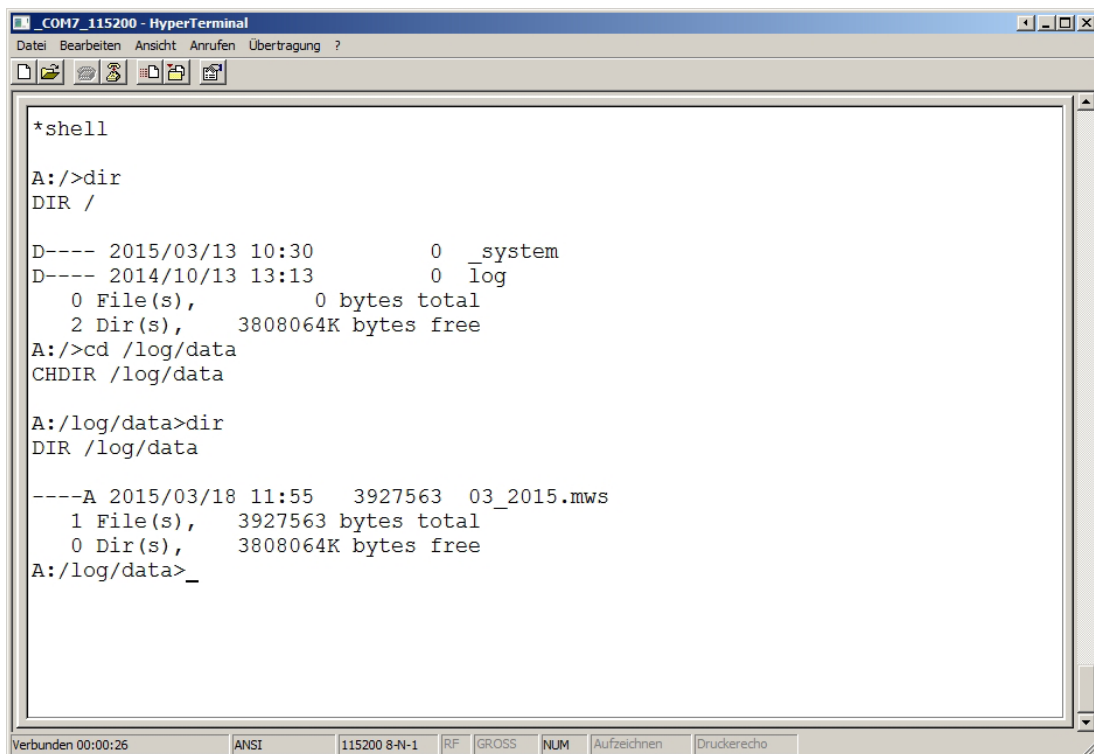
In case of missing data (cause by power fail, etc.) the software writes data with measuring values of -99999 to ensure integrity of the time axis. The software construes these values (-99999 and -99997) as missing data and creates measurement gaps in the graphical displays.

3.10.1 Data access onto the SD-card

The MWS 55 allows data access onto the SD-card with a shell similar to a DOS-window with different commands.

To perform, send the command *shell in a terminal software like hyperterminal, putty or any other terminal program. The weather station then switches into the command window.

PLEASE NOTE THAT THE STATION DOES NOT STORE ANY DATA INTO THE LOGGER WHILE IT IS IN THE COMMAND WINDOW !



```
COM17_115200 - HyperTerminal
Datei Bearbeiten Ansicht Anrufen Übertragung ?
*shell
A: />dir
DIR /
D---- 2015/03/13 10:30      0 _system
D---- 2014/10/13 13:13      0 log
  0 File(s),      0 bytes total
  2 Dir(s),    3808064K bytes free
A: />cd /log/data
CHDIR /log/data
A: /log/data>dir
DIR /log/data
----A 2015/03/18 11:55  3927563  03_2015.mws
  1 File(s),  3927563 bytes total
  0 Dir(s),    3808064K bytes free
A: /log/data>_
Verbunden 00:00:26  ANSI  115200 8-N-1  RF  GROSS  NUM  Aufzeichnen  Druckerecho
```

Paths must be separated with slash (/) not with backslash (\).

To exit the shell type EXIT and then press the ENTER key.

The shell can be used to delete weather data files which are not needed any longer, for storing calibration settings or for checking the free space on the SD-card.

3.10.1.1 Available commands:

ATTRIB
CD / CHDIR
COPY
DEL
DIR
EXIT
FIND
FORMAT
FTIME
HELP
MD / MKDIR
MOUNT
REN
SHELL
TYPE
WRITE

3.10.1.2 Description of the commands

ATTRIB <+R | -R | +A | -A | +H | -H | +S | -S> <name>

Changes the attributes of a file or directory. The attributes must be typed in capital letters! The order doesn't matter.

+R -> Set to Read-Only
-R -> Remove Read-Only
+A -> Set to Archiv
-A -> Remove Archiv
+H -> Set to Hide
-H -> Remove Hide
+S -> Set to System
-S -> Remove System

CD <name> - Change path into directory

CHDIR <name> - Change path into directory

Changes into the specified sub directory

COPY <src_name> <dst_name>

Copies the file <src_name> to <dst_name>

DEL <name>

Deletes the specified file or directory.
Caution! Deleting is performed without warning.

DIR [<path>]

Lists the content of the specified or current directory.

e.g.

D---- 2013/01/01 19:43 0 html

----A 2013/01/01 23:42 110 test.txt

Displayed: Attributes, file date, file time, file size (bytes), name.

Attribut D---- is a directory and has always got the size 0 bytes.

EXIT

Exits the Command-Shell.

FORMAT <logi drv#> <part type> <bytes/clust>

Formats the SD-card and creates a new file system (FAT).

CAUTION: Formatting is performed without warning!

<logi drv#> is the drive, <part type> is the partitioning rule(0:FDISK, 1:SFD)

<bytes/clust> are the allocation units.

e.g. formatting a memory card **FORMAT A: 0 4096**

FTIME HHMMSSDDMMYY <name>

Changes the file or directory time and date. The year is related to the year 2000.

e.g. **FTIME 234200010113 test.txt**

is output to:

----A 2013/01/01 23:42 110 test.txt

MOUNT <logi drv#>

Explicit mounting of a file system to drive <logi drv#>, e.g. **MOUNT A:**

MD <name>

MKDIR <name>

Creates a new sub directory.

REN <old name> <new name>

Renames the file or directory <old_name> to <new_name>

SHELL

(Re)starts the Command-Shell

TYPE [<option>] <file name/sector>

Shows the content of a file or sector.

<option>:

-s -> shows the specified sector in HEX format (512 Bytes)

e.g. TYPE -s 123456

-x -> shows the specified file in HEX format

e.g. TYPE -x test.txt

If used without <option> the file is shown in text format.

The output can be cancelled with ***!!!

WRITE [<option>] <file name>

Creates the file <file_name> and receives characters via the serial port written into the file.

When receiving ***!!! the receiving of characters is cancelled and the file is being closed.

3.10.1.3 Saving settings onto the SD-card

***ADMIN SAVE CONFIG**

Saves all current settings into the text-file /_system/save/config.sav.

If there already is a config.sav file it will be saved under config.bak in the same directory.

3.10.1.4 Load settings from the SD-card

***ADMIN LOAD CONFIG**

Loads the file /_system/save/config.sav and integrates the contained settings into the FLASH memory.

This takes about 20 minutes. If the command was sent via the serial port, a progress bar is displayed:

```
LOAD CONFIG |-----+-----+-----+-----+-----I-----+-----+-----+-----+-----|
```

Each - stands for 1%, each + for 10% and the I for 50%.

CAUTION! If the FLASH memory is write protected (ADMIN LOCK), the command is performed but no data will be changed.

So this command only makes sense when the FLASH is not protected or when performed within the SECURE mode.

3.10.1.5 Access to the SD-card via FTP

Since firmware version 3.0221 (from 03.05.2017) a FTP-client is included for accessing the SD-card. See [here](#).

3.11 System requirements

At least a computer with Pentium1 / 200 Processor and 512MB RAM.

WIN ME, WIN2k, WIN XP, Vista, WINDOWS 7, WINDOWS 8, WINDOWS 10.

VGA-graphic card with Monitor.

An online-help is available within the weather32 software with the F1 key or in the menue under '?'.
'?'

4 Connections and Pin assignments

4.1 Cables

4.1.1 Data Cable - Allocation of the Connection Cable for MWS 55

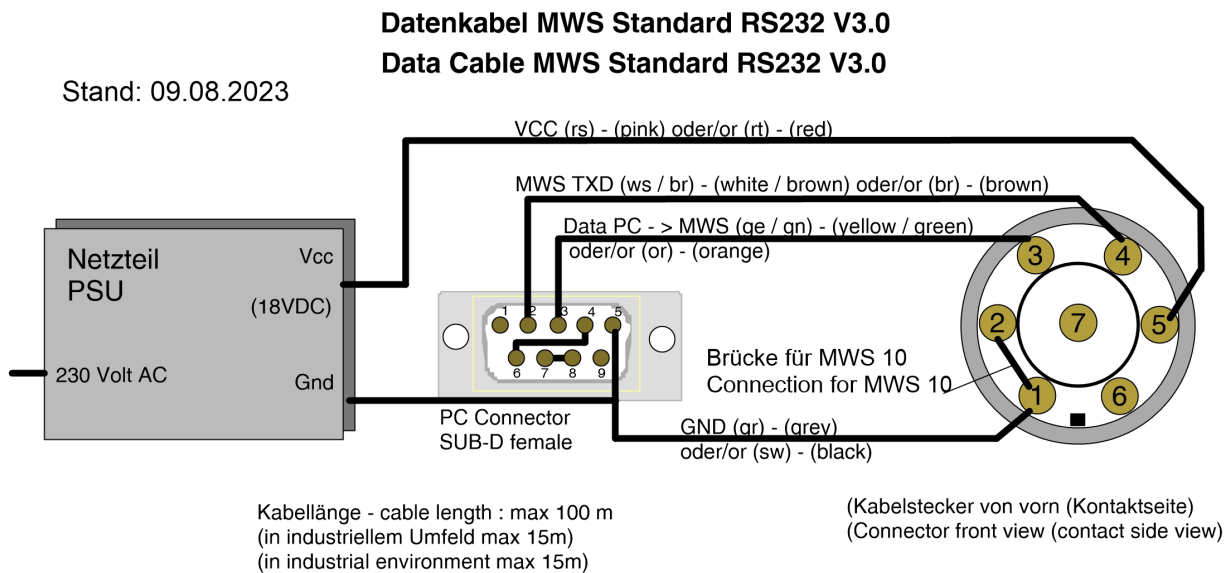
7 pole connector (MWS - connection)		9-pole interface connector (computer)
Pin 1 (GND)	←————→	Pin 5 (GND)
Pin 2 (GND - used for MWS 10)		
Pin 3 (RXD-MWS)	←————→	Pin 3 (TXD-PC)
Pin 4 (TXD-MWS)	←————→	Pin 2 (RXD-PC)
Pin 5 (VCC 18VDC)		
Pin 6 (R- with RS422 /485)		
Pin 7 (T+ with RS422 /485)		

Connect Pin 4 and 6
Connect Pin 7 and 8

The data cable can be lengthened to up to 150 m at 9600baud under optimum conditions and with suited cable (not in industrial environment!!)
(see also [6.1.1. Allowed cable lengths](#))

In case you lengthen the data cable, please take care that the connections in the connector at the computer must be wired. (Connect Pin 4 to Pin6 and Pin7 to Pin8).

4.1.1.1 Connection Diagram Standard data cable



4.1.2 Allocation of the Connection Cable for MWS Heating

6 pole connector
(MWS 55-Heating and GPS-connection)

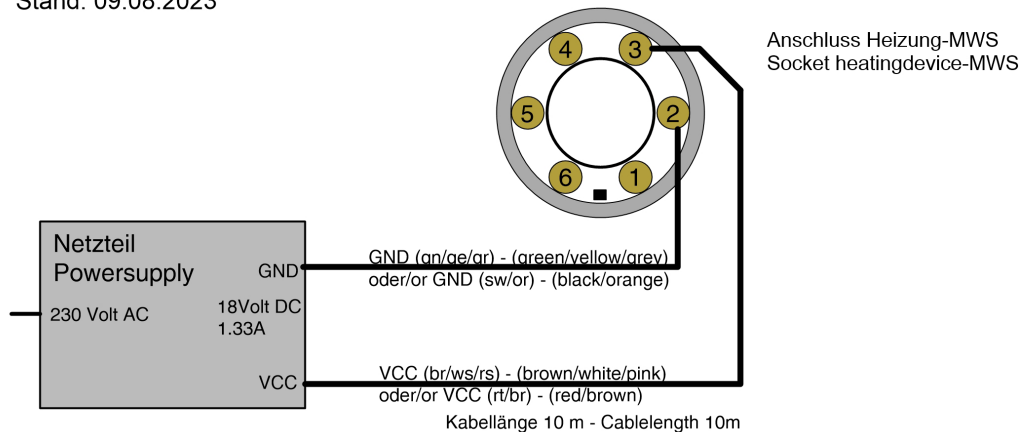
Pin 1	not connected		
Pin 2	(GND Heating)	←————→	GND-PSU 18VDC
Pin 3	(VCC Heating)	←————→	VCC-PSU 18VDC
Pin 4	not connected		
Pin 5	not connected		
Pin 6	not connected		

4.1.2.1 Connection Diagram Cable for heating device

MWS Anschlusskabel für Heizung - Connection cable for Heating device

Stand: 09.08.2023

(Ansicht auf die Frontseite - view onto front side)



NOTE

The cable for the heating is 10 m long and can neither be lengthened nor shortened.
A GPS-receiver is connected to an MWS 5M with heating via the combined socket for GPS and heating with 2 separate cables and a special adaptor.

4.1.3 Allocation of the Connection Cable for GPS-Receiver (Garmin GPS 18x LVC) :

6 pole connector
(MWS 55 - GPS-connection)

Pin 1	(GND GPS)	←————→	Garmin GPS 18x LVC GND
Pin 2	not connected		
Pin 3	not connected		
Pin 4	(Controlling GPS)	←————→	Garmin GPS 18x LVC In
Pin 5	(Signal GPS)	←————→	Garmin GPS 18x LVC Out
Pin 6	(VCC GPS-5VDC)	←————→	Garmin GPS 18x LVC VCC

4.1.4 Allocation of the Connection Cable for Heating and GPS-Receiver (Garmin GPS18x LVC):

6 pole connector (only combined GPS / Heating connector)
(MWS 55-Heating and GPS-connection)

1 x 6 pole connector

6 -pole connector

Pin 2 (GND Heating)	←—————→	GND-PSU 18VDC
Pin 3 (VCC Heating)	←—————→	VCC-PSU 18VDC

Pin 1 (GND GPS)	←—————→	Garmin GPS18x LVC GND
Pin 5 (Signal GPS)	←—————→	Garmin GPS18x LVC Out
Pin 6 (VCC GPS-10..24VDC)	←—————→	Garmin GPS18x LVC VCC

4.1.5 Allocation of the Connection Cable for Sensors with RS422-port

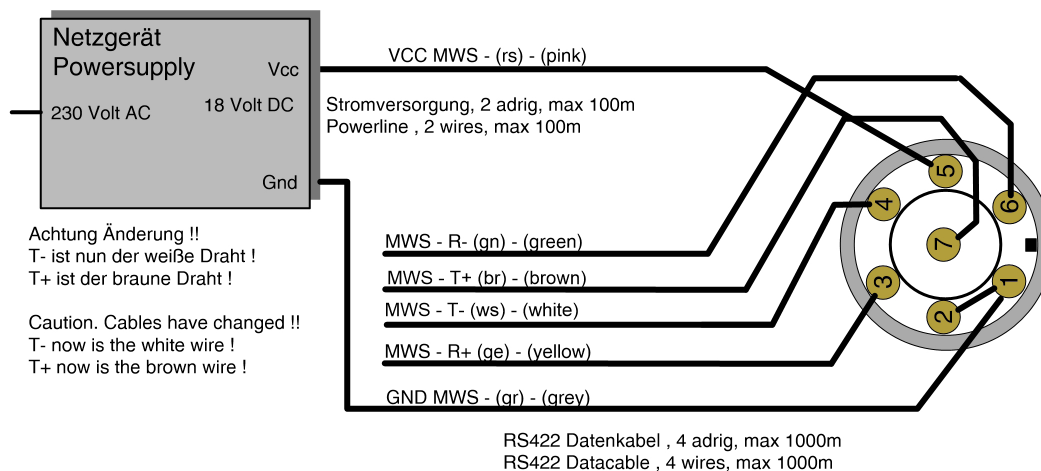
7 pole connector
(MWS 55-power supply and data-connection)

Pin 1 (GND)	←—————→	PSU-GND (grey)
Pin 2 (GND - used for MWS 10)		
Pin 3 (R+ of MWS)	←—————→	wire (yellow)
Pin 4 (T- of MWS)	←—————→	wire (white) - (Caution: has changed !!)
Pin 5 (VCC 18VDC)	←—————→	PSU-VCC (pink)
Pin 6 (R- of MWS)	←—————→	wire (green)
Pin 7 (T+ of MWS)	←—————→	wire (brown) - (Caution: has changed !!)

Datenkabel RS422 - Daticable RS422 (MWS55 / MWS88 / MWS10 / Sens_55)

(Stand 09.08.2023)

(alle Ansichten auf die Frontseite - all views onto contact side)



4.1.6 Allocation of the 1:1 cable for sensors with RS232-port

1:1 Kabel RS232 - 1:1 Cable RS232 (MWS, Sens_55 & Sens_M)

(Stand 09.08.2023)

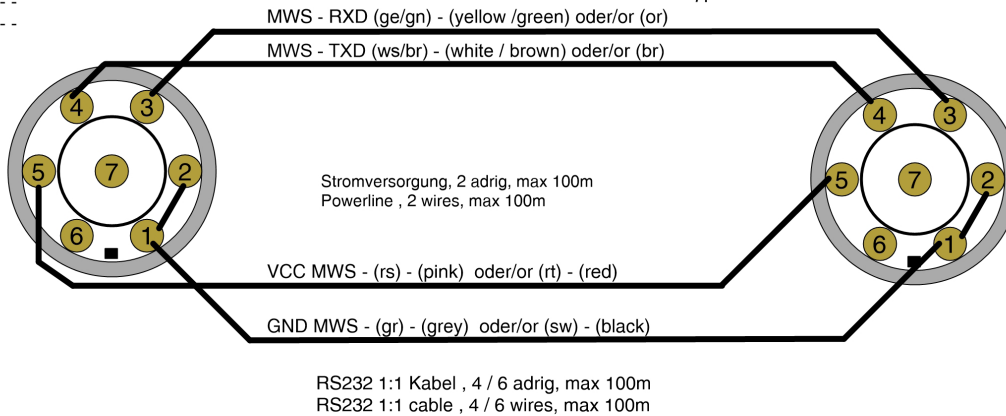
(alle Ansichten auf die Frontseite - all views onto front side)

MWS 5M, 8, 9-5:

- 1,2: GND (gr) oder (sw)
- 3: RXD MWS (ge/gn) oder (or)
- 4: TXD MWS (ws/br) oder (br)
- 5: VCC (rs) oder (rt)
- 6: ---
- 7: ---

WLAN-Modul, TCP/IP-Converter ...

- 1,2: GND (gr) oder (sw)
- 3: RXD MWS (ge/gn) oder (or)
- 4: TXD MWS (ws/br) oder (br)
- 5: VCC (rs) oder (rt)
- 6: ---
- 7: ---



4.1.6 Allocation of the 1:1 cable for Sensors with RS422-port

1:1 Kabel RS422 - 1:1 Cable RS422 (MWS55 / MWS88 / MWS10 / Sens_55)

(Stand 09.08.2023)

(alle Ansichten auf die Frontseite - all views onto front side)

MWS 55, 88, 10:

- 1,2: GND (gr)
- 3: R+ MWS (ge)
- 4: T- MWS (ws)
- 5: VCC (rs)
- 6: R- MWS (gn)
- 7: T+ MWS (br)

WLAN-Modul, ...:

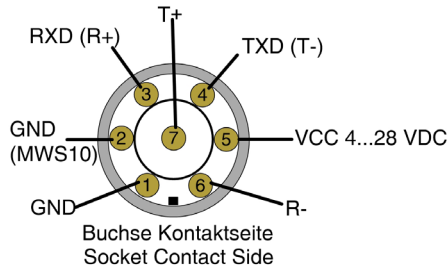
- 1,2: GND (gr)
- 3: R+ MWS (ge)
- 4: T+ MWS (br)
- 5: VCC (rs)
- 6: R- MWS (gn)
- 7: T- MWS (ws)



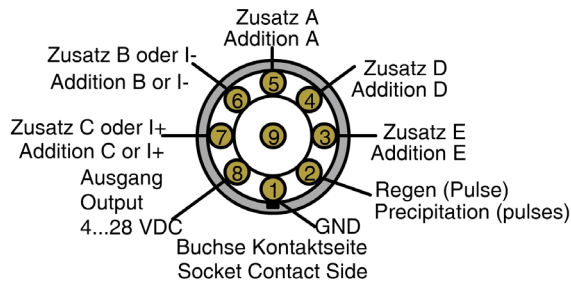
4.2 Pin assignments

4.2.1 Allocation of the MWS 55-Connection Sockets

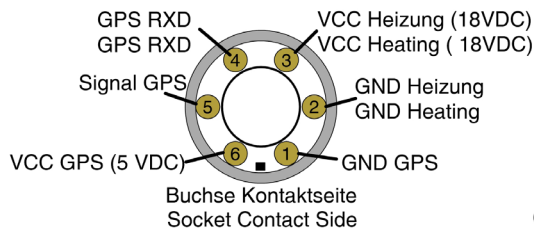
MWS55 / MWS10 / Sens_XX Buchse : Power und Daten
MWS55 / MWS10 / Sens_XX Socket : Power and Data



Buchse : Zusatzeingänge
Socket : Additional Inputs

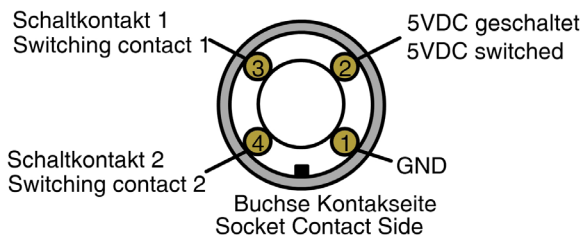


Buchse GPS (GPS / Heizung)
Socket GPS (GPS / Heating)



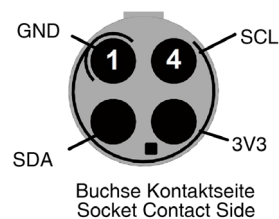
08/23

WSA Buchse 4-pol. : Schaltausgänge
WSA Connector 4-pole : Switching outputs



08/23

I²C Buchse 4-polig
I²C connector 4-pole



08/23

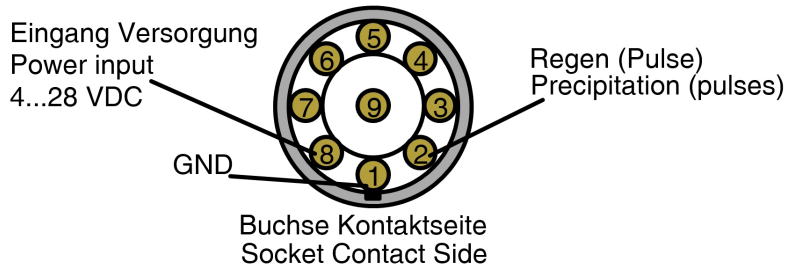
4.2.1.1 Allocation of the RMS 55 TTL-Connection Sockets

RMS 55 TTL : Power und Daten

RMS 55 TTL : Power and Data

Buchse : Versorgung / Ausgang

Socket : Power / output

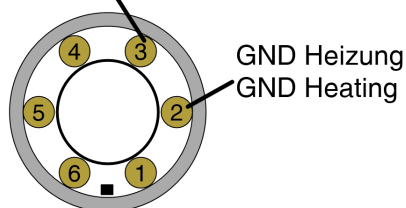


Buchse GPS (GPS / Heizung) (Option)

Socket GPS (GPS / Heating) (Option)

VCC Heizung (18VDC)

VCC Heating (18VDC)



08/23

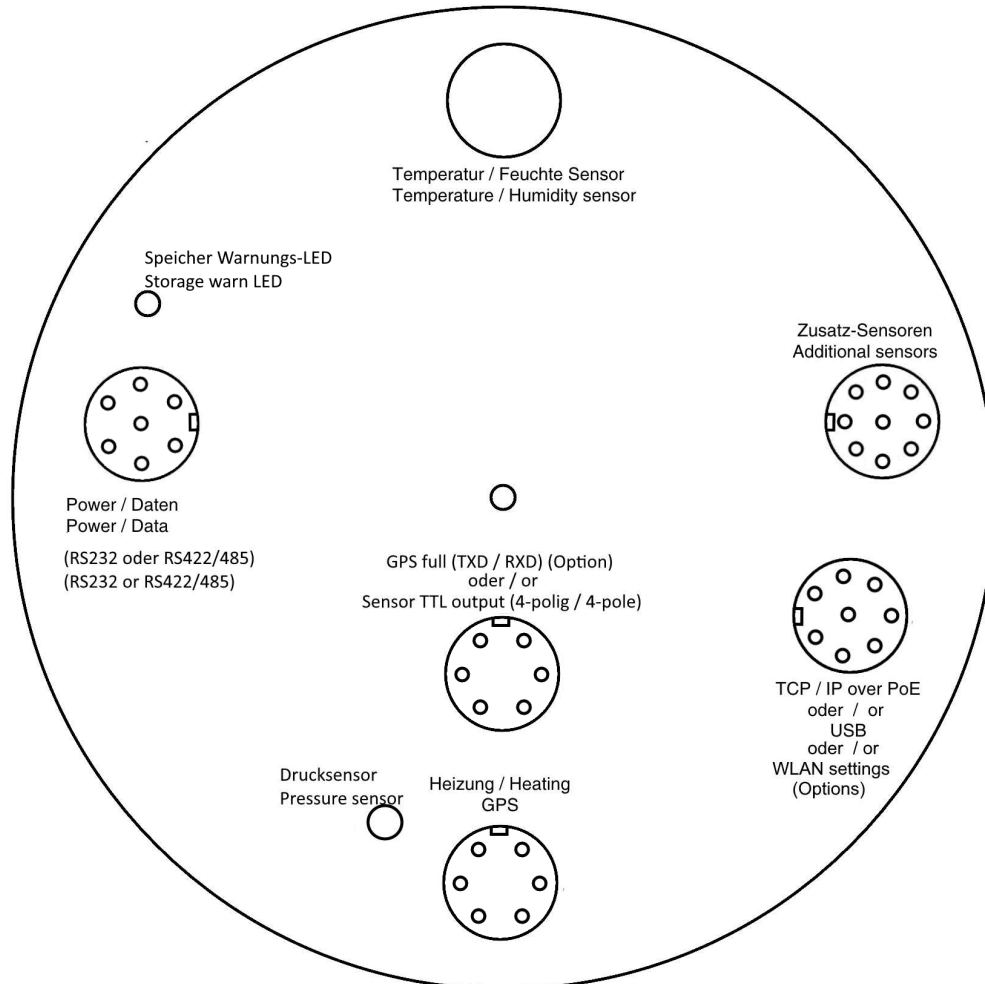
4.2.2 Bottom side of weather station MWS 55 / MWS 88-2 (connectors)

Unterseite der Wetterstation (Anschlüsse)

Bei Sonderanfertigungen können Abweichungen auftreten

Bottom side of weather station (connectors)

There may be deviations at special versions



Caution!

