## **ECL**



ECL 1
ECL2
ECL 3/S
ECL 3/N
ECL 8
EBR
ECL SC



ECL2H ECL 9 ECL 10 ECL 11

**CLOSED AMPEROMETRIC CELLS** 

EN

**OPERATING MANUAL** 

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This operating instructions contains safety information that if ignored can endanger life or result in serious injury.

The original instruction is in Italian. All non-Italian instructions are translations of the original instruction.

Read these instructions carefully before use and keep them for future reference.

Information and specifications on this manual could be uncorrect or could have printing errors. Specifications are subject to change without notice.

Version: R1-07-14



## NORME CE EC RULES (STANDARD EC) NORMAS DE LA CE

Direttiva Basso Voltaggio Low Voltage Directive Directiva de baja tensión

> 2006/95/CE

Direttiva EMC Compatibilità Elettromagnetica EMC electromagnetic compatibility directive EMC directiva de compatibilidad electromagnética

2004/108/CE

#### **GENERAL SAFETY GUIDELINES**

Operating, installing, or maintaining the unit in any way that is not covered in this manual could cause death, serious personal injury, or damage to the equipment.

ICON

This manual use the following safety message icon:



#### Danger!

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



## Warning!

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



**Important** - A practice not related to personal injury or additional information.

Cross reference - An instance which refers to related information elsewhere in the same document

## PURPOSE OF USE AND SAFETY

## EQUIPMENT INTENDED FOR THE MEASUREMENT OF CHLORINE (OR ITS ABSENCE) IN WATER.

Do not use in explosive area (EX).
Do not use with flammable chemicals.
Do not use with radioactive chemicals.

Use the probe in accordance with the data and specifications printed on the label.

Do not modify or use in a manner inconsistent with the provisions of the operating manual.



When using this product with aggressive chemicals observe the regulations concerning the transport and storage of aggressive fluids.



When installing always observe national regulations.



Manufacturer is not liable for any unauthorized use or misuse of this product that may cause injury, damage to persons or materials.



Probes must be serviced and repaired by qualified and authorized personnel only.



Before any operation:

- · always read chemical Material Safety Data Sheet (MSDS);
- · always wear protective clothing;
- empty and rinse the liquid end before work on a the product which has been used with hazardous or unknown chemicals.

# Environmental safety

#### Work area

Always keep the area clean to avoid and/or discover emissions.

## Recycling guidelines

EWC code: 16 02 16

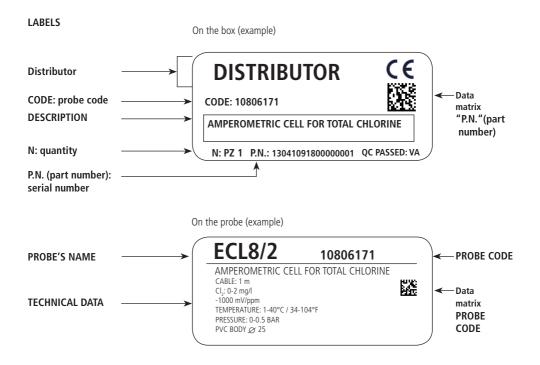
Always recycle according to these guidelines:

- 1. If the unit or parts are accepted by an authorized recycling company, then follow local recycling laws and regulations.
- 2. If the unit or parts are not accepted by an authorized recycling company, then return them to the nearest representative.

## Waste and emissions regulations

Observe these safety regulations regarding waste and emissions:

- Dispose appropriately of all waste.
- Handle and dispose of the dosed chemical in compliance with applicable environmental regulations.
- Clean up all spills in accordance with safety and environmental procedures.
- Report all environmental emissions to the appropriate authorities.



Spare parts

For spare parts orders or any other communication, refer to the pump's label. Code (CODE) and serial number (P / N) uniquely identify the probe.

#### Transportation and storage

An unsuitable transportation or storage can cause damages.

Use original box to pack the probe.

Observe storage conditions also for transportation.

Although packed, always protect the unit against humidity and the action of chemicals.

Before returning the probe to the manufacturer repair service, clean and rinse it. Disassemble the membrane cap and discard electrolyte.

DO NOT DISCARD PACKAGING. USE IT TO RETURN THE PROBE.

IMPORTANT

Do not assemble the membrane cap with electrolyte until the probe is ready to be inserted in the PEF flow cell with water flowing through it.



## IMPORTANT

The probe MUST NOT be allowed to remain DRY for long periods of time once assembled. Otherwise the probe may become damaged.

#### Storage procedure

To store the probe:

- 1. After use rinse the probe with fresh water.
- 2. Check that the micro-holes are not obstructed.
- 3. Disassemble membrane cap and discard electrolyte.
- 4. Clean the probe as in "Cleaning procedure".
- 5. Dry the probe in the air.
- 6. Store the probe in the original box, protected against sun, chemicals and humidity.
- 7. For ECL2H, ECL 9, ECL10 and ECL11 store the membrane cap into the small container filled with the storage chemical.

