RUSSELL MAINSTREAM SUPPLY LTD.

*Providing Solutions*


# ELECTROCHEMICAL SENSORS for the measurement of Chlorine, Chlorine Dioxide, Ozone, Hydrogen Peroxide, & Peracetic Acid

# Introduction


With the exception of the 4-20mA sensors, where the length is 220mm, the sensors have a length of 175mm and a diameter of 25mm, with plug adaptor connection.
They are designed to fit into the available flow cells.
The low current produced by the sensors is electronically amplified in the measurement cell.
No zero point calibration is necessary, and measurements can be taken in pressure up to 1 BAR.
The sensors are temperature compensated, and will operate in the range 0 to 45 degrees C (for the 7 Series, 0-55).
The water has to be flowing to obtain a reading, which is why flow cells are recommended.
Changes to the minimum flow rate will only slightly affect the measurement signal.
Surfactants should not be present in the water being measured (does not apply to the 7 Series probes).

For the dual electrode system, the measurement cell is made of gold, and the counter and reference electrodes of silver with silver halogenid coating. A bias voltage (polarisation) is applied between the two electrodes.

For the potentiostatic 3 electrode system, the measurement electrode is made of gold, the reference electrode is made of silver with a silver halogenid coating, and the counter electrode of stainless steel.

# Chlorine Amperometric Sensors

CL4.1 - Application: Free Chlorine, Inorganic Chlorine. Cannot measure with Cyanuric Acid present.

CS2.3 - Application: Free Chlorine, Organic & Inorganic Chlorine, Reduced pH Dependency

CC1 - Application: Total & Free Chlorine, Isocyanuric Chlorine, Reduced pH Dependency

CP2.1 - Application: Total & Free Chlorine, Organic & Inorganic Chlorine, Reduced pH Dependency

- Amperometric Two and Three electrode systems with replacement membranes.
- 30/40 L/h Flow rate required.
- 1 Bar permissable pressure
- Single point calibration
- Sample must be free of surfactants

## Specifications - 4 Pole Sensors

| Part Number | Range (ppm) | Resolution | Slope (mV/ppm) | PH Range | No. of Electrodes | Membrane Cap |
|---|---|---|---|---|---|---|
| CL4.1N | 0.05 - 20 | 0.01ppm | -100 | 4 - 8 | 2 | M20 |
| CL4.1H | 0.005 - 2 | 0.001ppm | -1000 | 4 - 8 | 2 | M20 |
| CS2.3N | 0.05 - 10 | 0.01ppm | -100 | 4 - 11 | 3 | M48 |
| CP2.1N | 0.05 - 10 | 0.01ppm | -100 | 4 - 12 | 3 | M48 |
| CP2.1H | 0.005 - 2 | 0.001ppm | -1000 | 4 - 12 | 3 | M48 |
| CC1N | 0.05 - 20 | 0.01ppm | -100 | 4 - 12 | 3 | M48 |
| CC1H | 0.05 - 2.00 | 0.001ppm | -1000 | 4 - 12 | 3 | M48 |

## Specifications - 2 Pole Sensors

| Range (ppm) | | | | | Resolution | PH Range | No. of Electrodes | Membrane cap |
|---|---|---|---|---|---|---|---|---|
| 0 - 0.05 | 0 - 2 | 0 - 5 | 0 - 10 | 0 - 20 | | | | |
| CL4.1MA0.5 | CL4.1MA2 | CL4.1MA5 | CL4.1 MA10 | CL4.1 MA20 | 0.01ppm | 4 - 8 | 2 | M20 |
| | CS2.3MA2 | CS2.3MA5 | CS2.3 MA10 | | 0.01ppm | 4 - 11 | 3 | M48 |
| | CP2.1MA2 | CP2.1MA5 | CP2.1 MA10 | | 0.01ppm | 4 - 12 | 3 | M48 |
| | CC1MA2 | CC1MA5 | CC1MA10 | | 0.01ppm | 4 - 12 | 3 | M48 |

- Handling, commissioning and service are extremely easy. The electrode system has a very long working life, with just the membrane cap subject to wear and tear. This needs to be replaced every year. However, maintenance costs are very low.
- The time needed to polarise most of the probes is less than 2 hours.
- No zero point calibration is necessary, and it is only necessary to have a single point calibration, only a slope test is required.
- Because the flow dependence is so low, various in-line probe housings can be used, and it is possible to fit "in-line".
- For most of the probes it is possible to operate up to 1 Bar (higher on request), and this enables the water to be easily returned.
- Temperature compensation is integrated in every probe.
- 90% of the final value of the measurement can be reached in less than 2 minutes for most measurement probes.
- Long term stability is excellent, slope loss is approximately 1% per month.
- Due to low impedance of the probes, long cables can be used without problems.
- Because the probes are available with different ranges, and power supplies, they can be used with a customers existing controllers.

If a suitable one is not available R.M.S Ltd are able to supply one.

