# Operator Instruction Manual

## EC 2000 Pt-Co

## Lovibond® Water Testing and Colour Measurement

LM162010 Version 1.1

# Table of Contents


Environment:.....4

Introduction:.....5

Keypad:.....6

Display Icons:.....6

Power- USB:.....6

Power- Battery:.....6

Firmware and Version Number:.....7

Settings.....8

- Instrument Diagnostics.....8
- Instrument Settings.....9
- Information.....11
- Power Saving Settings.....11
- Regional Settings.....12
- Date and Time.....12

Projects:.....13

- New Projects.....13
- Set Tolerances.....14
- Averaging and Automatic Log (automatic saving).....15
- Edit a Project.....16
- Delete a Project.....16
- Make a Project Default.....17
- Make a Project Current.....18
- View the Measurements.....18
- Delete a Measurement.....18

Save a Measurement (manual saving) ..... 19
Error Warnings: ..... 20
Updating the firmware: ..... 21
EC 2000 Kit Contents – Pt-Co: ..... 23
EC 2000 Technical Data – Pt-Co ..... 24
Performing a Zero – Pt-Co: ..... 25
Performing a Test - Pt-Co: ..... 26
Performing an Instrument Validation – Pt-Co: ..... 28
Performing an Instrument Validation using a Glass Standard – Pt-Co: ..... 31
Sales Offices ..... 33

## Environment:

This appliance is marked according to the European Directive 2002/95/EC on the waste of Electrical and Electronic Equipment (WEEE). By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product.

Lovibond

# DECLARATION OF CONFORMITY

The Tintometer Limited, declare that the stated product(s) below conform to the following directives/standards:

**DIRECTIVES**
89/336/EEC, 92/31/EEC
73/23/EEC, 93/68/EEC

**TEST SPECIFICATIONS**
EN 61326 - 2-1:2013, EN 301489 – 17 v2.2.2 using the common Technical requirements of EN 61326-1:2013 & EN301489-1 v1.9.2

FCC Rules CFR 47:2013 Part 15.107 and 15.109 Class B

**TESTS CARRIED OUT**
Radiated RF & Conducted RF Emissions, Harmonic Current Emissions, Voltage Fluctuation & Flicker, Radiated and Conducted RF Immunity, Electrostatic Discharge Immunity, Electrical Fast Transient Burst Immunity, Voltage Surge Immunity Voltage Dips and Interruptions

**TYPE OF EQUIPMENT**
Colorimeter

**MODEL(S)**

Date: 15th December 2014

N Barnes
(Technical Manager)
On behalf of The Tintometer Ltd

Registered Office:
The Tintometer Limited · Lovibond House · Solar Way · Solstice Park · Amesbury SP4 7SZ · UK
Registered in England No: 45024
Tel: +44(0)1980 664800 Fax: +44(0)1980 625412
Email: sales@tintometer.com Internet: www.tintometer.com
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# Introduction:

The Lovibond® EComparator Series provides an easy way to transition from subjective visual measurement to a non-subjective, accurate electronic measurement.

Colour graders who are used to the traditional comparator series sometimes find the upgrade or transition to an electronic system daunting. The assurance of relying on physical colour difference is diminished.

With the EComparator Series, users can view the colour in two different ways:

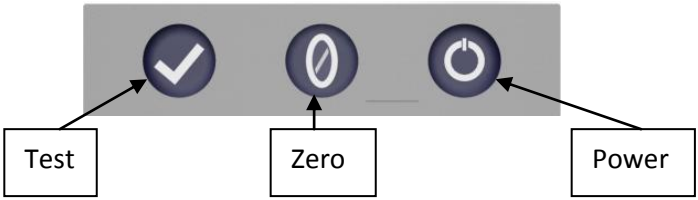
On-Screen Numerical Display

On-Screen Colour Display of sample and nearest colour scale standards

Touch screen technology allows the EComparator Series to show simple, specific and intuitive menus on screen. Users can set language, date and time, view preferences and create projects with individual tolerance settings. An on-screen warning system of:
Within Tolerance = Green;
Outside Tolerance = Red;
On Border of Tolerance = Amber
provides the user with immediate information on the sample.

The user friendly ergonomics and intuitive interface guarantee new users can be quickly trained and easily supported. Large data storage (> 20,000 readings), USB connectivity ensure readings can be stored and shared easily and quickly. Flexibility is further enhanced with software packages for Windows®, IOS® and Android™ with multiple language support on-screen.

## Keypad:

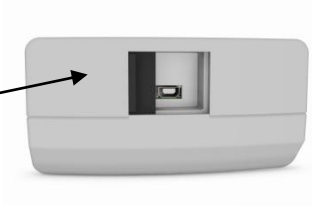



## Display Icons:

| Icon | Function |
|---|---|
| | Battery Low |
| | Powered by Battery |
| | Powered by USB |
| | SD Card OK |
| | Warning |

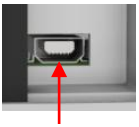
## Power- USB:

The USB port can be accessed by sliding the panel at the rear of the instrument.



