TRANS INSTRUMENTS
for the professionals

WalkLAB

Professional Conductivity-TDS-Salinity Meter

HC 9021

Operations Manual

INTRODUCTION

Your purchase of this Conductivity/TDS/Salinity meter which mark a step forward for you into the field of precision measurement. Although this meter is a complex and delicate instrument, its usability will allow many years of use if proper operating techniques are observe and practice.

1. FEATURES:
- Able to display reading in µSiemen, mSiemen, ppm, ppt and temperature
- Automatic range switching over 5 ranges.
- Up to 5 points calibration at 1 point in each range
- Autolock / automatic-endpoint detection function
- 99 memory with real time clock recording
- USB data logging / transfer to PC (sold seperately)
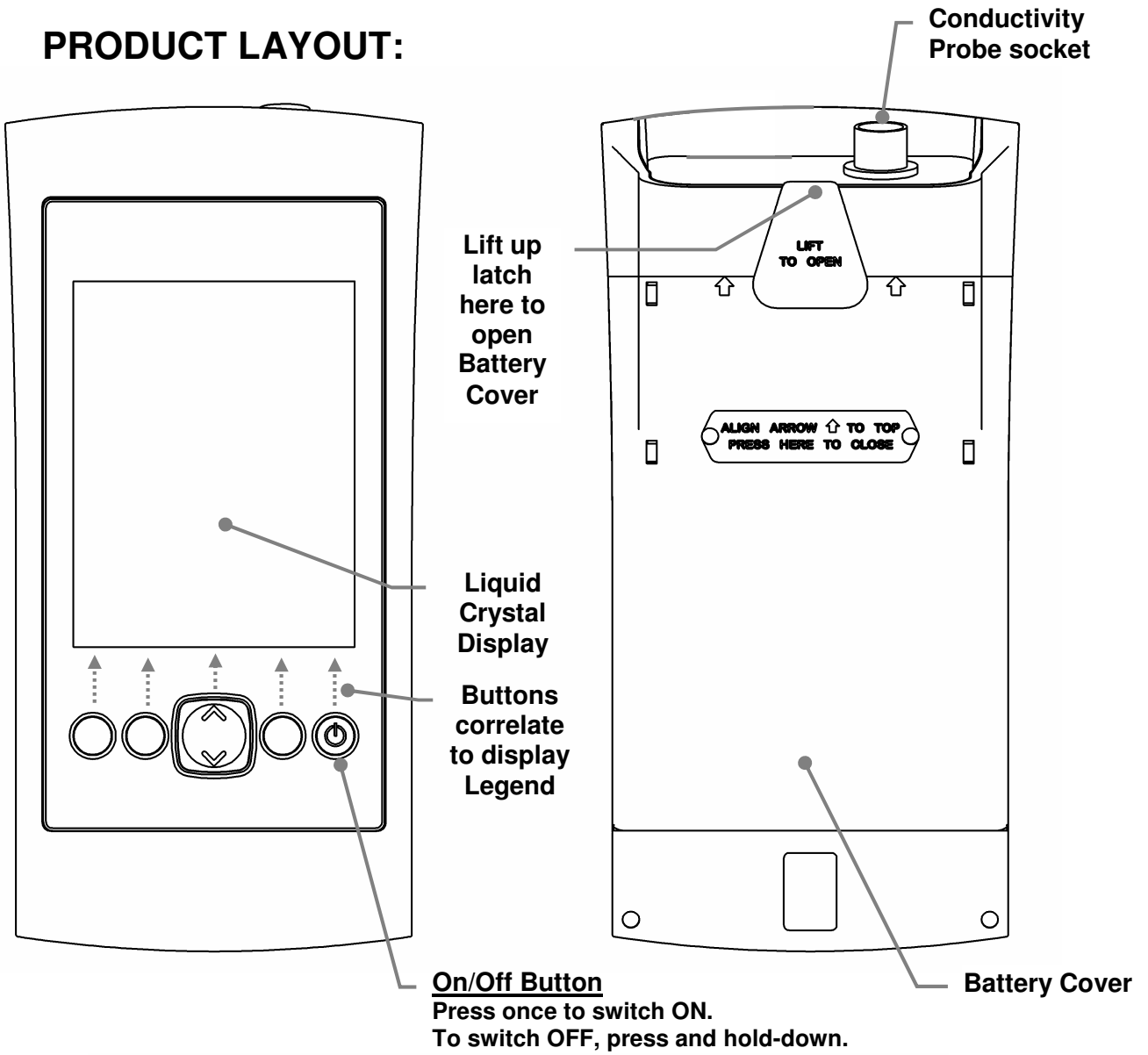
2. CONTENT:
Carefully unpack the box. It should contain the following items:
a. Main unit
b. Conductivity Probe with built in temperature sensor
c. Calibration standard solution 1413µS and 12.88mS each 90ml.
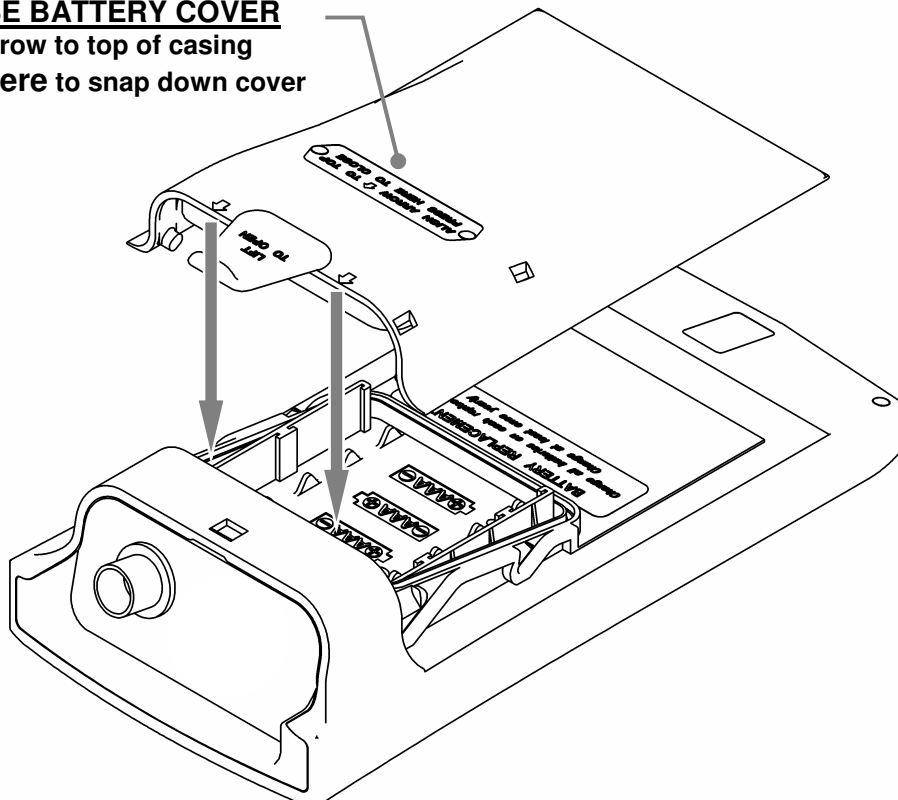d. Operations manual

