



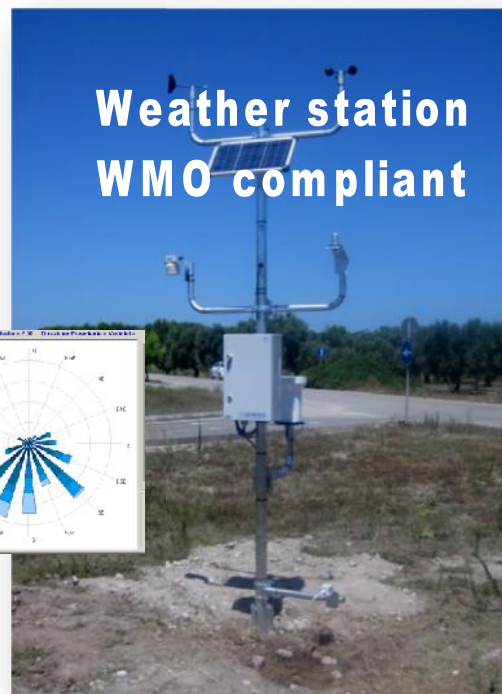
MICROMET3 – METEOROLOGICAL STATIONS FOR CLIMATE AND ENVIRONMENT MONITORING (Rev.3 101023)

MicroMet stations have been designed for weather, climate and environment monitoring in compliance with **WMO** guidelines (World Meteorological Organization – Annex 8).

MicroMet stations are equipped with the MicroMET3 datalogger and by professional sensors which can be calibrated from external laboratories (e.g. **Accredia**, **WMO**, **Measnet**, ecc...). Sensors may operate in several critical conditions (strong wind, hail, saltiness, ice, etc...) and, thanks to their low consumption, without any connection to the electrical grid.

MicroMet stations, based on the numbers and kinds of connected sensors, can be responding to the following applications and requirements:

1. **"Compact meteo"**: station with 3m telescopic pole, easy to install and suitable for any application where available spaces are limited or where the optical impact must be minimum. Typical installations: meteo-urban monitoring, harbour areas, universities, research institutes, local boards, industrial areas, dams, civil protection, etc...
2. **"Synoptic meteo"**: station with 10m tiltable/telescopic pole, suitable for applications where the anemometric measures must be done in compliance with WMO guidelines (ref. meteorological measurements in open field). Typical installations: monitoring of atmospheric pollutants dispersion (evaluation of Pasquill stability classes), airport, anemological studies, primary measure stations for weather forecasting, monitoring of snow and glaciological layers, etc...



Compact meteorological station with 3m pole

The datalogger MicroMET3, which is the central processor unit of the station, is able to display, acquire, memorize and transmit by remote all data. Thanks to its modularity, the datalogger may receive up to 13 analog, 3 digital measures and 1 water multi-parametric probe with serial port.

Advantages



Meteorological station with 10m pole for monitoring of atmospheric pollutant dispersion (installation in cogeneration 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	<ul style="list-style-type: none"> >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	<ul style="list-style-type: none"> 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, Wind Chill, Humidex
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

Model	mSTAU – Air temperature-humidity sensor
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
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 e WS2 – Wind speed sensors
Range	0...50 m/s (typical) gusts >75m/s
Transducer	Magnetic with sinusoidal AC signal not powered
Rotation	High performance bearings
Anti-icing heater	12Vdc/1W (only for WS2 model)
Accuracy	< ±0.1m/s

Models	mWD1 e WD2 – Wind direction sensors
Range	0...359°
Transducer	Linear Potentiometer with continuous 360°
Rotation	High performance bearings
Anti-icing heater	12Vdc/1W (only for WD2 model)
Accuracy	< ±2°

Model	PIRSC – Silicon cell pyranometer (global solar irradiance)
Measuring range	0...2000 W/m ²
Spectral Range	0.4...1.1µm
Transducer	Silicon cell
Accuracy (typ.)	±3,5%

Models	PIR2S / PIR01 / PIR02 – Thermopile pyranometers (global solar irradiance)
Measuring range	0...2000 W/m ²
Spectral Range	PIR01 and PIR02: 300...2800nm; PIR2S: 283...2800nm
Transducer	Thermopile
ISO9060 accuracy classes	PIR2S: Secondary standard (high quality) PIR01: First Class (good quality) PIR02: Second class (moderate quality)
Available certifications	ISO9001 in compliance with ISO9847 norm

Model	NSR – Net radiometer (Net solar radiation)
Measuring range	±2000 W/m ²
Transducer	Thermopile (spectral range: 0,3...100µm)
Sensitivity	10µV/W/m ²
Available certifications	ISO9001 in compliance with ISO7726 norm

Model	mPA, BAR – Barometers for indoor or outdoor (with static port)
Range (typical)	800...1100 hPa (on request 600...1100 hPa for sites over 1000m above s.l.)
Transducer	Piezoresistive
Average accuracy @ 25°C	BAR: ±0.5hPa; mPA: ±0.6hPa
Long-term stability	±0.01hPa/year

Model	EVAS – Evaporimeter with class A pan
Range of the measure sensor	0...30mB
Transducer	Capacitive with polynomial temperature compensation
Accuracy (between 10...50°C)	<0.1% f.s.
Evaporimeter accessories	Wooden platform with protective coatings; AISI304 stainless steel pan, class A in compliance to WMO Annex 8 guidelines
Power supply	8...28Vdc
Output	4...20mA



Model	SNU – Sonic level sensor (snow depth gauge)
Range	0...6m
Transducer	sonic
Accuracy	<0,2% of measured value
Output	4...20mA
Power supply	10...30Vdc



