



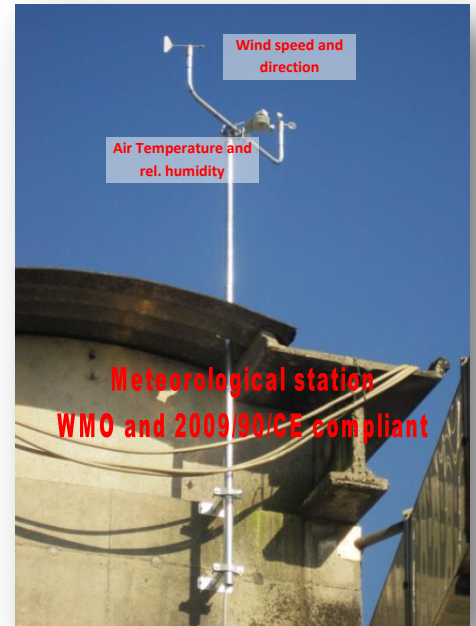
MICROMet3BC – MONITORING STATIONS FOR WEATHER AND EFFICIENCY MEASURING IN BIOGAS POWER AND COMPOSTING PLANTS (Rev.2 180121)

MicroMet3BC stations have been designed for meteorological and environmental monitoring of biogas power and composting plants in compliance with guidelines of current international legislation (Italian reference **D.Lgs. 152/06**).

In composting or biogas power plants where smell volatile substances can be released in the atmosphere, it is essential that **meteorological measures** and in particular those **anemometrical** are done with the best accuracy; indeed the pollution dispersion is strongly influenced from dynamic atmosphere conditions. For this reason the MicroMet monitoring stations are equipped with professional Geoves sensors which can be certifiable in external calibration centers that are internationally recognized (eg. **Accredia, WMO, Measnet**).

Besides the weather-climatic measures, the parameters that allow to evaluate the perfect efficiency of the bio-filter plant such as the **temperature and humidity of the bio-compost**, the measurements of air intake for odorous and polluting substances (air delivery, pressure, differential pressure, etc...) and finally the pH value of the leachate deriving from the bio-filter humidification.

For such needs, **MicroMet3BC** is not just a simple weather station, but an evolved monitoring system able to receive up to 16 analog and 2 digital measures and the possibility to integrate multiparametric sensor/probe with serial output (eg. for water monitoring, sensors for air quality monitoring such as electronic noses, analyzers, gas sensors, particulate/dust gauges).



Advantages



Temperature-moisture, pH and air aspiration monitoring in a bio-gas plant

- ✓ Instruments **WMO** compliant and **Accredia** certifiable
- ✓ **Low consumption** and possibility of powering with photovoltaic panel
- ✓ **No property communication protocol**
- ✓ **Standard text data format** (CSV format) compatible with Excel, database and the most common softwares available in the market.
- ✓ **No connection charges** (with GPRS wireless transmission and photovoltaic panel power supply)
- ✓ **Critical working conditions** (presence of salinity, ice, sand, corrosive agents, high temperature excursions, etc...)
- ✓ **Reliability, long-life and minimum requested maintenance**
- ✓ **High accuracy and resolution of the measure**
- ✓ **Fully italian technology**

Technical Data

DATALOGGER	mMET3 – Multichannel Datalogger
I/O Channels	8 analog inputs (+ 8 option on Expa8 interface): in voltage or current (typ.0...5Vdc or 4...20mA); 2 insulated digital inputs (pulse counter) for sensors with "high" frequency up to 50KHz (anemometers, flow gauges, ecc...) and with "low" frequency output (rain gauges), sensors that requires the time counting (sunshine duration, leaf wetness,...), on/off signal (free-contacts); 1 diagnostic input for battery monitor
Power supply	10...14.4Vdc (typical 12Vdc); On-board battery charger, input from photovoltaic panel, with battery monitoring (deactivation of the load <10,5Vdc, restart >12Vdc) or power supplier 220Vac/12Vdc
Average autonomy of a weather station with 7 measures	>15days: with 12Vdc/7Ah battery, 20W photov. panel, storage: 5' transmission: 60' >30days: with 12Vdc/18Ah battery, 30W photov. panel, storage: 5' transmission: 60'
Data communication	<u>Wireless</u> via GSM/GPRS on FTP area <u>wired</u> via RS232/LAN cable with PC free software for data download
Alarms transmission	via e-mail using MeteoGraph web (with GPRS data transmission)
Programming	On site: setting of text file in the SD Card memory
Settable parameters	- Date and time with NTP synchronization (network time protocol) - Anemometer and rain gauge constants - Storage rate (5, 10, 15, 30 or 60');) - Transmission rate (5, 10, 15, 30 or 60');
Elaborations	Min, max (gust), arithmetic average, standard deviation, turbulence; trigonometric average; sum; diagnostic measure for battery voltage. Calculable measurements (if the weather sensors that allow the calculation are present): Evapotranspiration Et0, TD Dew point temperature, TWB wet bulb temperature
Data storage	Data backup of 500 days with circular storage
Conformity	Annex 8 – WMO (World Meteorological Organization)
Working temperature	-30...+70°C
IP65 Enclosure (basic version)	Plastic material Dim.(LxHxP): 250x350x160mm, key closure and universal brackets for mounting on the pole.



