

**Consort**

Artistic in science



20-06

Product catalogue

# Controllers



- **Gold Plated BNC**
- **2 Multiparamter Channels**
- **2 (3) Independent Control Systems**
- **Control types**  
proportional  
on/off
- **Safety Features**  
Stop control without stopping measurements  
Automatic Resume  
Washing Program  
Programmable alarm
- **Pre-programmed standards**  
pH: 1.68, 2.00, 4.00, 4.01, 6.87, 6.99, 9.18, 9.21, 10.01, 12.00, 12.45 (at 25°C)  
Conductivity: 1413  $\mu$ S/cm, 12.88 mS/cm, 111.8 mS/cm (at 25°C)
- **No interference between electrodes**
- **Stability algorithm with intuitive indicator**
- **Selectable resolution**
- **Capacitive compensation**
- **Galvanic isolated RS485 interface**
- **Galvanic isolated 4-20mA outputs**
- **High Accuracy**
- **Free software**
- **Open Communication Protocol**



FC3020T flowcell with intergrated T sensor

The R3600 adds 2 (3 for R3630) independent programmable control systems to measurement system of C3000 series. It's possible to connect up to 31 controllers with a computer. A programmable alarm function prevents overdosing of chemicals in the process liquid.

R3614 and R3624 are versions with 1 extra DIN connector for 4-pole conductivity electrodes.

### Specifications depending on model

Measurement Channels	2
Temperature Channels	2
Controls	2 (3)
Solid State Relays	4
pH	-2.000...+16.000 pH
mV	$\pm$ 2000.0 mV
Ion	0.01 ng/l...100 g/l
Conductivity	0...2000 mS/cm
Dissolved oxygen	0...60.00 mg/l 0...600%
Free chlorine	0...10 mg/l
Air pressure	600...1300 hPa
Temperature	-5.0...+105.0°C
Digital output	RS485
Analogue output	4..20mA
Warranty	36 months
Made in Belgium	

Code	Description
R3610	Controller for pH/mV/conductivity/dissolved oxygen
R3614	Controller for pH/mV/conductivity/dissolved oxygen with 4-pole input
R3620	Controller for pH/mV/conductivity/dissolved oxygen/ion
R3624	Controller for pH/mV/conductivity/dissolved oxygen/ion with 4-pole input
R3630	Controller for pH/mV/conductivity/dissolved oxygen/free chlorine
FC3020T	2 channel flow cell with integrated Pt1000 temperature sensor and mounting accessories excl. electrodes

→ Add -US for 120 VAC versions.

<b>Measurement Channels</b>	<b>2</b>
<b>Temperature Channels</b>	<b>2</b>
<b>Controls</b>	<b>2</b>
<b>Solid State Relays</b>	<b>4</b>
<b>pH</b>	-2.000...+16.000 pH
<b>mV</b>	±2000.0 mV
<b>Ion (R3620 and R3624 only)</b>	0.01 ng/l...100 g/l
<b>Conductivity</b>	0...2000 mS/cm
<b>Dissolved oxygen</b>	0...60.00 mg/l
	0...600%
<b>Air pressure</b>	600...1300 hPa
<b>Temperature</b>	-5.0...+105.0°C
<b>Digital output</b>	RS485
<b>Analogue output</b>	4..20mA
<b>Warranty</b>	36 months
<b>Made in Belgium</b>	



## ● Description

R3600 controller series is based on the C3000 series measurement system and has as such the same functionality. This controller adds 2 independent programmable control systems. All inputs, including temperature, can be used as input for the control system. After an unexpected mains interrupt, the controller will automatically continue with it's task.

The system has 4 programmable solid state relays and two 4-20mA analogue outputs. Various control modes and safety features are provided.

Via a galvanic isolated RS485 interface it's possible to connect up to 31 controllers with a computer. Both software and communication protocol can be downloaded for free from our website.

A programmable alarm function prevents overdosing of chemicals in the process liquid. Each time a pre-set level is exceeded the corresponding relay is closed and an alarm timer starts to count down. When the level is still exceeded after the count down, all relays will be opened and an alarm is given.

R3614 and R3624 are versions with 1 extra DIN connector for 4-pole conductivity electrodes.

## ● Highlights

**Multichannel** up to 2 measurements can be performed at the same time and simultaneous or individually displayed on the screen. Measurement speed is 2Hz.