## Chlorine Dioxide, Ozone, Peracetic Acid & Hydrogen Peroxide Amperometric Sensors.

- Amperometirc Dual Electrode System with Replacement Membranes.
- Severn Series for measurements when surfectants present.
- Gold Cathode, Silver/Silver Halogenid Anode.
- One and four series temperature range 45°C.
- Severn series temperature range 55°C.

2 Pole Sensor

4 Pole Sensor

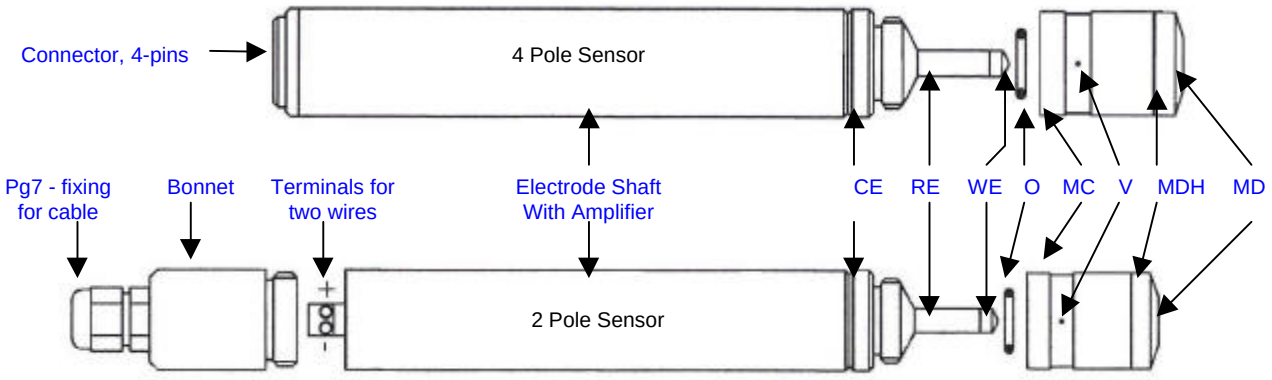
### Specifications - 4 Pole Sensors

| Description | Range (ppm) | Resolution | 1 or 4 Series Option | pH Range | 7 Series Option | pH Range |
|---|---|---|---|---|---|---|
| Chlorine Dioxide | >0.05 - <20.00 | 0.01 | **CD4N** | 1 - 14 | **CD7N** | 2 - 11 |
| Chlorine Dioxide | >0.005 - <2.00 | 0.001 | **CD4H** | 1 - 14 | **CD7H** | 2 - 11 |
| | | | | | | |
| Ozone | >0.05 - <20.00 | 0.01 | **OZ1N** | 1 - 14 | **OZ7N** | 2 - 11 |
| Ozone | >0.005 - <1.00 | 0.001 | **OZ1H** | 1 - 14 | **OZ7H** | 2 - 11 |
| | | | | | | |
| Peracetic Acid | >0.05 - >2000 | 1ppm | **-** | - | **PES7N** | 2 - 11 |
| Peracetic Acid | >0.05 - 2.00 | 1ppm | **-** | - | **PES7H** | 2 - 11 |
| | | | | | | |
| Hydrogen Peroxide | >0.05 - >2000 | 1ppm | **-** | - | **WP7** | 2 - 11 |
| Hydrogen Peroxide | >0.0 - <200 | 1ppm | **-** | - | **WP7H** | 2 - 11 |

## Chlorine Dioxide, Ozone, Peracetic Acid, Hydrogen Peroxide Continued

### Specifications - 2 Pole Sensors

| Description | Range (ppm) | Resolution | 1 or 4 Series Option | pH Range | 7 Series Option | pH Range |
|---|---|---|---|---|---|---|
| Chlorine Dioxide | >0.0 - <0.5 | 0.01ppm | **CD4 MA0.5** | 2 - 11 | **CD7 MA0.5** | 2 - 11 |
| Chlorine Dioxide | >0.0 - <2.00 | 0.01ppm | **CD4 MA2** | 2 - 11 | **CD7 MA2** | 2 - 11 |
| Chlorine Dioxide | >0.0 - <5.00 | 0.01ppm | **-** | - | **CD7 MA5** | 2 - 11 |
| Chlorine Dioxide | >0.0 - <10.00 | 0.1ppm | **CD4 MA10** | 2 - 11 | **CD7 MA10** | 2 - 11 |
| | | | | | | |
| Ozone | >0.0 - <0.5 | 0.01ppm | **OZ1 MA0.5** | 2 - 11 | **OZ7 MA0.5** | 2 - 11 |
| Ozone | >0.0 - <2.00 | 0.01ppm | **OZ1 MA2** | 2 - 11 | **OZ7 MA2** | 2 - 11 |
| Ozone | >0.0 - <5.00 | 0.01ppm | **-** | - | **OZ7 MA5** | 2 - 11 |
| Ozone | >0.0 - <10.00 | 0.1ppm | **OZ1 MA10** | 2 - 11 | **OZ7 MA10** | 2 - 11 |
| | | | | | | |
| Peracetic Acid | >0.05 - >2000 | 1ppm | **-** | - | **PES7 MA-MM** | 2 - 11 |
| | | | | | | |
| Hydrogen Peroxide | >0.0 - <2000 | 1ppm | **-** | - | **WP7MA-MM** | 2 - 11 |
| Hydrogen Peroxide | >0.0 - <500 | 1ppm | **-** | - | **WP7 MA-D** | 2 - 11 |
| Hydrogen Peroxide | >0.0 - <10000 | 1ppm | **-** | - | **WP7MA-XM** | 2 - 11 |




