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1 GENERAL INFORMATION

Introduction to Palintest Sensor Technology

Thank you for purchasing this Palintest product.

Palintest instruments and reagents are renowned as being simple to use, while providing rapid and reliable results for the testing of water. Our instruments are of the highest quality and fully waterproof.

Palintest's experience, established over the last 50 years, is the reason why our instruments and reagents are used in laboratories, treatment plants, leisure facilities and industrial premises throughout the world.

Our products are packaged carefully and the product should reach you in the state it left our factory; if this product has reached you in a state that is less than satisfactory, please contact your local Palintest branch or your local distributor.

This booklet describes how to achieve the full potential from your Palintest product, and provides instructions for the range of water tests that can be performed using this instrument.

To guarantee high accuracy and performance, you must ensure that only Palintest reagents are used with Palintest instruments. Failure to do so can lead to erroneous results.

Kit Contents

These instructions are designed for use with the following instrument :-

ChlordioX™ Plus

The kit contains :-

ChlordioX™ Plus Instrument

2 Boxes of ChlordioX (CD) Sensors (with Calibration Chip)

Box of ChloroSense™ (CS) Sensors (with Calibration Chip)

25 ml Bottle of Reagent CR-1

25 ml Bottle of Reagent CR-2

25 ml Bottle of Glycine Reagent

Degassing Apparatus

Stirring Rods

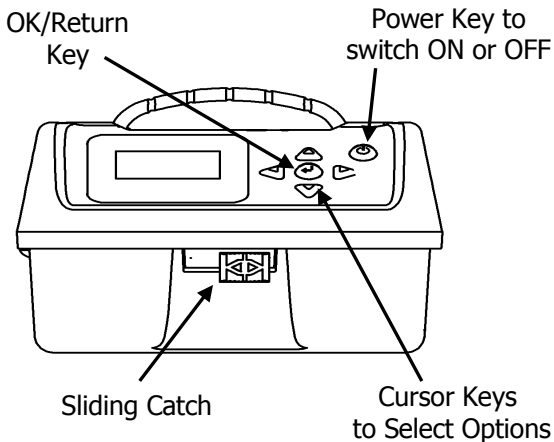
250 ml Sample Bottle

Instructions

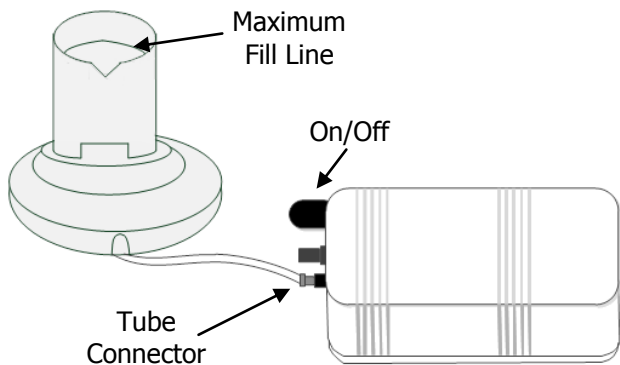
Drying Sticks

For re-ordering codes and accessories, please see Section 6.

Instrument Layout



The De-Gassing Equipment



2 BACKGROUND INFORMATION

Introduction to Electrochemical Measurement

Palintest Sensor Technology is based on quantifying chemical reactions by measuring electrical energy produced or consumed by the reaction. Chemical reactions involve the movement of electrons that create an electrical current that can be measured. Conversely, electrical energy can be used to drive chemical reactions.

The movement of the electrons flow from a chemical (oxidising agent) to another chemical (reducing agent) and is described as a redox reaction.

With Palintest Sensor Technology, each test method is slightly different but they are all based on similar principles, using either voltammetric or amperometric methods.

Our methods involve the reaction of the analyte in question with reagents pre-dosed onto the sensor surface. The rest of the conditions are controlled to minimise reaction products. The flow of current measured in this process is related to the concentration of the analyte in question and a reading in concentration units (mg/l or $\mu\text{g/l}$) is obtained.

