



€Select-CD1

EN OPERATING INSTRUCTIONS AND MAINTENANCE





ETATRON D.S.

(IT) DIRETTIVA "RAEE" 2002/96/CE E SUCCESSIVA MODIFICA 2003/108/CE SUI RIFIUTI DI APPARECCHIATURE ELETTRICHE ED ELETTRONICHE

Il simbolo sotto riportato indica che il prodotto non può essere smaltito come normale rifiuto urbano. Le Apparecchiature Elettriche ed Elettroniche (AEE) possono contenere materiali nocivi per l'ambiente e la salute e pertanto devono essere oggetto di raccolta differenziata: smaltite quindi presso apposite discariche o riconsegnate al distributore a fronte dell'acquisto di una nuova, di tipo equivalente o facente le stesse funzioni. La normativa sopracitata, alla quale rimandiamo per ulteriori particolari e approfondimenti, prevede sanzioni per lo smaltimento abusivo di detti rifiuti.

(UK) WASTE OF ELECTRICAL AND ELECTRONIC EQUIPMENT DIRECTIVE (WEEE, RAEE in Italy) 2002/96/EC AND SUBSEQUENT AMENDMENT 2003/108/EC

The marking shown below indicates that the product cannot be disposed of as part of normal household waste. Electrical and Electronic Equipment (EEE) can contain materials harmful to health and the environment, and therefore is subject to separate waste collection: it must be disposed of at appropriate waste collection points or returned to the distributor against purchase of new equipment of similar type or having the same functions. The directive mentioned above, to which make reference for further details, provides for punitive actions in case of illegal disposal of such waste.

(FR) DIRECTIVE "RAEE" 2002/96/CE ET MODIFICATION SUCCESSIVE 2003/108/CE CONCERNANT LES REBUTS D'APPAREILLAGES ÉLECTRIQUES ET ÉLECTRONIQUES

Le symbole ci-dessous indique que le produit ne pas être éliminé comme un normal déchet urbain. Les Appareillages Électriques et Électroniques (AEE) peuvent contenir des matériaux nocifs pour l'environnement et la santé et doivent donc faire l'objet de collecte différenciée: éliminés donc auprès de décharges prévues à cet effet ou rendus au distributeur pour l'achat d'un nouveau, de type équivalent ou ayant les mêmes fonctions. La réglementation susmentionnée, à laquelle nous vous renvoyons pour les détails et les approfondissements ultérieurs, prévoit des sanctions pour la mise en décharge abusive desdits rebus.

(ES) DIRECTIVA "RAEE" 2002/96/CE Y MODIFICACIÓN SUCESIVA 2003/108/CE SOBRE RESIDUOS DE APARATOS ELÉCTRICOS Y ELECTRÓNICOS

El símbolo que se muestra abajo indica que el producto no puede eliminarse como un residuo urbano normal. Los Aparatos Eléctricos y Electrónicos (AEE) pueden contener materiales nocivos para el medio ambiente y la salud y por tanto tienen que ser objeto de recogida selectiva: por consiguiente tienen que eliminarse en vertederos apropiados o entregarse al distribuidor cuando se adquiera uno nuevo, del mismo tipo o con las mismas funciones. La normativa mencionada arriba, a la que remitimos para más detalles y profundizaciones, prevé sanciones por la eliminación clandestina de dichos residuos.

(PR) DIRETRIZ "RAEE" 2002/96/CE E MODIFICAÇÃO POSTERIOR 2003/108/CE SOBRE RESÍDUOS DE EQUIPAMENTOS ELÉTRICOS E ELETRÔNICOS

O símbolo referido abaixo indica que o produto não pode ser eliminado como resíduo urbano normal. Os Aparelhos Elétricos e Eletrônicos (AEE) podem conter materiais nocivos ao ambiente e à saúde e, portanto, devem ser objeto de coleta seletiva: eliminados, portanto, através de depósitos apropriados ou pelo reenvio ao distribuidor para a aquisição de um novo, de tipo equivalente ou que realize as mesmas funções. A normativa referida acima, à qual nos referimos para detalhes complementares e esclarecimentos, prevê sanções no caso de eliminação inadequada de tais resíduos.



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eSelect-CD1 CONTROLLER SERIES INCLUDES SCREWS FOR WALL MOUNTING



eSelect-CD1 series is **NOT** provided with sensors, which are available upon request.
ETATRON D.S. declines any responsibility in case the controller is used with other brand probes and sensors

SAFETY STANDARDS

User information signs

	WARNING: ignoring safety information can endanger life or result in serious injury!
	CAUTION: ignoring safety information can result in injuries to persons or damage systems or materials! ⚡ HIGH VOLTAGE: ignoring this sign can result in death or serious injuries to persons!
	NOTE or INFORMATION SOURCE
	- this symbol "pointing finger" indicates programming steps. - if no keys are pressed within 60 seconds, controller will display current measurements



Qualified and authorized personnel must carry out any work or repair on the unit: manufacturer declines any responsibility for consequences in case this rule is not complied.

Unqualified personnel should keep away from the plant and/or hazard areas.

The official operator of the system or the plant, when installing the unit, is responsible to fulfil the above rules.

CONTROLLER DESCRIPTION

The eSelect-CD1 is a compact system with ELECTRICAL CONDUCTIVITY (EC) controller. In many cases, conductivity is linked directly to the total dissolved solids (T.D.S.): conductivity provides an approximate value for the TDS concentration, usually to within ten-percent accuracy. eSelect-CD1, along with the high quality performance in terms of measurements and functions thus satisfying most of the requirements for an instrument, it offers many features thus making it extremely versatile and easy to operate. Conductivity measurement are in micro Siemens features 4 K factor ranges (Cell Constant) suitable for following K:

Controller covers ranges from constant K 1 up to 20.00 mS and even 100.00 mS (latter with graphite sensor electrodes) and constant K 5 ranges 2.000 µS;

BENEFIT: The above feature allow dealers to stock one type for all controller thus reducing stock value or saving problems when issuing orders to manufacturer.

Two types of programming menu:

- **Basic** making life easier for those home applications such small swimming pool or water treatment systems;
- **Expert** for professionals giving the opportunity to refine measurements and safety functions.

A friendly user menu programming it is almost self-explanatory and the elegant wide display allows easy vision.

PARAMETER	VALUE
Measure	Conductivity up to 20mS
Type of probe	PTFE with graphite electrodes, k=1
Power supply	100÷240 Vac – 50/60 Hz – 6W
Display	Graphic 128x64 (visible area 70x37 mm)
Power supply protection	The whole power pack (there is no fuse)
Temperature probe	PT100, 0,1°C resolution
External casing	ABS, IP65
Inputs	Level, Proximity
Relay outputs	2 relay outputs (set-point 1 and set-point 2) ON-OFF or PWM type
Relay outputs features	maximum 5A on resistive load, maximum 1A on inductive load, 230Vac
mA outputs	1 mA galvanically separated output
mA outputs features	500 ohm maximum load impedance
Alarm	Overdosing alarm
Accessories	Wall mounting kit
Measures	120 x 200 x 90,5
Weight	Net weight: 1230 gr - Gross weight: 1255 gr
Front controls	Polycarbonate adhesive
Working temperature	0÷50 °C

TECHNICAL CHARACTERISTICS

Conductivity EC Measuring range and K factor (cell constant):	<ul style="list-style-type: none"> ▪ K 1 ranges up to 20.00 mS and even 100.00 mS (latter with graphite sensor electrodes) / Hysteresis / PWM point = 500 µS Resolution 10 µS ▪ K 5 ranges up to 2.000 µS / Hysteresis / PWM point = 50 µS Resolution 1 µS ▪ K10 ranges up to 200 µS / Hysteresis / PWM point = 0,50 µS Resolution 0,1 µS ▪ K 0.1 ranges up to 100.00 mS / Hysteresis / PWM point = 5000 µS Resolution 100 µS (only with graphite sensor electrodes)
Temperature setting:	automatic with combined conductivity + PT100 or NTC system
Temperature probe range:	– 20100°C
	<ul style="list-style-type: none"> ▪ Resolution 0.1% °C ▪ Accuracy: ± 0.5% °C
Power supply / Power consumption:	Universal power supply 100÷250 Vac / 5W at 240 V AC
Microprocessor technology:	SMD components mounting, digital controls keypad 6 key
Linearity, Stability Reproducibility:	± 0.5 % under standard conditions
Display:	back-lit custom display (128x64); Display visible area 70x37 mm
Delay:	Delay time relay activation, programmable for each set-point (999 sec.)
Start-up Delay:	Delay time relay when switching ON, programmable on each set-point

Power consumption / Nominal current:	230V=6W, 100mA / 24Vac-dc=7W, 300mA / 12Vdc=7W, 600mA
Internal electrical protection:	power supplier guarantees electrical protection (instead of fuse)
Level / Remote relay control	Chemical additive level (level switch not included)

Outputs:	Output RELAY 1 (set-point 1)	ON-OFF or PWM mode voltage free contact 5Amax 230Vac
	Output RELAY 2 (set-point 2)	ON-OFF or PWM mode voltage free contact 5Amax 230Vac
	FLUX sensor (proximity switch)	It blocks output operations in case of no flow into the sensor cell
	Unit load	Resistive load 5A max 230 V AC / Inductive load 1A 230 V AC
	Insulation voltage relay output:	> 3000 Vac
	Relay contact lifespan	> 10 ⁵ switching operations (at 3 A /230Vac)
	0/4...20 mA output EC	Adjustable (500 Ω max input impedance), galvanic separation
	Noise Level:	Irrelevant

Working temperature:	Ideal working temperature 5°C÷40°C, withstand 0°C÷45°C.
Environmental Conditions:	Possibly dry environment, altitude up to 2000m, Relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C. Pollution degree 2.
Transport and storage conditions:	– 5÷60°C possibly dry environment

HINTS AND WARNINGS

Please read the warning notices given in this section very carefully, because they provide important information regarding safety in installation, use and maintenance of the unit.

- Keep this manual in a safe place, so that it will always be available for further consultation.
- The company manufactured the unit in accordance with best practice. Both its lifetime and electrical and mechanical reliability will be enhanced if it is correctly used and subjected to regular maintenance.



Warning

Qualified and authorized personnel must carry out any intervention or repair for the unit; manufacturer declines any responsibility for consequences in case this rule is not complied.



Shipping and Transporting

Shipment is always at the purchaser's risk. Claims for any missing materials must be made within 15 (fifteen) days of goods arrival, while claims for defective materials will be considered within 30 (thirty) days from the same date. ETATRON D.S. authorized personnel must previously agree the return of the equipment or other materials.



Proper use of the controller

- Controller must be used only for the purpose for which it has been expressly designed, namely the controlling and measuring physical-chemical values.
- Any different use of it must be considered improper therefore dangerous.
- All other applications or modifications are prohibited.
- The equipment is NOT designed for use in explosion-hazardous locations.
- The unit can only be used for applications where technical requirements meet the ones of ETATRON D.S. characteristics and specification data shown in the present operating booklet.
- The vendor is not liable for damage deriving from improper and/or unreasonable use of the unit.



Risks

- After unpacking the equipment, ensure it is in good shape and form. In case of doubt, do not use it and contact qualified personnel. Keep out of reach of children packing materials (plastics bags, polystyrene, etc.) being potential sources of danger. However, save packaging: it can be useful for future shipments.
- Before connecting the equipment ensure voltage ratings corresponds to local power supply. You will find these characteristics in the product label placed on the equipment and packing.

- The electrical installation must comply with the standards and rules in force in the country where it is utilised.
 - Use of electrical equipment always implies observance of some basic rules:
 - 1 - Do not touch the equipment with wet or damp hands or feet;
 - 2 - Do not operate the equipment with bare feet (example: swimming pool equipment);
 - 3 - Do not leave the equipment exposed to the action of the atmospheric agents;
 - 4 - Do not allow the equipment to be touched by children or used by unskilled individuals without supervision;
 - **When commissioning the unit or in case of emergencies or improper functioning, the controller should be switched off immediately. Disconnect the power cable from the main power supply!** Contact our technical assistance for any necessary repairs, use only original spares! Failure to respect this condition could render the equipment unsafe to use.
 - When carrying out any repairs or opening the unit, ensure to disconnect it from power supply.
 - When there is no longer use requirement of installed equipment, ensure to disconnect it from power supply.
1. Disconnect power from mains or from the single-pole switch-contact.
 2. Take all due safety precautions during unit service (gloves, goggles, overalls, etc.).



Assembling and dismantling the equipment

ASSEMBLY: all ETATRON D.S. controllers are fully assembled. For the wall mounting, please proceed as follows.

DISMANTLEMENT: before dismantling the unit or carrying any operation, disconnect power.

ESELECT-CD1 SERIES ENCLOSURES, MOUNTING, COMMISSIONING AND OVERALL DIMENSIONS

Wall mounting enclosure eSelect-CD1



eSelect-CD1 enclosure ABS plastic 200w x 106h x 90,5d

To access the 4 wall mounting points remove the 4 mounting point closures **(A)** located in each corner of the controller.

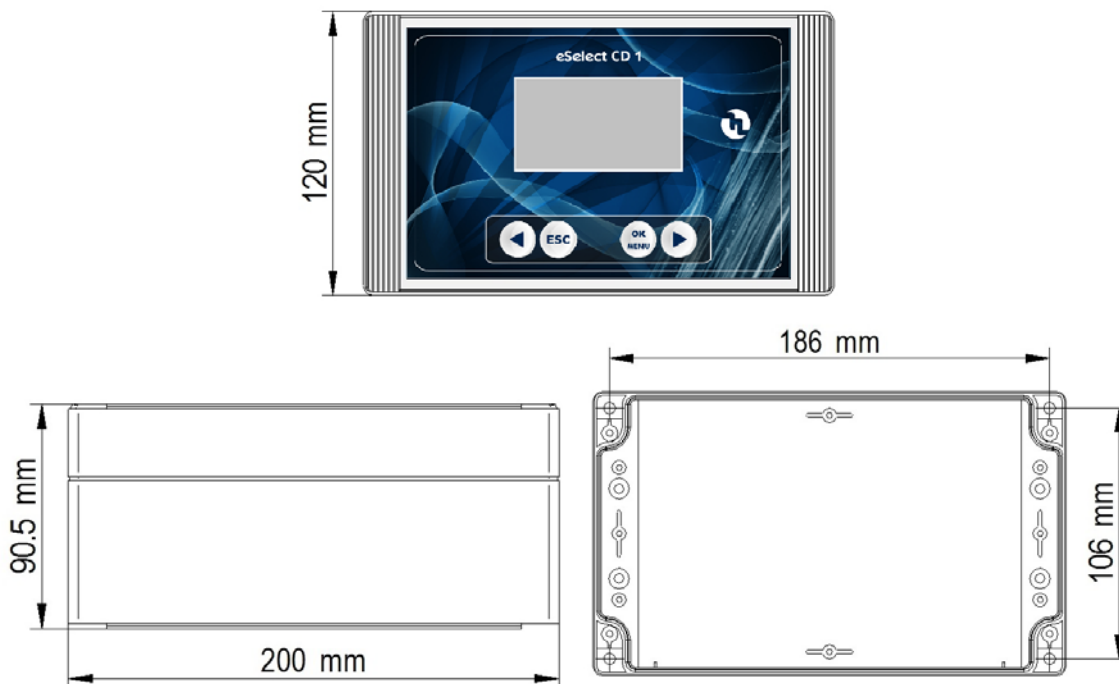
The enclosure features 4 captive screws for a quick opening/closing of the lid thus allowing easy access for commissioning and service and also guarantees a perfect seal for long time operation

- a. - Install the unit in a dry place and well away from heat sources; max environmental temperatures 40°C.
- b. - Carefully observe regulations in force in the various countries as in regards electrical installations.
- c. - Mount the controller on the wall using the screws and dibbles provided with the unit



VERY IMPORTANT NOTE FOR ENCLOSURE: when handling the unit bear in mind not to pull, drag, or mistreat the flat cable connecting the pcb display placed on the lid with main pcb.

Overall dimensions



Electrical wiring connectors

eSelect-CD1 is provided with 2 multiple cable glands for various input and output cable wirings. Complying with International electrical wiring rules, we advice not to connect more then one equipment on each pin.



CONNECTORS GLANDS USE:

Cable gland 1: Power cable

Cable gland 2 and 3: Recommended use for:

- Set-points relay outputs
- mA output
- Level probes for chemical tanks
- 12Vdc input
- Flow sensor
- AUX output
- Conductivity sensor
- Temperature Sensor

Connecting conductivity sensor

eSelect-CD1 works with simple conductivity 2-electrode open sensors, with AISI 316 and Graphite electrodes.



NOTE FOR CONDUCTIVITY SENSORS

eSelect-CD1 works with simple conductivity 2-electrode open sensors, AISI 316 OR Graphite electrode.

FOR CONDUCTIVITY SENSORS with internal temperature sensor: due to the various types on the market, in case operator wished to use such sensor, use PT100 temperature sensors, please contact ETATRON D.S. service or Local Dealer to get the right configuration. eSelect-CD1 is **NOT** suitable for inductive EC sensors!

Install conductivity sensor into the system or an off-line holder and connect to Terminal board (see page 13) before connecting to mains. We recommend using a new electrode or at least in good conditions (not old).

Connect Conductivity sensor to internal terminal board.

PLEASE NOTE:

eSelect-CD1 automatically adjust itself for various conductivity ranges by adapting the controller to the different probes cell constant "K" characteristic. However, at the beginning of programming and in "Expert Menu Set-point1" user can adjust the required K factor.

It is always RECOMMENDED and mandatory to use the correct K probe according to the range in which the controller is working.

- Controller covers ranges from constant K 1 up to 20.00 mS and even 100.00 mS (latter with graphite sensor electrodes) and constant K5 ranges 2.000 μ S;

The controller will adapt also the Measurement and Display resolution according to the type of probe used;

CONTROLLER SENSOR "SENSOR CALIBRATION", check pages 22 and 26

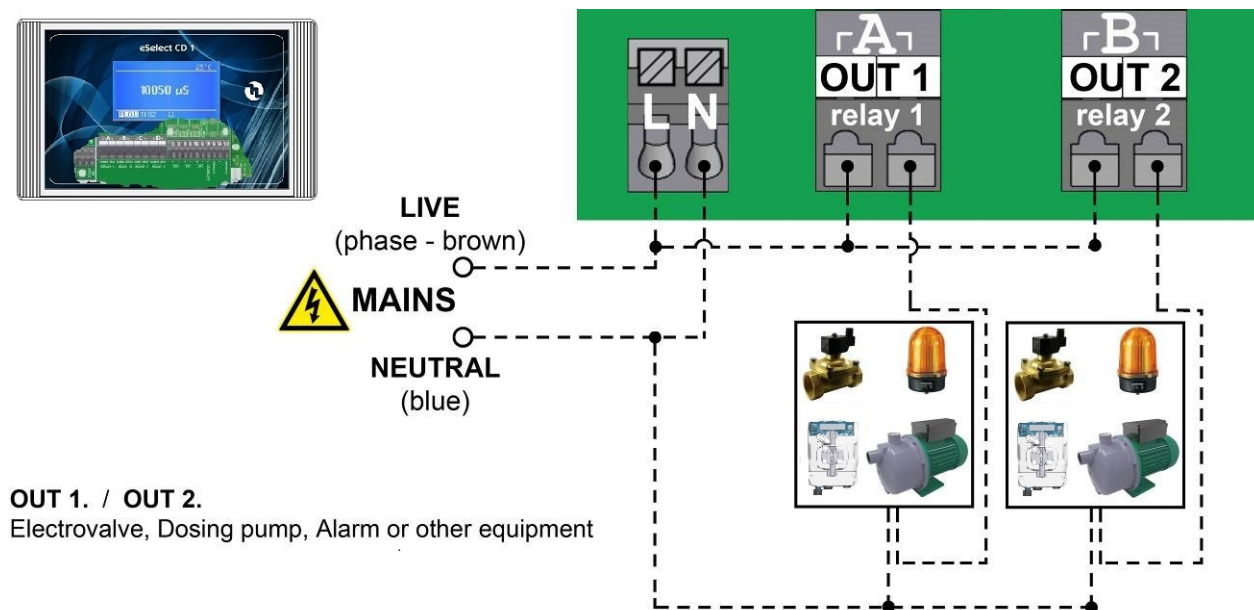
"SENSOR CONFIGURATION AND RANGE" check page 8

Connecting to main power supply / PARALLEL CONNECTIONS

PARALLEL CONNECTIONS: when connecting the unit to main power supply in parallel with other inductive equipment (motors, pumps, blowers, solenoid and motorized valves), these gears must be electrically isolated and with a proper Ground system, to prevent damages from inductive voltages when switching ON-OFF.

- try to use a power switch in order to have separate connections via contact relay or relay.
- when this is not possible, contact ETATRON technical service.

EXAMPLE CONNECTION CONTROLLER-DOSING PUMP RELAY OUTPUTS 1-2-3-4



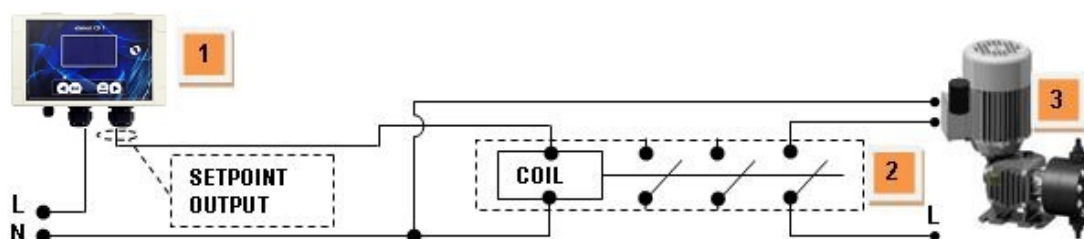
i ETATRON controllers are equipped only with clean contact relays to drive actuators (e.g.pumps) as shown in the above diagram. In case installator wishes to drive actuators directly from mains, wiring must respond according to local electrical rules and ensuring the following requirements: Max 3A, Max voltage 250Vac or 30Vdc.

Example connection controller-motor dosing pump relays OUT 1-2

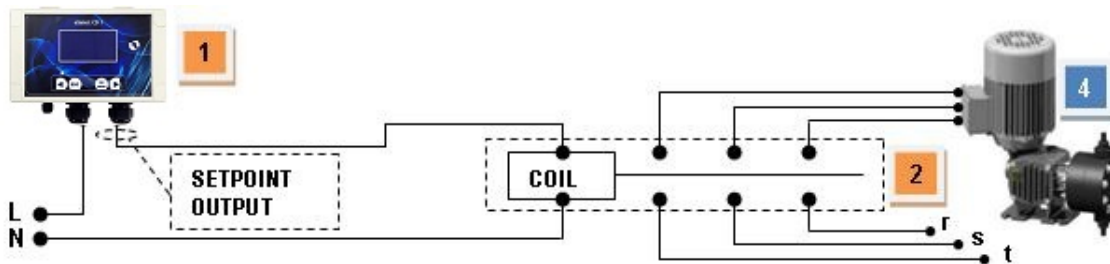
- | | |
|--|---|
| 1 CONTROLLER | 3 SINGLE PHASE MOTOR METERING PUMP |
| 2 POWER RELAY SWITCH 230V MAX 10A | 4 TRI-PHASE MOTOR METERING PUMP |

L = one phase of mains network N = neutral r - s - t = represent each phase of tri-phase mains system

SINGLE-PHASE CONNECTIONS DIAGRAM THROUGH POWER RELAY SWITCH



THREE-

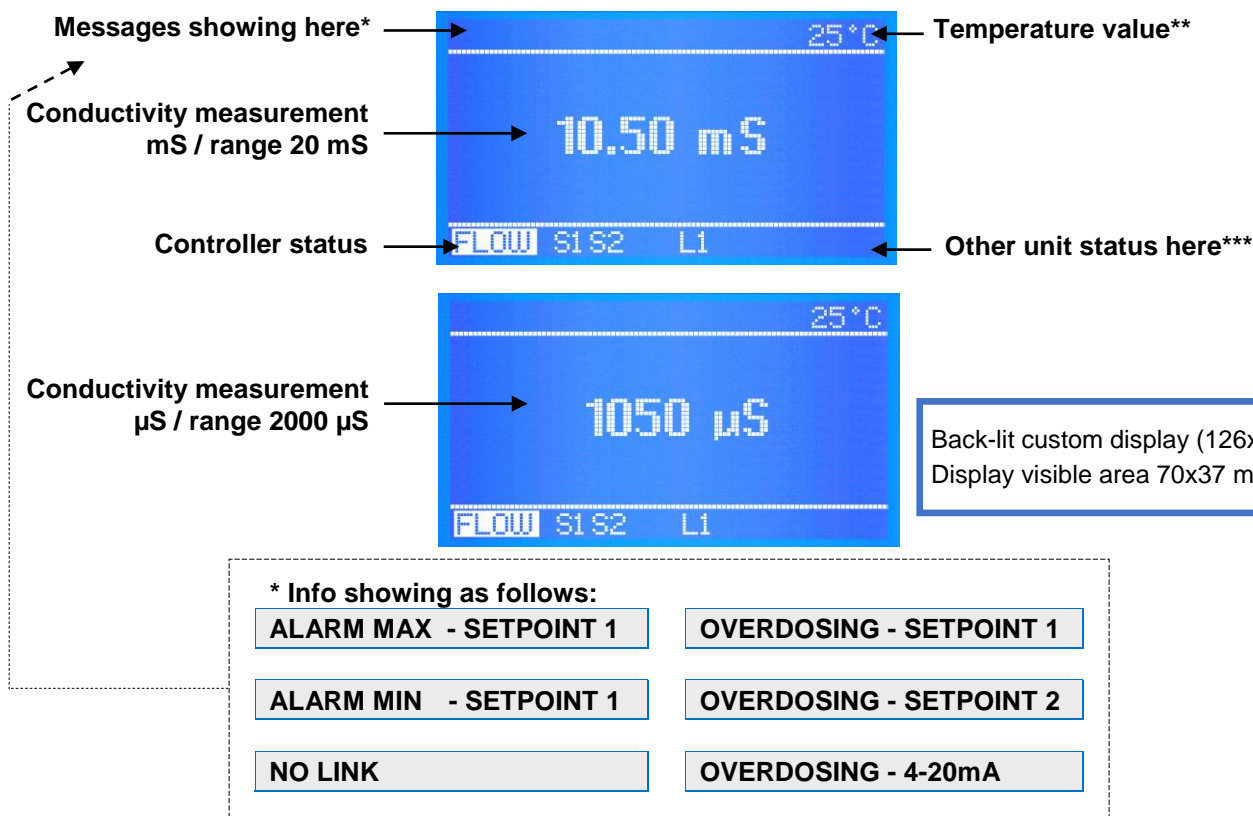


WHEN OPENING THE LID FOR SERVICING THE UNIT, ALWAYS DISCONNECT POWER SUPPLY!!!



KEEP IN MIND: unit with universal voltage 100÷250Vac ($\pm 10\%$) or 9÷24Vdc. If the actual voltage is constantly at the limit (lower or higher), or when spikes are much higher than mentioned range, the unit input is electronically protected against Voltage fluctuations; outside the above mentioned ranges, controller will not function and circuit boards must be replaced. We **RECOMMEND** using voltage protections, checking system ground and, when connecting in parallel other equipment, using "power switch". A plant not built according to correct electrical rules, without a ground system, with frequent ON/OFF operations, could affect directly the circuit boards.

DISPLAY DESCRIPTION



If there are more than one function active, messages appear in a continuous cycle lasting 3 sec. for each item. ALARM or OVERDOSING messages will disappear once measurements are restored according to programmed settings whilst Overdosing icon will remain; to delete activated icons from the display, keep pressing on **ESC**. When messages appear, temperature status will NOT be shown.

Temperature value:** in case the temperature has been set with Manual mode, the temperature value will correspond to the one selected. In case has been selected the PT100 mode and such temperature sensor has been connected, the temperature value shown will correspond to the actual value in the system.

NO LINK: communication break down between controller and display



eSelect-CD1 series power and control boards software are linked together via 485 protocol: when in place of the temperature display is shown "NO LINK" it means there is a problem between the two boards in that case check the electrical flat cable and wiring connection between the them and contact immediately ETATRON service.

Other status icons shown at bottom line***

Here are displayed some other messages status such as:

S1 S2 L1 ALARM OVERDOSING FLOW "BASIC MENU" "EXPERT MENU"

"BASIC MENU" "EXPERT MENU" these messages appear during programming steps as reminders.

Controller is set as default with * **BASIC MENU** * which is a simple programming for not professional user keeping all the functions to a very basic simple menu.

* **EXPERT MENU** * features other parameters to select thus refining the unit operation and safety functions although programming is still user friendly.

S1 S2 indicating the correspondent active Set point. When selecting "Mode Timed Pulses" (Pulse With Modulation) during set point step, the message S1... S2 will flash during PWM operations but when the set point is NOT active there will not be any message.

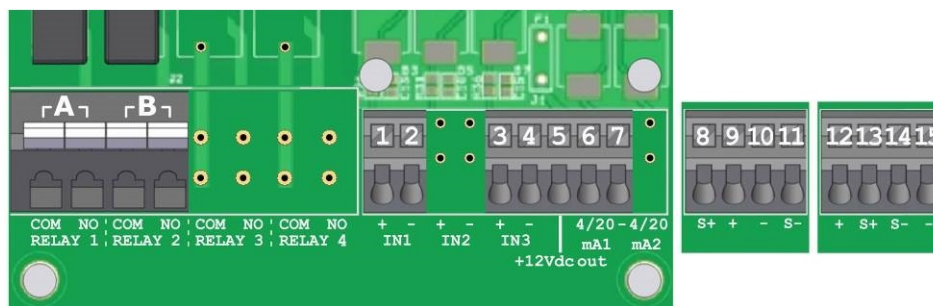
**** FLOW **** shows the absence of water flow into the sensor holder: this is valid only when using a Proximity switch and the "Flow sensor" is **enable** which is possible only when using "Menu Expert".

L1 L2 indicate the "Level" control of external chemical tanks and are only shown once the floating level probe/s are connected to the terminal block pins IN1 and IN2: when the level into the tank is lower than the level probe floater, this will enable the Status message.

When switching ON the controller for the **first time**, it will appear a list of all the programming keys function.

Controller covers ranges from **constant K 1 up to 20.00 mS** and even 100.00 mS (latter with graphite sensor electrodes) and **constant K 5 ranges 2.000 μ S**. Display will show μ S values but in case setpoint value exceed 1999 μ S, it will show 2.00 mS (decreasing the value will return to μ S reading). Selecting K5 (5.000) range setpoint value 100 μ S.

TERMINAL BOARD ELECTRICAL WIRING

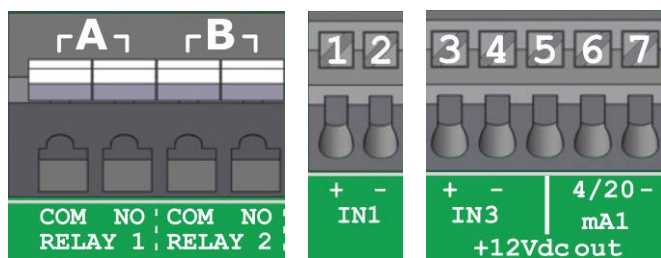


WHEN OPENING THE LID FOR SERVICING THE UNIT, ALWAYS DISCONNECT POWER SUPPLY!!!

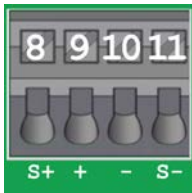
- Unscrew the front panel and carefully open the lid
- eSelect-CD1 series is provided with 2 m cable already wired; in case user wishes to replace the cable with a longer one, connect the mains to neutral, phase, unit switches **ON**, initially display **quickly** shows the instrument latest software review.



The terminal board is built with special pin for top safety: ensure to twist well the wire ends, use a small screwdriver to press the safety on top of the slot where insert the wire ends and, according International electrical rules, we do not recommend to connect more then one equipment on each pin.



Out A Pin COM / N.O.RELAY1	Set-point 1 ON-OFF / output relay PWM timed pulses
Out B Pin COM / N.O.RELAY2	Set-point 2 ON-OFF / output relay PWM timed pulses
Pin 1 + / Pin 2 - IN 1	Digital Input Level switch for chemical tank
Pin 3 + / Pin 4 - IN 3	Proximity Switch input BLACK + / BLUE - wires
Pin 5 + +12Vdc out	Proximity Switch input 12Vdc BROWN wire
Pin 6 / Pin 7 4/20mA	4-20mA proportional output for mA dosing pump or data device



Conductivity sensor 2 wires
DO NOT CONNECT BRAIDED WIRE

Pin 8 = S+ RED or WHITE

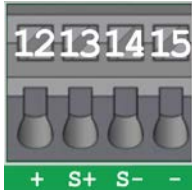
Pin 9 = +

Pin 10 = -

Pin 11 = S- WHITE or RED



*eSelect-CD1 works with simple conductivity 2-electrode open sensors, AISI 316 **OR** Graphite electrode. FOR CONDUCTIVITY SENSORS with internal temperature sensor: due to the various types on the market, in case operator wished to use such sensor, please contact ETATRON service or Local Dealer to get the right configuration for connecting to terminal board. eSelect-CD1 is NOT suitable for inductive EC sensors!*



Temperature probe PT100
DO NOT CONNECT BRAIDED WIRE

Pin 12 = + RED

Pin 13 = S+ BLUE

Pin 14 = S- GREEN

Pin 15 = - YELLOW



KEEP IN MIND: unit with universal voltage 100÷250Vac ($\pm 10\%$) or 9÷24Vdc. If the actual voltage is constantly at the limit (lower or higher), or when spikes are much higher than mentioned range, the unit input is electronically protected against Voltage fluctuations; outside the above mentioned ranges, controller will not function and circuit boards must be replaced. We **RECOMMEND** using voltage protections, checking system ground and, when connecting in parallel other equipment, using "power switch". A plant not built according to correct electrical rules, without a ground system, with frequent ON/OFF operations, could affect directly the circuit boards.

OPERATING MODES GLOSSARY

ON-OFF mode

- Unit is provided with ON-OFF mode which will activate (or deactivate in case of reverse mode ON) output relays Constant / ON-OFF dosing pumps mode or other ON-OFF equipment.

BENEFITS: it will work with most of ON-OFF equipment, which are also cost effective.

DISADVANTAGES: due to dosing equipment high output performance rate (frequency for dosing pump and peristaltic dispensers with motor rpm), this will result to a slight different values between actual measurement in the system and what controller shows.

USING EXTRA ON-OFF RELAY OUTPUT

- ON-OFF Relay** probably will connect a dosing pump; the free available relays can connect an alarm device (buzzer and light), programming different values then the ones for dosing pumps.

BENEFITS: increase safety measurements ensuring warning in case parameters are out of control.

DIRECT / REVERSE DIRECTION MODE

- Set points relays Direction mode are set as default as follow:

Set point 1 EC (conductivity measure: DIRECT mode, meaning that output is active when measured value is lower than selected set-point. Set point 2 is set with REVERSE direction mode output is active when measured value is higher than selected set-point..

ALARM HIGH / LOW FUNCTION

- Alarm** function allows selecting two points high and low passed which controller will go into alarm. Set point 2 relay can function as Alarm connecting and diving an alarm device or other equipment (only Alarm High or Low).

BENEFITS: increase safety measurements ensuring warning in case parameters are out of control.

HYSTERESIS

- Hysteresis** is useful during ON-OFF mode set-point adjustment operations and is used to activate or deactivate output relays when selected hysteresis is reached. Hysteresis is useful when there are too many and/or quick changes around set point, which could damage connected equipment. Increasing Hysteresis will allow moving away from set point according to required value.

Example with range 2000 μS : if selected set-point is 700 μS EC and Hysteresis set to 100 μS , the two active points are 600 μS and 800 μS : within this range, set-point is OFF and outputs are blocked, outside this range set-point is ON (always in accordance with direct or reverse mode).

BENEFITS: ensuring good control the systems without stressing connected equipment.

DISADVANTAGES: user must remember that programmed hysteresis is slightly different from required set point.

DELAY

- **Delay time** blocks relay outputs (max 999 sec. programmable) to ensure that the outputs are active only when the sensors measurements are stable thus allowing the best results in terms of chemical balance.

TIMED PULSES MODE (PWM) PULSES WITH MODULATION TIME/PAUSE

- **Timed Pulses** also known as **PWM** "pulses with modulation" time/pause allows proportional mode on each ON-OFF set-point activating corresponding pulses with Start/Stop time cycle variation according to measured value in respect to set-point.