Top of Instrument

Ensure the cable connector is inserted into the socket in the correct orientation. The symbol on the USB connector should be facing down.



Top of Connector

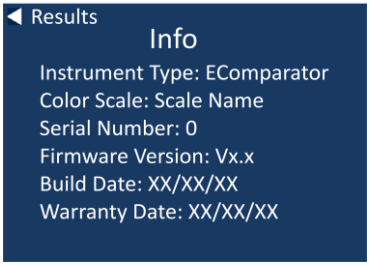
## Power- Battery:

The batteries can be replaced by removing the 4 x screws at the back of the instrument and removing the battery cover.

# Firmware and Version Number:

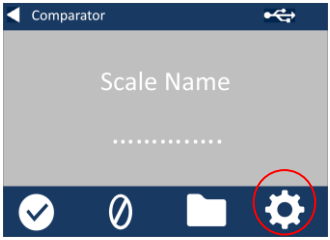
The Firmware and Version Number will be displayed when the instrument is switched on.

(Please Note: “Scale Name” will be replaced by the Scale your EComparator measures).



# Settings

1 - To enter the settings menu, press the settings icon at the bottom tool bar.

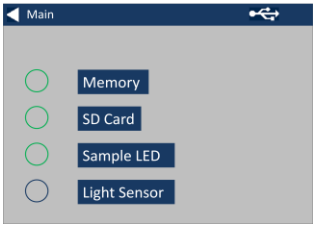



1a -The settings display will show.

## Instrument Diagnostics

2 - For Instrument Diagnostics, press the Diagnostics Icon.

2a - The instrument will perform diagnostics on the Memory, SD Card, LED and Light Sensor.

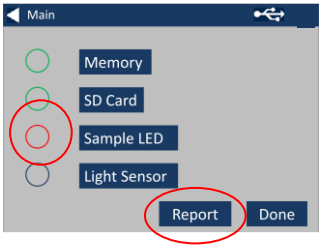



2b - Any errors will be shown in red.

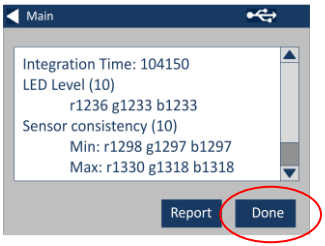
To view detailed information select Report.

Please contact you local service centre for help.

www.lovibondcolour.com/ServiceCenter



2c - The instrument will display the report. When finished, select Done.

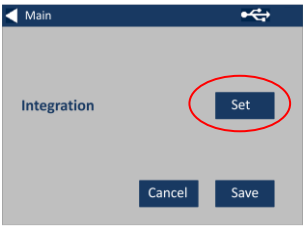



## Instrument Settings

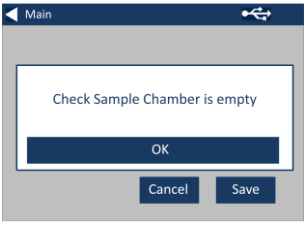
3 - For Instrument Settings, press the Instrument Icon

3a – To set the integration time, ensure the sample chamber is empty, and then press Set.

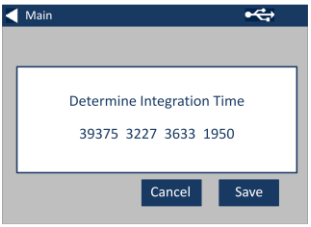
(This will set the optimum time for taking a measurement).



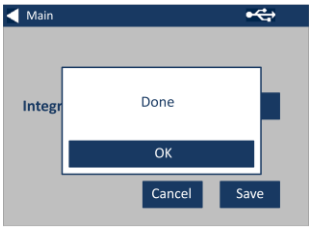

3b– The instrument will advise to check the Sample Chamber. Press OK when empty.




3c – The instrument will determine the integration time, a series of numbers will appear on the screen.

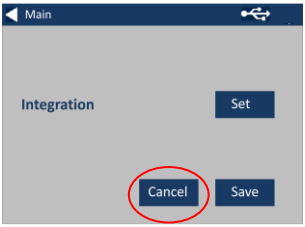


3d – Click OK when complete.

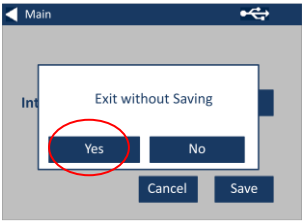



3e - To save the settings, press Save.

3f - To cancel the settings, press Cancel.



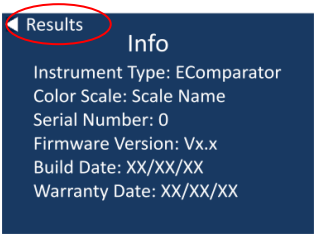

3g – To exit without saving, press Yes, or press No to continue.