One implication of this is that it is the batch of sensors that dictates the calibration rather than the instrument.

A representative sample from each batch of sensors is tested as part of the manufacturing process and the average response to known standards provides the calibration data for that sensor batch.

The instrument measures the flow of current generated when the sensor is immersed in the test sample. Then, using the calibration data stored on the calibration chip, the instrument converts the response into a direct reading in mg/l (or $\mu\text{g/l}$).

It is therefore important to ensure the calibration information stored in the instrument is the same as the calibration information for the current batch of sensors in use.

Entering Calibration Information

The sensors are calibrated rather than the instrument and the instrument requires the calibration information associated with the current batch of sensors before any tests are carried out :-

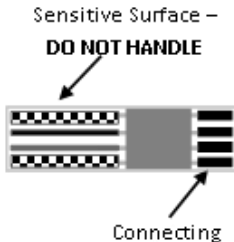
- 1 Slide the front catch to the right, and open the instrument case fully.
- 2 Press the blue lever, and insert the contacts of the calibration chip fully into the slot. Release the blue lever to clamp the chip in place.
- 3 Close the instrument lid and view the display which will indicate that the upload of data is taking place. Check the calibration number displayed on screen matches the number on the sensor packaging. A test can now be performed.
- 4 If the calibration procedure was unsuccessful, an error message will be displayed.
Do not remove the calibration chip. Just open and close the lid again to repeat the calibration process. Contact your local distributor if the problem persists.
- 5 Remove the calibration chip once the new calibration code has been accepted. This process does not need repeating unless the batch of sensors being used changes.

Care and Maintenance

The handling of the instrument and sensors requires some consideration.

The sensors are sensitive to contamination if not handled correctly. The instrument is robust and waterproof (IP67), and by following the 'Care and Maintenance' tips below, you can ensure your instrument is performing to specification:-

- Prepare your workplace before use. Make sure that you have enough space to work and the instrument is placed on a flat, vibration free surface.
- Do not handle the sensitive part of the sensor. Insert the sensor using the foil covering as a protective sheath and once the sensor is inserted, remove the sheath :-



- It is very important to ensure the calibration code being used is correct. Ensure the calibration code shown on the screen matches the code shown on the sensor packaging.

- Do not leave water in the sample container after the test. Remove the sample after every test and dispose of it appropriately.
- Do not leave used sensors in the instrument. Remove used sensors after the test has been completed. Never attempt to re-use sensors.
- Immediately wipe any drips or spillages onto the instrument or into the test chamber with a clean tissue.
- Store the instrument in a clean, dry place when it is not in use, eg in the carry case.

Modes of Use

The instrument itself can be operated in three distinct modes :-

'Analysis' mode. This is the mode used for analyzing water samples and is the default mode for the instrument.

'System' mode. This allows the instrument to be set-up for use in the field, eg time and temperature settings, access to the memory log, etc, and is accessed by connecting the instrument to a PC via the USB port

'Calibration Check' mode. This is accessed when the user wishes to check the instrument functionality. The method for accessing this mode is only made available on purchasing check standards (see Section 5 for more information and Section 6 for re-order codes).

3 TEST PROCEDURES

The methodologies listed here are for use with the ChlordioX™ Plus instruments.

Before starting any tests ensure you read Section 2 of these instructions, especially the 'Entering Calibration Information' and 'Care and Maintenance'.

To Select the Test

The tests that are to be carried out depend upon the application.

Stage 1 – analysis of the sample for chlorine dioxide.

Stage 2 – degassing stage which removes any chlorine dioxide from the sample (not required if chlorine dioxide is below the limit of detection).

Stage 3 – analysis of the sample for free chlorine (not required if chlorine is not present in the sample)

Stage 4 – describes both steps required to analyse for chlorite.

Each one or more of these stages can be skipped if necessary allowing the user complete flexibility of testing depending upon the needs of their application.

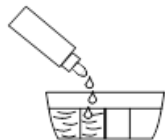
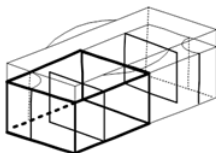
In all cases, it is recommended that the sample bottle provided with the kit is used to take a sample and the tests are all carried out from this sample bottle to ensure consistency between test samples.

