Weather Station **blueberry All-In-One**

Description

Based on our data logger **blueberry NANO** this weather station is a compact and rugged system for precise acquirement of meteorological data.

Due to its low power drain, communication via LTE-M and secure data transmission via MQTT/TLS it is a good base for scalable meteorological measurement networks, agrometeorology, industrial IoT application and environmental monitoring. The optional LTE-Cat.1 modem provides worldwide data transmission wherever cellular 4G, 3G or 2G networks are available.

The system is expandable through serial interfaces. Automatic recognition of sensors reduces the configuration requirements to a minimum.

A photovoltaic solar module, integrated charge controller and backup battery ensures autonomous operation of the weather station at remote sites.

The weather station sends measured data automatically to our data portal **blueMoni**. Optionally, the weather station can be integrated into existing data infrastructure via MQTT.

Technical Data

System	
Measurement Inputs	2 x RS-485 (half-duplex), 1200…115200 Baud 1 x RS-232, 1200…115200 baud 2 x Digital IN (counter, frequency, status)
Serial Protocols	ASCII Modbus-RTU
Communication Interfaces	RS-485 RS-232
Power Requirements	360 mW (28 mA @ 12.8 V) at data transmission every minute (LTE-M version) 490 mW (40 mA @ 12.8 V) at data transmission every minute (LTE-Cat.1 version) Wind sensor 80 mW (6 mA @ 12.8 V)
Power Supply	Integrated power supply: • Solar charge controller 12V To be ordered separately:

	• Backup battery 12V/9Ah (AGM) or 12V/12Ah (LiFePO4) • Solar module 12V/30Wp
Sensor Power Supply	Power supply output for external sensors connected to the weather station 12 VDC (11…15 VDC, depending on battery charge status) / max. 160 mA
Operating Conditions	-40...+60 °C, 0…100 %rF
Protection Class	IP66
Material	Stainless steel, Aluminium, UV-stabilized plastic
Dimensions and Weight	300 x 180 x 250 mm, approx. 4 kg (dependent on battery type)
Cellular Modem	Integrated LTE-M modem (low power 4G), other modems and transmission options on request (NB-IoT, LTE, …)
Integrated Sensors	Air temperature, relative humidity, barometric pressure, global irradiance, wind (some of them are optional)
Data Transmission	Automatic secure transmission of measured data to a central data server via MQTT/TLS, other data protocols and data formats on request
Data Server	Management and display of measured data on the data portal **blueMoni**
Configuring	Automatic sensor recognition, other parameters via the data portal **blueMoni**
Sampling Interval	1/10/60 s
Statistic Interval	1 minute / 10 minutes

Sensors	
Air Temperature + Air Humidity (TH)	Thermo-hygro sensor in a passive radiation shield mounted below the enclosure Measurement range: -40…+60 °C / 0…100 %rF Accuracy: temperature ±0.1 K (+20…+60 °C), ±0.2 K (-40…+20 °C) humidity ±1.5% (0…80 %rF), ±2% (>80 %rF)
Barometric Pressure (p)	Measurement range: 300…1250 hPa Accuracy: ±0.5 hPa (500…1100 hPa)
Global Irradiance (GHI)	Si-based global irradiance sensor on the upper surface of the enclosure Spectral range: 350…1100 nm Measurement range: 0…3000 W/m² Accuracy: ±3% (typ. basic accuracy), ±5% (total accuracy at -10…+40 °C, directional errors, non-linearity and longterm drift over 2 years inclusive). The sensor complies to **fast response Class C** according to ISO 9060:2018
Wind Speed and Wind Direction	Ultrasonic wind sensor with wireless data transmission to the weather station base. No cabling required! Maximum distance: 30m at free line of sight. The sensor is powered by an integrated solar cell with LiFePO4 backup battery. Output rate: 1 Hz Measurement range: wind speed 0…40 m/s, wind direction 0…360° Accuracy: wind speed ±0.5 m/s (0…5 m/s), ±10% (>5 m/s) (meets WMO-No.8), wind direction ±2° Operating temperature range: -15…+55 °C (ice free)
Additional Sensors	The weather station features two serial RS485 bus interfaces for connection of additional sensors. We offer a broad range of sensors for the following measurands: Wind speed, wind direction, air temperature, humidity, precipitation, leaf wetness, soil moisture, soil temperature, soil conductivity, PAR, UV, global

	irradiance (thermopile pyranometers), DNI, DHI, PV reference power, soiling of solar modules, further sensors on request

