Instruction Manual
COND 600/610
Waterproof Handheld Conductivity Meter

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68X415302 Rev.1 NOV 06

Preface

This manual serves to explain the use of the **COND 600/610 Waterproof Handheld conductivity Meter**. The manual functions in two ways, firstly as a step by step guide to help the user operate the instrument. Secondly, it serves as a handy reference guide. This instruction manual is written to cover many anticipated applications of the COND 600/610 conductivity Meter. If you have doubts in the use of the instrument, please do not hesitate to contact the nearest Authorised Distributor.

The information presented in this manual is subject to change without notice as improvements are made, and does not represent a commitment on part of Eutech Instruments / Oakton Instruments.

Eutech Instruments/ Oakton Instruments cannot accept any responsibility for damage or malfunction of the unit due to improper use of the instrument.

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1. Getting Started

1.1 About the Meter

Thank you for purchasing the COND 600 series meter.

COND 600 series handheld meters are micro-controller based instruments and are design with many user friendly features to measure Conductivity (0 to 500mS), Temperature (-10.0°C to 110.0°C) / units °C or ° F, Total Dissolved Solids (TDS) (500ppt), Resistivity (0 to 20.00MΩ) and Salinity (80ppt).

The meter also allows you to select cell constants, temperature coefficients, normalised temperature, TDS factor, calibration standard, points and temperature units.

There are two models in COND 600 series:

COND 600: The basic model is capable of measuring Conductivity/ TDS with all the features listed below.

COND 610: Capable of measuring Conductivity/ TDS/ Salinity/ Resistivity

For the model of your purchase, simply use the model's Table of Content to guide you to your meter's operating instructions.

Special Features:

- Automatic temperature compensation
- Large Monochrome graphic display with 110X128 resolution and viewing area of 68X74 mm
- Powered by ARM7TDMI-S cored microcontroller
- Built in memory backup to save calibration and 500 sets of measured data.
- Real Time Clock, Calibration time also being stored.-- GLP
- One way serial data transmission through IrDA or RS232 through LED.
- "CAL-DUE" indication for user calibration
- High, Low Alarm
- Power source and Battery level indicator
- Work either from mains power or battery and automatically detect and switch to mains if available.
- Alkaline Battery can last for more than 200Hours of continuous operation without Backlight and Serial data transferring
- Water proof casing.
- User configurable password protection for calibration & setup data.

Useful hints will appear throughout the manual and also on the meter's screen to ease user during meter operation.

1.2 Display & Keypad

1.2.1 Display Overview

The large monochrome display shows detailed information about measurements, various indicators, annunciators, functions and useful tips. The display consists of 3 main sections when the meter is in the measurement mode:

- **Header** – Displays indicators for power source, battery level, conductivity range of the probe, data transmission mode, real-time clock, user lock/unlock etc.
- **Body** – Displays measurement related information.
- **Footer** – Displays functions available for a given mode of operation. At any given time, up to four function names are displayed, that correspond to 4 function keys in the keypad. Left & Right arrow icons are displayed when there are more functions available than the 4-functions shown in the display. To access a function, press the corresponding function key (in keypad) just below the function name. To see other available functions, press left ◀ or right ▶ arrow key in the keypad.

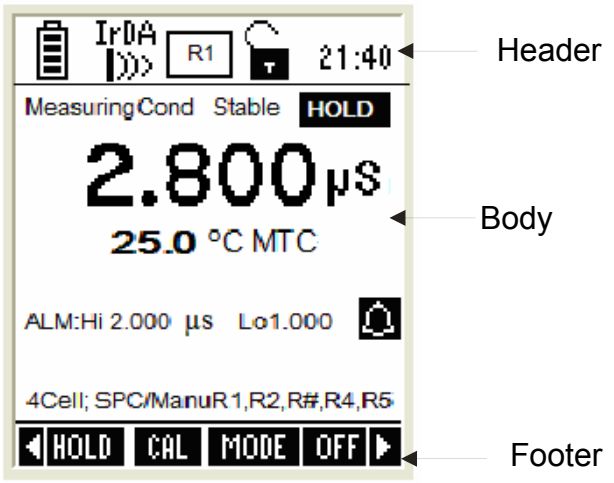


Figure 1: Display

Indicators Used in Header Area			
	Power Source & Battery Level: Battery, level 80%-90%		Conductivity range of the probe
	Power Source: DC Adapter		Current Time in 24 Hour format
	Data Transmission mode: LED		Password Protection: Disable
	Data Transmission mode: Infrared		Password Protection: Enable
	Data Logging Mode: MEM		

Refer **calibration mode, measurement mode** & **setup mode** for details on indicators shown in body & footer sections.