Stage 1 – Chlorine Dioxide Test

Uses one ChlordioX (CD) Sensor

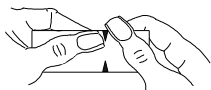
Glycine reagent is provided for test samples containing either chlorine or copper. The addition of glycine (Steps 3 and 4) can be omitted if neither of these are present in the sample:-

- 1 Slide the front catch to the right, and open the instrument case fully.
- 2 Remove the sample container from the instrument. Rinse, then fill **one half** to the stepped line with the test sample.
- 3 Add 6 drops of 'Glycine Reagent' to the test.
- 4 Stir the solution gently for 5 seconds with the rod provided.



- 5 Replace the sample container in the instrument with the half containing the sample facing the front of the instrument.

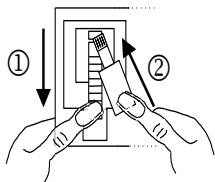
- 6 Tear open the CD sensor foil along the pre-cut marks, in the manner shown. Holding the sensor through the foil pack, expose the connecting tracks.



Ensure that the CD sensor batch number on the sensor foil matches the number displayed on the screen.

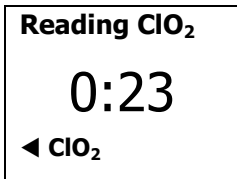
(If it does not, see Section 2).

- 7 Press the blue lever to open the jaws of the sensor connector. Insert the exposed end of the sensor, connecting tracks upper-most, into the slot, and release the lever. The jaws will close to hold the sensor in place. Ensure the sensor is inserted fully. Slide the foil pouch off to expose the sensor.



Do not touch the sensitive part of the sensor.

- 8 **Gently** close the instrument lid to immerse the sensor in the sample. The test starts automatically. The display indicates the test time remaining. ***Do not disturb the instrument during the test.***



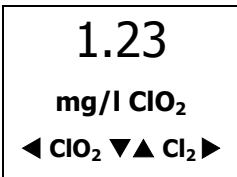
- 9 The chlorine dioxide result is displayed.

At this point, pressing the up (▲) or down (▼) arrow will scroll through temperature, date and time and sample Number.

Pressing the left arrow (◀) will return to the chlorine dioxide start screen.


Pressing the right arrow (▶) will continue the test sequence and move to Stage 2 of the test sequence.

All results are automatically stored in the instrument log with time/ date, temperature and sample number.



- 10 If testing is complete at this stage, open the instrument and press the blue lever to remove the used sensor.

Empty and rinse the sample container with the test sample.

Press the power button  to switch off. If no button is pressed within 5 minutes the instrument will automatically power off.

Do not leave sample within the instrument on completion of the test.

- 11 To recall the last reading, press the up (▲) or down (▼) arrow from the 'Insert Sensor' screen.

Stage 2 – Degassing the Solution

To analyse for free chlorine, the chlorine dioxide must first be removed from the solution by degassing (see Section 5 for further information on the degassing equipment):-

- 1 If the Cl_2 (free chlorine) test is selected the screen will prompt the user to discard the CD sensor and the used sample.

To continue, open the instrument, discard the CD sensor and used sample. Then close the lid (with no sample or sensor present).

At this point, pressing the left arrow (◀) will return to the chlorine dioxide start screen.

**Discard sensor
and sample
Close lid**
◀ ClO_2

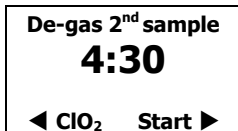
- 2 When the lid is closed the screen will display the time needed to degas the chlorine dioxide from the second portion of the sample. This time is calculated from the result determined in Stage 1. If the answer is Stage 1 was below the limit of detection or Stage 1 was skipped, then continue straight to Stage 3.

De-gas 2nd sample
4:30
◀ ClO_2 Start ▶

- 3 Fill the degasser vessel up to the mark with the second portion of the test sample. Attach the degasser to the battery operated pump. The pump attaches to the degasser via the base.