Transportation and storage temperature ..... 10 - 50°C (32 - 122°F) 



## IMPORTANT

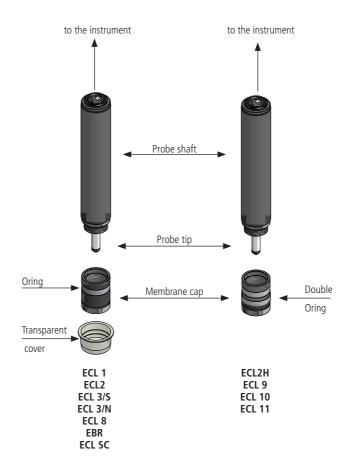
After a storage period, check the micro-holes are not obstructed from product residues.

Closed amperometric cells

They are equipped with a special membrane system. ECL1, 3 and 8 work in chlorine water system.

## Absence of chlorine could damage the probe except for ECL SC probe.

The probe has to be installed into a probe holder and connected to a measuring and control instrument.



## **Packaging**

The packaging will include the following:

- probe with membrane cap (for ECL2H, ECL9, ECL10 and ECL11 membrane cap is supplied into a small container filled up with electrolyte)
- connector cable
- electrolyte
- abrasive paper (S2)
- operating manual

## MODELS

- ECL1/x for free chlorine (inorganic)
- ECL3S/10 for free chlorine (organic and inorganic) for fresh water
- ECL3N/x for free chlorine (inorganic) for fresh water
- ECL8/x for total chlorine
- ECL2/x for chlorine dioxide
- ECL2H/x for chlorine dioxide
- ECL9/x for hydrogen peroxyde
- ECL10/x for ozone
- ECL 11/x for peracetic acid
- EBR for bromine
- ECL SC for chlorine absence

	ECL1/x	ECL1/x mA
Parameter	FREE CHLORINE (INORGANIC)	
Measuring range	ECL1/2: 0-2 mg/l (0-2 ppm) resolution: ± 0.001 ECL1/5: 0-5 mg/l (0-5 ppm) resolution: ± 0.001 ECL1/20: 0-20 mg/l (0-20 ppm) resolution: ± 0.01 ECL1/200: 0-200 mg/l (0-200 ppm) resolution: ± 0.1	
Output (Output resistance)	0 / -2000 mV (1kΩ)	4 / 20mA uncalibrated
Voltage supply	±5 - ±15 VDC (10 mA)	12 / 30 VDC
Connection	4-pole screw connector	2-pole terminal
Measuring system	membrane covered, amperometric 2-electrode system	1
Ph working range	6-8 pH	
Run-in-time	first start up: 1 h approx.	
Response time	T <sub>90</sub> : 30 sec. approx.	
Zero point adjustment	see chapter "Probe alignment"	
Slope calibration	see chapter "Probe alignment" DPD1 method	
Alcalinity	80 ppm	
Working temperature	1-40° C (34-104°F)	
Temperature compensation	automatically, by an integrated temperature sensor	
Max pressure	1 bar (14.5 PSI) - 10 mwc [mH20] no pressure impulses and/or vibration, no depressure	
Power supply	4 wires (brown +; white -; green IN; yellow GND)	2 wires
Cable (standard)	1 m (3.28 ft)	no cable
Electrolyte mod.	ELECL1	
Membrane mod.	MECL1-2	
Working flow	30 l/h	
Suitable for probe holder mod.	PEF1, PEF1/E, PEF5, PEF23	
Material	semipermeable membrane, PVC-U	
Storage	probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored electrolyte: in original bottle, protect from sunlight (5-25°C)	
Maintenance	regular control of measuring signal change of the membrane cap: once a year at min. change electrolyte: every 3-6 months SHORTEN THE MAINTENANCE INTERVALS APPROPRIATELY DEPENDING ON WATER QUALITY.	
Dimension	Diam.: 25 mm Length: 175 mm	

	ECL3S/10	ECL3S/10 mA
Parameter	FREE CHLORINE (ORGANIC AND INORGANIC) FOR F	RESH WATER
Measuring range	0-20 mg/l (0-20 ppm) resolution: ± 0.01	
Output (Output resistance)	0 / -2000 mV (1kΩ)	4 / 20mA uncalibrated
Voltage supply	±5 - ±15 VDC (10 mA)	12 / 30 VDC
Connection	4-pole screw connector	2-pole terminal
Measuring system	membrane covered, amperometric potentiostatic 3-el	ectrode system
Ph working range	4-12 pH, highly reduced dependance on pH value	
Run-in-time	first start up: 2 h approx.	
Response time	T <sub>90</sub> : 2 min. approx.	
Zero point adjustment	see chapter "Probe alignment"	
Slope calibration	see chapter "Probe alignment" DPD1 method	
Alcalinity	80 ppm	
Working temperature	1-40° C (34-104°F)	
Temperature compensation	automatically, by an integrated temperature sensor	
Max pressure	0.5 bar (7 PSI) - 5 mwc [mH2O] no pressure impulses and/or vibration, no depressure	
Power supply	4 wires (brown +; white -; green IN; yellow GND)	2 wires
Cable (standard)	1 m (3.28 ft)	no cable
Electrolyte mod.	ELECL3S (for ECL3S probe for salt water ECL3S/SEA)	
Membrane mod.	MECL3	
Working flow	30 l/h	
Suitable for probe holder mod.	PEF1, PEF1/E, PEF5, PEF23	
Material	microporous hydrophilic membrane, PVC-U, stainless steel 1.4571	
Storage	probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored electrolyte: in original bottle, protect from sunlight (5-25°C)	
Maintenance	regular control of measuring signal change of the membrane cap: once a year at min. change electrolyte: every 3-6 months SHORTEN THE MAINTENANCE INTERVALS APPROPRIATELY DEPENDING ON WATER QUALITY.	
Dimension	Diam.: 25 mm Length: 175 mm	