**No interference** between pH/ORP/Ion and conductivity electrodes in the same solution

**Custom calibration tables** allows the user to add complete buffer/standard-temperature relation tables. With this feature the built-in tables can be extended with your own tables. Tables can be entered via a device menu or uploaded from a PC.

**LCD Display** shows 2 channels at the same time including temperature and date/time.

**Stability indicator** algorithm ensures stable reading and visualisation of when measurement stabilised.

**Selectable resolution** for more stable readings for mV, pH and DO.

**Capacitive compensation** eliminates the capacitive component of the electrode and cable at low conductivity measurements

**Galvanic isolated RS485 interface** eliminates ground loop effects when connected to a PC.

**Galvanic isolated 4..20mA analogue output.**

**Control types:** proportional, on/off

### **Safety Features:**

- Stop the control (relays off) without stopping the measurements
- Automatic resume
- Washing program
- Programmable alarm

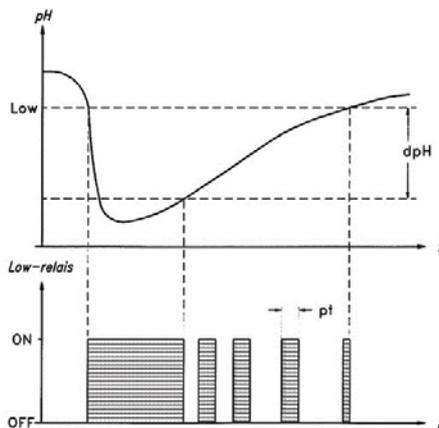
**Pre-programmed standards** pH: 1.68, 2.00, 4.00, 4.01, 6.87, 6.99, 9.18, 9.21, 10.01, 12.00, 12.45 (at 25°C)  
Conductivity: 1413 µS/cm, 12.88 mS/cm, 111.8 mS/cm (at 25°C)

**Free software and firmware updates** downloadable from [www.consort.be](http://www.consort.be)

## Specifications

<b>pH</b>	Range	-2...+16 pH
	Resolution	0.001 pH
	Accuracy	0.1% ± 1 digit
	Calibration	1...5 points
	Buffers	11 pre-programmed 5 user specified
	Temperature compensation	-5...+105°C
	ISO-pH	6...8 pH
	Slope	80...120%
<b>mV</b>	Range	±2000 mV
	Resolution	0.1 mV
	Accuracy	0.1% ± 1 digit
	Calibration	1 point
<b>CONDUCTIVITY</b>	Range (cc dependent)	0...2000 mS/cm
	Resolution (cc dependent)	0.001 µS/cm
	Accuracy	0.5% f.s. of range
	Calibration	1...3 points
	Standards	3 pre-programmed 3 user specified
	Cell constant (cc)	0.1/1/10 cm <sup>-1</sup> ±30%
	Temperature compensation	-5...+105°C
	Reference temperature	20° or 25°C
	Temperature coefficient	natural waters (EN27888)
	Capacitive compensation	✓
<b>DISSOLVED OXYGEN</b>	Range	0...60 mg/l (0...600%)
	Resolution	0.01 mg/l (0.1%)
	Accuracy	1% ± 1 digit
	Calibration	1 point
	Temperature compensation	0...50°C
	Salinity compensation	0...40
<b>ION (R62x only)</b>	Range	0.01 ng/l...100 g/l
	Resolution	3 digits
<b>ION (R62x only)</b>	Accuracy	0.5% ± 1 digit
	Calibration	2...5 points + blank

<b>TEMPERATURE</b>	Range	-5...+105°C
	Resolution	0.1°C
	Accuracy	0.1°C
<b>AIR PRESSURE</b>	Range	600...1300 hPa
	Calibration	1 point
<b>CHANNELS</b>	Measurement	2
	Temperature	2
<b>INPUTS</b>	Measurement	2 BNC, 10 <sup>12</sup> Ω 1 DIN (R36x4 only)
	Temperature	2 BNC, for Pt1000
	Calibration	0...999 h
<b>CONTROL</b>	independent controls	2
	On/Off	✓
	Proportional	✓
	Wash program	✓
	Alarm timer	✓
<b>DISPLAY</b>	LCD	128x64 pixels
	White back-light	✓
	Selectable resolution	✓
	Real time clock	✓
	Built-in help	✓
	Languages	English Dutch French German
	ANALOG OUTPUTS	Two outputs
<b>COMMUNICATION</b>	RS485, baud rate	300...19200 b/s
<b>DATA-LOGGING</b>	Data sets	12000 + °C/date/time
	Modes	all
	Interval	1 s...4 h
<b>RELAY OUTPUT</b>	Four relays	4 solid state
	Voltage	12...250 VAC/ min. 1 mA/ max. 1 A
<b>SECURITY</b>	Identification number	✓
	Password protection	✓
<b>AMBIENT CONDITIONS</b>	Temperature	0...40°C
	Humidity	0...95%, non condensing
<b>POWER SUPPLY</b>	Mains	210...250 VAC, 50/60 Hz
<b>DIMENSIONS</b>	WxDxH	28x17x6 cm
<b>WEIGHT</b>	Meter	1.3 kg



