REINHARDT
System- und Messelectronic GmbH

REINHARDT Weather Stations

MWS 88-2   MWS 10   MWS 3   MWS 55

- Precise measurements at the physical limits
- High long-time stability und high quality materials
- Big internal data logger 16 GB (not MWS 3)
- Evaluation electronics / interface in one housing
- Practice-oriented software
- Starting-up in 5 minutes without soldering/clamming
- Stationary and portable
- Use all year long with optional heating
- Low current consumption
- Tested in in-circuit and function test
- Cycle endtest in a climatic chamber
- Own hardware and software development
- Service, production and calibration at one site

In both technique and quality REINHARDT-products are High-End products, but at medium prices. Among other things, the MWS-family impresses with its compact structure and the digital data transmission via RS232, RS422, RS485 and optional USB, WLAN, GSM, TCP/IP, PoE. Other than in analog transmission, the measured values are not distorted by losses or couplings. To avoid early failures, the electronics undergoes a burn-in of at least 1 week in a cycle of 4 hours cycle between 0 °C and 50 °C. The finished unit is calibrated in several cycles in a climatic chamber (e.g. -40 ° to +65 °Celsius). In the climatic chamber environmental

parameters are simulated. The reference values gained in this way become part of an interpolation table used for calibrating the units.

Applications:
Environmental measuring stations – weather services – acoustics – Formula1 Team courses – test courses of renowned tyre and car producers – building management system – military – TV – power plants – airports – sports clubs – insurance companies – road service – dump sites – petrochemical plants – food industry – agriculture – schools and universities – research institutes – health resorts – tourist information.

Instead of an instrument shelter, the temperature and humidity sensors of MWS 10 are double screened and come with an electrical axial fan. The powder-coated white bladed housing of MWS 55V protects temperature measurement from direct sunlight. This simulated instrument shelter is aerated by a system-controlled electric fan (e.g. dependent on the wind speed). This makes the measured values a lot more current and more exact than those gained in a traditional measuring procedure.

**Block Diagram
MWS 3 Weather Station**
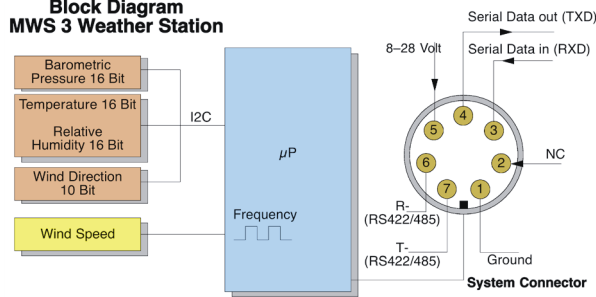
MWS 3

Standard:

· Temperature
· Relative humidity
· Dewpoint (via software)
· Barometrischer or absolute pressure
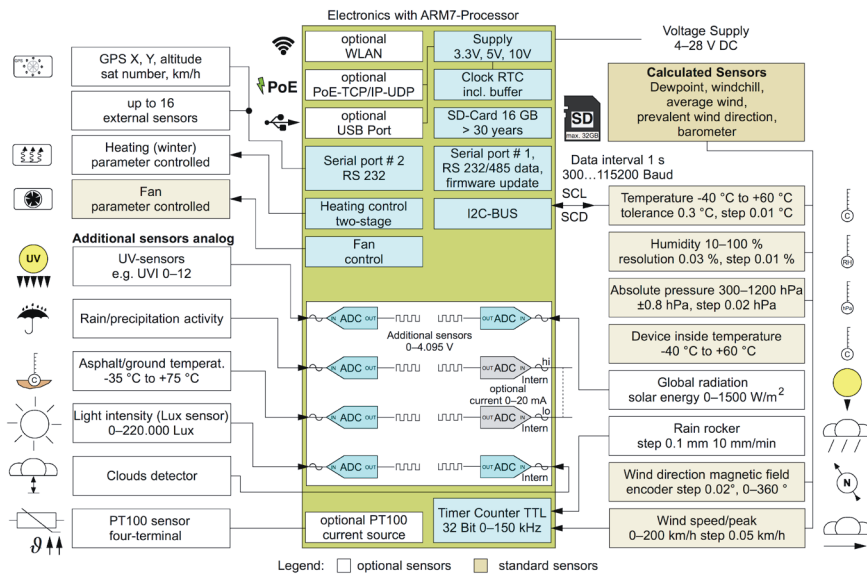· Wind speed
· Gust speed/peak
· Wind direction WR