	ECL3N/x	ECL3N/x mA
Parameter	FREE CHLORINE (INORGANIC) FOR FRESH WATER	
Measuring range	ECL3N/2: 0-2 mg/l (0-2 ppm) resolution: ± 0.001 ECL3N/10: 0-20 mg/l (0-20 ppm) resolution: ± 0.01 ECL3N/200: 0-200 mg/l (0-200 ppm) resolution: ± 0.1	
Output (Output resistance)	ECL3N/2: 0 / -2000 mV (1k $\Omega$ ) ECL3N/10: 0 / -2000 mV (1k $\Omega$ ) ECL3N/200: 0 / -2000 mV (1k $\Omega$ )	4 / 20mA uncalibrated
Voltage supply	±5 - ±15 VDC (10 mA)	12 / 30 VDC
Connection	4-pole screw connector	2-pole terminal
Measuring system	membrane covered, amperometric potentiostatic 3-el	ectrode system
Ph working range	4-9 pH, reduced dependance on pH value. When the the measured signal decreases at about 10% per pH	
Run-in-time	first start up: 2 h approx.	
Response time	T <sub>90</sub> : 2 min. approx.	
Zero point adjustment	see chapter "Probe alignment"	
Slope calibration	see chapter "Probe alignment" DPD1 method	
Alcalinity	80 ppm	
Working temperature	1-40° C (34-104°F)	
Temperature compensation	automatically, by an integrated temperature sensor	
Max pressure	0.5 bar (7 PSI) - 5 mwc [mH2O] no pressure impulses and/or vibration, no depressure	
Power supply	4 wires (brown +; white -; green IN; yellow GND)	2 wires
Cable (standard)	1 m (3.28 ft)	no cable
Electrolyte mod.	ELECL3N	
Membrane mod.	MECL3	
Working flow	30 l/h	
Suitable for probe holder mod.	obe PEF1, PEF1/E, PEF5, PEF23	
Material	microporous hydrophilic membrane, PVC-U, stainless steel 1.4571	
Storage	probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored electrolyte: in original bottle, protect from sunlight (5-25°C)	
Maintenance	regular control of measuring signal change of the membrane cap: once a year at min. change electrolyte: every 3-6 months SHORTEN THE MAINTENANCE INTERVALS APPROPRIATELY DEPENDING ON WATER QUALITY.	
Dimension	Diam.: 25 mm Length: 175 mm	

	ECL8/x	ECL8/x mA
Parameter	TOTAL CHLORINE	
Measuring range	ECL8/2: 0-2 mg/l (0-2 ppm) resolution: ± 0.001 ECL8/20: 0-20 mg/l (0-20 ppm) resolution: ± 0.01	
Output (Output resistance)	ECL8/2: 0 / -2000 mV (1k $\Omega$ ) ECL8/20: 0 / -2000 mV (1k $\Omega$ )	4 / 20mA uncalibrated
Voltage supply	±5 - ±15 VDC (10 mA)	12 / 30 VDC
Connection	4-pole screw connector	2-pole terminal
Measuring system	membrane covered, amperometric potentiostatic 3-el	ectrode system
Ph working range	4-12 pH, reduced dependance on pH value. When the pH value increases, the measured signal decreases at about 10% per pH unit.	
Run-in-time	first start up: 2 h approx.	
Response time	T <sub>90</sub> : 2 min. approx.	
Zero point adjustment	see chapter "Probe alignment"	
Slope calibration	see chapter "Probe alignment" DPD4 method	
Alcalinity	80 ppm	
Working temperature	1-40° C (34-104°F)	
Temperature compensation	automatically, by an integrated temperature sensor	
Max pressure	0.5 bar (7 PSI) - 5 mwc [mH2O] no pressure impulses and/or vibration, no depressure	
Power supply	4 wires (brown +; white -; green IN; yellow GND)	2 wires
Cable (standard)	1 m (3.28 ft)	no cable
Electrolyte mod.	ELECL8	
Membrane mod.	MECL8/2 or MECL8/20	
Working flow	30 l/h	
Suitable for probe holder mod.	PEF1, PEF1/E, PEF5, PEF23	
Material	microporous hydrophilic membrane, PVC-U, stainless steel 1.4571	
Storage	probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored electrolyte: in original bottle, protect from sunlight (5-25°C)	
Maintenance	regular control of measuring signal change of the membrane cap: once a year at min. change electrolyte: every 3-6 months SHORTEN THE MAINTENANCE INTERVALS APPROPRIATELY DEPENDING ON WATER QUALITY.	
Dimension	Diam.: 25 mm Length: 175 mm	

