

AUTOMATIC WEATHER AND HYDROLOGICAL STATIONS

METEODATA/HYDRODATA-3000C SERIES





GENERAL DESCRIPTION

The **METEODATA/HYDRODATA-3000C** type Automatic Meteorological and Hydrological Stations are **measurement, storage and data and image transmission** equipment, specially designed for outdoors installation, in remote unattended areas, with the possibility of building systems or networks of stations comprising an undetermined number of field stations and one or more Central Stations for receiving, presenting, storing and optional end processing of all the information received.

If operating a network using any of the communication options available (cellular telephone 3G/GPRS, point-to-point radio link, Ethernet connection, etc.), from the Central Station it is possible to manually or automatically get information from each and every one of the measurement stations, remotely program all their functionalities, manage alarms received and even display the images captured by one or more of the **webcams**, connected to the field stations, on the central server monitor.

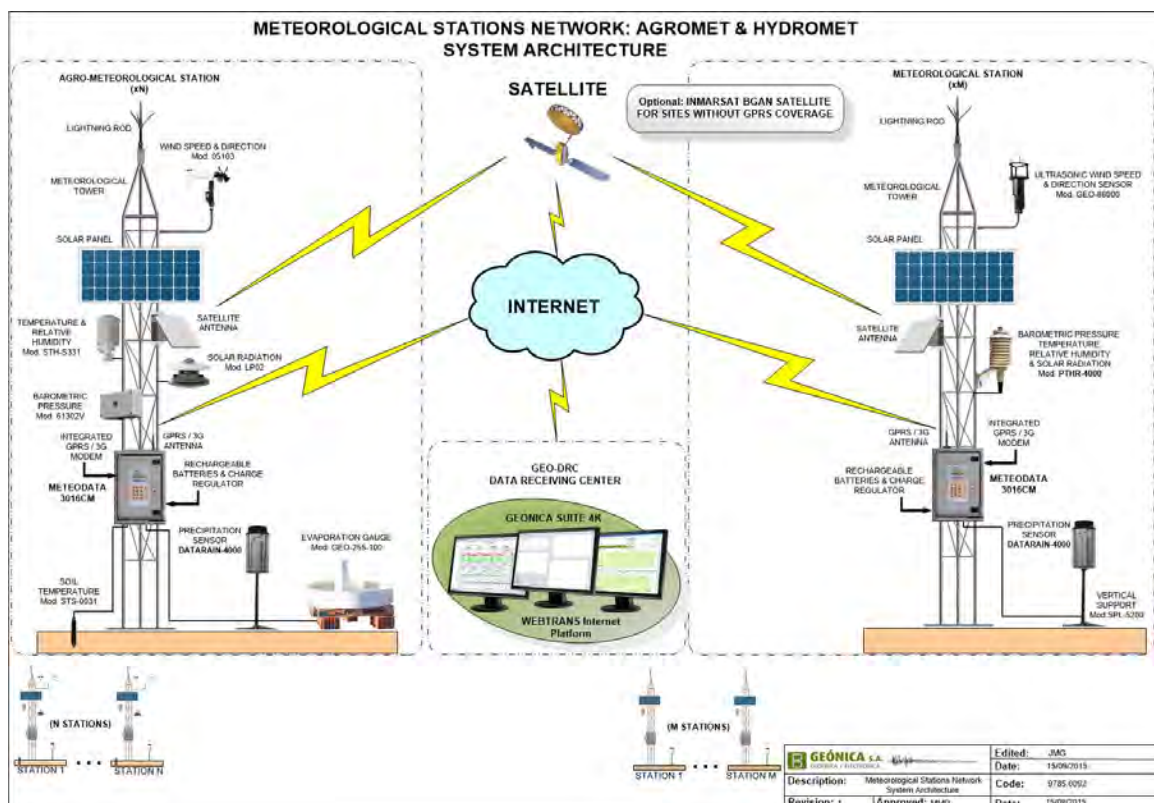
To program the 3000C series remote stations as well as to download data and manage all the field stations on a network, the **GEONICA SUITE** software package, developed specifically for such purposes, must be installed on a laptop computer or on the central station server.