Window Width (example range 2000 μ S): pulses are timed ON and OFF according to the distance from selected set-point, programmable, example: if selected set point is 700 μ S EC and measured value is 600 μ S, PWM mode will start after reaching 650 μ S with Time/Pause pulses and decreasing the active time while reaching set point value.

Cycle Time: PWM mode cycle 60 seconds (programmable): example set point 700 μ S = active time 60 sec - pause time = 0 sec.; 675 ppm active time= 30 sec / pause time 30 sec.....and decreasing active time accordingly while reaching set point value. Cycle time depends on many variables such as: distance from injection point to treating system, how fast or slow set point must react, chemical concentration, etc....

Active Time MIN programmable: it sets the minimum time in which PWM is active; it overrules selected settings. Times Pulses function is adjusted via 3 functions following the formula:

Active Time according to selected formula = (measured value – set point) / window width * cycle time If the result of the formula is < the selected Active Time Min, the latter with overrule the first, example range 2000 μ S: measured 600 μ S -set point 700 μ S / Window Width 0.50 *Cycle time 60 sec=active time 4 sec.

In case user has selected **Active time min 5 sec.**, this will be minimum time of PWM and not 4 sec.

BENEFITS: a simile-proportional function more accurate then ON-OFF mode using simple equipment such as Constant dosing pumps and peristaltic dispensers.

DISADVANTAGES: not as accurate as mA mode, user needs an accurate selection of dosing unit flow rate.

PROPORTIONAL ANALOG CURRENT OUTPUT 4÷20 mA

- **4÷20mA1 and mA2 programmable proportional mode:** at 4 mA corresponds selected set-point, at 20 mA corresponds the max measured distance from selected set point. The active time on the mA outputs is calculated according to the following relation: 0 sec:4 mA / 1 sec:20mA. Analog mA outputs connections are galvanic separated. Controller allows choosing between AUX (driving data logger or data recorder or other equipment) and Dosing set point (driving dosing pumps) or all equipment suitable to work with mA signal).

BENEFITS: best results because pulses are extremely accurate in relation to measured levels.

DISADVANTAGES: user needs a specific dosing pump for such operational mode.

OVERDOSING TIME

- **Over dosing time-out** alarm allows to select a period of time in which set point must be reached. If during this time set point is not reached, controller will block outputs operations including mA outputs (dosing pump), Alarm is ON shown on display and will activate a signalling device connected to alarm relay.

BENEFITS: to prevent excess of chemical addition.

START-UP DELAY

- **Start-up Delay time** "freezes" the relay outputs when switching ON the unit thus allowing sensors to polarize ensuring correct measurements (programmable).

FLOW SENSOR "PROXIMITY SWITCH" FUNCTION

- **Flow Sensor:** in case, no water is running through the sensor cell holder (and eventually into the systems), flow sensor (proximity switch) will deactivate all outputs ensuring that no extra chemical is added.

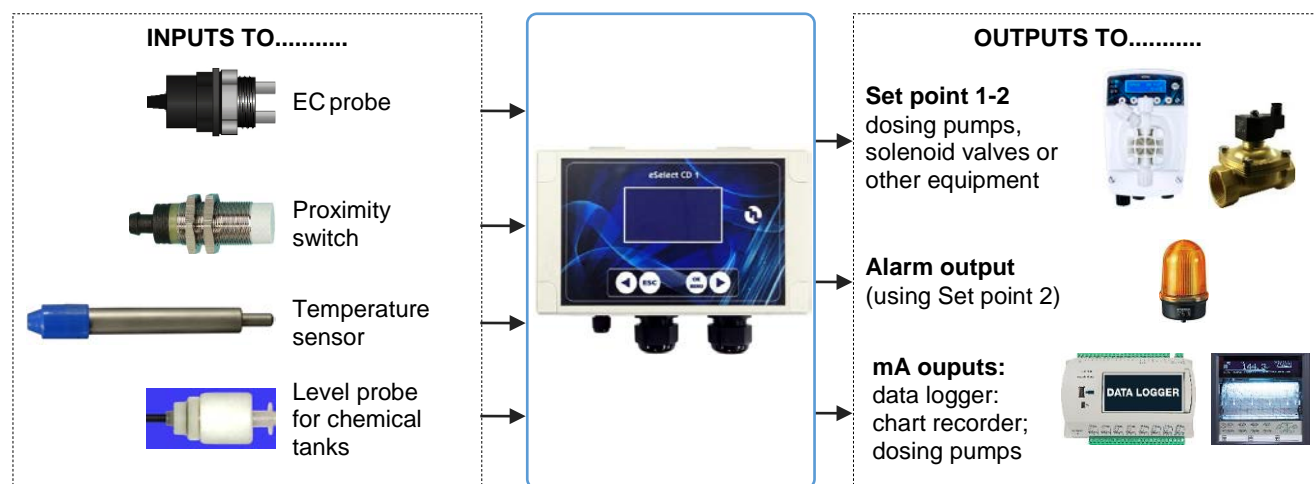
TEMPERATURE

- **Manual temperature compensation.** 0÷100°C. Selecting TEMP.PROBE (latter temperature sensor) compensates temperature/electrode measurements, always giving the exact value against the current temperature.

PROGRAMMING FUNCTIONS

Set-Points	Output Relay 1 - 2	2 set-points ON-OFF	<i>Independent setting to activate Constant / ON-OFF mode dosing pumps or On-Off equipment.</i>
		Set point	<i>adjusts set-point value (ON-OFF mode).</i>
		Hysteresis	<i>It selects a measuring range around set-point value, blocking output relays (ON-OFF mode)</i>
		Direct - Reverse	<i>It selects output dosing relay dosing direction.</i>
		PWM Proportional mode with modular pulses	<i>Proportional time/pause pulses output will activate a Constant / ON-OFF mode dosing pumps or other equipment.</i>
		Delay on set point	<i>It selects a delay time (999 seconds adjustable) before activating relay output.</i>
		Alarm Min / Alarm Max	<i>Alarm function selects alarm Lowest and Highest level passed which alarm relay will be ON or OFF.</i>
mA output	<i>It allows to select Conductivity (μS) levels corresponding to min. / max mA output analogical signal. It activates a dosing pump suitable to process a remote mA signal or chart recorder or Data logger.</i>		
Calibration	<i>Calibration menu for Conductivity sensor.</i>		
System Settings	Flow sensor	<i>It activates (ON) or deactivates (OFF) flow sensor (proximity switch) input.</i>	
	Manual temperature	<i>It selects manual temperature compensation. 0÷100°C (Auto-Temp=OFF).</i>	
	Auto-temperature Compensation	<i>It compensate the temperature/electrode sensor thus always measuring the exact value against the current temperature.</i>	

INPUTS / OUTPUTS DIAGRAM FUNCTIONS



INITIAL DISPLAY

NOTES FOR PROGRAMMER: try not to press the keys continuously. First, read the manual before programming or have the booklet handy so to be sure to perform a correct selection.

IMPORTANT: if keys are not pressed during 60 seconds, controller will display current measurements.
For rapid advancement, keep pressed firmly either one of ◀▶ keys

ETATRON D.S.
MODEL ESELECT-CD1
Rev. X.X

When the controller is turned ON there will be displayed at the bottom the latest software upgrade.
Software is subject to revision without further notice.

Controller will get set for measurements and ready to work.



at this point there could be some here are displayed some other messages status such as:

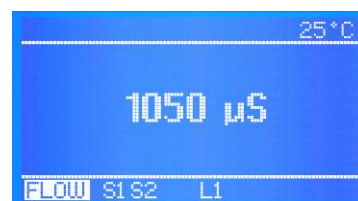
S1 S2 L1 ALARM OVERDOSING FLOW *BASIC MENU* *EXPERT MENU*
which could be ON due to actual measurements, just go ahead with programming.

Display shows pH, Redox mV and Chlorine ppm measurements. If controller has been already programmed, display shows previously selected set points.

INITIAL DISPLAY shows measurements according to the K range selected in the next paragraph. If the controller has been already programmed, display will show previously selected programs.

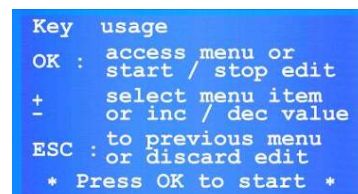
CONTINUOS MEASUREMENT DISPLAY shows when parameter measurements, function status and alarm indications.

When the controller is turned **ON** for the first time, there will be displayed a list of all the programming function keys which will not appear in the next switching ON operations.

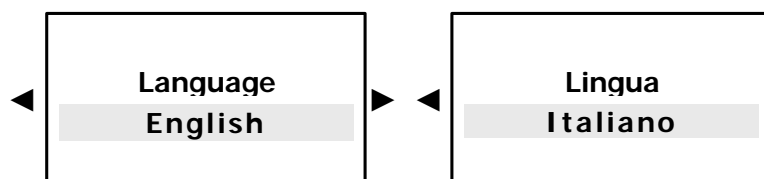


CAREFULLY READ KEY USAGE THEN PRESS OK to start

For rapid advancement keep pressed firmly either one of the ◀▶ keys



Selecting Language



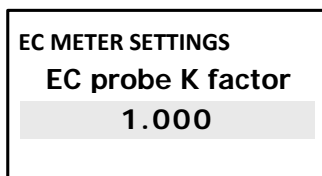
The controller has 2 languages: English and Italian, selected by using the keypad arrows.

Selecting Conductivity (EC) “K” factor

Conductivity EC value automatically adjust itself for various conductivity ranges by adapting the controller to the probes cell constant “K” characteristic.

Controller covers ranges from cell constant K 1 up to 20.00 mS and even 100.00 mS (latter with graphite sensor electrodes) and constant K 5 ranges 2.000 µS. Display will show µS values but in case setpoint value exceed 1999 µS, it will show 2.00 mS (decreasing the value will return to µS reading). Selecting K5 (5.000) range setpoint value 100 µS.

IMPORTANT: the above µS ranges are just indicative: for example a K1 probe can make good measurements below 1000 µS, only resolution will be less accurate. However the same concept doesn't apply the other way for high ranges.



K selections starts from 1.000 and pressing ◀▶ value can reach up to 20.000 or down to 0,000.
 K1 select 1.000
 K5 select 5.000

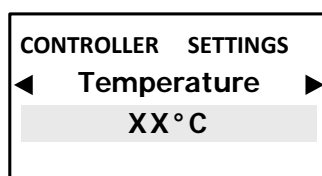
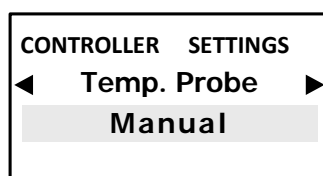
Controller will adapt Measurement and Display resolution according to the type of probe used as shown in page 13;

IMPORTANT: once selected EC probe K factor, **ENSURE**, to connect the **proper** Conductivity sensor.

In case, the user wished to change the EC K RANGE, even during operations:

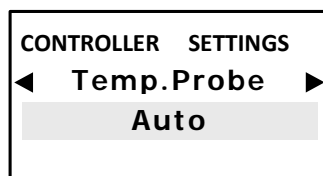
- ☛ from * **BASIC** * menu, move to > **SETTINGS** > **CALIBRATION** > **EC probe K factor**
- ☛ from * **EXPERT** * menu, move to > **MAIN MENU** > **CALIBRATION** > **EC probe K factor**
- ☛ Press **ESC** to return to **MAIN MENU** or Press **ESC ESC** to **CONTINUOS MEASUREMENT** display.

TEMPERATURE settings



Manual temperature compensation 0÷100°C.

☛ Press ◀▶ to show the environmental temperature.
 Selecting **AUTO** compensation temperature/electrode measurements, always giving the exact value against the current temperature.



Press ◀▶ to show the environmental temperature to calibrate sensor.

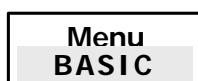
Programming MENU

eSelect-CD1 series allows choosing between:

- **BASIC** programming: simplified mode for not professional operators
- **EXPERT** programming: complete programming including functions for a more refined control and results

Once selected the programming menu, Menu and submenus will change accordingly.

