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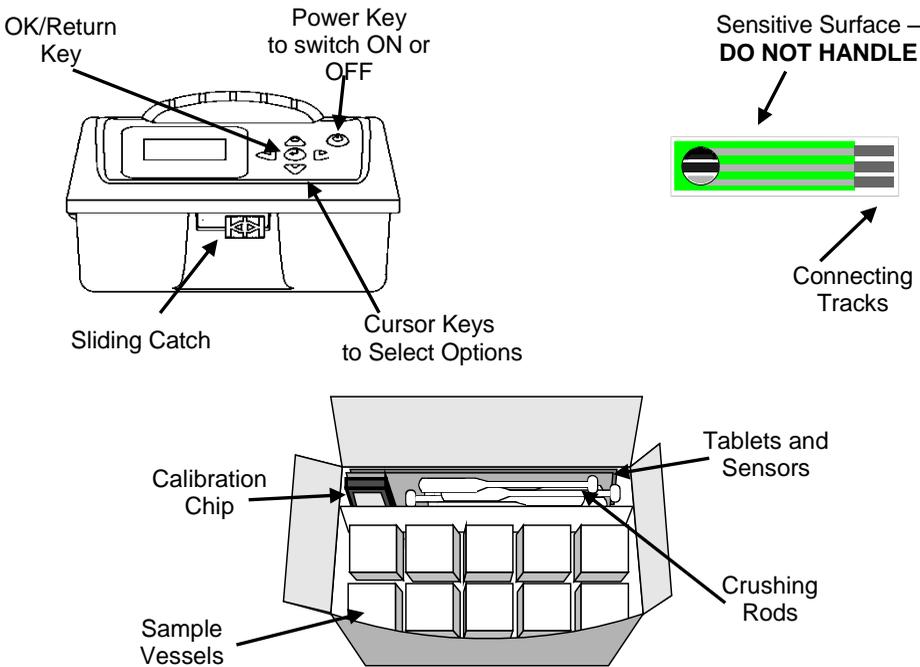
## INTRODUCTION

The Palintest Scanning Analyzer is a precision instrument used with unique pre-calibrated disposable sensors. It offers a simple method of analyzing for lead or copper.

The instrument is lightweight and portable for field or laboratory use. It is extremely simple to use, with a large, clear, backlit results display.

Once linked to a PC through the USB interface, a stored log of up to 500 tests may be accessed.

## Diagram of Kit, Instrument and Sensor



## Use of Sensor

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

## INSTRUMENT OPERATION

The Scanning Analyzer automatically engages with the computer when connected to it via its USB port. This allows the user to view the log of results on their PC.

To perform a test the unit should be battery powered and not connected to a PC.

### Testing the Sample

#### *Instrument Start Up*

- 1 Press and hold the power button (⏻) until the title screen is displayed.
- 2 When the instrument passes all internal functional checks on start up, the screen displays the current calibration code and prompts the user to insert a sensor.
  - Ensure the calibration code shown on screen matches with the number on the box of sensors in use.
  - When the instrument is first turned on, the test that is currently selected is displayed on the screen, eg Lead in Water.

To enter a new calibration code, see Page 8 for further instructions.

To change the test, see Page 9 for further instructions.

If start up fails, an error message is displayed.

**Palintest**  

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**SA1100**  
**SCANNING ANALYZER**

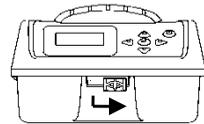
**Insert  
Sensor**  

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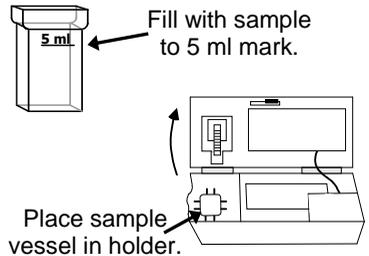
**Lead in Water**  
**113-753-22**

## Performing a Test

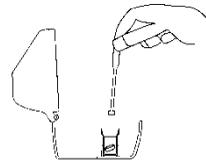
- 1 Slide the front catch all the way to the right, and open the instrument case fully.