MWS 55V and MWS 88

Standard:

· Temperature
· Relative humidity
· Dewpoint
· Barometric and absolute pressure
· Wind speed
· Gust speed/peak
· Average wind
· Windchill
· Wind direction WR
· Prevalent wind direction WR

Optional:
* Global radiation
* Precipitation
* Light intensity
* UV-radiation
* GPS
* Heating

MWS 10

Standard:

· Temperature
· Relative humidity
· Dewpoint
· Barometric and absolute pressure
· Global radiation
· Precipitation
· Wind speed
· Gust speed/peak
· Average wind
· Windchill
· Wind direction WR
· Prevalent wind direction WR

Optional:
* Light intensity
* UV-radiation
* GPS
  - Local altitude
  - Local coordinates
* Greenwich mean time (UTC-time)
* Heating
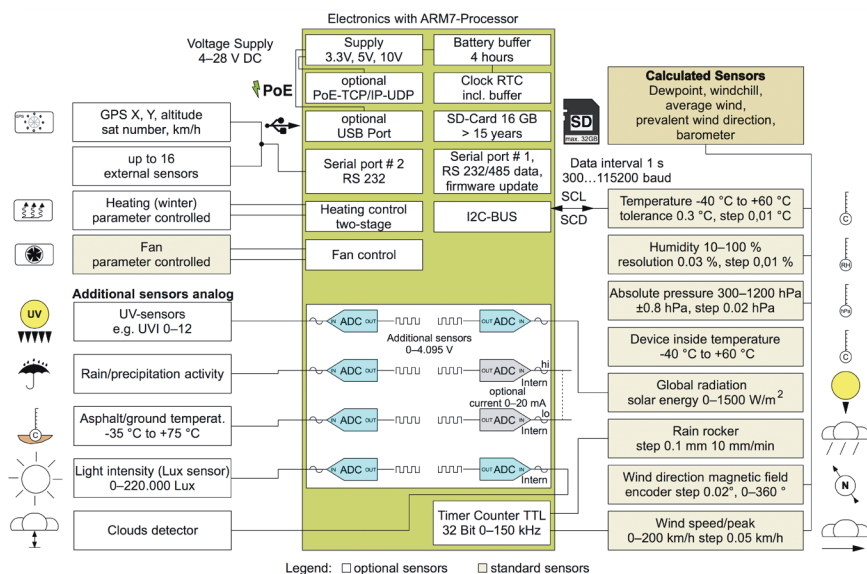
Installation

All stations excel in easy installation of hardware and software so that the weather station can be used after 5 to 10 minutes. Even PC amateurs can work very quickly with the easy-to-use and practical menu-driven software. A comprehensive help-function (F1-key) is available.
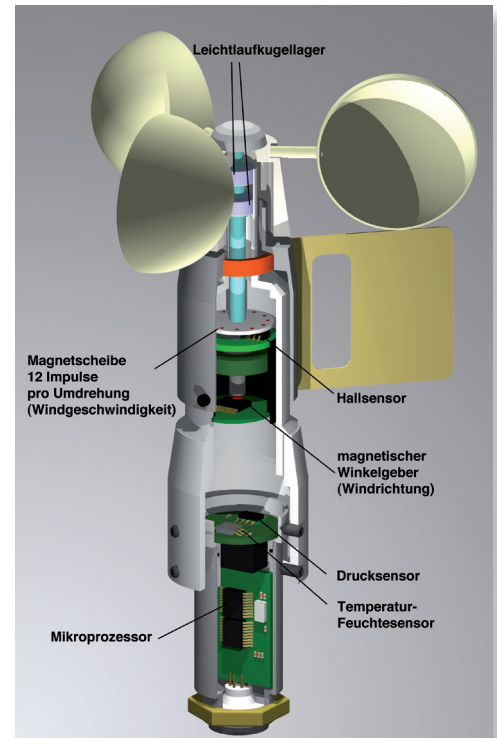
Expansions (not MWS 3)