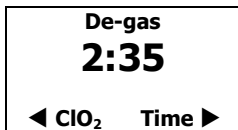
Turn on the pump using the on/off button.

Press the right arrow (▶) to start the degassing timer.



- 4 The display indicates the time remaining for degassing.

Pressing the right arrow (▶) will give options to reset or skip the timer (see below).



Pressing the left arrow (◀) will reset the timer to the start as in Step 4 above. Pressing the right arrow (▶) will skip the timing and go to the next stage in the sequence.



Stage 3 – Chlorine Test

Uses one ChloroSense (CS) Sensor

- 1 When the de-gassing stage is complete, the display will prompt the user to insert a CS sensor.

Pressing the right arrow (▶) will skip this stage and will continue the test sequence to the chlorite test (Stage 4), skipping the chlorine test.

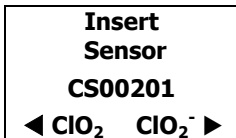
Ensure that the CS sensor batch number on the sensor foil matches the number displayed on the screen.

(If it does not, see Section 2).

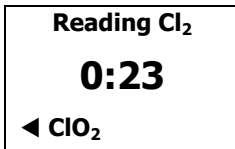
Pressing the left arrow (◀) will return to the chlorine dioxide start screen.

- 2 Fill one half of the sample container with the degassed sample. Do not disconnect the base from the cup.

Open the instrument, place the sample container into the instrument with the filled half to the front and insert a CS sensor as described in Stage 1. Close the lid to start the test.

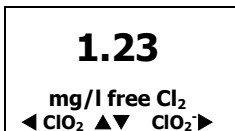


- 3 The screen will display the test time remaining.



- 4 The free chlorine result will be displayed.

Pressing the up (▲) and down (▼) arrow will scroll through free Cl₂, temperature, date/ time and sample Number.



Pressing the right arrow (▶) will continue the test sequence to the chlorite test (see Stage 4).

Results are automatically stored to the instrument log.

Pressing the left arrow (◀) will return to the chlorine dioxide start screen.

Stage 4 – Chlorite Measurement

Uses two ChlordioX (CD) Sensors

The chlorite test requires that two measurements are made (A & B). These measurements should be made with sensors from the same batch :-

Part A

- 1 If the chlorite test is selected the screen will prompt to add chlorite reagent CR-1 and insert a new sensor.

Open the instrument, discard the CS sensor. **Retain the sample.**

- 2 Add 6 drops of Reagent CR-1. Mix using the stirrer provided. Insert a new Chlordiox (CD) sensor. Close the lid.
- 3 The screen will indicate the test time remaining.

Add CR-1, Insert
New Sensor
CD00199

◀ ClO₂

Reading ClO₂⁻(A)
00:55

◀ ClO₂

Part B

- 4 When the measurement is complete, the screen will prompt to discard the sensor and add 6 drops of reagent CR-2 and stir gently. Close the lid **without** a sensor in the instrument.

**Discard Sensor
Add CR-2
Close lid**
◀ ClO₂

- 5 The screen will display the time remaining for the chlorite to react with the reagents.

Waiting ClO₂⁻
1:59
◀ ClO₂ Time ▶

- 6 At the end of the two minute waiting period the screen will prompt to insert a Chlordiox (CD) sensor.

**Insert
Sensor
CD00199**
◀ ClO₂

Open the lid and insert a new sensor. Close the lid.

- 7 The test will start and the screen will show the time remaining.

Reading ClO₂⁻(B)
00:23
◀ ClO₂

- 8 The screen displays the chlorite concentration.

Pressing the up (▲) and down (▼) arrow will scroll through the temperature, date/time and sample Number.

Pressing the right arrow (▶) will display the results summary table which displays all three parameters and temperature, date/time etc

Pressing the left arrow (◀) will return to the chlorine dioxide start screen.