3. SPECIFICATION:

	Contuctivity / TDS					Salinity	Temperature
Range	0~19.99µS	0~199.9µS	0~1999µS	0~19.99mS	0~199.9mS	0~100.0ppt	0~120 °C
	0~9.99ppm	0~99.9ppm	0~999ppm	0~9.99ppt	0~99.9ppt		
Resolution	0.01 µS / ppm	0.1 µS / ppm	1 µS / ppm	0.01 mS / ppt	0.1 mS / ppt	0.1ppt	0.1 °C
Accuracy	±1% Full Scale						±0.5 °C
Calibration	5 points with 1 point on each range						
TDS Factor	Adjustable from 0.40 to 1.00						
Cell constant	Selectable from 0.1 , 1.0 & 10.0						
ATC	Automatic from 0 - 100 °C						
Memory	99 data with real time clock						
Power source	4 x 1.5Volt AAA size battery						
Battery Life	40 hrs of continuous use with white backlight on						

4. PRODUCT LAYOUT:

Conductivity Probe socket

Lift up latch here to open Battery Cover

LIFT TO OPEN

ALIGN ARROW ⇧ TO TOP
PRESS HERE TO CLOSE

Liquid Crystal Display

Buttons correlate to display Legend

On/Off Button
Press once to switch ON.
To switch OFF, press and hold-down.