1.2.2 Key Functions

The keypad consists of:

- 4 – Function keys (F1, F2, F3 & F4)
- 4 – Navigation key
- 1 – Enter key

Key	Function
	▪ Selects the function shown (in the display) just above the key.
	▪ Navigates to next available functions
	▪ Increment/decrement values in Setup & Calibration modes. ▪ Navigates to sub groups in Setup selection screen.
	▪ In Setup mode, confirms selection or modified values ▪ In Calibration mode, confirms calibration points or modified values

Figure 2 : Display & Keypad

1.3 Inserting Batteries

The meter supports dual-power sources.

1. Four ‘AA’ size 1.5 V alkaline batteries (supplied) or,
2. 9V DC power adapter (Optional in some models).

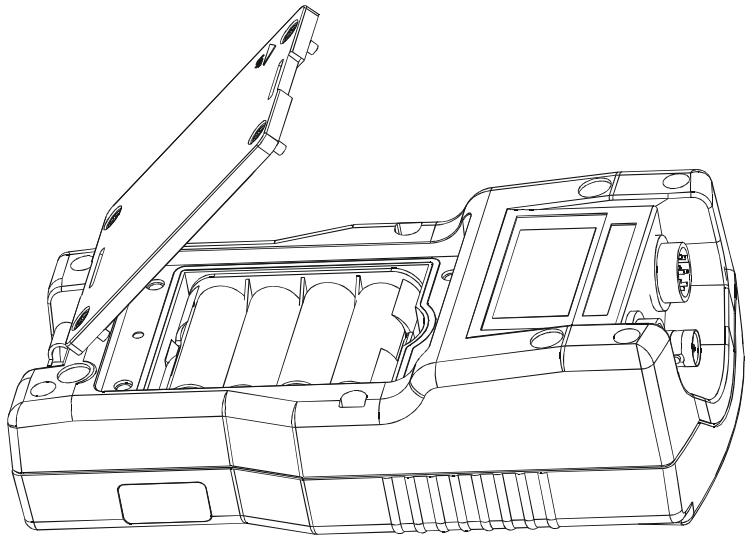


Figure 3 : Battery compartment

1.3.1 Inserting batteries for the first time

1. Use a Phillips screw driver to remove four screws holding the battery cover.
2. Remove the battery cover.
3. Follow the polarity indicated in the battery compartment and insert the batteries.
4. Replace the battery cover onto its original position using the four screws. Note the ▲**UP** symbol marked on the cover.
5. The meter is ready to operate. Use **ON (F4)** key to switch on the meter. The **ON (F4)** key has to be kept pressed until the display comes up.
6. Set the system date & time before you start operating the meter for the first time. Refer ‘: System Settings - Page 2’ in page 49 for details on how to set date & time.

1.3.2 Changing batteries subsequently

The LCD has battery voltage level indicator. **Number of bars indicates the voltage level. See** Table 1 for details. When the empty battery indicator starts blinking, it is time to change the batteries.

The system time might be automatically reset during the battery change. To prevent that happening, always connect the DC adapter during battery change.

Alternatively, if the DC adapter is not available, switch **off** the meter and change the batteries within **30** seconds to avoid resetting the clock.

Number of Bars	Approximate battery voltage (V)
4	6.0 to 5.4
3	5.4 to 4.8
2	4.8 to 4.2
1	4.2 to 3.8
No bars (Empty battery blinks)	Below 3.8

Table 1 : Battery level indication

1.3.3 Connecting DC Power adapter

Connecting the DC adapter saves battery life. The power adapter indicator appears in LCD when you connect the DC power adapter to the meter.