1.23
mg/l ClO₂⁻
◀ ClO ₂ ▼▲ Results ▶


0.50 mg/l	ClO₂
0.25 mg/l	free Cl₂
0.10. mg/l	ClO₂⁻
◀ ClO ₂ ▼▲	

4 INSTRUMENT

For an illustration on the instrument layout, see Section 1.

For information on performing a test, see Section 3.

Replacing the Batteries

The ChlordioX™ Plus is powered by standard 4 x 1.5V 'AA' batteries. The instrument features an automatic battery condition check as part of the analysis cycle. If the batteries require replacement a 'Low Battery' warning message appears. The message can be cleared by pressing . The batteries should be replaced as soon as possible. When the power supplied by the batteries is insufficient to carry out a test, the instrument displays the warning message continually and will not allow a test to be carried out.

The battery compartment is located in the base of the instrument and is secured by four screws. To replace the batteries, remove the cover, remove the battery pack and discard the old batteries. Replace all four batteries at once with fresh batteries, observing the correct polarity as marked in the battery holder.

Insert the battery pack in the base of the instrument, replace the battery compartment cover. Tighten the screws in diagonal pairs to ensure waterproof fit.

Avoid corrosion damage through leakage by removing batteries from the instrument if it is to be left unused for a long period of time.

Liability

Under no circumstances shall Palintest Ltd be liable for loss of life, property, profits or other damages incurred through the use or misuse of their products.

Disposal


The Waste Electrical and Electronic Equipment (WEEE) Regulations require that producers of electrical equipment are obliged to contribute financially towards the recycling of electrical goods. These regulations also require that all retailers actively assist in delivering a UK wide WEEE collection infrastructure and encourage the consumers to recycle electronic equipment. Palintest is committed to establishing and enforcing responsible environmental practices. We are actively contributing towards a national fund to assist local councils with the development of existing waste electronics collection facilities.

Our electrical products must not be treated as landfill waste. This is indicated on our products using the following symbol :-







This symbol means that you should not put this item in your normal waste stream. It is your responsibility to ensure that WEEE is recycled via appropriate means. Your nearest electronic recycling site can be found at www.recycle-more.co.uk. Note that Palintest are not responsible for the content of external websites. Alternatively, you may return units to Palintest where we will organise this for you. Please discuss with your Sales contact.

Error Messages

The ChlordioX™ Plus features error detection systems to guide the user and ensure performance. After correcting an error, press  key to reset the instrument. Always use a fresh portion of sample if a sensor has been immersed in the water sample.

If a problem persists, contact your local Palintest branch or distributor.

Error	Diagnosis and Action
Unable to read: Check sensor and contacts	<p>The sensor has not been correctly inserted into the instrument :</p> <ol style="list-style-type: none"> 1 Remove sensor, dry the contacts (see page 30). 2 Remove calibration chip.
Unable to read: Sensor already used	<p>Water residue is causing the instrument to detect abnormal current flow :</p> <ol style="list-style-type: none"> 1 Remove and discard wet sensor. 2 Dry the contacts (see page 30).
Unable to read: Sensor missing	<p>The instrument cannot detect that a sensor has been inserted :</p> <p>Press  key then insert sensor and restart test.</p>
Unable to read: Faulty Sensor	<p>The sensor has given a response that is unexpected :</p> <ol style="list-style-type: none"> 1 Remove and discard the sensor. 2 Dry the contacts (see page 30). Press  key and start again with fresh sample and sensor.
Lid opened during test	<p>Remove the sensor. Press  key and start again with fresh sample and sensor.</p>
Sample not level during test	<p>Remove the sensor. Press  key and start again with fresh sample and sensor.</p>

Technical Specification

Instrument Type	Fixed voltage potentiostat
Sensor Type	Disposable, single-use, pre-calibrated chrono-amperometric sensors
Display	Backlit, graphical LCD (42 x 22 mm) and direct-reading of results in mg/l
User Selectable	Set time and date, date format, display language (French, Spanish, German, Italian), reset sample number and temperature units
Data Logging	Stores 500 results with date/time and temperature.
Interface	Waterproof USB connection to PC
Power	4 x 1.5v 'AA' batteries. Battery power saving system with auto switch-off after five minutes. Powered via USB port when connected to computer
Size	Instrument 170 x 126 x 116 mm
Weight	990g

