Palintest
Water Analysis Technologies

ChloroSense HR
Instruction Manual

About us

Palintest
Water Analysis Technologies

A Rich History of Innovation

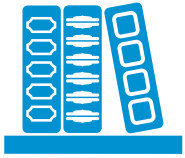
Palintest are committed to making water analysis technologies simple and accessible.

A Global Company with a Local Approach

•Australia •China •UK •USA

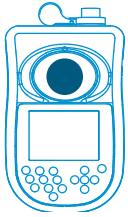
75 Years of Research

We have built up an extensive online library, with research and insights about our products and the applications they serve.



Product Range

From multiparameter photometer kits to visual test Palintest has an instrument solution for every application.



Contents

Introduction

Palintest sensor technology offers a unique method for water disinfection monitoring.

The portable ChloroSense HR combines with single use sensors to provide a quick and easy method for water analysis.

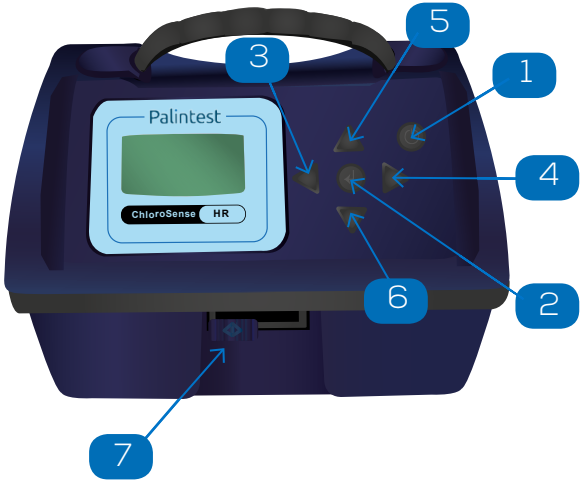
The ChloroSense HR is ideal for:

- Disinfection monitoring.
- Field monitoring of water samples.
- Operational facilities where there is a requirement for no glassware or reagents.

Kit Contents

ChloroSense HR Instrument
Sensor Pack (x100 Sensors)
Instructions
Dilution Tube
Syringe
Sensor Carrying Box

Instrument Diagram



1	Power	4	Right	7	Catch slide
2	Enter	5	Up		
3	Left	6	Down		

The sensor is designed for single use only. The surface of the sensor is highly sensitive. It should be handled by the edges or through the foil packaging only.

Instrument Operation

The ChloroSense HR has three operating modes:

Analysis Mode

Perform a test. See page 4

Check Standard Mode

Run the check standards. See the calibration check standard instructions (with CS182 ChloroSense HR Check Standards) for details.

Set Up Mode

Change the instrument settings. See page 13

Analysis Mode – For Testing Water Samples

1

Press the power button.

2

Ensure the calibration code shown on screen matches with the batch number printed on the foil of the sensor.

3

To accept the calibration, press the right button.
See Performing a Test (Analysis Mode) – Page 5

To change the calibration, press the left button
See Entry of New Calibration Code – Page 11

Performing A Test (Analysis Mode)

When the instrument passes all internal functional checks on start-up, the screen displays the current batch code and prompts the user to insert a sensor.

1

Slide the front catch to the right. Open the instrument case fully.

2

Rinse out the sample container, then fill the front part all the way up to the brim with the water sample.

If the sample concentration is higher than the measurement range, follow the dilution instructions on page 9.

3

Tear open the sensor packet foil along the pre-cut marks. **Hold the sensor through the foil pack,** exposing only the connecting tracks.

4

With your left thumb, press the bottom of the blue lever. Insert the exposed end of the sensor into the gap, with the connecting tracks facing up.

Release the lever to secure the sensor in place. Slide off the foil pouch to expose the sensor.

5

Gently close the instrument lid to immerse the sensor in the water sample. The test starts automatically. The display indicates progress of the test.

Do not disturb the instrument during the test. Operating the instrument on a vibrating surface may affect results.

6

The Free Chlorine result will be displayed.

Press the down arrow to scroll through Free Chlorine, Total Chlorine, Temperature, Date and Time, and Sample Number. All results are automatically stored to the instrument log.