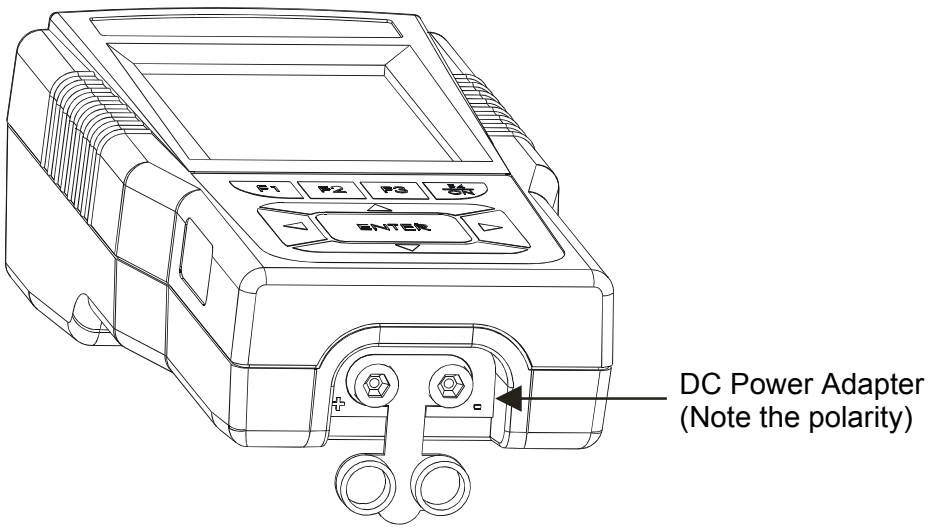


Figure 4 : Connecting DC power adapter

1.4 Attaching Safety Belt

The safety belt provides secured support when you hold the meter on your palm.

To attach the safety belt:

1. Use a Phillips screw driver to remove four screws holding the battery cover.
2. Remove the battery cover.
3. Insert the safety belt through the two slots as indicated in the Figure 5.
4. Replace the battery cover onto its original position using the four screws. Note the ▲**UP** symbol marked on the cover.
5. Insert your palm in between the belt and the body of the meter and adjust the hook & loop fastener.