## Information

4a – The information screen will be displayed. Press the back arrow to return to the results screen.

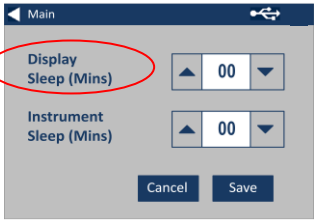
(Please Note: “Scale Name” will be replaced by the Scale your EComparator measures).




## Power Saving Settings

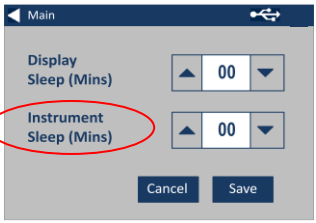
5 - For Power Saving Settings, press the Power Icon.

5a – Press the up and down arrows to adjust the time interval before the display goes to sleep in minute increments.

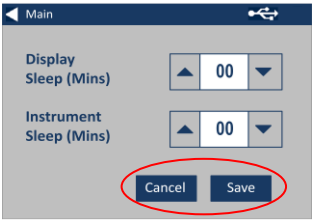



5b – Press the up and down arrows to set the time interbal before the instrument shuts down after being inactive.

To restart the instrument, press the power button.




5c - To save the settings, press Save, or to cancel the changes, press Cancel.




5d- If screen starts to dim, press anywhere on the screen to turn backlight on.

## Regional Settings

6 - For Regional Settings, press the Regional Icon.

6a - Select the language that you would like the instrument to display.

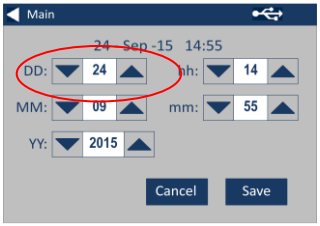
The instrument will return to the settings screen.

## Date and Time

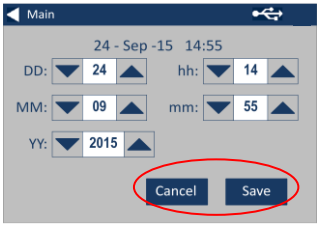
7 - To set the Date and Time, press the Clock Icon.

The current time shown is the time the screen was opened, and does not continuously update.

7a – Use the up and down arrows to set the date and time.

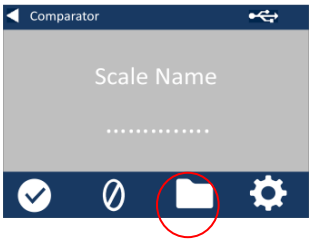



7b - To save the settings, press Save, or to cancel the changes, press Cancel.

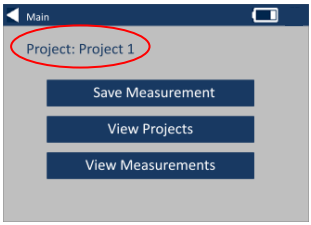


# Projects:

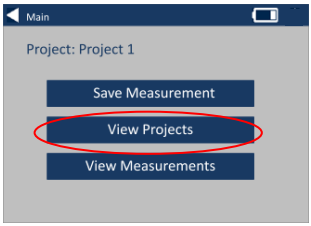
1 - To enter the projects menu, press the Projects Icon on the bottom tool bar.




2 – The projects screen will be displayed. The Project named at the top is the current project.

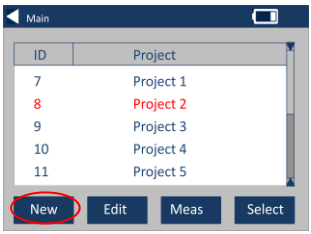



3 – To view, or manage projects, click on View Projects.

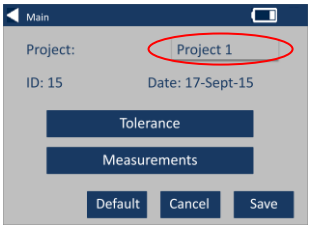



## New Projects

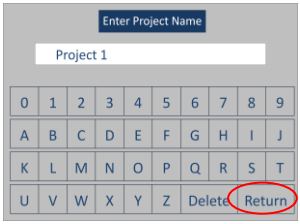
4 – This will bring up a list of the current projects. To create a New Project, click on New.




5 – To change the name, select the name box.

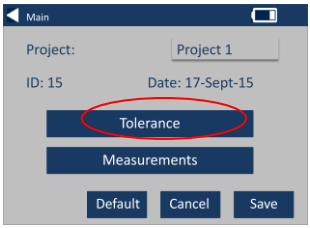


6 – Enter the new project name using the keypad, then select Return.