7

After completion of the test, open the instrument and press the blue lever to remove the used sensor.

Empty and rinse the sample container.

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

8

Press the enter key to carry out a new test.

After five minutes of inactivity on the instrument, it will automatically switch off

9

To recall the last reading to the screen, press the enter key from the 'Insert Test Sensor' screen.

Do not reuse sensors or sample water. After the sensor has been in contact with the sample water, discard both the sensor and the sample

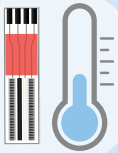
Getting The Best Results

1. Don't touch the surface of the sensor, this may affect your results.

2. Place the instrument on a flat surface free from vibration.

3. Do not disturb the instrument or sample during the test.

4. Measure sample water within the specified temperature and concentration range. The instrument compensates for temperature effects within that range.



5. When storing sensors for over a year, keep them in a refrigerator. When storing them for less than one year, keep them at a temperature of less than 20° C.

Dilution

If the free chlorine concentration being measured is above 25mg/L, perform a dilution. Use the Palintest Dilution Tube (PT 512) and 10 mL Syringe (PT 369), or a suitable laboratory method.

1

Determine the required dilution factor:

Free Chlorine Concentration Range (mg/L)	Dilution Factor
0 - 25	None
Up to 50	2
Up to 75	3
Up to 100	4
Up to 125	5
Up to 250	10

2

Fill the dilution tube to the line labelled with the dilution factor. A 10mL syringe is provided for greater precision.

3

Fill the tube with deionised water to the line marked "deionised water"

4

Cap the tube and mix until combined.

5

Fill the front part of the ChloroSense HR sample vessel to the brim with diluted solution. Proceed with testing as normal.

Discard the remainder from the dilution tube, and rinse with deionised water.

6

Multiply the value displayed on screen by the dilution factor. Record the product as the test result.

For example:
Displayed on screen: 15 mg/L
Dilution factor: 5
Test result: 75 m g/L

Calibration Mode

Load a new calibration code whenever a new batch of sensors is used with the instrument. The stored calibration code must match the batch code of the sensor.

Entry Of New Calibration Mode

1

On start-up, change the calibration using the left button.

Slide the front catch to the right, and open the instrument case.

2

With your left thumb, press the bottom of the blue lever.

Insert the calibration chip into the gap, with the connecting tracks facing up. Release the lever.

3

Close the instrument lid and wait for the calibration to complete. Check that the new code displayed on screen matches the number on the sensor packaging. A test can now be performed.

If the calibration procedure was unsuccessful, an error message will be displayed. Do not remove the calibration chip, open and close the lid again to repeat the calibration.

4

Press the blue lever and remove the calibration chip.

Error Messages

The ChloroSense HR features an error detection system to guide the user. If an error message appears, follow the guidelines below.

After correcting each error, press the power key to reset the instrument. Always replace the sample water if a sensor has had contact with it.

Error	Action
Unable to read: Check sensor and contacts	Remove and discard the sensor, dry the electrical connectors (see page 13). OR Remove the calibration chip.
Unable to read: Sensor not responding	Press the enter key and use check standards. See the calibration check standard instructions (with CS182 ChloroSense HR Check Standards) for details.
Unable to read: Faulty sensor	Dry the electrical connectors (see page 13)
Lid opened during test	Discard sensor and sample. Repeat test.
Sample not level during test	Discard sensor and sample. Repeat test.

Drying the Electrical Connectors

The instrument is fitted with electrical connectors that make contact with an inserted sensor. If the contacts become wet, open the jaws with the blue lever and insert a Palintest Contact. Wait a few seconds until it absorbs the water, remove and insert the opposite end of the stick to check the contacts are dry. The 'Contact Drying Stick' may also be used to clean the contacts.

Set-Up Mode

The ChloroSense HR is 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. The instrument settings cannot be changed accidentally, or without supervisor intervention.

1

To enter SET-UP mode, connect the instrument to a PC via the USB port.

2

Press the power button.

3

Scroll through the menu of options using the up and down keys. Press Enter to select.