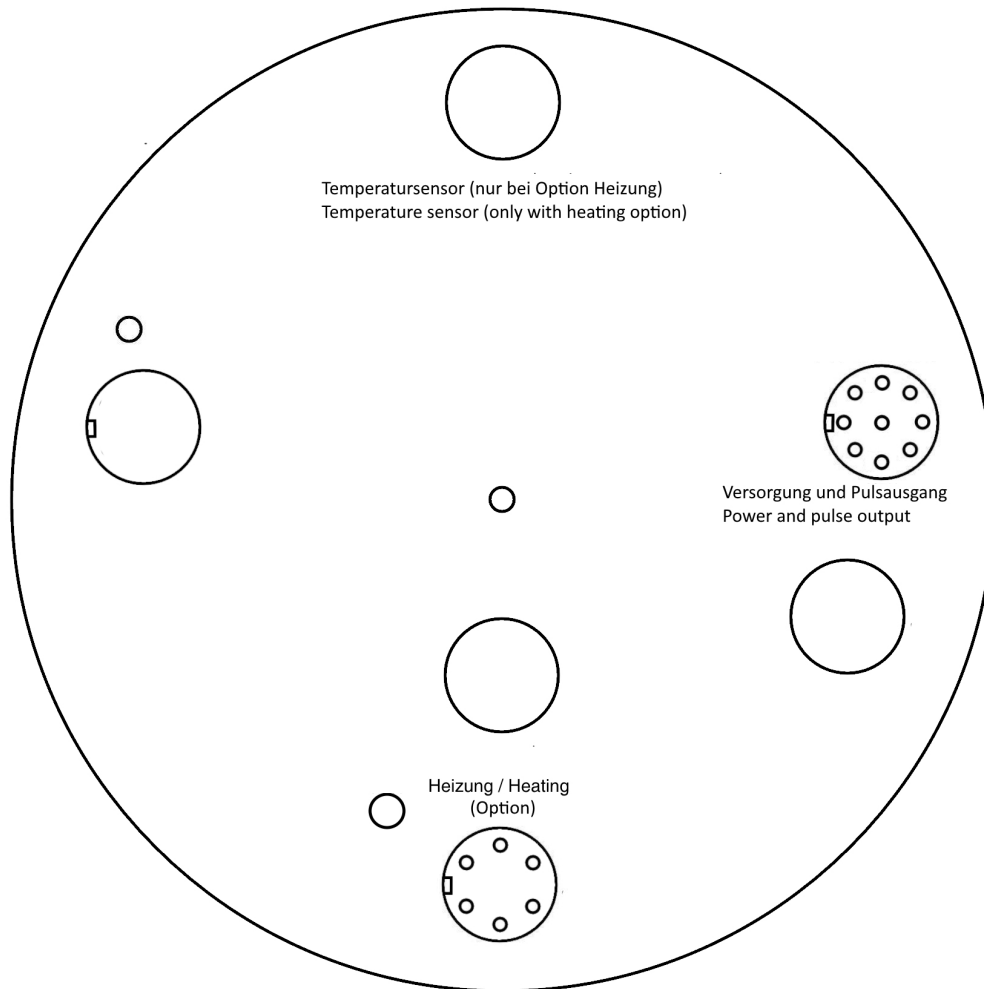
Protect all unused sockets with the protective caps to avoid corrosion of the contacts!!

When removing the weather station in case of recalibration or other cases it is essential to protect the cables from rain and unplug all power supplies to avoid corrosion of the contacts!!

4.2.2.1 Bottom side of RMS 55 TTL (connectors)

Unterseite des RMS 55 TTL (Anschlüsse)

Bottom side of RMS 55 TTL (connectors)



Caution!

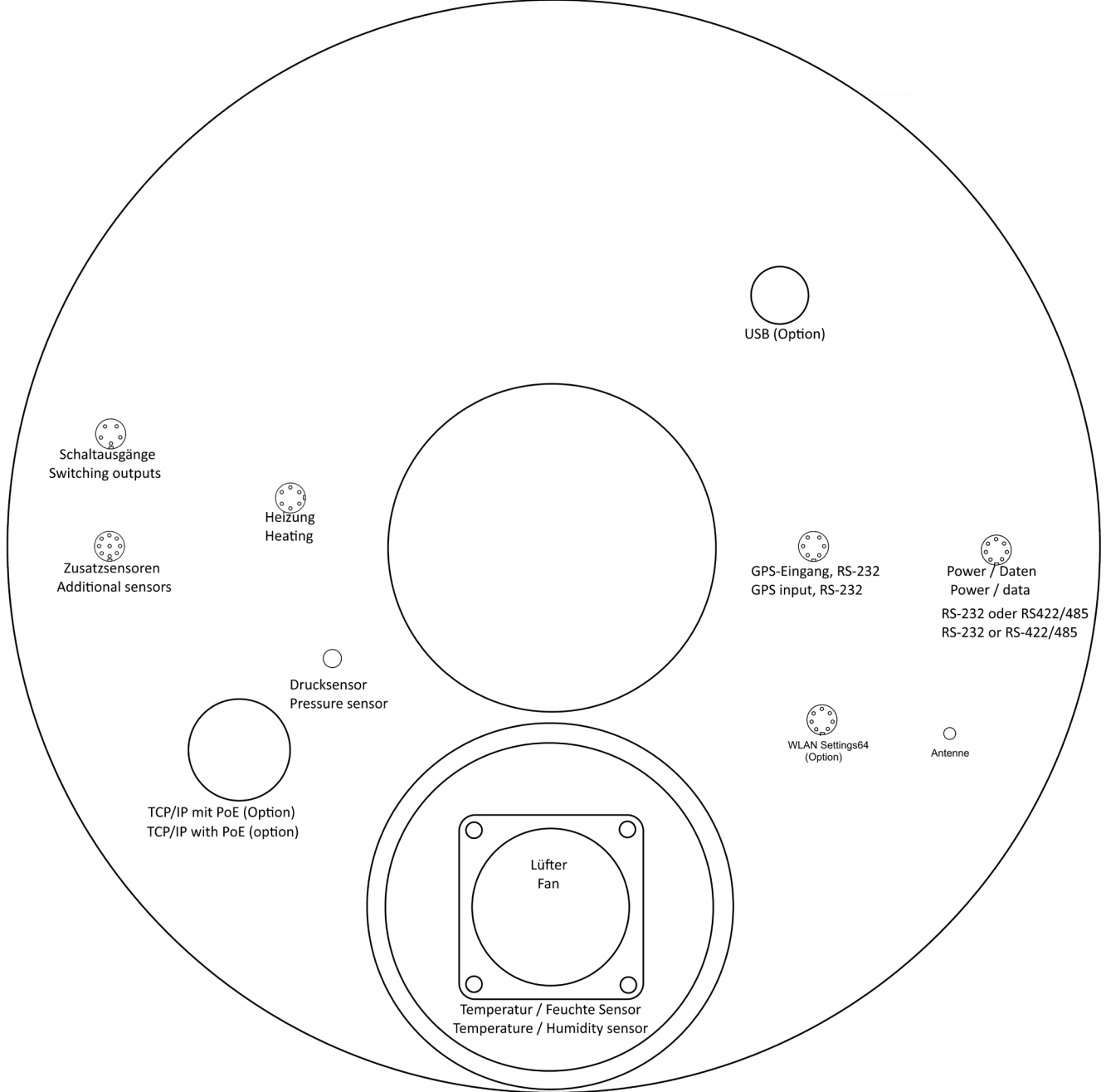
Protect all unused sockets with the protective caps to avoid corrosion of the contacts!!

When removing the weather station in case of recalibration or other cases it is essential to protect the cables from rain and unplug all power supplies to avoid corrosion of the contacts!!

This page is left free for further expansions

4.2.3 Bottom side of weather station MWS 10 (connectors)

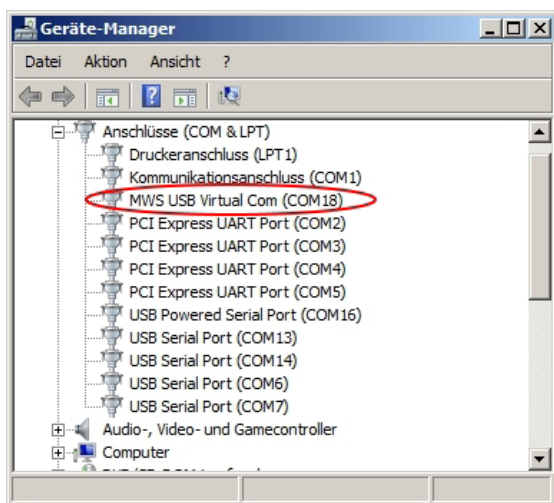
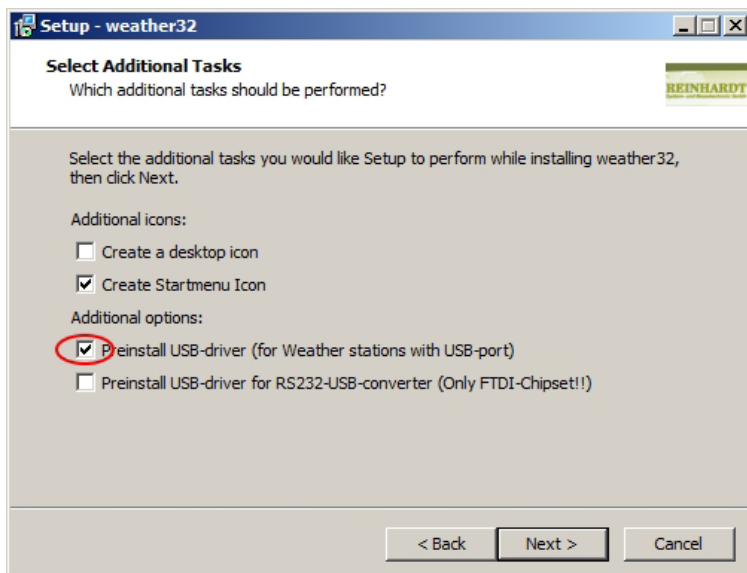
Unterseite der Wetterstation (Anschlüsse)
Bottom side of weather station (connectors)



4.3 USB-Port

4.3.1 Installing the USB driver

For MWS 55 an optional USB-port is available.
The driver can be pre-installed during the installation of the weather32 software.



CAUTION:

If the USB-port of the MWS 55 is recognized but disabled after a short time or is installed as "Unknown device" too high current load at the USB-port may be the reason.

To run the MWS 55 at a USB-port you should disconnect all not needed USB devices from your computer's USB-ports, use an external powered USB-Hub or use a USB3-port for this one can provide a higher current at it's output for supplying the MWS 55.

The MWS 55 needs at least 150mA at the USB-port without fan!

If the fan is active, the MWS 55 draws up to 400mA for a short time from the USB-port.

Continuous operation with fan draws app. 300mA from the USB-port.

On that score the MWS 55 disables it's fan when running at the USB-port and the serial port RS-232 is being disabled by default.

When disconnecting the MWS 55 from the USB-port and connecting it to a serial RS-232 port, the fan will be enabled.



The USB-port (maximum 5m cable length) is to be used for fast downloading the data previously recorded from the data logger to a computers harddisk.

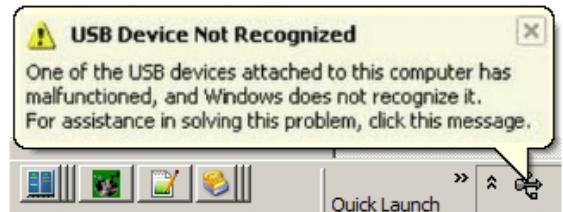
For continuous measuring we recommend using the serial port RS-232 or a PoE connection (option).

Also the supply voltage from the USB port is not sufficient for some additional sensors, e.g. the soil temperature sensor or the road surface sensor, for this sensors need at least 6VDC for correct operation and the USB port only provides 5VDC!!!

4.3.2 Problems with the USB Port

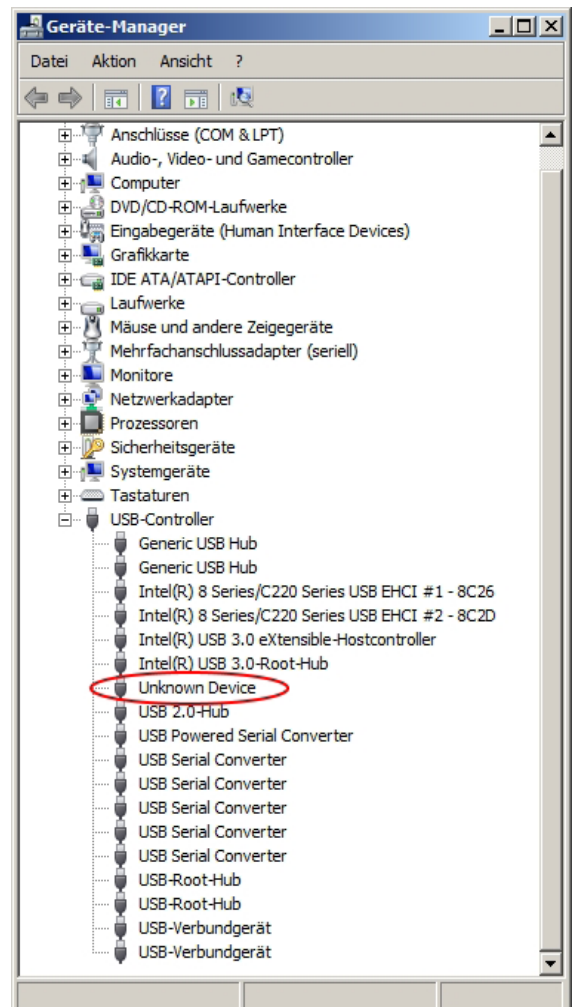
4.3.2.1 USB-Device was not recognized

As mentioned above there may occur problems recognizing and installing a MWS 55 connected to the USB port due to too high current consumption at the USB port. The MWS 55 cannot be recognized and installed correctly.



In the Device Manager (*Windows-Key + X*) or (*Windows-Key + R* and then type *devmgmt.msc*) there is no *MWS USB Virtual COM Port* installed but under *USB-Controller* as *Unknown device* a new device has been created.

To remedy that you may remove other USB devices, use an external powered USB-Hub or use an USB3 port as mentioned above.



4.3.2.2 Microsoft Ballpoint instead of MWS USB Virtual COM

Windows often wrongly installs a driver for "*Microsoft Ballpoint Mouse*" when connecting a USB device although there is no mouse connected at all.
This results in malfunction of the driver for the MWS 55.

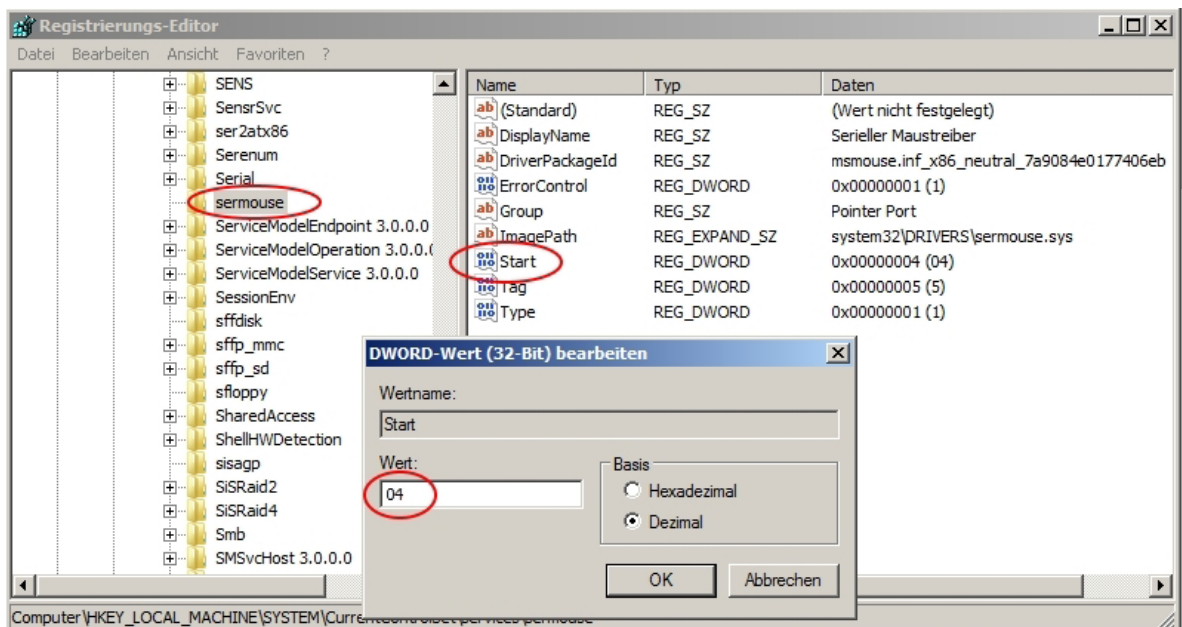
The problem may be solved by a change in the registry.

To perform you start the registry editor by pressing the WINDOWS KEY + R and then type *regedit* and press OK.

In the next window you choose *YES*.

In the Registry editor you navigate to the following key:
HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\Sermouse
and right click on *Start* and choose *modify*.

Change the value to 4.



This should prevent Windows from wrongly installing the driver for the serial ballpoint mouse.

See also:

[https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-2000-server/cc959920\(v=technet.10\)](https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-2000-server/cc959920(v=technet.10))

4.4 TCP/IP-Port with PoE

Another option of the MWS 55 is the TCP/IP port with PoE.

If your MWS 55 is equipped with this option, the unit can be power supplied via a network cable and send the data over it's IP-address (port 20002).

If recommended you may change the standard port number, see [Changing the port number](#).

The data cable length should not exceed 100m!



CAUTION: When running the MWS 55VY with PoE NEVER connect a second power source (e.g. RS-232 cable with PSU) for in that case the MWS 55VY may get damaged!!!

When running the unit over PoE there are lots of possible settings.

You may set a master having full control to the unit. this can be a MAC-address, an IP-address or a range of IP-addresses.

Up to 15 clients can have access to the unit, preferred only reading to avoid command conflicts when controlling the unit.

You can read the addresses of all connected units and you can read the receive and send statistics. Also a FTP client is included for access to the data on the internal SD-card.

The commands for TCP/IP operation and setting up the TCP/IP port you'll find [here](#).

4.4.1 Reading the data logger over PoE (TCP/IP)

In PoE mode (TCP/IP) there is a limitation reading the data logger.

The transmission rate set for the serial port is also valid for the transmission over TCP/IP.

If this speed is too high, a buffer overflow may occur causing that not all data in the data logger can be transmitted over the TCP/IP interface. This leads to gaps in the data file.

Therefore the transmission rate should not exceed 19200 baud if you want to read the data logger via the PoE (TCP/IP) interface.

This limitation applies to firmware version up to 3.0207.

4.4.2 Accessing the SD-card via FTP

Since firmware version 3.0221 a FTP client for accessing the SD-card is included.

Access to the SD-card is protected with a password.

The user name is ADMIN, the password is the 7-character serial number of your weather station without version number, e.g. 1035123.

Access to the SD-card is possible with a file manager (Total commander, Speed commander, e.g.) or via a browser.

For accessing via a browser you type into the address line:

ftp://ADMIN:xxxxxxx@<IP-address>, where xxxxxxx is the 7-character serial number of your weather station (without version number), e.g.:

ftp://ADMIN:1035123@192.168.100.200

CAUTION: If you set an admin password (*ADMIN SET PASSWD), then FTP-access to the SD-card only is possible with this admin password and the admin IP-address!!

For access to the station with the **F**ile **T**ransfer **P**rotocol the HTTP/FTP protocol needs to be enabled (see !DC or ?DC, Bit 24)

and the Ethernet port must be enabled (!F+24 or *ADMIN SET PERMIT 15 ON) or being configured.

For the station only supports passive FTP, the Administrator client must establish a connection on FTP port 21 connecting via FTP.

The station will answer with „**220 <Station> GRANTED: ADMIN**“.

If a FTP connection is not initiated from the admin address, the connection will be closed immediately!

The Administrator client must determine the user with the command „**USER ADMIN**“ on which the station will request the transmission of the command „**PASS <Password>**“ with „**331 NEED PASSWD**“.

After this the user is logged in and the station will report this with „**230 USER LOGGED IN**“.

The <Password> normally is the Administrator password (see [ADMIN SET PASSWD](#)), if this is not set, the serial number of our weather station is the password.

After log in successfully the user can navigate the directories of the internal SD-card. For this is the Admin additionally to download files also deleting and creating files and directories is possible!

CAUTION: If the directory /log/data is deleted no more weather data can be stored.

Example of establishing a connection:

FTP-Server (Weather station)	Client (Administrator)
	Ask for connection on FTP port 21
Accept connection: 220 MWS GRANTED: ADMIN	
	Send command: USER ADMIN
User OK: 331 NEED PASSWD	
	Send command: PASS 1234567
Password OK: 230 USER LOGGED IN	
	Ask current folder: PWD
Current directory: 257 "/"	
	Determine ASCII-transmission: TYPE A
Type configured successfully: 200 OK TYPE A	
	Determine passive mode: PASV
Passive mode confirmed: 227 Entering Passive Mode (IP/Port)	
	Establish data connection to IP/Port
	Read directory: LIST
Transmission initiated: 150 Opening Data Connection	
	Receive data
Close data connection: 226 Closing Data Connection	

FTP-Command overview:

Cmd.	Description
USER	Transmit user
PASS	Transmit password
ACCT	User identifier
QUIT	Close connection
PWD	Output current directory
NOOP	No operation
PASV	Request passive FTP connection
TYPE	Determine data type, only ASCII allowed
SYST	Determine operating system
LIST	Output directory list ausgeben
CDUP	Directory level higher
CWD	Change directory
SIZE	Output file size
MDTM	Change file date
RETR	Copy file from weather station
REST	Restart transmission
STOU	Copy renamed file to weather station
STOR	Copy file to weather station
APPE	Add data to file
MKD	Create directory
RMD	Delete directory
DELE	Delete file
ABOR	Cancel previous command
RNFR	File name to rename
RNTO	New name for rename
MODE	Determine transfer mode (only S)
STRU	Directory structure (only F allowed)

4.4.2.1 Access via FTP with FileZilla

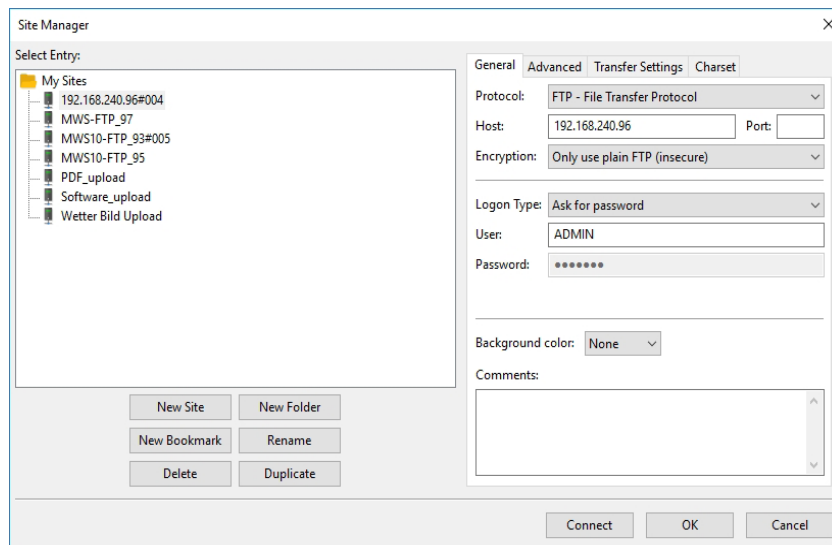
Here the access via FTP with FTP client FileZilla is described

FileZilla is a free FTP software which allows up / downloads of data from a server and also from MWS 55 with PoE option.

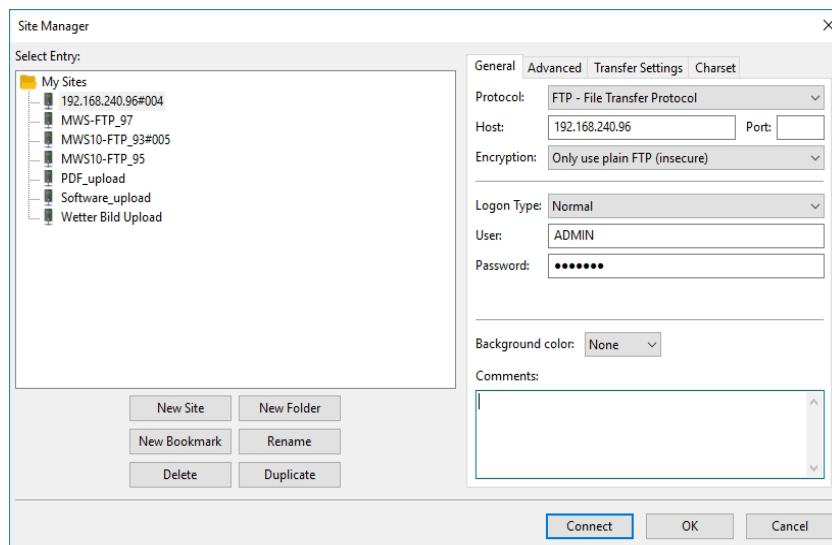
You will find FileZilla here: <https://filezilla-project.org/>

After you installed FileZilla create a new server under **File / Site Manager**.

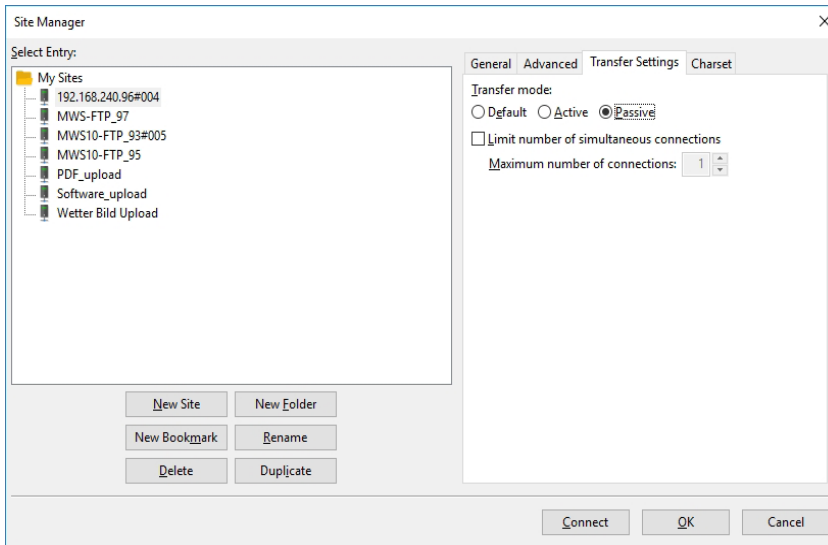
Select "**New Site**" and insert the MWS 55 IP-address under "**Host**", e.g. 192.168.240.95, you don't need to insert the port.



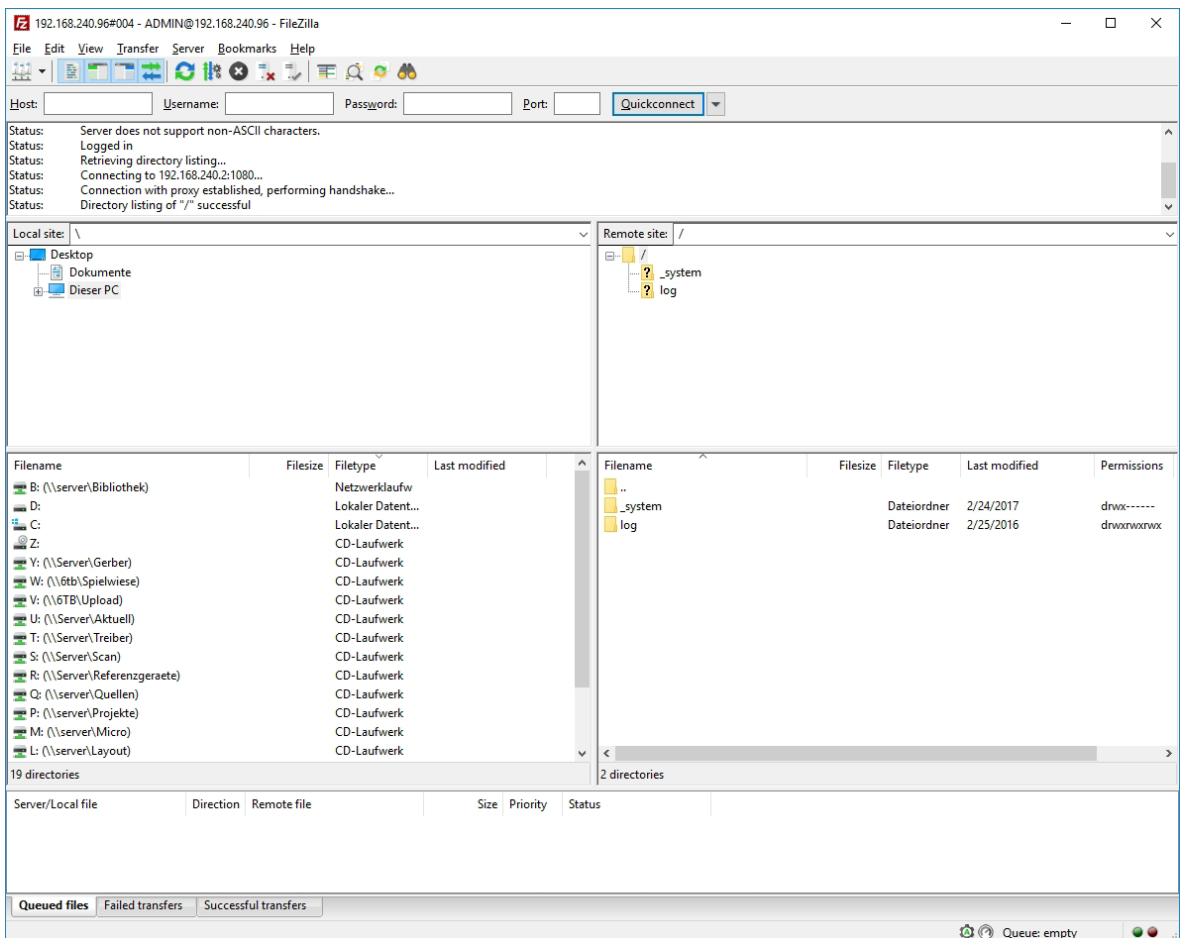
Under "**Logon type**" you choose if the password (7 char serial of MWS 55, e.g. 1033123) is needed each time accessing the MWS 55 (**Ask for password**) or the password is permanently stored and accessing the MWS 55 runs without the need of a password (**Normal**). The user always is "**ADMIN**" (See below):



It is very important to set the transfer mode under "**Transfer Settings**" to "**PASSIVE**".
(See below).