Sensor Performance

	ANALYTE	
Analysis Time	Chlorine dioxide Free chlorine Chlorite	< 1 minute test time
Precision Range	Chlorine dioxide Free chlorine Chlorite	0.02 – 50 mg/l 0.02 – 10 mg/l 0.02 – 50 mg/l
Resolution	Chlorine dioxide Free chlorine Chlorite	0.01 up to 10 mg/l 0.1 mg/l thereafter 0.01 up to 1.0 mg/l 0.1 mg/l thereafter 0.01 up to 2.5 mg/l 0.1 from 2.5 to 20mg/l 1.0 mg/l thereafter
Precision	Chlorine dioxide Free chlorine Chlorite	≤ 5% CV @ 1.00
Minimum Detection Limits	Chlorine dioxide Free chlorine Chlorite	0.03 mg/l 0.04 mg/l 0.02 mg/l

Cleaning the Instrument

Any build-up of dirt or deposits may affect readings.

To clean the instrument, gently clean the internal surfaces with a soft, non-abrasive cloth. Do not use solvents. Deposits may be removed with a slightly dampened cotton bud.

The instrument contains no user-serviceable components. If the instrument requires servicing or repair, this can be arranged through your local distributor or Palintest office.

Drying the Contacts

The interface between the sensor and the instrument is the most sensitive part of the instrument. Keep this area in particular clean and dry. Drying sticks (CS 160) are provided with all kits to remove any moisture build up in this area. Errors associated with wet contacts require the drying sticks to remove any water from the contacts. If the error continues then place the instrument in warm, dry conditions to ensure all moisture is removed.

Servicing and Warranty

Palintest instruments are covered by warranty for a period of two years from the date of purchase, excluding accidental damage or damage caused by unauthorised repair or misuse. Should repair be necessary, contact your local distributor quoting the serial number. This warranty does not affect your statutory rights.

An instrument failure due to misuse is not covered by the Palintest instrument warranty.

Check Standards are available from Palintest in order to allow users to check instrument is performing to specification.

The instrument does not need recalibrating unless a new batch of sensors is being used.

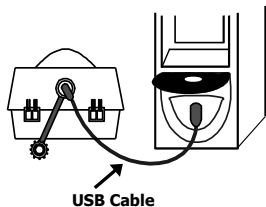
Sensors are hermetically sealed and have a shelf-life of two years. They should be stored in cool (<math><30^{\circ}\text{C}</math>, 86°F), dry conditions.


Adjusting Optional Settings and Data Handling (System Mode)

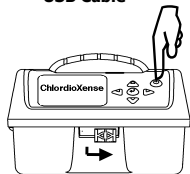
The ChlordioX™ Plus are designed for simplicity of use in the field. The user selectable options are only accessed when linked to the PC. Once selections have been made, these are stored in memory, and applied to each reading.

Enter System Mode

- 1 To start 'system' mode, connect the instrument to a PC via the USB port using USB cable.



- 2 Press and hold the  button.



- 3 Scroll through the menu of options using the ▲▼ keys, and press (↵) to select.



Selectable Options

Language

Press (↵) to show the available languages. Scroll ▲ or ▼ to highlight the required language. Press (↵) to select and return to the options list.

Show as...

Use the ▲ or ▼ keys to toggle between displaying your results as mg/l ClO₂ or as mg/l chlorine equivalence.

Clear Log

Press (↵) to select. Use ◀ or ▶ keys to highlight [Yes] or [No].





Press (↵) to perform the action and return to the options list.

Reset Sample

Press (↵) to select reset of sample number to 1. Use ◀ or ▶ keys to highlight [Yes] or [No].






Press (↵) to perform the action and return to the options list.

Set Time

Press  to edit the displayed time. Use  or  keys to change the highlighted number. Use the  keys to select the next number.




Press  to accept the new time and return to the options list.