The data and images from the remote stations can also be transmitted to the **WEBTRANS Platform**, which GEONICA offers on the Internet via a powerful **WEB Server** so that each subscriber to the **WEBTRANS** service is able to view the parameter graphs and the images captured in each one of the remote locations of their own stations. Additionally, they can download stored data without having to communicate directly with the stations, i.e. by simply accessing the platform with the corresponding password via their own INTERNET connection.



If the subscriber has **3G/GPRS** or **CDMA** communication coverage, the **WEBTRANS** service permits obtaining data in quasi real time, updating information every five or ten minutes if necessary. A demonstration of said platform, in which real data for different types of applications in operation is shown, can be viewed at <http://demowebtrans.geonica.com>.

A typical **Data & Image Communications Network** with optional **INTERNET ACCESIBILITY** is showed in the following general diagram:



AVAILABLE MODELS

The Remote Data Acquisition Station METEODATA/ HYDRODATA 3000C Series is available in two versions with 8 or 16 Analog Input Channels, corresponding to Models 3008CM and 3016CM.

The initials "CM" of models 3008CM and 3016CM indicate that the units are offered in a Compact ("C") mode and mounted, in a Metallic ("M") IP-66 enclosure, having inside all the basic elements in a modular manner:

- **Microprocessor**
- **Protection Circuits**
- **Communications Modem**

- **Power Source including: Battery and Charge Regulator for solar panel or mains AC power supply.**
- **Display and keyboard (optional)**
- **Terminal Strip for external connections**, with access to the cables by way of a outdoors bushings, allowing easy access for maintenance and repair.

It is also available another version "CP": Models 3008CP and 3016CP (Compact mount on a Polypropylene IP-67 enclosure) ideal for portable use or marine environments.



3000-CM SERIES



3000-CP SERIES

MAIN FEATURES

Connections with the sensors and other external components such as the communication antenna, the solar panel, a radio-modem or satellite transmitter equipment, etc., can optionally be made using specific accessible connectors on the outside of the box or cabinet, which facilitates operation, permitting a quick connection that is useful when working with mobile or transportable stations.

The 3000C remote units were designed using the highest technology electronic components with a high level of miniaturization and integration, combining the following in a single 6 layers circuit board, SMD technology and other conventional components, which are necessary for the specific required functions.

Among the most noteworthy technical characteristics of the 3000C are its:

- **Ultra low consumption (10 mA in complete work cycle and 1 mA at idle power-saving mode);**
- **High resolution (via a 24 bit A/D converter delta-sigma technology);**

- **Very High data storage capacity (via 64 MBytes of internal memory allowing circular storage);**
- **Total versatility for communications (by cellular telephone 3G, GPRS, point-to-point radio, Ethernet links, satellite, etc.);**
- **Local and remote programming capacity**
- **Possibility to connect all types of sensors with analog and digital outputs, smart sensors with special protocol, etc.**

The highly advanced technical characteristics of the 3000C Series remote stations, previously described and enumerated in detail below, are the result of more than 30 years of GEONICA experience in designing and manufacturing this type of electronic instrumentation, having also achieved total integration of the new Information and Communication Technologies. For all the aforementioned reasons, it can be affirmed that our stations offer the highest professional quality required with the important advantage of a truly competitive price.

TECHNICAL SPECIFICATIONS 1/3

Inputs/Outputs	Mod. 3008	Mod. 3016
Analog input channels (totally differential)	8	16
Digital Inputs 4000V galvanic insulation	2 Micro-relay Digital Inputs	
Digital Outputs 4000V galvanic insulation	2 Micro-relay Digital Outputs	
Digital counters of 16 bits	4 Digital counters, for pluviometers, anemometers and other similar sensors with impulse/frequency output.	
Communication ports RS232/422/485; Ethernet, etc.	4 programmable Serial ports RS232/422/485 (up to 6 ports optional)	

Input-Connectivity Signals

The 3000C Unit permits connection with any type of sensors, analog or digital, accepting:

- Voltage signals from ± 2.5 microV up to $\pm 2,500$ mV, extendable up to $\pm 5,000$ mV and other higher ranges.
- Current Signals in 0-20 / 4-20 mA, etc...
- PTC, NTC and Pt-100 type resistors for temperature measurement, thermistors, thermocouples, piezoelectric sensors, etc.
- Frequency signals
- Periodic signals
- Pulse counters
- Relay contact (reed type, voltage free, solid state, etc.)
- Smart sensors with their own communication protocol
- Webcams for taking and transmitting still images

The communication speed can be programmed by the user for between 1,200 and 115,200 bauds. Likewise, the parameters for each serial port can be programmed, locally or remotely, using the TELETRANS-W4K software, included in the GEONICA SUITE software package.