Finally click to "**Rename**" to give a name to the new site. Now you can access the MWS 55 by clicking on "**Connect**".



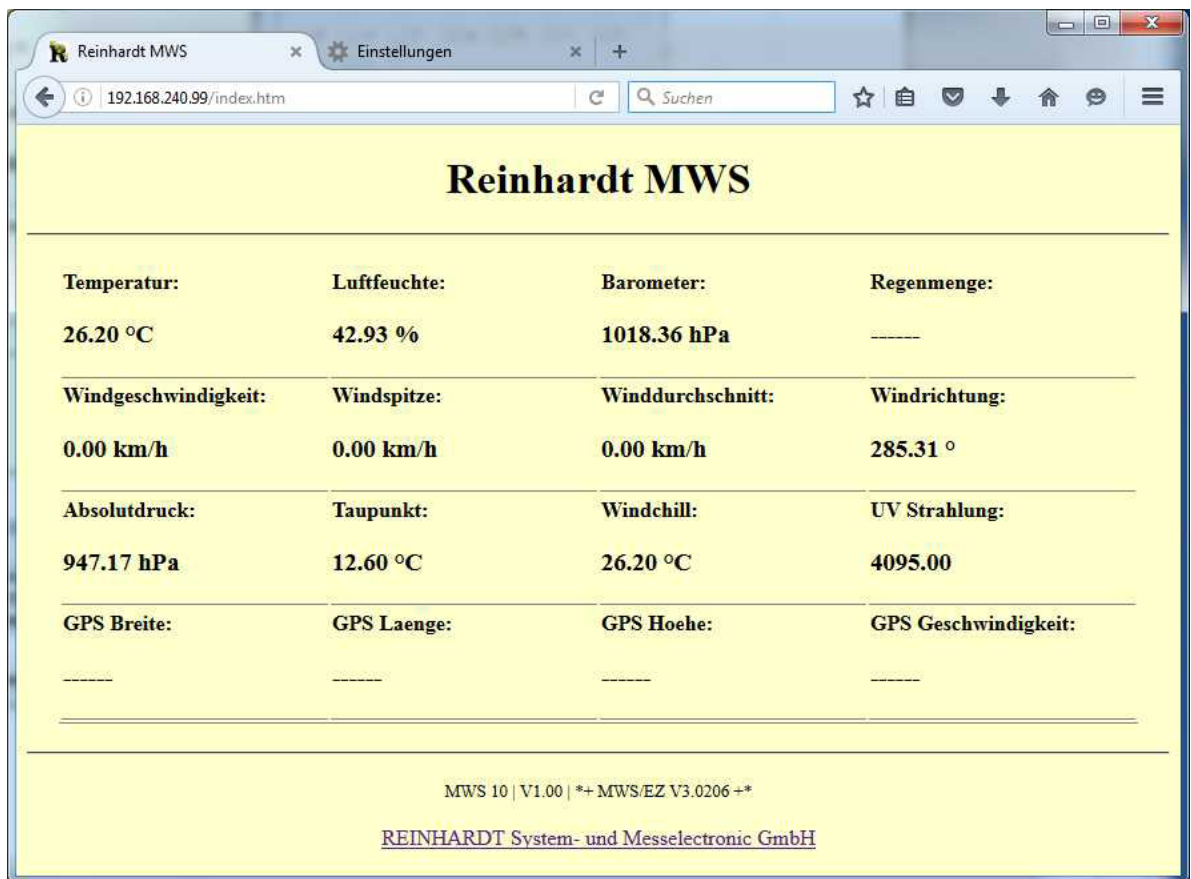
4.4.3 WEB-Server

To use the station as WEB-server, the HTTP protocol needs to be enabled (see !DC or ?DC, Bit 24). To use the station as WEB server the HTTP protocol must be enabled. (see !DC or ?DC, Bit 24) Also the Ethernet port must be enabled (!F+24 or *ADMIN SET PERMIT 15 ON) or being configured. This already is preconfigured when ordering a station with TCP/IP PoE option!

It is important that at the access permissions with *ADMIN SET INCLUDE the connection type HTTP (or HTTP* for privileged access) is added. Access from an IP / MAC address not being enabled for this connection type will get no answer!

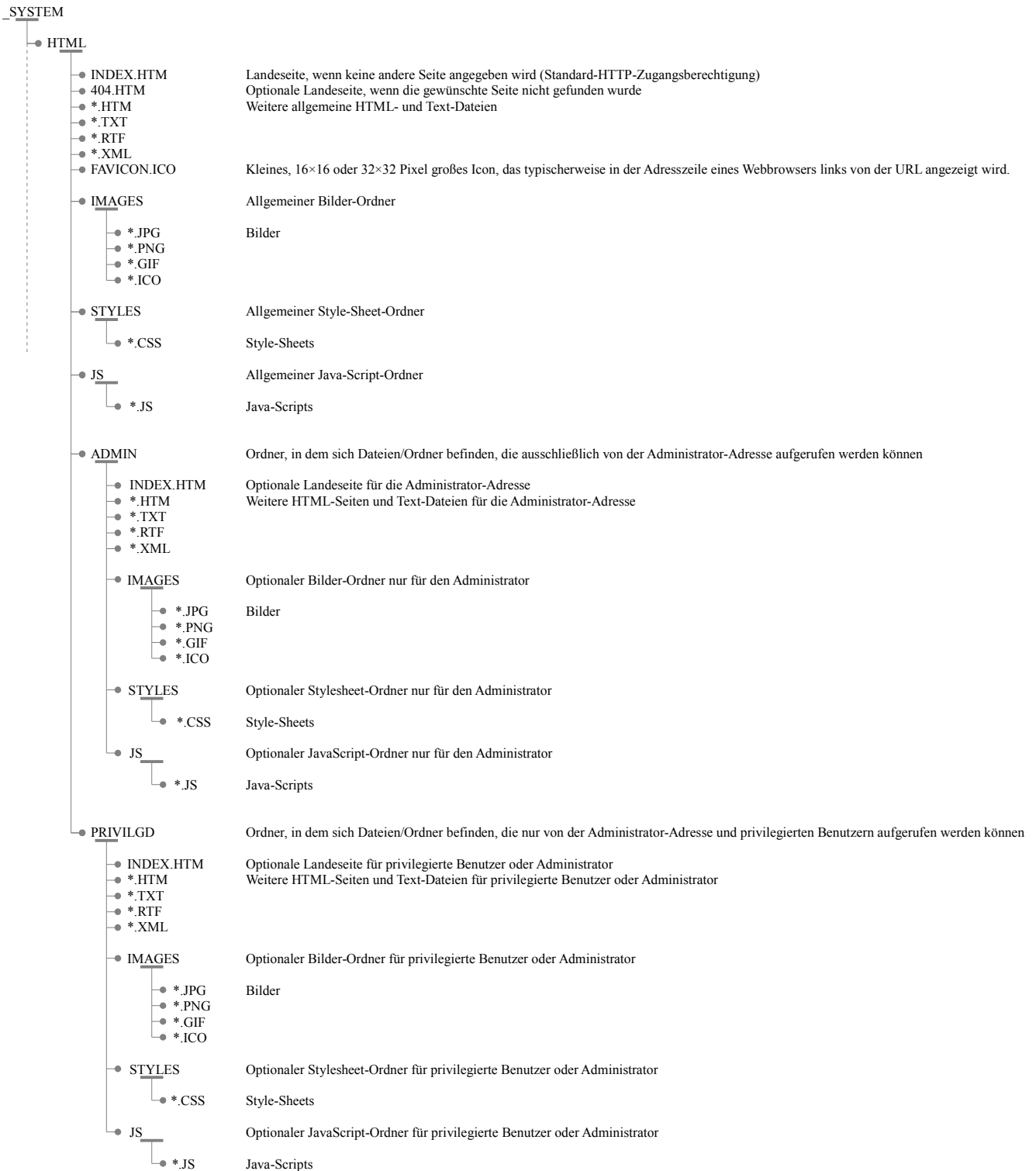
A HTTP read access may be granted with the command *ADMIN SET INCLUDE 192.168.0.12 [HTTP].

If the station hasn't got an internal SD-card, via the HTTP port 80 an internal default page can be retrieved from the stations IP-address (set by *ADMIN ETHERNET IP).



If a SD card is available, the HTML pages will be searched on the SD card or scripts are executed. The starting directory for the search is `/_system/html`. This path must be present on the SD card, otherwise a 404-File not found error will occur.

The directory structure on the SD card should be like this:



If the station gets a HTTP-GET request from the browser at first the IP-address of the sender is checked:

- if this is the Administrator, at first the ADMIN directory is searched for the requested file. If the file is not found there, next the PRIVILGD directory and at last the HTML root directory is searched for the requested file.
- if this is a privileged user, at first the PRIVILGD directory and then the HTML root directory is searched for the requested file.
- if this is a standard user only in the HTML root directory is searched for the requested file.

If the requested file is not found a "404-File not found" error page occurs.

Example:

There is an Administrator set by ***ADMIN SET ADDRESS 192.168.100.25**, standard user in the internal network set by ***ADMIN SET INCLUDE 192.168.100.x [HTTP]** and two privileged users set by ***ADMIN SET INCLUDE 192.168.100.10 [HTTP*]** and ***ADMIN SET INCLUDE 192.168.100.11 [HTTP*]**.

- If the computer with IP address 192.168.100.25 opens the browser and the station's IP address is entered there, the browser initiates a HTTP-GET request, e.g. GET / HTTP/1.1. The station recognizes "/" as landing page "index.htm" and the Administrator's IP address, so at first the directory ADMIN is searched for "index.htm", then the directory PRIVILGD and at last the HTML root directory, where there must exist a "index.htm" page.
- If the same request comes from IP address 192.168.100.10 or 192.168.100.11 the search on the SD card for "index.htm" starts in the directory PRIVILGD and then in HTML root directory. Each other user from the SUB-net 192.168.101. will see the "index.htm" page from the HTML root directory.
- Requests from users in other SUB-nets (e.g. 192.168.101.) will not be answered and will get a time out message from the browser.

For standard user are able to open pics or JAVA scripts in the STYLES or JS directory, in the ADMIN and / or in the PRIVILGD directory also STYLES and JS folders may be created, which only can be opened by Administrator or privileged users.

4.4.3.1 Password and HTPASS folder

Another possibility granting users access is creating passwords instead to limit access via IP addresses. To perform, at least one password protected access (admin address or standard user) needs to be created with the INCLUDE command.

CAUTION: Here you can only use MAC addresses in the format xx-xx-xx-xx-xx-xx!

Here one example for a set of users to create:

Admin with: **ADMIN SET ADDRESS 12-34-56-78-12-34 'nimdA'**,

standard user with: **ADMIN SET INCLUDE xx-xx-xx-xx-xx-xx 'stdpass' [HTTP]**,

first privileged user with: **ADMIN SET INCLUDE 12-34-xx-xx-xx-xx 'pvpass1' [HTTP*]**

second privileged user with: **ADMIN SET INCLUDE 12-34-xx-xx-xx-xx 'pvpass2' [HTTP*]**

Without password request each access works like shown above:

the admin with MAC address **12-34-56-78-12-34** has got access to ADMIN-, PRIVILDG- and HTML root directory,

the two privileged users (**12-34-...**) can access PRIVILDG- and HTML root directory and the standard user(s) only can access the HTML root directory.

If there is a **HTPASS** folder in the HTML root directory, files (text or WEB sites) only can be accessed when the command **MWS HTTP PASSWD** with subsequent password is sent to the weather station.

The weather station then will compare this password with the stored passwords (nimdA, pvpass1, pvpass2, stdpass) and grant access to the respective folder if the password matches with one of the stored passwords.

Typically this command is submitted as a request with the POST method, e.g.:

```
<form action="login.htm" method="post">
  <label for="pass">Please insert password</label>
  <input id="pass" name="MWS HTTP PASSWD" maxlength="15" size="15" type="password">
  <button type="submit" value="submit">sign up</button>
</form>
```

You can make use of the fact that the HTPASS folder is searched before the root folder, if the access was granted. So in the root folder a file login.htm with the above code can exist, which interrogates the password, and calls again a file login.htm

(1. line: form action="login.htm").

If the access was granted, the file **/HTPASS/login.htm** is called, which shows the user the desired information. If an incorrect password was used, the file /login.htm is shown again, and the user has the opportunity to enter the password again.

Of course you can also branch in case of errors, and e.g. show an error page.

The **HTPASS** folder may exist (like Images, Javascript and Styles folder) several times, once in the **ADMIN** directory, once in the **PRIVILDG** directory and once in the HTML root directory.

The order is analogous to the other files, except that an HTPASS folder is always searched first, provided that access has been granted.

If access is denied (wrong password) **all** HTPASS folders will be dropped.

Administrator	Privileged user	Standard user
ADMIN/HTPASS /ADMIN /PRIVILDG/HTPASS /PRIVILDG /HTPASS /	/PRIVILDG/HTPASS /PRIVILDG /HTPASS /	/HTPASS /
/ADMIN /PRIVILDG /	/PRIVILDG /	/

4.4.3.2 Creating WEB sites

When creating WEB sites the directory structure does not need to be considered, for the weather station ignores path details, e.g. a request like "192.168.240.99/global/xyz.htm" is treated the same as "192.168.240.99/xyz.htm" (if 192.168.240.99 is the IP address of the weather station). Only the files's suffix (.htm / .jpg / .css) and the access permission determine from which directory the searched file is read.

So after creating the local paths can be kept, e.g. in the picture on the right side in line 7 also may be written href="meinstyle/admin.css" or in line 9 the local Java-Script folder „java“ heißen: src="../../java/senscfg.js"

```

1 <!DOCTYPE html>
2 <html>
3
4 <head>
5   <title><!--MWS GET STATION NAME --></title>
6   <meta charset="ISO-8859-15">
7   <link href="../../styles/admin.css" type="text/css" rel="stylesheet">
8   <link href="favicon.ico" type="image/x-icon" rel="shortcut icon">
9   <script src="../../js/senscfg.js"></script>
10 </head>

```

Tips:

- Already when creating files regard the length of the file names max. 8 characters + 3 characters suffix (8.3)
- Using many templates or pics increases the load time of HTML pages for the WEB server is not a GigaHertz controller but a energy saving CPU!
- Better use more small sites than less big sites. This especially is valid for embedded Java Script and Style Sheet files!

CAUTION!

If there is a Proxy server within your network, it is absolutely necessarily to disable it for local addresses for otherwise the addresses will be not routed correctly through your network and the set admin- privileged and standard user addresses won't be recognized in the right way!

4.4.3.3 WEB-Page - current Data

This page shows an overview with sensors set under index.htm.
The appearance of the sensors is controlled with [control commands for output & storing](#).

aktuelle Daten	Sensoren 2	Min/Max	Ethernet	Station	Sensor Konf.	Terminal	ADMIN
Reinhardt MWS							
MIT, 08. AUG 2018 08:50:55							
Temperatur:	Luftfeuchte:	Luftdruck:	Barometer:	Taupunkt:			
26.96 °C	47.36 %	943.80 hPa	943.80 hPa	14.82 °C			
Windgeschwindigkeit:	Windspitze:	Winddurchschnitt:	Windrichtung:	Hauptwindrichtung:			
0.00 km/h	0.00 km/h	0.00 km/h	256.07 °	-----			
Globalstrahlung:	Luefterstatus:	Luefter:	VCC:	Zusatzsensor_A:			
1329.15 W/m²	1	5061 U/min	11.95 V	4073.55 mV			

--	--	--	--	--	--	--	--

4.4.3.4 WEB-Page - current Data 2

This page shows an overview with sensors set under sens2.htm.

aktuelle Daten	Sensoren2	Min/Max	Ethernet	Station	Sensor Konf.	Terminal	ADMIN
Reinhardt MWS							
MIT, 08. AUG 2018 08:54:26							
Zusatzsensor_A:	ZB:	ZC:	ZD:	ZE:			
4073.55 mV	4073.55 mV	10.41 mV	4073.48 mV	4074.51 mV			
Windchill:	Innentemperatur:	GPS Breite:	GPS Laenge:	GPS Hoehe:			
27.04 °C	42.17 °C	-----	-----	-----			
VCC:	:	:	:	:			
11.92 V							

MWS 55V V1.11 *+ MWS/EZ V3.0243 +* REINHARDT System- und Messelectronic GmbH							
---	--	--	--	--	--	--	--

4.4.3.5 WEB-Page - Min / max

Here the maximum and minimum values are listed.

aktuelle Daten	Sensoren2	Min/Max	Ethernet	Station	Sensor Konf.	Terminal	ADMIN
Reinhardt MWS							
MIT, 08. AUG 2018 08:55:14							
Temperatur	27.03°C						
					MAX: 27.05°C Ø : 26.99°C MIN: 24.79°C	08:54:08 08.08.2018 +/- 0.0450°C 07:34:03 08.08.2018	
Luftfeuchte	47.43%						
					MAX: 55.54% Ø : 47.24% MIN: 46.07%	07:55:07 08.08.2018 +/- 0.1949% 08:32:22 08.08.2018	
Barometer	943.92hPa						
					MAX: 944.08hPa Ø : 943.82hPa MIN: 942.10hPa	08:54:42 08.08.2018 +/- 0.1141hPa 07:31:03 08.08.2018	
Windgeschwindigkeit	0.00km/h						
					MAX: 2.18km/h Ø : 0.00km/h MIN: 0.00km/h	08:05:19 08.08.2018 +/- 0.0033km/h 08:55:15 08.08.2018	
Windrichtung	256.11°						
					MAX: 340.07° Ø : 256.02° MIN: 6.70°	08:05:38 08.08.2018 +/- 1.1295° 08:05:37 08.08.2018	
Globalstrahlung	1329.15W/m²						
					MAX: 1329.15W/m² Ø : 1329.15W/m² MIN: 1329.15W/m²	07:30:38 08.08.2018 +/- 0.0000W/m² 08:55:16 08.08.2018	
Regenmenge	0.00mm						
					MAX: 0.00mm Ø : 0.00mm	08:55:16 08.08.2018 +/- 0.0000mm	

4.4.3.6 WEB-Page - Ethernet

Here the Ethernet settings are listed. Here you also can perform settings!

aktuelle Daten	Sensoren2	Min/Max	Ethernet	Station	Sensor Konf.	Terminal	ADMIN
Reinhardt MWS							
Global							
MAC-Adresse	<input type="text" value="78-B3-D5-4A-E2-9C"/>						
IP-Adresse	<input type="text" value="192.168.240.90/24"/>			<input type="button" value="Übernehmen"/>			
Gateway-IP	<input type="text" value="192.168.240.1"/>			<input type="button" value="Übernehmen"/>			
Nameserver-IP	<input type="text" value="192.168.240.2"/>			<input type="button" value="Übernehmen"/>			
Administrator							
Administrator-Adresse	<input type="text" value="IP 0. 0. 0./00 (xx.xx.xx.xx)"/>			<input type="button" value="Übernehmen"/>			
Zugelassene Adressen und Berechtigungen							
1	<input type="text" value="IP 192.168.240. 0/24 (C0.A8.F0.xx) [TCP]"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
2	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
3	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
4	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
5	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
6	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
7	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
8	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
9	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
10	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
11	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
12	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
13	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			
14	<input type="text" value="---"/>			<input type="button" value="Übernehmen"/> <input type="button" value="Löschen"/>			

4.4.3.7 WEB-Page - Station

Lists the station's settings.

aktuelle Daten	Sensoren2	Min/Max	Ethernet	Station	Sensor Konf.	Terminal	ADMIN
Reinhardt MWS							
Uhrzeit							
Stationszeit	WED, 08 AUG 2018 08:58:55						
Zeitzone	1.00 Übernehmen						
Autom. Sommerzeit	<input checked="" type="checkbox"/> Ein +1 Übernehmen						
Station (UTC)	WED, 08 AUG 2018 06:58:55 GMT nach Computer stellen						
Übertragungszeit	500 ms						
Computer (UTC)	Wed, 08 Aug 2018 06:58:57 GMT						
Datenlogger							
Speicherintervall	60 s Übernehmen						
Speicherbelegung	19%						
Info							
Stationstyp	MWS 55V						
Seriennr.	1032751						
Betriebstage	270						
Festlegungen							
Stationsname	Reinhardt MWS Übernehmen						
Stations-ID	50 Übernehmen						
Baudrate	115200 Übernehmen						
MWS 55V V1.11 *+ MWS/EZ V3.0243 +*							
REINHARDT System- und Messelectronic GmbH							

4.4.3.8 WEB-Page - Sensor configuration

Lists the sensor's settings.

aktuelle Daten	Sensoren2	Min/Max	Ethernet	Station	Sensor Konf.	Terminal	ADMIN
Reinhardt MWS							
<div style="display: flex; justify-content: space-around;"> Sensor 1..8 Sensor 9..16 Sensor 17..24 Sensor 25..32 </div>							
Nr.	Sensor	Kennung	Name	Einheit			
1	<input checked="" type="checkbox"/> Ein	64	Uhrzeit	m	Übernehmen		
2	<input checked="" type="checkbox"/> Ein	96	TE Temperatur	°C	Übernehmen		
3	<input checked="" type="checkbox"/> Ein	97	FE Luftfeuchte	%	Übernehmen		
4	<input checked="" type="checkbox"/> Ein	98	TD Innentemperatur	°C	Übernehmen		
5	<input checked="" type="checkbox"/> Ein	99	DR Luftdruck	hPa	Übernehmen		
6	<input checked="" type="checkbox"/> Ein	4	WR Windrichtung	°	Übernehmen		
7	<input checked="" type="checkbox"/> Ein	4	WV Hauptwindrichtung	°	Übernehmen		
8	<input checked="" type="checkbox"/> Ein	58	WG Windgeschwindigkeit	km/h	Übernehmen		
MWS 55V V1.11 *+ MWS/EZ V3.0243 +*							
REINHARDT System- und Messelectronic GmbH							

192.168.240.90/senscfg1.htm#

4.4.3.9 WEB-Page - Terminal

Allows controlling and reading the station via a terminal with a command line.

Nr.	Sensor Kennung	Name	Einheit
1	<input checked="" type="checkbox"/> Ein 64	Uhrzeit	m
2	<input checked="" type="checkbox"/> Ein 96	Temperatur	°C
3	<input checked="" type="checkbox"/> Ein 97	Luftfeuchte	%
4	<input checked="" type="checkbox"/> Ein 98	Innentemperatur	°C
5	<input checked="" type="checkbox"/> Ein 99	Luftdruck	hPa
6	<input checked="" type="checkbox"/> Ein 4	Windrichtung	°
7	<input checked="" type="checkbox"/> Ein 4	Hauptwindrichtung	°
8	<input checked="" type="checkbox"/> Ein 58	Windgeschwindigkeit	km/h

MWS 55V | V1.11 | ** MWS/EZ V3.0243 **
[REINHARDT System- und Messelectronic GmbH](#)

192.168.240.90/senscfg1.htm#

Caution! The ADMIN commands, which are look like *ADMIN GET ETHER input via an external terminal software (putty, hypertrm, ...) must be typed without the leading * in here!

The terminal window does not refresh automatically but needs to be refreshed by the Refresh- or Send button or with the reload function within the browser!

4.4.3.10 HTML-Templates und POST-commands

To make HTML pages dynamic, templates that are replaced by values of the weather station before the HTTP output are used. Furthermore, the HTTP POST method can also send commands to the weather station.

4.4.3.10.1 Templates

Templates always start with `<!-- MWS` and must be completed with `-->`. In the browser, these are ignored (for example, when being created) because in the HTML language this represents a comment.

All text files are scanned in output on templates (also stylesheet and Javascript files), and corresponding values are inserted. Faulty templates are removed or "nothing" inserted.

`<!--MWS GET ETHERNET IP -->`

Outputs the specified IP address of the weather station, see [ADMIN ETHERNET IP](#).

The output can not be formatted.

`<!--MWS GET ETHERNET GATEWAY -->`

Outputs the specified IP address of the gateway, see [ADMIN ETHERNET GATEWAY](#).

The output can not be formatted.

`<!--MWS GET ETHERNET NAME -->`

Returns the specified IP address of the name server, see [ADMIN ETHERNET NAME](#).

The output can not be formatted.

`<!--MWS GET ETHERNET CONNECTION x -->`

This command outputs one ($x = 1..20$) of the 20 possible connections. The first 16 are TCP connections, the remaining 4 UDP connections,

see [ADMIN GET ETHERNET CONNECTIONS](#).

`<!--MWS GET INCLUDE x -->`

This command displays the addresses and permissions of the users who are allowed to access the station, each for one of the 15 positions ($x = 1..15$), see [ADMIN SET INCLUDE](#).

The output can not be formatted. If a position is empty, "---" is output.

`<!--MWS GET ADMIN NUMBER -->`

Returns the administrator number, see [ADMIN SET NUMBER](#).

The output can not be formatted. If no number is specified, "---" is output.

`<!--MWS GET ADMIN ADDRESS -->`

Outputs the administrator IP / MAC address, see [ADMIN SET ADDRESS](#).

The output can not be formatted. If no address is specified, "---" is output.

`<!--MWS GET HTTP LOG NUMBER -->` [since V3.0242]

Returns the number of HTPASS folder authorities (0..16) that are currently in use.

The output is usually a decimal number (`<!-- MWS GET '% d' ... -->`).

<!--MWS GET HTTP LOG IDENT --> [since V3.0242]

Returns the number of the current user's authority (MAC address) for the HTPASS folder. The output is usually a decimal number (<!-- MWS GET '% d' ... -->), where:

0 (zero): The current user has no authorization (= not logged in).

1..15: User has used the password of the corresponding position see [ADMIN SET INCLUDE](#).

99: User has transmitted the administrator password ([ADMIN SET ADDRESS](#)) via MWS HTTP PASSWD.

<!--MWS GET HTTP LOG IDENT VERIFY y ?'<true>'[:'<false>']--> [since V3.0242]

Compares the number of the authorization point of the current user with y and, if it matches, outputs the test enclosed in apostrophes following the **?**. Optionally, an alternative text following a **:** (also enclosed in apostrophes) can be output if no match is found.

Both texts must not exceed 50 characters, and the complete command (<!-- MWS ... -->) must not exceed 120 characters!

<!--MWS GET HTTP DATA x --> [since V3.0242]

Returns the value of the 8-bit global variable x (1..16), (0..255).

This can be set with MWS HTTP DATA. When the station is reset, all variables are set to 0.

The output is usually a decimal number (<!-- MWS GET '% d' ... -->).

<!--MWS GET HTTP DATA x VERIFY y ?'<true>'[:'<false>']--> [since V3.0242]

Compares the value of the 8-bit variable x (1..16) with y (0..255) and, if it matches, outputs the test enclosed in apostrophes following the **?**. Optionally, an alternative text following a **:** (also enclosed in apostrophes) can be output if no match is found.

Both texts must not exceed 50 characters, and the complete command (<!-- MWS-->) must not exceed 120 characters!

HTML-File
<pre><nav> current Data Sensors2 <!--MWS GET HTTP DATA 1 VERIFY 1 ?'Index'--> </nav> <!--MWS HTTP DATA 1 1 --></pre>
Browser view (1. call)
<pre><nav> current Data Sensors2 </nav></pre>
Browser view (2. call)
<pre><nav> current Data Sensors2 Index </nav></pre>

Instead of an output text, a (different) variable may also be given a value, e.g. with

<!--MWS GET HTTP DATA 7 VERIFY 0 ?DATA 7 10 -->

is checked, if variable 7 is zero, if yes then variable 7 is set to 10.

The values following the **?**, or the **:** correspond to the command MWS HTTP DATA, means

<!--MWS GET HTTP DATA 7 VERIFY 0 ?:DATA 7 -1 --> can count down the variable 7 as long as it is not yet zero.

<!--MWS GET STATION IDENT -->

Returns the device address of the station (0..255), see [ADMIN STATION IDENT](#)

The output is usually a decimal number (**<!-- MWS GET '% d' ... -->**)

<!--MWS GET STATION BAUD -->

Returns the specified baud rate of the serial (PC) interface, see [ADMIN STATION BAUD](#).

The output is usually a decimal number (**<!--MWS GET '%d' ... -->**)

<!--MWS GET STATION NAME -->

Returns the station's name, see [ADMIN STATION NAME](#)

<!--MWS GET STATION LOG UPDATE -->

Returns the storage interval of the data logger in seconds (usually as decimal number).

<!--MWS GET STATION LOG CAPACITY -->

Returns the size of the remaining (free) memory in kByte (usually as decimal number).

<!--MWS GET STATION LOG LIMIT -->

Returns the total size of the memory in kByte (usually as decimal number).

<!--MWS GET STATION SENSOR x NUMBER -->

Returns the number of sensor x (1..32 or prefix) (0..127, usually as decimal number),

see [ADMIN STATION SENSOR x NUMBER](#)

<!--MWS GET STATION SENSOR x IDENT -->

Returns the prefix of sensor x (1..32 or prefix) (max. 4 characters),

see [ADMIN STATION SENSOR x IDENT](#)

<!--MWS GET STATION SENSOR x NAME -->

Returns the name of sensor x (1..32 or prefix) (max. 19 characters),

see [ADMIN STATION SENSOR x NAME](#)

<!--MWS GET STATION SENSOR x UNIT -->

Returns the unit of the sensor x (1..32 or prefix) (max. 7 characters),

see [ADMIN STATION SENSOR x UNIT](#)

<!--MWS GET STATION SENSOR x ON -->

Indicates whether the sensor x (1..32 or Prefix) is switched on (1) or off (0).