Set Date

Press  to edit the displayed date. Use the  or  keys to increment/ decrement the highlighted number. Use the  or  keys to move the highlight to different numbers.

Press  to accept the new date and return to the options list.

Date Format

Press  to select date format. Use the  or  keys to highlight either DD/MM/YYYY or MM/DD/ YYYY.

Press  to select and return to options list.


Temperature Format

Press  to select the temperature scale for logged results. Use the  or  keys to highlight °C or °F.

Press  to select and return to the options list.

Serial Number

Press  to view the instrument serial number.


Press  to return to the options list.

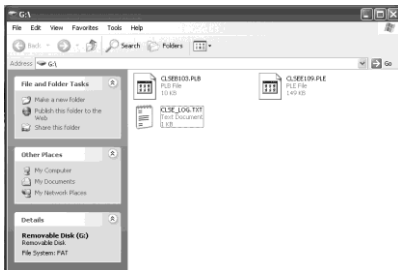
Computer Interface

The instrument USB port, once connected to a PC, can be used to access data stored in the instrument log, and to upgrade the instrument software.

When the instrument is connected to a PC, it behaves like a removable hard drive (slave) or USB memory stick.

Data Access

- 1 Connect the instrument to a PC using the USB cable.
- 2 Press and hold the  key until the title screen appears then release.
- 3 On the PC, open the hard drive window. Three files will be seen :-



- 4 Results are stored in the Log file, CLSE_LOG.TXT.
- 5 Copy the file to the PC to view and handle the data.
- 6 Open this file. Results appear as a text file. Each result appears on one line with spacing to allow easy opening in a spreadsheet program (see example below) :-


The screenshot shows a Notepad window with the following data:

DD/MM/YYYY	HH:MM	Sample	'C	Batch	conc.	Units
22/06/2011	11:43	000093	23.7	CD00210	<0.02	mg/l C10
22/06/2011		000093				mg/l C10
22/06/2011	11:48	000093	23.6	CD00210	<0.02	mg/l C10
22/06/2011	11:40	000092	23.0	CD00210	0.02	mg/l C10
22/06/2011		000092				mg/l C10
22/06/2011		000092				mg/l C10
22/06/2011		000091				mg/l C10
22/06/2011	11:29	000091	23.0	CS00182	0.34	mg/l C10
22/06/2011	11:35	000091	23.0	CD00210	0.83	mg/l C10
21/06/2011		000090				mg/l C10
21/06/2011	16:55	000090	18.6	CS00182	0.65	mg/l C10
21/06/2011	17:00	000090	19.2	CD00210	1.04	mg/l C10
21/06/2011		000089				mg/l C10
21/06/2011		000089				mg/l C10
21/06/2011	15:41	000089	22.9	CD00210	0.93	mg/l C10
21/06/2011		000088				mg/l C10
21/06/2011	15:21	000088	23.2	CS00182	4.8	mg/l C10
21/06/2011	15:26	000088	23.2	CD00210	0.87	mg/l C10
21/06/2011		000087				mg/l C10
21/06/2011		000087				mg/l C10
21/06/2011	15:17	000087	23.2	CD00210	0.93	mg/l C10
21/06/2011		000086				mg/l C10
21/06/2011		000086				mg/l C10
21/06/2011	15:09	000086	23.1	CD00210	0.85	mg/l C10
21/06/2011		000085				mg/l C10
21/06/2011		000085				mg/l C10
21/06/2011	14:56	000085	23.0	CD00210	1.00	mg/l C10
21/06/2011		000084				mg/l C10
21/06/2011	14:22	000084	23.0	CS00182	0.90	mg/l C10
21/06/2011	14:27	000084	22.9	CD00210	0.94	mg/l C10
21/06/2011		000083				mg/l C10
21/06/2011	14:10	000083	22.8	CD00210	1.13	mg/l C10
21/06/2011		000082				mg/l C10
21/06/2011	13:41	000082	22.8	CS00182	5.0	mg/l C10
21/06/2011	13:47	000082	22.7	CD00210	1.06	mg/l C10
21/06/2011		000081				mg/l C10
21/06/2011	13:31	000081	22.8	CS00182	5.1	mg/l C10
21/06/2011	13:36	000081	22.7	CD00210	<0.02	mg/l C10
21/06/2011		000080				mg/l C10
21/06/2011	13:20	000080	22.7	CS00182	<0.02	mg/l C10
21/06/2011	13:26	000080	22.7	CD00210	0.93	mg/l C10
21/06/2011		000079				mg/l C10
21/06/2011		000079				mg/l C10
21/06/2011	12:54	000079	23.0	CD00210	0.96	mg/l C10
21/06/2011		000078				mg/l C10
21/06/2011	12:39	000078	22.9	CS00182	4.8	mg/l C10
21/06/2011	12:45	000078	22.8	CD00210	1.20	mg/l C10
20/06/2011		000077				mg/l C10