To help operator to choose the correct menu here following the main difference between the two menus:

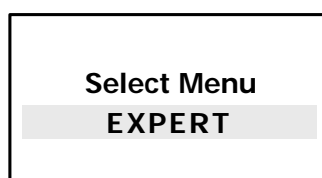
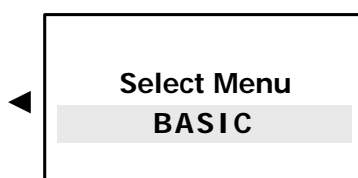


Setpoint 1-2 *Setpoint Value - Dosing Mode - Mode ON/OFF or Timed Pulses - Alarm MIN/MAX - Priming* > **Calibration** > **Settings**



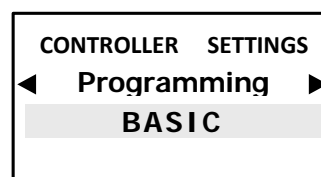
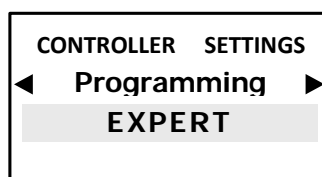
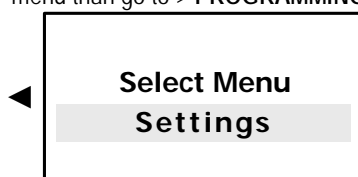
Setpoint 1-2 *Setpoint Value - Dosing Mode - Mode ON/OFF or Timed Pulses - Hysteresys - Delay - Temperature correction Alarm MIN/MAX - Overdosing - Startup Delay - Priming* > **4-20mA** > **Calibration** > **Settings**

☛ Press **OK/MENU** display shows **BASIC** mode (default):



Selecting either one of the two menus, will change the Main Menu programming accordingly.

In case the user wished to change the operating Menu, after the initial selection and even during operations, move to > **SETTINGS** menu than go to > **PROGRAMMING** steps.



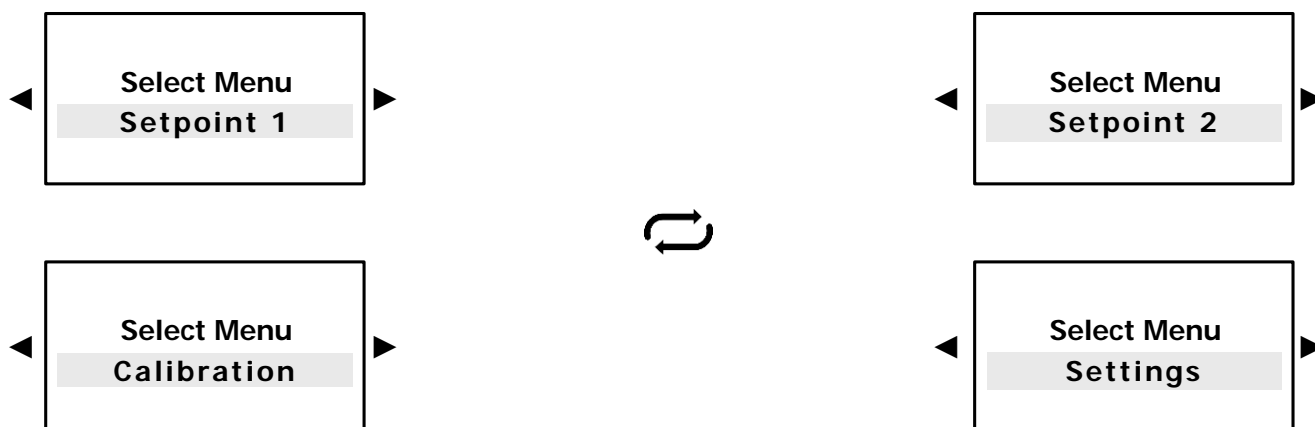
☛ Press **ESC** to return to **MAIN MENU** or press **ESC ESC** for **CONTINUOS MEASUREMENT** display.



After selecting, e.g. choosing **EXPERT**, at first display will still show Basic but as soon as moving to other steps it will change to Expert, and vice versa.

MAIN MENU > BASIC PROGRAMMING MENU

These are all the steps included in the **MAIN MENU** loop visualization with **BASIC** menu programming:

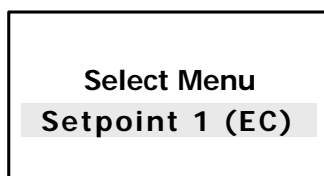


Selecting **EC probe K range**, **Setpoint 1 - 2** and **Calibration** programming will follow range values.

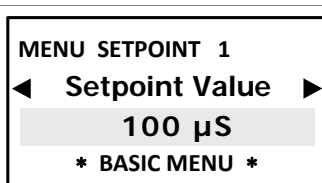
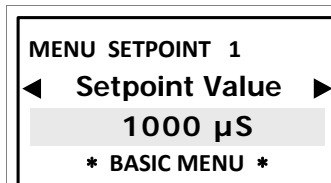
Press **OK/MENU** to confirm selection and to approach next submenu.

Press **ESC** to return to CONTINUOUS MEASUREMENT display.

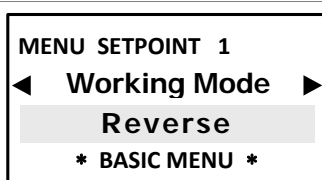
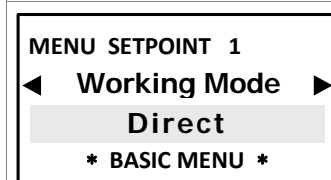
SETPOINT 1 EC CONDUCTIVITY > BASIC MENU



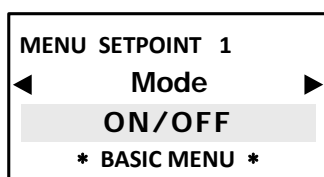
Keep in mind that the value displayed is automatically adjusted to the selected conductivity range cell constant "K" characteristic in previous paragraph SELECTING CONDUCTIVITY "K" FACTOR



Set point will activate output relays for dosing pumps or other equipment once selected set-point level is reached. Display will show μS values but in case setpoint value exceed 1999 μS , it will show 2.00 mS (decreasing the value will return to μS reading). Selecting K5 (5.000) range setpoint value 100 μS

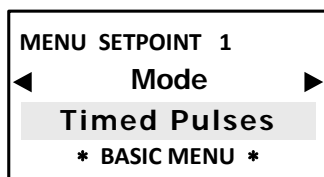


Direct mode operation: output is active when measured value is lower than selected set point thus driving connected equipment. Reverse mode works the opposite way.



Unit is provided with **ON-OFF mode** which will activate (or deactivate in case of reverse mode ON) output relays such as Constant / ON-OFF mode dosing pumps or other On-Off equipment.

* SELECTING MODE "ON-OFF" NEXT PROGRAMMING STEP → "ALARM MIN" ↺



*Timed Pulses also known as PWM "pulses with modulation" time/pause allows proportional mode on each ON-OFF set point activating corresponding pulses on output relay according to measured value and always relating to the previous hysteresis selected settings. **Default activating point at 1000 μS** (range 0-20.000 μS DEFAULT); **100 μS** (range 0-2000 μS); **0,10 μS** (range 0-200 μS); **10000 μS** (range 0-200.000 μS)

For more accurate "Timed Pulses" PWM settings, select "Expert" menu from initial settings

↺ * BACK TO SETPOINT PROGRAMMING STEPS FROM EITHER "ON-OFF" OR "TIMED PULSES" MODE

MENU SETPOINT 1 Alarm MIN 0 µS * * BASIC MENU *	MENU SETPOINT 1 Alarm MAX 20.00 mS * * BASIC MENU *	Alarm MIN function selects alarm LOWEST level passed which alarm relay will be ON. Alarm MAX function selects alarm HIGHEST level passed which alarm relay will be ON.
--	--	---

*Selecting **EC probe K range**, Alarm Max will show the max value of the selected range, example: selecting range K1 range 20.00 mS, this will be Max alarm value, selecting K5 at the beginning of programming shows 2000 µS

MENU SETPOINT 1 Priming OFF * BASIC MENU *	MENU SETPOINT 1 Priming ON * BASIC MENU *	ONLY WHEN USING DOSING PUMPS Priming function ON will "freeze" the set point value to allow the dosing pumps to be primed, outputs will not be active.
---	--	--

Press **ESC** to return to MAIN MENU or Press **ESC ESC** to CONTINUOUS MEASUREMENT display

SETPOINT 2 EC CONDUCTIVITY > BASIC MENU

Select Menu Setpoint 2 (EC)	Keep in mind that the value displayed is automatically adjusted to the selected conductivity range cell constant "K" characteristic in previous paragraph <u>SELECTING CONDUCTIVITY "K" FACTOR</u> . Set point 2 relay can function as Alarm connecting and driving an alarm device or other equipment (only Alarm High or Low).
--	--

MENU SETPOINT 2 Setpoint Value 1000 µS * BASIC MENU *	MENU SETPOINT 2 Setpoint Value 100 µS * BASIC MENU *	Set point will activate output relays for dosing pumps or other equipment once selected set-point level is reached. Display will show µS values but in case setpoint value exceed 1999 µS, it will show 2.00 mS (decreasing the value will return to µS reading. Selecting K5 range setpoint value 100 µS
--	---	---

MENU SETPOINT 2 Working Mode Reverse * BASIC MENU *	MENU SETPOINT 2 Working Mode Direct * BASIC MENU *	Reverse mode operation: output is active when measured value is higher than selected set-point, dosing pump injects chlorine reducer. Direct mode dosing pump injects chlorine (Oxidant).
--	---	---

MENU SETPOINT 2 Mode ON/OFF * BASIC MENU *	Unit is provided with ON-OFF mode which will activate (or deactivate in case of reverse mode ON) output relays such as Constant / ON-OFF mode dosing pumps or other On-Off equipment.
---	--

* **SELECTING MODE "ON-OFF" NEXT PROGRAMMING STEP → "ALARM MIN" ↺**

MENU SETPOINT 2 Mode Timed Pulses * BASIC MENU *	*Timed Pulses also known as PWM "pulses with modulation" time/pulse allows proportional mode on each ON-OFF set point activating corresponding pulses on output relay according to measured value and always relating to the previous hysteresis selected settings. Default activating point at 1000 µS (range 0-20.000 µS DEFAULT); 100 µS (range 0-2000 µS); 0,10 µS (range 0-200 µS); 10000 µS (range 0-200.000 µS)
---	--

For more accurate "Timed Pulses" PWM settings, select "Expert" menu from initial settings

↺ * **BACK TO SETPOINT PROGRAMMING STEPS FROM EITHER "ON-OFF" OR "TIMED PULSES" MODE**

MENU SETPOINT 2 Priming OFF * BASIC MENU *	MENU SETPOINT 2 Priming ON * BASIC MENU *	ONLY WHEN USING DOSING PUMPS Priming function ON will "freeze" the set point value to allow the dosing pumps to be primed, outputs will not be active.
---	--	--

Press **ESC** to return to MAIN MENU or Press **ESC ESC** to CONTINUOUS MEASUREMENT display

IMPORTANT NOTES:

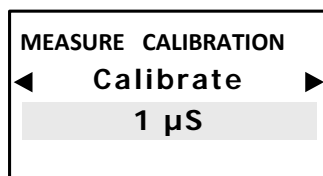
- If there is NO temperature sensor to adjust Temperature move into **Expert Menu** "Settings > Temperature > Manual" to change it to required temperature value;
- When calibrate the sensor ensure that the probe electrodes do not touch any surface except the solution;
- Ensure that the sensor is firmly positioned without movements into the solution container;
- Wait the necessary time until calibration measurements are stabilised.



A message will appear before calibration reminding:



We recommend to make a sample solution which matches the required EC value in the system (normally the set-point value); using a good portable EC meter, ensure conductivity levels correspond to the EC requirements. Use a Conductivity sensor with cell constant according to the selected K factor range (paragraph 8.2) with max cable length of 4 m. After calibration wait 5/10 minutes for measure to stabilise.



Dip EC probe into sample solution previously prepared, wait until measure stabilises.
To modify the value press **OK/Menu** key, then press **◀▶** until it shows the sample solution value, press **OK/MENU** to confirm.
Dip EC probe into a buffer solution value which is within the sensor K range wait until measure stabilises.
To modify the value press **OK/MENU** key, then press **◀▶** until it shows the buffer solution value, press **OK/MENU** to confirm.