(In other words, if it is present in output and in data logger)

<!--MWS GET STATION SENSOR x DATA [y] -->

Returns the value of sensor x (1..32 or prefix). If y is not specified, the real value is output, otherwise the following values:

y	Output	y	Output
0	Raw value	1	Real value
2	Attenuated real value	4	Minimum
5	Average	6	Maximum
7	Standard deviation	13	Time/Date minimum
		14	Time/Date maximum

The output is usually a floating-point number, with the number of decimal places depending on the sensor configuration, unless explicit formatting overrides them.

(z. B. <!--MWS GET '%.2f ... -->).

Another exception are sensors with time or date (sensor number 64-66), or

<!--...DATA 13 --> oder <!--...DATA 14 -->.

By default, the time is formatted as '% 02d:% 02d:% 02d', the date as '% 02d.% 02d.% 04d', what is resulting in output "hh: mm: ss" or "dd.mm.yyyy ".

Formatting the output:

For most <!--MWS GET – commands that output numbers, the format can be changed by inserting apostrophes ('.') after GET.

It is crucial whether an integer value or a floating-point number is to be output.

The format specification adheres closely to the PRINTF format string, but this is limited to 18 characters and may be corrected or ignored if errors occur.

Basic structure of the format specifiers: % Flags Field width . Accuracy . Type variant

Type variant		Flags	Field width (0..9)	Accuracy (0..9)
d	Decimal number (Whole number)	0 Filling with zeroes + Output always signed	Minimum character number, possibly filled (Blank or zero)	-
i	Decimal number (Whole number)	0 Filling with zeroes + Output always signed	Minimum character number, possibly filled (Blank or zero)	-
u	Unsigned decimal number	0 Filling with zeroes	Minimum character number, possibly filled (Blank or zero)	-
o	Octal format	0 Filling with zeroes	Minimum character number, possibly filled (Blank or zero)	-
x	Hexadecimal format	0 Filling with zeroes	Minimum character number, possibly filled (Blank or zero)	-
f	Fixed point schema	0 Filling with zeroes + Output always signed	Minimum character number, possibly filled (Blank or zero)	Number of decimal places (possibly rounded)
e	Floating point with exponent	0 Filling with zeroes + Output always signed	Minimum character number, possibly filled (Blank or zero)	Number of decimal places (possibly rounded)

Examples of formatting:

HTML-File	Browser sight (Example)
<code><p>Nr: 0x<!--MWS GET '%x' STATION IDENT --></p></code>	<code><p>Nr: 0xff</p></code>
<code><p>Nr: 0x<!--MWS GET '%X' STATION IDENT --></p></code>	<code><p>Nr: 0xFF</p></code>
<code><p>Nr: <!--MWS GET '%2d' STATION IDENT --></p></code>	<code><p>Nr: 255</p></code>
<code><p>Nr: <!--MWS GET '%4d' STATION IDENT --></p></code>	<code><p>Nr: 255</p></code>
<code><p>Nr: <!--MWS GET '%04d' STATION IDENT --></p></code>	<code><p>Nr: 0255</p></code>
<code><p>Nr: <!--MWS GET '%+3d' STATION IDENT --></p></code>	<code><p>Nr: +255</p></code>
<code><p>Nr: <!--MWS GET '%o' STATION IDENT --></p></code>	<code><p>Nr: 377</p></code>
<code><p>Data: <!--MWS GET '%.4f %s' STATION SENSOR TE DATA --></p></code>	<code><p>Data: +31.1763 °C</p></code>
<code><p>Data: <!--MWS GET '%.3f (%s)' STATION SENSOR TE DATA --></p></code>	<code><p>Data: 31.176 (°C)</p></code>
<code><p>Data: <!--MWS GET '%.2f' STATION SENSOR TE DATA --></p></code>	<code><p>Data: +31.18</p></code>
<code><p>Data: <!--MWS GET '%.1f' STATION SENSOR TE DATA --></p></code>	<code><p>Data: 31.2</p></code>
<code><p>Data: <!--MWS GET '%.2e' STATION SENSOR TE DATA --></p></code>	<code><p>Data: 3.12e+01 °C</p></code>
<code><p>Data: <!--MWS GET '%d' STATION SENSOR TE DATA --></p></code>	<code><p>Data: 31</p></code>
<code><p>Data: <!--MWS GET '%06x' STATION SENSOR TE DATA --></p></code>	<code><p>Data: 00001F</p></code>
<pre> <p>Data: <!--MWS GET '%.2f %s' STATION SENSOR TE DATA --></p> <p id="p1">Data: <!--MWS GET '%06x' STATION SENSOR TE DATA --></p> <p id="p2">Data: <!--MWS GET '%4o %s' STATION SENSOR TE DATA --></p> <script> if (<!--MWS GET '%d' STATION SENSOR TE DATA --> < 30) { document.getElementById("p1").style.fontSize = "<!--MWS GET '%2d' STATION SENSOR TE DATA -->px"; document.getElementById("p1").style.color = "<!--MWS GET '%06x' STATION SENSOR TE DATA 0 -->"; } else { document.getElementById("p2").style.fontSize = "<!--MWS GET '%2d' STATION SENSOR TE DATA -->px"; document.getElementById("p2").style.color = "<!--MWS GET '%06x' STATION SENSOR TE DATA 0 -->"; } </script> </pre>	<pre> <p>Data: +31.18 °C</p> <p id="p1">Data: 00001f</p> <p id="p2">Data: 37 °C</p> <script> if (31 < 30) { document.getElementById("p1").style.fontSize = "31px"; document.getElementById("p1").style.color = "#0071b4"; } else { document.getElementById("p2").style.fontSize = "31px"; document.getElementById("p2").style.color = "#0071b4"; } </script> </pre>

<!--MWS HTTP TERM 0 -->

Returns a link to REINHRDT Web page:

„<a href= \"<https://www.reinhardt-testsystem.de> \">REINHARDT System- und Messelectronic GmbH“

<!--MWS HTTP TERM 1 -->

Returns „REINHARDT System- und Messelectronic GmbH“.

<!--MWS HTTP TERM 2 -->

Returns the device identifier as string (see also !DI), e.g. „MWS 10“

<!--MWS HTTP TERM 3 -->

Returns the device version as string (see also !DV), e.g. „1.20“

<!--MWS HTTP TERM 4 -->

Returns the serial number of the device, e.g. „1023456“

<!--MWS HTTP TERM 5 -->

Returns the firmware header of the device, e.g. „*+ MWS/EZ V3.0247 +*“

<!--MWS HTTP TERM 10 -->

Returns the local time and date of the station (engl.) in the format:

Day of week, Day Name of month Year hh:mm:ss, e.g. „WED, 04 MAY 2011 14:00:00“

<!--MWS HTTP TERM 11 -->

Returns the UTC time and date of the station (engl.) in the format:

Day of week, Day Name of month Year hh:mm:ss, e.g. „WED, 04 MAY 2011 13:00:00 GMT“

<!--MWS HTTP TERM 12 -->

Returns the local time and date of the station (ger.) in the format:

Day of week, Day. Name of month Year hh:mm:ss, e.g. „MIT, 04. MAI 2011 14:00:00“

<!--MWS HTTP TERM 13 -->

Returns the UTC time and date of the station (ger.) in the format:

Day of week, Day. Name of month Year hh:mm:ss, e.g. „MIT, 04. MAI 2011 13:00:00 GMT“

<!--MWS HTTP TERM 14 -->

Returns the local time of the station in the format: hh:mm:ss, e.g. „14:00:00“

<!--MWS HTTP TERM 15 -->

Returns the local date of the station in the format: dd:mm:yyyy, e.g. „04.05.2011“

<!--MWS HTTP TERM 16 -->

Returns the time zone (Difference of hours to UTC-time) in floating point spelling with 2 places, e.g. 1.00 or -4.50

<!--MWS HTTP TERM 17 -->

Returns, if daylight saving time is valid for current date (1 = DST, 0 = not DST).

If automatically switching of daylight saving time is disabled, output is always = 0.

<!--MWS HTTP TERM 18 -->

Returns, if automatically switching of daylight saving time is active (1 = on, 0 = off).

<!--MWS HTTP TERM 19 -->

Output of differing hours in daylight saving time in decimal notation (e.g. 1 for MESZ)

<!--MWS HTTP TERM 20 -->

Returns number of operating days in decimal notation.

4.4.3.10.2 POST-commands

To allow the weather station to respond to user input, subsequent POST commands are provided which may be indicated in HTML forms as a POST method, e.g. as name and / or as value in text fields or buttons.

These can also be listed in template form in the HTML page. This is highlighted in gray in the instructions. Nothing is output, that means the template is removed before output.

ATTENTION! These only work as administrator or from the administrator address!

MWS HTTP WRITE command

<!--MWS HTTP WRITE command -->

Makes the weather station execute any command, e.g.

MWS HTTP WRITE !U123456091011 or **<!--MWS HTTP WRITE !U123456091011-->**

sets the clock (12:34:56, 09.10.2011)

MWS HTTP PASSWD letMEin

[since V3.0242]

<!--MWS HTTP PASSWD letMEin -->

Passes the weather station a password (here "letMEin"), which compares this with the administrator address (see [ADMIN SET ADDRESS](#)) or authorized users (see [ADMIN SET INCLUDE](#)). If the stored password matches the user (MAC address) gets access to the content of the HTPASS folder, if the user has got authorization for the HTTP protocol.

Access is valid for maximum 12 hours or until the station receives the command

MWS HTTP LOG OFF.

MWS HTTP LOG OFF

[since V3.0242]

<!--MWS HTTP LOG OFF -->

Deletes the access authorization to the contents of the HTPASS folder of the current MAC address from the 16-digit authorization memory, so that the current user can only call files outside of this folder (which ones depend on the respective authorization and access type, eg administrator, privileged user, ...). By renewing the password by means of MWS HTTP PASSWD, a new authorization can be obtained.

MWS HTTP LOG CLEAR

[since V3.0242]

<!--MWS HTTP LOG CLEAR -->

Deletes all access permissions to the contents of the HTPASS folder. All users must request a new authorization by resubmitting the password using MWS HTTP PASSWD.

MWS HTTP DATA x y

[since V3.0242]

<!--MWS HTTP DATA x y -->

Writes one of 16 (x: 1..16) global 8-Bit variables with the value of y (0..255). This can be read or compared with [MWS GET HTTP DATA](#) or [MWS GET HTTP DATA x VERIFY](#).

By prefixing special characters, the variable may be incremented, decremented, multiplied, or divided by an amount instead of a fixed value, or copied, e.g.

MWS HTTP DATA 7 #5	increases variable 7 by 5
MWS HTTP DATA 7 -1	decreases variable 7 um 1
MWS HTTP DATA 7 *3	multiplies variable 7 with 3
MWS HTTP DATA 7 /10	divides variable 7 by 10
MWS HTTP DATA 7 @5	copies variable 7 to variable 5

A special case is variable 17, in which the first 4 variables (1..4) are combined into an integer number, ie. these are overwritten by the command **MWS HTTP DATA 17 ...**. This makes it possible to represent and compare a number from 0 up to 4 294 967 295.

MWS SET INCLUDE x <IP-/MAC-Adresse> [<art>, <art>,...]

<!--MWS SET INCLUDE x <IP-/MAC-Adresse> [<art>, <art>,...] -->

This command sets the addresses and rights of the users who have access to the station, for each of the 15 positions (x = 1..15), see [ADMIN SET INCLUDE](#).

MWS SET ADMIN ...

<!--MWS SET ADMIN ... -->

Access to all ADMIN SET – commands, e.g.

MWS SET ADMIN ADDRESS 192.168.1.2 or

<!--MWS SET ADMIN ADDRESS 192.168.1.2 --> executes the command

[ADMIN SET ADDRESS](#) 192.168.1.2, and thus sets the administrator-IP-address.

MWS ETHERNET ...

<!--MWS ETHERNET ... -->

Access to all ADMIN ETHERNET – commands, e.g.

MWS ETHER IP 192.168.1.9 or <!--MWS ETHER IP 192.168.1.9 --> executes the command

[ADMIN ETHERNET IP](#) 192.168.1.9, and thus sets the IP-address of the station.

MWS STATION ...

<!--MWS STATION ... -->

Access to all ADMIN STATION – commands, e.g.

MWS STATION NAME MyStation or <!--MWS STATION NAME MyStation --> executes the

command [ADMIN STATION NAME](#) MyStation, and thus sets the name of the station..

MWS REMOVE ...

<!--MWS REMOVE ... -->

Access to all ADMIN REMOVE – commands, e.g.

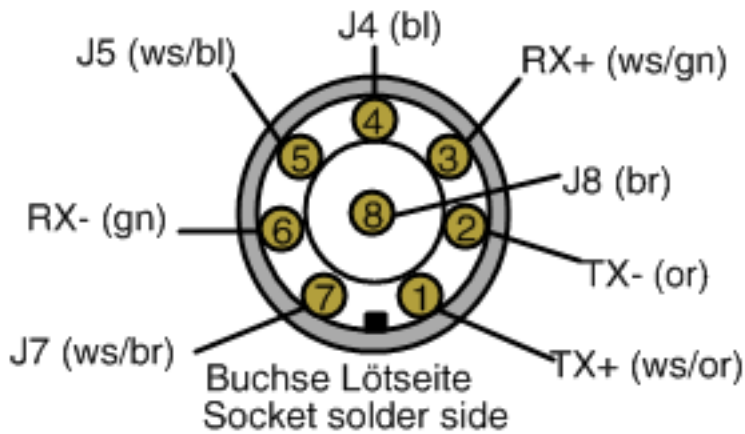
MWS REMOVE ETHER CONNECT * or <!--MWS REMOVE ETHER CONNECT * -->

executes the command [ADMIN REMOVE ETHERNET CONNECTION](#) *, and thus (temporarily) closes all TCP- and UDP-connections of the weather station.

4.4.4 Pin assignments of the PoE connector

Buchse : Ethernet PoE (RJ45 568B)

Socket : Ethernet PoE (RJ45 568B)



The RJ45 connector of the network cable is wired according to EIA / TIA 568B.

Signal	Pin	Farbe
Signal	Pin	Color
TX+	1	weiß/orange white/orange
TX-	2	orange
RX+	3	weiß/grün white/green
	4	blau / blue
	5	weiß/blau white/ blue
RX-	6	grün / green
	7	weiß/braun white/brown
	8	braun/brown

4.4.5 Problems with data transmission via TCP/IP and PoE

When there are problems in data transmission with PoE or the connection frequently is interrupted, you may reduce the speed of data transmission.

To reduce the speed from 100M Full Duplex to 10M Full Duplex, send the following command to the station via a terminal program:

```
!XW0007c9ec,58f500
```

To switch back to automatic connection speed, send the following command:

```
!XW0007c9ec,5d0000
```

After these settings please perform a restart of your weather station!

Please note that the maximum cable length is 100m!

4.5 Wireless LAN (WLAN) built-in

Another interface option is the built-in WLAN interface.

This enables the weather station to transmit data via an IP address and 2 separate channels.

One channel offers full access to the station, the second limited access (read only).

The default is port 10001 for full access and port 10002 for limited access.

The internal WLAN-module can be activated by the command `!F+4` (`!F-4` disables the module).

4.5.1 Settings for WLAN Option via WEB-Interface

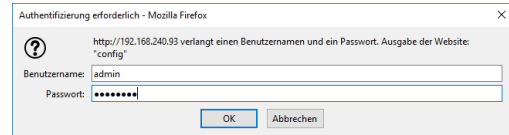
If you did not specify a IP address when ordering your weather station with internal WLAN option, the IP address is set to "**192.168.240.93/24**", SSID is "**WETTER**" and security is "**none**". (see XML-file `xPico_set_#192_168_240_93.txt` on stick)

This IP address takes you to the WEB interface of the WLAN module xPico-Wi-Fi, where you can perform all necessary settings.

Further information can be found in the two manuals for the xPico WLAN module ([xPico-Wi-Fi UG.pdf](#) and [xPico IG.pdf](#)).

4.5.2 WEB-Interface of xPico WLAN-module

For accessing the WEB interface of the xPico WLAN module insert the module's address (in our case 192.168.249.93) into a WEB browser.



A password request will appear:

The default user is `admin`,

the default password is `PASSWORD`.

After clicking onto OK, the WEB interface will open:

Product Information	
Product Type:	xPicoWifi
Firmware Version:	1.4.0.0R28
Build Date:	Oct 22 2015 (18:55:25)
Serial Number:	0080A3A00DA6
Uptime:	0 days 00:57:11
Permanent Config:	saved

Network Settings	
Interface ap0	
MAC Address:	00:80:A3:A0:0D:A6
Interface wlan0	
Connection State:	Connected
Active WLAN Profile:	1
IP Address:	192.168.240.93/24
Default Gateway:	<None>
Hostname:	<None>
Primary DNS:	<None>
Secondary DNS:	<None>

Line Settings	
Line 1:	115200, None, 8, 1, None Tunnel
Line 2:	115200, None, 8, 1, None Tunnel

Tunneling		
	Accept Mode	Connect Mode
Tunnel 1:	1 Active	Disabled
Tunnel 2:	Waiting	Disabled

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Here you can perform all settings you'll need.

4.5.3 Basic settings for the WLAN option via serial interface (CLI)

If you do not have access to the WEB interface, you can make the basic settings such as IP address, network name (SSID) and settings of the serial interface parameters using the standard RS-232 cable on a serial port of your PC.

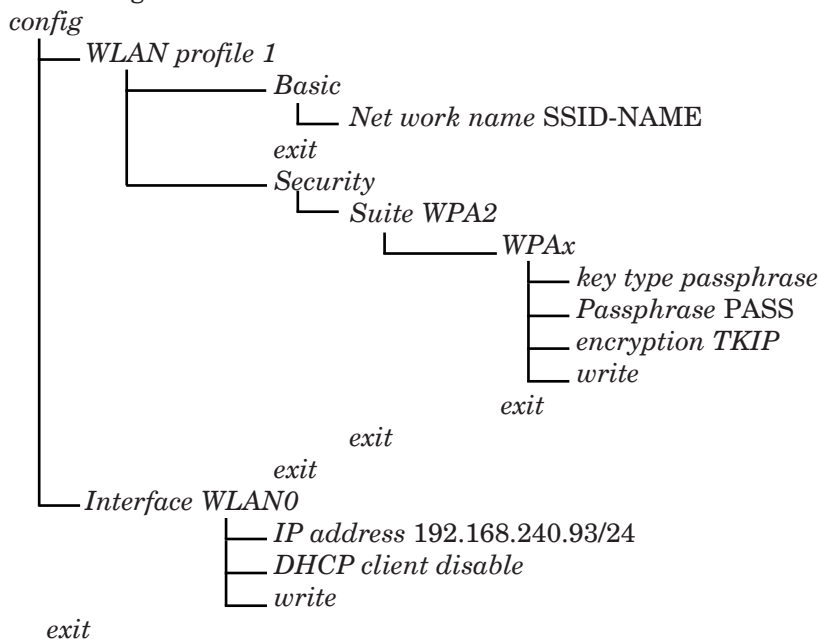
To do this, start a terminal program (Putty, Hyperterminal, or any other) with 9600 baud, 8bit, no parity, 1 stop bit and no protocol.

Plug the power supply of the serial cable into the 230V mains voltage and then the 7-pin plug of the standard cable into the configuration port for WLAN (WLAN settings) on the weather station.

Now briefly press the red button on the underside of the weather station and then, within the next 3 seconds, press the x button in the terminal program until you receive a message from the WLAN module in the terminal program (up to 10 seconds).

Then immediately press the Enter key. By entering a "?" you receive a list of the possible commands at each command level.

Now you can set the most important parameters of the WLAN module with the following commands to get access to the module via the more comfortable WEB interface:



A description of all commands that are possible via the serial interface are described in the manual [xPico-Wi-Fi UG.pdf](#), in each case under "Using CLI".

4.5.4 Basic settings for the WLAN option via XML

An easier way to transfer the basic settings to the xPico WLAN module is to transfer an XML file via a terminal program.

To do this, start a terminal program, e.g. the free program TeraTerm (<https://tera-term.en.lo4d.com/windows>) recommended by Lantronix (also included on the weather stick) and activate the xPico-WLAN module as described [here](#).

You'll find a sample file in the TeraTerm folder in the weather stick's software directory, which contains the basic settings for the xPico WLAN module (*xPico_set_ # 192_168_240_93.txt*).

You may adapt this file to your specifications and save it.

Then transfer this file with the TeraTerm terminal program to the WLAN module with **File** and then **Send File**. Find the file you want to send in the Explorer window and select **Open**.

The message **Importing XML** appears and TeraTerm sends the file to the weather station. After approx. 20 seconds you will get an **XML import completed** message from the WLAN module, which means that the transfer is complete.

After the data has been transferred, the WEB interface of the xPico module can be reached at the IP address 192.168.240.93 or the address that you have set. You can now easily perform other settings [there](#).

More details for configuration via CLI you'll find in the [Wireless LAN Module manual](#).

4.5.5 Parallel operation via WLAN and serial interface

In WLAN operation, parallel operation with the serial cable via the RS-232 interface is possible at any time.

However, please note that "command collisions" can occur with controlling access via wireless LAN and the RS-232 interface, e.g. when reading out the data logger.

Example: If the command to read out data logger is sent via the RS-232 interface, the station will start to output the data from the logger. If another command is received over WLAN during the logger reading, the reading of the data logger is interrupted!

4.6 UDP connection

With microprocessor version 3.0262, the UDP protocol has been added.

Here a UDP connection (like TCP tunnel) can be opened via port 30003.

For this purpose ***connect** must be sent to port 30003 (together with the receive port and the IP address in the UDP protocol), then the station opens a new data port (30004, ...) for each UDP connection.

To close the UDP connection, a ***CLOSE** is sent (either to 30003 or data port).

A maximum of 4 UDP connections can be opened!

4.7 TCP/IP via Fiber cable

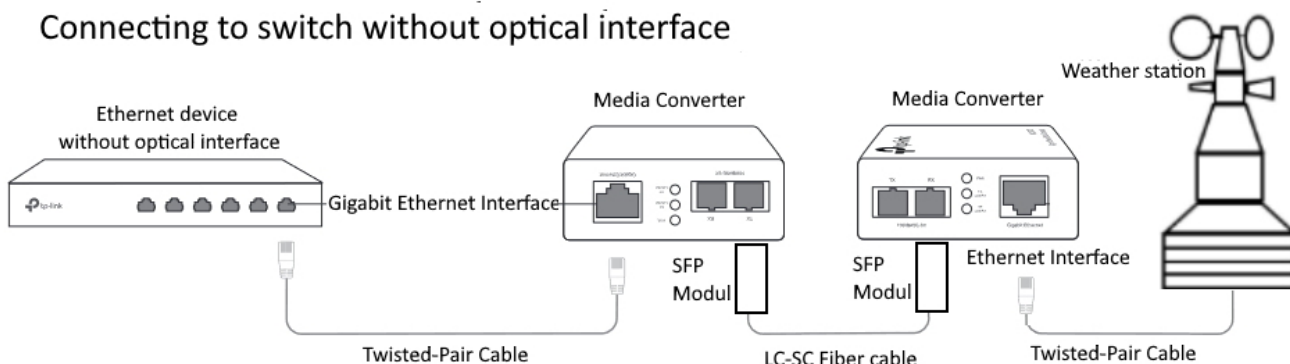
It is often necessary to send the data in the network over longer distances than 100m. You can achieve this if you transmit the data via fiber optic cable. Another advantage of data transmission via fiber optics is that the network is also protected against overvoltage (lightning strike) due to the galvanic isolation.

A simple solution for transmission via fiber optics is the conversion of the Ethernet interface to fiber optics via SFP module (Small Form-factor Pluggable Transceiver) and media converter. All you need are 2 SFP modules, 2 media converters and a fiber cable, or a switch with SFP port, a media converter, 2 SFP modules and a fiber cable.

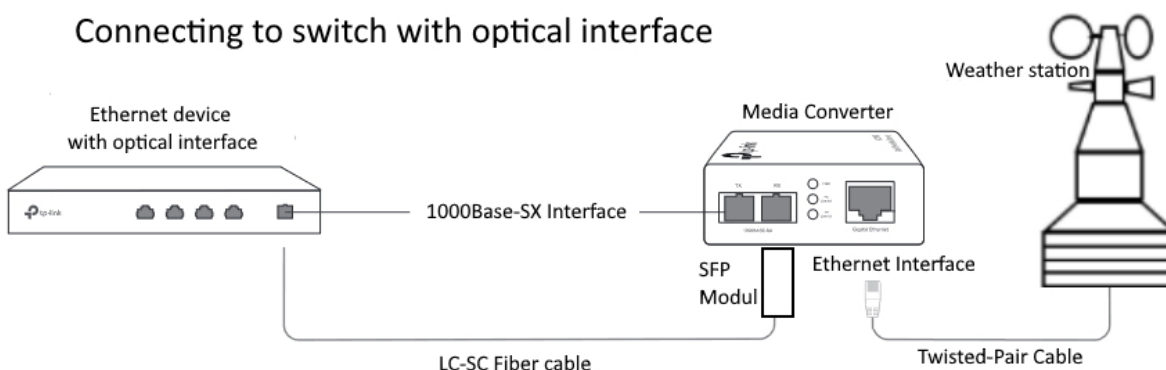
The media converters each have a port for a network cable and for an SFP module. With the media converters you convert the Ethernet interface to optical transmission, the SFP modules (plugged into the media converter) then transmit the data via fiber.

Below are 2 possible scenarios:

Connecting to switch without optical interface



Connecting to switch with optical interface



We have had good experience with the following components:

- Media converter TP-Link MC220L (For single-mode and multi-mode fiber).
- H!Fiber.com Gigabit SFP Multimode Transceiver, 1000Base-SX LC (850nm)
- DIGITUS fiber patch cable OM3 - 20 m LC to LC fiber cable -
LSZH - duplex multimode 50/125 μ - 10 GBit/s
- Netgear Switch

With these components you can transmit the data up to 550m distance .
(Of course, you will need a suitable longer fiber optic cable).

For longer distances you need single-mode components, which work with a shorter wavelength and thinner optical fibers.

5 Excerpts from the Directions of DWD for Automatic Weather Stations

2.2 Regulations for Installation

2.2.1 Demands on Location

When you choose a place for the weather station, there must be no impediments, its horizon must be free. Soil and plants must be representative for its surroundings.

For measuring wind it is compulsory that there are no obstacles. Measuring the duration of sunshine especially is based on a free horizon.

When transmitting stations such as directional radio or installations for air traffic control are near, there must be additional shielding.

...

All preventive measures will prove useless if radio medium frequency transmitters are around.

2.2.2 Measuring field

The measuring field ought to be 10 x 10m, but at least 6 x 6m...

3. Sensors

3.1 Measuring air temperature 200cm

By standard, air temperature is measured 2m above ground...

In order to keep radiation errors as low as possible, air temperature ought to be measured in a weather hut...

3.4 Measuring relative air humidity 200cm

By standard, relative air humidity is measured 2m above ground...

3.5 Measuring precipitation 100cm

...

The collecting area is 200cm². The Hornersche Wippe (see-saw) tilts when it is filled with 2cm², i.e. 0.1 mm precipitation.

3.7 Measuring windspeed

A cup anemometer is used for measuring wind speed. Its rotational speed is proportional to the horizontal wind speed.

3.8 Measuring wind direction

A wind vane with a perpendicular rotary shaft is used for measuring wind direction. Its orientation in the wind results from the pressure difference on both sides of the vane.

By standard wind direction and wind speed is measured 10m above ground

6 Trouble Shooting

6.1 Transfer problems

If the weather station is placed and mounted as described, there should be no problems in recording data.

When having problems with data transmission, you may decrease the Baud-rate or shorten the cable. You should use low capacitive cable when using cable length over 15m (RS232).

(Further hints on the weather CD under FAQs.)

6.1.1 Allowed cable lengths

Allowed cable lengths with standard cable at different baud rates are:
2.400Baud - up to 900 m, 4.800Baud - up to 300 m, 9.600Baud up to 152 m,
19.200Baud - up to 15 m, 57.600Baud - up to 5 m, 115.200Baud - <2 m.

Using the weatherstation in industrial environment can cause big problems in data transmission or even storing in the logger, when disturbance scatters into the cable. In this case you should use shielded cable or use RS422 Interface.

(Further hints you'll find on the CD under FAQs)

6.2 No data / wrong baud rate

If you accidentally set the baud rate to a wrong value or the weather station does not respond to any command you may try the following procedure to get access to the weather station again.

Start a terminal program with 9600baud, 8bit, no parity, no protocol.

Then you send exclamation marks (!) to the weather station continuously. Power up the weather station. The following messages should appear in the terminal window:

```
## Secure-Immortal-Mode enabled  
## UART-Buffer...!!!!!!!!!!!!  
## Init Done
```

Then press the ENTER key once, the following error message should appear:
<ERROR: !!!!!!!!!!!!!!!!!!!!!>

Then insert the command !B5 for setting to 9600baud and press the ENTER key.
The weather station then should send continuously:

```
**SECURE**  
**SECURE**  
**SECURE**  
...
```

Then type the command !" and press the ENTER key to exit the SECURE mode.
The weather station now should send weather data each second.
Now it is standard mode at 9600baud.