| | |
|---|---|
| CE | - Counter Electrode |
| RE | - Reference Electrode |
| WE | - Working Electrode |
| O | - O-Ring 14 x 1.8mm |

| | |
|---|---|
| MC | - Membrane Cap |
| V | - Vent |
| MDH | - Membrane Disc Holder |
| MD | - Membrane Disc |

## CONTROLLER & FLOW THROUGH CELLS

### DAS-CL

- 1 x Amperometric Sensor
- Up to 50°C Temperature
- 6 x 8mm Hose Connector
- Up to 5 Bar pressure

(Requires installation kit)

### ME5090 - Controller

Can be configured to: pH, Redox, Chlorine, Chlorine Dioxide, Ozone, Peracetic Acid, Hydrogen Peroxide or Temperature


ME5090 Controller connected up to the PEF1 Flow Through Cell

### PEF1

- 1 x Amp Sensor
- 6 Bar Pressure
- Needle Valve & Flow Indicator
- Stop Flow Switch

### PEF3

- 1 x Amp Sensor & 2 x PG13.5
- 6 Bar Pressure
- Needle Valve & Flow Indicator
- Stop Flow Switch

### PEF5

- 2 x Amp Sensors & 3 x PG13.5
- 6 Bar Pressure
- Needle Valve & Flow Indicator
- Stop Flow Switch

# Ordering Information

**Points to consider when ordering:**

- **Choose an Application: i.e.: Chlorine, Chlorine Dioxide, Ozone, Hydrogen Peroxide, or Peracetic Acid**
- **Choose a suitable Controller: ME5090 or own 4:20mA input. This must have Galvanic Isolation and be able to accept signal - 100mV per ppm.**
- **Choose your measurement range**
- **Select a required flow cell and cable (contact R.M.S for assistance, if required)**

**Questionnaire**

**(Please photocopy, fill in and return to R.M.S to determine your exact requirements)**

1) What is your application?

_____

2) Which of our probes are you interested in?

_____

3) What range do you wish to work in?

_____

4) What resolution do you need?

_____

5) Do you have a suitable Controller (i.e.: 4-20mA)?

_____

6) If the answer is No, would you be interested in one?

_____

7) If you are not able to maintain a constant flow of 30-40 litres/hour across the membrane, which flow through cell would suit your needs?

_____

8) What length of cable will you need? (up to 15 metres)

_____

9) Any other comments about your needs?

_____

Your Details:

Name:_____ Company:_____

Tel:_____ Fax:_____

Email:_____

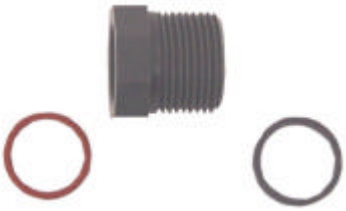
# Accessories

## PG13.5 Electrodes

P14/SG/S8 - pH Electrode
Can be used with the PEF3 & PEF5
Flow Through Cells

O14/SG/S8 - Redox Electrode
Can be used with the PEF3 & PEF5
Flow Through Cells

Electrolyte

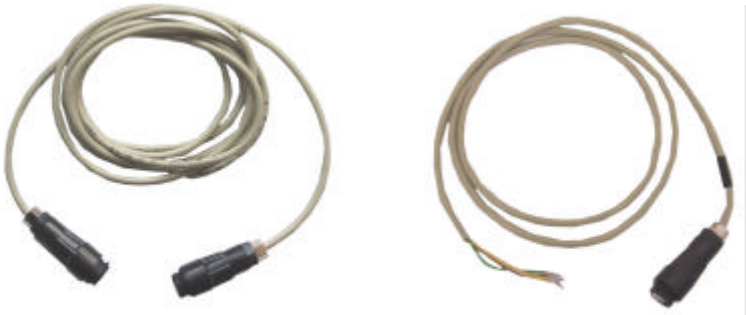


Installation Kit for DAS CL
Flow Cell

M20

M48

Membrane Caps
(please state sensor
when ordering)



Connecting Cables:
(State Length required: 0.5 - 15M)
1 Connector for use with 2 Pole Sensor
2 Connectors for use with 4 Pole Sensor

NOTE: R.M.S offer a full range of DO2 and Conductivity Sensors to match your requirements.

Full details available on request.

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