	CHI ODINE DIOVIDE
Parameter	CHLORINE DIOXIDE
Measuring range	ECL2/2: 0-2 mg/l (0-2 ppm) resolution: ± 0.001 ECL2/20: 0-20 mg/l (0-20 ppm) resolution: ± 0.01
Output (Output resistance)	ECL2/2: 0 / -2000 mV (1k $\Omega$ ) ECL2/20: 0 / -2000 mV (1k $\Omega$ )
Voltage supply	±5 - ±15 VDC (10 mA)
Connection	4-pole screw connector
Measuring system	membrane covered, amperometric 2-electrode system
Ph working range	1-11 pH
Run-in-time	first start up: 1 h approx.
Response time	T <sub>90</sub> : 15 sec approx.
Zero point adjustment	see chapter "Probe alignment"
Slope calibration	see chapter "Probe alignment"
Alcalinity	80 ppm
Working temperature	1-40° C (34-104°F)
Temperature compensation	automatically, by an integrated temperature sensor
Max pressure	1 bar (14.5 PSI) - 10 mwc [mH20] no pressure impulses and/or vibration, no depressure
Power supply	4 wires (brown +; white -; green IN; yellow GND)
Cable (standard)	1 m (3.28 ft)
Electrolyte mod.	ELECL2
Membrane mod.	MECL1-2
Working flow	30 l/h
Suitable for probe holder mod.	PEF1, PEF1/E, PEF5, PEF23
Material	semipermeable membrane, PVC-U
Storage	probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored electrolyte: in original bottle, protect from sunlight (5-25°C)
Maintenance	regular control of measuring signal change of the membrane cap: once a year at min. change electrolyte: every 3-6 months SHORTEN THE MAINTENANCE INTERVALS APPROPRIATELY DEPENDING ON WATER QUALITY.
Dimension	Diam.: 25 mm Length: 175 mm

## ECL2H/x

Parameter	CHLORINE DIOXIDE
Measuring range	ECL2H/2: 0-2 mg/l (0-2 ppm) resolution: ± 0.001
Output (Output resistance)	0 / -2000 mV (1kΩ)
Voltage supply	±5 - ±15 VDC (10 mA)
Connection	4-pole screw connector
Measuring system	membrane covered, amperometric 2-electrode system
Ph working range	1-11 pH
Run-in-time	first start up: 1 h approx.
Response time	T <sub>90</sub> : 1.5 min. approx.
Zero point adjustment	see chapter "Probe alignment"
Slope calibration	see chapter "Probe alignment"
Alcalinity	80 ppm
Working temperature	1-40° C (34-104°F)
Temperature compensation	automatically, by an integrated temperature sensor. Temperature changes <5°C
Max pressure	1 bar (14.5 PSI) - 10 mwc [mH20] no pressure impulses and/or vibration, no depressure
Power supply	4 wires (brown +; white -; green IN; yellow GND)
Cable (standard)	1 m (3.28 ft)
Electrolyte mod.	ELECL2H
Membrane mod.	MECL2H
Working flow	30 l/h
Suitable for probe holder mod.	PEF1, PEF1/E, PEF5, PEF23
Material	PVC-U, stainless steel 1.4571
Storage	probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored electrolyte: in original bottle, protect from sunlight (5-25°C)
Maintenance	regular control of measuring signal change of the membrane cap: once a year at min. change electrolyte: every 3-6 months SHORTEN THE MAINTENANCE INTERVALS APPROPRIATELY DEPENDING ON WATER QUALITY.
Dimension	Diam.: 25 mm Length: 175 mm

Parameter	HYDROGEN PEROXIDE
Measuring range	ECL9/200: 0-200 mg/l (0-200 ppm) resolution: ± 0.1 ECL9/2000: 0-2000 mg/l (0-2000 ppm) resolution: ± 1
Output (Output resistance)	0 / -2000 mV (1kΩ)
Voltage supply	±5 - ±12.5 VDC 10 - 25 VDC 25 mA
Connection	4-pole screw connector
Measuring system	membrane covered, amperometric 2-electrode system
Ph working range	2-11 pH
Run-in-time	first start up: 3 h approx.
Response time	T <sub>90</sub> : 10 min. approx.
Zero point adjustment	see chapter "Probe alignment"
Slope calibration	see chapter "Probe alignment"
Alcalinity	80 ppm
Working temperature	1-40° C (34-104°F)
Temperature compensation	automatically, by an integrated temperature sensor
Max pressure	1 bar (14.5 PSI) - 10 mwc [mH20] no pressure impulses and/or vibration, no depressure
Power supply	4 wires (brown +; white -; green IN; yellow GND)
Cable (standard)	1 m (3.28 ft)
Electrolyte mod.	ELECL9
Membrane mod.	MECL9
Working flow	30 l/h
Suitable for probe holder mod.	PEF1, PEF1/E, PEF5, PEF23
Material	PVC-U, stainless steel 1.4571
Storage	probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored electrolyte: in original bottle, protect from sunlight (5-25°C)
Maintenance	regular control of measuring signal change of the membrane cap: once a year at min. change electrolyte: every 3-6 months SHORTEN THE MAINTENANCE INTERVALS APPROPRIATELY DEPENDING ON WATER QUALITY.
Dimension	Diam.: 25 mm Length: 175 mm