mMET3



Datalogger mounting in the IP65 container

METEOROLOGICAL SENSORS	mSTAU – Air temperature-humidity sensor
Model	mSTAU – Air temperature-humidity sensor
Power	+9...+24Vdc
Output	0...5Vdc o 4...20mA
Temperature - Range	-40...+60 °C
Transducer	Pt100 with anti-radiation shields
Accuracy	±0.2°C
Rel. Humidity - Range	0...100 %
Transducer	Capacitive with anti-radiation shields
Accuracy	±2%



Model	RG200 – Rain gauge (available also with anti-icing heater)
Range	infinite
Orifice area	200cm ² (option: 400 cm ²)
Transducer	Double contact (n.o.) tilting bucket (on request Out:0...5Vdc or 4...20mA)
Accuracy	Class B UNI 11452:2012 (class A connected to the Geoves datalogger)
Resolution	0.2 mm/commutation (or 0.1mm 400cm ² version)
Power supply	Without heater: none; With heater (Vers.-R): 12-24Vdc 60W



RG200

RG400

Models	mWS1 – Wind speed sensor
Range	0...75m/s
Transducer	Magnetic with sinusoidal AC signal not powered
Rotation	High performance bearings
Typ. output	AC sine wave
Typ. constant	4.3Hz / m/s
Accuracy	< ±0.1m/s

Models	mWD1 – Wind direction sensor
Range	0...359° (true electric angle 0...352° ±4°)
Transducer	Linear Potentiometer with continuous 360°
Rotation	High performance bearings
Typ. output	Resistance changing
Accuracy	< ±2°

Model	PIRSC – Silicon cell pyranometer
Measuring range	0...2000 W/m ²
Spectral Range	0.4...1.1µm
Transducer	Silicon cell
Accuracy (typ.)	±3.5%

Model	STP – Bio-compost temperature probe
Range	-40...+60 °C
Transducer	Pt100 1/3DIN with stainless steel rod Ø5-12 x 1000-2000mm
Accuracy	±0.2°C
Output	-N 4 wires Pt100; -I 4...20mA

Model	RHT – Soil moisture probe
Typ. Range	0...57-60% VWC (soil Volumetric Water Content)
Transducer	Dielectric
Power / consumption	12Vdc/ 1mA
Output	4...20mA
Accuracy / Resolution	±3% VWC / 0,08% VWC

Model	Pitot tubes
Typ. Range	2...40 m/s
Transducer	Pitot tube with differential pressure amplifier
Power	12...24Vdc
Output	4...20mA
Accuracy / Resolution	±1%
Dimensions and diameters	Several lengths and diameters (depending on the piping section)

*Other meteorological sensors are available on request

HYDROLOGICAL SENSORS	
PH meter	Mod. PH-I
Range	0...14 pH
Transducer	Double annular junction with temperature compensated polymer gel electrolyte
Accuracy	0.01pH
Output	4...20mA
Power	12...24Vdc



Model	SMx-485 - Multiparametric Probe	
Detectable Measures	Standard range	Accuracy
1. Temperature:	-5...+55 °C	±0,25 °C
2. ORP (Redox):	± 1.000,0 mV	±30 mV
3. pH:	-2...16 pH	±0,25 pH
4. Conductivity:	0...6.000 mS autorange (o 0...60.000 mS)	±0,25% v.m.
5. Depth:	0...20m; (0...350m vers.-P)	±0,02 m
6. Dissolved Oxygen:	0...20ppm, mg/l or 0...200% (other ranges on request)	±0,1 ppm, mg/l
Options		
7 Turbidity :	0...4.000 NTU	± 5% v.m.
or		
7a n.1 chemical parameter at your choice among:	1) Ammonia, 2) Chlorides, 3) Nitrates (max water depth 5m)	
Working pressure	3bar with Depth, Temperature, Conductivity, pH, ORP, Dissolved Oxygen 35bar on demand	
Power and consumption	9...14Vdc (typ.12Vdc) 30mA max	
Communication	RS485 (option: RS232 converter) with protocol suitable for Geoves dataloggers or Modbus-RTU protocol	
Standard Cable	30m freestanding vented cable (other lengths on request)	
Housing material	PVC	
Dimensions	mod.: SMx: ø70mm x 510mm, Weight: 1,6kg mod.: mSMx: ø42mm x 510mm, Weight: 1,2kg	