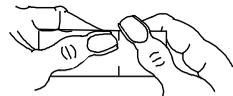
- 2 Rinse the sample vessel and then fill to the 5 ml line with the sample. Place the sample vessel in its position within the instrument.



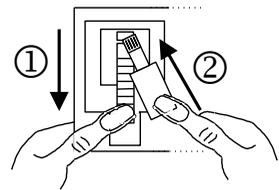
- 3 Add one Soluprep SP-A tablet to the sample, crush with the crushing rod and stir to dissolve. When the tablet is dissolved the sample is prepared for the test.



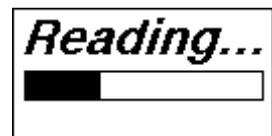
- 4 Tear open the foil along the indicating marks, in the manner shown. Holding the sensor through the foil pack, expose the connecting tracks.



- 5 Press the blue lever to open the jaws of the sensor connector. Insert the exposed end of the sensor, connecting tracks uppermost, into the slot, and release the lever. The jaws will close to hold the sensor in place. Slide the foil pouch off to expose the sensor.



- 6 **Gently** close the instrument lid to immerse the sensor in the sample. The test starts automatically. **Do not disturb the instrument during the test.**



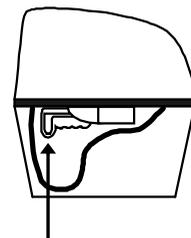
- 7 After three minutes, the lead or copper result will be displayed. If the concentration of copper is >500 µg/L, the result will be displayed after 30 seconds. Press the down arrow to scroll through 'Date and Time and Sample Number'. All results are automatically stored to the instrument log.

**36**  
**µg/L Lead**  
← Read Sample →

- 8 After completion of the test DO NOT OPEN THE INSTRUMENT. The sensor must be released into the sample vessel while the instrument lid is closed - push up on the lever located within the left-hand side of the instrument - *accessible without opening the lid*. Once the sensor has been released, open the instrument lid and cap the sample vessel with the used sensor still inside.

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

***The sensor contains mercury and therefore must be disposed of as per state or national/regional laws.***



Using forefinger on left-hand, push lever upwards to release sensor into the sample vessel.

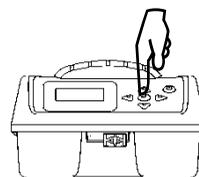
- 9 Press  key to carry out a new test or new calibration.

If no key is pressed within five minutes, the instrument automatically switches off to save power.

- 10 To scroll through all the previous readings, use the left/right keys when on the results screen.

- 11 The following symbols will appear if the result is out of range :-

- > Higher than test range
- < Lower than limit of detection



### ***Stored Samples***

Stored samples are usually treated with nitric acid (to 0.15%) to ensure metals remain in solution.

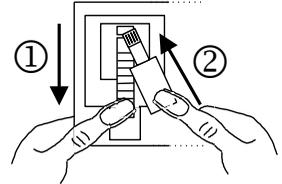
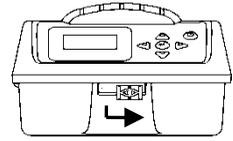
If samples have been acidified, they should be neutralized before analysis. A Neutralisation Pack (PT 429) is available as an optional extra.

### ***Getting the Best Results***

- 1 Handle the sensors with care.
- 2 Place the instrument on a flat surface free from vibration.
- 3 Do not disturb the instrument or sample during the test.
- 4 The sensor response is most accurate and precise when sample temperature is in the range of 20 – 25°C.
- 5 Use a fresh sample vessel and clean crushing rod for each test.
- 6 Ensure the correct Soluprep tablet is used for the test and is completely dissolved before starting the test.

