MicroHYD3 – Monitoring stations for hydrometric control and flooding
ALARM (Rev.4 180121)

Description and functioning

The **MicroHYD3** monitoring and alarm stations had been developed to measure mainly the data becoming from hydrometric level sensors and for generate SMS messages when an overcome of **pre-alarm** and **alarm thresholds** occurs. Furthermore when the alarm happens, the station can increase the number of data memorizations and transmissions up to a rate of 5 minutes; in this way it's possible analyzing with greater resolution a flood phenomenon. As soon the alarms subside, the data memorization and transmission resume the normal rate of operating Furthermore MicroHYD3 can manage **2 pre-alarm and alarm relais** to activate external devices for local alert (in this case mains 220Vac is needed)

Alarms

Alarms

Data .TXT

Photovoltaic panel

Hydrometer

Datalogger with GPRS modem (data transmission via FTP and alarms via SMS, option via email)

Surface water monitoring and alarm station

Main features

All working logic is managed from Geoves **MicroHYD3 datalogger** which is able to display, acquire, save and transmit the data via **GPRS**. Besides MicroHYD3 has three multifunction buttons that allow to setup on site the following hydrometric parameters: **different kind of hydrometer** (sonic, radar, piezometric, bubble air, …); **engineering full scale**; **calibration offset** to get the measure a.s.l. (above sea level up to 9999,01m); **distance** between the

no contact sensor and the minimum detectable level; **pre-alarm and alarm thresholds**. Furthermore the MicroHYD3 datalogger can interface also **meteorological sensors** (eg. thermohygrometer, rain gauge) or other measures with analog output.

MicroHYD3 stations can be equipped by several accessories for the installation of the hydrometer and the datalogger on bridges, piers and gangways, sinks, reservoirs, wharfs, channels, rivers, etc… Finally, thanks to a **very low power consumption** (few mAs), it's possible supply the datalogger from a little photovoltaic panel and install the station everywhere even if the site is not reached from mains 220Vac (eg. high mountain or open field)

Advantages

Underground water monitoring station in a landfill

- ✓ Possibility to manage **n.2 hydrometric measurement** simultaneously
- ✓ Possibility to **set** and **calibrate** the **hydrometric measurement on site**
- ✓ **Remote alarm** sending via SMS and **locally** via pre-alarm and alarm relays for the control of external actuators (sirens, traffic lights, ...)
- ✓ Data in standard text format (**CSV format**) compatible with Excel, database and with the most common software available on the market.
- ✓ **No connection charges** (with GPRS wireless transmission and photovoltaic panel power supply)
- ✓ Data accessible on the **web** from any device connected to the Internet (PC, smartphone, etc.) without the need to install any software

Monitoring Systems for the environment and renewable energy

Main applications

1) **Groundwater monitoring** (groundwater, wells, landfills, landslides, etc ...) and **Surface water** monitoring (rivers, streams, lakes, basins, canals, collection tanks, etc.)
2) Monitoring of **marine waters** (ports, buoys, platforms, etc ...)
3) **Flood alert** on construction sites adjacent to waterways
4) Water level failure alert (**MINIMUM VITAL flow rate**)
5) **Underpass flooding alarm**, underground tunnels, etc ...

Technical Data

DATALOGGER	
Model	**mHYD3 – Multichannel hydrometric datalogger**
I/O Channels	**6 analog inputs**, 2 of which dedicated to hydrometric sensors and 4 free inputs for meteorological sensors or other devices with analog output. **1 digital input** for pulse counter for rain gauge **n.2 pre-alarm and alarm outputs** on 2 double contact relays (V = 12Vdc, Imax = 500mA) with status led
Date clock	internal RTC; automatic update with GPRS link to NTP server
Data storage	Normal state: Programmable 10-15-30-60'; on SD Card up to 2GB Alarm state: every 5' (on request every 1' with evaluation of power consumption)
Elaborations	arithmetic average; sum (rain); counter of time
Transmission	**Data**: wireless **GSM/GPRS** via FTP or via cable **RS232/LAN** with free software Geodesk for data download and data export **Alarms:** via **SMS** when the overcome of the 2 thresholds occurs (pre-alarm and alarm). Sending up to 2 mobile numbers of on-call staff. Option: **via email** with **MeteoGraph** web service
Serial ports	n.1 RS232 for GSM/GPRS connection n.1 free serial port
Power supply	**20W photovoltaic panel, 12Vdc 12Ah battery** (standard autonomy [1] up to 20days with one hydrometer, 15days with two hydrometers) **30W photovoltaic panel, 12Vdc 18Ah battery** (standard autonomy up to 30-35days with one hydrometer, 20-30days with two hydrometers) **220Vac** with magneto-thermic switch and 12Vdc 2Ah backup battery (to be used in the case of local signaling devices, e.g. sirens, lamps, traffic lights, etc ...)
Assembling and enclosure	Fixing on **DIN bar** and IP65 box with key enclosure, brackets for fastening on poles or wall