If the MWS 55 often changes its BAUD rate automatically, disturbances on the data cable which are interpreted as a command may be a reason for this problem.
You can disable the automatic changing of the BAUD rate with a command: see [here](#).

6.2.1 Diagnostic connector for testing the data cable

If you do not receive any data at all and the fan on the station is not turning either, then the cable or the power supply unit can also have a defect.

For this purpose, we can provide you with a diagnostic connector on request for checking the cable and the power supply.

To check the cable and the power supply unit, plug the data cable into the diagnostic connector and plug the power supply unit into a socket.

If the LED on the diagnostic connector lights up, the power supply unit and the supply wires in the cable should be all right.

To check the data lines (RS-232) install and start the program *MWS10_cfg.exe*, which you can find under *English\Install\MWS10_CFG_e* on the WetterStick.

Alles kopieren

MWS / Sensor	Firmware / Abgleich	Trennzeichen	WSA Schaltausgänge	EIN	EIN	AUS	Bedingungen	Sonstiges	SHELL
Uhrzeit stellen	Close Port	_ Standard	Schaltkontakt (nicht Serie 55) (V9)	DATA1	Toggle	DATA1	SET[1] Read[1]	GET DC Passwd Flash sperren	Shell
Stumm schalten	Firmware Update	.	+5V out (MWS10 / WSA) (V10)	DATA2	Toggle	DATA2	SET[2] Read[2]	SET DC Passwd Flash entsperren	Auflisten
Aktiv schalten		/	Steuerausgang 3 (LED - ge) (V11)	DATA3	Toggle	DATA3	SET[3] Read[3]	Save Config Load Config	CD..
Konfiguration 0 lesen	Abgleichdaten übertragen	Port	Steuerausgang 4 (LED - rt) (V12)	DATA4	Toggle	DATA4	SET[4] Read[4]	Subtrahiere Flag Addiere Flag	CD/
Konfiguration 1 lesen		10001 20002	Steuerausgang 5 (LED - gn)	DATA5	Toggle	DATA5	SET[5] Read[5]	Subtrahiere PFlag Addiere PFlag	CD DATA
Konfiguration x lesen	Open Port	ZA-ZE AN	Heizung 1 (V14)	DATA6	Toggle	DATA6	Heiz 1 Read[6]	SET INCLUDE GET INCLUDE	CD SAVE
Versorgungsspannung?	Lithiumzelle aktivieren	ZA-ZE AUS	Heizung 2 (V15)	DATA7	Toggle	DATA7	Heiz 2 Read[7]	Setze IP-Adresse GET Ethernet	DEL 01_2000
Secure Mode	Lithiumzelle deaktivieren	ZA-ZE Attn.	Lüfter (V16)	DATA8	Toggle	DATA8	Lüfter Read[8]	Setze Gateway GET Ether Conn	Shell beenden
LIST ERRORS	Setze Tageszähler auf 0	EIN AUS	ALLE			Manuelles Schalten der Ausgänge		Setze Nameserver GET Ether Data	
LIST_DELETE ERRORS	Setze Tageszähler auf 1	TE/DR/FE Attn.	Ja			NEIN		Setze ADMIN GET ADMIN@	
RESET		EIN AUS	Kabeltest mit Diagnosestecker			Ja NEIN			

Datenleitungen OK{13}{10}

Datenleitungen OK{13}{10}

Wenn Sie einen Diagnose-Stecker für Datenkabel einer Reinhardt Wetterstation haben, können Sie durch Klick auf diesen Button die Datenleitung prüfen.
Ist der Diagnose-Stecker aufgesteckt, muss bei eingestecktem Netzteil die LED leuchten, das bedeutet dann, dass die Versorgungsleitung und das Netzteil OK sind.
Beim Klick auf den Button muss bei gesteckten Diagnose-Stecker die Meldung "Datenleitungen OK" erscheinen, bei abgezogenem Diagnose-Stecker darf bei Klick auf den Button die Meldung NICHT ausgegeben werden!!

If you have a diagnostic connector for the data cable of a Reinhardt weather station, you can check the data line by clicking on this button.
If the diagnostic connector is plugged in, the LED must light up when the power pack is plugged in, this then means that the supply line and the power supply are OK.
When you click on the button, the message "Data lines OK" must appear when the diagnostic connector is connected.
If the diagnostic connector is removed, the message must NOT be output when the button is clicked !!

LED an / LED on

LED aus / LED off

COM: COM5 Baud: 9600 V2.2

Alternatively, you can use any terminal program (e.g. Putty) to type in characters on the keyboard that are output in the terminal window when the diagnostic connector is plugged in and the cable is free of errors. No characters should appear in the terminal window without a diagnostic connector!

6.2.2 Operating LED

In response to multiple customer requests, we will equip all MWS 55VY and MWS 88-2 weather stations with an operating LED from June 2021, as far as the configuration allows it!

The LED is located at the bottom of the weather station and lights up as soon as a power supply has been connected.

This LED says nothing about the quality or level of the voltage, but only serves to check whether a supply voltage is present at all.

The sensor with the identifier UB in the data string is used to measure the supply voltage. This measurement shows the level of the supply voltage behind the fuse and the reverse polarity protection diode.

The real voltage that is fed into the weather station is therefore approx. 0.4V higher than the voltage displayed.

The MWS 55VY has got a blue LED, the MWS 88-2 a green LED. The version number then has an attached -LED. The LED cannot be switched off!



6.2.3 Storage Warn LED

From version 1.60 (or suffix -WLED in the version number) there is a red LED next to the power socket.

If this LED is permanently red after plugging in the power cable, no correct data logger access is possible (either the internal lithium cell is exhausted, i.e. the time was not buffered, or the SD card is defective).

In this case, it is essential to replace the lithium cell and / or check the SD card and replace it if necessary, otherwise no data will be stored in the data logger!

Afterwards, be sure to set the time correctly again!

When replacing the SD card (FAT formatted!), it is essential to transfer the standard files from the weather stick to the SD card, otherwise the data logger will not function properly.

You'll find these files on the "WetterStick" under:

Software/SD-Karte.

The LED also lights up if the lithium cell was deactivated with the command ***ADMIN REMOVE POWER** before the station was last switched off!



In this case it is absolutely necessary to set the clock before unplugging the cable again, otherwise it will show the wrong time when plugged in the next time, but the LED will then no longer be lit and thus logging will also fail!



6.3 RS422/RS485 interface

With RS422 data are sent immediately after applying power to the station.

With RS485 the station can receive data after applying power but does not send any data. The output is tri state. Data only will be sent on request with the correct address. Initialization and memory check with RS485 are performed as well but without sending any data for the output is disabled (tri state).

While initializing after power up the weather station doesn't respond to any commands for app. 10 seconds.

For controlling the weather station with RS485 the address of the weather station must be added after the ! or ? command, otherwise the unit won't respond to any command.

The default address with RS485 is 1.

The command for reading the current data set therefore is ?1U for example contrary to ?U with all the other interface versions.

6.4 Protocol-files (weather32 software)

6.4.1 Fault Log

The MWS 55 has got an Fault Log which can be read with the command ?E.

Example output (since version 3.0.230) :

```
ERROR: 21 (CO: 966, CC: 901, CL: 0, CA: 0, RoC: 0, RoL: 0)
>13:36:50, 12.10.(285)
    20, DISK I/O-failure
>( +33 x)
    20, DISK I/O-failure
>13:42:30, 12.10.(285)
    20, DISK I/O-failure
>13:43:24, 12.10.(285)
    18, I2C line state
```

The value following ERROR is the number of entries in the error list (>),
CO: number of all errors,
CC: number of critical errors (PIO-failure, SPI-initialisation, Memory errors and disk errors),
CL: number of less critical errors (initialisation errors, transmission errors of RTC, ADC, UARTs, USB, I²C and Ethernet and soft interrupts),
CA: number of annoying errors (accu charge errors and wrong commands errors),
RoC: reset after number of critical errors (see also !ER),
RoL: reset after number of less critical errors (see also !ER)

Especially for resetting the MWS 55 after a certain number of errors the command
!ER [roc,rol] [clear]
has been created.

This command allows to write the number of errors into the NV RAM.

Default for roc = 10 (reset after 10 critical errors) and rol = 0 (no reset after less critical errors).
A following CLEAR deletes the error memory and resets all error counters. (like ?E CLEAR)

- CAUTION! The error reset only is performed if the station is in standard mode!
For the error counter is always active, already after the next error after switching back to standard mode a reset may be performed!

- Critical errors are PIO failures, SPI initialisation errors, Memory errors and disk errors (errors initializing and reading / writing the SD-card).
- Less critical errors are initializing and transmission errors of RTC, ADC, UARTs, USB, I²C and Ethernet as well as soft interrupts.
- Annoying errors are errors charging the accu (MWS10) and command errors (unknown or wrong commands)

- CAUTION!

After a firmware update in each case the !ER command and the APPENDIX command must be performed

6.4.2 Log-file in case of error (ErrLog.txt)

Softwareversions for sensors without logger same or newer than V2.26 write a log-file (**ErrLog.txt**) in case of errors (dataerrors or tranmission problems), in which the timepoint and kind of the error is stored. Older versions displayed an error-message like **!p** or **data error**, which was displayed permanently until the user clicked it away. This caused the problem that no further data were written for the time the message was visible although the error did not exist any longer. In version same or newer V2.26 also an error message appears, but this message is deleted automatically when the error is removed. In this case an entry is written into the log-file.

6.4.3 Logfile when starting up (log.dat)

When the software for weatherstations and sensors with logger is started, the communications between the computer and the weatherstation is stored in a log-file (**log.dat**). With this file you may get important hints in case of problems.

Caution! This log-file is overwritten each time, when the software is restarted. To keep this file, store it in another place or rename it.

6.4.4 Show output (internal)

In the software under *VIEW* and *SHOW OUTPUT* the software lists all communication with the weather station since the programm was started. Also the commands sent within the terminal window of the weather32 software will be listed.

This list you may copy into the clipboard to store it in a textfile for checking the communication in cases of problems.

6.5 Problem with Mobotix Cameras

The MWS 55VY can be connected to some types of Mobotix WEB cams and display it's data in the cam picture.

This feature was implemented by Mobotix into some models of Mobotix cams.

To learn more about this feature please contact Mobotix: <https://www.mobotix.com/en>

We heard of problems displaying data of MWS 55VY in the WEB cam picture.

This problem is caused by disabling the COM-port of the MWS 55VY after a data string has been sent.

Since firmware version 3.0244 from 20.08.2018 the COM port of MWS 55VY can be enabled permanently which solves this issue. The command to perform is:

!S+18

You also can set the MWS 55VY to a compatibility mode (MWS 5MV mode) which switches the MWS 55VY to data output each 2 seconds like the previous model MWS 5MV.

The command to switch to compatibility mode is:

!S+22

To set the MWS 55VY back to original mode please use the following commands:

!S-18

and

!S-22

7 Options

7.1 Switching outputs

The MWS 55 / 88 and sensors series 55 are also available with switching outputs.

The MWS 10 already contains this option!

These switching outputs can switch a contact (Photo-MOS relays) and a ground referred voltage 5VDC /100mA in dependence of measured values.

These contacts are accessible at a 4-pole connector.

On the following page you'll find an overview of the connectors of Sensors series 55 with switching outputs.

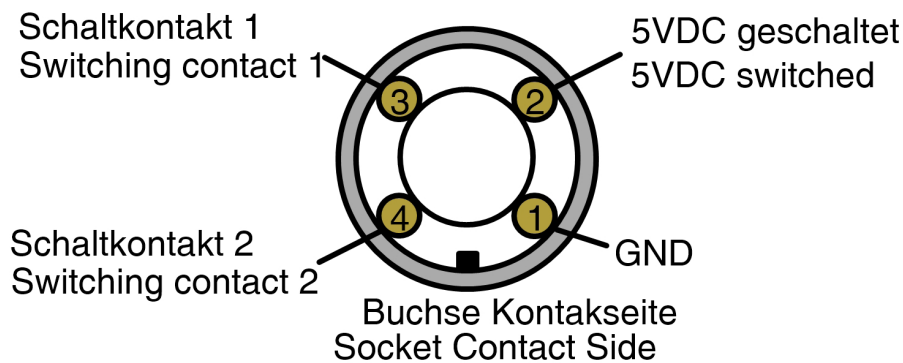
These sensors are based onto the WSA (Warning signal alert).

Further details you'll find in the respective [manual of WSA](#).

The cable (option) for connecting the switching outputs has the following connections:

- GND (Pin1) - grey
- 5VDC switched (Pin2) - pink
- Switching contact 1 (Pin3) - green/yellow
- Switching contact 2 (Pin4) - white/brown

WSA Buchse 4-pol. : Schaltausgänge WSA Connector 4-pole : Switching outputs



The switching contact is controlled by the virtual sensor V9.

The switched 5VDC is controlled by the virtual sensor V10.

If, for example, the contact should be closed when wind speed exceeds 15 km/h, the following command will perform this:

!V9,Term *?1:00!30"30 WG>15

The meaning of all parameters is as follows:

Close contact when WG>15; *(always); ?(at least 1min0sec); !(delay on 30sec); "(delay off 30sec).

A detailed description of this command you'll find [here](#).

More additional modules you can find here:

http://www.reinhardt-testsystem.de/english/climate_sensors/additional_modules.php

7.2 Available displays

7.2.1 Meteograph

Precision analog display with high grade stepping motors.
For indoor use only.

7.2.2 DKA1

LED mini display for alternating of up to 9 values. 13 mm digit size.
For indoor use only.

7.2.3 DMMK

Small digital meteo display for displaying 10 parameters simultaneously with digit size 13 mm.
Available for wall mounting or placing on a table.
For indoor use only.

7.3 GPS-Receiver

When performing mobile measurements at different locations the position data on which the measurements were carried out may be important. For this case we offer a GPS receiver (Garmin GPS18x LVC - 5V) for storing the position data, altitude and accurate time.

The longitude has got the identifier GX, the latitude the identifier GY.

A data set of stored data looks like that: GX10.9991,GY47.9850.

The position data here are: Longitude: 10° 59' 56.8", Latitude: 47° 59' 06.0".

The GPS receiver is powered by the MWS 55VY, and transmits data by default with 9600Baud.
This baud rate is retained even if the baud rate of the actual data of the MWS 55VY is changed over.

Please note that the clock of the MWS 55VY with connected GPS receiver can no longer be set via the serial interface, but only by the GPS receiver!

When using the Reinhardt-software you should start it with the parameter -GPS (see weather32 manual)

8 Technical Appendix

8.1 Control parameters for calibrating an additional sensor

PLEASE NOTE:

<#13> stands for ASCII-character 13, (Carriage Return).

The command can also be closed with <#13><#10> (<CARRIAGE RETURN> - <LINE FEED>, i.e. <CR><LF>).

Changing from Measured Value output and Adjustment Mode (output of raw values):

!W<#13>

Transmitting the linearisation data:

!L<SENSORNUMBER>,<INDEX : 1..8>,F<RAW VALUE><#13>

!L<SENSORNUMBER>,<INDEX : 1..8>,W<ANALOGVALUE><#13>

E.g.: You measure 30540 V at 24.5 °C for additional sensor A in the 3rd position of your adjustment table, it will look like this :

!L5,3,F30540 <#13>

!L5,3,W24.5 <#13>

8.2 Controlling the Microcontroller

8.2.1 Input parameters of MWS 55 -Microcontroller

(Excerpt from the instruction set - The most important commands)

Reset:

!*<#13>

Setting the BAUD rate:

!B<X><#13> ; 0 < X < 9 : or baud rate directly 300..115200

BAUD-Rate for X = 0 : 300
1 : 600
2 : 1200
3 : 2400
4 : 4800
5 : 9600 (default)
6 : 19200
7 : 38400
8 : 57600
9 : 115200

Enhanced:

Add COM port parameters, e.g.:

9600Baud, 8bit, no parity, 1 stopp bit:

!B5,8,N,2<#13>

or:

19200Baud, 8bit, even parity, 1 stopp bit:

!B6,8,E,2<#13>

or:

38400Baud, 8bit, odd parity, 1 stopp bit:

!B7,8,O,2<#13>

Avoiding automatic changing of BAUD rate:

!BX AUTO OFF

where X is the desired BAUD rate (see above)

Continue reading the logger after an interruption:

!C<#13>

Reset after errors, setting the error memory

!ER[<roc,rol>] [CLEAR] [since V3.0230]

Setting the number of critical errors (roc) or less critical errors (rol), after which the watchdog reset is performed. A following CLEAR deletes all error counters (like ?E CLEAR).

A value of 0 disables the reset, for enabling the error reset numbers of 3 and higher are valid!

- CAUTION! The error reset only is performed if the station is in standard mode!

For the error counter is always active, already after the next error after switching back to standard mode a reset may be performed!

Selecting the BAUD rate of a sensor or unit at the GPS input:

!GB<X><#13> ; 0 < X < 9 : or baud rate directly 300..115200

8.2.1.1 Input-Flags, GPS & timer options

!F<#13>

Input flags for controls, !Fx, 0 <= x <= 255:

Bit 24 ENET_ENABLE (Activates the Ethernet opt)

Bit 23 USB_ENABLE (Activates the USB-port)

Bit 20-22 Reserved

Bit 19 BIGDATA (Allows manually changing of digital outputs (heating, fan, ...))

Bit 9-18 Reserved

Bit 8 - Reserved (DEBUG_OUTPUT)

Bit 7 - Device-address (DA) with <CR><LF> in front of each data string

Bit 6 - Reserved

Bit 5 - Activates the GPS input for connecting another RS232 device.

By disabling this bit the interface and it's level shifter component is switched off.

Bit 4 - Activates or disables the internal WLAN / BT module

Bit 1-3 Reserved

!F+<Bit#><#13> ; Set single bit

!F-<Bit#><#13> ; Disable single bit

Example: !F-5 disables GPS-input

!G<#13>

(GPS_CFG_MODE) ;causes a looping through of the received data at the GPS input.
The received data are marked with a leading *

!GBx<#13>

;set GPS-baud rate, x: 0 = 300 b/s ... 5 = 9600 ... 9 = 115200 b/s

!GT<#13>

(GPS-Transmit):

All characters following !GT) are sent to the GPS (or secondary station at the GPS input).

This command can simply be abbreviated to \$ in GPS configuration mode (=!GT!)

e.g. setting the clock of secondary station: **\$U075500111214**

!Gx,CLEAR<#13>

;remove GPS-/RS232-sensor (remove from processing) [since V3.0118]

!Gx,GPGGA,9,<#13>

;configure GPS-sensor (\$GPGGA-data set, value after 9.delimiter ",")

!Gx,GPRMC,5,,<#13>

;configure GPS-sensor (\$GPRMC-data set, value after 5.delimiter ",")

!Gx,P,zzzz<#13>

;RS232-sensor with prefix "zzzz"

!G10,s,3,##<#13>

;RS232-sensor with value after 3. delimiter, delimiter "##"

!Ix,A1<#13>

;activate internal sensor x as TIMER

(when sensor previously was disabled, a restart is required)

!Ix,A2<#13>

;activate internal sensor x as COUNTER (falling edge)

!Ix,A3<#13>

;activate internal sensor x as COUNTER (rising edge)

!Ix,A4<#13>

;activate internal sensor x as COUNTER (both edges)

!Ix,A0<#13>

;internal sensor x timer/counter off

(when sensor previously was disabled, a restart is required)

!Ix,RP0|1

;reset internal sensor x raw value on !P (logging) off/on

(makes only sense in counter operation)

!Ix,RR0|1

;reset internal sensor x raw value on !R (on global reset hour) off/on

(makes only sense in counter operation)

!Ix,T0.5<#13>

;add (or sub) offset to raw value of internal sensor x [since V3.0130]

Is used to add an offset to wind speed when raw value is > 0.

Can be used in any frequency measure option (TIMER).

Has got no function in COUNTER.

8.2.1.2 Controlling the output & storage format



CAUTION: When a sensor has to be moved to another output position it must be moved with ALL sensor properties! This is not easy to perform! If you are not sure how to perform please contact us for information!

!Kx,A0 | 1[,out[,log]]

Sensornumber x (1..32) disable (=0) or enable(=1).

Disabled sensors are displayed in brackets after a request (!?)

out: optional output value or log: optional storage value setting:

0 = raw value

1 = real value

2 = attenuated real value

4 = minimum

5 = average

6 = maximum

7 = standard deviation

15 = no logging

Examples:

Switching on / off single sensors (List of all available sensor some pages later):

!Kx,A0<#13> ; Sensor with output number x is disabled

!Kx,A1<#13> ; Sensor with output number x is enabled

Attenuation for sensors enable / disable:

!Kx,MW1<#13> ; Sensor with output number x is strongly averaged

!Kx,M0<#13> ; Average off for sensor x

*Attenuation for sensor **output** enable / disable:*

!Kx,A1,1,1<#13> ; Sensor with output number x is not averaged

!Kx,A1,2,1<#13> ; Sensor with output number x is averaged

*Attenuation for sensor **storage** enable / disable:*

!Kx,A1,1,1<#13> ; Sensor with output number x is not averaged

!Kx,A1,1,2<#13> ; Sensor with output number x is averaged

*Attenuation for sensor **output** and sensor **storage** enable / disable:*

!Kx,A1,1,1<#13> ; Sensor with output number x is not averaged

!Kx,A1,2,2<#13> ; Sensor with output number x is averaged

Sensor output attenuation but storing maximum value

!Kx,A1,2,6<#13> ; Sensor with output number x output attenuated but store maximum value

Set reset time for a sensor

!Kx,RA1<#13> ; Sensor with output number x automatic (hourly) reset on

!Kx,RA0<#13> ; Sensor with output number x automatic (hourly) reset on

!Kx,ZSy<#13> ; Sensor number x (1..32), set interval for sensor x in seconds
(average, delete min/max)

!Kx,ZDy<#13> ;Sensor number x (1..32), set interval for sensor x in y * 2 seconds steps

!Kx,Zy<#13> ;Sensor number x (1..32), set interval for sensor x in y * 10 seconds steps

Sensor's basic settings

!Kx,[s],cccc[,Name[,Unit]]

Define sensor position x (1..32) with sensor s.

s: Sensor, see [sensors overview](#)

cccc: Prefix, maximum four characters (ASCII 32..127),
ASCII-sign 126 (= "~"/Dos, "ß"/Windows) suppresses output of characters

A sensor name (max 19 characters) and a unit can be defined optionally.

If a unit is by the user set the internal SD-card is searched for the required unit in the file `/_system/boot/unit.ini` which is a copy of the `weather32unit.ini` of the Reinhardt weather32 software. If a suitable unit is found it will be calculated and stored into one (the next unused) of the 20 available unit positions. Calculation of the unit always will be performed not before output of data. The values in the logger are always stored without unit, on data request the calculation then will be performed online (only for sensors with unit).

A unit group can be selected with [brackets], e.g. [temperatur]°C or °C[temperatur]. The name of the unit group must exactly match with the name of the unit group stored on the SD-card (not case sensitive)!

It is also allowed to insert an integer value containing informations regarding group, number of unit and internal unit storage position, for the controller also stores these informations as integer value and reads these values from the unit.ini at startup. So it is important not to insert new units in the middle of the unit.ini but only add new units at the end of the file. Otherwise the allocation of the units will be mixed and the commands !K... for each sensor would be required to be performed again.

There is a abbreviation, too.

!Kx,1,,unit. This only changes the unit.

In the integer value the highest bytes are defined as flags:

Bit 32 = Output (and recalculation) at RS-232/422/485 (also data logger request)

Bit 31 = Output (and recalculation) via HTTP

Bit 30 = Reserviert. [Output (and recalculation) via Modem-interface]

Bit 29 = Reserviert. [Output (and recalculation) via Ethernet-interface]

Bit 28 = Reserved

Bit 27 = Reserved

Bit 26 = Reserved

Bit 25 = Reserved

These can be set / deleted with + / - bit, e.g. **!K2,1,,+32.**

By default all these bytes are set by the **!K** command.

Examples:

!K2,0,TE<#13> ;sets output position 2 to sensor 0 (SHT25 temperature) and Prefix TE

!K3,1,FE,Humidity,%<#13> ;sets output position 3 to sensor 1 (SHT25 humidity), Prefix FE, sensor's name Humidity and unit %

!K4,41,TX,TempExternal,°F<#13> ;sets output position 4 to sensor 41 (RS232-input), Prefix TX, name TempExtern and unit °F

!K4,1,,-32<#13> ;Prevents that the unit of output position 4 is calculating and output over RS-232/422/485

!K2,\$96<#13> ;sets linearisation table 1 as sensor for output position 2.
All allocations (name, unit, ..) will remain.

!Kx,Cy<#13>	;Sensor position x (1..32) set sensor dependent calculation option y (0..15). 0 = Standard. See sensors overview
!Kx,P0..7<#13>	;Sensor position x (1..32), set precision. Sets the number of decimal places (0..7). With a value > 2 the sensor position (= alias) will be marked with a "P".
!Kx,M1,x.x	;Sensor position x (1..32), Averaging coefficient 1 (= Set weighting for new value = time t)
!Kx,M2,y.y	;Sensor position x (1..32), Averaging coefficient 2 (= Set weighting for previous value = time t-1)
!Kx,M3,z.z	;Sensor position x (1..32), Averaging coefficient 3 (= Set weighting for pre previous value = time t-2) Attention. The addition of the 3 coefficients (x.x + y.y + z.z) must result in 1!!!
!Kx,MW0<#13>	;Sensor position x (1..32), attenuation averages with real values
!Kx,MW1<#13>	;Sensor position x (1..32), attenuation averages with attenuated values
!Kx,Gy.y<#13>	;Sensor position x (1..32), gain (= multiplier) of real value before limitation
!Kx,Ty.y<#13>	;Sensor position x (1..32), translation (= offset) of real value before limitation
!Kx,Uy.y<#13>	;Sensor position x (1..32), sets lower limit (not concerning the raw value)
!Kx,Oy.y<#13>	;Sensor position x (1..32), sets upper limit (not concerning the raw value)
!Kx,OZ0<#13>	;Sensor position x (1..32), normal limitation value > upper limit: value = upper limit value < lower limit: value = lower limit
!Kx,OZ1<#13>	;Sensor position x (1..32), establish circular reference of limitation. Falling limited value = value + (upper limit - lower limit) : ...UG+1->UG->OG->OG-1... Rising limited value = value - (upper limit - lower limit) : ...OG-1->OG->UG->UG+1... Caution! Circular reference has got effects onto the average calculation! (see wind average)
!Kx,SMY.y<#13>	;Sensor position x (1..32), averaging coefficient for average (for additional weaken / enhance of averaging)
!Kx,ZSy<#13>	;Sensor position x (1..32), set interval for sensor in seconds (Average, clear min / max)
!Kx,ZDy<#13>	;Sensor position x (1..32), interval in *2 seconds
!Kx,Zy<#13>	;Sensor position x (1..32), interval in *10 seconds
!Kx,SW0<#13>	;Sensor position x (1..32), use real values for entire statistics (min/max/average/standard deviation)
!Kx,SW1<#13>	;Sensor position x (1..32), use attenuated values for entire statistics (min/max/average/standard deviation)
!Kx,RA1<#13>	;Sensor position x (1..32), automatic reset of statistic values (counter = interval)
!Kx,RA0<#13>	;Sensor position x (1..32), auto reset off (counter counts up to interval then remains on value)
!Kx,RP0 1<#13>	;Sensor position x (1..32), reset of statistic values on command !P, or rather disable / enable storing into data logger
!Kx,RR0 1<#13>	;Sensor position x (1..32), reset of statistic values on command !R, or rather disable / enable global hour of reset

!Kx,D,TERM <Term><#13>

Generates a dependence of calculation of alias x from another alias input by a term. If this term is true alias x and its sensor is calculated, otherwise output is -99999.9

<Term>: containing of

- Sensor prefix, or sensor name or \$<sensor>
- <, <=, >, >= or =, <> (unequal) value or =, <> (range lower limit, range upper limit)

e.g. **!K5,D,TERM WG > 0** ; K5 only is calculated if WG > 0

!K2,D,TERM te = (-30,60) ; K2 only gets new values if TE is in the range of -30...60

!Kx,D,A0 | 1[,a[,a..]]<#13>

;Disable / enable dependency

If the dependency is disabled, sensor output runs normal, otherwise the dependent sensor position is calculated with the term at first and if true the value is updated.

Optionally attenuated real value, minimum, maximum, average and standard deviation can be switched to the real sensor's value,

e.g. **!K5,D,A1,4,6** additionally switches min and max.

8.2.1.3 Linearisation / calibration data

Sending linearization data:

!L<SENSORNUMBER>,<INDEX : 1..8>,F<RAW VALUE>><#13>

!L<SENSORNUMBER>,<INDEX : 1..8>,W <ANALOG VALUE>><#13>

Detailed informations regarding the calibration of the MWS 55 you'll find on the "WetterStick":
[../English/Manual/ Calibration instructions MWS.pdf](#)

Setting the altitude for calculating the barometric pressure:

!O<ALTITUDE(m)><#13>

Setting the factor for correct measurement of the supply voltage (VCC):

!PL,G0.000504

Reset of precipitation measurement:

!R<X><#13> X is the full hour for precipitation reset if storage interval is > 0 (logger on)

!R<#13> Sets precipitation to 0 if storage interval = 0 (logger off)

8.2.1.4 Protocol-Select (CAUTION)



Controlling the interface (Protocol select)

CAUTION: THESE SETTINGS ARE VERY CRITICALLY!!