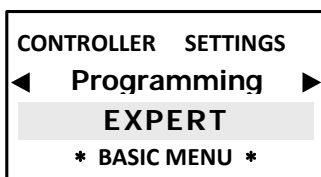
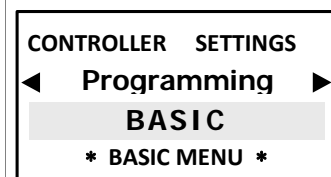
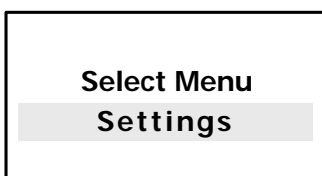
Press **OK/MENU** to confirm selection.

Press **ESC** to MAIN MENU

Press **ESC ESC** to CONTINUOS MEASUREMENT display.

* It will show the value according to selected range, example: selecting K1 (1.000) range 20.00 mS, this will be Max alarm value, selecting K5 (5.000) at the beginning of programming shows 2000 µS

SETTINGS > BASIC MENU

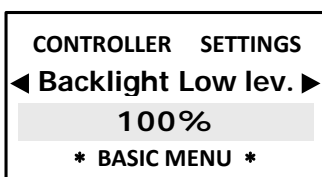


BASIC programming: simplified mode for not professional operators

EXPERT programming: complete programming including functions for a more refined control and results.

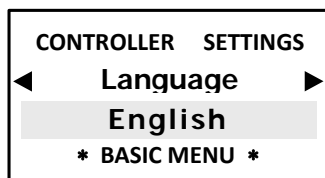


After selecting, e.g. choosing EXPERT, at first display will still show Basic but as soon as moving to other steps it will change to Expert, and vice versa.



It adjusts the display save energy mode backlight level; touching any button will restore full 100% display operative brightness.

Press **ESC** to return to MAIN MENU or Press **ESC ESC** to CONTINUOS MEASUREMENT display.

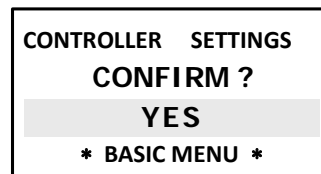
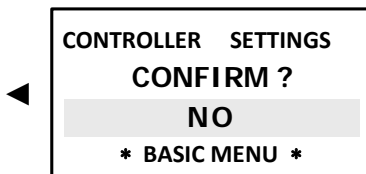
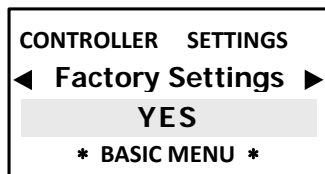


LANGUAGE: Choose between English and Italian

Press ESC to return to MAIN MENU or Press ESC ESC to CONTINUOS MEASUREMENT display.



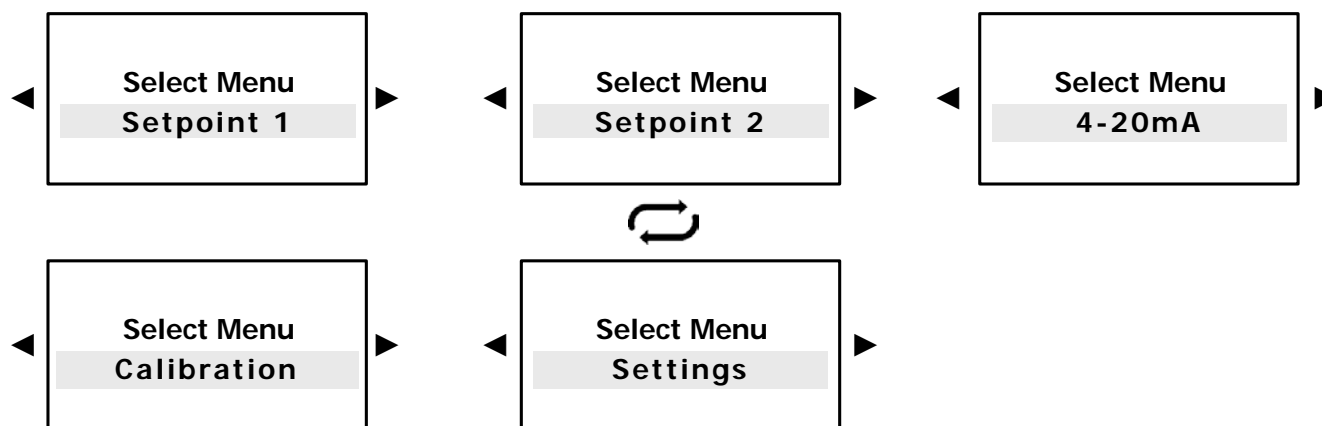
FACTORY SETTINGS: it restores factory default settings. To be used ONLY when parameters or measurements are not responding correctly or when user wants to ensure to re-program from zero. Not to abuse, continuous restoring can affect controller efficiency.



Once confirmed YES, display will be OFF for 1 second than will return to starting display.

MAIN MENU > EXPERT PROGRAMMING MENU

These are all the steps included in the MAIN MENU loop visualization with EXPERT menu programming:



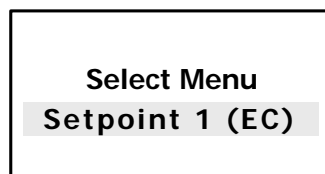
*Selecting EC probe K range , Setpoint 1 - 2 and Calibration programming will follow range values.

*Selecting K factor range Setpoint 1 - 2 and Calibration programming will follow selected range values.

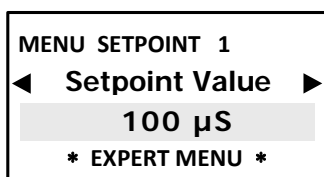
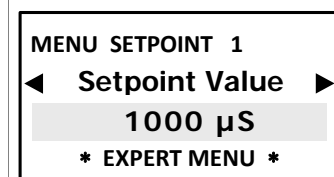
Press OK/MENU to confirm selection and to approach next submenu.

Press ESC to return to CONTINUOS MEASUREMENT display.

SETPOINT 1 EC CONDUCTIVITY > EXPERT MENU



Keep in mind that the value displayed is automatically adjusted to the selected conductivity range cell constant "K" characteristic in previous paragraph SELECTING CONDUCTIVITY "K" FACTOR



Set point will activate output relays for dosing pumps or other equipment once selected set-point level is reached. Display will show µS values but in case setpoint value exceed 1999 µS, it will show 2.00 mS (decreasing the value will return to µS reading). Selecting K5 (5.000) range setpoint value 100 µS

MENU SETPOINT 1
◀ Working Mode ▶
Direct
* EXPERT MENU *

MENU SETPOINT 1
◀ Working Mode ▶
Reverse
* EXPERT MENU *

Direct mode operation: output is active when measured value is lower than selected set point thus driving connected equipment. Reverse mode works the opposite way.

MENU SETPOINT 1
◀ Mode ▶
ON/OFF
* EXPERT MENU *

Unit is provided with **ON-OFF mode** which will activate (or deactivate in case of reverse mode ON) output relays such as Constant / ON-OFF mode dosing pumps or other On-Off equipment.

* SELECTING MODE "ON-OFF" NEXT PROGRAMMING STEP → "HYSTERESIS" ↺

SELECTING MODE "TIMED PULSES" WILL REQUIRE NEXT PARAMETERS SETTINGS

MENU SETPOINT 1
◀ Mode ▶
Timed Pulses
* EXPERT MENU *

*Timed Pulses also known as PWM "pulses with modulation" time/pause allows proportional mode on each ON-OFF set point activating corresponding pulses on output relay according to measured value and always relating to the previous hysteresis selected settings. **Default activating point at 1000 μ S** (range 0-20.000 μ S DEFAULT); **100 μ S** (range 0-2000 μ S); **0,10 μ S** (range 0-200 μ S); **10000 μ S** (range 0-200.000 μ S)

EC CONDUCTIVITY TIMED PULSES PROGRAMMING

MENU SETPOINT 1
◀ Window Width ▶
1000 μ S*
* EXPERT MENU *

Window Width (example with range 2000 μ S): pulses are timed ON and OFF according to the distance from selected set point, programmable, example: if selected set point is 700 μ S EC and measured value is 600 μ S, PWM mode will start after reaching 650 μ S with Time/Pause pulses and decreasing the active time while reaching set point value. **Value shown according to selected K range.*

MENU SETPOINT 1
◀ Cycle Time ▶
60 sec
* EXPERT MENU *

Cycle Time: PWM mode cycle 60 seconds (programmable): e.g. set point 700 μ S, window width 850 μ S EC = active time 60 sec / pause time = 0 sec.; at measured value 775 μ S EC active time = 30 sec / pause time 30 sec.....and decreasing active time accordingly while reaching set point value.

Cycle time depends on many variables such as distance from injection point to treating system, reaction time required, chemical concentration, etc....

MENU SETPOINT 1
◀ Active Time MIN ▶
5 sec
* EXPERT MENU *

Active Time MIN (minimum, programmable): it sets the minimum time in which PWM is active, it overrules the minimum setting programmed, In case user has selected **Active time min 5 sec.**, this will be minimum time of PWM (check page 15, Timed Pulses function).

SELECTING MODE "ON-OFF" NEXT PROGRAMMING STEPS ARE AS FOLLOW.....

MENU SETPOINT 1
◀ Hysteresis ▶
200 μ S*
* EXPERT MENU *

NOT AVAILABLE WITH TIMED PULSES MODE

Hysteresis is used to activate or deactivate output relays when selected value is reached. It is useful when there are too many and/or quick changes, which could damage connected equipment. Increasing Hysteresis will allow to move away from set point value. **Value shown according to selected K range.*

MENU SETPOINT 1
◀ Set point Delay ▶
5 sec
* EXPERT MENU *

NOT AVAILABLE WITH TIMED PULSES MODE

Delay time blocks relay outputs to ensure that the outputs are active only when the sensors measurements are stable thus allowing the best results in terms of chemical balance.

↺ *BACK TO SETPOINT PROGRAMMING STEPS FROM EITHER "ON-OFF" OR "TIMED PULSES" MODE

MENU SETPOINT 1
◀ Temp. correction ▶
0.0 %/°C
* EXPERT MENU *

EC alfa factor is the correction factor for conductivity measurement in function of temperature: EVERY CONDUCTIVITY SENSOR IS TEMPERATURE-DEPENDENT. Conductivity varies linearly according to the temperature of the solution. This coefficient normalize the measurement of the conductivity at the reference temperature of 25° C. For aqueous solutions, this coefficient is normally 1.9%-2% per °C. Select 0 if you do not want to normalize the reading. Alfa factor ensures best measurement results and accuracy.

EVERY CONDUCTIVITY SENSOR IS TEMPERATURE DEPENDENT. Conductivity varies linearly according to the temperature of the solution. Normally the best measurements are obtained by automatic temperature compensation using PT100 temperature sensor. Whenever operator DOES NOT have the temperature sensor, we strongly recommend to set use MANUAL temperature programming step. eSelect-CD1 series allows to choose between:

- **MANUAL** selecting the buffer solution and/or environmental current temperature (default set at 25°C)
- PT100 or NTC system allowing automatic temperature compensation connecting a temperature probe.

MENU SETPOINT 1

◀ Reference Temp. ▶

XX °C

* EXPERT MENU *

Press ◀▶ to adjust according current liquid temperature to calibrate sensor.

MENU SETPOINT 1

◀ Alarm MIN ▶

0 µS*

* EXPERT MENU *

MENU SETPOINT 1

◀ Alarm MAX ▶

20.00 mS*

* EXPERT MENU *

Alarm MIN function selects alarm LOWEST level passed which alarm relay will be ON.

Alarm MAX function selects alarm HIGHEST level passed which alarm relay will be ON.

*Selecting **EC probe K range**, Alarm Max will show the max value of the selected range, example: selecting range K1 range 20.00 mS, this will be Max alarm value, selecting K5 at the beginning of programming shows 2000 µS

MENU SETPOINT 1

◀ Overdosing ▶

00:00 h:m

* EXPERT MENU *

ONLY WHEN USING DOSING PUMPS

Over dosing time-out alarm selects a period of time for reaching set-point. If set point is not reached within time, controller will block outputs operations including mA outputs (dosing pump). Alarm is ON shown on display and will activate relay4 activating an alarm device.

MENU SETPOINT 1

◀ Startup Delay ▶

00:00 h:m

* EXPERT MENU *

Start-up Delay time "freezes" the relay outputs when switching ON the unit thus allowing sensors to polarize ensuring correct measurements.