## Entry of New Calibration Code

- 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 revealed. Release the blue lever.
- 3 Close the instrument lid and view the display. Check the new calibration code displayed on screen matches the number on the sensor box. A test can now be performed.
- 4 If the calibration procedure was unsuccessful, an error message will be displayed. Steps 1 – 3 should be repeated, if the chip will still not calibrate, contact Palintest technical enquiries for further information.
- 5 Remove the calibration chip.  
NB: The instrument stores separate calibration values for each type of sensor. If a Copper in Water calibration chip is inserted while the instrument is set to read Lead in Water, then the instrument will store this value to use for Copper in Water tests, but will continue to use the previously stored calibration for Lead in Water.



**Lead in Water**  
**113-753-22**

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**Lead in Water**  
**Failed**

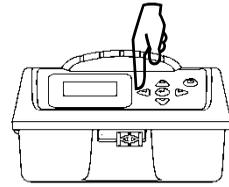
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**113-753-22**

## Optional Settings and Data Handling

### Enter SET-UP Mode

- 1 To engage the system menu, turn the unit on and press the left hand side arrow on the front of the unit.
- 2 Scroll through the menu of options using the  $\Delta$   $\nabla$  keys and press  $\leftarrow$  to select.
- 3 To exit the system menu, select the left hand side arrow when the system menu screen is displayed.



**Choose a Test  
Language  
Clear Log  
Sample Number**

### Selectable Options

#### Choose a Test

There are two tests available on the SA1100:

Press  $\leftarrow$  to show the tests.

Scroll  $\Delta$   $\nabla$  to highlight the required test.

Press  $\leftarrow$  to select and return to the options list.

**Lead in Water  
Copper in Water**

#### Language

Press  $\leftarrow$  to show the available languages. Scroll  $\Delta$   $\nabla$  to highlight the required language. Press  $\leftarrow$  to select and return to the options list.

#### Clear Log

Press  $\leftarrow$  to select. Use  $\triangleleft$   $\triangleright$  keys to highlight [Yes] or [No].

Press  $\leftarrow$  to perform the action and return to the options list.

#### Sample Number

Press  $\leftarrow$  to select the sample number option. Use  $\triangleleft$   $\triangleright$  keys to highlight [On] or [Off].

Selecting 'On' will mean the sample number screen is displayed to the user before the test starts, allowing the user the option to manually adjust the sample number.

Press  to perform the action and return to the options list.

### ***Sample Increment***

Press  to select the sample increment option. Use   keys to highlight [On] or [Off].

Selecting 'On' will mean the sample number is automatically allocated as the next sequential number in the data log.

Press  to perform the action and return to the options list.

### ***Set Time***

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

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

### ***Set Date***

Press  to edit the displayed date. Use the   keys to increment/decrement the highlighted number. Use the   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 UK or US date format. Use the   keys to highlight either DD/MM/YYYY or MM/DD/YYYY.

Press  to select and return to options list.

### ***Serial Number***

Press  to view the instrument serial number.

Press  to return to the options list.

## **Error Messages**

The Scanning Analyzer features an error detection system to guide the user. After correcting each error, press  key to reset the instrument. Always use a fresh portion of sample if a sensor has been immersed in the water sample.

<b>Error</b>	<b>Action</b>
Unable to read: Sensor damaged	Remove sensor and discard before trying a new sensor.
Unable to read: Check sensors and contacts	1) Remove and discard wet sensor. Dry the contacts (see below) 2) Remove calibration chip.
Error: Sensor disconnected	Remove sensor and discard before trying a new sensor.
Lid opened during test	Remove the sensor. Press  key and start again with fresh sample and sensor.
F01, F02...F30, etc	These errors are indicating a fundamental error with the electronic check chip. Ensure the chip is inserted correctly and re-try. If this still fails, contact the Palintest technical department.