HYDROMETERS	
Model	**SLP Pressure transmitter level sensor (immersion sensor)**
Range	0…10m (other range available on demand)
Transducer	piezoresistive
Typical accuracy	<0.5% f.s.
Output signal	4…20mA
Model	**SLR Radar level sensor (without water contact)**
Range	0…15m (20-30-35m on demand)
Transducer	Radar
Typical accuracy	±2mm
Output signal	4…20mA
Model	**SNU Sonic level sensor (without water contact)**

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[1] With data storage every 15' and transmission every 60'

Range	0…6m
Transducer	Sonic
Typical accuracy	<0,2% of measured value
Output signal	4…20mA

METEOROLOGICAL SENSORS	
Model:	**mSTA – Outdoor air temperature sensor**
Model:	**mSTAUR – Outdoor air temperature-humidity sensor**
Output signals	-V 0…5Vdc; -I 4…20mA; -N 4 wires Pt100 (T) and 0…5Vdc (RH)
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	mPA – Micro Barometer
Range (typical)	800…1100 hPa (on request 600…1100 hPa for sites over 1000m above s.l.)
Transducer	Piezoresistive
Accuracy	±0.6hPa @ 25°C
Output signals	-V 0…5Vdc; -I 4…20mA

Model	RG200, RG400 – Rain gauges (available with anti-icing heater)
Range	infinite
Orifice area	RG200: 200cm^2; RG400: 400cm^2
Transducer	Double contact (n.o.) tilting bucket
Accuracy	Class B UNI 11452:2012 (class A with connection 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
Output signals	-N pulses; with device CP-VI: 0…10Vdc or 4…20mA

RG200   RG400

EXTERNAL ACTUATORS	
Model	mVEN-AL_2L - Optical indicator with 2 lamps (indicative picture)
Lamp coulors	Orange: pre-alarm/warning; Red: alarm
Lamp type	Long-life leds (up to 50.000 hours)
Power and Consumption	12/24Vdc @ 50mA per lamp
Degree of protection	IP65 for outdoor
Mounting	On horizontal or vertical poles ⌀25…43mm or on the wall

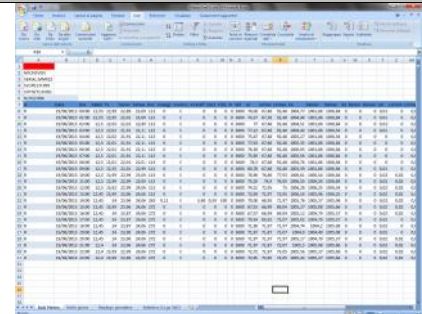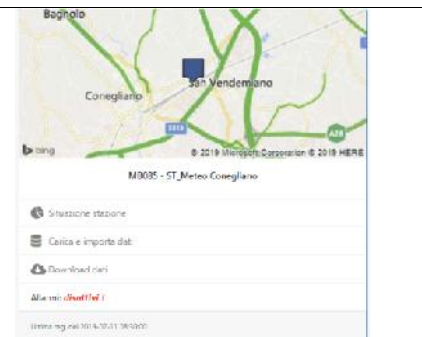| Model	mVEN-AL_SIR – Acoustic siren (indicative picture)
Sound power	up to 115dB max
Type of siren	Electromagnetic buzzer with continuous operation
Power	12/24Vdc
Degree of protection	IP65 for outdoor
Mounting	On horizontal or vertical poles ⌀25…43mm or on the wall

POLES		
Models	PF2-55	PF3-55
Height (m)	2	3
Type	fix	telescopic
Wind resistance up to 1000m without ice load	100km/h with gusts up to 130km/h	
Diameters (mm)	55	55, 50
Weight (kg)	6kg	11kg
N. of guy wires	none	
N. elements	1	2
Housing material	Galvanized steel	
Required workers for installation	1	
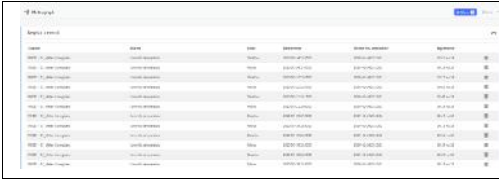
Examples of installation with 3m poles

SOFTWARE	
Model	Geodesk & MeteoGraph – Web software for environmental data management

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** underline 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:
  - o Date and time of Start data storage
  - o Date and time Last data storage
  - o 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.)

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 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

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