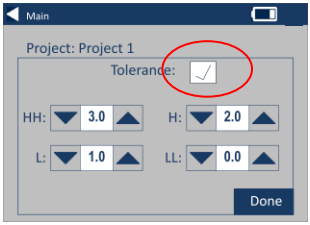



## Set Tolerances

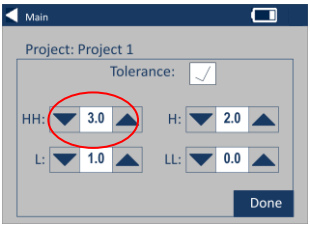
7 – The instrument will display the Project Settings Screen, to set the Tolerances, select Tolerance.

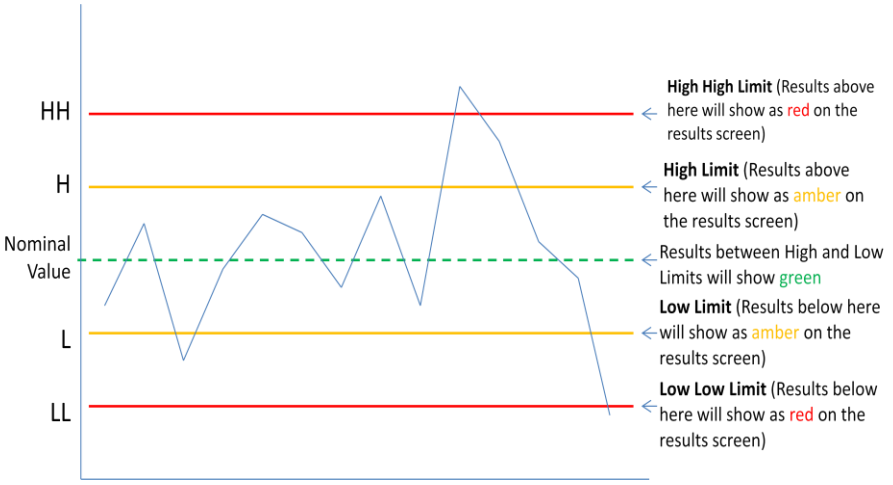



8 – To apply the tolerance limits, select the Tolerance checkbox.



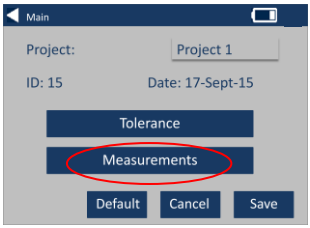

9 – To change the tolerance values, use the appropriate up and down arrows. Select Done when complete.





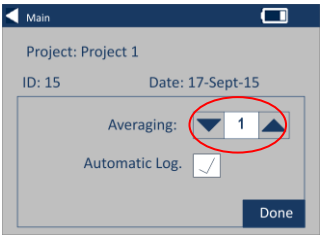

## Averaging and Automatic Log (automatic saving)

10 – To change the Averaging and Automatic Log (automatic saving), select Measurements.

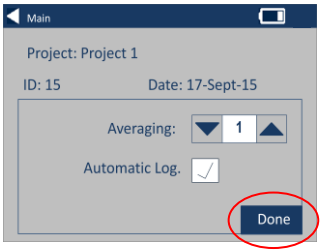



11 – To change the Averaging, use the up and down arrows

(This will set the number of measurements taken per test then take an average of those measurements).

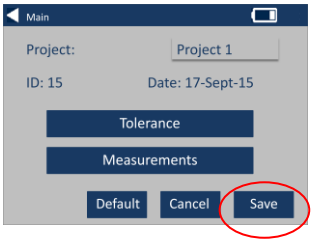



12 – To set the automatic logging, select the Automatic Log checkbox. This will save every measurement that is taken. Select Done when complete.



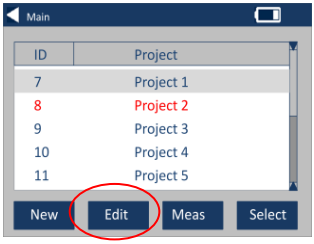
13 – To save all the settings, select Save.

NOTE: Until save is selected, neither Tolerance nor Measurements are saved.

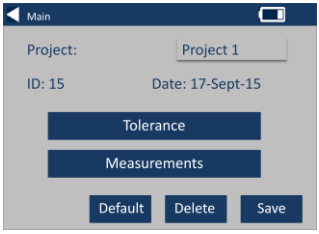



## Edit a Project

14 – To edit a project, go to the projects list. Highlight the project by clicking on it, and then select Edit.

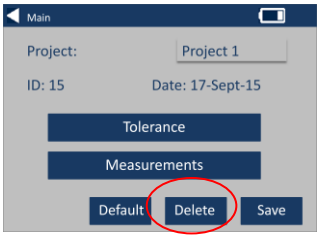



15 – This will bring you to the Project Settings Screen. To make changes follow steps 6-12.