The instrument is fitted with integral electrical connectors for insertion of the sensors. If the contacts accidentally become wet, open the jaws with the blue lever and insert a Palintest Contact Drying Stick (CS 160). Wait a few seconds until it absorbs the water, then remove and insert the opposite end to check the contacts are dry. A dry 'Contact Drying Stick' may also be used to clean the contacts.

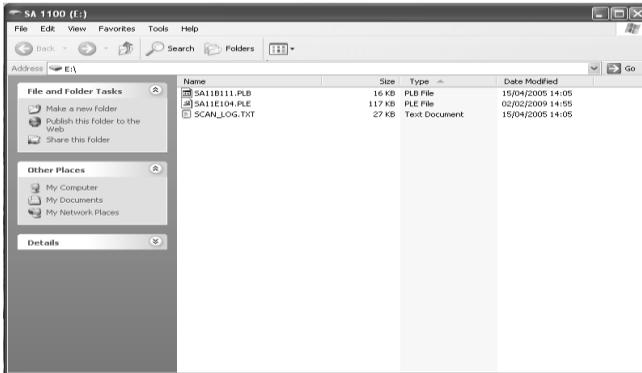
## COMPUTER INTERFACE

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

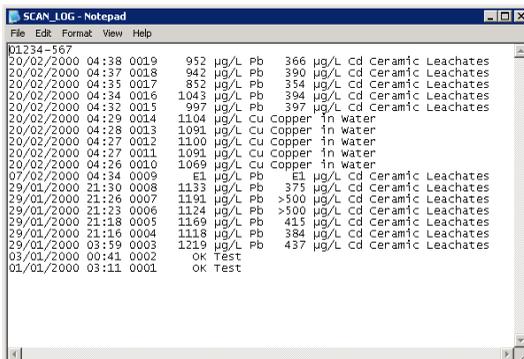
When the Scanning Analyzer is connected to a PC, it behaves like a removable hard drive or USB memory stick.

### Data Access

- 1 Connect the Scanning Analyzer to a PC using a 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, SCAN\_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 :-



- 7 The results stored in the instrument memory can be deleted in either of two ways – either delete the log file on the hard drive window that is shown by the PC, or use the instrument Set-Up mode as shown on Page 8.
- 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 Scanning Analyzer may be upgraded. Files will be available by e-mail or on the Palintest website :-

- 1 Connect the Scanning Analyzer to a PC using a USB cable.
- 2 Press and hold the  key until the title screen appears. Release the  key.
- 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 Scanning Analyzer. The instrument will re-start to run the new software.
- 6 When upgrading the PLB. file, the instrument should be turned off and then back on again in order for the new software to take effect.

Any logged data will be retained during this upgrade.

## TECHNICAL INFORMATION

### Operating Principle

The Palintest Scanning Analyzer is an electro-chemical device that utilises the analytical technique of anodic stripping voltammetry. It can be divided into the plating phase and the scanning phase.

The plating phase begins as soon as the electrode is immersed in the sample. A voltage is applied to the electrode that induces a small electric current to pass through the sample. The dissolved metal ions are deposited onto the electrode surface. Once the plating phase is complete, the scanning phase commences. The Scanning Analyzer applies an increasing reverse voltage to the electrode to strip off the deposited metals. Each metal is stripped from the electrode in a defined order and at a precisely known voltage, thus metals are separated and identified.

The Scanning Analyzer controls the voltage cycle, and captures and collates thousands of signal readings. The processor interprets these readings to identify the specified metal and determines its exact concentration. The instrument display gives a direct reading of the test result.