Parameter	OZONE
Measuring range	ECL10/1: 0-0,5 mg/l (0-0,5 ppm) resolution: ± 0.001 ECL10/10: 0-10 mg/l (0-10 ppm) resolution: ± 0.01
Output (Output resistance)	ECL10/1: 0 / -1000 mV (1kΩ) ECL10/10: 0 / -1000 mV (1kΩ)
Voltage supply	±5 - ±15 VDC 10 mA
Connection	4-pole screw connector
Measuring system	membrane covered, amperometric 2-electrode system
Ph working range	2-11 pH
Run-in-time	first start up: 1 h approx.
Response time	T <sub>90</sub> : 50 sec. approx.
Zero point adjustment	see chapter "Probe alignment"
Slope calibration	see chapter "Probe alignment"
Alcalinity	80 ppm
Working temperature	1-40° C (34-104°F)
Temperature compensation	automatically, by an integrated temperature sensor
Max pressure	1 bar (14.5 PSI) - 10 mwc [mH20] no pressure impulses and/or vibration, no depressure
Power supply	4 wires (brown +; white -; green IN; yellow GND)
Cable (standard)	1 m (3.28 ft)
Electrolyte mod.	ELECL10
Membrane mod.	MECL10
Membrane mod. Working flow	MECL10 30 l/h
	····
Working flow Suitable for probe	30 l/h
Working flow Suitable for probe holder mod.	30 l/h PEF1, PEF1/E, PEF5, PEF23
Working flow Suitable for probe holder mod. Material	30 l/h  PEF1, PEF1/E, PEF5, PEF23  PVC-U, stainless steel 1.4571  probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored

Parameter	PERACETIC ACID
Measuring range	ECL11/200: 0-200mg/l (0-200 ppm) resolution: ± 0.1 ECL11/2000: 0-2000 mg/l (0-2000 ppm) resolution: ± 1
Output (Output resistance)	0 / -2000 mV (1kΩ)
Voltage supply	±5 - ±15 VDC 10 mA
Connection	4-pole screw connector
Measuring system	membrane covered, amperometric 2-electrode system
Ph working range	1-6 pH
Run-in-time	first start up: 1 h approx.
Response time	T <sub>90</sub> : 3 min. approx.
Zero point adjustment	see chapter "Probe alignment"
Slope calibration	see chapter "Probe alignment"
Alcalinity	80 ppm
Working temperature	1-40° C (34-104°F)
Temperature compensation	automatically, by an integrated temperature sensor
Max pressure	1 bar (14.5 PSI) - 10 mwc [mH2O] no pressure impulses and/or vibration, no depressure
Power supply	4 wires (brown +; white -; green IN; yellow GND)
Cable (standard)	1 m (3.28 ft)
Electrolyte mod.	ELECL11
Membrane mod.	MECL11
Working flow	30 l/h
Suitable for probe holder mod.	PEF1, PEF1/E, PEF5, PEF23
Material	PVC-U, stainless steel 1.4571
Storage	probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored electrolyte: in original bottle, protect from sunlight (5-25°C)
Maintenance	regular control of measuring signal change of the membrane cap: once a year at min. change electrolyte: every 3-6 months SHORTEN THE MAINTENANCE INTERVALS APPROPRIATELY DEPENDING ON WATER QUALITY.
Dimension	Diam.: 25 mm

Parameter	BROMINE
Measuring range	EBR1/20: 0-20mg/l (0-20 ppm) resolution: ± 0.01
Output (Output resistance)	0 / -2000 mV (1kΩ)
Voltage supply	±5 - ±15 VDC 10 mA
Connection	4-pole screw connector
Measuring system	membrane covered, amperometric potentiostatic 3-electrode system
Ph working range	6.5-9.5 pH
Run-in-time	first start up: 2 h approx.
Response time	T <sub>90</sub> : 2 min. approx.
Zero point adjustment	see chapter "Probe alignment"
Slope calibration	see chapter "Probe alignment"
Alcalinity	80 ppm
Working temperature	1-40° C (34-104°F)
Temperature compensation	automatically, by an integrated temperature sensor
Max pressure	0.5 bar (7 PSI) - 5 mwc [mH2O] no pressure impulses and/or vibration, no depressure
Power supply	4 wires (brown +; white -; green IN; yellow GND)
Cable (standard)	1 m (3.28 ft)
Electrolyte mod.	ELEBR
Membrane mod.	MEBR
Working flow	30 l/h
Suitable for probe holder mod.	PEF1, PEF1/E, PEF5, PEF23
Material	Microporous hydrophilic membrane, PVC-U, stainless steel 1.4571
Storage	probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored electrolyte: in original bottle, protect from sunlight (5-25°C)
Maintenance	regular control of measuring signal change of the membrane cap: once a year at min. change electrolyte: every 3-6 months SHORTEN THE MAINTENANCE INTERVALS APPROPRIATELY DEPENDING ON WATER QUALITY.
Dimension	Diam.: 25 mm Length: 195 mm