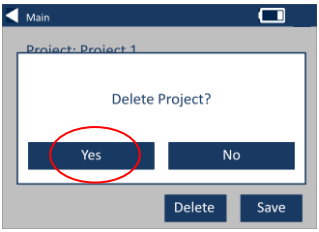



## Delete a Project

16 – To delete the project, select Delete.

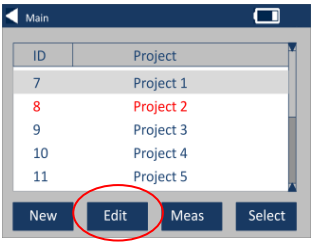


17 – The following prompt will appear. Select Yes to confirm.

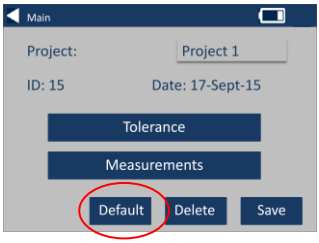



## Make a Project Default

18 – To make a project Default, go to the projects list (this will highlight the project that is current when the instrument is switched on). Highlight the project and select Edit.

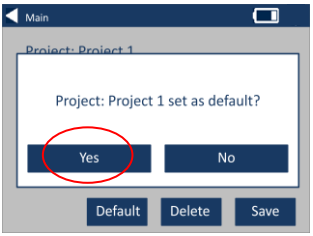



19 – Select Default.



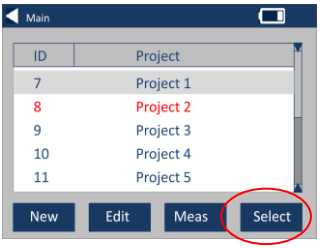

20 – The following prompt will appear. Select Yes to confirm.

**NOTE:** The first project (ID 1) can not be deleted, but can be re-named.



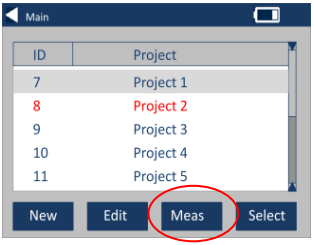
## Make a Project Current

21 – To make a project current, go to the project list, highlight the project required then press Select. All readings will be saved into the current project.

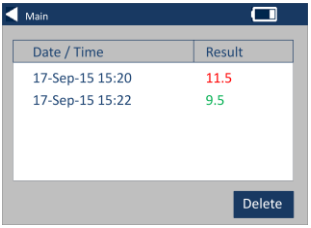



## View the Measurements

22 – To view the measurements of a project, go to the projects list, highlight the project required then press Meas.

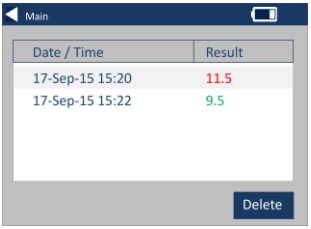



23 – This will bring up a list of the measurements stored for this project. If the tolerance limits are switched on (step 7), the results will be displayed as in the tolerance column (see page 15)

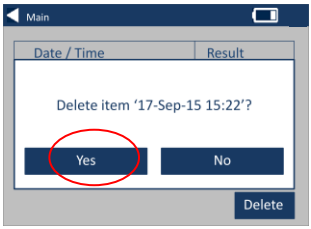



## Delete a Measurement

24 – To delete a measurement, highlight the measurement then select Delete.



25 – The following prompt will appear. Select Yes to confirm.

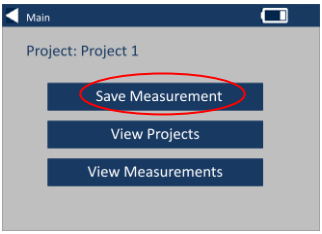



26 – To view the measurements from the main project screen for the current project (named at the top of the screen), select View Measurements.

## Save a Measurement (manual saving)

27 – If automatic saving is not enabled, you can **save** every measurement taken by selecting Projects.

28 – On the main projects screen, select Save Measurement. This will save to the current project.



# Error Warnings:

| Warning | Description |
|---|---|
| Error 1 | SD Card Error |
| Error 2 | Light Level Too High |
| Error 3 | Light Level Too Low |
| Error 4 | Sensor Error |
| Error 5 | File System Error |
| Error 6 | Communication Error |
| Error 7 | Keypad Error |
| Error 10 | Non Volatile Memory Error |

Please contact you local Service Centre for help:

www.lovibondcolour.com/ServiceCentre

# Updating the firmware:

The latest version of the EC 2000 and EC 3000 firmware can be obtained from the internet, [www.lovibondcolour.com](http://www.lovibondcolour.com)

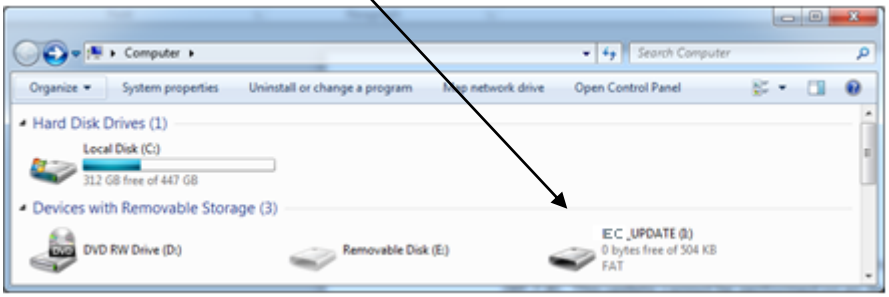
1 - Ensure that the EComparator Instrument is connected to a Computer running a Microsoft® Operating System (XP,7,8).

**NOTE: This update cannot be performed on an Apple Mac or Linux® system**

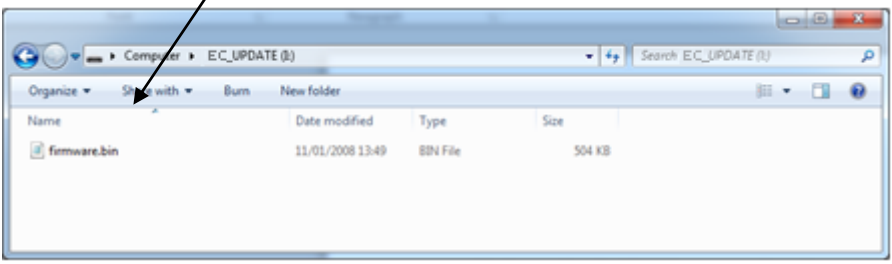
2 – Switch off the instrument.

3 – Press and hold down the test key on the keypad whilst switching on the EComparator Series instrument.

4 – A drive named “EC_UPDATE” will appear on your PC.

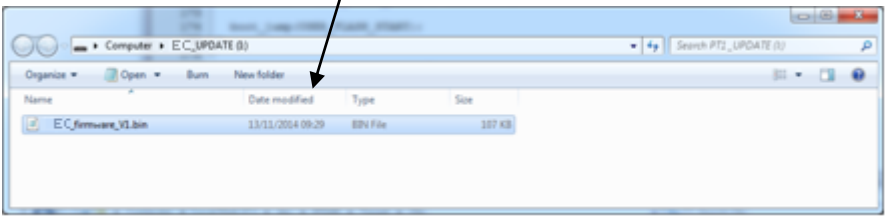


5 - Open the drive “EC_UPDATE” the contents of the drive will show a file named “firmware.bin”.



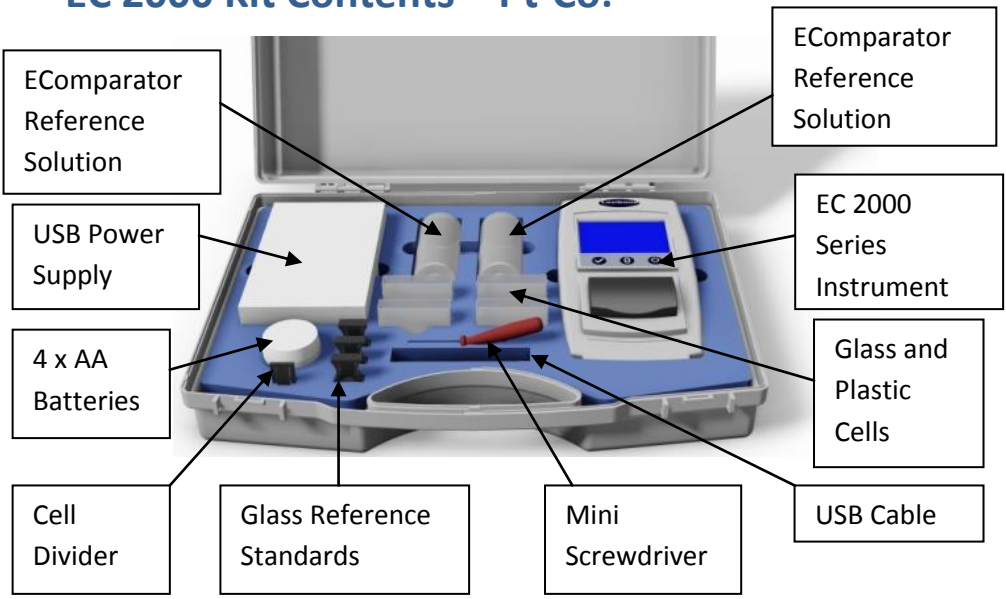

6 - Delete the file “firmware.bin”

7 - Now copy the Update File onto this drive.




8 - Switch OFF the Instrument and then switch back it ON. The instrument will restart with the updated firmware.

# EC 2000 Kit Contents – Pt-Co:




| Item | Included |
|---|---|
| | |
| **Instrument Type** | EC 2000 |
| **Power Supply** | • |
| **USB Cable** | • |
| **Screwdriver** | • |
| **Pot of 4x AA Batteries** | • |
| **Liquid Reference Standard 1** | • |
| **Liquid Reference Standard 2** | • |
| **Glass Cell** | • 1x W100 OG 50 mm |
| **Plastic Cell** | • 3x W100 50 mm |
| **Glass Reference Standard 1** | • |
| **Clear Glass Standard** | • |

- = Available in the kit

# EC 2000 Technical Data – Pt-Co

Often referred to as Pt-Co, Platinum-Cobalt, Hazen, APHA Colour or True Colour Units (TCU). All terms are interchangeable and equally valid. It is used to measure clear to dark amber liquids.

Originally defined by specified dilutions of a platinum-cobalt stock solution, ranging from **0** at the light end of the scale to **500** at the darkest.

Platinum Cobalt is used extensively in the water industry but also for clear oils, chemicals and petrochemicals such as glycerine, plasticisers, solvents, carbon tetrachloride and petroleum spirits

**Guaranteed Agreement with International Standards;** for many product types, a characteristic set of standards was agreed and adopted to aid colour control and the communication of colour specifications worldwide; the result is a selection of colour grading scales that have been adopted as international industry standards.

The EComparators are fully equivalent to the appropriate Visual International Standards and fully compliant with Automatic International Standards detailed below:

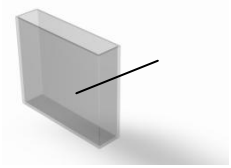
**EC 2000 Pt Co (ASTM D1209, D5386)** because in D5386 section 12 Precision and Bias a note is made *"Supporting Data are available from ASTM".* This is the data showing repeatability and reproducibility to Pt-Co standards. These values are much better than those in D1209. From this, data equivalency can be assumed.

| Parameter | Details |
|---|---|
| **Colour Scales** | Platinum Cobalt/Hazen/APHA/TCU |
| **Range** | 0 to 500 |
| **Resolution** | 1 Pt-Co Unit |
| **Repeatability** | ± 3% +1 Pt-Co Units |

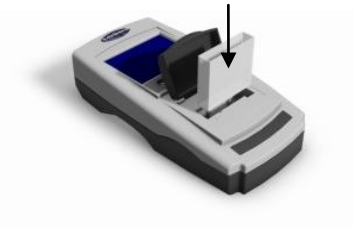
# Performing a Zero – Pt-Co:

1 – Once initiated, the instrument will display.

2 – Measuring Pt-Co
Fill a 50 mm cell 2/3 full with EC 2000 Pt-Co Zero Solution.



3 - Place the cell in the sample chamber of the EC 2000 Pt-Co, push to the left hand side.



4 - Close the sample lid and press the zero key on the keypad or the display.

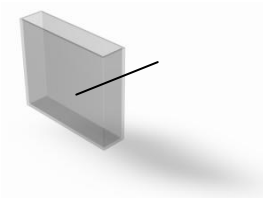
5 - While performing a zero, the instrument will display:

6 - When complete, the instrument will display:

# Performing a Test - Pt-Co:

**Note: Ensure that the sample being measured is free from turbidity; if necessary, filter the sample through a 0.45 micron filter paper.**

1 – Fill a clean Cell 2/3 full with the sample.

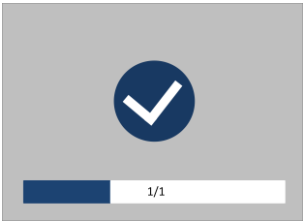


2 - Place the cell in the sample chamber of the EC 2000, push to the left hand side.

3 - Close the sample lid and press the test key on the keypad or the display.

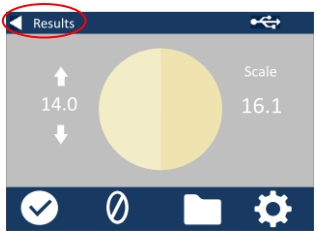
4 - While performing a test, the instrument will display:

5 – If averaging is set, the instrument will measure again and display:

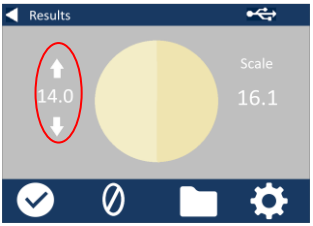


6 - The instrument will display the result as:

7 - Press the back arrow on the display to change between numeric and comparator mode.




8 - Press the up and down arrows to view the stages / steps as they would be on the visual disc.



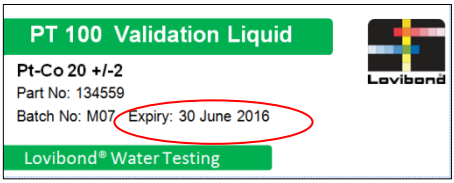
# Performing an Instrument Validation – Pt-Co:

The EC 2000 Pt-Co is supplied with two bottles of liquid.