MENU SETPOINT 1

◀ Priming ▶

OFF

* EXPERT MENU *

MENU SETPOINT 1

◀ Priming ▶

ON

* EXPERT MENU *

ONLY WHEN USING DOSING PUMPS

Priming function ON will "freeze" the set point value to allow the dosing pumps to be primed, outputs will not be active.

Press ESC to return to MAIN MENU or Press ESC ESC to CONTINUOS MEASUREMENT display

SETPOINT 2 EC CONDUCTIVITY > EXPERT MENU

Select Menu

Setpoint 2 (EC)



Keep in mind that the value displayed is automatically adjusted to selected conductivity range cell constant "K" characteristic in previous paragraph SELECTING CONDUCTIVITY "K" FACTOR. Set point 2 relay can function as Alarm connecting and diving an alarm device or other equipment (only Alarm High or Low).

MENU SETPOINT 2

◀ Setpoint Value ▶

1000 µS

* EXPERT MENU *

MENU SETPOINT 2

◀ Setpoint Value ▶

100 µS

* EXPERT MENU *

Set point will activate output relays for dosing pumps or other equipment once selected set-point level is reached. Display will show µS values but in case setpoint value exceed 1999 µS, it will show 2.00 mS (decreasing the value will return to µS reading). Selecting K5 (5.000) range setpoint value 100 µS

MENU SETPOINT 2

◀ Working Mode ▶

Reverse

* EXPERT MENU *

MENU SETPOINT 2

◀ Working Mode ▶

Direct

* EXPERT MENU *

Direct mode operation: output is active when measured value is lower than selected set point thus driving connected equipment. Reverse mode works the opposite way.

MENU SETPOINT 2

◀ Mode ▶

ON/OFF

* EXPERT MENU *

Unit is provided with **ON-OFF mode** which will activate (or deactivate in case of reverse mode ON) output relays such as Constant / ON-OFF mode dosing pumps or other On-Off equipment.

* SELECTING MODE "ON-OFF" NEXT PROGRAMMING STEP → "HYSTERESIS" ↩

SELECTING MODE "TIMED PULSES" WILL REQUIRE NEXT PARAMETERS SETTINGS

MENU SETPOINT 2

◀ Mode ▶

Timed Pulses

* EXPERT MENU *

*Timed Pulses also known as PWM "pulses with modulation" time/pause allows proportional mode on each ON-OFF set point activating corresponding pulses on output relay according to measured value and always relating to the previous hysteresis selected settings. **Default activating point at 1000 μ S** (range 0-20.000 μ S DEFAULT); **100 μ S** (range 0-2000 μ S); **0,10 μ S** (range 0-200 μ S); **10000 μ S** (range 0-200.000 μ S)

EC CONDUCTIVITY TIMED PULSES PROGRAMMING

MENU SETPOINT 2

◀ Window Width ▶

1000 μ S*

* EXPERT MENU *

Window Width (example with range 20000 μ S): pulses are timed ON and OFF according to the distance from selected set point, programmable, example: if selected set point is 700 μ S EC and measured value is 600 μ S, PWM mode will start after reaching 650 μ S with Time/Pause pulses and decreasing the active time while reaching set point value. *Value shown according to selected K range.

MENU SETPOINT 2

◀ Cycle Time ▶

60 sec

* EXPERT MENU *

Cycle Time: PWM mode cycle 60 seconds (programmable): e.g. set point 7,00pH, window width 850 μ S EC = active time 60 sec / pause time = 0 sec.; at measured value 775 μ S EC active time= 30 sec / pause time 30 sec.....and decreasing active time accordingly while reaching set point value. Cycle time depends on many variables such as distance from injection point to treating system, reaction time required, chemical concentration, etc....

MENU SETPOINT 2

◀ Active Time MIN ▶

5 sec

* EXPERT MENU *

Active Time MIN (minimum, programmable): it sets the minimum time in which PWM is active, it overrides the minimum setting programmed, In case user has selected Active time min 5 sec., this will be minimum time of PWM (check page 15, Timed Pulses function).

SELECTING MODE "ON-OFF" NEXT PROGRAMMING STEPS ARE AS FOLLOW.....

MENU SETPOINT 2

◀ Hysteresis ▶

200 μ S*

* EXPERT MENU *

NOT AVAILABLE WITH TIMED PULSES MODE

Hysteresis is used to activate or deactivate output relays when selected value is reached. It is useful when there are too many and/or quick changes, which could damage connected equipment. Increasing Hysteresis will allow to move away from set point value. *Value shown according to selected K range.

MENU SETPOINT 2

◀ Set point Delay ▶

5 sec

* EXPERT MENU *

NOT AVAILABLE WITH TIMED PULSES MODE

Delay time blocks relay outputs to ensure that the outputs are active only when the sensors measurements are stable thus allowing the best results in terms of chemical balance.

↩ *BACK TO SETPOINT PROGRAMMING STEPS FROM EITHER "ON-OFF" OR "TIMED PULSES" MODE

MENU SETPOINT 2

◀ Overdosing ▶

00:00 h:m

* EXPERT MENU *

Over dosing time-out alarm selects a period of time for reaching set-point. If set point is not reached within time, controller will block outputs operations including mA outputs (dosing pump). Alarm is ON shown on display and will activate relay4 activating an alarm device.

MENU SETPOINT 2

◀ Priming ▶

OFF

* EXPERT MENU *

MENU SETPOINT 2

◀ Priming ▶

ON

* EXPERT MENU *

ONLY WHEN USING DOSING PUMPS

Priming function ON will "freeze" the set point value to allow the dosing pumps to be primed, outputs will not be active.



Press ESC to return to MAIN MENU or Press ESC ESC to CONTINUOS MEASUREMENT display

Select Menu

4-20mA

*Selecting **Conductivity range**, **Setpoints** and **Calibration** programming will follow selected range values.

eSelect-CD1 proportional analog 4-20mA follows the option previously selected among the conductivity measuring range.

eSelect-CD1 series mA allows choosing between two functions:

- **AUX** driving data logger or data recorder or other equipment suitable to work with mA signal.
- **DOSING SETPOINT**: driving dosing pumps suitable to work with mA signal.

4-20mA EC CONDUCTIVITY > AUX FUNCTION

Select Menu

4-20mA

eSelect-CD1 series proportional analog 4-20mA 2 follows the option previously selected among the conductivity measuring range.

4-20mA SETTINGS

◀ **mA Output Mode** ▶

AUX

* EXPERT MENU *

Proportional analog 4-20 mA outputs Dosing Setpoint follow the set point here following selected thus driving a dosing pump suitable to process a remote mA current signal.

4-20mA SETTINGS

◀ **Measure @4mA** ▶

0 µS

* EXPERT MENU *

Select the value corresponding to 4 mA point according to **Set point 1** settings.

Keep in mind that the value displayed is automatically adjusted to the selected conductivity range cell constant "K" characteristic in previous paragraphs.

4-20mA SETTINGS

◀ **Measure @20mA** ▶

20.00 mS

* EXPERT MENU *

Select the value corresponding to 20 mA point according to **Set point 1** settings.

🔑 Press ESC to return to MAIN MENU or Press ESC ESC to CONTINUOS MEASUREMENT display.

4-20mA EC Conductivity > DOSING SETPOINT

Select Menu

4-20mA

eSelect-Cd1 series proportional analog 4-20mA 2 follows the option previously selected among the conductivity measuring range.

4-20mA SETTINGS

◀ **mA Output Mode** ▶

Setpoint

* EXPERT MENU *

Proportional analog 4-20 mA outputs Setpoint follow the set point here following selected thus driving an electrovalve or dosing pump suitable to process a remote mA current signal.

4-20mA SETTINGS

◀ **Setpoint Value** ▶

1000 µS

* EXPERT MENU *

Select the value corresponding to 4 mA point according to **Set point 1** settings.

Keep in mind that the value displayed is automatically adjusted to the selected conductivity range cell constant "K" characteristic in previous paragraphs.

<div style="border: 1px solid black; padding: 5px; text-align: center;"> 4-20mA SETTINGS ◀ Working Mode ▶ <div style="background-color: #cccccc; padding: 2px 10px; display: inline-block;">Direct</div> * EXPERT MENU * </div>	<div style="border: 1px solid black; padding: 5px; text-align: center;"> 4-20mA SETTINGS ◀ Working Mode ▶ <div style="background-color: #cccccc; padding: 2px 10px; display: inline-block;">Reverse</div> * EXPERT MENU * </div>
--	---

Direct mode operation, meaning that output is active when measured value is lower than selected set-point, connected dosing pump will be dosing chlorine and vice versa with Reverse Mode

<div style="border: 1px solid black; padding: 5px; text-align: center;"> 4-20mA SETTINGS ◀ Window Width ▶ <div style="background-color: #cccccc; padding: 2px 10px; display: inline-block;">200 µS</div> * EXPERT MENU * </div>	<p>Window Width: sets the distance from set point at which point 4-20mA mode will start: 4 mA = 0 dosing pump pulse, 20 mA = max dosing pump pulses frequency. Window width depends on many variables: distance injection point, reaction time, chemical %, etc.</p>
--	--

<div style="border: 1px solid black; padding: 5px; text-align: center;"> 4-20mA SETTINGS ◀ Overdosing ▶ <div style="background-color: #cccccc; padding: 2px 10px; display: inline-block;">00:00 h:m</div> * EXPERT MENU * </div>	<p>Over dosing time-out alarm selects a period of time for reaching set-point. If set point is not reached within time, controller will block outputs operations including mA outputs (dosing pump). Alarm is ON shown on display and will activate relay4 activating an alarm device.</p>
---	--

Press ESC to return to MAIN MENU or Press ESC ESC to CONTINUOS MEASUREMENT display.

SENSOR CALIBRATION > EXPERT MENU

IMPORTANT NOTES:

- if there is NO temperature sensor to adjust Temperature move into **Expert Menu "Settings > Temperature > Manual"** to change it to required temperature value;
- when calibrate the sensor ensure that the probe electrodes do not touch any surface except the solution;
- ensure that the sensor is firmly positioned without movements into the solution container;
- wait the necessary time until calibration measurements are stabilised.

<div style="border: 1px solid black; padding: 5px;"> Select Menu Calibration </div>	Press OK/MENU to confirm selection and to approach next submenu.
--	--

A message will appear before calibration reminding:



We recommend to make a sample solution which matches the required EC value in the system (normally the set-point value); using a good portable EC meter, ensure conductivity levels correspond to the EC requirements. Use a Conductivity sensor with cell constant according to the selected K factor range (paragraph 8.2) with max cable length of 4 m. After calibration wait 5/10 minutes for measure to stabilise.

Dip EC probe into sample solution previously prepared, wait until measure stabilises.
To modify the value press OK/Menu key, then press ◀▶ until it shows the sample solution value, press OK/MENU to confirm.

MEASURE CALIBRATION
 ◀ **Calibrate** ▶

0 µS

Dip EC probe into a buffer solution value which is within the sensor K range wait until measure stabilises.
To modify the value press OK/MENU key, then press ◀▶ until it shows the buffer solution value, press OK/MENU to confirm.

- Press OK/MENU to confirm selection.
- Press ESC to MAIN MENU
- Press ESC ESC to CONTINUOS MEASUREMENT display.

* It will show the value according to selected range, example: selecting K1 (1.000) range 20.00 mS, this will be Max alarm value, selecting K5 (5.000) at the beginning of programming shows 2000 µS

Select Menu
Settings



CONTROLLER SETTINGS

◀ Programming ▶

EXPERT

* EXPERT MENU *

CONTROLLER SETTINGS

◀ Programming ▶

BASIC

* EXPERT MENU *

BASIC programming: simplified mode for not professional operators

EXPERT programming: complete programming including functions for a more refined control and results.



After selecting, e.g. choosing EXPERT, at first display will still show Basic but as soon as moving to other steps it will change to Expert, and vice versa.

CONTROLLER SETTINGS

◀ Flow Sensor ▶

Disabled

* EXPERT MENU *

CONTROLLER SETTINGS

◀ Flow Sensor ▶

Enabled

* EXPERT MENU *

Flow sensor enabled in case no water into sensor cell holder (proximity switch will deactivate all outputs ensuring that no extra chemical is added).