The basic versions of the weather stations can be expanded with additional sensors. All sensors and evaluation electronics are within the housings of the weather stations. If sensors are needed in addition to the basic version, our weather stations already come with high-quality sockets. When they are not needed, the sockets are protected against environmental influences by a protective cover. Even several years later, you can order additional sensors in this way. You just plug them into the respective socket and transmit the new sensor parameters via interface (Plug and Play). You will find details on the additional sensors in the table on the last page or in the diagrams. For expansions or further tasks there are free inputs between 0 and 4.095 Volt and an optional frequency measurement (TTL-level) with MWS 10. The weather stations offer a networking connection via an RS232 to TCP/IP converter or via Wireless LAN (in free field up to 100 m), MWS 55, MWS 88-2 and MWS 10 can also use PoE via internet. A GSM-module is available too. The weather data can thus be inquired on a data mobile phone. This option is also used for transmitting the selected weather data by SMS. A subscription function for periodic data scanning is available too. One example of this use is e. g. the inquiry of the weather data of a vacant heliport.

MWS 3, diameter cup anemometer 120 mm

Data Logger

The MWS 55V, MWS 88-2 and MWS 10 weather stations hold a big internal data logger with non-volatile storage (SD card). At a 10 s interval it stores data of more than 30 years. Portable operation without PC is possible therefore. In case of power failure, MWS 10 even records data non-stop for up to 4 hours because of its internal accumulator buffer. A "Mini-USV" is available for the other weather stations. MWS 55, MWS 88-2 and MWS 10 have a battery buffered click so you can start storing the data even without a PC at any time.

Data Format

One feature why our products are so successful is that the sensor identification is continuously transferred together with the measured value. The measured values are linearised within the weather station and converted into an ASCII-signal which is transmitted via RS232-interface (optionally RS422/485 and USB). The data transfer rate of the RS232-interface can be set in various baud rates 1200, 2400, 4800, 9600, 19200 and 38400 (MWS 55, MWS 88 and MWS 10: 300 to 115.200). The signals are processed as standard ASCII-data, separated by comma (Example: 13:20:10,15.2.16,TE17.7,DR946.9,WR351.6,FE70.8,WG0.0,WS0.0,WD0.0,WC17.7,), to further data processing equipment or PCs.

Mounting a weather station
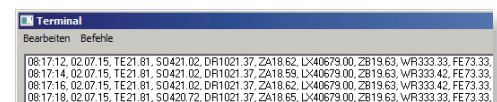
Data string for processing

The MWS 55V, MWS 88-2 and MWS 10 weather stations read the information of the optional GPS-mouse in the NMEA-standard and integrate it in the data string. Local altitude, time (UTC), position and speed above ground are transmitted with the data string. This information is always stored together with the environmental data in the data logger so that the measured values can always be assigned to a geographical position. The GPS-data can be displayed with the REINHARDT-software although with this software, they cannot be integrated in Routing-programs.

MWS 3
MWS 3 is even smaller, lighter and more compact than MWS 55V and MWS 10. This weather station comes with non-contact sensors and sensors with magnetic sampling for wind speed and wind direction. Power consumption is only 0.18 W.

Mobility Package for MWS 55V and MWS 88
The optional mobility package was developed so that environmental data can be recorded or evaluated on site. The standard package comes with a transport box with a tripod for the weather station and foam cuttings which hold the weather station, the connection cable, the mains supply unit and other accessories. An accumulator with wiring is an option.