- 7 To delete the results from the instrument memory, delete the log file on the hard drive window or from the instrument memory.
- 8 Note that for security of the audit trail, it is not possible to save files to the log file stored in the instrument.

Software Upgrade

When new software is made available by Palintest, the instrument software may be upgraded. Files will be available by e-mail or Palintest website :-

- 1 Connect the instrument to a PC using the USB cable.
- 2 Press the  key until the title screen appears.
- 3 On the PC, open the hard drive window.
- 4 Drag and drop the software upgrade (PLE.) file onto the hard drive window.
- 5 The new software will be programmed into the instrument. The instrument will re-start to run the new software.
- 6 When upgrading the PLE. file, the instrument should be turned off and then back on again in order for the new software to take effect.
- 7 Any logged data will be retained during this upgrade.

5 TROUBLESHOOTING

Compliance

The method outlined in these instructions has been shown as equivalent to EPA approved methods.

The sensors are calibrated on real chlorine dioxide and chlorite solutions (assigned using titration and spectroscopic methods) rather than surrogate standards.

The Palintest instrument series has been independently tested and has earned the European CE Mark of Compliance for electro-magnetic compatibility (EMC).

Degassing Equipment

The degassing equipment consists of a base and cup with a porous filter and O-ring in the middle.

The degassing equipment comes as one complete part but the apparatus can be disassembled and parts reordered if they require replacement. The plastic base and cup can be disconnected to allow the filter and the O-ring seal to be replaced.

The filters do not have a shelf life as the longevity of the component will be dictated by the test samples being used with the degasser.

A spare filter is provided with the kit. If the filter becomes blocked then to replace it, carry out the following steps carefully:

- 1 Release the cup from the base by gently twisting the cup anti-clockwise.
- 2 The filter disc is placed in the base of the degasser with the red ring facing upward.
- 3 The O-ring seal is placed in the cup. Press the seal into the groove situated on the bottom of the cup.
- 4 Replace the cup on to the base and gently twist the cup clockwise.
- 5 Test the seal prior to use on a real sample.
- 6 The tube from the pump connects to the degasser on the underside of the base.

Sample Collection

The following points should be observed when taking water samples. Take water samples from outlet or below the water surface. Collect in a clean plastic bottle (supplied) and fill to the neck so as to avoid unnecessary airspace.

The results may drop during sample storage as the oxidants being measured are volatile. Samples should therefore be tested as soon as possible after sample collection.

6 REORDER CODES and ACCESSORIES

Description	Product Code
ChlordioX™ Plus Kit	CS 400
Chlorosense (CS) Sensors (100 pack)	CS 110
Chlorosense (CS) Sensors (500 pack)	CS 150
ChlordioX (CD) Sensors (100 pack)	CDX 310
ChlordioX (CD) Sensors (500 pack)	CDX 350
Drying Sticks	CS 160
ChlordioX Check Standards	CS 190
CR-1 Reagent	PT 546
CR-2 Reagent	PT 547
Glycine Reagent	PT 549

Accessories Description	Product Code
De-gassing Equipment Set	PT 553
Replacement Filter (Degassing Equip't)	PT 556
Pump Set (De Gas)	PT 554
Replacement O-Rings (Degassing Equip't)	129-133