

# Pressure and temperature data logger

## NanoVACQ Pressure



Control of pressure and temperature inside packages, autoclaves...

**NanoVACQ Pressure** enabling the use of 1 pressure sensor and 1 or 2 temperature sensors on the same logger, thus answering a lot of industrial needs.

The combination of pressure and temperature is the best way to control saturated steam as in sterilization validation.

Following is a list of standard models for temperature and pressure, which can vary by shape and length of the probes if necessary:



### NanoVACQ PT

- 1 piezoresistive pressure sensor
- 1 internal platinum temperature sensor for pressure sensor compensation.

### NanoVACQ PT-Tc

- 1 piezoresistive pressure sensor
- 1 internal platinum temperature sensor for pressure sensor compensation
- 1 platinum temperature sensor at the end of a rigid probe diameter 3 mm > 1.9 mm (hybrid) or diameter 3 mm and length 30 mm (possible from 10 mm to 120 mm)

### NanoVACQ PT-Td

- 1 piezoresistive pressure sensor
- 1 internal platinum temperature sensor for pressure sensor compensation
- 1 platinum temperature sensor at the end of a rigid probe (diameter 3 mm, length to be defined between 20 mm and 100 mm), at the end of a flexible probe (diameter max 5 mm, length to be defined between 100 mm and 1000 mm), or also at the end of a semi-rigid probe coated with stainless steel (diameter 2 mm and length to be defined between 100 mm and 1000 mm).

### 10Hz Version

All the above models are available in 10 Hz version (10 acquisitions per second) for fast pressure gradients measurement.



# NanoVACQ Pressure



## Operating range

- In temperature ..... from -30°C to +140°C (optional: down to -55°C).

Batteries to be used depending on operation range and height of the logger (diameter 31 mm)

Operation range	from -55°C to +85°C	from 0°C to +125°C	from 0°C to +140°C
Height 31 mm		014Z	
Height 39 mm	014ZF*	014ZF*	Routine
Height 125 mm	014ZFL		

To benefit of greater temperature ranges, it is possible to exchange batteries on the same device.

\*Battery 014ZF is not recommended for sustained use at high temperature (ex: sterilization).

## Metrology

- In pressure ..... from 30 mbar to 5 bar or 15 bar from -30°C to 140°C (optional: down to -55°C), possibility of higher pressure.

### ● Calibration uncertainties:

- In temperature..... +/- 0.1°C from -55°C to 140°C (+/-0.05°C upon request)
- In pressure ..... +/- 10 mbar from 0°C to 140°C and from 30 mbar to 5 bar (1Hz or 10Hz mode)
- ..... +/- 12 mbar from 0°C to 140°C and from 30 mbar to 15 bar (1Hz mode)
- ..... +/- 17 mbar from 0°C to 140°C and from 30 mbar to 15 bar (10Hz mode)
- ..... unspecified from -30°C to 0°C
- ..... not functional from -55°C to -30°C

The uncertainties correspond to 2 standard deviations.

The uncertainties are calculated taking into account the various significant sources of error, including calibration sensors, the equipments, the environmental conditions, the influence of the logger, repeatability, etc...

### ● Resolution and noise:

- In temperature..... 0.04°C
- In pressure ..... 0.8 mbar (5 bar) 2.6 mbar (15 bar)

● Annual recalibration and check-up recommended.

● Each logger can be calibrated and checked up at the temperature points needed by the users.

## Technical specifications

● External material biocompatible and sterilizable: 316 L stainless steel

● **Dimensions:** diameter 31 mm, height from 31 mm to 125 mm depending on the battery used.

### ● Sensors:

- In temperature..... Pt1000 or Pt100
- In pressure ..... piezoresistive

● **Memory capacity:** 48 000 acquisitions, divided by the number of measurement channels

### ● Programmable acquisition rate:

- minimum 1 second, maximum 59 minutes and 59 seconds for 1Hz version
- minimum 100 ms to maximum 59 minutes and 59 seconds for 10Hz version

● Programmable acquisition duration.

● Programmable recording start by date, hour, minute or on temperature threshold.

● High temperature battery replaceable by the user.

● Non volatile memory (EEPROM).

## Software operating conditions

● Data transfer with a communication interface connected to the USB port.

● Operates under Windows® XP (SP3)/Vista/7



### NOTA :

Annual maintenance is recommended for replacement of o-rings, calibration and adjustment.

## Radio Option



### Real time data

**NanoVACQ Radio** are autonomous transmitters/recorders equipped with sensors.

They have been developed to enable two functions: real time radio transmission of the data measured by the sensors and recording of the transmitted data. All the NanoVACQ Pressure are available with optional radio transmission.



They are designed to support temperatures from  $-30^{\circ}\text{C}$  to  $+140^{\circ}\text{C}$  (optional:  $-55^{\circ}\text{C}$ ).

- The body of the NanoVACQ Radio is 31 mm in diameter, its height is 45 or 132 mm.
- The NanoVACQ Radio antenna is removable from the body, its length can vary from 30 mm to 110 mm according to application. It allows data transmission by hertzian channel.
- The NanoVACQ Radio can be set up by the user. The operation mode of the device may be selected during programming:
  - Radio transmission of data without recording in memory.
  - Radio transmission of data while recording in the memory.

### Radio transmission

- The frequency used by the radio transmitter is within ISM 2,4GHz bandwidth (industrial, scientific or medical devices). This bandwidth can be used without licence.
- NanoVACQ radio loggers use the technology based on the IEEE 802.15.4 standard, which enables to manage various loggers in the same space with more frequent sampling.
- The receiving base station can be connected either directly by USB, or using a long distance connection RS485 type, or an Ethernet connection or a wifi signal.
- Various types of receiving antennas can be connected to the radio receiver according to loggers use.

Reach between transmitter and receiver

- 25 meters in clear field,
- For all applications, a preliminary test must be done to validate the hertzian transmission in the user's environment.

### Dimensions

- Body height of NanoVACQ Radio :
  - 45 mm (range  $-55^{\circ}\text{C}$  to  $+140^{\circ}\text{C}$ )
  - 132 mm (range  $-55^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ )