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User Guide

Elcometer 130

Salt Contamination Meter

CONTENTS

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For the avoidance of doubt, please refer to the original English language version.

The Elcometer 130 Model T meets the Radio and Telecommunications Terminal Equipment Directive. The Elcometer 130 Model S meets the Electromagnetic Compatibility Directive. This product is Class B, Group 1 ISM equipment according to CISPR 11. Class B product: Suitable for use in domestic establishments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes. Group 1 ISM product: A product in which there is intentionally generated and/or used conductively coupled radiofrequency energy which is necessary for the internal functioning of the equipment itself.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. The Elcometer 130 Model T complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. Elcometer 130 Model T: The FCC identifier and the Japanese radio law certification numbers can be located in the gauge's Regulatory screen found in the following menu structure Menu/About/Legal/Regulatory.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

Modifications not expressly approved by Elcometer Limited could void the user's authority to operate the equipment under FCC rules.

Elcometer 130 Model S: This Class B digital apparatus complies with Canadian ICES-003.

Elcometer 130 Model T: Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

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All other trademarks acknowledged.

Gauge Dimensions: 250 x 145 x 50mm (9.8 x 5.7 x 1.9"). Gauge Weight: 780g (1.72lb)

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1 GAUGE OVERVIEW & BOX CONTENTS

Gauge Overview

1 USB Data Output Socket (below cover)
2 On/Off Key
3 Multifunction Softkeys
4 LCD Display
5 Shoulder Strap Connection
6 Magnetic Safety Catch
7 Pressure Plate
8 Measurement Electrodes

Box Contents

- Elcometer 130 Salt Contamination Meter
- High Purity Test Papers (Box of 100)
- Bottle of Pure Water; 250ml (8fl oz)
- 3 x Syringes; 2.5ml (0.08fl oz)
- Sensor Wipes (Box of 72)
- 2 x Plastic Tweezers
- Disposable Vinyl Gloves; Box of 20
- PVC Self Seal Bags; Box of 20
- Shoulder Strap
- 1 x Screen Protector
- Transit Case
- 4 x AA Batteries
- USB Cable (Model T)
- ElcoMaster™ 2.0 Software (Model T)
- Test Certificate
- Calibration Certificate (if ordered)
- User Guide

2 USING THE GAUGE

		Model
a	Green LED	ST
b	Battery Life Indicator	ST
c	Bluetooth On	T
d	Auto Temperature Compensation On - °C / °F	T
e	Filter Paper Size - full, half, quarter	ST
f	Units of Measurement	ST
	Model S - µg/cm²	
	Model T - µg/cm², mg/m², ppm, µS/cm, mS/cm, % Salinity	
g	Calibration Offset On - offset value displayed	T
h	Menu Softkey	ST
i	Display Softkey	T
j	Batch Softkey	T

		Model
k	Timer Softkey - start, stop, reset	ST
	(Displayed when timer is enabled)	
l	Reading Value	ST
m	User Selectable Statistics - 4 rows	T
n	Batch Name (when in batching)	T
	Date & Time (when not in batching)	ST
o	Red LED - reading outside limit	T
p	Bar Graph - highest, lowest & average reading	T
q	Upper Limit On	T
r	Run Chart - last 20 readings	T
s	Batching On	T
t	Softkeys	ST
u	On / Off Key	ST

3 GETTING STARTED

3.1 SELECTING YOUR LANGUAGE

1 Press and hold the ON/OFF button until the Elcometer logo is displayed
2 Press Menu/Setup/Language and select your language using the ↑↓ softkeys
3 Follow the on screen menus

To access the language menu when in a foreign language:

1 Switch the gauge OFF
2 Press and hold the left softkey and switch the gauge ON
3 Select your language using the ↑↓ softkeys

3.2 SELECTING THE MEASUREMENT MODE (MODEL T)

The Elcometer 130 can be used to measure soluble salts (Model S & T) or conductivity (Model T).

To select the measurement mode (Model T), press Menu/Setup/Measurement Mode.

3.3 SELECTING THE MEASUREMENT UNITS (MODEL T)

Whilst the Elcometer 130 Model S provides readings in µg/cm^2, the Model T has a choice of measurement units:

Surface Cleanliness Mode:	µg/cm^{2†} or mg/m^2
Conductivity Mode:	µS/cm†, mS/cm, ppm or % Salinity

To select the measurement units (Model T), press Menu/Setup/Units.

† Default setting

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3.4 SELECTING THE FILTER PAPER SIZE (MODEL S & T)

The Elcometer 130 can be set to automatically detect the filter paper size in use or this can be manually selected by the user.

To select the paper size, press Menu/Setup/Filter Paper Size followed by “Full”, “Half” or “Quarter” as required. Selecting “Auto” sets the Elcometer 130 to automatically detect the filter paper size.

For Half Size Paper, fold the standard paper in half and cut into two along the fold line. For Quarter Size Paper, fold the standard paper into quarters and cut into quadrants along the fold lines.

The Elcometer 130 will automatically adjust the reading according to the filter paper size detected or selected, assuming that the paper is positioned on the measurement electrodes correctly, and if manually set up, the correct paper size is used. No manual calculations are required by the user.

3.5 TWO MINUTE TIMER

The wetted filter paper should be left on the surface under test for 2 minutes. The Elcometer 130 has a built in, optional timer for this purpose. To enable the timer, press Menu/Setup/Timer.

When enabled, the left softkey is labelled “Timer”. This softkey is used to start, stop and reset the timer as required.

Filter paper should be discarded and the sample re-tested if the paper is left on the substrate for more than 3 minutes.

3.6 CALIBRATION OFFSET FUNCTION (MODEL T)

Soluble salts should be measured using high purity water. Non-pure water, with a maximum conductivity of 237.5µS/cm‡ (equivalent to 2µg/cm²‡ or 119 ppm‡), may be used by setting a calibration offset on the Elcometer 130 Model T.

To set the calibration offset, fill a bottle with the non-pure water, press Menu/Calibration/Calibration Offset and follow the on-screen instructions to set the offset value. The calibration offset should be reset each time the bottle is refilled. The Calibration Offset icon will be displayed on screen together with the offset value.

When Calibration Offset is in use, the Temperature Compensation function will be switched on automatically, see section 3.7.

3.7 TEMPERATURE COMPENSATION

The temperature of the substrate will affect the reading. As the Elcometer 130 has been calibrated at 25°C, to provide an accurate measurement of soluble salt levels the reading must be adjusted to take into consideration any temperature variance.

The automatic Temperature Compensation function on the Elcometer Model T measures the temperature of the wet filter paper when placed on the measurement electrodes and using this value, adjusts the reading accordingly. To activate, press Menu/Setup/Temperature Comp.

‡ Nominal values

3 GETTING STARTED (continued)

The Elcometer 130 Model S does not have automatic temperature compensation and therefore, the actual level of soluble salts needs to be calculated manually using the following equation:

$$k = \frac{k_{measured}}{1 + c\,[T - T_{cal}]}$$

Where:
k = Corrected Result
c = Temperature Coefficient (2.0%)
T = Measurement Temperature °C
T_{cal} = Calibration Temperature (25°C)

Example: Measured Value: 12.3µg/cm^2 at 28°C

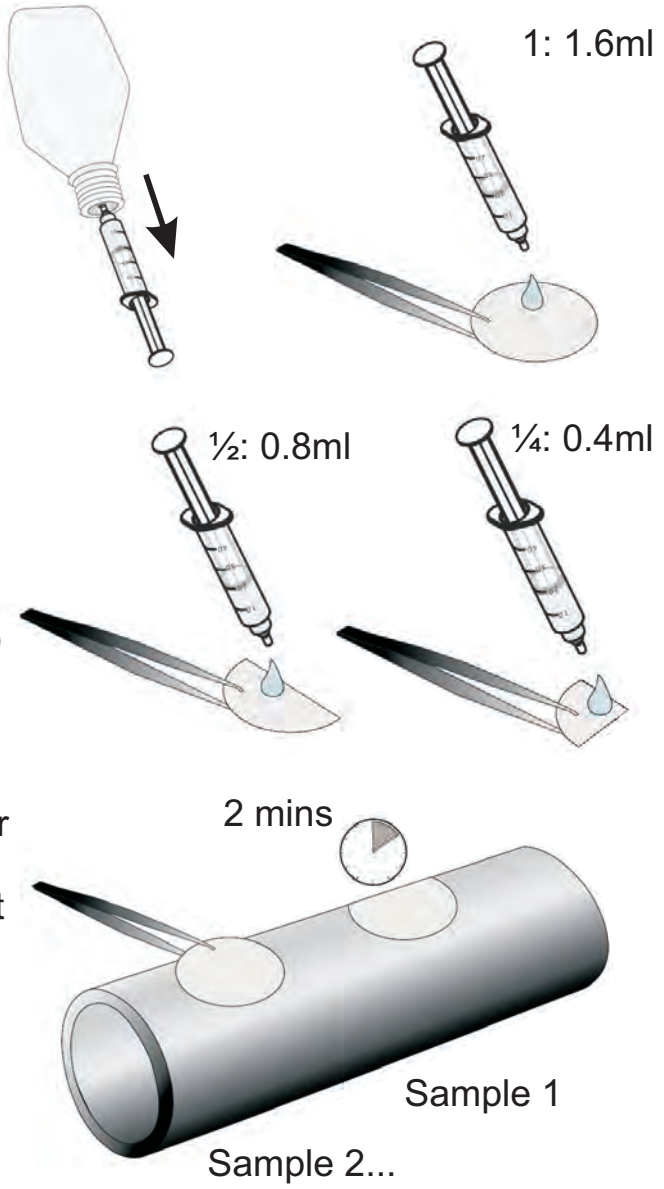
$$k = \frac{12.3}{1 + 0.02\,[28 - 25]} \qquad 11.6\mu g/cm^2$$

If using the Elcometer 130 Model T with Automatic Temperature Compensation disabled, the same equation should be used to correct the gauge reading for temperature variances.

4 MEASURING SOLUBLE SALTS

1 Press and hold the ON/OFF button to switch the gauge on.
2 Set the filter paper size as required, see section 3.4.
3 Put on a pair of clean disposable gloves.
4 Fill a syringe with the precise amount of high purity water[#] required, dependent on the filter paper size:
Full: 1.6ml; Half: 0.8ml; Quarter: 0.4ml.
5 Using tweezers, remove a filter paper from the pack.
- For half size paper: fold the standard paper in half and cut into two along the fold line.
- For quarter size paper: fold the standard paper into quarters and cut into quadrants along the fold lines.

6 Eject the pure water from the syringe evenly onto the filter paper, taking care to retain all the water on the paper.
7 Place wetted paper on to the area under test, pressing firmly into any contours or irregularities to remove any entrapped air and start the 2 minute timer.
- The Elcometer 130 has an optional timer, see section 3.5.
- When testing on hot substrates, a clean plastic bag can be placed over the paper to reduce evaporation.
- Additional samples can be prepared whilst waiting for the 2 minute test time to elapse.



Filter paper should be discarded and the sample re-tested if the paper is left on the substrate for more than 3 minutes.

[#] Non-pure water, with a maximum conductivity of 237.5µS/cm (equivalent to 2µg/cm^2 or 119 ppm) can be offset using the Calibration Offset feature (Model T), see section 3.6

4 MEASURING SOLUBLE SALTS (continued)

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8 After 2 minutes, remove the filter paper from the test surface and place on to the measurement electrodes.
- For half size paper: position on the bottom half of the circle using the markers on the measurement electrodes as a guide.
- For quarter size paper: position on the bottom right quadrant of the circle using the markers on the measurement electrodes as a guide.

9 Close the lid ensuring that the magnetic catch is fully engaged.

10 The reading will automatically be displayed on screen and stored into memory together with the filter paper size, temperature, date and time (Model T - when in Batch Mode).
- The Elcometer 130 will automatically adjust the reading according to the filter paper size detected or selected, assuming that the paper is positioned on the measurement electrodes correctly, and if manually set up, the correct paper size is used. No manual calculations are required by the user.

11 Lift the lid and remove the filter paper.

12 Place the filter paper in a resealable bag (supplied), if required for further chemical analysis.

13 Clean the electrodes between tests using pure water and a sensor wipe (supplied).

Failure to thoroughly clean the electrodes between tests may contaminate subsequent tests and result in inaccurate readings.

The Elcometer 130 measurement electrodes are gold plated to prevent corrosion and oxidisation, prolonging the life and accuracy of the gauge. They should be cleaned using pure water and the sensor wipes supplied. DO NOT use abrasive materials as this will damage the electrodes.

5 MEASURING CONDUCTIVITY (MODEL T)

1 Press and hold the ON/OFF button to switch the gauge on.
2 Press Menu/Setup/Measurement Mode/Conductivity to set the measurement mode.
3 Press Menu/Setup/Units to set the measurement units.
- Only the measurement units applicable to conductivity will be available for selection, see section 3.3. If set to an alternative measurement unit prior to selecting the measurement mode Conductivity, the gauge will automatically default to µS/cm.

4 Put on a pair of clean disposable gloves.
5 Using tweezers, remove a filter paper from the pack and place on to the measurement electrodes.
6 Fill a syringe with precisely 1.6ml of the contaminated liquid / liquid under test.
7 Eject the test liquid from the syringe onto the filter paper, ensuring even distribution.
8 Close the lid ensuring that the magnetic catch is fully engaged.
9 The reading will automatically be displayed on screen and stored into memory.
10 Lift the lid and remove the filter paper.
11 Place the filter paper in a resealable bag (supplied), if required for further chemical analysis.
12 Clean the electrodes between tests using pure water and a sensor wipe (supplied).
13 Clean the syringe between tests using pure water or alternatively discard and use a new syringe for each test.

Failure to thoroughly clean the measurement electrodes and syringe between tests may contaminate subsequent tests and result in inaccurate readings.

The Elcometer 130 measurement electrodes are gold plated to prevent corrosion and oxidisation, prolonging the life and accuracy of the gauge. They should be cleaned using pure water and the sensor wipes supplied. DO NOT use abrasive materials as this will damage the electrodes.

6 VERIFYING THE GAUGE CALIBRATION

The Elcometer 130 is factory calibrated. Users can verify the gauge's performance in the field using the optional Calibration Verification Tiles, part number T13023980.

Supplied as a set of 3, these tiles can be used to verify the accuracy of the gauge calibration at 0.4, 5 and 20µg/cm² (nominal values).

To verify the calibration, press Menu/Calibration/Calibration Verification and follow the on screen instructions.

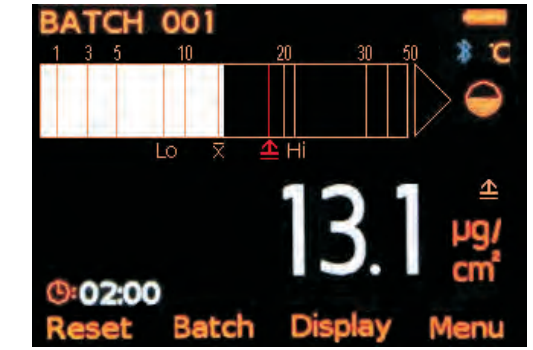
Should the gauge / tile readings be outside the stated accuracy of the gauge, re-calibration is recommended - contact Elcometer or your local supplier for further information.

7 BATCHING (MODEL T)

1 To use the Batching memory facility, press the Batch softkey.
2 Select "New Batch" or "Open Existing Batch" to add readings.
3 Copy and review batch data.
4 Select "Edit Batch" to rename, clear readings from or delete a batch.
5 Fixed Batch Size allows users to pre-define the number of readings to be stored in a batch. Once all readings have been taken the gauge automatically opens a new batch with a link to the original batch name. For Example *NewBatch_1* becomes *NewBatch_2*, *NewBatch_3*, etc.

8 DISPLAYING GRAPHS & STATISTICS (MODEL T)

8.1 BAR GRAPH



The Bar Graph displays an analogue representation of the reading together with the highest, lowest and average reading as measurements are taken. To display the Bar Graph:

1 Press the Display softkey and select “Readings & Bar Graph”

- If a reading is outside set limits, the white bar and the reading value turn red.

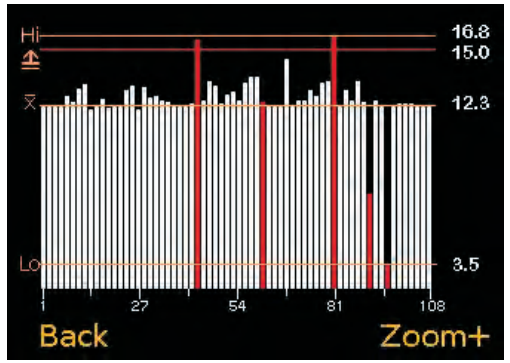
8.2 RUN CHART

To display the Run Chart of the last 20 readings:

1 Press the Batch softkey
2 Select “New Batch” or “Open Existing Batch”
3 Press the Display softkey and select “Readings & Run Chart”

- Red points signify a reading outside the batch’s limits (if set)

8.3 BATCH GRAPH



To display the Batch Graph:

1 Select the appropriate batch name from Batch/Review Batch
2 Select “Batch Graph”

- Red columns signify a reading outside the batch’s limits (if set)
- Press the Zoom+ softkey followed by ← or → to review individual readings as required

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8.4 STATISTICS

A combination of up to 8 statistical values can be displayed on screen at any time. To display statistics:

1 Press the Display softkey and select “Readings & Selected Stats”
2 Press “Statistics” and “View All” to display all 8 statistical values or alternatively, press “Select Statistics” to select only those required.

9 DOWNLOADING DATA & UPGRADING YOUR GAUGE

9.1 ELCOMASTER™ 2.0 SOFTWARE

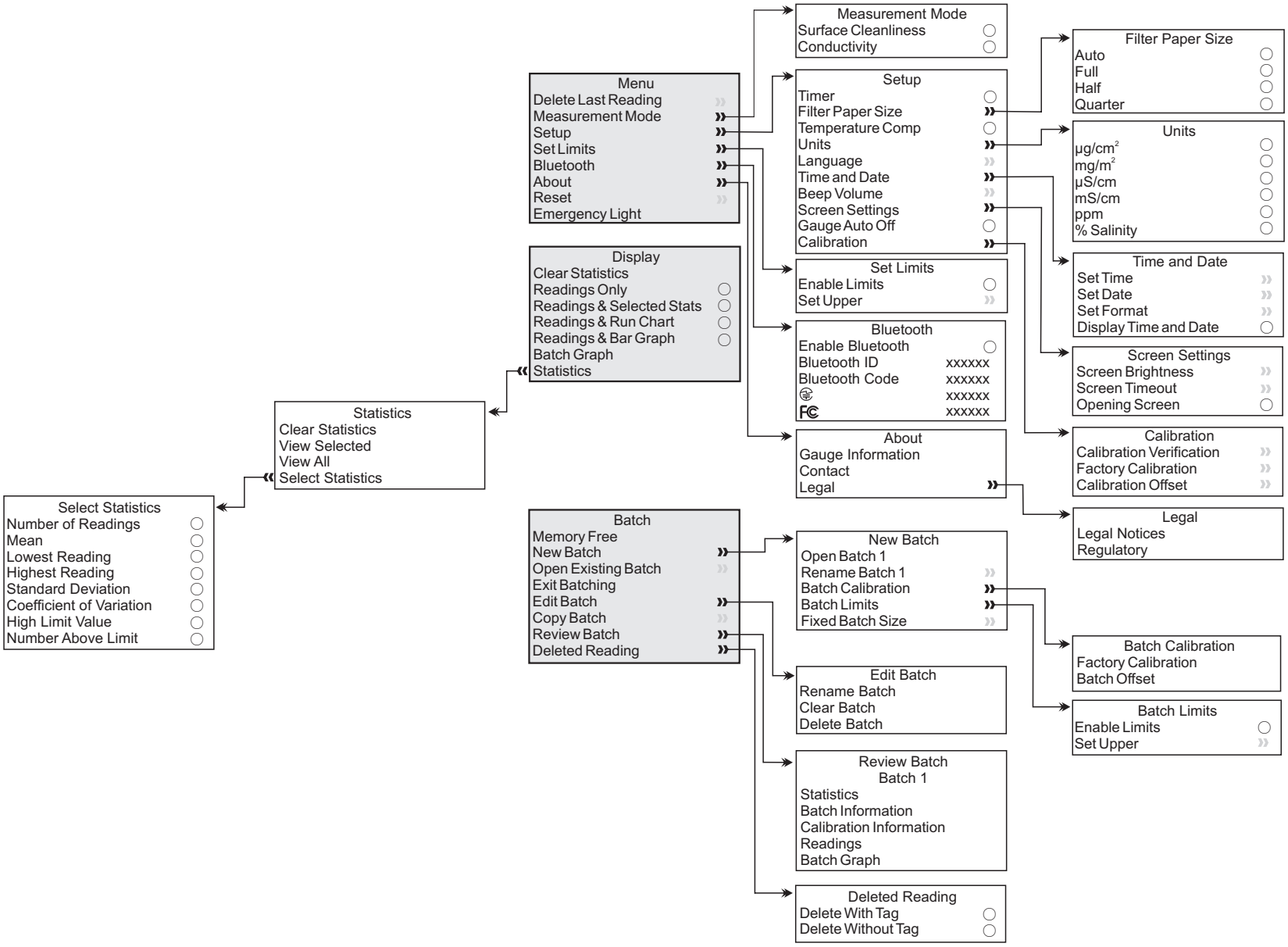
Supplied with the Elcometer 130 Model T and available as a free download at elcometer.com - ElcoMaster™ 2.0 is a fast, easy-to-use software solution for all your data management, reporting and quality assurance needs.

1 ElcoMaster™ 2.0 allows users to transfer live gauge readings, to be stored in a batch within ElcoMaster™ 2.0, as each measurement is taken (Model S & T). Live gauge readings can be recorded via USB (Model S & T) or Bluetooth® (Model T).
2 Batch data (Model T) can be downloaded to a PC via USB or Bluetooth® for archiving and report generation.
3 ElcoMaster™ 2.0 will inform you of any updates when the gauge is connected to the PC with an internet connection.

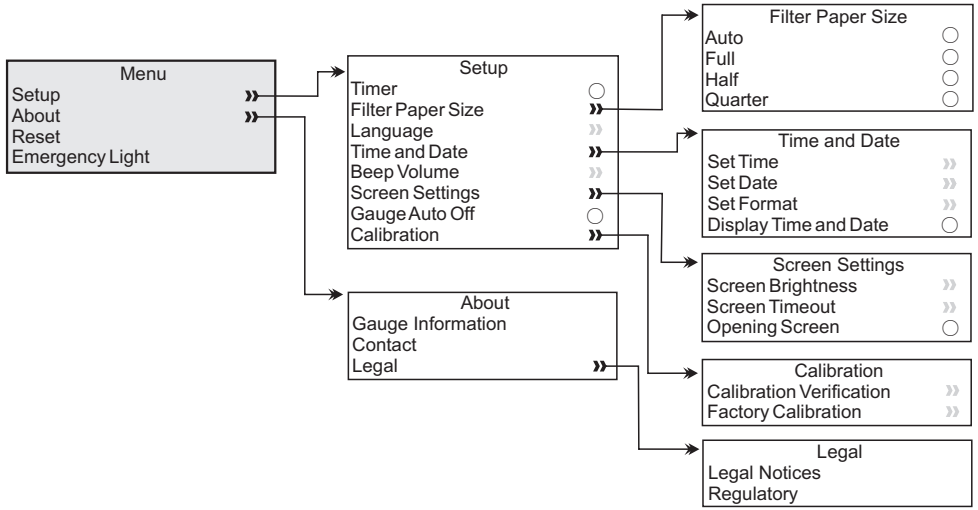
9.2 UPGRADING YOUR GAUGE

Elcometer 130 gauge firmware can be upgraded to the latest version by the user via ElcoMaster™ 2.0, as it becomes available. Simply connect your gauge to a web enabled PC running ElcoMaster™ 2.0 and follow the on screen instructions.

10 MENU STRUCTURE - ELCOMETER 130 MODEL T



11 MENU STRUCTURE - ELCOMETER 130 MODEL S



12 SPARES AND ACCESSORIES

The following spare parts and accessories are available from your local Elcometer supplier or direct from Elcometer:

Description	Part Number
Calibration Verification Tiles, Set of 3	T13023980
Bottle of Pure Water, 250ml / 8.5fl oz	T99911344
Syringes, x3, 2.5ml / 0.08fl oz	T13024091
High Purity Test Papers, Box of 100	T13024094
Sensor Wipes, Box of 72	T13024087
Disposable Vinyl Gloves, Box of 20	T13024092
Plastic Tweezers, x2	T13024098
Self Seal Polythene Bags, Box of 20	T13024093

We recommend that the Elcometer 130 is used with the filter papers supplied by Elcometer as alternative papers may result in variances in the measurement results.

13 TECHNICAL SPECIFICATION

Elcometer 130	Model S	Model T
Measurement Range	0 - 25µg/cm²	0 - 50µg/cm²; 0 - 500mg/m² 0 - 6000µS/cm; 0 - 6mS/cm 0 - 3000ppm; 0 - 0.3% Salinity
Resolution	0.1µg/cm²	0.1µg/cm² 1mg/m² 1µS/cm 0.001mS/cm 1ppm 0.0001% Salinity
Accuracy	±1% of the reading plus ±1 digit (0.1µg/cm² or equivalent in other units)	
Sample Size & Time	110mm (4.3") diameter circle, or part of; 2 minutes (maximum 3 minutes)	
Operating Range	5 to 50°C (41 to 122°F)	
Power Supply	4 x AA dry cell batteries (rechargeable batteries can also be used) or USB	
Battery Life	Approximately 4,000 measurements	
Dimensions	250 x 145 x 50mm (9.8 x 5.7 x 1.9")	
Weight	780g (1.72lb)	
Can be used in accordance with SSPC Guide 15		