FC3020T flowcell with integrated T sensor

## Ordering codes

Code	Description
<b>R3610</b>	Controller for pH/mV/conductivity/dissolved oxygen
<b>R3614</b>	Controller for pH/mV/conductivity/dissolved oxygen with 4-pole input
<b>R3620</b>	Controller for pH/mV/conductivity/dissolved oxygen/ion
<b>R3624</b>	Controller for pH/mV/conductivity/dissolved oxygen/ion with 4-pole input
<b>FC3020T</b>	2 channel flow cell with integrated Pt1000 temperature sensor and mounting accessories

→ Add -US for 120 VAC versions.

<b>Measurement Channels</b>	<b>2</b>
<b>Temperature Channels</b>	<b>2</b>
<b>Controls</b>	<b>2</b>
<b>Solid State Relays</b>	<b>4</b>
<b>pH</b>	-2.000...+16.000 pH
<b>mV</b>	±2000.0 mV
<b>Free chlorine</b>	0...10 mg/l
<b>Conductivity</b>	0...2000 mS/cm
<b>Dissolved oxygen</b>	0...60.00 mg/l
	0...600%
<b>Air pressure</b>	600...1300 hPa
<b>Temperature</b>	-5.0...+105.0°C
<b>Digital output</b>	RS485
<b>Analogue output</b>	4..20mA
<b>Warranty</b>	36 months
<b>Made in Belgium</b>	



**One free chlorine channel**  
**One temperature channel**

## ● Description

R3630 controller series is based on the C3xxx series measurement system and has the same functionality. This controller also can measure free chlorine. The controller has 3 independent programmable control systems. All inputs, including temperature, can be used as input for the control system. After an unexpected mains interrupt, the controller will automatically continue with it's task.

The system can control up to 4 solid state relay outputs and 2 4-20mA analogue outputs. Various control modes and safety features are provided.

Via a galvanic isolated RS485 interface it's possible to connect up to 31 controllers with a computer. Both software and communication protocol can be downloaded for free from our website.

A pre-programmable alarm function prevents overdosing of chemicals in the process liquid. Each time a pre-set level is exceeded the corresponding relay is closed and an alarm timer starts to count down. When the level is still exceeded after the count down, all relays will be opened and an alarm is given.

## ● Highlights

**Multichannel** up to 2 measurements can be performed at the same time and simultaneous or individually displayed on the screen. Measurement speed is 2Hz.

**No interference** between pH/ORP and conductivity electrodes in the same solution

**Free chlorine** control via a double platinum titration electrode.

**Custom calibration tables** allows the user to add complete buffer/standard-temperature relation tables. With this feature the built-in tables can be extended with your own tables. Tables can be entered via a device menu or uploaded from a PC.

**LCD Display** shows 2 channels at the same time including temperature and date/time.

**Stability indicator** algorithm ensures stable reading and visualisation of when measurement stabilised.

**Selectable resolution** for more stable readings for mV, pH and DO.

**Capacitive compensation** eliminates the capacitive component of the electrode and cable at low conductivity measurements.

**Galvanic isolated RS485 interface** eliminates ground loop effects when connected to a PC.

**Galvanic isolated 4..20mA analogue output.**

**Control types:** proportional, on/off

### **Safety Features:**

- Stop the control (relays off) without stopping the measurements
- Automatic resume
- Washing program
- Programmable alarm

**Pre-programmed standards**      pH: 1.68, 2.00, 4.00, 4.01, 6.87, 7.00, 9.18, 9.21, 10.01, 12.00, 12.45 (at 25°C)  
Conductivity: 1413 µS/cm, 12.88 mS/cm, 111.8 mS/cm (at 25°C)

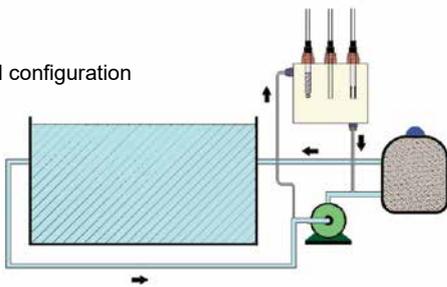
**Free software and firmware updates** downloadable from [www.consort.be](http://www.consort.be)

## Specifications

<b>pH</b>	Range	-2...+16 pH
	Resolution	0.001 pH
	Accuracy	0.1% ± 1 digit
	Calibration	1...5 points
	Buffers	11 pre-programmed 5 user specified
	Temperature compensation	-5...+105°C
	ISO-pH	6...8 pH
	Slope	80...120%
<b>mV</b>	Range	±2000 mV
	Resolution	0.1 mV
	Accuracy	0.1% ± 1 digit
	Calibration	1 point
<b>CONDUCTIVITY</b>	Range (cc dependent)	0...2000 mS/cm
	Resolution (cc dependent)	0.001 µS/cm
	Accuracy	0.5% f.s. of range
	Calibration	1...3 points
	Standards	3 pre-programmed 3 user specified
	Cell constant (cc)	0.1/1/10 cm <sup>-1</sup> ±30%
	Temperature compensation	-5...+105°C
	Reference temperature	20° or 25°C
	Temperature coefficient	natural waters (EN27888)
	Capacitive compensation	✓
<b>DISSOLVED OXYGEN</b>	Range	0...60 mg/l (0...600%)
	Resolution	0.01 mg/l (0.1%)
	Accuracy	1% ± 1 digit
	Calibration	1 point
	Temperature compensation	0...50°C
	Salinity compensation	0...40
<b>FREE CHLORINE</b>	Range	0...10 mg/l
	Resolution	0.01 mg/l
	Accuracy	5% ± 1 digit
	Calibration	1 point
	pH compensation	5...9 pH
	Temperature compensation	10...40°C
	min. flow rate	20 cm/s

<b>TEMPERATURE</b>	Range	-5...+105°C
	Resolution	0.1°C
	Accuracy	0.1°C
<b>AIR PRESSURE</b>	Range	600...1300 hPa
	Calibration	1 point
<b>CHANNELS</b>	Measurement	2
	Free Chlorine	1
<b>INPUTS</b>	Measurement	2 BNC, 10 <sup>12</sup> Ω
	Free chlorine	1 BNC
	Temperature	1 BNC, for Pt1000
<b>CALIBRATION</b>	Reminder	0...999 h
	GLP	✓
<b>CONTROL</b>	Independent controls	3
	On/Off	✓
	Proportional	✓
	Wash program	✓
	Alarm timer	✓
<b>DISPLAY</b>	LCD	128x64 pixels
	White back-light	✓
	Selectable resolution	✓
	Real time clock	✓
	Built-in help	✓
	Languages	English Dutch French German
<b>ANALOG OUTPUTS</b>	Two outputs	4...20 mA, max. 300 Ω load
<b>COMMUNICATION</b>	RS485, baud rate	300...19200 b/s
<b>DATA-LOGGING</b>	Data sets	12000 + °C/date/time
	Modes	all
	Interval	1 s...4 h
<b>RELAY OUTPUT</b>	Four relays	4 solid state
	Voltage	12...250 VAC/ min. 1 mA/ max. 1 A
<b>SECURITY</b>	Identification number	✓
	Password protection	✓
<b>AMBIENT CONDITIONS</b>	Temperature	0...40°C
	Humidity	0...95%, non condensing
<b>POWER SUPPLY</b>	Mains	210...250 VAC, 50/60 Hz
<b>DIMENSIONS</b>	WxDxH	28x17x6 cm
<b>WEIGHT</b>	Meter	1.3 kg

Swimming pool configuration

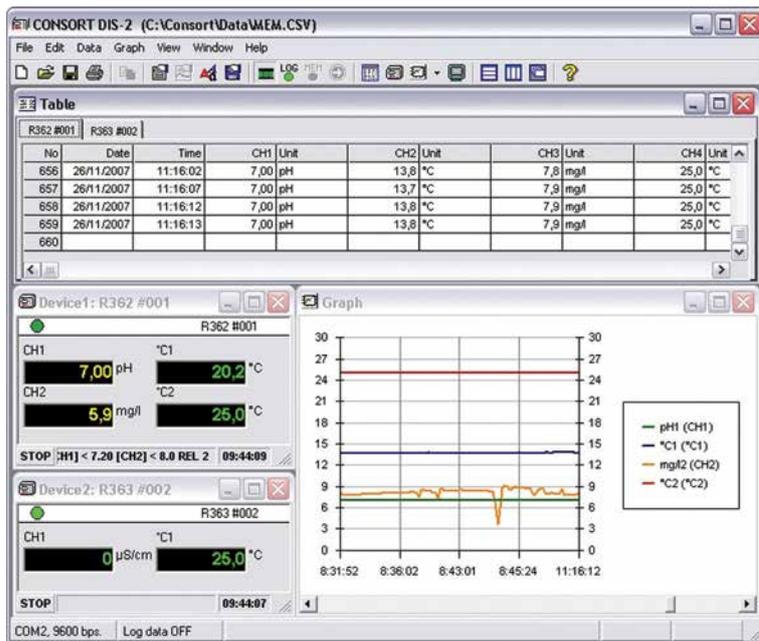


FC3020T flowcell with integrated T sensor

## Ordering codes

Code	Description
<b>R3630</b>	Controller for pH/mV/conductivity/dissolved oxygen/free chlorine
<b>FC3020T</b>	2 channel flow cell with integrated Pt1000 temperature sensor and mounting accessories

→ Add -US for 120 VAC version.



This is a configuration window titled 'C:\Toeste\Dis2.cfg'. It has tabs for 'Log', 'Connection', 'Language', and 'Devices'. The 'Devices' tab is active, showing a table with columns 'No', 'Device', 'ID.no.', and 'Channels'. The table lists 9 devices, all with 4 channels.

No	Device	ID.no.	Channels
1	R362	001	4
2	R362	002	4
3	R362	003	4
4	R363	004	4
5	R363	005	4
6	R363	006	4
7	R362	007	4
8	R362	008	4
9	R362	009	4

Buttons for 'OK', 'Cancel', and 'Help' are located on the right side of the window.



## ● Description

This free software package is specially designed to collect, store and manage data from the R36xx controllers when equipped with a RS485 interface. It can also be used with the following previous models or versions when equipped with an RS485 interface: R305, R315, R335.

DIS-2 runs under Windows™ 2000 or higher and can be downloaded from [www.consort.be](http://www.consort.be)

## ● Highlights

**Data acquisition.** All measurements of all instruments are processed at the same time, each in its own window. Data is collected on-line at a programmable interval determined by the program (1 s ... 24 h).

**Starting** By using a program-key, the data-logging will start automatically after opening the program. Data-logging can be stopped or continued at any moment. Data, which is stored in the internal memory of the connected instrument, can also be read and processed.

**Table** Data is always stored in a table. Comments can be added to each line in a special information column.

**Files** All data is saved in a user defined file. Just open the file to view, process or print the stored data. The incoming data can be stored immediately in a file. All measurements are saved in CSV format which is easily transferred into spreadsheets.

**Graphs** are generated using automatic or user defined settings. The number of visible values can be changed at any time. Programmable alarm limits for each graph allow to print a report indicating when limits have been exceeded and it shows statistics about minima, maxima and averages.

**Communication port** COM1 to COM9 can be used to connect up to nine series of max. 31 instruments. Baud rate: 300..9600 b/s.

**Terminal** shows exactly how data is received. It enables the user to check for possible errors in the data transmission.

**Settings** The style of each window can be set up separately. Choose fonts, colours etc... All settings are stored in a configuration file and automatically recalled when opening the program. Documented printouts will show:

- file name.
- date and time.
- name of the operator.
- name of the company.
- name of the division.
- optional notes by the operator.

**Functions** are accessible through the menu. Only valid options appear in the menu to eliminate set-up errors. Special buttons, icons and short-keys allow the user to easily access the most useful functions. The contents of each window can be transferred to other programs by using a copy function.

## ABSOLUTE READINGS

The instrument shows the actual value without compensating to a reference temperature.

## AC-ADAPTOR

An internationally approved mains-plug with built-in low voltage transformer for a safe supply of energy to instruments.

## ACCURACY

Maximum electronic error of the measured unit. The accuracy of an electrochemical determination such as pH, conductivity, dissolved oxygen & ion-selective measurements is mainly limited by the electrodes and calibration solutions.

## ALARM

An alert sounds or a relay is closed when readings stray outside pre-set limits.

## ALTERNATING DISPLAY

The meter can automatically scan all selected inputs for display or transmission to a computer or printer.

## AUTOMATIC CROSS-OVER

When the resistance of an electrophoresis apparatus changes during a run, the power supply is able to switch automatically between constant voltage, constant current and constant power.

## BATTERY CAPACITY

Percentage of remaining battery capacity.

## BAUD RATE

Communication speed, in bits/second (b/s), of the digital interface (RS232).

## BUFFER

A solution of buffered species where the pH tends to remain constant if diluted or concentrated.

Pre-programmed pH buffers: 1.68/ 2.00/ 4.00/ 4.01/ 6.87/ 7.00/ 9.18/ 9.21/ 10.01/ 12.00/ 12.45.

User specified pH buffers: special tables can be stored for future calibrations.

## CALIBRATION REMINDER

A timed calibration procedure facilitates considerably GLP management by prompting the user when his instrument needs to be recalibrated.

## CAPACITIVE COMPENSATION

The capacity of the electrode and its cable falsifies the measurement at very low conductivities. A capacity compensation allows to compensate for these errors.

## CELL

The 2-pole design is the most commonly used conductivity cell. The electrodes are made of platinumised platinum. The cell must be replaced or re-platinised if the plates become fouled.

The 4-pole design reduces considerably the problems of polarisation and fouling. By utilising four electrodes, no current flows through the measuring circuit. The AC-current is only applied to the outer pair of rings allowing the inner pair of electrodes to measure the voltage without any polarisation effects.

## CELL CONSTANT

The cell constant (cm<sup>-1</sup>) of a conductivity electrode is determined by the length (cm) of the column of liquid between the plates divided by the area (cm<sup>2</sup>) of the plates.

## CONCENTRATION

Concentration measurement with an ion selective electrode requires a minimum of chemical know-how to make successful ion selective determinations.

## CONDUCTIVITY

The conductivity is a measure of the solution's ability to conduct electric current. The basic unit is Siemens/cm (S/cm). It is measured by an electrode consisting of two platinum plates to which an alternating potential is applied. The corresponding current is proportional to the conductivity of the ionic solution in which the electrode is dipped.

## DATA-ACQUISITION

Connect the instrument to a computer via an USB, RS232, RS485 interface for bi-directional communication capabilities. Most instruments require no special software and feature an advanced easy to use data acquisition fully compatible with spread-sheet.

## DATA-LOGGING

Stores automatically or manually the measured values (+ °C & time/date) in a built-in non-volatile memory.

## GLP

Good Laboratory Practices procedures help to increase accuracy through calibration reports.

## GROUND LEAKAGE

Leaking or dirty electrophoresis apparatus are dangerous, since the applied high voltage may result in an electric current flowing through the operator to the ground.

## IDENTIFICATION NUMBER

Several instruments connected to the same computer can easily be identified when specific numbers are allocated to them.

## INPUT

Several types of connectors are used according to the application. Check the specifications of meter-input and electrode-plug on their compatibility.

## ISO-pH

Zero-point of a pH electrode. A new pH electrode has an ISO-pH between 6.5

and 7.5 pH.

## MINIMUM/MAXIMUM MEMORY

Recalls the lowest/highest values ever measured since the last calibration.

## mV

Electrode potential is read in mV.

## ON/OFF CONTROL

Simple control system in which the relays are continuously closed when a pre-set level is exceeded.

## ORP

Oxido-Reduction-Potential (the reducing or oxidising capability of a solution).

## PASSWORD PROTECTION

For tamper-proof storage of parameters and data, a secret personal code protects the instrument against any undesired access.

## pH

The pH is a measurement for the acidity or alkalinity of a solution. In pure water the hydrogen ion (H<sup>+</sup>) and hydroxyl ion (OH<sup>-</sup>) concentrations are equal at 10<sup>-7</sup> M (25°C). To provide a convenient and effective means of defining acidity and alkalinity, the negative logarithm of hydrogen ion activity is used. The pH is calculated from the potential between a glass and a reference electrode (Nernst equation).

## PROPORTIONAL CONTROL

The control relay will pulse at a rate proportional to the regulation difference. When the difference is superior to a pre-set maximum value, the relay is continuously activated. However, when reaching a pre-set level the wait-time between the pulses will increase gradually in order to perform very accurate regulations.

## Pt100

Platinum resistance thermometer (100 Ω at 0°C). It requires a low resistance cable for highest accuracy.

## Pt1000

Platinum resistance thermometer (1000 Ω at 0°C). Less errors when using longer cables.