!S<DZ><#13> Suppresses inter alia the output of data
DZ is the decimal value from the following binary list for the different protocols.

Binary list of protocol parameters for DZ.

DZ (binary) =

- xxxxxx00b (bit 1+2) : RS232 - MWS sends a datastring each second
- xxxxxx01b (bit 1+2) : RS422 - MWS sends a datastring each second
- xxxxxx10b (bit 1+2) : RS485 - MWS is addressed and sends data only on request
- xxxxxx11b (bit 1+2) : Reserved
- xxxxx1xxb (bit3) : MWS sends data only on request (RS232 + RS422)
- xxxx1xxxb (bit4) : MWS sends data on request and when storing into the logger
- xxxXxxxxb (bit5) : Reserved
- xxXxxxxxb (bit6) : Reserved
- x1xxxxxb (bit7) : Sends check byte (bit 1+2≠11), simple XOR or CRC-8 (Bit21=1)
- 1xxxxxb (bit8) : Flash write protection. (Commands changing the data flash are rejected (except update))

This mode only can be cancelled in SECURE-Mode!

- xxxxxxxx 1xxxxxxx xxxxxxxxb (bit16)
: Suppresses reset outputs on the GPS/RS-232 port, which are sent by default since V3.0222
- xxxxxxxx1 xxxxxxxxxx xxxxxxxxb (bit17)
: Standard protocol: Sets RS-485 full duplex to suppress the waiting time in "normal" RS-485 mode (half duplex) (since V3.0240)
- xxxxxx1x xxxxxxxxxx xxxxxxxxb (bit18)
: Prevents the port from disabling (since V3.0244)
Important when operating at a MOBOTIX cam!
- xx1xxxxx xxxxxxxxxx xxxxxxxxb (bit22)
: MWS 5MV compatibility mode (data each 2 seconds)

By adding of single binary values the parameters can be combined.

Example for MWS with RS422 only sends on request:

for RS422 (binary) = xxxxxx01 (DZ=1)

for sending on request (binary) = xxxxx1xx (DZ=4)

added --> = xxxxx101 --> decimal = 5 --> !S5<#10>

CAUTION: With RS485 the WSA's address must always follow on ! or ?, for otherwise the command won't be recognized! (Standard@ = 10)

!S+<Bit#><#13> ; Set single bit in protocol select

!S-<Bit#><#13> ; Set back single bit in protocol select

Example: !S+3 activates sending data on request and when storing.



CAUTION! Never use this command with analog display connected!!!

IMPORTANT!!!

Switching the protocols from RS422 and RS485 to another protocol only works in SECURE mode (!") due to safety reasons!!



Example:

If you want to change from RS422 (!S1) to RS485 (!S2) first change into SECURE mode with the command !" . The MWS 55 now will send permanently the following:

****SECURE****

Then you send the command !S2. The MWS 55 now is in RS485 mode and has got the preset address (10 by default). To exit the SECURE mode insert the following command:

!10"

Now you can retrieve the current data string with the command ?10U.

To change back to RS422 first switch to SECURE mode with the command !10" and then enter the command !10S1 to change to RS422. The MWS 55 now permanently will send ****SECURE****. With the command !" you exit the SECURE mode and the MWS 55 will send a data string each second.

This page is left free for further expansions!

8.2.1.5 Date / time / storage settings

Set clock and date:

!U<TIME & DATE in format HHMMSSDDMMYY><#13>

Example: **!U092030100515#13** sets the clock to 20 past 9 a.m. and 30 seconds on 10.05.2015.
When a GSM900 module is connected its clock will be set, too!

!u<TIME & DATE in format HHMMSSDDMMYY><#13>

When a GSM900 module is connected the input of a small u only the clock of the weather station will be set. The clock of the GSM900 module won't be changed!

Changing between measurement output and calibration mode (raw value output):

!W<#13>

Setting the transmission rate with TCP/IP (PoE) - (Ethernet Init Flag) - Since V3.0230

10M Half Duplex: **!XW0007c9ec,5c3100**

100M Half Duplex: **!XW0007c9ec,5f6200**

10M Full Duplex: **!XW0007c9ec,58f500**

100M Full Duplex: **!XW0007c9ec,5ba600**

Auto (standard): **!XW0007c9ec,5d0000**

Set storage interval for data logger:

!Z<INTERVAL in 10 Seconds steps><#13>(0 = Logger off)

Valid values: 1..8640

!ZD<INTERVAL in 2 Seconds steps><#13> (0 = Logger off)

Valid values: 1..43200

!ZS<INTERVAL in 1 Seconds steps><#13> (0 = Logger off)

Valid values: 1..86400

Examples: **!Z1#13** stores a data set every 10 seconds

!Z3#13 storage every 30 seconds

!ZD5#13 storage every 10 seconds

!ZD1#13 storage every 2 seconds

!Z12#13 storage every 2 minutes ...etc

!Z0#13 no storage

Time zone when receiving time by GPS (Deviation to UTC time):

!ZZx.x

Set time zone (UTC-> RTC). Settable in 15 minutes steps.

(with old MWS5M only in 1 hour steps). Valid values: -12 ... +13,

e.g. Venezuela: -4.5 (see: <http://www.worldtimezone.com/>)

!ZZA0|1

Automatic switching between day light savings time and winter time off / on.

When active on last Sunday in March the clock will be set to 03:00:00 after 01:59:59

and set to 02:00:00 after 02:59:59 on last Sunday in October.

!ZZDx

Number of hours being added or subtracted to DST or wintertime on automatic switching.

(standard = 1)

8.2.1.6 Activate / deactivate the internal Lithium cell

Disable buffering the clock by the Lithium cell - (Since Board version 1.057)

***ADMIN POWER REMOVE**

Requires setting the clock for proper storage of data after putting MWS 55VY in operation with disabled Lithium cell!

Caution:

This is the delivered condition of the MWS 55VY since board version 1.057!

Enable buffering the clock by the Lithium cell - (Since Board version 1.057)

***ADMIN POWER MOUNT**

The Lithium cell is activated automatically when applying power to the MWS 55VY!

8.2.1.7 Setting the switching outputs

For setting the (optional) switching outputs following commands with different parameters are available.

!Vx,TERM <hour>,<...> <Term1>[<linking> <Term2> <linking> <Term3> <linking> <Term4>]<#13>

Sets the output term of virtual sensor x (9..16)

<hour>: either numbers 0..23 or + (= 8-18) or * (=0-23), always separated by comma, e.g. 11,12,13,20 or 6,+,19

Optional (directly subsequent):

;<Default>: Sets or deletes the output, if the time is out of the set hours (;1 or ;0).

?<inhibit>: Minimum on time in minutes, or

?m:s or ?h:m:s with minutes, seconds and hour

!<Delay_on>: Number of consecutive data strings in which term must be 1 (true) to set the output (default = 1)

"<Delay_off>: Number of consecutive data strings in which term must be 0 (false) to delete the output (default = 1)

<Term>: Sensor prefix <, <=, >, >= or =, <> (unequal) value or

Sensor prefix =, <> (range lower limit, range upper limit)

<Linking>: & (AND) or + (OR)

Following virtual Sensors are available:

V9 = switching contact

V10 = switched 5VDC (100mA)

V14 = Heating 1

V15 = Heating 2

V16 = Fan

Details of virtual sensors you'll find [here](#).

8.2.2 SECURE-Mode

!"

Switches into SECURE mode which allows to change locked settings.

Output in Secure-Mode:

SECURE

8.2.3 Requesting the microcontroller

Get the current data string:

?U<#13>

Read stored data from a defined time & date:

?D<TIME & DATE in format HHMMSSDDMMYY><#13>

Read all stored data:

?D000000000000<#13>

Interrupt data output:

<#13>

Continue data output after interrupting:

!C<#13>

Cancelling data output:

<#13><#13>

Reading the error memory:

?E<#13>

ERROR: 21 (CO: 966, CC: 901, CL: 0, CA: 0, RoC: 0, RoL: 0)

>13:36:50, 12.10.(285)

20, DISK I/O-failure

>(+33 x)

20, DISK I/O-failure

>13:42:30, 12.10.(285)

20, DISK I/O-failure

>13:43:24, 12.10.(285)

18, I2C line state

The value after ERROR is the complete number of entries in the list (>),

CO: complete number of errors,

CC: number of critical errors (PIO-failure, SPI-initialisation, Memory errors and disk errors),

CL: number of less critical errors (initialisation errors, transmission errors of RTC, ADC, UARTs, USB, I²C and Ethernet and soft interrupts),

CA: number of annoying errors (accu charge errors and wrong commands errors),

RoC: reset after number of critical errors (see also !ER),

RoL: reset after number of less critical errors (see also !ER)

Reading and deleting the error memory:

?E CLEAR<#13>

Read GPS-/RS232-Sensor configuration:

?Gx<#13>

e.g. ?G2 (GPS-Data string GPRMC)

=====*GPS/RS232: 02*====

>Source: GPS-GPRMC

|->Separator: ,

|->Position: 5

e.g. ?G7 (Data string with prefix TE)

=====*GPS/RS232: 07*====

>Source: String (prefixed)

|->Prefix: TE

Read sensor configuration of internal sensors:

[since V3.0200]

?Ix<#13>

e.g. ?I2 (Wind speed)

=====*Internal: 02*=====

>Sensor 58:

|->Mode: *Timer*

|->Gain: *1.0000*

|->Transl.: *0.0000*

e.g. ?I3 (Rain counter)

=====*Internal: 03*=====

>Sensor 59:

|->Mode: *Counter (/ + \)*

|->Reset: *(none)*

e.g. ?I4 (Counter/Timer/Analogue)

=====*Internal: 04*=====

>Sensor 60:

|->Mode: *Analog*

Read Linearisation table *x* (1..32), e.g. ?L1 (Temperature)

?Lx<#13>

Alias *x* (= Sensor position *x*) (1..32) read values, e.g. ?K2 (Temperature):

?Kx<#13>

=====*02:TE*=====

>Name: *Temperature, Unit: °F (1.810000, 32.000000)*

>Value:

|->Real: *26.5311*

|->Smooth: *26.5231*

|->Raw: *27368.0000*

>Statistic:

|->Min: *26.4239 @ 01:58:56, 01.01.(001)*

|->Average: *26.4819*

|->Max: *26.5740 @ 01:59:05, 01.01.(001)*

|->Std.Dev.: *0.0307*

|->Interval: *126 (300)*

Read / List I²C-Sensors
?Sx<#13>

[since V3.0248]

List all Sensors (?S)
===I2C-Sensors...
01: 001,SHT25
02: 001,SHT25
03: 001,BMP180
04: 001,BMP180
05: 001,AS5048B
06: 001,AS5048B
07: 001,TSL4531
08: 001,TCS3414CS
(09: 128,STS21)
10: 001,BMP280
11: 001,BMP280
12: 000,---
13: 000,---
14: 001,AS5601
15: 001,AS5601
16: 000,---
17: 000,---
18: 000,---
19: 000,---
20: 000,---
21: 000,---
22: 000,---
23: 000,---
24: 000,---
25: 000,---
26: 000,---
27: 000,---

The 3 digits numbers are the I²C flags of each sensor:
000 = Sensor not found / not present while initialisation
001 = Sensor present and active
128 = Sensor present, but not used (see also: ?DC)
In addition the sensor is set in brackets
In plain text the sensor hardware is listed with its name.

Read special sensor x (?Sx) (1..27)

?Sx<#13>

Example: ?S3 (=Pressure sensor BMP180, Temperature)

===== I2C: 03 =====

>Source: BMP180

>Value:

|->Raw: 30348.0000

Read virtual sensor x (1..32)

?Vx<#13>

Request virtual sensor x (1..8):

[ab V3.0248]

Example: ?V4 (=Altitude (previously set to 640m with !O)

==== Virtual-Tab: 04 =====

>Sensor 67 Value: 640.00

Request virtual sensor x (9..16)

Example: ?V15

==== Virtual-Tab: 15 =====

>Sensor 78 Sources:

|----- 01 -----| |----- 02 -----| |----- 03 -----| |----- 04 -----|

|->Sensor 00 |->Sensor 00 |->Sensor 58 |->Off

>TIME 0-23,

>DEFAULT NC

>INHIBIT 10 (0 left)

>DELAY-ON 10 (9 left)

>DELAY-OFF 10 (0 left)

>TERM [TE < -10.00] + [TE < 0.00] & [WG > 10.00]

Output of settings of sensor 78: Digital output 7 (Heating_device_2)

This one is fed by 3 sensors,

1. Sensor 00 (=TE)
2. Sensor 00 (=TE)
3. Sensor 58 (=WG)

and has got the value 1 or 0, depending on if term [TE < -10] OR [TE < 0] AND [WG > 10] is true or false within time from 0:00 to 23:59.

Request virtual sensor x (17..32)

Example: ?V17

==== Virtual-Tab: 17 =====

>Sensor 80 Sources:

|----- 01 -----| |----- 02 -----| |----- 03 -----| |----- 04 -----|

|->Sensor 02 |->Sensor 01 |->Sensor 67 |->Sensor 03

|->Calc.Opt: 0 |->Calc.Opt: 0 |->Calc.Opt: 0 |->Calc.Opt: 0

|->Gain: 1.0000 |->Gain: 1.0000 |->Gain: 1.0000 |->Gain: 1.0000

|->Transl.: 0.0000 |->Transl.: 0.0000 |->Transl.: 0.0000 |->Transl.: 0.0000

Output of settings of sensor 80: barometric pressure

This one is fed by 4 sensors:

1. Sensor 02 (=TD), Calculation option 0, Gain 1.0, Offset 0.0
2. Sensor 01 (=FE), Calculation option 0, Gain 1.0, Offset 0.0
3. Sensor 67 (=Ortshöhe), Calculation option 0, Gain 1.0, Offset 0.0
4. Sensor 03 (=DR), Calculation option 0, Gain 1.0, Offset 0.0

Read all configuration data:

!<#13>

!0 <#13>

Output of main information.

!1 <#13>

Output of information about the single sensors.

!2 <#13>

Output of information about sensor #2 (temperature)

!3 <#13>

Output of information about sensor #3 (humidity)

...etc.

8.2.4 Meaning of the listing with !?0

DA: Device Address

DC: Device Capabilities !!! INTERNAL !!!

DI: Device Ident

DS: Device Serial

DV: Device Version

ME: Memory (capacity of SD-card in kByte)

MU: Memory Unused (free memory on SD-card in kByte)

MI: Memory Intervall (storage interval in seconds)

OD: Operation Days

A#: Calibration number

ER: Error

Bit 8 = Reserved

Bit 7 = ERR_EXT_MEMORY -> Memory card detected but not responding

Bit 6 = Reserved

Bit 5 = Reserved

Bit 4 = Reserved

Bit 3 = ERR_GPS_TIME -> No GPS time set in current hour until now

Bit 2 = ERR_5V -> no 5V from USB

Bit 1 = ERR_VIN -> Input voltage too low (leading ****UNDERVOLTAGE****)

FL: Flags

Bit 6..8 = Reserved

Bit 5 = GPS_ONLINE GPS (or RS232-Sensors) ready (= Data string received)

Bit 4 = GPS_CFG_MODEGPS-Configure mode active:

Data at GPS-Input are mirrored to the PC-port

(with leading *)

Bit 3 = RAW_MODE

Raw value mode active: Values are sent as raw values.

(with leading ****ABGLEICH**** TKxxxx,)

Bit 2 = SECURE_MODE

No calculation and storing of any values, bypasses write protection

Output of **** SECURE ****

Bit 1 = IMMORTAL_MODE

COM port automatically (temporarily) set to RS232 with 9600 baud when received characters !!!!!!!!!!!!! (RS232/9600)

PM: PageMode Reserved

PS: Protocol_Select (see !S)

SC: SciFlags

- Bit 8 = SCI_FRM_ERR -> Frame-Error (is deleted after request)
- Bit 7 = SCI_OVR_ERR -> Overrun-Error (is deleted after request)
- Bit 6 = SCI_PAR_ERR -> Parity-Error (is deleted after request)
- Bit 5 = Reserved
- Bit 4 = Reserved
- Bit 3 = SCI_TX_ENA -> Sender active
- Bit 2 = SCI_RX_ENA -> Receiver active
- Bit 1 = TERMINATION -> Instruction termination (Carriage-Return) received

TZ: Time-Zone (UTCtoRTC), -12 ... +13,

- (AUTO) shows that automatic DST switching is active,
- (DST) shows, that daylight savings time is set

AT: Attenuation (not used)

HZ: Value for activation of heating device (not used)

TA: TK_calibration-Temp. (after I-Temp.raw value), 0-255

KM: Compressing value (not used)

IF: Admin-Flags (see !F)

PF: Power-Flags (undocumented)

8.2.5 Order of the MWS 55 Sensors

<i>Output #</i>	<i>Sensor ID</i>	<i>Sensor</i>	<i>default</i>	<i>unit</i>
1	---	Clock / date	on	SS:MM:ss, TT.MM.JJ
2	TE	Temperature	on	[°C]
3	FE	Humidity	on	[%]
4	TD	Internal temperature	on	[°C]
5	DR	Absolute pressure	on	[hPa]
6	WR	Winddirection	on	[°]
7	WV	Main winddirection	on	[°]
8	WG	Wind speed	on	[km/h]
9	WS	Wind peak	on	[km/h]
10	WD	Wind average	on	[km/h]
11	RE	Precipitation	off	[mm] / [l/m ²]
12	RD	Precipitation in storage interval	off	[mm] / [l/m ²]
13	SO	Solar radiation	off	[W/m ²]
14	ZA	Additional sensor 1	off	[mV]
15	ZB	Additional sensor 2	off	[mV]
16	ZC	Additional sensor 3	off	[mV]
17	ZD	Additional sensor 4	off	[mV]
18	ZE	Additional sensor 5	off	[mV]
19	UB	Supply voltage	on	[V]
20	UV	UV-Radiation	off	[mW/m ²]
21	LX	Light intensity	off	[lux]
22	DB	Barometric pressure	on	[hPa]
23	TP	Dewpoint	on	[°C]
24	WC	Windchill	on	[°C]
25	---	not used	off	
26	---	not used	off	
27	FS	Fan Status	on	[---]
28	GH	GPS-Altitude	off	[m]
29	GX	GPS-Longitude	off	
30	GY	GPS-Latitude	off	
31	GV	GPS-Speed	off	
32	GS	GPS-Satellites	off	

There are further reserved IDs for optional (additional) sensors, e.g.:

UH : Heater status
 OH : Altitude
 AK : Contact output
 AV : Voltage output
 RT : Rain detector
 RA : RDT Activity
 WU : Clouds base
 WK : Clouds detector
 WT : Temperature sensor of clouds sensor
 FA : Fan speed
 BA : Temperature Soil Sensor 140 at + 30cm
 BB : Temperature Soil Sensor 140 at bei + 5cm
 BC : Temperature Soil Sensor 140 at - 5cm
 BD : Temperature Soil Sensor 140 at - 50cm
 BE : Temperature Soil Sensor 140 at - 100cm
 ...

On the next pages you'll find a detailed description of all available (internal) sensors of the MWS 55:

Manual MWS 55VY / MWS 88-2Y / MWS 10 and Sensors 55Y

Sensor	Group	Sensor-Pos	Description	Sensoroptions	Sensor-ID	Datasource	Compensation	Special
0	PC	(K2)	Temperature (SHT25) → TK Humidity (SHT25)		TE	L1 \$96		
1	PC	(K3)	Humidity (SHT25)		FE	L2 \$97	Dependency Tab D1	
2	PC	(K4)	Temperature (BMP180) → TK Pressure (BMP180)		TD	L3 \$98		
3	PC	(K5)	Pressure (BMP180)		DR	L4 \$99	Dependency Tab D2	
4	PC	K6 K7	Winddirection (AS5048B)	0: Clockwise 1: Counter clockwise	WR WV			
5	PC		Magnitude (AS5048B)	1: AGC-Value (0..255)	MG			
6	PC	(K21)	LUX (TSL4531)		LX			
7	PC		Color (TCS3414) [since V3.0130]	0: clear value 1: red 2: green 3: blue				
8	PC	(K2)	Temperature (STS21) [since V3.0202]		TE	L1 \$96		
9	PC	(K4)	Temperature (BMP280) → TK Druck (BMP280) [since V3.0212]		TD	L3 \$98		
10	PC	(K5)	Pressure (BMP280) [since V3.0212]		DR / DB	L4 \$99	Dependency Tab D2	
11	PC		Temperature (SHT35/45) [since V3.0244/3.0261]		TE	L1 \$96		
12	PC		Humidity (SHT35) [since V3.0244] Humidity (SHT45) [since V3.0261]		FE	L2 \$97	Dependency Tab D1	
13	PC		Winddirection (AS5601) [since V3.0244]	0: Right spin (CW) 1: Left spin (CCW)	WR, WV			
14	PC		Magnitude (AS5601) [since V3.0244]	1: AGC-value (0..255)	MG			
15	PC		CO ₂ (SCD41) [since V3.0260]		CO			
16	PC		Temperature (SCD41) [since V3.0260]		TX			
17	PC		Humidity (SCD41) [since V3.0260]		FX			
18	PC							
19	PC							
20	PC							
21	PC							
22	PC							
23	PC							
24	PC							
25	PC							
26	PC							
27	Ext_AD	(K16)	External AD-Converter, Channel 1		ZC (pin7)	L7 \$102		ZC Optional current input I+ Channel n.c.
28	Ext_AD	(K15)	External AD-Converter, Channel 2		ZB (pin6)	L6 \$101		ZB Optional current input I- → Ionut
29	Ext_AD	(K14)	External AD-Converter, Channel 3		ZA (pin5)	L5 \$100		
30	Ext_AD	(K17)	External AD-Converter, Channel 4		ZD (pin4)	L8 \$103		
31	Ext_AD	(K18)	External AD-Converter, Channel 5		ZE (pin3)	L9 \$104		
32	Ext_AD	(K13)	External AD-Converter, Channel 6		SO	L11 \$106		
33	Ext_AD	(K19)	External AD-Converter, Channel 7		ZF (int.)	L10 \$105		
34	Ext_AD	(K20)	External AD-Converter, Channel 8		UV	L12 \$107		
35	GPS	K28	GPS-Altitude !G1		GH			
36	GPS	K29	GPS-X (Longitude) !G2	0: Original (° ' ") 1: Dezimal Grad	GX			
37	GPS	K30	GPS-Y (Latitude) !G3	0: Original (° ' ") 1: Dezimal Grad	GY			
38	GPS	K31	GPS-Speed !G4		GV			
39	GPS	K32	GPS-Sat (Current satellites) !G5		GS			
40	GPS							
41	RS232		RS232-Sensor 1 !G7					
42	RS232		RS232-Sensor 2 !G8					
43	RS232		RS232-Sensor 3 !G9					
44	RS232		RS232-Sensor 4 !G10					
45	RS232		RS232-Sensor 5 !G11					
46	RS232		RS232-Sensor 6 !G12					
47	RS232		RS232-Sensor 7 !G13					

Manual MWS 55VY / MWS 88-2Y / MWS 10 and Sensors 55Y

Sensor	Group	Sensor-Pos	Description	Sensoroptions	Sensor-ID	Datasource	Compensation	Special
48	RS232		RS232-Sensor 8	!G14				
49	RS232		RS232-Sensor 9	!G15				
50	RS232		RS232-Sensor 10	!G16				
51	RS232		RS232-Sensor 11	!G17				
52	RS232		RS232-Sensor 12	!G18				
53	RS232		RS232-Sensor 13	!G19				
54	RS232		RS232-Sensor 14	!G20				
55	RS232		RS232-Sensor 15	!G21				
56	RS232		RS232-Sensor 16	!G22				
57	Internal		Frequency lightning	!I1	0: Counter (Raw val.) 1: Frequency (Hz) 2: Windspd. (1 x) 3: Windspd. (12 x) 10: Counter Resetval.			Micro: Pin 57 (F-input)
58	Internal	K8 K9 K10	Frequency Windspeed	!I2	0: Counter (Raw val.) 1: Frequency (Hz) 2: Windspd. (1 x) 3: Windspd. (12 x) 10: Counter Resetval.	WG WS WD		Micro: Pin 46
59	Internal	K11 K12	Frequency Precipitation	!I3	0: Counter (Raw val.) 1: Frequency (Hz) 2: Windspd. (1 x) 3: Windspd. (12 x) 10: Counter Resetval.	RE RD		Micro: Pin 116
60	Internal		Internal AD-Converter, Channel 1 (AD0_0) (*or Timer/Counter 4)	!I4)	*0: Counter (Raw val.) *1: Frequency (Hz) *2: Windspd. (1 x) *3: Windspd. (12 x) *10: Counter Resetval.			Micro: Pin 13 (i.e. Tacho signal fan)
61	Internal		Internal AD-Converter, Channel 2 (AD0_1)					
62	Internal		Internal AD-Converter, Channel 3 (AD0_2)					
63	Internal		Internal AD-Converter, Channel 5 (VIN) Sensoroptions 1..3 Sensoroptions 4..7	!PL [since V3.0209] [since V3.0230]	0: AD-CVT value 1: Error counter 2: last error code 3: no Batt. Voltage 4: number of errors 5: "-" critical errors 6: "-" less critical error 7: "-" annoying errors			
64	Virtual	K1	RTC (RealTimeClock: Time, Date)		P0: Date 2char P1: Date 2char US P4: Date 4char P5: Date 4char US			
65	Virtual		Time		0: 0 (Time) 1: Seconds 2: Minutes 3: Hours 4: Min. * 60 + Sec. 5: Hrs*3600+Min*60+Sec 10: Second odd			
66	Virtual		Date		0: 0 (Time) 1: Day (1..31) 2: Month (1..12) 3: Year (4stellig) 4: Day of week (0..6) 5: Day of year (1..365) 10: Day of year odd ----- P0: Date 2char P1: Date 2char US P4: Date 4char P5: Date 4char US			
67	Virtual	K27	Altitude			OH		
68	Virtual							
69	Virtual							
70	Virtual							
71	Virtual							
72	Virtual		Output1 (switched contact)	!V9	Steuer 7	Data 1		Reed at Signalmodule (Pin120)
73	Virtual		Output2 (switched 5VDC)	!V10	Steuer 6	Data 2		+5V at Signalmodule (Pin110)
74	Virtual		Output3 (not used)	!V11	Steuer 5	Data 3		Pad at Signalmodule (Pin108)
75	Virtual		Output4 (Fan spd 0)	!V12	Steuer 4	Data 4		Pad at Signalmodule (Pin104)
76	Virtual		Output5 (Fan spd 1)	!V13	Steuer 3	Data 5		Green at Signalmodule (Pin101)
77	Virtual		Output6 (Heating 1)	!V14	Steuer 2	Data 6		Yellow at Signalmodule (Pin94)
78	Virtual		Output7 (Heating 2)	!V15	Steuer 1	Data 7		Red at Signalmodule (Pin91)
79	Virtual		Output8 (Fan)	!V16	Steuer 8	Data 8		N.c. at Signalmodule (Pin54)

Manual MWS 55VY / MWS 88-2Y / MWS 10 and Sensors 55Y

Sensor	Group	Sensor-Pos	Description	Sensoroptions	Sensor-ID	Datasource	Compensation	Special
80	Virtual	K22	Barometric Pressure !V17 S1 = TD, S2 = FE, S3 = Altitude, S4= DR	0: Intern.formula 1: DWD (+TE/FE) 2: BMP180 (simple)	DB			
81	Virtual	K23	Dewpoint !V18 S1 = TE, S2 = FE saturation vapor pressure (4) [since version 3.062] only uses S1 [=TE]	0: Dewpoint W./Ice 1: Vap.Pressure W./Eis 2: Humidex 3: Heat Index 4: SVP water/ice	TP			
82	Virtual	K24	Windchill !V19 S1 = TE, S2 = WG	0: Formula 2001 1: Formula MWS5M	WC			
83	Virtual		Color !V20 S1 = Sensor 7, Sensoroption 0 (clear value) S2 = Sensor 7, Sensoroption 1 (red) S3 = Sensor 7, Sensoroption 2 (green) S4 = Sensor 7, Sensoroption 3 (blue)	0: C.ColorTemp. [K] 1: X (Tristimulus) 2: Y (* = Illuminance) 3: Z (*) 4: x (Chromaticity) 5: y (Chromaticity)				
84	Virtual		Mathematic operators !V21 [since V3.0248] Disabled sensors are calculated with value 0. The arithmetic mean is calculated including all active sensors.	0: S1 - S2 + S3 - S4 1: S1 + S2 - S3 + S4 2: S1 - S2 - S3 - S4 3: S1 + S2 + S3 + S4 4: Arithmetic mean				
85	Virtual							
86	Virtual							
87	Virtual							
88	Virtual							
89	Virtual							
90	Virtual							
91	Virtual							
92	Virtual							
93	Virtual							
94	Virtual							
95	Virtual			!V32				
96	Linear	K2	Linear-Table 1	!L1		For TE		
97	Linear	K3	Linear-Table 2	!L2		For FE		
98	Linear	K4	Linear-Table 3	!L3		For TD		
99	Linear	K5	Linear-Table 4	!L4		For DR		
100	Linear	K14	Linear-Table 5	!L5		For ZA		
101	Linear	K15	Linear-Table 6	!L6		For ZB		
102	Linear	K16	Linear-Table 7	!L7		For ZC		
103	Linear	K17	Linear-Table 8	!L8		For ZD		
104	Linear	K18	Linear-Table 9	!L9		For ZE		
105	Linear	K19	Linear-Table 10	!L10		For ZF		
106	Linear	K13	Linear-Table 11	!L11		For SO		
107	Linear	K20	Linear-Table 12	!L12		For UV		
108	Linear		Linear-Table 13	!L13				
109	Linear		Linear-Table 14	!L14				
110	Linear		Linear-Table 15	!L15				
111	Linear		Linear-Table 16	!L16				
112	Linear		Linear-Table 17	!L17				
113	Linear		Linear-Table 18	!L18				
114	Linear		Linear-Table 19	!L19				
115	Linear		Linear-Table 20	!L20				
116	Linear		Linear-Table 21	!L21				
117	Linear		Linear-Table 22	!L22				
118	Linear		Linear-Table 23	!L23				
119	Linear		Linear-Table 24	!L24				
120	Linear		Linear-Table 25	!L25				
121	Linear		Linear-Table 26	!L26				
122	Linear		Linear-Table 27	!L27				
123	Linear		Linear-Table 28	!L28				
124	Linear		Linear-Table 29	!L29				
125	Linear		Linear-Table 30	!L30				
126	Linear		Linear-Table 31	!L31				
127	Linear		Linear-Table 32	!L32				

8.2.6 Listing of current sensors

With the command `!#1` you'll get the listing of all current sensors. i.e.:

```
<!#1>{13}{10}
Konfig. :{13}{10}
01: 064, W_ {13}{10}
02: 096,TE M_ {13}{10}
03: 097,FE M_ {13}{10}
04: 098,TD _ {13}{10}
05: 099,DR _ {13}{10}
06: 013,WR _ {13}{10}
07: 013,WV A_ {13}{10}
08: 058,WG _ {13}{10}
09: 058,WS X_ {13}{10}
10: 058,WD A_ {13}{10}
(11: 059,RE _){13}{10}
(12: 059,RD _){13}{10}
13: 106,SX _ {13}{10}
(14: 100,ZA _){13}{10}
(15: 101,ZB M_){13}{10}
(16: 102,ZC M_){13}{10}
(17: 103,ZD M_){13}{10}
(18: 104,ZE M_){13}{10}
19: 063,UB _ {13}{10}
20: 014,MG _ {13}{10}
(21: 006,LX _){13}{10}
22: 080,DB M_ {13}{10}
23: 081,TP _ {13}{10}
(24: 082,WC _){13}{10}
(25: 041,XX _){13}{10}
(26: 042,YY _){13}{10}
27: 079,FS _ {13}{10}
(28: 035,GH _){13}{10}
(29: 036,GX _P){13}{10}
(30: 037,GY _P){13}{10}
31: 063,AE _ {13}{10}
(32: 039,GS _){13}{10}
{13}{10}
```

There are 32 sensors available (01-32), after the sensor's number the internal data source of each sensor (see table above) and then the sensor's identifier is shown.