AIR POLLUTANTS MONITORING SENSORS			
Models and Measures		Range	Resolution
SCO-I	Carbon monoxide (CO)	0...200ppm	1ppm
SSO2-I	Sulphur dioxide (SO ₂)	0...20ppm	0,2ppm
SH2S-I	Sulphured hydrogen (H ₂ S)	0...100ppm	0,1ppm
SNO-I	Nitrogen oxide (NO)	0...100ppm	0,5ppm
SNO2-I	Nitrogen dioxide (NO ₂)	0...10ppm	0,05ppm
SO3-I	Ozone (O ₃)	0...2ppm	0,02ppm
SCO2-I	Carbon dioxide (CO ₂)	0...2000 or 5000ppm	0,5% f.s.
SNH3-I	Ammonia (NH ₃)	0...100ppm	1ppm
SCL2-I	Chlorides (Cl ₂)	0...10ppm	0,05ppm
SCH4-I	Methane (CH ₄)	0...100% o 0...5% Vol.	0,5...1% f.s.
Output signal		4...20mA	
Power and consumption		12...24Vdc 30mA (average)	



Note: To get a better measurement resolution, it is recommended to use specific analyzers or sensors (on request)

Fix, telescopic and tilttable poles	PF2-55	PF3-55	PTAP10-80	PRBF10-110
Models:				
Heights (m)	2	3	10 max 2 min	10 max
Raising	None (fix)	telescopic	Telescopic with pump	Balanced tiltable
Diameters (mm)	Base: 55 Top: 55	Base: 55 Top: 50	Base: 80 Top: 40	Base: 170 Top: 70
Weight (kg) guy wires and accessories excluded	6kg	11kg	23kg	170kg
N. of guy wires	none	none	3@120°	none
N. elements	1	1	6	2
Housing material	Galvanized steel	Galvanized steel	Aluminum	Galvanized steel
Required workers for installation	1	1	2	1+truck with crane

*Other poles are available on request

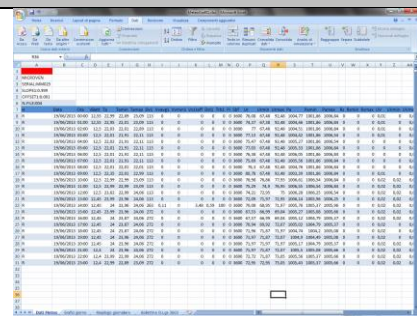


Geodesk&Meteograph - Free softwares for datalogger setup and web service of data management

SOFTWARE

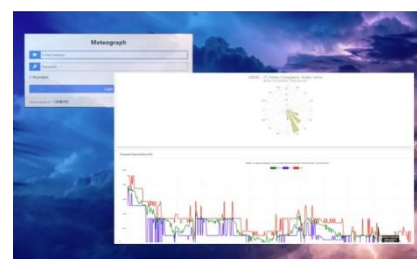
Model

Geodesk & MeteoGraph



Geodesk is a basic service software, free supplied with all Geoves datalogger, that can import data recorded (on SD card or sent via GPRS or transmitted by cable from the datalogger) and generate a single data file in Excel format. In this way it's possible to create data aggregation of desired period (eg. Monthly) and then derive the tabular and graphical reports.

Besides Geodesk creates the setup configuration for the functioning of Butterfly, Micro3 and LPDL Geoves dataloggers

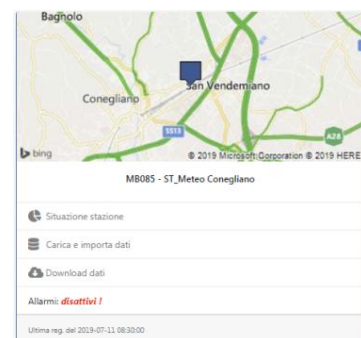


MeteoGraph is a web application for the numerical and graphic display of data transmitted via GPRS on FTP area from environmental monitoring stations with Geoves datalogger.

The software relies on an FTP Geoves area where data is sent autonomously by the control units at fixed times and are available in **standard text format** with fields separated by commas (**CSV format**).

The data is therefore **always usable** without the need to use proprietary communication protocols or specific programs for data decoding; furthermore, the software **does not require any installation** as Internet access is sufficient and a username and password must be entered to enter the dedicated web page and display the measurements from a PC, tablet or smartphone.

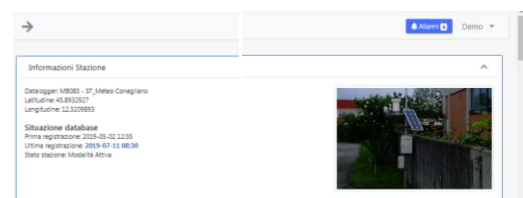
The data in text format are processed by MeteoGraph to obtain on the web page both the measurement in numeric format (eg average minimum maximum trend, etc.) and in graphic format that can be downloaded in jpg bitmap format.