POLES/MASTS Models	PF2-40	PF3-55	PL3-TREP	PF4-55 (PF5-55)	PTAP10-80	PRBF10-110
Heights (m)	2m	2,7 max 2 min	3.9 max 1.9 min	3,7 max (o 5m) 2 min	10* max 2 min*	10 max
Typical application	Fix or relocatable	Fix	Fix or portable	Fix	Fix or portable	Fix
Mounting	On soil without civil works or plinth or wall	On civil works or plinth or wall	On soil without civil works or concrete platform	On civil works or plinth or wall	On wall or with field tripod	On civil works or plinth
Raising	No	Telescopic, manual			Telescopic, pneumatic	Tiltable balanced
Wind resistance	100km/h with gusts up to 130km/h@0...1000mslm and without ice load					
Diameters (mm)	Base: 40 Top: 40	Base: 55 Top: 50	Base: 40 Top: 30	Base: 55 (55) Top: 50 (45)	Base: 80* Top: 40*	Base: 170 Top: 70
Weight (kg) guy wires and accessories excluded	4kg	11kg	10kg	13kg (18kg)	23kg	170kg
Material	Galvanized steel				Anodized Aluminum	Galvanized steel
N. elements	1	2	3	3	6	2
N. of guy wires	/			3 @ 120°	3 @ 120°	/
Required workers for installation	1				2 (PRBF10-110 need truck with crane)	

*Other poles are available on request

EXAMPLES OF MICROMET APPLICATIONS



Meteorological portable station with 10m pneumatic pole, folding tripod and multi-parametric sonic anemometer with on-board compass



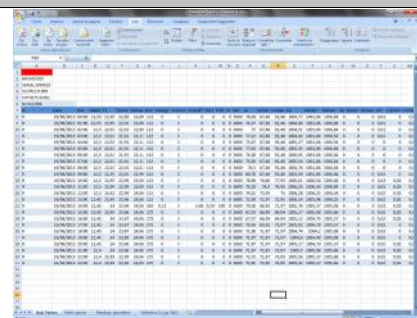
Weather station on telescopic pole h=3m (without civil works) for climatologic monitoring in the Taranto gulf



Meteorological station mounted on 10m light telescopic pole. Installation in a shelter for air quality analysis

SOFTWARE

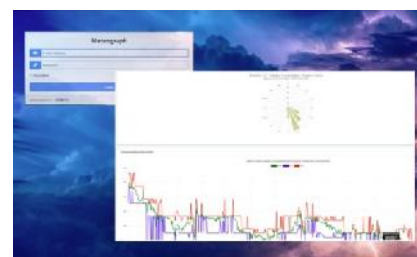
Model



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

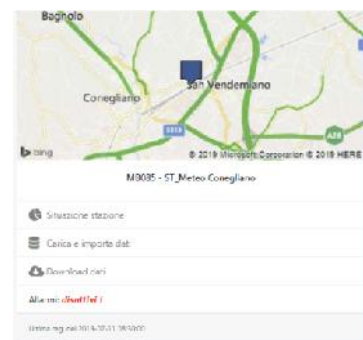


MeteoGraph is a web application for the numerical and graphic display of data transmitted via GPRS on FTP area from environmental monitoring stations with Geoves datalogger.

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.

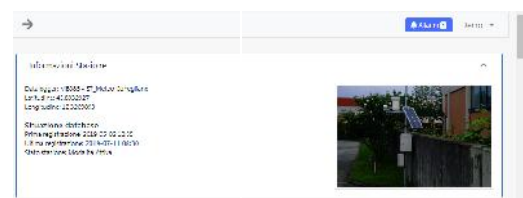
The data in text format are processed by MeteoGraph to obtain on the web page both the measurement in numeric format (eg average minimum maximum trend, etc.) and in graphic format that can be downloaded in jpg bitmap format.



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

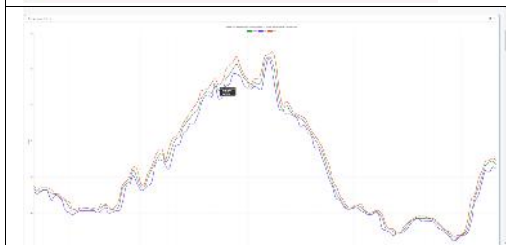
Da: 01/07/2019 00:00

A: 01/07/2019 22:59

Aggiorna

Observation period

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



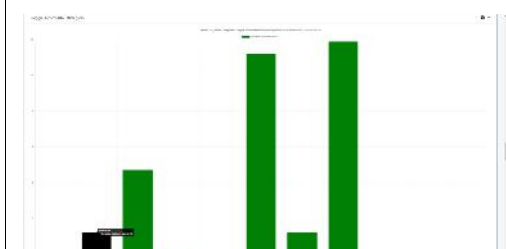
Graphic elaborations

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



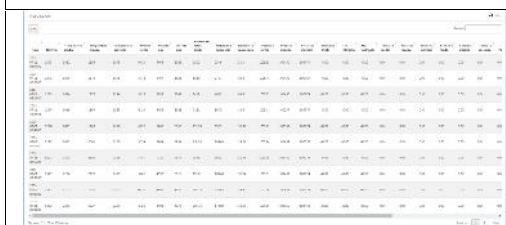
Graphic elaborations

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



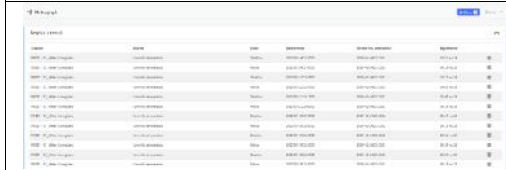
Graphic elaborations for precipitation

- 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