



STMVEN – WIND MONITORING STATIONS FOR EOLIC SOURCE YIELD ASSESSMENT (WITH LIGHT POLES AND NO CIVIL WORKS NEEDED) (Rev.2 100119)

The wind monitoring stations of the series MicroVEN have been designed and constructed entirely from Geoves in accordance with standard **IEC61400-12** and **Measnet** guidelines. For this reason MicroVen stations are used for wind monitoring finalized to the evaluation of eolic yield and the next wind turbines installation.

ADVANTAGES and MAIN FEATURES

Compliance

- ✓ **IEC61400-12 compliance of:** datalogger, data elaboration, anemometers, brackets length
- ✓ Datalogger tested by **Measnet laboratory**
- ✓ **MEASNET calibration certificate** (Optional) for anemometers

Mechanical strength and Reliability

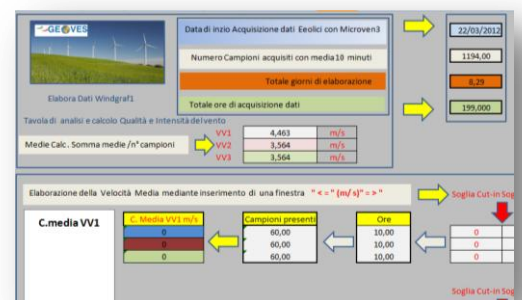
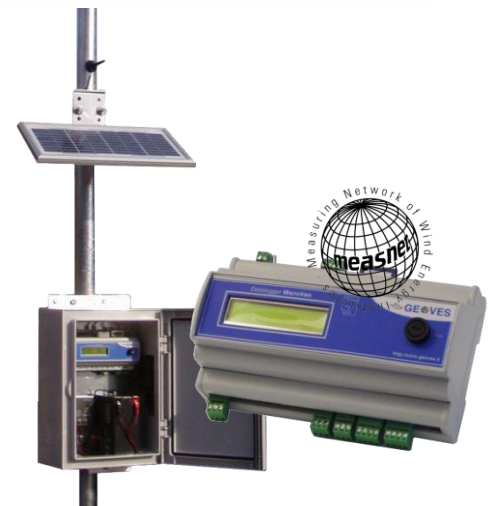
- ✓ Sensors and dataloggers made to minimize / eliminate failures caused by direct lightning strikes
- ✓ Acquisition of the diagnostic data of the **battery voltage** to prevent possible system shutdowns
- ✓ Instrumentation made of **resistant stainless materials** to operate in all working conditions such as ice, high temperature ranges, salinity, sand, gusts of wind, hail,

Easy installation

- ✓ All components are **light and easily transportable** and the pole does not require building works
- ✓ **No connections required:** the system has a very low consumption and power is supplied by small photovoltaic panels
- ✓ **GPRS wireless data transmission**
- ✓ Integrated **automatic procedure** that allows to get the best GPRS signal and to track properly the antenna

Datalogger main features

- ✓ Setup of anemometric constants (**slope** and **offset**) for every wind speed sensor.
- ✓ Memory card protected against data manipulation
- ✓ Automatic calculation of **dew-point** (used to optimized the consumption of the anemometers anti-icing unit)
- ✓ Data format: Standard Ascii text .TXT with every field separated by comma (**CSV format**); compatibility with Excel, database and the most common software available in the market
- ✓ Data transmission wireless between **GPRS quadric-band modem via FTP**. The data will sent in a protected web area where it's possible to access only with username and password dedicated.
- ✓ Free software **WindGraf1** to get a good evaluation of the wind energy yield



Technical Data

DATALOGGER

Model:	mVEN3 - Multichannel datalogger
Input Channels	7 analog inputs for wind direction sensors, pyranometers, barometers, thermo-hygrometers or other analog meteorological sensors; n.1 input for battery voltage (diagnostic measure) 3 digital inputs (frequency meter) for wind speed sensors
Calculated measures	Frost point: this measure is necessary to switch on the smart heating system of the anemometers just with ice-presence (this calculation is possible just with the connection of a thermo-hygrometer)
Elaborations with 1s sampling rate (IEC61400-12)	Wind speed: Min, max (gust), arithmetic average, standard deviation, turbulence; Wind direction: trigonometric average; Other meteorological sensors: arithmetic average
Data storage (typ.)	10' (600 samples) on SD Card up to 2GB (autonomy 511 days)
Data Transmission	Wireless: GSM/GPRS via FTP (via e-mail on request)
Data format	ASCII standard text with separated values by comma (CSV format)
Data safety	Memory card protected against data manipulation
Local HMI	2r. 16 crt. display LCD with sliding pages n.3 multifunction buttons
Clock	Internal RTC, NTP synchronism (Network time protocol)
Communication ports	n.2 RS232 for GPRS or smart sensors
Power supply	11...24Vdc
Current Consumption	<10mA@12Vdc
Op. Temperature	-40...+80°C
Fastening	DIN bar
Dim. (Lxhxp)	Datalogger (excluded outdoor housing): 160x94x62mm
Certifications	Measnet
Accessories supplied	
- Power supply system:	Photovoltaic panel 20W, Vnom. 12Vdc, 12Vdc/7Ah backup sealed battery, battery charger; automatic management device for battery monitor
- Outdoor housing	IP65 enclosure, in polycarbonate with anti-radiation treatment dim. Lxhxp: 250x350x170mm. Key enclosure, crossarms for fastening on the pole or on the wall.