Battery Cover

TO CLOSE BATTERY COVER
1 Align arrow to top of casing
2 Press **here** to snap down cover

5.   DISPLAY PANEL:

Auto-lock indicator

Display put on hold or freezed

Measuring mode indicator

Cond TDS Salinity DO ION pH

pH Auto Lock HOLD %ppm µS mS mV ppt

Thousand Feet Thousand Meter kPa

Low battery indicator

Automatic Temperature Compensation indicator

ATC -188.8 ºC ºF

Temperature reading or SETUP Sub-display indicator

DAY *MONTH* *YEAR*

Memory 88 18 : 88 AM PM

Memory counter

Date or Time display

RECALL EXIT SELECT ENTER SETUP
M+ CAL MODE READ

Button keys legend
(correlate to button key)
Indicator will blink while the function mode is active.

6   SETTING UP THE UNIT:

6.1   Before you begin using the unit, it is important to define your measuring requirements.   This will allow the unit to display accurately on the condition of sample that is measured.

6.2   While the unit is switched ON, press the **SELECT** button once and the **Button Keys Legend** will show **SETUP**.

6.3   Press the **SETUP** key to enter setup mode.

6.4   Display will show **SETUP** blinking, indicating you are in setup mode.

6.5   Press the **SELECT** button **up** to move to next setting or **down** to the previous setting parameter displayed on screen.

6.6   After setting, meter will retain the info until you reset them.

6.7   Below are the description for each setting parameter:

   *＊Anytime during setup, press **EXIT** to cancel the setting.*

ЯLс - AUTO LOCK SETTING

Autolock feature allows the meter to automatically sense a stabilized reading and locks the endpoint reading. Factory preset is ЧЕ5.

1. Press the **ENTER** key to set; display will show ЧЕ5 blinking.
2. Press the **SELECT** key **up** or **down** to choose between ЧЕ5 and ɳо
3. Press the **ENTER** key to confirm.
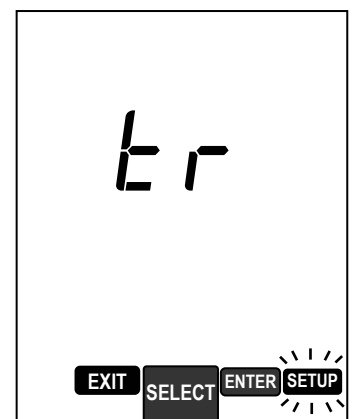4. Press the **SELECT** key **up** for next setting.
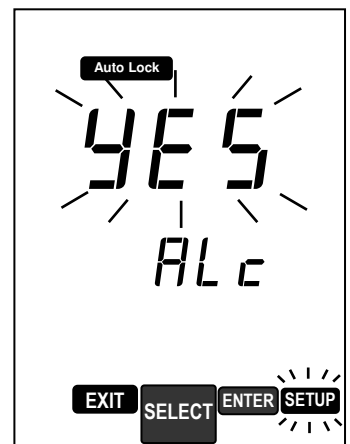
Łг - DATA TRANSMISSION TO PC
(Note: will not appear if no data saved)

This setting allows you to download saved memory data to PC via the RS232 connector & CD software kit *(connector & software kit sold seperately)*.

1. Download the software and run on PC.
2. Follow the CD instructions to setup software and PC connection with RS232 connector.
3. Press the   **ENTER**   key and display will alternate between Łг and оцŁ, indicate transfer in progress.
4. When display return to Łг, transfer completed. Check the PC for the transferred file.
5. Press the **SELECT** key **up** for the next setting.

