

# MULTIPARAMETER PHOTOMETRIC SYSTEM

Controllers

Sensors

Analysers

Samplers

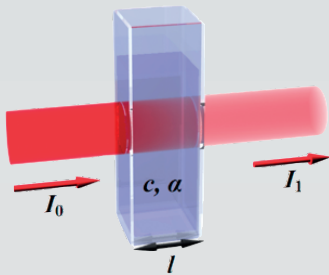
Flow

Level

Pressure

Web remote control

Access



## THE PHOTOMETRIC METHOD

In the last decades, Photometry has developed as an essential method of analysis because it enables the "quantitative" determination of both organic and inorganic compounds.

The technique uses the colorimetric methods characteristic of certain analytes, i.e. the properties of certain chemical reagents to develop colour with an intensity proportional to the concentration of a given substance, at a particular wavelength of the spectrum visible between the UV and IR (from 400 to 800 nm).

Compared to UV or IR spectrophotometry, the colorimetric technique has the extraordinary advantage of relying on well-defined linear reactions and with few well-known interfering substances.

The Palin method employs the interactive DPD principle to determine the concentration of certain oxidants such as: Free Chlorine, Total Chlorine, Chlorine Dioxide, Ozone, Peracetic Acid, Bromine, Permanganate etc...

The DPD reacts with the oxidant present in the water, producing almost instantly a pink colour, making sure that all those factors that may affect measurement (pH,  $\mu$ S,  $^{\circ}$ C, organic matter etc.) have no influence on the analytical methodology.

Our photometric system is a reference point in the DPD chlorine control thanks to the combination between reagents and water sampling that guarantees a maximum measurement accuracy, making it a compact analytical mini laboratory, dedicated to the chlorine measurement.

## 4001 SERIES

### Phases of the measuring cycle

**Entry of the sample** in the measuring cell for washing/priming

**First measurement** on the sample as is (Photometric Zero)

**Reagent addition** using the peristaltic pump

**Development of the reaction** through stirring

**Reading of the colour (Absorbance)** the differential measurement between the Zero and the Absorbance is processed by the electronic processor and converted into a concentration value, using specific correlation tables developed in our laboratories



The **electronic controller displays** the measured substance in mg/l and provides whether or not to activate the dosing components designed to control or correct it.

The operating and maintenance costs are very low and, above all, the **system calibration** is performed automatically at each measuring cycle.

### User Interface (HMI)

**Programming keypad** with 4 bubble-keys

**STN 240x128 backlit graphic LCD** to display measurements (simultaneous measurement and temperature parameter + trend line), digital output status, storage status, faults, photometric measurement phase.

### Software & Functions

**Data logger** of Circular (F.I.F.O.) or Filling type, on an internal 4 Mbit flash memory, equal to 16000 records, with a recording interval from 1 to 99 min.

**RS485 serial output** for set-up and Real Time status from remote or to download stored data on a PC or laptop (using dedicated software), via MODBUS RTU communication protocol.

**Digital input** for disabling dosages

### Application fields

Industrial applications include the analysis of drinking and waste water as well as the analysis of food products, pharmaceuticals, chemicals etc.

### Measuring cell



Photometric measuring cell complete with RS485 serial interface card

Body made of PVC; Plexiglass; Glass

Light-Emitting Diode

Silicon photosensor

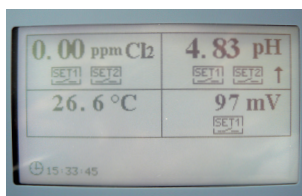
Electrode holder cup for housing pH, Rx electrodes, temperature/flow sensors

Hydraulic supply 60 l/h

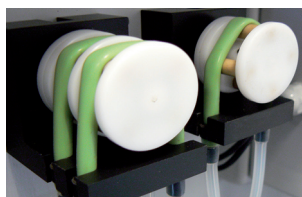
Max pressure 1 bar

Gravity drain for clean water or for polluted water

### Features



Intuitive interface with messages about the status of the method; the large display enables the creation of graphs to display the measurements stored in the internal Data Logger



The peristaltic pump using four pressure points ensures reagent saving



Continuous monitoring of the reagents through level probes. The powder DPD reagent to be diluted before use is an excellent solution for storing the product safely in any place.