ANEMOMETRICAL SENSORS

Models	mWS1 e WS2 – Wind speed sensors (available also mod. WS2R with anti-icing heater)
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 WS2R model)
Output	sinusoidal AC signal
Accuracy	< ±0.1m/s
Available certifications	Measnet compliant to IEC61400-12 norms (for bank acceptance)



Models	mWD1 e WD2 – Wind direction sensors (available also mod. WD2R with anti-icing heater)
Range	0...359° (true electrical angle 0...352° ±4°)
Transducer	Linear Potentiometer with continuous 360°
Rotation	High performance bearings
Anti-icing heater	12Vdc/1W (only for WD2R model)
Output	Vers. -N: Resistance variation (10KOhm)
Accuracy	< ±2°



METEOROLOGICAL SENSORS

Models	mSTA – Air temperature sensor mSTAUR – 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%
COMMON FEATURES	
Power supply	+9...+24Vdc
Typical outputs	Vers. -V: 0...5Vdc

Model	mPA – Micro Barometer
Range (typical)	800...1100 hPa (on request 600...1100 hPa for sites over 1000m a.s.l.)
Transducer	Piezoresistive
Accuracy	±0.4hPa @ 25°C
Output signals	-V 0...5Vdc; -I 4...20mA

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%



MASTS

IMPORTANT NOTE: NO CIVIL WORKS REQUIRED!!

Models	Tiltable mast PRF20-60	Tiltable mast PRF30-120	Tiltable mast PRF40-150
Heights (m)	20	30	40 (different heights with multiples of 3m)
Tilt up	Gin pole		
Max gustS resistance	130km/h		
Diameters (mm)	60	114	152
Weight (kg) wire guys and accessories excluded	60kg	170kg	210kg
N. of wire guys	5x4@90°	4x4@90°	4x4@90°
N. of elements	10	10	13,5
Housing	Galvanized steel		
Requested workers x installation	4	4	4

Recommended standard configurations in compliance with IEC61400-12 norms

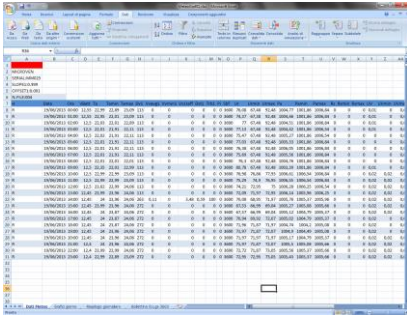
Anemometrical station Model	20m Mini-B	30m Mini-C	40m Mini-D
Datalogger / data transmission	mVEN3+GPRS	mVEN3+GPRS	mVEN3+GPRS
Wind speed sensors	n.1@15m n.1@20m	n.1@20m n.1@30m	n.1@20m n.1@30m n.1@40m
Wind direction sensors	n.1@20m	n.1@20m n.1@30m	n.1@20m n.1@40m
Meteorological sensors	Options: thermo-hygrometer and barometer		
Pole	PRF20-60	PRF30-120	PRF40-150
Certificates of calibration	Measnet or similar		



SOFTWARE

Model

Geodesk – Software for datalogger setup and data export



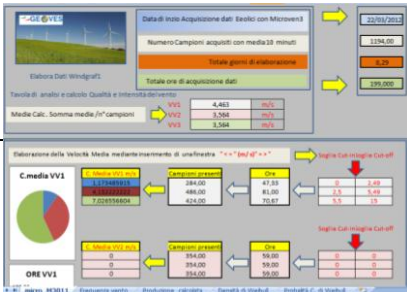
Geodesk

Geodesk is a 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.

Model

WindGraf 1 – Software package for wind data management

Main features:



WindGraf1 allows the upload of anemometric data, the configuration and setting of chosen wind turbine power curve; in this way it's possible getting all wind elaborations necessary to calculate the eolic yield of the site

Preliminary wind power analysis

In this table it is possible to preliminarily evaluate the frequency of the wind hours available for each single anemometer. The table allows to correlate the wind speed measured at the different heights in which the anemometers are installed

Graph "Hours of wind frequency"

The graph illustrates the hours of wind frequency divided by steps of intensity of 0.5 m / s.

Report "Generated Wind Power"

The report allows user to set the power curve parameters of the wind turbine supplied by the manufacturer to relate it to the wind speed and frequency time. In this way it's calculated the power energy in KW/h generated in the period of interest.

Graph "Weibull probability density"

The Weibull probability density graph represents an statistical distribution estimate that expresses the probability that the wind speed be within a certain range of values of known speed. The graph is calculated by setting the form factor and the scale factor

Graph "Weibull cumulated probability"

The Weibull cumulative probability graph represents an statistical distribution estimate that expresses the probability that the wind speed be below a speed threshold. The graph is calculated by setting the form factor and the scale factor

Graph "Wind Rose"

The wind rose graph is a radial representation of the frequency of the winds shown over a compass. The wind rose is subdivided on 16 sectors of the compass where can be seen the intensity classes related to the wind direction, so that user can locate the cardinal point where can be generated greater wind energy.