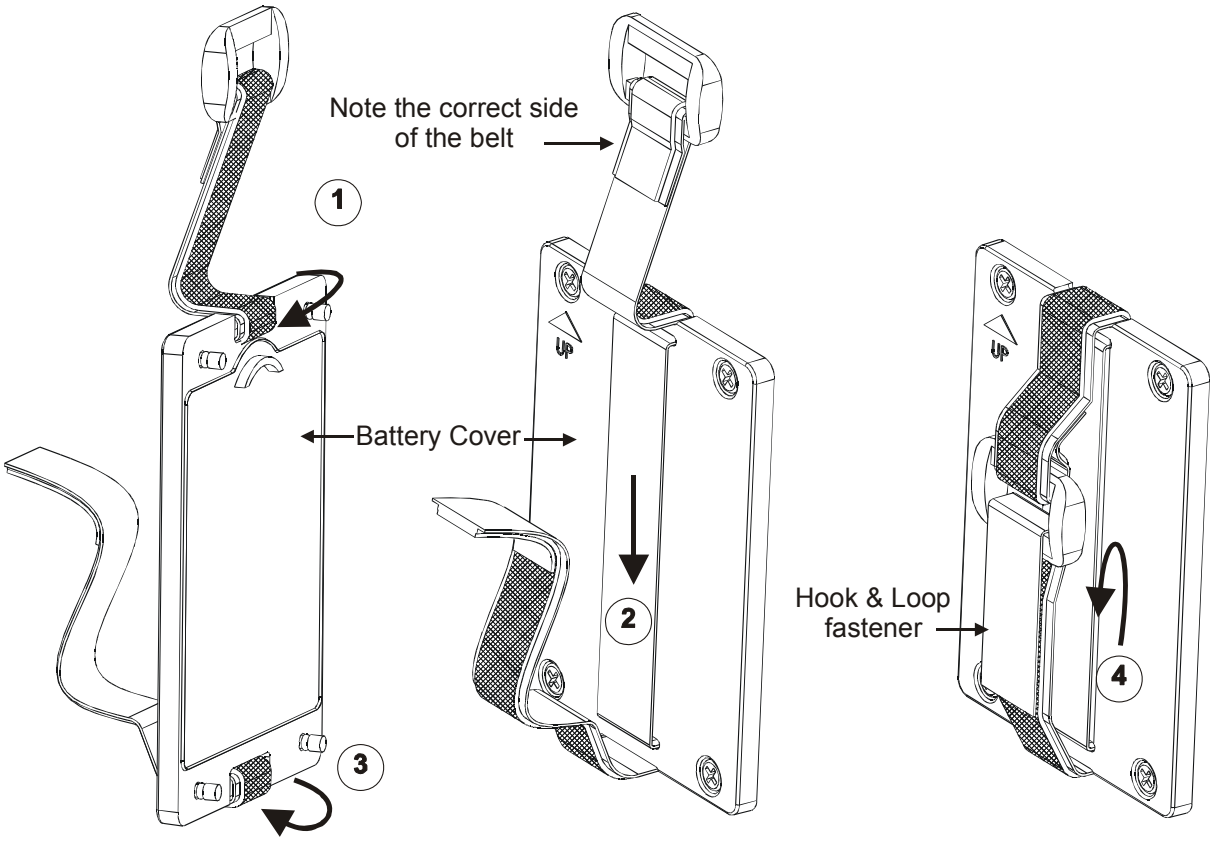
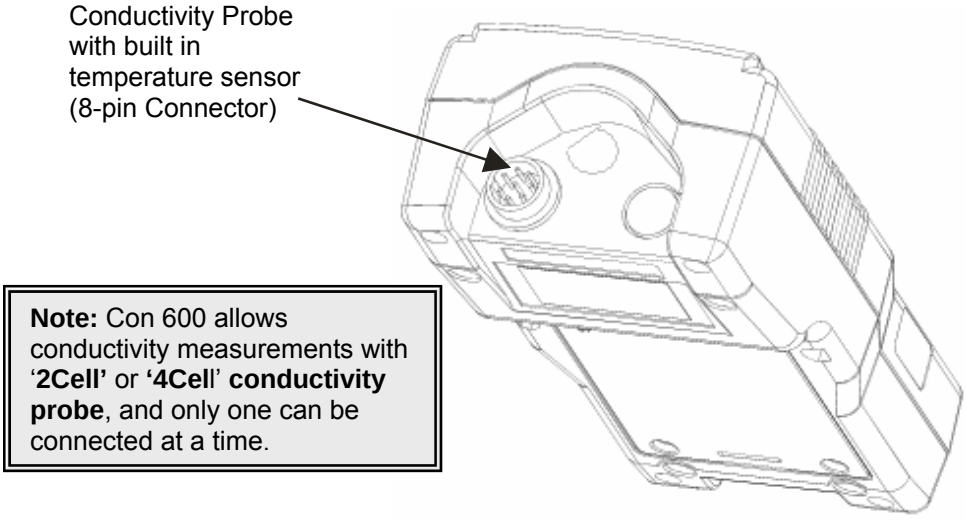


Figure 5 : Attaching safety belt

1.5 Connecting Peripherals

1.5.1 Probes

Insert the 2-cell or 4-cell conductivity cell with built in temperature sensor into the 8-pin connector as indicated in the figure below.



Note: Con 600 allows conductivity measurements with '**2Cell'** or **'4Cell**' **conductivity probe**, and only one can be connected at a time.

Figure 6 : Connecting Probes

The Con 600 meters allow you to use two types of conductivity electrodes: the 2-cell conductivity cell and the 4-cell conductivity cell. Only one type of conductivity cell can be connected at a time. For COND 610 cell constant can be adjusted from 0.010 to 10.000 and for COND600 from 0.100 to 10.000.

This electrode features a built-in temperature sensor for Automatic temperature compensation (ATC). It has a specially designed housing that provides fast temperature response and reduces air bubble entrapment, which makes it easy to obtain accurate, stable readings.

Proper use of electrode is essential to ensure that the optimum measurement is taken in a short time. The removable protective plastic electrode guard is meant for simple periodic maintenance and it must be kept in tact during measurement and calibration.

Always immerse the electrode beyond upper steel band as shown in Figure 7.