⌐⌐⌐ - MANUAL RANGE & RESOLUTION OVERIDE

This meter has a built-in auto-range feature to optimize reading resolution at different measuring range. When conductivity readings are high, there will be a reduction in display resolution due to the capacity of the electronic circuitry and the display panel. This package comes with a standard probe with cell constant of 1.0. Display range are divided into 5 ranges:
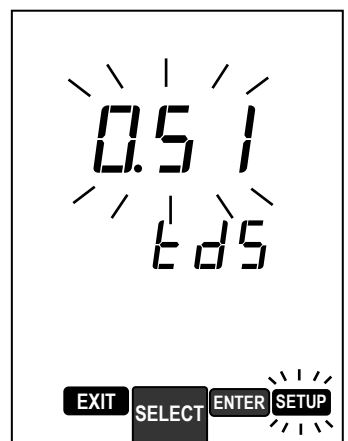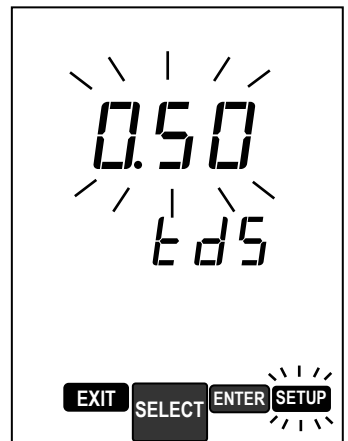
1. Press the **ENTER** key to set; display will show *Auto* blinking.
2. Press the **SELECT** key **up** or **down** to select from *Auto*, *20.00* µS, *200.0* µS, *2000* µS, *20.00* mS or *200.0* mS and press the **ENTER** key to confirm.
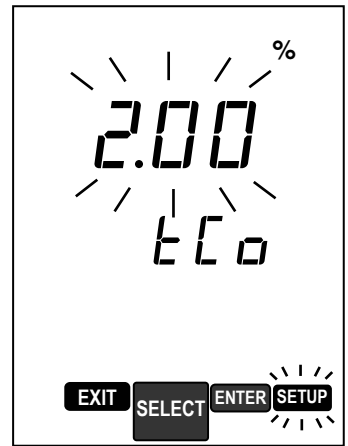3. Press the **SELECT** key **up** for next setting.
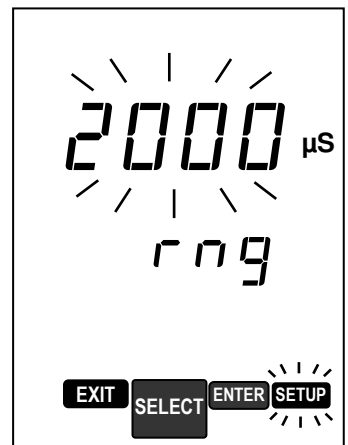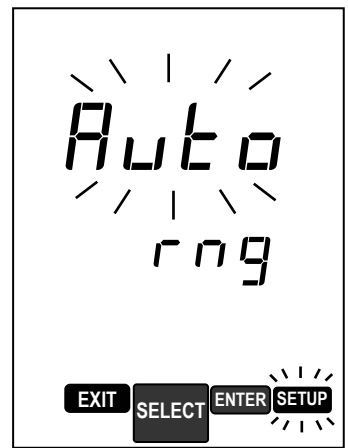
⌐dS - TDS FACTOR:

This setting allows you to set the TDS conversion factor. Different combination of elements or salt in a liquid gives variable conductivity in a liquid. To correlate conductivity into TDS, a factor of 0.5 was used for municipal water. The factor of 0.7 is used for measurement of nutrient solution. If the factor of the liquid is known, you can set this factor for a more precise conversion.

1. Press the **ENTER** key to set; display will show *0.50* blinking.
2. Press the **SELECT** key **up** or **down** to increase or decrease between *0.40* to *1.00* .
3. Press the **ENTER** key to confirm.
4. Press the **SELECT** key **up** for the next setting.

tCo - TEMPERATURE COEFFICIENT

Temperature coefficient is the ratio of conductivity change per degree Celsius in a solution. Since each solution has varying temperature coefficient, adjusting the value would enhance accuracy of temperature compensation thus giving a more precise reading. Temperature coefficient is expressed in percentage per degree Celsius. In most of common liquid, 2.0%/°C is used if this value is not available.
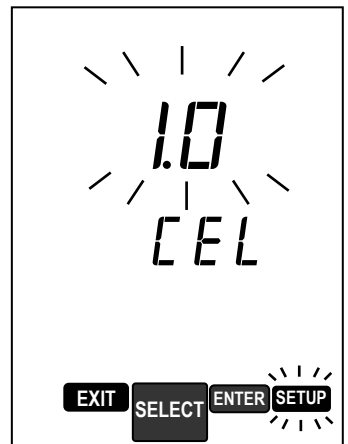
1. Press the **ENTER** key to set; display will show 2.00 blinking.
2. Press the **SELECT** key **up** or **down** to increase or decrease between 1.70 to 2.30 %.
3. Press the **ENTER** key to confirm.
4 Press the **SELECT** key **up** for the next setting.
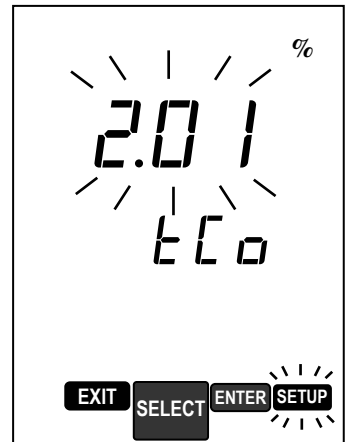
CEL - PROBE CELL SETTING

There are three types of conductivity probes for measuring liquid at different concentration. For high purity liquid of below 20µS, a probe with a cell constant of 0.1 is to be used. For general liquid in the middle range, a probe with a cell constant of 1.0 is used. For high concentration liquid of above 20mS, the cell constant of 10.0 is used.

This setting allows you to change the cell constant to match the probe you are using. The probe in this package is a general-purpose probe with a cell constant of 1.0.
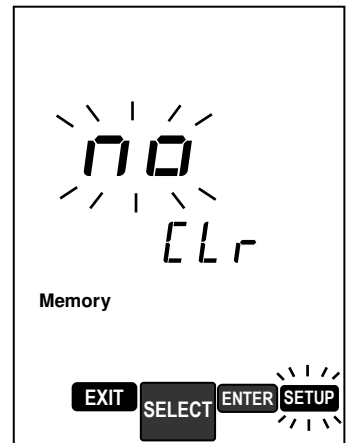
1. Press the **ENTER** key to set; display will show 1.0 blinking.
2. Press the **SELECT** key **up** or **down** to select 1.0 , 10.0 or 0.1 .
3. Press the **ENTER** key to confirm.
4 Press the **SELECT** key **up** for the next setting.
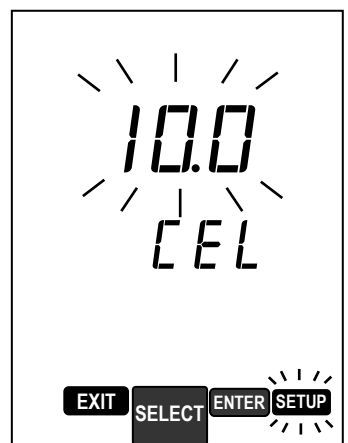
⌐Lⲅ - CLEAR SAVED MEMORY

This setting will clear all saved memory in the unit.

1 Press the **ENTER** key to set; display will show *no* blinking.
2. Press the **SELECT** key **up** or **down** to choose between *YES* and *no*.
3. Choose Yes to clear, press the **ENTER** key to confirm.
4 Press the **SELECT** key **up** for the next setting.