Available Communication Protocols

- TCP/IP (Telnet, SMTP, FTP, etc.)
- Short SMS messages to mobile telephones for notices or alerts
- GEONICA protocol (TELETRANS-W4K Software)
- SDI-12
- Modbus
- GPS (NMEA, GLL, CGA, etc.), in case a GPS receiver is integrated in the station
- Specific protocol for **Smart Sensors**, etc.

All of the above as a function of the port used.

Communication Adaptors (options available)

- Physical cable for PC connection (RS232/USB)
- GSM Modem (internal)
- 3G/GPRS Modem (internal)
- Fiber optics (internal or external)
- Radio-Modem (internal or external)
- Ethernet (internal)
- SDI-12 (internal)
- Wi-Fi (internal or external)
- Bluetooth (internal or external)
- Satellite (internal or external): INMARSAT, INSAT, GOES, IRIDIUM, VSAT, THURAYA, etc.

Internal Clock and Synchronization by GPS Receiver

The new 3000C series stations have a clock circuit and an Independent **watchdog**. Optionally, the clock circuit can be automatically synchronized by including a **GPS receiver**, internally integrated with the unit's own electric circuit and connected to an external antenna that receives time and position signals from a constellation of satellites.

This option permits clock precision on the order of nanoseconds, which is very useful for precisely synchronizing the pace of the clocks from all of a series of networked remote stations. Likewise, it permits knowing the position of each one of them with GPS precision.

TECHNICAL SPECIFICATIONS 2/3

Other General Features:

- Remote Unit for Data and Image Collection, Processing and Transmission, with **64MBytes of Flash Nand internal memory** (128 MB, optionally) and **24 bit resolution Analog/Digital converter delta-sigma technology**.

All electronics are mounted on a **6 layer, monoplate circuit board** with a high level of integration, **totally weather proofed for tropical environments** for protection against humidity and condensation.

- The station and all the channels (analog, digital, counter inputs and other ports) can be **totally programmed** independently, using a locally connected PC or remotely using communication links such as GSM, GPRS, Radio, Ethernet, etc.

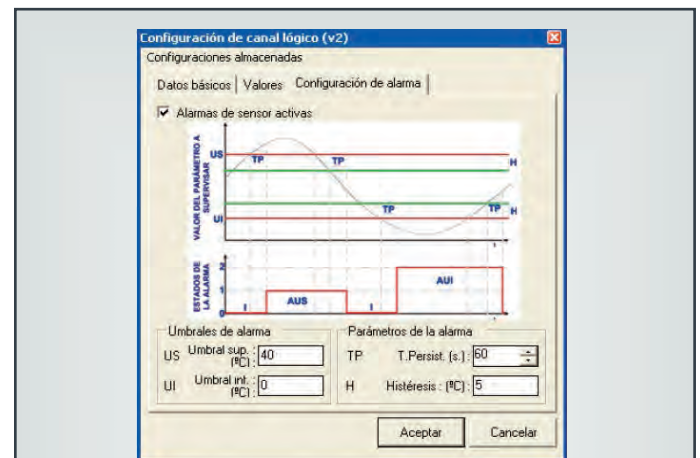
For example, the sampling frequency can be independently programmed for each channel, for up to 25 samples per second, as a function of the desired resolution; select the calculation periods for the average, maximum, minimum and accumulated values; determine the data transfer rate, etc.

The 3000C series units can also carry out very **diverse types of calculations** including **standard deviation** of the measurements obtained for a specific parameter; **Dew Point calculations** as a function of temperature and humidity; **adjusting a non-linear response sensor signal**, using a polynomial equation; calculating the potential **evapotranspiration** of a crop and even **calculating the hours of sunlight** with certain precision and without the need to connect a specific sensor for said purpose.