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## Available versions 4001 SERIES

### 4001 2 Cl<sub>2</sub>

Photometric Free (or Total) Chlorine and Temperature meter

Free Chlorine	0...5.0 ppm (0...2.0 ppm on request)
Resolution	0.01 ppm
Accuracy	1% f.s. (colorimetric method with DPD)
Temperature	0...50.0 °C – Resol. 0.1 °C – Accuracy 1% f.s.

### 4001 2 PPA

Photometric Peracetic Acid and Temperature meter

Peracetic Acid	0...5.0 ppm (0...2.0 ppm on request)
Resolution	0.01 ppm
Accuracy	1% f.s. (colorimetric method with DPD)
Temperature	0...50.0 °C – Resol. 0.1 °C – Accuracy 1% f.s.

### 4001 2 ClO<sub>2</sub>

Photometric Chlorine Dioxide and Temperature meter

Chlorine Dioxide	0...5.0 ppm (0...2.0 ppm on request)
Resolution	0.01 ppm
Accuracy	1% f.s. (colorimetric method with DPD)
Temperature	0...50.0 °C – Resol. 0.1 °C – Accuracy 1% f.s.

### 4001 2 O<sub>3</sub>

Photometric Ozone and Temperature meter

Ozone	0...5.0 ppm (0...2.0 ppm on request)
Resolution	0.01 ppm
Accuracy	1% f.s. (colorimetric method with DPD)
Temperature	0...50.0 °C – Resol. 0.1 °C – Accuracy 1% f.s.

### 4001 3 Cl<sub>2</sub> - pH - T

Multiparameter control unit for determination of Free Chlorine with photometric method and pH

Free Chlorine	0...5.0 ppm (0...2.0 ppm on request)
Resolution	0.01 ppm
Accuracy	1% f.s. (colorimetric method with DPD)
pH	0...14.00 pH
Resolution	0.01 pH
Accuracy	1% f.s. (colorimetric method with DPD)
Temperature	0...50.0 °C – Resol. 0.1 °C – Accuracy 1% f.s.

## Other available versions 4001-SERIES

Photometric Bromine meter
Integration with Conductivity measurement
6 Paramter: Total,Free, Combined* Chlorine, pH, ORP, T
*as calculation (Total less Free)

## Operating conditions, power supply/electrical protection 4001-SERIES

Operating temperature	0...50 °C
Storage and transport	-25...65 °C
Humidity	10...95% non-condensing
Power supply	100...240Vac 50-60Hz
Power consumption	66 W
Electrical protection	UL6950-1 TUV EN60950 EN 55022 Class B EN61000 ENV50204 EN55024

## Hardware features, software features and functions 4001 SERIES

Display	LCD STN with white backlight
Resolution	240 x 128 pixels
Languages	Italian, English, French, German, Spanish
Keypad	4 bubble-keys [▼] [▲] [GRAPH/USB] [ESC/MODE] [ENTER/CAL]
Data logger	Internal Flash 4Mbit Memory equal to 16000 records with a recording interval of 01:00...99:99 min
Recording method	Circular (F.I.F.O.) or Filling
Display of stored data	in tabular and graphic form (1 for each parameter)
Analogue outputs	1 for each parameter measured (excluding Comb. Chlorine)
Type	0/ 4...20 mA galvanically isolated
Programming limits	lower / upper / reverse
Maximum load	500 Ohm
Alarm output	according to NAMUR 2.4 mA (with range 4/20mA)
PID Control	activation on the pH output
Set point relay outputs	two (2) for primary measure + two (2) for pH measure (only mod. 4001-3)
Programming	Hysteresis, Working time and Daily/hourly activation non subject to the measured value: ON – OFF: 00.00...05.00 ppm Cl <sub>2</sub> / 00.00...14.00 pH
Working time	0...999 sec.
Max resistive load relay	5A at 230Vac
Alarm relay output	Cumulative ON-OFF for: Min/Max, set point delay, faults (no water, reagents finished, projector burned, cell dirty)
Delay time	00:00...59:99 mm:ss with minimum steps of 15 seconds
Max resistive load relay	5A at 230Vac
Auxiliary relay output	Programmable as: Set point for Temperature measurement or Timed activation (programmable frequency and activation time)
Max resistive load relay	5A at 230Vac
Digital Input	Clean contact for disabling dosages
RS485 serial output	MODBUS RTU Protocol (1200... 38400 Baud Rate) for set-up, Real Time status or downloading data
Dimensions (L x H x P)	598 x 601 x 190 mm
Total width	598 mm
Total height	601 mm (including valves)

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