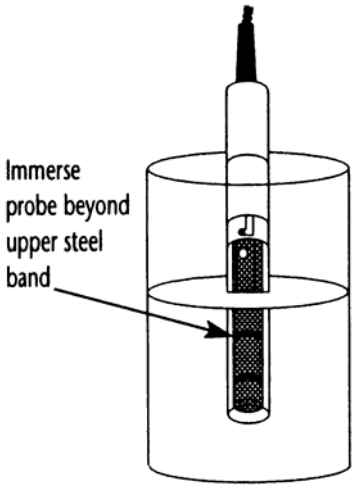


Figure 7: **Probe immersion level**

NOTE: **DO NOT** remove the protective electrode guard during measurement and calibration as it may affect your readings.
We recommend that you do not submerge the electrode above the protective yellow cap. You can submerge the cable for brief periods of time, but not continuously.

1.5.2 Protective Rubber Boot

The rubber boot protects the meter and gives a good hand grip. It is ideal when you use the meter in the field. For bench top applications, lift up the stand at the back of the rubber boot.

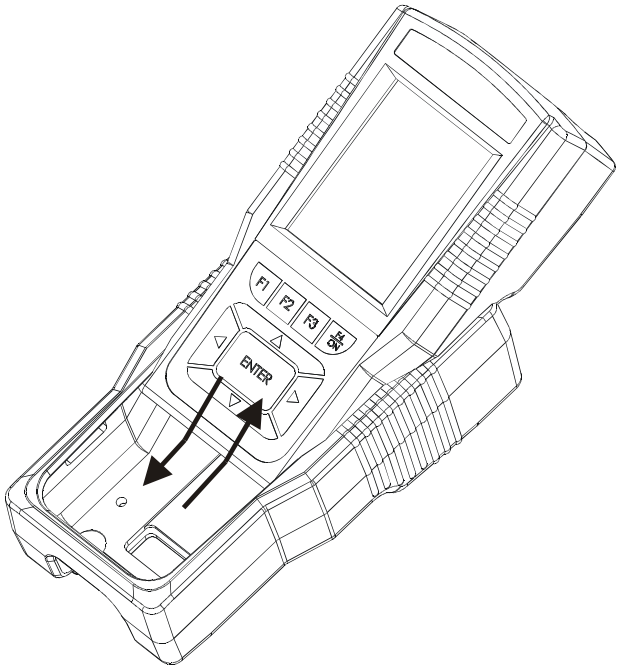


Figure 8 : Inserting/removing the rubber boot

1.6 CyberComm 600 Data Acquisition Software

1.6.1 About CyberComm 600 DAS Application

The COND 600 series meters are shipped with a companion software application called **CyberComm 600 Data Acquisition Software (DAS)**. This is a simple, easy to use, Windows® based PC compatible software application which lets you download your measurement data, calibration reports & stored data from the COND 600 series meters and save them in your PC in text (.txt) files. It automatically recognizes meter's model number once the connection is established.

CyberComm DAS communicates with the meter through wireless IrDA connection. You need to have a PC or Notebook running Windows® 2000 or Windows® XP with an IrDA port or with USB-IrDA dongle (not supplied) installed into the USB port of your PC.

1.6.2 Installing CyberComm 600

Make sure to log in to your computer with administrator user account. Insert the supplied software CD into the CDROM drive of your computer. The installation wizard should automatically start. Follow the screen instructions and complete the installation.

The software installs CyberComm 600 icon on Desktop and Start menu shortcut at 'Start > Programs > PC Communication > CyberComm 600'.

1.6.3 Starting CyberComm 600 for the first time

1. Double-click on the **CyberComm 600** icon available in the Desktop.
2. CyberComm 600 application starts. The screen lists connection procedure.
   - Switch on the meter. Make sure that the following settings have been configured in System Settings of the meter Setup. (Refer Figure 49 : System Settings - Page 4' on page 51 for more details.)
     - PRINT MODE : IrDA
     - DATA FORMAT: CyberComm
     - CURRENT DATA SET: TIMED
   - Make sure the IrDA port of the meter is closer and pointing towards (line-of-sight with) the IrDA port (or USB-IrDA dongle) of the computer.
   - From measurement mode, press left ◀ or right ▶ arrow key until you see **PRIN** function in the display.
   - Press **PRIN (F3)** key. IrDA data communication icon 

starts animating as the meter sends data to computer through IrDA.
3. The Computer recognizes the COND 600 series meter and you will see 'Found New Hardware' message in the Taskbar. (Figure 9)

Figure 9 : Computer recognizes the meter

4. The 'Found New Hardware Wizard' starts automatically. Select '**Yes, this time only**' option for the first screen. (Figure 10) .Click **Next** to continue.