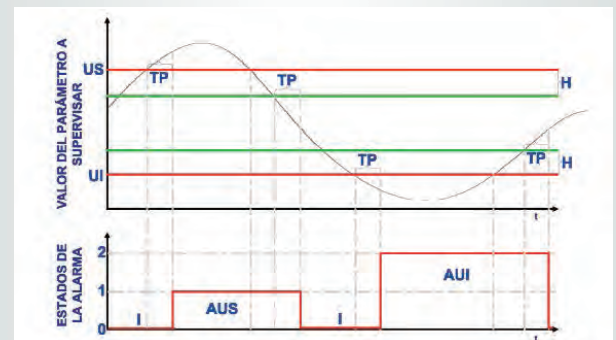
It is also possible to use the software to adjust the **transfer constant deviations** for a sensor or **to calibrate the zero and the full scale** for a channel, produced as a consequence of prolonged temperature effects, aging of the transducer or for any other reason. This functionality is especially important since it omits the need to replace a specific sensor, maintaining the original precision of the measurements.

- Optional liquid crystal (LCD) 4x20 **alphanumeric display**, with integrated 18 key **membrane keypad**.

- Possibility to independently **program alarms** for each channel as well as to generate **SMS notice messages** sent to mobile telephones and to **send emails** to maintenance personnel if certain limits are exceeded for critical parameters or if certain alarm statuses are detected, which require pre-notice or specific surveillance.



Alarm Parameters Configuration

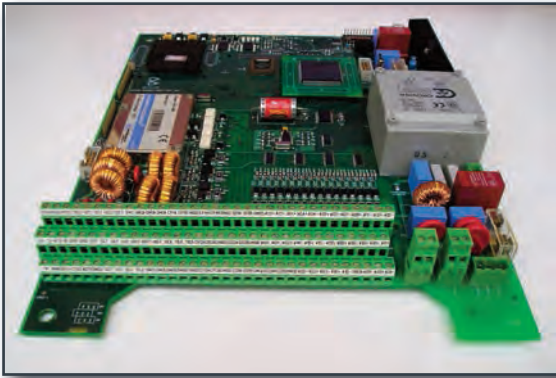


Graphic Illustration of the Alarm Criteria

- Possibility of connecting low consumption **webcam video cameras**, which are powered at 12 VDC from the same remote station, for capturing and sequentially transmitting images over the same transmission path as that used for the data.
- Possibility of **direct connection with Variable Message Signs** for presenting text messages or pictogram notices to the public on roadways or urban travel routes, maritime ports, etc. when there are low visibility conditions, fog or strong wind warnings, etc.

TECHNICAL SPECIFICATIONS 3/3

- **Internal quick connect terminal strips** for all the sensors, solar panel, supply network, radio transmitter, antennas, etc.



- **Integral protection for all Input/Output lines** for the equipment, using Transzorbs, gas Dischargers, Coils, Varistors, Resistors, Network filters and fuses.
- **Internal Power Source** including **12V-9Ah battery expandable to two (12V - 2x9Ah=18Ah)** and **Charger-Regulator** for connection to a Solar Panel or 110/220 VAC network . External battery is optional.
- **Average consumption** of the microprocessor:
- **10 mA at 12 VDC** on 100% work cycle.
- **Consumption at idle power-saving mode:** less than 1mA.



Operating Temperature

The 3000C remote stations are prepared to operate in a wide range of temperatures, between **-30°C and +70°C (-40°C to +70°C optional)**, as long as the LCD display is still legible at the lower limit of -20°C.

External Connections

All the remote unit connections with the sensors, solar panel, antennas and other external elements, are made using IP-67 protection bushings or alternatively by specific connectors in order to facilitate a quick connection and disconnection in case the stations are mobile or transportable.

Mounting

The supports for the mounting of the equipment to the tower are included.

Optional accessory: hasp for padlocks

Portable version

The **3008CP and 3016CP Models** are made of a completely compact unit, with all of its components (microprocessor, modem, battery, charger, keyboard, display, etc.) mounted inside of a highly resistant, weatherproof, Polypropylene box at a size of 40x33x18cm and with IP-67 protection, suitable for marine environments or portable use.

It includes a transport handle and the accessories necessary to install it on a wall or on a post/mast.