Example Mobility Package

Control Outputs
MWS 10 has got two control outputs which can be configured (1x contact, 1x0/5 V) and which can be switched dependent on the measured value. Such outputs are optional in MWS 55V, MWS 88-2 and the sensors. The measured values of up to 4 sensors can be used.
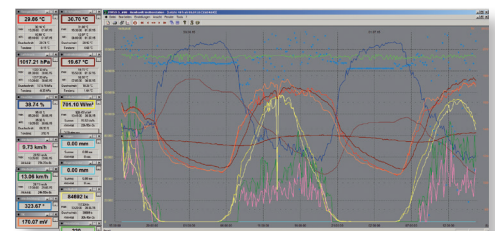
Graphical Menu
The measured values are displayed graphically with the standard evaluation and display software (operation system from WINDOWS 98® to WINDOWS 10®). There are three ways of displaying the values: numerically, graphically (XY-curve) and display of wind in a wind rose. The display windows can be sized individually and can be combined as you like. The stored data come in such a way that they can be read in with other software, such as e.g. EXCEL® and can then be processed and displayed. A converter is integrated for exporting the stored ASCII-data to the CSV-file.

Weather values in graphical display

With the software, humidity can also be displayed as dewpoint (not MWS 3). Wind speed is given in the three measured values wind activity, gust speed and average value. All three curves can be shown on one screen. There is also statistical evaluation via software. For all sensors, statistical data such as minimum, maximum, average, tendency) can be faded in. Precipitation, wind speed and global radiation are displayed with activity reports with adjustable threshold values. Global radiation can also be displayed with the total power in W/h, kW/h or MW/h. All parameters can also be displayed in other measuring units.
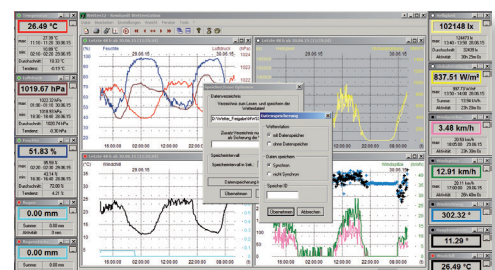

Display of selected weather parameters

For undisturbed operation in winter a heating is recommended which is controlled dependent on temperature. This largely averts snow deposits.

Control Menu

In the special software menu you can set minimum or maximum limits for every measured parameter, logically link several measured values and control facilities in this way. When the limits are exceeded or come below, program steps will be executed which can activate an external relay board which e.g. controls greenhouses or venetian blinds of large buildings or whole petrochemical plants. Depending on the resp. parameter, an e-mail can be sent too.

Software for Calculating the Wind Run

This optional software calculates and displays the wind run. The data can be shown with map in the background. You can use any maps in JPEG- or Bitmap-format (do not come with the unit!).

Displays

DMMK shows up to 12 parameters simultaneously. Its size is almost that of a sheet of paper, 20 x 30 x 2.8 cm and it is loaded with red 7-segment displays (15 mm high) so that the display is easily legible even in bright daylight. The analog meteograph with 23 cm diameter displays the weather data with 7 clocks.

With the optional **UWDS11-software** you can present the current weather and environmental data on a large scale monitor and enter text or scanned loaded pictures between the inserts for sales promotion.

HTTP-Server Link

With the latest version of the weather station software and HTTP-server link you can display the weather data of the weather stations on your homepage. Via a PHP-HTTP-interface you can send the data to a MYSQL-database and display them in defined intervals on your homepage. All the available sensors can be selected and visualised in a graph or a table. All the data stored in the MYSQL-database can be processed individually for your own applications. For comprehensive visualisations Web-programming knowledge is required.

An Upload to AWEKAS.AT is integrated in the software.

For detailled information on the 485-sensors and additional sensors, please see our brochures "485-Sensors" or "Sensors".
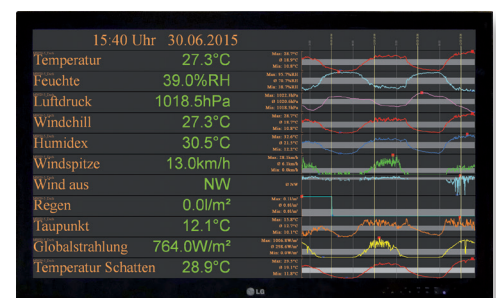