No user calibration is required because each electrode batch is meticulously checked during manufacture and assigned a calibration code. This code is used to construct a calibration curve that exactly 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

	LEAD	COPPER
<b>Analysis Time</b>	3 minutes	30s or 3 minutes
<b>Precision Range</b>	2 – 100 µg/l	50 – 2000 µg/l
<b>Resolution</b>	1 µg/l	1 µg/l
<b>Sample Temperature</b>	15 - 30°C	15 - 30°C

### Unit Conversions

To convert µg/l (parts per billion, ppb) into mg/l (parts per million, ppm) :-

$$\text{Result in } \mu\text{g/l} / 1000 = \text{Result in mg/l}$$

## GENERAL INFORMATION

### Technical Specification – Instrument

Instrument Type	Fixed voltage potentiostat
Display	Backlit, graphical LCD (42 x 22 mm), with six language options and direct-reading of results in $\mu\text{g/l}$
User Selectable Options	Set time and date, date format, display language and reset sample number
Data Logging	Stores 500 previous readings and offers prompts when 40 and 20 left
Interface	Waterproof USB connection to PC
Power	4 x 1.5v 'AA' alkaline batteries. Battery power saving system with auto switch-off after five minutes. Powered via USB port when connected to computer
Size	Instrument only 170 x 126 x 116 mm
Weight	975g

### Technical Specification – Sensors

Sensor Type	Disposable, single-use sensor
Calibration	Pre-calibrated during manufacture
Packaging	Individually packed in sealed foil
Storage Life	18 months
Storage Temperature	2°C – 30°C (35°F – 86°F)

### Calibration Check Standards

For help with the preparation of standard solutions in order to enable full testing of the instrument, please contact Palintest Technical Queries Department.

To use the electronic check standards, please follow the instructions included in the kit.

## **Power Supply**

The Scanning Analyzer is designed to operate on alkaline batteries. If the batteries require replacement a 'Low Battery' warning message appears. The message can be cleared by pressing . The instrument continues to function correctly for several tests, but 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 carry out a test.

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

Insert the battery pack into the base of the instrument, replace the battery compartment cover. Tighten the screws in diagonal pairs to ensure water-proof 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.

## **CARE AND MAINTENANCE**

The Scanning Analyzer is designed to give long and trouble-free operation. The instrument is suitable for both laboratory and field use.

On no account should solvents or abrasive materials be used to clean the instrument.

### **Guarantee**

The Palintest Scanning Analyzer is guaranteed 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 our Technical Services Department quoting the serial number shown on the instrument label. This guarantee does not affect statutory rights.

## Reordering Information

<b>Part Code</b>	<b>Product Description</b>
PT 435	Lead Sensors x10
PT 436	Copper Sensors x10
PT 429	Neutralisation Pack
CS 160	Contact Drying Sticks
CS 640	Instrument Check Chip

## **CONTACT INFORMATION**

### **Palintest Limited**

Palintest House, Kingsway, Team Valley, Gateshead, Tyne & Wear, NE11 0NS, England  
Tel: 0191 491 0808  
Fax: 0191 482 5372  
E-mail: [palintest@palintest.com](mailto:palintest@palintest.com)  
Website: [www.palintest.com](http://www.palintest.com)

### **Palintest USA**

1455 Jamike Avenue (Suite 100), Erlanger, Kentucky, 41018 USA  
Tel: (859) 341 7423  
Fax: (859) 341 2106  
E-mail: [info@palintestusa.com](mailto:info@palintestusa.com)  
Website: [www.palintestusa.com](http://www.palintestusa.com)

### **Palintest Australia**

Unit 1/53, Lorraine Street, Peakhurst, NSW 2210, Australia  
Tel: (02) 9153 8890  
Priority Tel: 1300 13 15 16  
Fax: (02) 9153 8894  
Priority Fax: 1300 13 19 86  
E-mail: [palintest@palintest.com.au](mailto:palintest@palintest.com.au)  
Website: [www.palintest.com.au](http://www.palintest.com.au)

### **Palintest China**

Room 1711, Fanli Mansion, 22 Chaowai Street, Chaoyang District, Beijing 100020 PRC  
电话 : 86-10-51261868-809  
传真 : 86-10-82626620  
E-mail: [china@palintest.com](mailto:china@palintest.com)  
Website: [www.palintest.cn](http://www.palintest.cn)