Following the storage / output options are displayed with following meaning:

W=raw value

_=real value

M=attenuated real value

N=minimum value

A=average value

X=maximum value

D=standard deviation

Sensors in () are disabled.

8.2.7 Detailed information of each sensor

If you need detailed information of a certain sensor you'll get this with the command `!?` followed by the sensor's number, e.g.: `!5` for the sensor with identifier **DR**:

```

<!5>{13}{10}
===== Alias-Tab: 05 ====={13}{10}
>Sensor 99 (Linear 04) -> 10 (I2C 11){13}{10}
>Prefix: DR, Name: Luftdruck, Unit: 1073938691 [#02/U:01/G:03] -> hPa (1.000000, 0.000000)
{13}{10}
>Flags: 4625{13}{10}
|->Output: Real{13}{10}
|->Store: Real{13}{10}
|->Digits: 2{13}{10}
|->Smooth: Smooth{13}{10}
|->Statistic: Real{13}{10}
|->Statistic Reset: (none){13}{10}
|->Calc.Opt: 0{13}{10}
|->Limit: Normal{13}{10}
{13}{10}
>Min: 200.0000{13}{10}
>Max: 1200.0000{13}{10}
>Gain: 1.0000{13}{10}
>Translation: 0.0000{13}{10}
>Smooth.Weight 01: 0.100000, 02: 0.300000, 03: 0.600000, {13}{10}
>Statistic:{13}{10}
|->Interval: 300 (300){13}{10}
|->Avg.Weight: 1.000000{13}{10}
{13}{10}
>Dependency:{13}{10}
|->Alias: (none){13}{10}
|->TERM OFF{13}{10}
|->Affects: (none){13}{10}
{13}{10}
===== Linear-Tab: 04 ====={13}{10}
>Sensor 10 Source: Real{13}{10}
|->01: 600.0000, 600.2000{13}{10}
|->02: 700.0000, 700.2000{13}{10}
|->03: 800.0000, 800.2000{13}{10}
|->04: 900.0000, 900.1500{13}{10}
|->05: 1000.0000, 1000.1500{13}{10}
|->06: 1100.0000, 1100.2000{13}{10}
{13}{10}
>Dependencies{13}{10}
|----- 01 -----| |----- 02 -----| |----- 03 -----| {13}{10}
|->Off             |->Sensor 09          |->Off             | {13}{10}
|                  |-->01: 350000.0000, 0.0000          |                  | {13}{10}
|                  |-->02: 400000.0000, 0.0000          |                  | {13}{10}
|                  |-->03: 450000.0000, 0.0000          |                  | {13}{10}
|                  |-->04: 550000.0000, 0.0000          |                  | {13}{10}
|                  |-->05: 620000.0000, 0.0000          |                  | {13}{10}
|                  |-->06: 999999.8750, 0.0000          |                  | {13}{10}
|                  |-->Min: -10.0000                    |                  | {13}{10}
|                  |-->Max: 10.0000                     |                  | {13}{10}
|                  |-->Gain: 1.0000                     |                  | {13}{10}
|                  |-->Smooth: 0.800000                 |                  | {13}{10}
{13}{10}

```

8.3 Ethernet Port

The first setting of Ethernet configuration should be performed via the serial port!

8.3.1 Administrator

By default no admin account is defined, the ADMIN address is 0.0.0.0. All clients have got full access to the unit and can execute commands!

An administrator owns full access to the unit, therefore you should select an authorized IP-address, better a MAC-address or best both (IP-address and MAC-address) with the command ***ADMIN SET ADDRESS**, so that nobody else but only the desired computer (or client) has full access!

With ***ADMIN SET ADDRESS 192.168.100.25** only the computer with this address has administrative access (ADMIN commands) to the unit.

For this address is not the "correct" computer for certain, you can set a MAC-address, too. A MAC-address is explicit assigned to a computer or network adaptor.

***ADMIN SET ADDRESS 00-11-22-33-44-55** sets the MAC-address and only from this network adaptor administrative commands will be accepted. To increase safety, both, IP-address and MAC-address can be set simultanely, e.g.:

***ADMIN SET ADDRESS 00-11-22-33-44-55 192.168.100.25**

sets the network adaptor with MAC-address 00-11-22-33-44-55 and with the IP-address 192.168.100.25 as ADMIN.

It doesn't matter if first the MAC-address or the IP-address is inserted.

The IP- or MAC-address of a computer under Windows can be requested in the command prompt with the command `IPCONFIG /all`.

You may set more than one ADMIN address by using the command like:

***ADMIN SET ADDRESS 00-11-22-x**

Now all MAC-addresses starting with 00-11-22 are ADMINs.

The same is possible with IP-addresses:

***ADMIN SET ADDRESS 192.168.x**

or the same:

***ADMIN SET ADDRESS 192.168.0.0/16**

(/16 set the number of bits to be compared, in this case 192.168)

With:

***ADMIN SET ADDRESS 0.0.0.0/0**

each client is ADMIN.

You should avoid to allow many Admins for this could lead to collisions within the network if more than one Admin are accessing the unit at the same time!

8.3.2 Setting the Station's IP address

***ADMIN ETHER IP <IP-Address>**

This command sets the station's IP-address, e.g.:

*ADMIN ETHER IP 192.168.240.93/24 sets the station's IP-address to:
192.168.240.93 with subnet mask 255.255.255.0

NOTE: If you don't get access to the station via the network, you need to set the station's IP-address via the serial port.

8.3.3 Setting an ADMIN address and an ADMIN password

***ADMIN SET ADDRESS <IP-Address>**

***ADMIN SET ADDRESS <MAC-Address>**

***ADMIN SET ADDRESS <MAC-Address> <IP-Address>**

So you can set the ADMIN address (MAC- and / or IP-address) getting full access to the weather station. --> See also [here](#)

The setting is similar to ***ADMIN SET INCLUDE**, this means, you also can set ranges of addresses what is not recommendable.

***ADMIN SET PASSWD 123xyz**

sets the ADMIN password which is used for the ADMIN commands.

The password can contain up to 15 alpha numerical characters. No blanks and # / ! ? must be contained in the password. The first character must not be a letter! If the password does not meet this rules it will be rejected!

Capital and non capital letters are distinguished. (A ≠ a)!

If an ADMIN password is set this password needs to be inserted directly after ADMIN, e.g.:

***ADMIN 123myPW GET POWER.**

Also setting a new password required the old password:

***ADMIN 123myPW SET PASSWD 456myNewPW**

***ADMIN GET ADDRESS**

outputs the ADMIN address previously set with ***ADMIN SET ADDRESS**:

ADMIN ADDRESS

>MAC 90-1B-0E-23-45-67 & IP 192.168. 0. 0/16 (C0.A8.xx.xx)

If an ADMIN address is not yet set or has been deleted with ADMIN REMOVE ADDRESS, only three minusses will be displayed:

ADMIN ADDRESS

>---

8.3.4 Deleting the Administrator

***ADMIN REMOVE PASSWD**

Deletes the ADMIN password. After deleting this password, ADMIN commands can be executed without the need to input a password.

***ADMIN REMOVE ADDRESS**

Deletes the administrator -(client)-IP-/MAC-address.

CAUTION!

After closing the current connection to the Administrator-Client (if connected), the weather station won't accept ADMIN commands via Ethernet-RS-232 tunnel any more, that means, only via the RS-232 or USB-port ADMIN commands can be executed!

8.3.5 Closing connections

***ADMIN REMOVE ETHERNET CONNECTION x**

closes an Ethernet connection. x is the number of the TCP-connection to be closed. (1..16, see [*ADMIN GET ETHERNET CONNECTIONS](#)).

If an "*" is inserted instead of a number, all opened TCP- and UDP-connections will be closed.

***ADMIN REMOVE ETHERNET TCP CONNECTION x**

closes an Ethernet TCP-connection. x is the number of the TCP-connection to be closed. (1..16, see [*ADMIN GET ETHERNET CONNECTIONS](#)).

If an "*" is inserted instead of a number, all opened TCP-connections will be closed.

***ADMIN REMOVE ETHERNET UDP CONNECTION x**

closes an Ethernet UDP-connection. x is the number of the TCP-connection to be closed. (1..4, see [*ADMIN GET ETHERNET CONNECTIONS](#)).

If an "*" is inserted instead of a number, all opened UDP-connections will be closed.

8.3.6 Set access addresses and authorizations

With ***ADMIN SET INCLUDE** a number of addresses allowed to connect to the weather station can be set. This is similar to ***ADMIN SET ADDRESS**, but here you can set additional privileges and connection types (ports).

Here the ADMIN-address does not need to be inserted, the ADMIN address always has full access (to each port) and priority.

A global limitation is recommended, e.g.:

***ADMIN SET INCLUDE 192.168.0.0/16** (or ***ADMIN SET INCLUDE 192.168.x**)

This sets a read access for all IP-addresses starting with 192.168 on port 20002 (RS-232 tunnel). After that you might create a (limited) read / write access from IP-address 192.168.0.12 on port 20002 (RS-232 tunnel) with the command:

***ADMIN SET INCLUDE 192.168.0.12 [TCP*]**

This privileged access ("Super user") is necessary to e.g. set the clock or read the data logger

***ADMIN SET INCLUDE <IP-Address> [<kind>, <kind>, ...]**

***ADMIN SET INCLUDE <MAC-Address> [<kind>, <kind>, ...]**

***ADMIN SET INCLUDE <MAC-Address> <IP-Adresse> [<kind>, <kind>, ...]**

If commands are received from more than one address at the same time, the first received (or the lowest number) will be processed, and all other commands of other addresses are temporarily blocked, except commands from the ADMIN address.

Commands from the ADMIN address interrupt / discard commands from all INCLUDE addresses and will be executed with priority. Write accesses should be given sparingly to avoid influences on other clients.

This possibility actually is intended to get commands either from one or another client.

In addition to the IP-address also a MAC-address can be inserted. To compare only a part of a MAC-address, the MAC-address can be closed after a part of the address, e.g.:

***ADMIN SET INCLUDE 90-1B-0E-x**

This enables read access for all MAC-addresses starting with 90-1B-0E on port 20002 (RS-232 tunnel)

To enable access for only one explicit client you can insert a fixed MAC-address:

***ADMIN SET INCLUDE 90-1B-0E-12-34-56 [TCP*]**

For additional limit of the SUB-net, from which this client can access you may add an IP-address:

***ADMIN SET INCLUDE 90-1B-0E-12-34-56 192.168.10.x [TCP*]**

Then only from the computer with MAC-address 90-1B-0E-12-34-56 in the SUB-net starting with 192.168.10 (one from 255 clients) commands can be received in the local network.

The current clients list can be read with ***ADMIN GET INCLUDE**

single or all addresses can be removed with ***ADMIN REMOVE INCLUDE**

When the list is empty, only the ADMIN has access (assumed that an ADMIN-address is set).

(See also ***ADMIN SET ADDRESS**).

With these commands up to 15 addresses (MAC or IP addresses) can be set having access to the weather station. Also the kind of access can be set here. For by default there is full access to the MWS 55, an administrator address (ADMIN SET ADDRESS) must be set for otherwise any client has full access to the MWS 55 and the INCLUDE settings are without effect in this case.

In the simplest case an IP-address can be set, e.g. with

***ADMIN SET INCLUDE 192.168.3.4**

(the same as **ADMIN SET INCLUDE 192.168.3.4 [TCP]**) the client can connect with this IP-address over port 20002 and read the data from the MWS 55 (RS232-TCP-tunnel), for the TCP transmission is enabled on port 20002.

To select a different port or kind of transmission this has to be added explicitly, e.g.

***ADMIN SET INCLUDE 192.168.3.4 [HTTP]**

to allow a client access only to port 80 (HTTP-port).

To allow additional TCP transmission from port 20002 to this client a TCP has to be added. e.g.

***ADMIN SET INCLUDE 192.168.3.4 [TCP, HTTP]**

The following types of connection are allowed (to be added and separated by blank or comma after the []):

TCP [= TCP-connection (RS232-tunnel) on port 20002]

UDP [= UDP-connection (RS232-tunnel) on port 20002]

HTTP [= HTTP-connection on port 80]

However, no commands will be accepted from this client with these settings!

To allow limited and non administrative writing access for this client, after the <kind> a * has to be added to tell the weather station that this client has privileged access.

Privileged access:

***ADMIN SET INCLUDE 192.168.3.4 [TCP*]**

or to allow a MAC-address, starting with 90-1B-0E-4C, privileged TCP and HTTP-access.

***ADMIN SET INCLUDE 90-1B-0E-4C-x [TCP* HTTP*]**

IMPORTANT:

If there already exists the same IP-address (or MAC-address) as set in a new INCLUDE command, this address won't be created new but the kind of access (port) or privileges are changed for the existing address.

If this address doesn't exist yet it will be created on the next free position.

To delete an existing address use the following command:

***ADMIN REMOVE INCLUDE**

MAC-addresses must be written in HEX-Code separated with a "-" (00-20-4A-92-61-57) and IP(V4)-addresses in decimal separated with a "." (192.168.100.223)

***ADMIN GET INCLUDE**

With this command the addresses and permissions of the users accessing the weather station which have been set by ADMIN SET INCLUDE are displayed. After the number the MAC and / or IP-addresses is sent. Don't care is marked with a x in the MAC-addresses. In IP-addresses /<bits> shows how many bits must be equal with the setting.

Following the kind of connection (port release) is displayed where a * marks a privileged access to this port:

INCLUDE

```
>01:MAC 90-1B-0E-4C-xx-xx [TCP*, HTTP*]
>02:IP 192.168. 10. 2/32 (C0.A8.0A.02) [TCP*]
>03:IP 192.168. 0. 0/16 (C0.A8.xx.xx) [TCP]
>04:MAC 90-1B-0E-xx-xx-xx & IP 192.168. 0. 0/16 (C0.A8.xx.xx) [TCP, HTTP]
>05:---
>06:---
>07:---
>08:---
>09:---
>10:---
>11:---
>12:---
>13:---
>14:---
>15:---
```

***ADMIN ETHERNET IP xxx.xxx.xxx.xxx/yy**

This sets the IP-address and the net mask of the MWS 55. With IPV4 the 4 bytes must be separated by a "." (192.168.10.25). The net mask is separated with "/" or "%" from the IP-address and contains the number of the set bits, e.g.

***ADMIN ETHERNET IP 169.254.100.50/16**

sets the IP-address of the MWS 55 to 169.254.100.50 and the net mask to 255.255.0.0.

***ADMIN ETHERNET IP 192.168.10.99/24**

sets the IP-address of the MWS 55 to 192.168.10.99 and the net mask to 255.255.255.0

***ADMIN ETHERNET GATEWAY xxx.xxx.xxx.xxx**

Sets the address of the "default router" which establishes the connection to the nearest Subnet (e.g. Internet)

At IPV4 the 4 bytes must be separated by ".", e.g.:

***ADMIN ETHERNET GATEWAY 192.168.0.1**

sets the „default router“ IP-address to 192.168.0.1

***ADMIN ETHERNET NAME xxx.xxx.xxx.xxx**

notifies the IP-address of the name server which performs the name resolution of readable addresses in IP-addresses to the weather station.

At IPV4 the 4 bytes must be separated by ".", e.g.

***ADMIN ETHERNET NAME 192.168.0.2**

sets the IP-address of the name server to 192.168.0.2

The current setting can be read with
***ADMIN GET ETHERNET**

ETHERNET

```
>MAC 70-B3-D5-4A-E3-C2
>IP 192.168.240. 90/24 (C0.A8.F0.5A)
>GATE 192.168.240. 1 (C0.A8.F0.01)
>NAME 192.168.240. 2 (C0.A8.F0.02)
```

CAUTION! An existing network connection will be closed and reopened.

***ADMIN GET ETHERNET CONNECTIONS**

With this command an overview about all Ethernet connections is displayed.

First of all the connection condition is shown:

CLOSED --> Connection closed

ESTABL. --> Connection established

WAITING --> Connection not (longer) active, waiting for access or closing after 120 seconds.

STOPPED --> Connection interrupted.

ACTIVE --> Establishing or closing a connection

If the connection is not closed, the local port (= weather station), the authorisation of the client for this port (- = limited, only reading; * = privileged; A = ADMIN) and the client's IP-address is displayed.

With ***ADMIN REMOVE ETHERNET CONNECTION x**, the connection with number x can be forcibly closed:

ETHERNET CONNECTIONS

>TCP

```
|->01:ESTABL. :20002 - 192.168.240.101 (C0.A8.F0.65)
|->02:ESTABL. :20002 A 192.168.240.108 (C0.A8.F0.6C)
|->03:ESTABL. :20002 * 192.168.240.144 (C0.A8.F0.90)
|->04:WAITING : 80 - 192.168.240. 2 (C0.A8.F0.02)
|->05:CLOSED
|->06:CLOSED
|->07:CLOSED
|->08:CLOSED
|->09:CLOSED
|->10:CLOSED
|->11:CLOSED
|->12:CLOSED
|->13:CLOSED
|->14:CLOSED
|->15:CLOSED
|->16:CLOSED
```

>UDP

```
|->01:CLOSED
|->02:CLOSED
|->03:CLOSED
|->04:CLOSED
```

*ADMIN GET ETHERNET DATA

This command shows statistics about the previous received and sent IP-/ICMP-/TCP-/UDP-packets via the Ethernet port:

ETHERNET DATA

>IP

```
|->Rec'vd Pkts: 2577
|->Sent Pkts: 307
|->Dropped Pkts: 2269
|-->Ver/Hdr Errs: 2
|-->Length-Hi Errs: 0
|-->Length-Lo Errs: 0
|-->Fragmt Errs: 0
|-->Chksum Errs: 0
|-->Proto Errs: 0
```

>ICMP

```
|->Rec'vd Pkts: 0
|->Sent Pkts: 0
|->Dropped Pkts: 0
|->Type Errs: 0
```

>TCP

```
|->Rec'vd Pkts: 308
|->Sent Pkts: 307
|->Resent Pkts: 0
|->Rec'vd Rsts: 1
|->Dropped Pkts: 0
|-->Chksum Errs: 0
|-->Ack-Num Errs: 0
|-->Conns Ovrflw: 0
|-->Conns Bad Ports: 0
```

>UDP

```
|->Rec'vd Pkts: 0
|->Sent Pkts: 0
|->Dropped Pkts: 0
|-->Chksum Errs: 0
```

8.3.7 Changing the port number

With the following command you may change the standard port number to the same port number as our WLAN modules or TCP/IP converters are set to (10001). :

```
!XW0007c9e0,504b39bb06c1507e115504b60000000000
```

With the following command you set the port number back to standard (20002):

```
!XW0007c9e0,504b39bb06c1507e22aa37b60000000000
```

You may change the port number also to any other number but it is not recommended to perform!

8.4 Access permissions

Depending on the used interface the weather station has different access permissions:

Commands	Ethernet	COM	USB
Disk-Commands (*SHELL)	Only Administrator	Full access	Full access
! - Commands			
!“, !A, !B, !D, !F, !G, !I, !K	Only Administrator		
!L, !O, !S, !PF, !PL, !V, !W		Full access	Full access
[to V3.0207]: !?			
!CRC, !P, !R, !U, !Z, !*	Administrator + Super-User	Full access	Full access
[later than V3.0207]: !?	Administrator + Super-User		
? - Commands	Administrator + Super-User	Full access	Full access
* - Commands			
*ADMIN	Administrator Full access (possibly password), Super-User in configuration (possibly password)	Full access (possibly password)	
*DATA	[to V3.0207]: Only Administrator [later than V3.0207]: Administrator + Super-User, Writing in configuration	Read access, Writing in configuration	
*LEVEL	[to V3.0207]: Only Administrator [later than V3.0207]: Administrator + Super-User	Access	
*UPDATE	No access	Full access	No access

8.5 Plain text commands

Plain text commands are used for mobile connections via SMS but also can be used via serial connection (USB, RS-232) or Ethernet tunnel by adding a * in front of the commands

8.5.1 Listing of plain text commands

DATA [<output> <on/off>,<output> <on/off>, ...]

***DATA** [<output> <on/off>,<output> <on/off>, ...]

This is used to display or switch the digital outputs. To turn one or more outputs on or off, the command must be followed by the output designation (e.g., O1 or sensor prefix or name) and the desired state. This can either be a numeric one, or the word ON, or numeric zero, or the word OFF. Further outputs must be separated by spaces or commas.

To operate the outputs manually, this function must be enabled (see [ADMIN SET PERMIT](#)).

Whether with or without output switch, the DATA command always returns the current states of the outputs, e.g.

DATA O1 on O2 off o3 1,o4 0

leads to output:

DATA

Reinhardt MWS

>OUTPUT 1: ON

>OUTPUT 2: OFF

>OUTPUT 3: ON

>OUTPUT 4: OFF

>OUTPUT 5: OFF

>Heating_1: OFF

>Heating_2: OFF

>Fan: ON

With defined (or in sensor output contained sensors) sensors, the sensor name (or sensor prefix) is used instead of OUTPUT.

It also is allowed to send **DATA fan on**.

Caution:

You may temporarily override an automatic circuit (such as Fan) set before with ADMIN SET OUTPUT x TERM with this command. This should be avoided as far as possible, or be used only in the switching breaks / inactive phases of the automatic, otherwise the automatic switches within a second again.

LEVEL

***LEVEL**

Returns the current supply voltage (in volts) aus, e.g.

VOLTAGE LEVEL

>17.94

ADMIN STATION IDENT x

***ADMIN STATION IDENT x**

sets the device address $0 \leq x \leq 255$. with $x = 255$ the device accepts all commands.

Only when used with RS-485 protocol(s).

ADMIN STATION NAME Name

***ADMIN STATION NAME** Name

sets the station name, which is listed in the SMS as headline over the sensor identifiers and its values.

Any 19 characters are allowed (numbers, lowercase and uppercase letters, special characters).

Please note that special characters in the GSM character set may not be included.

Pay attention to short names to ensure a good readability of the SMS.

ADMIN STATION BAUD x

***ADMIN STATION BAUD** x

Sets the baud rate of the serial port.

Valid baud rates are: 300,600,1200,2400,4800,9600,19200,38400,57600 oder 115200.

All other values will be ignored.

ADMIN GET STATION

***ADMIN GET STATION**

Returns the parameters previously set with ADMIN STATION ...

STATION

>IDENT 255

>BAUD 9600

>NAME Reinhardt MWS

ADMIN STATION SENSOR x NUMBER s

***ADMIN STATION SENSOR** x NUMBER s

Define sensor position x (1..32) with sensor s.

s: Sensor, see [Sensors overview](#)

ADMIN STATION SENSOR x IDENT cccc

***ADMIN STATION SENSOR** x IDENT cccc

cccc: Prefix, maximum four characters from the following selection, set in front of the measured value in the output string:

0123456789ABCDEFGHIJKLMN OPQRSTUVWXYZabcdefghijklmnopqrstu vxyz_#@\$%& / ()=~

and the space, which must not be the 1st character (will be skipped).

ASCII-sign 126 (= "~") suppresses the character output.

e.g. **ADMIN STATION SENSOR 2 IDENT TE**

ADMIN STATION SENSOR x NAME Name

***ADMIN STATION SENSOR** x NAME Name

Sets the sensor name (e.g. Temperature).

Any 19 characters from the following selection are allowed:

0123456789ABCDEFGHIJKLMN OPQRSTUVWXYZabcdefghijklmnopqrstu vxyz_+.;#@\$%& /

()=~

and the space, which must not be the 1st character (will be skipped).

Please note that special characters in the GSM character set may not be included.

Pay attention to short names to ensure a good readability of the SMS.

e.g. **ADMIN STATION SENSOR 2 NAME Temperature**

ADMIN STATION SENSOR x UNIT unit

***ADMIN STATION SENSOR x UNIT unit**

If a unit is specified, the controller will search the **unit.ini** file on the SD card, which is a copy of the **Weather32unit.ini**, for the corresponding unit characters. The result of conversion will be set to one (the next unused) of the 20 available unit locations. The conversion is always carried out at the time of output. In the data logger the values are stored without unit, and the query is then converted online (for sensors with units).

It is also possible to specify the group by means of rectangular brackets, e.g. [temperature] ° C or ° C [temperature]. The group must exactly match (except upper / lower case) with the specification in the file, e.g. **ADMIN STATION SENSOR 2 UNIT °C**

ADMIN GET STATION SENSOR x

***ADMIN GET STATION SENSOR x**

Returns the parameters of sensor x, which were set by **ADMIN STATION SENSOR**

ADMIN SET NUMBER

***ADMIN SET NUMBER <telephone number>**

sets the current telephone number, from which the command was sent, as Administrator number.

If the command is sent via the serial interface, the telephone number must be attached in international format (+49 ...).

The administrator number enables a (mobile) phone to pass all ADMIN commands without the IMEI number as a password.

However, an administrator password set with ADMIN SET PASSWORD always must be entered.

ADMIN GET NUMBER

***ADMIN GET NUMBER**

Returns the Administrator number, which was defined with **ADMIN SET NUMBER**.

ADMIN NUMBER

>+491234567890

If no number is defined yet, or if it has been deleted with ADMIN REMOVE NUMBER, three minus signs are displayed:

ADMIN NUMBER

>---

ADMIN SET PASSWD 123xyz

***ADMIN SET PASSWD 123xyz**

sets the administrator password used below for the ADMIN commands. This can consist of up to 15 alphanumeric and special characters, with the following exceptions: No spaces or the characters # / !? contained, and the first character must not be a letter. Otherwise the password will be limited or not accepted. There is a distinction between uppercase and lowercase letters (A ≠ a)! If the password has been set, the password must be entered directly after ADMIN for all ADMIN commands.

e.g. **ADMIN 123myPW GET POWER**.