Language

From set up mode, use the up and down keys to highlight 'Language' and press enter to select to show the available languages.

Scroll to highlight the required language.
Press enter to select and return to the options list.

Clear Log

From set up mode, use the up and down keys to highlight 'Clear log' and press enter to select.

Use the up and down keys to highlight Yes or No.
Press enter to perform the action and return to the options list.

Reset Sample

From set up mode, use the up and down keys to highlight 'Reset sample' and press enter to select.

Use the up and down keys to highlight Yes or No.
Press enter to perform the action and return to the options list.

Set Time

From set up mode, use the up and down keys to highlight 'Set Time' and press enter to select.

Use the left and right keys to highlight hour (HH) or minute (MM). Use the up and down keys to set the time. Press enter to accept the time and return to the options list.

Set Date

From set up mode, use the up and down keys to highlight 'Set Date' and press enter to select.

Use the left and right keys to highlight day (DD), month (MM) or year (YY). Use the up and down keys to set the date. Press enter to accept the date and return to the options list.

Data Format

From set up mode, use the up and down keys to highlight 'Date Format' and press enter to select UK or US date format.

Use the up and down keys to highlight either DD/MM/YYYY or MM/DD/YYYY.

Temperature Format

From set up mode, use the up and down keys to highlight 'Temperature Format' and press enter to select the temperature scale for logged results.

Use the up and down keys to highlight °C or °F. Press enter to select and return to the options list.

Serial Number

From set up mode, use the up and down keys to highlight 'Serial number' and press enter to select.

Press enter to view the instrument serial number. Press enter to return to the options list.

Computer Interface

To extract the data stored in the instrument log, or to upgrade the instrument software, connect the instrument to a PC via the USB port.
When connected, the instrument will appear like a removable hard drive or USB memory stick.

Note: If the window flashes on screen and reloads, please wait until the window opens the second time. If you continue to have issues please contact your Palintest representative.

Data Access

1. Connect the ChloroSense HR to a PC using the USB cable.

2. Press and hold the power key until the title screen appears then release.

3. On the PC open the hard drive window. Three files will be seen.

   Results are stored in the Log file, CLSE_LOG.TXT.

4. Copy the file to the PC to view the data.

5. 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:

6. To delete the results from the instrument memory, delete the log file on the hard drive window or from the instrument memory.

Software Upgrade

When new software is made available by Palintest, the ChloroSense HR may be upgraded.

1. Connect the ChloroSense HR to a PC using the USB cable.

2. Hold the power 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 ChloroSense HR. The instrument will restart to run the new software

6

When upgrading the .PLE file, the instrument should be turned off and then back on again, for the new software to take effect.

7

Any logged data will be retained during this upgrade.

Operating Principle

The ChloroSense HR uses the electrochemical technique known as chronoamperometry.

Chronoamperometry involves applying a fixed voltage to a working electrode and recording the resulting current-time dependence. The magnitude of the current is directly proportional to the concentration of chlorine in the test sample.

ChloroSense HR sensors have two working electrodes, one that measures free chlorine and one that measures total chlorine. The voltage has been selected so that free and total chlorine can be measured simultaneously.

Once the sensor is inserted, the analysis is fully automatic and operator independent. The ChloroSense HR precisely controls the sensor cycle, capturing and collating thousands of signal readings. The processor interprets these readings to identify free and total chlorine, and determines the concentration. The instrument display gives a direct reading of the test result in mg/L.

No user calibration is required, because each sensor batch is assigned a calibration code during manufacture. This code is used to construct a calibration curve that matches the sensor batch. A pre-programmed, plug-in calibration chip is provided with each pack of sensors to automatically enter the calibration code into the instrument.

System Performance Characteristics

	Free Chlorine	Total Chlorine	Temperature
Analysis Time	1 minute	1 minute	1 minute
Range	0.1 mg/L to 25.0 mg/L	1.0 mg/L to 500 mg/L	0 °C to 100 °C*
Display Resolution	0.01 from 0.1 mg/L to 1.0 mg/L 0.1 from 1.0 mg/L	0.1 from 1.0 mg/L to 100 mg/L 1 from 100 mg/L	0.1°C
Precision @ 10 °C	≤ 2.0 mg/L @ 20.0 mg/L	≤ 10.0 mg/L @ 200 mg/L	0.5°C
Sample Temperature	5°C to 25°C	5°C to 30°C	N/A

*The temperature probe measures beyond the sensor operating range.