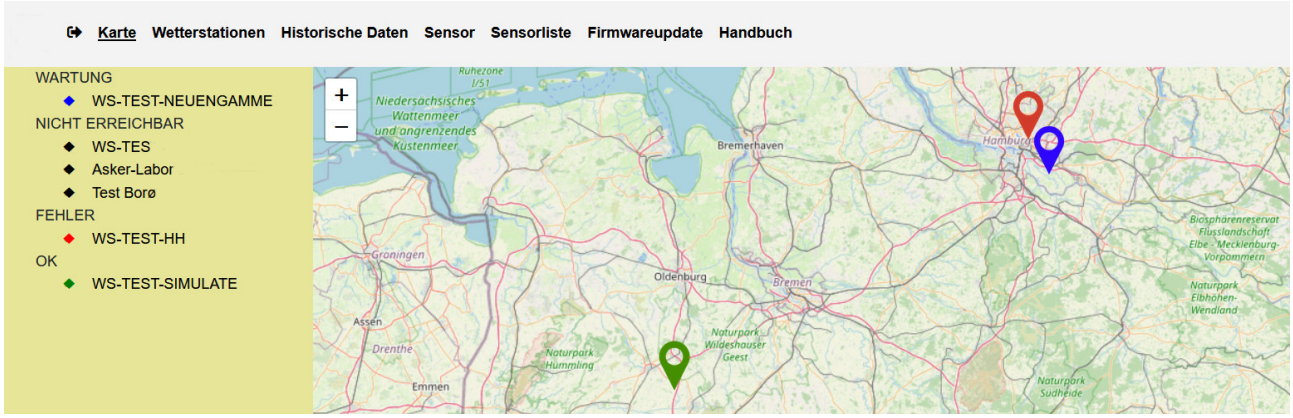
Available Models	
PartNo. 100754	Integrated sensors for TH, p and GHI
PartNo. 100828	Integrated sensors for TH, p, GHI and Wind

Accessories	
PartNo. 100791	Backup battery 12V/12Ah (LiFePO4)
PartNo. 100790	Backup battery 12V/9Ah (AGM)
PartNo. 100279	Solar module 12V/30Wp

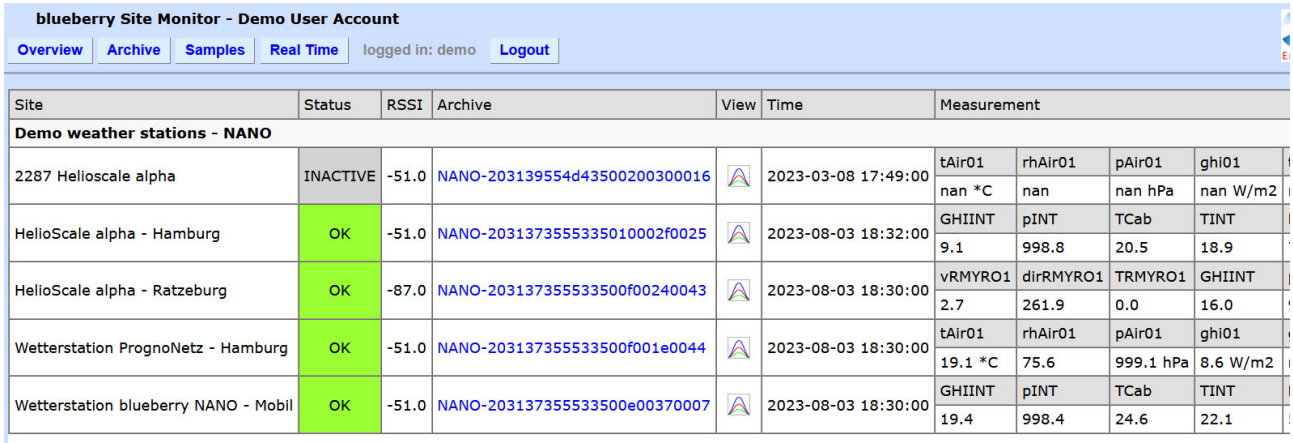
Data Portal blueMoni

The data portal **blueMoni** provides access to realtime data and to stored data of all weather stations. The access is protected by passwords. The encrypted MQTT data transmission to **blueMoni** provides a high security level.

Display of all weather stations on a map provides a good overview about the measurement network:



blueMoni provides access to realtime values and to stored measurement data:



Site	Status	RSSI	Archive	View	Time	Measurement			
Demo weather stations - NANO									
2287 Helioscale alpha	INACTIVE	-51.0	NANO-203139554d43500200300016		2023-03-08 17:49:00	tAir01	rhAir01	pAir01	ghi01
						nan *C	nan	nan hPa	nan W/m2
HelioScale alpha - Hamburg	OK	-51.0	NANO-2031373555335010002f0025		2023-08-03 18:32:00	GHIINT	pINT	TCab	TINT
						9.1	998.8	20.5	18.9
HelioScale alpha - Ratzeburg	OK	-87.0	NANO-203137355533500f00240043		2023-08-03 18:30:00	vRMYRO1	dirRMYRO1	TRMYRO1	GHIINT
						2.7	261.9	0.0	16.0
Wetterstation PrognoNetz - Hamburg	OK	-51.0	NANO-203137355533500f001e0044		2023-08-03 18:30:00	tAir01	rhAir01	pAir01	ghi01
						19.1 *C	75.6	999.1 hPa	8.6 W/m2
Wetterstation blueberry NANO - Mobil	OK	-51.0	NANO-203137355533500e00370007		2023-08-03 18:30:00	GHIINT	pINT	TCab	TINT
						19.4	998.4	24.6	22.1