Figure 10 : First screen of 'Found New Hardware Wizard'

5. In the second screen (Figure 11), select '**Install the software automatically (Recommended)**' and click **Next** to continue.

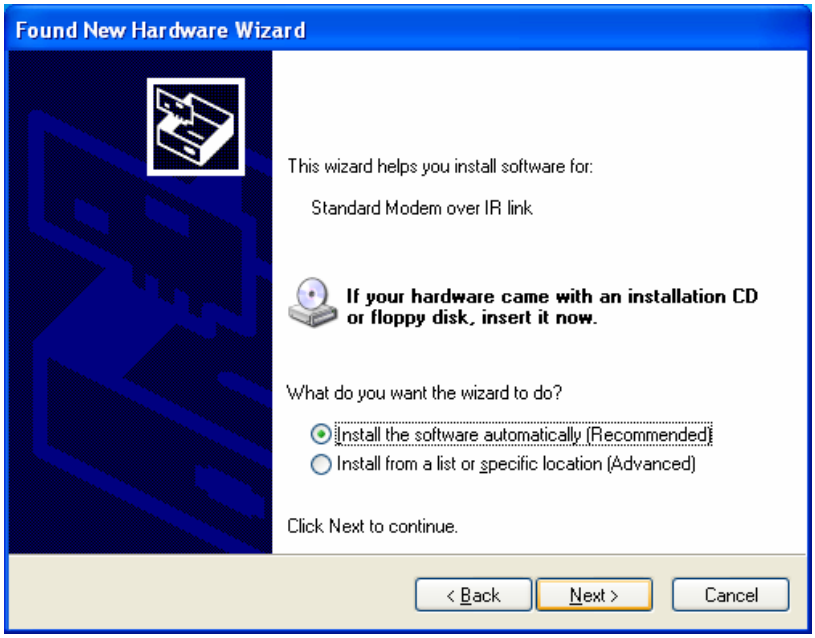


Figure 11 : First screen of 'Found New Hardware Wizard'

6. Once the wizard completed the installation (Figure 12), click **Finish** to close the wizard.

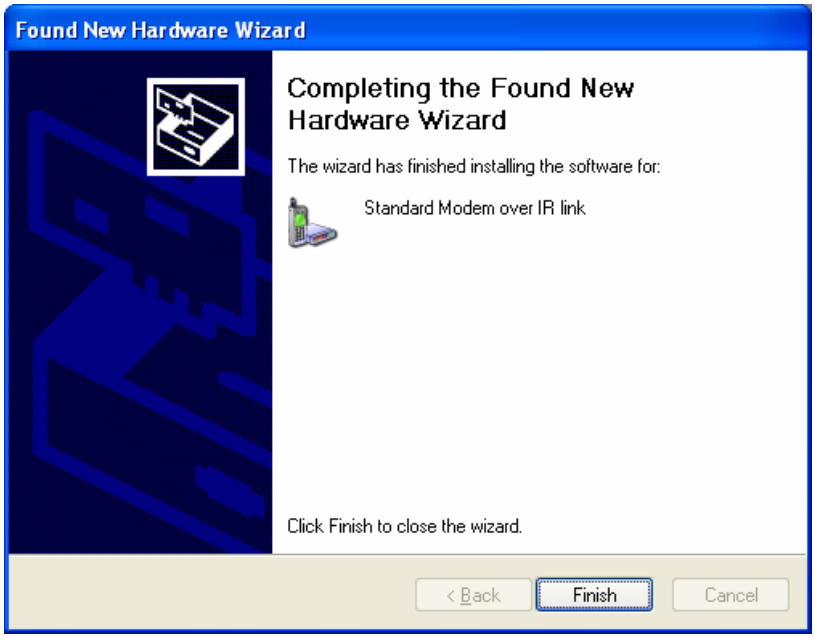


Figure 12 : 'Found New Hardware Wizard' completed

7. In CyberComm 600 application screen, click **Find Device** button. The screen shows a message "Finding device". When CyberComm recognizes the meter it shows "Instrument in Range, click Connect button to establish connection…"

> **Note:** If you do not see the above message, re-position the IrDA port of the meter with IrDA port of computer so that they become close to each other and are in-line.