Parameter	FREE CHLORINE- FOR MONITORING THE ABSENCE OF CHLORINE
Measuring range	ECLSC: 0-2mg/l (0-2 ppm) resolution: ± 0.001
Output (Output resistance)	0 / -2 mV (max -2.5 V) (1kΩ)
Voltage supply	24 VDC (+22.526 VDC) ±12 VDC 20 mA
Connection	4-pole screw connector
Measuring system	membrane covered, amperometric potentiostatic 3-electrode system
Ph working range	6.5-9 pH
Run-in-time	first start up: 24 h approx. after maintenance: 6h approx.
Response time	T <sub>90</sub> : 2 min. approx.
Zero point adjustment	see chapter "Probe alignment"
Slope calibration	see chapter "Probe alignment"
Alcalinity	80 ppm
Working temperature	1-40° C (34-104°F)
Temperature compensation	automatically, by an integrated temperature sensor
Max pressure	0.5 bar (7 PSI) - 5 mwc [mH2O] no pressure impulses and/or vibration, no depressure
Power supply	4 wires (brown +; white -; green IN; yellow GND)
Cable (standard)	1 m (3.28 ft)
Electrolyte mod.	ELECLSC
Membrane mod.	MECLSC
Working flow	30 l/h
Suitable for probe holder mod.	PEF1, PEF1/E, PEF5, PEF23
Material	microporous hydrophilic membrane, PVC-U, stainless steel 1.4571
Storage	probe: frost-protected, dry and without electrolyte (5-40° C) membrane cap: used membrane cap can not be stored electrolyte: in original bottle, protect from sunlight (5-25°C)
Maintenance	regular control of measuring signal change of the membrane cap: once a year at min. change electrolyte: every 3-6 months SHORTEN THE MAINTENANCE INTERVALS APPROPRIATELY DEPENDING ON WATER QUALITY.
Dimension	Diam.: 25 mm Length: 195 mm

## Operating principle

ECL probes are membrane covered amperometric electrode systems.

The measuring electrode is membrane covered and it is in the electolyte area together with the reference electrode. Electrolyte area contains a special electrolyte and it is separated from the measuring water.

ECL probes measuring method is an electrochemical technique that measures the changes in current resulting from chemical reaction as function of the analyte concentration.

#### Precautions

Before any operation (preparation, cleaning and replacements) and before handly the probe you MUST FOLLOW these PRECAUTIONS.





## **▲** DANGER

Wear unpowdered nitrile gloves. Avoid contact of the electrolyte with the skin. In case of contact with skin, rinse immediately with plenty of water.





## A DANGER

Wear eye protection Avoid contact of the electrolyte with the eyes. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Preparation ECL1/x ECL3S/10 ECL3N/x ECL8/x ECL2/x EBR ECL SC

## **MPORTANT**

Do not assemble the membrane cap with electrolyte until the probe is ready to be inserted in the PEF flow cell with water flowing through it.



The probe MUST NOT be allowed to remain DRY for long periods of time once assembled. Otherwise the probe may become damaged.



**MPORTANT** 

DO NOT TOUCH probe tip and keep it clean. Do not remove the layer on the probe tip.

## **1** IMPORTANT

After a storage period, check the micro-holes are not obstructed from product residues.

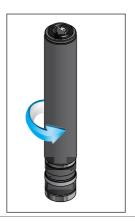


Move down the o-ring (rubber band) in order to allow bleed air from the underneath micro-hole and remove the transparent cover.



Do not cover or close the micro-holes when screwing or unscrewing the probe. This could damage the membrane.





Unscrew membrane cap from the probe shaft and keep in on a clean and non-absorbent surface.



## IMPORTANT: THIS STEP IS FOR ECL3N/x ONLY.

Fill up the internal membrane with the electrolyte gel.

#### Avoid air bubble.

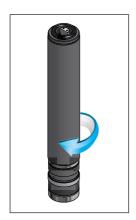
Hold the electrode shaft upright and push the electrode finger carefully into the filled internal membrane.



Fill up completely the membrane cap with the electrolyte gel.

**Avoid air bubble.** If necessary use "knock method" to remove air entrapments in the membrane area.

**Knock method:** knock gently with the electrode shaft on the membrane cap until no air bubbles bubble up anymore.



Screw membrane cap on the probe shaft until the thread engages.

Electrolyte may flow out from the membrane cap through the micro-holes. Wash the probe with fresh water.



## IMPORTANT

Do not cover or close the micro-holes when screwing or unscrewing the probe. This could damage the membrane.



Move up the o-ring (rubber band) to its seat. The probe is ready to be used.

Preparation ECL2H/x ECL9/x ECL10/x **ECL 11/x** 

## IMPORTANT

Do not assemble the membrane cap with electrolyte until the probe is ready to be inserted in the PEF flow cell with water flowing through it.



The probe MUST NOT be allowed to remain DRY for long periods of time once assembled. Otherwise the probe may become damaged.



## IMPORTANT

DO NOT TOUCH probe tip and keep it clean. Do not remove the layer on the probe tip.



Membrane cap is located into a transparent small container filled with storage solution. Pull out it using a gripper and leave the storage solution into the small container for storage.



Do not wash or dry the membrane cap.



Move down the o-ring (rubber band) in order to allow bleed air from the underneath micro-hole...



## IMPORTANT

Do not cover or close the micro-holes when screwing or unscrewing the probe. This could damage the membrane.

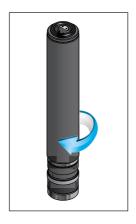






Fill up completely the membrane cap with the electrolyte gel.

Avoid air bubble. If necessary use "knock method" to remove air entrapments in the membrane area



Screw membrane cap on the probe shaft until the thread engages.

Electrolyte may flow out from the membrane cap through the micro-holes. Wash the probe with fresh water.



## **IMPORTANT**

Do not cover or close the micro-holes when screwing or unscrewing the probe. This could damage the membrane.



Move up the o-ring (rubber band) to its seat and move second oring over the first to obtain only one ring.