Station dashboard

The available functions are:

- **Station situation:** access to the graphic processing page and to the station's synoptic
- **Load and import data:** the data saved on the datalogger SD card are imported, or on a PC folder (or other support)
- **Data download:** data are downloaded in text format with fields separated by commas for simple backups or subsequent processing with other applications (eg Excel, Access, external databases or other commercially available software)
- **Alarms:** access to the station alarm management menu (optional on request)



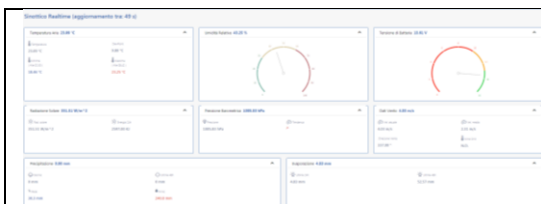
Station situation - Station information

The parameters displayed are:

- Station unique identifier (ID)
- Name of the station
- Geographic coordinates (Latitude and Longitude)
- Data base status:
 - Date and time of Start data storage
 - Date and time Last data storage
 - Operation status of the station
- Photos of the station

Real-time synoptic of the station

The synoptic is a very useful tool for assessing the situation of the latest measurements taken by the monitoring station and assessing the meteorological or environmental situation of the site. For each



measurement it is possible to associate one or more dedicated processes. For example, for the temperature it is possible to indicate the minimum and maximum value and the time in which it occurred in addition to other calculated measures such as the dew point.

The synoptic also shows:

- calculated measures
- Diagnostic data (eg battery voltage)
- Significant data for the interpretation of the measure (eg barometric tendency, wind chill, monthly precipitation, etc.)

Selezionare il periodo di osservazione

Intervallo dati

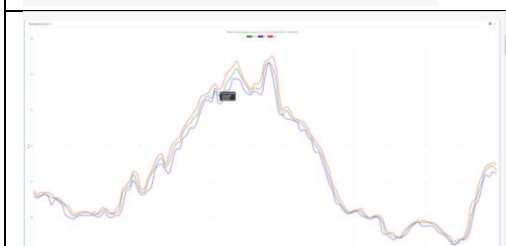
Da 10/07/2019 00:00

A 11/07/2019 23:59

Aggiorna

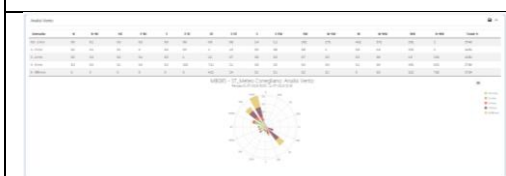
Observation period

It is possible to select the observation period in which to carry out all the elaborations that are displayed by MeteoGraph



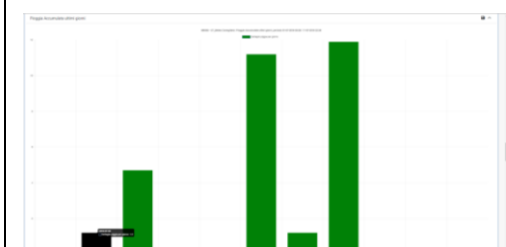
Graphic elaborations

- **Linear multi-line** for measurements where the arithmetic average is applied (eg temperature, humidity, pressure, etc.) with representation of the minimum and maximum value



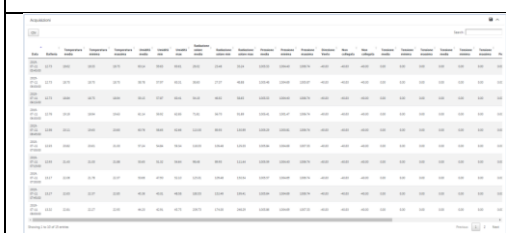
Graphic elaborations

- **Wind-rose** for the anemometer measurements



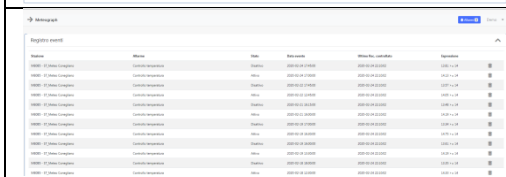
Graphic elaborations for precipitation

- Graph with hourly summation
- Monthly or annual precipitation histogram
- Other graphs are available on request or can be customized with simple filters



Tabular elaborations

Daily data table can be downloaded both in text and in .png image format



Alarm management

To manage alarms, the software allows you to set upward (> value) or downward (<value) intervention thresholds, after which alert emails are sent to the personnel in charge.

The alarms are then represented on the screen with adequate effects and colors to attract the attention of the operator