Unt - TEMPERATURE UNIT OF MEASUREMENT

This setting allows you to set the unit of measurement for temperature between Celcius and Fahrenheit. Factory preset is in Celcius.
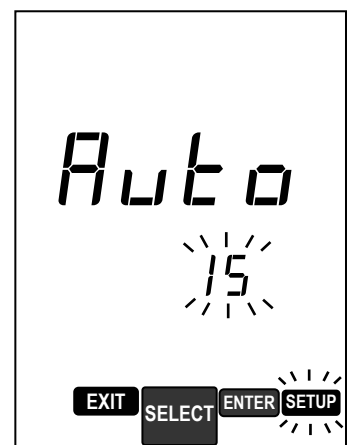
1. Press the **ENTER** key to set; display will show *C* blinking.
2. Press the **SELECT** key **up** or **down** to choose between *C* and *F*
3. Press the **ENTER** key to confirm.
4. Press the **SELECT** key **up** for the next setting.
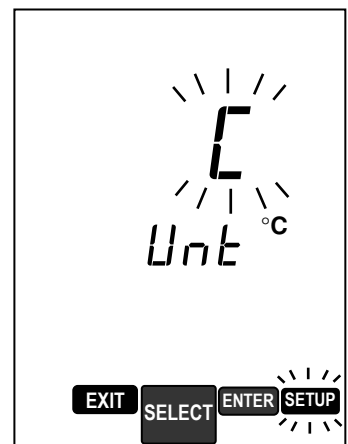
Auto oFF - AUTO-OFF TIME SETTING

This setting allow you set the time to automatically shutoff the unit to power save. This feature is good if you want the meter to make prolong measurement or continuous display.
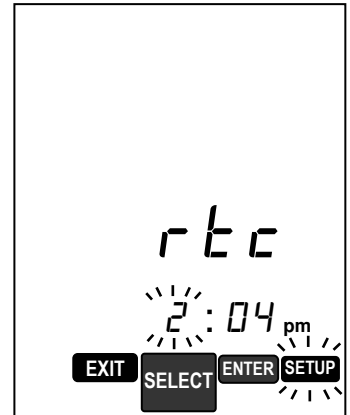
1. Press the **ENTER** key to set; display will show *15* blinking.
2. Press the **SELECT** key **up** or **down** to scroll between *no*, *15* minutes, *30* minutes or *60* minutes.
3. Select *no* will disable auto-shutoff feature.
4. Press the **ENTER** key to confirm.
5. Press the **SELECT** key **up** for the next setting.

rtc - REAL TIME CLOCK

This setting allows you to change the date and time on the meter.

1. Press the **ENTER** key to begin setting; display will show clock with hour digit blinking.
2. Press the **SELECT** key **up** or **down** to scroll digit.
3. Press the **ENTER** key to confirm or move to set Minute then Day, Month and Year on each instance. While digit is blinking, repeat step 2~3 to set digit.
4. After setting Year and **ENTER**, clock is up to date.
5. Press the **SELECT** key **up** for the next setting.

rSt - MASTER RESET

This setting allows you to reset the unit to the original factory's default.
Original factory default:
Auto Shutoff   = 15 minutes

1. Press the **ENTER** key to set; display will show no blinking.
2. Press the **SELECT** key **up** or **down** to choose between YES and no
3. Press the **ENTER** key to confirm.
4. Press the **SELECT** key **up** to repeat from beginning or **EXIT** key to return to measuring mode.
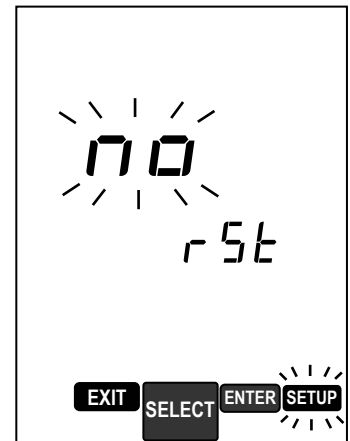
7   CALIBRATION:

* Calibration should be performed as frequently as possible to ensure accurate measurement, depending on the frequency of tests performed. Additional calibration solution should be purchased for future needs.

7.1   This meter is factory calibrated and re-calibration is not required. But if higher accuracy is required on a specific range or if readings are in doubt, recalibration should be performed.