CONTROLLER SETTINGS

◀ Temp. mode ▶

Manual

* EXPERT MENU *

CONTROLLER SETTINGS

◀ Temp. setting ▶

XX°C

* EXPERT MENU *

Manual temperature compensation 0÷100°C.

Press ◀▶ to show the environmental temperature. Selecting Auto automatic compensation temperature/electrode measurements, always giving the exact value against the current temperature.

CONTROLLER SETTINGS

◀ Temp. mode ▶

Auto

* EXPERT MENU *

CONTROLLER SETTINGS

◀ Probe Calibration ▶

XX°C

* EXPERT MENU *

Press ◀▶ to show the environmental temperature to calibrate sensor.

CONTROLLER SETTINGS

◀ Backlight Low lev. ▶

100%

* EXPERT MENU *

It adjusts the display save energy mode backlight level; touching any button will restore full 100% display operative brightness.

Press ESC to return to MAIN MENU or Press ESC ESC to CONTINUOS MEASUREMENT display.

CONTROLLER SETTINGS

◀ Factory Settings ▶

NO

* EXPERT MENU *

FACTORY SETTINGS: it restores factory default settings. To be used ONLY when parameters or measurements are not responding correctly or when user wants to ensure to re-program from zero. Not to abuse, continuous restoring can affect controller efficiency.

CONTROLLER SETTINGS

◀ Factory Settings ▶

YES

* EXPERT MENU *

CONTROLLER SETTINGS

CONFIRM ?

NO

* EXPERT MENU *

CONTROLLER SETTINGS

CONFIRM ?

YES

* EXPERT MENU *

Once confirmed YES, display will be OFF for 1 second than will return to starting display.

CONDUCTIVITY sensors NOTES

eSelect-CD1 works with simple conductivity 2-electrode open sensors, with AISI 316 and Graphite electrodes.

NOTE FOR CONDUCTIVITY SENSORS



eSelect-CD1 works with simple conductivity 2-electrode open sensors, AISI 316 OR Graphite electrode.

FOR CONDUCTIVITY SENSORS 4 WIRES (with internal temperature sensor): due to the various types on the market, in case operator wished to use such sensor, please contact ETATRON service or Local Dealer to get the right configuration for connecting to terminal board.

eSelect-CD1 is NOT suitable for inductive EC sensors !

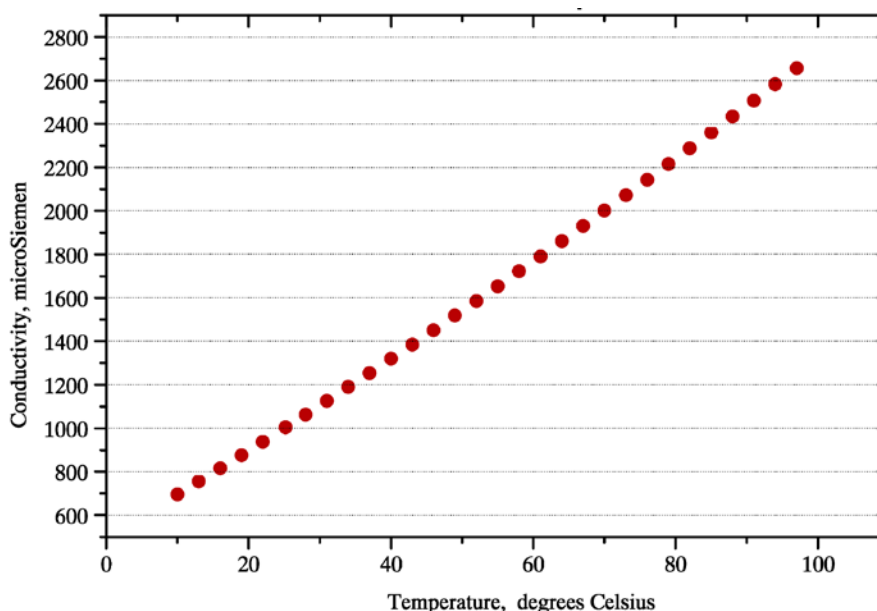
eSelect-CD1 automatically adjust itself for various conductivity ranges by adapting the controller to the different probes cell constant "K" characteristic.

Conductivity measurement are in micro Siemens features 4 K factor ranges (Cell Constant) suitable for:

IMPORTANT: the above μS ranges are just indicative, considering that, for example, a K1 probe can make good measurements below 1000 μS , only resolution will be less accurate. However, the same concept does not apply the other way around to higher ranges.

TEMPERATURE CORRECTION (EC alfa factor)

EC alfa factor is the correction factor for conductivity measurement in function of temperature: EVERY CONDUCTIVITY SENSOR IS TEMPERATURE-DEPENDENT. Conductivity varies linearly according to the temperature of the solution. This coefficient normalize the measurement of the conductivity at the reference temperature of 25° C. Alfa factor ensures best measurement results and accuracy. 2% per °C is an average found typical of many water samples with some dissolved solids. Over wide temperature spans (e.g. 0 to 100 °C) the temperature compensation factor may not remain constant,



CONDUCTIVITY sensors maintenance

Sensor Storage

Short term: Rinse the sensor electrodes in demineralised water; allow drying and storing dry.

Long term: Rinse the sensor electrodes in demineralised water, allow to dry, cover with tip with a plastic shipping cap and store dry.

Monthly Maintenance

A monthly maintenance check is recommended by grab sample calibration since the sensor is typically installed in the process and not easy to remove. Follow the procedure under calibration by grab sample.

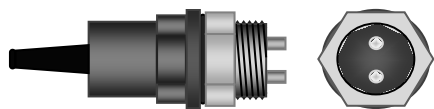
Keep a log of the cell constant at each monthly calibration.

When to clean your sensor

Various factors can affect the physical limits on the liquid and the apparent cell constant; scale, biological growths, oils, wax, gum, etc all reduce the area for current-carrying liquid. Periodic cleaning of conductivity sensors in continuous use will remove these deposits; restore the conducting surfaces, controlled cell volume, and thus the cell constant.

CONDUCTIVITY sensors range

SCD conductivity probe EC sensor K1
AISI 316 electrodes, PVC body (available PTFE),
1/2" Gm, 4 m cable



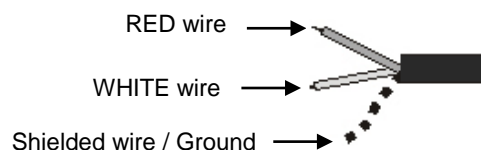
SCD conductivity probe EC sensor K5
AISI 316 electrodes, PVC body (available PTFE),
1/2" Gm, 4 m cable



STGCD conductivity probe EC sensor K1 or K5
GRAPHITE electrodes, PTFE body, 1/2" Gm, 4 m cable



Probe SCD cable wiring



SCD graphite conductivity probe has the same wiring configuration as above probes but electrodes are in graphite.

Graphite EC sensor K1 is also suitable for 100.000 μ S range.

TROUBLESHOOTING



WARNING: ignoring safety information can endanger life or result in serious injury!



BEWARE: in presence of chlorine gas or a environment saturated with chlorine gas, ensure to lock the power supply of the chlorine gas dosing equipment; ensure also to secure the power supply to other equipment being part of the plant.



Before working on the unit, disconnect the controller from the mains voltage

MALFUNCTION	POSSIBLE CAUSE	SOLUTION
1. Display is OFF	No power supply	a. Check electrical connections b. Check if mains correspond to power supply printed instrument label.
	Internal fuse is blown out	Change the fuse
2. Display measurements don't move (there are no changes)	Conductivity levels are NOT stable	Double check levels by means of portable instrument or colorimetric kit, particularly Temperature reference measure.
	Signal from sensor doesn't change	Repeat sensor calibration and if the problem remains change the probe
3. Display measurements change continuously (measuring jumps)	Electrical disturbs from electrical local network	Check the electrical local network. Check system ground connection.
	Electrical disturbs into the measuring liquid	Check controller calibration , if controller measures correctly eliminate electrical disturbs and refer to below point A.
4. It's not possible to complete sensor calibration procedure	Buffer solution kit old or contaminated	Change buffer solution and use portable Kit
	Sensor is defective	Check sensor condition (see page 29).

IMPORTANT TESTS in the above cases 2, 3, 4, always test the unit functioning making the following steps:

- Dismount the unit from the system and mount it into another room or you own lab without connection to other equipment but directly to local network mains.
- Recreate into a bucket with fresh water the physical-chemical conditions as in the plant, for pH levels.
- Program the unit and calibrate sensor.
 - If results are a correct unit functioning, it means there are problems with the systems
 - If problems persist, change sensor with brand new ones: if problem persist, the unit is defective, otherwise use new sensors

5. Set-point relay doesn't close the contact	Set-point value is incorrect	<i>Change set-point value</i>
	Set-point "direction" mode is incorrect	<i>Change set-point function mode, direct or reverse, from the menu functions</i>



The unit works with universal voltage 100÷250Vac (±10%) or 9÷24Vdc. If the actual voltage is constantly at the limit and/or lower or higher, or when voltage spikes are much higher than mentioned range, the unit c.a. input is electronically protected against previously mentioned Voltage fluctuations, above that, controller will not function and pcb must be replaced, contact manufacturer Customer Service or the local Dealer



Ensure that the system EARTH, in which the controller operates, is properly made, including pipes, other equipment installed, relays, etc.

TROUBLESHOOTING HINTS FOR CONDUCTIVITY SENSOR

Slow Response typically due to excessive sample line length and low flow, thus producing long sample transport lags. Resolve by adding a fast-flow loop with the sensor in a short side stream, or by shortening the line. Slow response can also be caused by a build up of dirt in the sample line. In this case the problem may be alleviated by changing the take-off point or by installing a knock-out pot.

Readings consistently low or spike low characteristic of bubbles in the sample line passing through the sensor or hanging up in the sensor.

Readings gradually falling the controller can no longer be calibrated properly. This problem is typical of scale or sludge/slime deposits in the sensor. The sensor may need to be cleaned.

Readings at maximum under all conditions. First verify that controller is displaying conductivity using Conductivity portable controller.



ETATRON D.S.

[illegible]

**HEAD OFFICE - ITALY**

Via dei Ranuncoli, 53 - 00134 ROMA - ITALY

Phone +39 06 93 49 891 - Fax +39 06 93 43 924

email: info@etatronds.com - web: www.etatronds.com

**ITALY (BRANCH OFFICE)
ETATRON D.S.**

Via Ghisalba, 13
20021 Ospiate di Bollate
(MI) ITALY
Phone +39 02 35 04 588
Fax +39 02 35 05 421

**ETATRON AMERICA
DILUTION SOLUTIONS Inc**

2090 Sunnydale Blvd
Clearwater FL 33765
Phone: 727-451-1198
Fax: 727-451-1197

**ASIA
ETATRON D.S. PTE Ltd**

(Asia-Pacific)
Oxley Business Hub, #04-46
Singapore 408729
Phone +65 67 43 79 59
Fax +65 67 43 03 97

**BRASIL
ETATRON do Brasil**

Rua Vidal de Negreiros, 108
Bairro Canindé - CEP 03033-050
SÃO PAULO SP
BRASIL
Phone/Fax +55 11 3228 5774

**ESPAÑA
ETATRON DOSIFICACION Y
MEDICION S.L.**

Ihurrita Bidea, 13 Bajo 25
Polígono Industrial Oiartzun
20180 OIARTZUN
(Guipúzcoa) ESPAÑA
Phone: +34 902 099 321

**FRANCE
ETATRON FRANCE**

Batiment 4 - Hall 406 95520
Osny FRANCE
Phone: +33 (0)1 34 48 77 15
Fax: +33 (0)1 78 76 73 95

**UNITED KINGDOM
ETATRON GB**

Newlin Business Park
Exchange Road
Lincoln, LN6 3AB UK
Phone +44 (0) 1522 85 23 97

**ROMANIA
ETATRON ROMANIA**

Str. Avram Iancu, nr.34A
407280 Floresti, Cluj,
ROMANIA
Phone +40 264 57 11 88
Fax +40 364 80 82 97

**RUSSIAN FEDERATION
DOSING SYSTEMS**

3-rd Mytishenskaya, 16/2
129626 Moscow RUSSIA
Phone +7 495 787 1459
Fax +7 495 787 1459

**UKRAINE
ETATRON - UKRAINE ltd.**

Soborna Street, 446 Rivne,
33024 Rivne Region UKRAINE
Phone +380 36 26 10 681
Fax +380 36 26 22 033