8. Click **Connect** button. Once the connection is established, the measurement data sent by the meter is shown in the CyberComm screen.

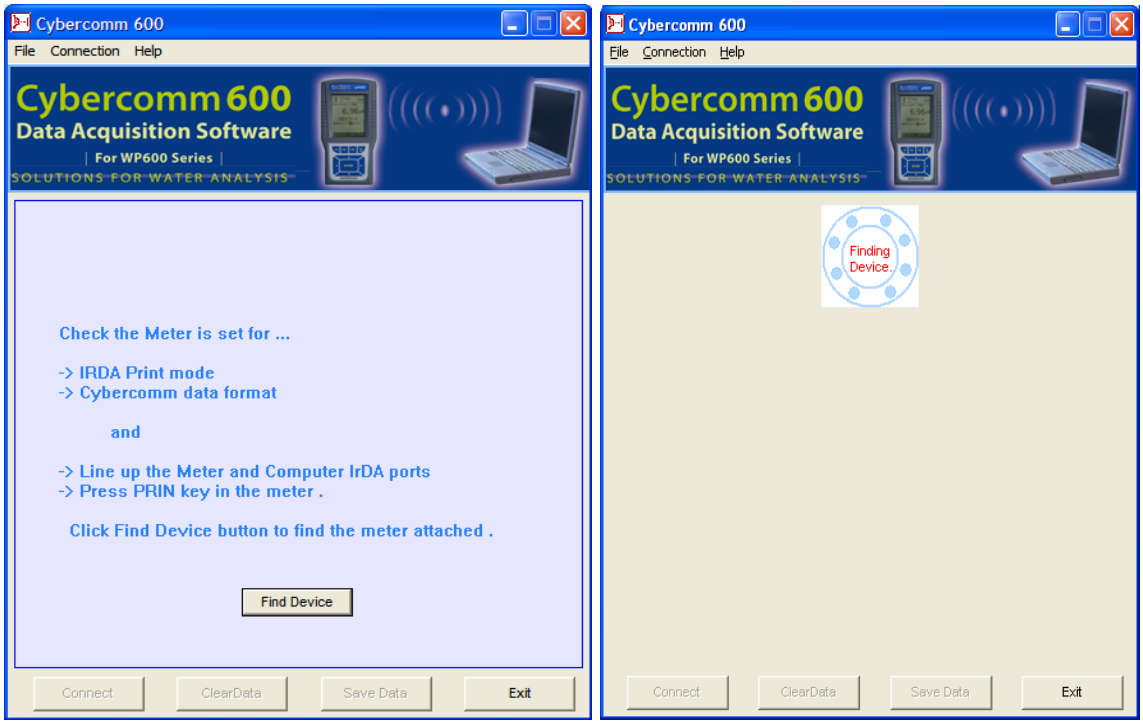
1.6.4 Connecting to the meter

Once you successfully established the connection between the meter and CyberComm, for the first time, as described in the above section, the subsequent connections will be established in a few easy steps.

Follow the steps below to connect CyberComm to the meter:

1. Start CyberComm by double-clicking on **CyberComm 600** Desktop icon. Make sure the IrDA port of the meter is closer and pointing towards (line-of-sight with) the IrDA port (or USB-IrDA dongle) of the computer.
2. In the meter, press **PRIN (F3)** key. IrDA data communication icon IrDA starts animating as the meter sends data to computer through IrDA.