## QUALITY MANAGEMENT

Measuring equipment should be calibrated on a regular basis (GLP). The accuracy of measurements is only limited by the electrodes and calibration solutions. At any moment, a complete documentation about the electrodes and calibration solutions can be printed or sent to a computer. This includes meter settings, data about the last calibration and a comparison with the previous calibration. The use of certified calibration solutions is strongly recommended. For very accurate quality measurements fresh standard solutions should be used for each calibration.

## QUANTIFICATION OF VINCENT

The quantification of Vincent is a measurement for the energy stored in an organism. It expresses the maximum dissipation of energy by a chemical or biochemical reaction. The basic unit is Watt (W) but it is more convenient to use  $\mu\text{W}$  (micro-watt). It is calculated from the ORP, referenced against a hydrogen electrode, and the resistance.

## RANGE LOCK

Allows to lock the initial conductivity measuring range when titrating in order to avoid cross-over errors due to varying measuring frequencies and linearity errors of the conductivity cell.

## REAL TIME CLOCK

Shows time and date on the display.

## REDOX POTENTIAL

The potential developed by a metallic electrode when placed in a solution containing a species in two different oxidation states. It is usually measured by a combination platinum electrode.

## REFERENCE TEMPERATURE

Conductivity measurements are temperature dependent. Therefore, the readings should be referenced to a standard temperature.

## RESISTIVITY

Electrical resistivity is the reciprocal of Conductivity. The basic unit is Ohm.cm ( $\Omega\cdot\text{cm}$ ). While the ion concentration of a solution decreases, the resistivity rises up to a maximum of  $18.3\text{ M}\Omega\cdot\text{cm}$  (absolute pure water at  $25^\circ\text{C}$ ).

## RESOLUTION

Smallest possible reading of the measured unit. More sophisticated meters allow to select the desired resolution. Unlike other meters, the CONSORT models round off the last digit rather than simply truncating digits outside the display range.

## rH2

The rH2 is a measurement for the level of electronic exchanges between water and dissolved ions. It enables to study incomplete, indeterminate and very diluted aqueous redox solutions. It is defined as the negative logarithm of molecular hydrogen ion activity, calculated from the pH and the ORP referenced against a hydrogen electrode.

## RS232

Digital interface, transmits the displayed values and calibration data to a printer or computer.

## RS485

Allows to connect several process controllers for bi-directional communication with a computer. It allows multiple devices (up to 32) to communicate at half-duplex on a single

pair of wires, plus a ground wire, at distances up to 1200 meters.

## SALINITY

Salinity gives an indication of the salt content of sea water. It is calculated from the conductivity referred to  $15^\circ\text{C}$ . The salinity is the ratio between the total salt content (g) and the total weight of the sea water (kg). Hence salinity can be expressed in ppt (parts per thousand).

## SLOPE

Percentage which relates the actual behaviour of a pH electrode to the Nernst's law. A new electrode has a slope between 95 and 100 %.

## S/S RELAY

A solid-state relay contains no mechanical contacts. Long life, compact design and spark-free switching are its main advantages. It should not be used for controlling very low power loads, as the small leakage current can cause unwanted switching-on.

## STABILITY INDICATION

A decimal point flashes until the electrode output remains constant, then readings can be recorded.

## TDS

Total Dissolved Salts of a solution gives an indication of the total ion concentration. Due to ionic interactions within a solution, the salt concentration cannot easily be related to conductivity. As the dissolved solids are generally unknown, a TDS measurement is always referred to a solution of pure Sodium Chloride.

## TEMPERATURE COEFFICIENT

Each solution has its own temperature coefficient (%/K). As this coefficient also varies with temperature, a standard conductometer cannot achieve a precise temperature compensation over a wide span of temperatures. However, a research grade meter is able to plot special temperature curves for each individual type of solutions in its non-volatile memory. Specific temperature coefficients can also be entered for special applications. For standard applications, the non-linear function for natural waters (EN27888) is used.

## TEMPERATURE COMPENSATION

Corrects readings for variations in electrode response due to temperature effects.

## THERMOCOUPLE

Thermocouples basically consist of two dissimilar wires (each made of a different alloy). One end is twisted or soldered to form a measuring junction. The other end is connected to a thermometer and forms the reference junction. The signal is a small voltage ( $\mu\text{V}$ ) proportional to the temperature

gradient between the measuring and reference junctions. Thermocouple probes are ideal to cover greater lengths. They also have a great temperature range and can easily pass through e.g. oven doors. Response time is faster than with Pt100 probes. Accuracy, stability and repeatability are less than with Pt100 probes.