If the sample concentration is out of range the instrument will display "<0.1mg/l" or ">25mg/l" (Free) or "<1mg/l" or ">500mg/l" (Total).

If the sample is above or below the temperature range, the instrument will display ">T" or "<T".

General Information

Instrument Type	Fixed voltage bipotentiostat
Display	Backlit, graphical LCD (42 x 22 mm), with two language options and direct-reading of results in mg/L
User Selectable options	Set time and date, date format, display language, reset sample number and temperature units.
Data Logging	Stores 500 previous readings and offers prompts when the instrument has only 20 storage spaces left.
Interface	Waterproof USB connection to PC
Powered	4 x 1.5v 'AA' alkaline batteries. Battery power saving system with auto switch-off after 5 minutes. Powered via USB port when connected to computer
Size	Instrument only 170 x 126 x 116 mm
Weight	975g (including batteries)

Technical Specification – Sensors

Sensor Type	Disposable, single-use, chronoamperometric sensor
Calibration	Pre-calibrated during manufacture
Packaging	Individually packed in sealed foil
Sensor Storage Life	2 years
Sensor Storage Temperature	< 4° C (39° F) for over 1 year < 20° C (68° F) for less than 1 year

Calibration Check Standards

Only Palintest ChloroSense HR check standards (CS182) can be used with this instrument.

Guarantee

The Palintest ChloroSense HR is guaranteed for a period of 2 years from the date of purchase. This excludes accidental damage or damage caused by unauthorised repair or misuse. Should repair be necessary, contact our Sales Department quoting the serial number shown on the instrument label. This guarantee does not affect statutory rights.

Power Supply

The ChloroSense HR operates on alkaline batteries. The instrument features an automatic battery condition check as part of the analysis cycle. If the batteries need replacing a 'Low Battery' warning message appears. The message can be cleared by pressing enter.

When the Low Battery warning appears the instrument continues to function correctly for several tests, but the batteries should be replaced as soon as possible.

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

Insert the battery pack in the base of the instrument, and replace the battery compartment cover. Tighten the screws in diagonal pairs to ensure waterproof fit. Use 4 x 1.5v 'AA' alkaline cells (type MN1500, LR6, E91 and AM3 or equivalent).

To avoid corrosion damage through leakage, remove batteries from the instrument if it is to be stored or left unused for a long period of time.

Reordering Information

Code	Description
CS800	ChloroSense HR Instrument with Pack of 100 Sensors and Calibration Chip
CS810	Pack of 100 Replacement ChloroSense HR Sensors with Calibration Chip
CS182	ChloroSense HR Check Standards Kit
CS850	Pack of 500 Replacement ChloroSense HR Sensors with Calibration Chip
CS160	Pack of 20 Contact Drying Sticks
PT747	USB Data Cable
PT677	Screwdriver (for Battery Compartment)
PT540	Sample Vessel
PT512	Palintest Dilution Tube
PT369	10 mL syringe

For further information and support, get in touch with a member of our team:

Palintest Australia
1/53 Lorraine Street
Peakhurst Business Centre
Peakhurst, NSW 2210
Australia

+61 1300 13 15 16
palintest@palintest.com.au

Palintest China
Room 1711, Fanli Mansion
22 Chaowai Street
Chaoyang District
Beijing 100020, PRC

+86 10 6588 6200
china@palintest.com

Palintest UK (HQ)
Palintest House
Kingsway, Team Valley, Gateshead
Tyne & Wear NE11 0NS, England

+44 (0) 191 491 0808
sales@palintest.com

Palintest USA
400 Corporate Circle
Suite J, Golden
CO 80401 USA

+1720-221-6878
info@palintestusa.com

Palintest

Water Analysis Technologies

A HALMA COMPANY

www.palintest.com