7.2   You can calibrate one point on each of the 5 ranges as below:

Range	Cell constant K= 1.0	Recommended Calibration Solution
Range 1	0.00 ~ 19.99 µS	
Range 2	20.0 ~ 199.9 µS	74µS
Range 3	200 ~ 1999 µS	1413µS
Range 4	2.00 ~ 19.99 mS	12.88mS
Range 5	20.0 ~ 199.9 mS	

7.3   Do not use solution value below 25% of the bottom value or 10% of the top value of the stated range, as it will limit the adjustment window and cause error. Choose solution values that are at the middle of the range. The supplied calibration solution is 1413µS.

7.4   Prepare each calibration solution in 2 containers, one for rinsing and the other for calibration. It is important to prevent liquid carry-over from the previous liquid or rinsing water, as they will affect accuracy.

7.5   Fill container with at least 4cm or 1 ½ inch height with the standard solution.

7.6   Rinse the probe with distilled water; then dip into the first container for rinsing, then into the second container for calibration.

7.7   Press **CAL** key for 2 seconds and display will show the 1413 and **CAL** blinking, indicating it is in calibration mode. Unit will automatically detect the calibration range. Or press the **SELECT** key **up** or **down** to adjust the value to exactly match the calibration solution value.

7.8   When the **ENTER** appear and beeping, press the **ENTER** button to confirm the calibration. Display will return to normal measuring mode.

7.9 For higher accuracy, repeat 7.5 to 7.8 for solution 12.88mS. If you have other solutions at different range, repeat 7.5 to 7.8

7.10 Anytime during calibration, press **CAL** or **EXIT** to exit and return to normal measuring mode.

> *Always rinses the electrode with distilled water before and after each test. This is to prevent solution carry over or cross contamination. Standard solutions must maintain highest purity; otherwise the meter's accuracy could be compromised.*

CALIBRATION FOR SALINITY:

7.11 If calibration for salinity is required, with the unit switched on and doing measurement, press the **MODE** button till **Salinity** appear on the measuring mode indicator of the LCD display.

7.12 Prepare standard calibration solution of NaCl for salt level between 20 to 40ppt.

7.13 Repeat 7.5 to 7.8 to complete the calibration.

7.14 There is only single point calibration for salinity calibration.

8 MAKING MEASUREMENT:

CONDUCTIVITY MEASUREMENT

8.1 To make conductivity measurement, simply switch on the unit. Note on the left side of display, **ATC** symbol should appear. Otherwise, the temperature sensor is faulty and the display will show the default temperature of 25ºC.

8.2 You can manually set the solution's temperature as follow:

8.3 While the unit is in the process of reading or measuring, ***press and hold down*** **MODE** button until temperature reading appears blinking.

8.4 Temperature digit will be blinking. Press the **SELECT** button **up** or **down** to adjust the value to that of the solution.

8.5 Press **ENTER** to confirm the set value or **EXIT** to abort. Display will resume measuring mode.

8.6 Rinse probe with distilled water then dip into the test liquid and stir the probe to remove bubbles. ***Tiny bubble in the sensor cell can affect measurement and gives erroneous reading.***

8.7 Keep still and wait a while for temperature compensation to take place.

Measurement with Auto-Lock feature enabled:(see Page 4)

8.8   Display will show current reading with **AutoLock** symbol blinking.

8.9   When the **AutoLock** sign stops with short beep, an endpoint reading is establised. You can now record the reading.

8.10 Press the **READ** button for each new measurement.

8.11 Always rinse probe with distilled water before and after each tests.

Measurement with Auto-Lock feature disabled:(see Page 4)

8.12 When the Auto-lock feature is disabled, meter will display readings continuously.

8.13 Press the **READ** button once to freeze displayed reading.

8.14 The **HOLD** symbol will appear. Press again will release display and resume continuous measurement.

TDS MEASUREMENT

8.15 To make TDS measurement, with the unit switched on and doing measurement, press **MODE** button till **TDS** appear on the measuring mode indicator of the LCD display when .

8.16 The conversion factor for TDS is factory preset at 0.5. If another factor is known for the solution you are measuring, follow instructions under **SETUP** on page 5 of *tdS*.