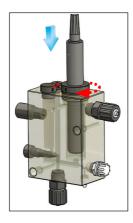
The probe is ready to be used.

## Probe alignment procedure

Alignment procedure must be performed monthly or more frequently if the application needs higher precision.

The sensor needs to be calibrated to the instrument it is connected to.

Two points calibration: 0 and a value close to working point.



Connect the probe to the measuring instrument.

Install the probe into PEF flow cell (PEF in the pictures is an example):

- close water inlet/outlet through the PEF:
- unscrew completely the threading nut on PEF:
- insert the probe **slowly** until the distance of the membrane is **approximately 5 mm from the bottom**;
- screw the threading nut to fix the probe into the PEF. Use **hands only**. Make sure the the probe is **tightly fastened** in the place.



To calibrate the probe to point 0, water must be chlorine free. For a chlorine free water, substitute the filter (installed before the PEF) with a carbon filter one.

Check the absence of chlorine by a DPD1 / DPD4 or a colorimetric method (depending on the probe).

Open PEF water outlet and then water inlet. Wait the time as in "Run-in-time" on the probe technical sheet (p. 8-17).

Proceed to 0 calibration as described on instrument manual.

To calibrate the probe on the second point, substitute the carbon filter with a standard filter.

Open PEF water outlet and then water inlet.

Wait the time as in "Run-in-time" on the probe technical sheet (p. 8-17).

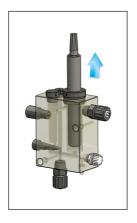
Check the water chlorine by a DPD1 / DPD4 or a colorimetric method (depending on the probe).

Proceed to slope calibration (Point 2) as described on instrument manual.





DO NOT TOUCH probe tip and keep it clean. Do not remove the layer on the probe tip.



Uninstall the probe from PEF flow cell.

- close water inlet/outlet through the PEF;
- unscrew completely the threading nut on PEF:
- extract the probe **slowly**.



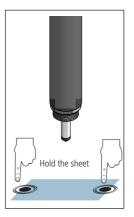
Move down the o-ring (rubber band) in order to allow bleed air from the underneath micro-hole.



## IMPORTANT

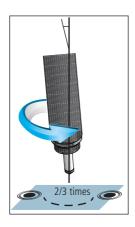
Do not cover or close the micro-holes when screwing or unscrewing the probe. The resulting vacuum could damage the membrane.

Unscrew membrane cap and discard the remaining electrolyte.



Use the special abrasive paper (S2) of the original box.

Hold the sheet on a flat surface with the textured part up.



Gently rub the gold electrode tip of the slightly inclined probe over the paper.

Repeat this movement 2/3 TIMES turning the probe around its axis.

Prepare again the probe as described in "Preparation" filling the membrane cap with fresh electrolyte and proceed to align the probe as described in "Probe alignment procedure".



After every cleaning procedure proceed with probe alignment and calibration.

#### Membrane cap replacement

Membrane cap replacement procedure must be performed once per year or more if the application need higher precision.

Every 6 months control membrane cap integrity.





## **IMPORTANT**

DO NOT TOUCH probe tip and keep it clean. Do not remove the layer on the probe tip.



Unscrew membrane cap, discard the remaining electrolyte and the membrane cap.

Refer to "Environmental safety" for recycling guidelines.

Use a new membrane cap and prepare the probe as in "Preparation" paragraph.



## IMPORTANT

After every membrane cap replacement proceed with probe alignment and calibration.

#### Electrolyte replacement

Electrolyte replacement procedure must be performed every 3/6 months or more if the application need higher precision.





DO NOT TOUCH probe tip and keep it clean. Do not remove the layer on the probe tip.



Move down the o-ring (rubber band) in order to allow bleed air from the underneath micro-hole.



## IMPORTANT

Do not cover or close the micro-holes when screwing or unscrewing the probe. The resulting vacuum could damage the membrane.



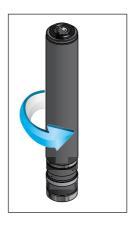
Unscrew membrane cap and discard the remaining electrolyte.



Fill up completely the membrane cap with the electrolyte gel.

Avoid air bubble. If necessary use "knock method" to remove air entrapments in the membrane area.

**Knock method:** knock gently with the electrode shaft on the membrane cap until no air bubbles bubble up anymore.



Screw membrane cap on the probe shaft until the thread

Electrolyte may flow out from the membrane cap through the micro-holes. Wash the probe with fresh water.



## **IMPORTANT**

Do not cover or close the micro-holes when screwing or unscrewing the probe. This could damage the membrane.



Move up the o-ring (rubber band) to its seat. For ECL2H/2, ECL9, ECL10 and ECL11 move second oring over the first to obtain only one ring.

The probe is ready to be used.



## IMPORTANT

After every electrolyte replacement proceed with probe alignment and calibration.

#### MAINTENANCE

## Maintenance schedule

#### DANGER MAINTENANCE SCHEDULE

In order to ensure the requirements of potable drinking water treated and the maintenance of the improvements as declared by the manufacturer, this equipment must be checked at least once a week.



## DANGER **OPERATOR PROTECTION**

Use safety equipment according to the company regulations.

Use this safety equipment within the work area during installation, service and when handling chemicals:

- protective mask
- unpowdered nitrile gloves
- safety goggles
- further security device, if necessary.