Control menu

Calculation of wind way

DMMK
20 x 30 x 2.8 cm

UWDS11-software on a big screen

Technical Data of the Weather Stations	MWS10	MWS88-2	MWS55V	MWS3
Temperature -40 to +60 °C resolution 0.01 °C tolerance 0.3 °C	●	●	●	●
Additional temperature sensor in a low radiation housing -40 to +60 °C	○	○	○	–
Ground temperature sensor, asphalt sensor -35 to +75 °C	○	○	○	–
Humidity 10 % to 100 % rel. F resolution 0.03 % tolerance 2 % RF	●	●	●	●
Barometric/absolute pressure 300 to 1200 hPa tolerance ±0.8 hPa, resolution 0.01 hPa, accuracy 1 hPa at 0–50 °C	●	●	●	●
Wind speed measuring range 0 to Response from 0.5 m/s MWS 55V, accuracy ±2.5 km/h, resolution: 0.01 km/h	200 km/h	200 km/h	200 km/h	200 km/h
Windchill measuring range +50 to -50 °C, MWS 3 calculated by software	●	●	●	●
Wind direction response <0.5 m/s or 1.0 m/s resp., accuracy ±5.0 °, resolution: 0.025 ° measuring range 0–360 °	●	●	●	●
Global radiation measuring range 0 to 1500 W/m² resolution 0.3 W accuracy ±40 W spectral range 0.3 to 2.8 µm	●	○	○	–
Rain/precipitation resolution 0.1 mm accuracy 0.2 mm colleting area 200 cm² max. intensity 10 mm/min	●	○	○	–
Heating for operation in winter 18 VDC, max. 1.33 A	○	–	○	–
Dewpoint -40 °C to +50 °C resolution 0.1 °C, MWS 3 by software	●	●	●	●
Light intensity (Lux-Sensor) 0 to 220000 Lux resolution 4 Lux tolerance 6 % Spectral range: human eye response	○	○	○	–
Ultraviolet radiation 0 mW to 15,000 mW resolution 3.6 mW tolerance 10 %, Spectral range 320 nm…395 nm	○	○	○	–
Free analog measuring inputs 0 to 4.095 V, resolution 16 bit	5	5	5	–
Free TTL measuring input 0 to 40000 Hz resolution 10 Hz tolerance 20 Hz (optional 0….4 kHz)	○	–	–	–
Control outputs (1x contact, 1x 0/5 V)	●	○	○	–
Secure linearised transmission of the measured values via RS232 up to 150 m (RS422 optional up to 1 km), baud rates 1200, 2400, 4800, 9600 (ASCII), 19200, 38400, (MWS 10, MWS 55V, MWS 88: 300 to 115200)	●	●	●	●
RS422-module for PC (RS422 → RS232)	○	○	○	○
USB-interface, MWS 3 USB-converter external	○	○	○	○
Internal clock and data logger: memory at 10 seconds interval (Minimum step: 1 second)	30 years	30 years	30 years	–
GPS (Universal time, local coordinates)	○	○	○	–
802.11b/g Wireless LAN module	○	○	○	○
TCP/IP Module indoor (MWS 3)**, PoE-interface** (MWS10, MWS55, MWS88)	○	○	○	○
GSM-module (dualband)	○	○	○	○
PC-software	●	●	●	●
Low current consumption at 18 VDC	>80 mA	70 mA	70 mA	10 mA
Various displays, digital (LED) and analog (clocks)	○	○	○	○
Power supply and 10 m cabling	●	●	●	○
Mounted on a 1 " pipe without thread, optional with external thread (for external pipe diameter ca. 33.8 mm) or 1"-thread; **MWS 3 thread M18**	●	●	●	–
Weight incl. PSU	2.90 kg	2.20 kg	1.60 kg	0.40 kg
Height	215 mm	330 mm	300 mm	175 mm
Diameter	240 mm	145 mm	125 mm	120 mm

Legend: ● = series ○ = option – = not possible

For more than one additional external sensor ou need an optional collector for connecting additional sensors.

IE & OE Specifications subject to change without prior notice 11/2022