The renewed setting of the password must then be done with transfer of the old password:

ADMIN 123myPW SET PASSWD 456myNewPW

ADMIN SET ADDRESS <IP-Address>
ADMIN SET ADDRESS <MAC-Address>
ADMIN SET ADDRESS <MAC-Address> <IP-Adress>
ADMIN SET ADDRESS <MAC-Address> '<Password>'
***ADMIN SET ADDRESS** <IP-Address>
***ADMIN SET ADDRESS** <MAC-Address>
***ADMIN SET ADDRESS** <MAC-Address> <IP-Adress>
***ADMIN SET ADDRESS** <MAC-Address> '<Password>'

Here you can specify an administrator address (MAC and / or IP address) that should have full access to the weather station. The input is similar to ADMIN SET INCLUDE, which means that address ranges can also be entered, but this is not recommended. There should be a unique address here,

e.g. **ADMIN SET ADDRESS 90-1B-0E-23-45-67**

This would give the client with MAC address 90-1B-0E-23-45-67 administrative access. You could also enter an IP address to restrict the location,

e.g. **ADMIN SET ADDRESS 90-1B-0E-23-45-67 192.168.10.0/24**

would only accept commands from the client when it is sending from the local network and its IP address starts with 192.168.10 (24 bits for the compare mask).

The use of a single IP address is of course possible, although not so save, as well as the entry of address ranges.

ADMIN SET ADDRESS 192.168.10.25 for example, only allows one IP address, while **ADMIN SET ADDRESS 192.168.x** (or **ADMIN SET ADDRESS 192.168.0.0/16**) allows all IP addresses as administrators starting with 192.168..

The same can be done with the MAC addresses, e.g. **ADMIN SET ADDRESS 90-1B-0E-23-4x** allows all clients whose MAC address starts with 90-1B-0E-4 as administrator.

MAC addresses must be entered in hexadecimal notation and with - (minus signs) as byte separators, IP (V4) addresses in decimal notation with . (full stop) as separators.

Instead of an IP address, a password can also be entered together with the MAC address in order to gain access to the contents of the HTPASS folder [since of V3.0242].

The password must necessarily be enclosed in single quotes and may consist of max.15 characters from the following:

<SPACE>0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz_#@\$%& / ()=~

e.g. **ADMIN SET ADDRESS 90-1B-0E-23-45-67 'nimdA'**

ADMIN GET ADDRESS

***ADMIN GET ADDRESS**

returns the Administrator address, defined by **ADMIN SET ADDRESS**.

ADMIN ADDRESS

>MAC 90-1B-0E-23-45-67 & IP 192.168. 0. 0/16 (C0.A8.xx.xx)

If no address is defined yet, or if it was deleted with ADMIN REMOVE ADDRESS, three minus signs are displayed.

ADMIN ADDRESS

>---

ADMIN SET POWER x ON

ADMIN SET POWER x OFF

***ADMIN SET POWER x ON**

***ADMIN SET POWER x OFF**

With these command various power saving measures can be set, differentiated according to voltage source and voltage limits. See also **ADMIN SET LEVEL**.

For x, one of the following values can be used, which can be enabled with

ADMIN SET POWER x ON

or disabled with

ADMIN SET POWER x OFF.

15 = DISABLE_OUTPUT_USB:

Disables all outputs (except fan), when the station is run in USB node

14 = DISABLE_FAN_USB:

Disables the fan, when the station is run in USB mode

13 = Reserved

12 = Reserved

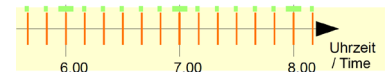
11 = SHUTDOWN_HOURLY_ACCU: [priority 2]

Switches off the station in standard and in battery mode, powers up 5 minutes before the full hour, and turns off 10 minutes later.

Caution! Data is not logged in the meantime!

A combined operation with value 10 is also possible:

In the diagram illustrated, the storage interval is orange, and the operating times of the station are shown in green.



10 = SHUTDOWN_LOGGING_ACCU: [Priority 2]

If the station is switched off in standard and in battery mode, it will boot up 30 seconds before the next time the data is logged, then save and then switch off immediately.

9 = Reserved

8 = SLOWDOWN_RATE_ACCU

Outputs data in RS232 standard and battery mode only every 10 seconds.

This is maintained until the voltage is $\geq 7V$ [ADMIN SET LEVEL 2], or comes from USB.

7 = Reserved

6 = Reserved

5 = DISABLE_OUTPUT_ACCU:

Turns off all outputs (except fans) when the station is on battery power, (Voltage $< 7V$ [ADMIN SET LEVEL 2])

4 = DISABLE_FAN_ACCU:

Turns off the fan when the station is on battery power (Voltage $< 7V$ [ADMIN SET LEVEL 2])

3 = Reserved

2 = Reserved

1 = SHUTDOWN_STATION_MIN: [Priority 1]

Switches the station off in standard and battery mode when the voltage drops below the minimum (Voltage $< 3V$ [ADMIN SET LEVEL 1]).

ADMIN GET POWER

*ADMIN GET POWER

Returns the assignment of the power switches, set by **ADMIN SET POWER**.

POWER

>1:ON

>2:OFF

>3:OFF

:

:

>31:OFF

>32:OFF

ADMIN SET OUTPUT x ON

ADMIN SET OUTPUT x OFF

*ADMIN SET OUTPUT x ON

*ADMIN SET OUTPUT x OFF

471/5000

This allows the digital output x (1..8) to be switched on (ON) or off (OFF), comparable to the command DATA Ox ON or DATA Ox OFF

You can temporarily override an automatic circuit set with ADMIN SET OUTPUT x TERM ... with this command. This should be avoided as far as possible, or be used only in the switching breaks / inactive phases of the automatic, otherwise the automatic switches within a second again.

ADMIN SET OUTPUT x TERM <hour>,<...><Term1><Link><T...2><V...><T...3><V...><Term4>

***ADMIN SET OUTPUT x TERM** <hour>,<...> <Term1><Link><T...2><V...><T...3><V...><Term4>

The command ADMIN STATION OUTPUT x TERM is used to establish an automatic switching of the output x (1..8) depending on up to 4 sensors.

With <hour> you can select the period in which the automatic switching is active. It can be separated by a comma for several hours, or the typing aids * (for all-day) and + (for 8:00 am - 6:59 pm) can be used. The space between the hours and the terms is important, while there should be no space between the hours !!

237/5000

For <Term> insert the identifier, the condition operator and the limit value of the sensors.

Conditional operators can be <(less), <= (less than or equal to), = (equal to), >= (greater than or equal to), > (greater) and <> (unequal).

The limit value is any number, with or without a comma (written as . (full stop))!!

It may also include a range, in this case a lower and, separated by a comma, an upper limit needs to be entered in brackets.

Here only = (equal) or <> (unequal) are allowed as conditional operators.

As <Link> only & (and) or + (or) are allowed.

Examples:

ADMIN SET OUTPUT 5 TERM 12,13 so>300

checks from 12:00 until 13:59, if the solar radiation exceeds 300W/m², switches output 5 when the solar radiation exceeds 300W/m².

If the solar radiation drops below this limit, output 5 is switched off.

ADMIN SET OUTPUT 4 TERM * te<0

always checks and switches output 4 if the temperature drops below 0°C. From 0°C and higher output 4 switches off.

This can be used to control a heater (e.g. as anti freeze)

ADMIN SET OUTPUT 3 TERM *?15 te<0.5

always checks and switches output 3 on, if temperature drops below 0.5°C. After switching on checking is paused for 15 minutes. This avoids permanent switching of the heater.

ADMIN SET OUTPUT 1 TERM *!8"3 te<10 & wg>10

always checks and switches on output 1, when in 8 successive data strings temperature is lower than 10°C and the wind speed is higher than 10 km/h.

Output 1 is switched off, if in 3 successive data strings either temperature is no longer below 10°C or the wind speed drops below 10 km/h. This avoids that short peaks switch the output.

ADMIN SET OUTPUT 4 TERM *!3 wg>10 & wr<>(25,335)

checks permanently and switches output 4 on, if in 3 successive data strings the wind speed is higher than 10 km/h and the wind comes from north direction 0° (+/- 25°).

Output switches off immediately, when one or both cases are false.

ADMIN GET OUTPUT x

***ADMIN GET OUTPUT x**

Returns the status and settings of the digital output x (1..8), e.g.

OUTPUT 7

>DATA OFF

>NAME

>TERM [TE <-10.00] + [TE < 0.00] & [WG > 10.00]

->TIME 0-23,

->DEFAULT NC

->INHIBIT 10 (0 left)

->DELAY-ON 10 (9 left)

->DELAY-OFF 10 (0 left)

ADMIN SET LEVEL x y.y

***ADMIN SET LEVEL x y.y**

sets the voltage limits for power save options and warnings.

This list consists of 7 voltage values, which are selected individually with <x>.

(<x> is a number from 1..7).

The voltage values need to be listed in ascending order, so LEVEL 1 is the lowest voltage value and LEVEL 7 the highest!

On delivery, the voltages are set as follows:

LEVEL 1:(STATION) 3.0

LEVEL 2:(ACCU) 7.0

LEVEL 3:(MOBILE) 8.0

LEVEL 4:(WARN #3) 10.0

LEVEL 5:(WARN #2) 11.0

LEVEL 6:(WARN #1) 12.0

LEVEL 7:(LIMIT) 30.0

The values between level 6 + 7 are the standard operating range!

The different levels cause a corresponding warning message when the voltage drops below (or exceeds at level 7), if this was enabled with ADMIN SET WARN.

If the voltage falls below level 1, the weather station is switched off when it is in battery mode and this has been set with ADMIN SET POWER. In this case, current values can no longer be retrieved. Every hour or in the event of an alarm, it is checked whether the voltage is sufficient and, if successful, switched on again. The station will be reactivated immediately if it is supplied either via the voltage connector (serial interface), via USB or via PoE.

If the voltage falls below level 2, it is assumed that battery operation is in progress and various energy-saving measures selected with ADMIN SET POWER can be initiated.

An optional handset can be switched off if it falls below Level 3.

All other voltage values only cause a warning message and have no effect on operation.

For <y.y> arbitrary floating-point numbers (however with a full stop instead of a comma) from 3.0 to 30.0 can be specified. Please keep the ascending order.

You can display the list of voltages with ADMIN GET LEVEL:

ADMIN GET LEVEL

***ADMIN GET LEVEL**

Returns the list of voltage limits set with ADMIN SET LEVEL or preset.

LEVEL

>1:(STATION) 3.00

>2:(ACCU) 7.00

>3:(MOBILE) 8.00

>4:(WARN #3) 10.00

>5:(WARN #2) 11.00

>6:(WARN #1) 12.00

>7:(LIMIT) 30.00

ADMIN SET PERMIT x ON

ADMIN SET PERMIT x OFF

***ADMIN SET PERMIT x ON**

***ADMIN SET PERMIT x OFF**

With this command, permissions to create and modify data can be enabled (ON) or limited (OFF).
For x one of the following values may be inserted:

17..19 = Reserved

16 = ETHERNET_ENABLE

Enables the Ethernet port.

15 = USB_ENABLE

Enables the USB port.

14 = ADMIN_ONLY

Changing settings may ONLY be done from the administrator's address / number,
even if e.g. in Ethernet the privileged authorization is set.

12..13 = Reserved

11 = DIGDATA

Allows manual modification of the digital outputs (via DATA)

1..10 = Reserved

ADMIN GET PERMIT

***ADMIN GET PERMIT**

This command displays the permissions for creating and modifying data set with
ADMIN SET PERMIT.

PERMIT

>1:OFF

>2:OFF

>3:OFF

>4:OFF

>5:OFF

>6:OFF

>7:OFF

>8:OFF

>9:OFF

>10:OFF

>11:ON

>12:OFF

>13:OFF

>14:OFF

>15:OFF

>16:OFF

>17:OFF

>18:OFF

>19:OFF

ADMIN LOCK

***ADMIN LOCK**

sets the Flash write protection. No changes in the configuration data are saved anymore (corresponds to the command! S + 8 via the serial interface). Even the administrator can not make any changes until the flash was unlocked with ADMIN UNLOCK (or! S-8), (change number / password, etc.).

ADMIN UNLOCK

***ADMIN UNLOCK**

disables the flash write protection. Now changes can be made in the configuration data. This corresponds to the! S-8 command via the serial interface.

ADMIN OFF

***ADMIN OFF**

switches off the station in battery mode (and standard mode).

ADMIN SAVE CONFIG

***ADMIN SAVE CONFIG**

Saves all current settings in the text file /_system/save/config.sav on the SD card. An existing config.sav file is saved under the name config.bak in the same directory.

ADMIN LOAD CONFIG

***ADMIN LOAD CONFIG**

Loads the file /_system/save/config.sav and transfers the containing information into the flash memory. This takes about 20 minutes. If the command was sent via the serial interface, a progress bar is transmitted:

```
LOAD CONFIG |-----+-----+-----+-----+-----I-----+-----+-----+-----|
```

Each minus sign corresponds to 1%, each plus sign to 10% and the "I" to 50%.

ATTENTION! If the flash memory is write-protected (ADMIN LOCK), the command will be executed, but no data will be changed! **Accordingly, the command can only be used meaningfully with either unlocked flash or in SECURE mode.**

ADMIN POWER REMOVE

[ab V3.0242]

***ADMIN POWER REMOVE**

Disables the backup battery. The next time the station is staked off, the real-time clock loses the data, i. the time starts at the following power up at 0 o'clock on 01.01.2000. New data will not be stored correctly until the time is set correctly again!

ATTENTION! Only supported from board version 1.057!

ADMIN POWER MOUNT

[ab V3.0242]

***ADMIN POWER MOUNT**

Activates the backup battery (again) to the controller. This is performed automatically each time the station is powered, but this can be used to undo an inadvertent ADMIN POWER REMOVE command.

ATTENTION! Only supported from board version 1.057!

8.5.2 Tree of plain text commands

DATA		Controlling and displaying the switching outputs
LEVEL		Output of current supply voltage
UPDATE		Called from update software in order to update the firmware.
ADMIN		
•	STATION	
•	• IDENT	Set the address of the station
•	• BAUD	Set the baud rate of the serial port
•	• NAME	Set the name of the station
•	• SENSOR	
•	•	NUMBER Define sensor
•	•	KEN oder IDENT Set identifier (Prefix) of a sensor (output position)
•	•	NAME Set whole name
•	•	UNIT Set unit of a sensor
•	ETHERNET	
•	• IP	Set the IP address of the station
•	• GATEWAY	Set the router address
•	• NAME	Set the address of the name server
•	SET	
•	• NUMBER	Register administrator number
•	• PASSWD	Set administrator password
•	• ADDRESS	Set administrator-IP- or/and MAC-address
•	• POWER	Set powersave functions
•	• OUTPUT	Set / delete outputs, set term
•	• LEVEL	Set voltage limits for monitoring
•	• PERMIT	Set creation and message restrictions
•	• WARN	<i>Ausgabe von Warnungen an den Administrator festlegen</i>
•	• INCLUDE	Set an access address
•	• EXCLUDE	<i>Eine von zehn Rufnummern speichern, die abgewiesen wird</i>
•	• KEN oder IDENT	<i>Standardsensoren festlegen, die unbekannte Anrufer bekommen</i>
•	• HTTP	<i>Zeitsteuerung für die Datenübertragung per HTTP (Mobile)</i>
•	GET	
•	• NUMBER	Request administrator number
•	• ADDRESS	Request administrator-IP- or/and MAC-address
•	• POWER	Request powersave functions
•	• OUTPUT	Request outputs
•	• LEVEL	Request voltage limits
•	• PERMIT	Request creation and message restrictions
•	• STATION	Request station's parameters (name, baud rate..)
•	•	SENSOR Request sensor's parameters (identifier, name, unit)
•	• ERR	Request error list
•	• INCLUDE	Request all access addresses
•	• EXCLUDE	<i>Ausgabe aller zehn Rufnummern, die abgewiesen werden</i>
•	• ETHERNET	Request IP-, router-, name-server-addresses
•	•	CONNECTIONS Request all current connections
•	•	DATA Request statistics about IP-/TCP-/ICMP- and UDP-packets
•	• WARN	<i>Konfiguration der Administratorwarnungen ausgeben</i>
•	• ABO	<i>Ausgabe aller zehn Abonnementplätze</i>
•	• ALARM	<i>Ausgabe aller zehn Alarmmeldungsplätze</i>
•	• KEN oder IDENT	<i>Ausgabe der Standard-Sensoren</i>
•	• LOG	<i>Ausgabe der letzten Aktionen</i>
•	• MOBILE	<i>Ausgabe der Mobiltelefon-Parameter (PIN, PUK...)</i>
•	• GPRS	<i>Ausgabe der GPRS Einstellungen</i>
•	• HTTP	<i>Ausgabe der HTTP-Einstellungen</i>
•	• SMTP	<i>Ausgabe der SMTP-Einstellungen</i>
•	REMOVE	
•	• PASSWD	Delete administrator password
•	• ADDRESS	Delete administrator-IP-/MAC-address
•	• ETHERNET	
•	•	CONNECTION Close one or all Ethernet-(TCP-) connections
•	•	TCP
•	•	CONNECT Close one or all TCP- connections
•	•	UDP
•	•	CONNECT Close one or all UDP- connections
•	• INCLUDE	Delete one or all access addresses
•	• EXCLUDE	<i>Löschen einer oder aller Rufnummern(e)</i>
•	• ABO	<i>Löschen eines oder aller Abonnementplätze / -nummern</i>
•	• ALARM	<i>Löschen eines oder aller Alarmmeldungsplätze / -nummern</i>
•	• TRACK	<i>Löschen einer oder aller Empfänger, die eine Rob-Daten-SMS / Email bekommen</i>
•	OFF	Shut down the weather station in batterie operation
•	LOCK	Enables the FLASH write protection
•	UNLOCK	Disables the FLASH write protection
•	SAVE	
•	• CONFIG	Save settings parameters
•	LOAD	
•	• CONFIG	Restore settings parameters
•	POWER	
•	• REMOVE	Switching off the internal backup battery (= storage mode)
•	• MOUNT	Switching on the internal backup battery (= operating mode)

This page is left free for further expansions!

9 Instructions for Mounting

9.1 Mounting MWS 55VY

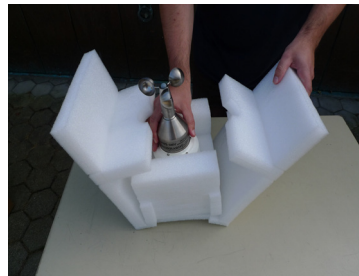
MWS 5 / 6 / Einzelsensoren

file:///G:/Wetter-CD-aktuell/English/Install/ShowMWS5.htm

Instructions for mounting:
MWS4, MWS 5M(V), MWS6, Sensors with logger



Click on picture to enlarge



Click on picture to enlarge

Step 1:

Check packing on damage.
Take out the complete inner package carefully.

Step 2:

Take out the socket with the
weather station from the package.



Click on picture to enlarge

Step 3:

Take out the weather station from
the socket carefully. Keep the packing!



Click on picture to enlarge

Step 4:

Mount the weather station on a 1" pipe,
adjust it to north and fix it well.

Manual MWS 55VY / MWS 88-2Y / MWS 10 and Sensors 55Y

MWS 5 / 6 / Einzelsensoren

<file:///G:/Wetter-CD-aktuell/English/Install/ShowMWS5.htm>



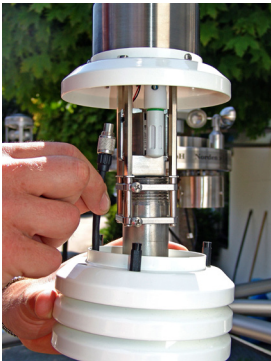
[Click on picture to enlarge](#)

Step 5:
Loose the 3 pagoda screws and keep them.



[Click on picture to enlarge](#)

Step 6:
Take off the 3 lower elements of the protection against radiated heat.



[Click on picture to enlarge](#)

Step 7:
Lead the cable through the protection against radiated heat.



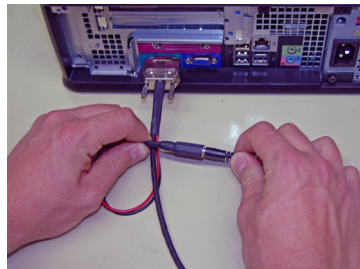
[Click on picture to enlarge](#)

Step 8:
Connect the cable to the POWER socket and fix it.



[Click on picture to enlarge](#)

Step 9:
Remount the protection against radiated heat.
The hardware now is installed.



[Click on picture to enlarge](#)

Step 10:
Connect the cable to a PC.
Last of all connect the PSU.

MWS 5 / 6 / Einzelsensoren

file:///G:/Wetter-CD-aktuell/English/Install/showmws5r.htm

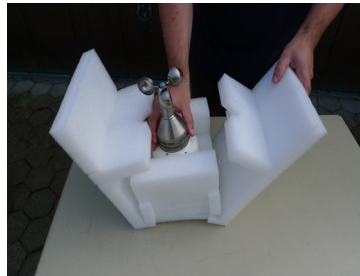
Instructions for mounting
MWS4, MWS 5M(V), MWS6, Sensors with logger,
when the cable is laid in the pipe.



Click on picture to enlarge

Step 1:

Check packing on damage.
Take out the complete inner package carefully.



Click on picture to enlarge

Step 2:

Take out the socket with the
weather station from the package.



Click on picture to enlarge

Step 3:

Take out the weather station from
the socket carefully. Keep the packing!



Click on picture to enlarge

Step 4:

Draw the cable through a 1" pipe.
Loose the 3 pagoda screws and keep
them.

MWS 5 / 6 / Einzelsensoren

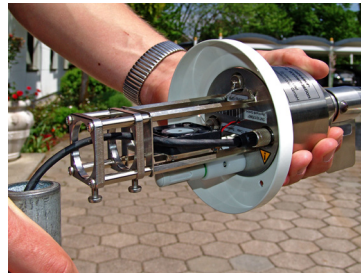
<file:///G:/Wetter-CD-aktuell/English/Install/showmws5r.htm>



[Click on the picture to enlarge](#)

Step 5:

Take off the 3 lower elements of the protection against radiated heat and put it over the pipe. Lead the cable through the 3 holes at the bottom of the weather station.



[Click on the picture to enlarge](#)

Step 6:

Connect the cable to the POWER socket and fix it. Lead the cable near the fan without jamming the fanwheel. Mount the weather station onto a 1" pipe.



[Click on the picture to enlarge](#)

Step 7:

Move up the 3 lower elements of the protection against radiated heat.



[Click on the picture to enlarge](#)

Step 8:

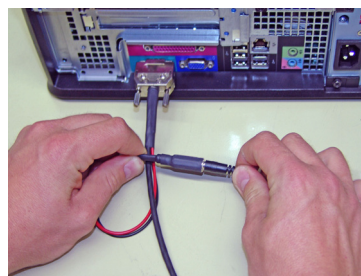
Remount the 3 lower elements of the protection against radiated heat.



[Click on the picture to enlarge](#)

Step 9:

Orientate the north marker to north and fix the weather station properly.



[Click on the picture to enlarge](#)

Step 10:

Connect the cable to a PC. Last of all connect the PSU.

9.2 Mounting MWS 10

MWS 9

<file:///G:/Wetter-CD-aktuell/English/Install/ShowMWS9.htm>

Installation of MWS 9-5 / MWS 10:



[Click on the picture to enlarge](#)



[Click on the picture to enlarge](#)

Step 1:

Check the package on damages, then open it and take out the top board and the cable.

Step 2:

Take out the MWS 9-5 carefully. Particularly take care of the windsensors!



[Click on the picture to enlarge](#)



[Click on the picture to enlarge](#)

Step 3:

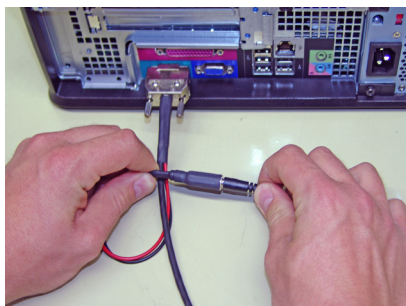
Mount a 1" pipe at the desired location of the MWS 9-5. (The pipe is not in the scope of delivery). **Pay attention to proper mounting of the pipe!**

Step 4:

Lay the cable to the location of the MWS 9-5. Install the cable as sheltered as possible, in order to prevent destruction by rodents!

MWS 9

file:///G:/Wetter-CD-aktuell/English/Install/ShowMWS9.htm



Click on the picture to enlarge

Step 5:

Connect the cable to a PC.
Connect the PSU to the mains
(100-240VAC 50/60Hz)
and plug it into the cable.
Install the weather software on your PC.



Click on the picture to enlarge

Step 6:

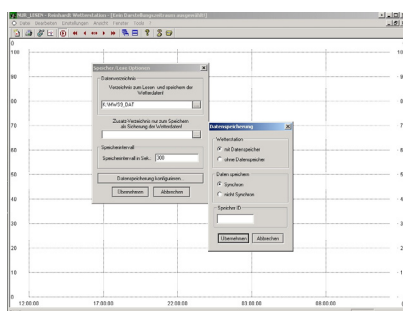
Mount the MWS 9-5 onto the 1" pipe.
Adjust the north marker of the MWS 9-5 to north direction.
Tighten the 2 screws of the socket properly.



Click on the picture to enlarge

Step 7:

Connect the cable to the power port of the MWS 9-5 and tighten it.
The MWS 9-5 now is ready for operation.
CAUTION: Only plug in the cable, when the PSU is already connected to the mains!
Otherways the MWS 9-5 is running only with the internal batteries and discharges them within 1 hour!!



Click on the picture to enlarge

Step 8:

Start the software to initiate the storing of data.
Let it run for at least one storage interval to ensure that a first dataset is written onto the disk.
When removing the PSU from the mains at all costs also plug off the power connector from the weather station to avoid totally discharge of the batteries of the MWS 9-5!!

[Back](#)

10 Packing MWS 55 properly

In case you want to ship your MWS 55, you must use the original packing. This packing was especially designed for MWS 55. It is the best protection against damage or destruction during transport. In this packing it will not even be damaged if it falls from 1 m height onto a concrete floor.



Do not fill the packing with polystyrene flakes. They could damage the wind vanes when the package is closed as there might be high pressure.

11 Exchange Connectors

In case you have to replace connectors, please contact:

Fa. Yamaichi, Tel: 0049 - 89 - 45109 146

The connectors belong to Series Y-Circ P.

Below you will find the order numbers:

6way connector (heating / GPS) Type number: **YCP-TPB09ACX-06MSCDX-051X**

6way connector (heating / GPS) Order number: **80-05781**

7way connector (data and power-supply) Type number: **YCP-TPB09ACX-07MSCDX-051X**

7way connector (data and power-supply) Order number: **80-05872**

9way connector (additional sensors) Type number: **YCP-TPB09ACX-09MSCDX-051X**

9way connector (additional sensors) Order number: **80-05873**

11.1 Connection adaptor Yamaichi-Binder

If you need to connect an old cable with Binder connectors to the MWS 55VY you'll need a connection adaptor from Binder to Yamaichi.

Below you see the description for the power / data connector:


Converters are also available for the additional sensor input and the GPS socket.

The TCP/IP connection is still a Binder connector (8-pin)


Anschlussumsetzer YAMAICHI-Binder 7-polig 1.0

Standardt 10cm (Kabel auf 15cm (+/-2cm) ablängen,
Kabeltronik LiYY Steuerleitung 4 x 0.14 mm² (AWG 26, A-Ø = ca. 4,1mm) Schwarz 095042609

Kabel:



Binder Kabeldose 7-polig
99-0476-102-07

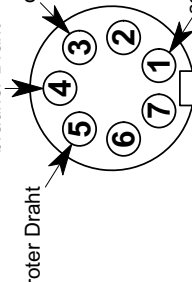


YAMAICHI Kabelstecker 7-pol
YCP-TPB09ACX-07MSCDX-046X

Vor dem zusammenbauen des Gehäuses die Kontakte mit Lötack versiegeln und nach dem Trocknen mit Silikon (Elastosil E41) vergießen > das Gehäuse muss innen bis zur Zugsicherung aufgefüllt sein.

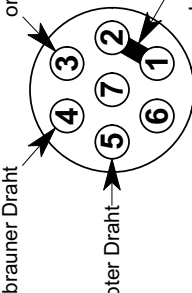
Kontakte mit Lötack versiegeln & die Pin's 3, 4 & 5 mit Schrumpfschläuchen isolieren! Pos. 1 = L 4mm x Ø 1,2mm

Verdrahtung Binder Kabeldose:



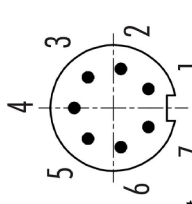
brauner Draht
roter Draht
schwarzer Draht

Verdrahtung YAMAICHI Stecker:

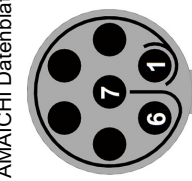


brauner Draht
roter Draht
schwarzer Draht,
Pin 1 & 2 mit
Lötbrücke verbinden

Ansicht Polbild ähnlich Binder Datenblatt



Ansicht Polbild wie YAMAICHI Datenblatt



Ansicht: Lötseite

Ansicht: Lötseite

Datum	15.12.23	Bearb.	MSI	Material			
Gepr.		Name		Titelansatz			
Norm		Datum		Datei: Anschlussumsetzer_YAMAICHI-Binder_7-polig_1.0			
Änderung			Bezeichnung				
			Anschlussumsetzer YAMAICHI-Binder 7-polig 1.0				

I&OE / Specifications subject to change without prior notice !

05/24

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