## **↑** DANGER

POWER SUPPLY DISCONNECTION Always disconnect power to the motor before you perform any installation or maintenance tasks. Failure to disconnect power will result in serious physical injury.



#### DANGER

## **AUTHORIZED AND QUALIFIED PERSONNEL**

Installation and maintenance tasks should be carried out by AUTHORIZED AND QUALIFIED PERSONNEL only in accordance with local regulations.



## IMPORTANT

Use original spare parts.

#### Maintenance inspection

INTERVAL	MAINTENANCE INSPECTIONS REFERENCE	
Weekly	Control probe reading using a DPD1/DPD4 or colorimetric method. Probe calibration procedure	
Monthly	Check probe integrity	Cleaning procedure
Monthly	Check electrical wiring	-
Every 3/6 months	Replace electrolyte solution into membrane cap. Control membrane cap integrity.  Electrolyte replacement procedure	
Yearly	Replace membrane cap.	Membrane cap replacement procedure

Shorten the inspection intervals appropriately if the chemical is abrasive or corrosive.

## TROUBLESHOOTING

PROBLEM	CAUSES	SOLUTIONS
Probe cannot calibrated /	Run-in time too short	Repeat calibration
deviation between measuring value and DPD result	Membrane cracked / damaged	Replace membrane cap
value and DPD result	Interfering substances in the measuring water	Examine the measuring water for interfering substances and remedy, if necessary contact supplier
	Air entrapments	Knock gently with the electrode shaft on the membrane cap until no air bubbles bubble up anymore ("knock method")
	Short-circuit / damage in the signal leads	Locate and eliminate short-circuit / defect, if necessary change the measuring cable
	Air bubbles on the outside of the membrane	Increase the flow rate temporary, if necessary check installation and revise it
	Distance between working electrode and membrane cap	Screw the membrane cap tightly onto the shaft
	Deposits on membrane cap	Carefully remove deposits with a soft brush or replace the membrane cap.
	No electrolyte in the membrane cap	Fill membrane cap with electrolyte
	DPD-/titration chemicals spent	Use new DPD-/titration chemicals, repeat calibration
	Only valid for peracetic acid: improper method of titration	Repeat titration with an appropriate method (with a minimal titration volume)
Measuring signal is not stable	Membrane cracked / damaged	Replace membrane cap
	Air bubbles in the electrolyte	Empty out the membrane cap and refill it carefully with new electrolyte avoiding bubbles
	Air bubbles on the outside of the membrane	Increase the flow rate temporary, if necessary check installation and revise it
	Air entrapments	Knock gently with the electrode shaft on the membrane cap until no air bubbles bubble up anymore ("knock method")
	Pressure fluctuations in the measuring water	Check and revise installation

## PRODUCT SERVICE REPAIR FORM

## ENCLOSE THE PRESENT FORM TO THE DELIVERY NOTE

Company name Address Phone no. Contact person.  PRODUCT TYPE (see product label) DEVICE CODE SofN (serial number).  DEPRATING CONDITIONS Location/installation description  Chemical Start-up (date)	Company name	SENDER	
Address Phone no. Contact person  PRODUCT TYPE (see product label) DEVICE CODE Son (serial number)  DEPERATING CONDITIONS Location/installation description	Address Phone no. Contact person  PRODUCT TYPE (see product label) DEVICE CODE Son (serial number)  DEPERATING CONDITIONS Location/installation description		
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PRODUCT TYPE (see product label)  DEVICE CODE  S/N (serial number)	PRODUCT TYPE (see product label)  DEVICE CODE  S/N (serial number)		
DEVICE CODE	DEVICE CODE		
OPERATING CONDITIONS  Location/installation description  Chemical  Start-up (date)	OPERATING CONDITIONS  Location/installation description  Chemical  Start-up (date)	PRODUCT TYPE (see product label)	
OPERATING CONDITIONS  Location/installation description  Chemical  Start-up (date)	OPERATING CONDITIONS  Location/installation description  Chemical  Start-up (date)	DEVICE CODE	
Chemical Start-up (date)	Chemical Start-up (date)	S/N (serial number)	
Chemical Start-up (date)	Chemical Start-up (date)	OPERATING CONDITIONS	
Chemical Start-up (date)	Chemical Start-up (date)	Location/installation description	
Start-up (date)	Start-up (date)	el II	
REMOVE ALL THE LIQUID AND DRY IT BEFORE PACKAGING IN ITS ORIGINAL BOX.  DESCRIPTION OF PROBLEM  MECHANICAL  Wear parts	REMOVE ALL THE LIQUID AND DRY IT BEFORE PACKAGING IN ITS ORIGINAL BOX.  DESCRIPTION OF PROBLEM  MECHANICAL  Wear parts		
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ELECTRICAL  Connections, connector, cables  Other  NOT OR INADEQUATE FUNCTION/OTHER	ELECTRICAL  Connections, connector, cables  Other  NOT OR INADEQUATE FUNCTION/OTHER	Corrosion	
Connections, connector, cables	Connections, connector, cables	Other	
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Other  NOT OR INADEQUATE FUNCTION/OTHER	Other  NOT OR INADEQUATE FUNCTION/OTHER	Connections, connector, cables	
NOT OR INADEQUATE FUNCTION/OTHER	NOT OR INADEQUATE FUNCTION/OTHER		
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