8.17 Follow 9.2 to 9.6 to make measurement.

ENHANCING RESOLUTION (RANGE OVERRIDING)

8.18 This meter has a built-in auto-range feature to optimize reading resolution at different measuring range. When conductivity readings are high, there will be a reduction in display resolution due to the capacity of the electronic circuitry and the display panel.

8.19 Range overriding will allow you to enhance display resolution by fixing measurement at one of the fixed range. As such, resolution is fixed over the specified measuring range.

8.20 Follow instructions under **SETTING UP THE UNIT** on page 5 of *rng*

SALINITY MEASUREMENT

8.21 To make salinity measurement, with the unit switched on and doing measurement, press the `MODE` button till `Salinity` appear on the measuring mode indicator of the LCD display.

8.22 The conversion factor for salinity is factory preset for NaCl.

8.23 Follow 8.6 to 8.14 to make measurement.

8.24 Always rinse probe in distilled water after measurement in salt liquid. Soak in distilled water for several minutes to remove salt concentrates on the surface of the sensor. The sensor can get coated with salt and degrade in functionality.

9   DATA MEMORY:

9.1 This meter can save up to 99 data with time and clock with either Conductivity or TDA or Salinity measurements.

STORE MEMORY

9.1 After a reading has established, press the `M+` button to save data into memory. Display will show 5ᴛᴏʀ and memory counter blink briefly.

9.2 Data is stored and measuring mode continue.

9.3 When memory is above 99, display will show **"FULL"** and data will not be saved. Please download data and clear memory to resume.
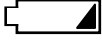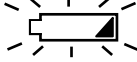
9.4 It is a good practice to download data daily.

RECALL MEMORY:

9.5 To review the saved data, press the `SELECT` button then press `RECALL` button.

9.6 Press the `SELECT` button **up** or **down** to review each saved data. Time and date will alternate briefly.

9.7 When finish reviewing, press `EXIT` to return to normal measuring mode.

10   ONLINE DATA LOGGING TO PC: (SOLD SEPARATELY)

The USB Connection kit is sold separately. Full instruction is in the Readme.txt file of the attached CD.

11 MAINTENANCE:

11.1 The electrode cell is the most critical part of the measuring system. Keeping the cell clean is important. If residue liquid is dried up on the cell, it may affect reading. Rinse the probe in alcohol liquid may remove these residues. Perform a calibration after cleaning.

11.2 Never rub, scratch inside the cell as this can damage the platinized coating and change the cell constant of the probe.

11.3 When the battery sign 🔋 appear permanently on the screen, it means the battery should be replaced. Removed the battery cover and replace with 4 "AAA" batteries according to polarity.

11.4 If the battery sign is blinking continuously 🔋 , it means that the back-up battery should be replaced. Return meter to your local agent for battery replacement.

12 TROUBLESHOOTING:

Error Code	Reason or cause	Remedy
- - - -	1. Inputs exceed measuring range 2. Probe connection faulty 3. Probe faulty	1. Measure liquid within specified range 2. Check connector's wire 3. Test with brand new probe to confirm.
ErLc Prob Readings drifty or unstable Cannot auto-lock during Read or CAL.	1. Ground loop in solution 2. Electromagnetic interference	1. Make measurement in a cup or container. 2. Move to another location to perform test. 3. Disable Auto-lock
Reading does not change	Hold function is activated.	Press **READ** button to release.
Wrong date & time	Backup battery has expired.	Contact your dealer to replace it with a new one.

WARRANTY:

Trans Instruments (Singapore) Pte. Ltd., warranties this product for a period of 12 months for main unit and 3 months for electrode, probe or sensors from date of purchase; against all defects in material and workmanship.

This warranty does not apply to the abuse or misuse of the instrument. If repairs or adjustments are required, please return the defective product freight prepaid. Instrument within warranty will be repaired at no charge.

Make sure that the product is properly packed and insured against possible damage or loss in shipment.

Purchase invoice **MUST** be accompanied in returned product or else warranty is considered void.

Please obtain authorization from Trans Instruments (Singapore) Pte Ltd. directly or through your local sales representatives prior to returning the product.

Trans Instruments staff can be contacted at the following email address or through our webpage contacts:

sales@transinstruments.com

http://www.transinstruments.com

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