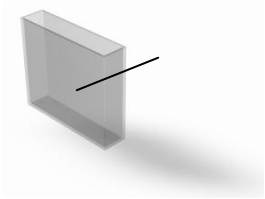
1) EC 2000 Pt-Co Zero and
2) EC 2000 Validation Liquid.

These liquids are used to validate that the instrument is measuring within the specified tolerances.

1 – Ensure that the Validation Liquid is within its expiry date.




2 – Fill a clean 50mm Cell 2/3 full with the EC 2000 Pt-Co Zero solution or fresh de-ionised water.



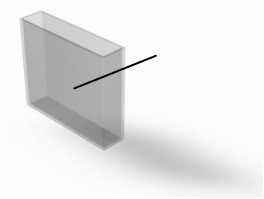
3 – Place the cell in the sample chamber of the EC 2000, push to the left hand side.

4 - Close the sample lid and press the zero key.

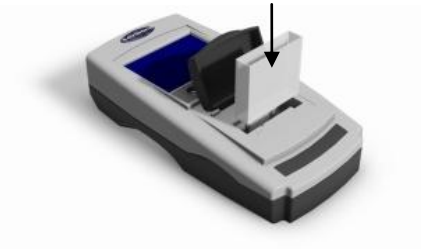
5 - While performing a zero, the instrument will display:

6 - When the zero operation has been completed, remove the cell from the instrument.

7 - Pour away the EC 2000 Zero solution in the cell then fill this Cell 2/3 full with the EC 2000 validation liquid.



**8 - With the cell in the same orientation as the when performing the zero,** place the cell into the sample chamber of the EC 2000, push to the left hand side.

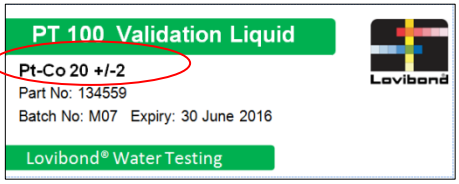


9 - Close the sample lid and press the test key.

10 - While performing a test, the instrument will display:

11 - The instrument will display the result.

12 - Compare the result from the instrument to the value on the label of the validation liquid, to check it is within the specified tolerances.



# Performing an Instrument Validation using a Glass Standard – Pt-Co:

1– Place the Clear Glass Verification Standard in the sample chamber on the right hand side.

2 – Press the zero key.

3 - While performing a zero, the instrument will display:

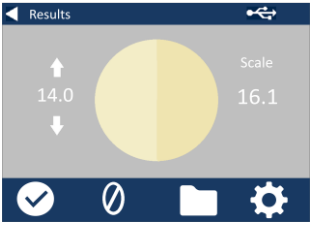
4 - When the zero operation has been completed, remove the Clear Glass Verification Standard from the instrument.

5– Place the selected standard in the sample chamber on the right hand side.

6– Press the test key on the keypad.

7– The result will be displayed on the screen. Compare these results to those on the label of the standard.

8- Press the back arrow on the display to change between numeric and comparator mode.



# Sales Offices

**Germany**
Tintometer GmbH
Lovibond® Water Testing
Schleefstraße 8-12
44287 Dortmund
Germany

Tel: +49 (0)231/94510-0
Fax: +49 (0)231/94510-20
Email: sales@tintometer.de

**United Kingdom**
The Tintometer Ltd
Lovibond House
Solar Way
Solstice Park
Amesbury SP4 7SZ

Tel: +44(0)1980 664800
Fax: +44(0) 1980 625412
Email: sales@tintometer.com

**North America**
Tintometer Inc
6456 Parkland Drive
Sarasota
Florida 34243
USA
Tel: +1 941 758 8671
Fax: +1 941 727 9654
Email: sales@tintometer.us

**South East Asia**
Tintometer South East Asia
Unit B-3-12-BBT One Boulevard,
Lebuh Baku Nilam 2, Bandar Bukit
Tinggi, Klang, 41200, Selangor D.E
MALAYSIA.
Tel: +60 (0) 3 3325 2285/6
Fax: +60 (0) 3 3325 2287
Email: lovibond.asia@tintometer.com

**Switzerland**
Tintometer AG
Hauptstraße 2
5212 Hausen AG
Switzerland

Tel: +41 (0)56/4422829
Fax: +41 (0)56/4424121
Email: info@tintometer.ch

**China**
Tintometer China
Room 1001, China Life Tower,
16 Chaoyangmenwai Avenue
Beijing 100020
China
Tel: +89 10 85251111 ext.330
Fax: +86 10 85251001
Email: chinaoffice@tintometer.com

**India**
Tintometer India Pvt. Ltd.
B-91, A.P.I.E. Sanath Nagar,
Hyderabad
500018
India
Tel: +91 (0) 40 4647 9911
Toll Free: 1 800 102 3891
Email: indiaoffice@tintometer.com

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