## USB

Universal Serial Bus is a standard designed to eliminate the guesswork in connecting peripherals to a computer.

## VOLT-HOUR INTEGRATOR

The distance at which molecules migrate in an electrophoresis apparatus depends on the applied voltage and run-time ( $\int V\cdot dt$ ). In order to achieve reproducible experiments, it is recommended to use a volt-hour integrator rather than a simple timer.

## ZERO POINT ( $E_0$ )

Standard pH meters assume a pH electrode to supply a zero potential at 7 pH. Electrodes for special applications (e.g. stomach pH measurements) may have a different zero point. An adjustable zero point correction feature will allow users to measure with these electrodes.

## **Art. 1**

Unless otherwise agreed in writing, the legal relationship between the parties is governed by the present general terms, of which the customer declares to have taken cognisance, and which prevail over the customer's possible terms of purchase.

## **Art. 2**

All quotations are without engagement. Prices do not include taxes. Any price stated is based at all times on the salaries, social charges and prices of materials obtaining on the date of the quotation. Official price modifications as arranged by legal dispositions automatically entail equivalent modifications of the prices stated in the contract. This proportional increase can also apply to part of the order or work.

## **Art. 3**

Transport or dispatch of our goods by any means of transport is at the consignee's risk, even with carriage paid.

## **Art. 4**

If our firm acts as an intermediary, the guarantee on the goods supplied by us is restricted to the guarantee given to us by the supplier or manufacturer. If the goods are subject to formal guarantee, defective, material will be repaired or replaced, but no claims for any other damage will be accepted.

## **Art. 5**

All invoices are payable cash on the address of the invoice unless otherwise stipulated in the documents committing the parties or unless an expiry date is stated on the Invoice.

## **Art. 6**

Contrary to art. 1583 of the Civil Code, any goods that are not paid in full remain our full property; in such case possible advance payments will serve as a compensation for costs and loss of profit.

## **Art. 7**

Bills in arrears entitle us to suspend any further deliveries or services without prior notice, such to prevent debts from further increasing.

## **Art. 8**

The supply of goods or services on a later date than the date stipulated for supply or service, if such is not caused by bad faith or a serious shortcoming of the supplier, shall never form a motive for suspending the order or the agreement, nor entitle the customer to claim any damages.

## **Art. 9**

If default is made in cash payment or if payment is not carried out on the expiry date stated, the amount of the invoice shall bear a conventional interest of 1.5% per month as from the day on which the invoice is remitted or as from the expiry date stated, such by right and without any formal notice. Each month started shall be charged as a full month.

## **Art. 10**

Moreover, by way of a fixed and irrevocable condition, the amount of the invoice shall be increased by 15% with a minimum of 200 EUR, by right and without formal notice, as a compensation for recovery costs of the claim (both staff and administration costs, management and follow-up of the file, influences on financial management, etc.), in application of art. 1147 C.C. and 1152 C.C. This compensation is due apart from the moratory interests, the recoverable procedure costs and the possible compensation for material damages and loss of profit. The parties thus agree that this compensation is fixed and that, contrary to art. 1231 C.C. It cannot be modified, even when the shortcoming is only partial.

## **Art. 11**

Cheques and bills of exchange are only accepted as payment after their repayment. Possible costs are at the expense of the purchaser or commissioner.

## **Art. 12**

The drawing and/or accepting bills of exchange or other transferable documents does not imply a novation or deviation from the general terms. The acceptance costs of bills of exchange are at the expense of the purchaser or commissioner.

## **Art. 13**

If one invoice remains unpaid on its expiry date, the balance due of any other invoices, even when not expired, are immediately recoverable by right.

## **Art. 14**

In the event of a dispute, only the courts of Turnhout, Belgium, shall have competence.

## **Art. 15**

Any complaints regarding the supply of the goods and services shall be made on termination and be confirmed by a motivated registered letter within 8 days of the date of supply. These complaints do not suspend the obligation of payment.

## **Art. 16**

Remarks and restrictions concerning the invoice and/or the general terms therein stated shall be transmitted to us by motivated registered letter within 8 days of date of invoice; for the settlement of disputes this period amounts to 30 days. If an order form is signed by a purchaser or commissioner, the regulations of the general terms stated on the order form shall apply.