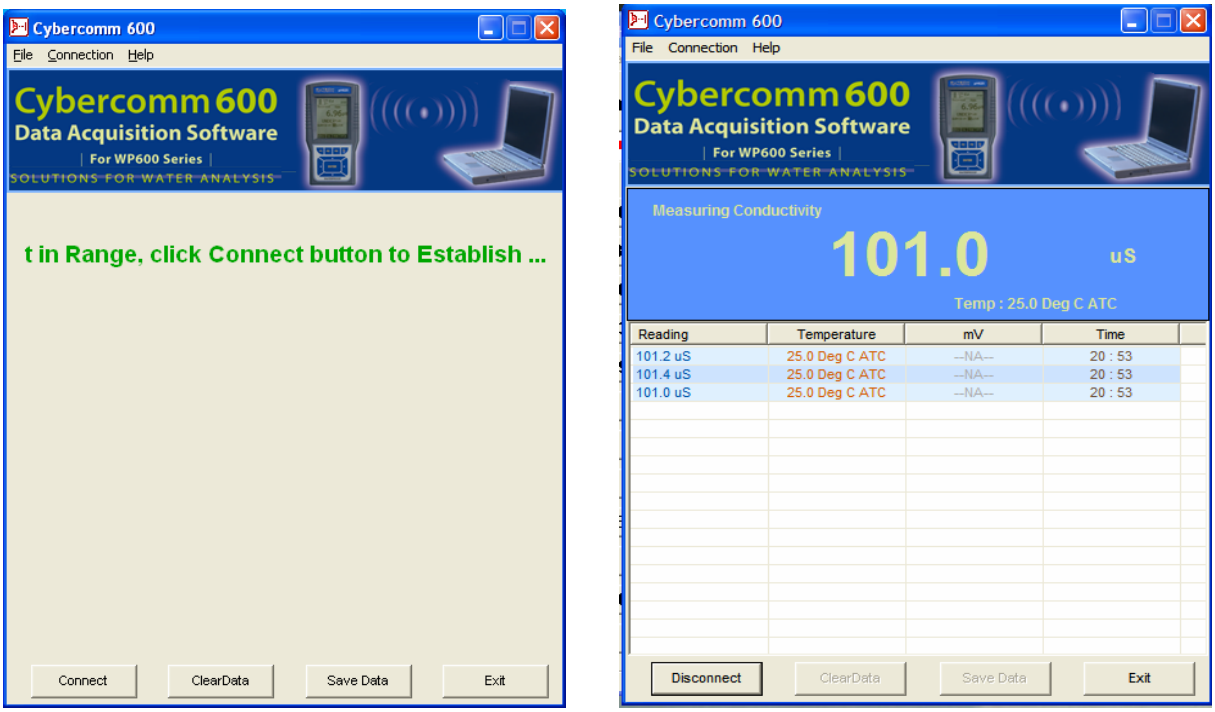
3. In CyberComm, press **Find Device** button.



(a) **(b)**

Figure 13 : CyberComm finds the meter

4. When CyberComm recognizes the meter it shows “Instrument in Range, click Connect button to establish connection…” Press **Connect** button.



(a) **(b)**

Figure 14 : CyberComm establishing connection with the meter

5. The connection is established and data is transferred.

Notes:
The communication between CyberComm and the meter is uni-directional. The connection is initiated by the meter when you press **PRIN** key. Once CyberComm finds the meter, press **Connect** button. Once the connection is established the data is transferred to CyberComm and then the IrDA link is disconnected automatically. IrDA link is disconnected after sending single set of data only if 'SINGLE' is selected from System Setup (page 51).

- To re-establish the connection, you need press **PRIN** key of the meter followed by **Connect** button from CyberComm.
- For continuous transfer of measurement readings, set CURRENT DATA SET parameter to 'TIMED' in System Setup (page 51).
- For single transfer of measurement reading, set CURRENT DATA SET parameter to 'SINGLE' in System Setup (page 51)

2. Measurement Mode

2.1 About Measurement Mode

Following measurement modes are available in COND 600 models:

- Conductivity measurement mode
- TDS measurement mode
- Temperature measurement mode
- Salinity (available only in COND 610 model)
- Resistivity (available only in COND 610 model)

When powered-on, the meter goes to any of the above measurement modes, depending on the last selected measurement mode, before the meter was powered-off. For instance, the meter starts with TDS measurement mode, if the meter was in TDS measurement mode, when you last switched off the meter.

Press **MODE (F3)** key to switch between above measurement modes.

2.1.1 Accessing functions

There are many functions available in the measurement mode. You can use the 4-function key to access them. These functions are grouped into 4 to share the available 4-function keys. The first group appears when you enter the measurement mode. Press left ◀ or right ▶ arrow key to navigate to 2nd and 3rd function groups. .

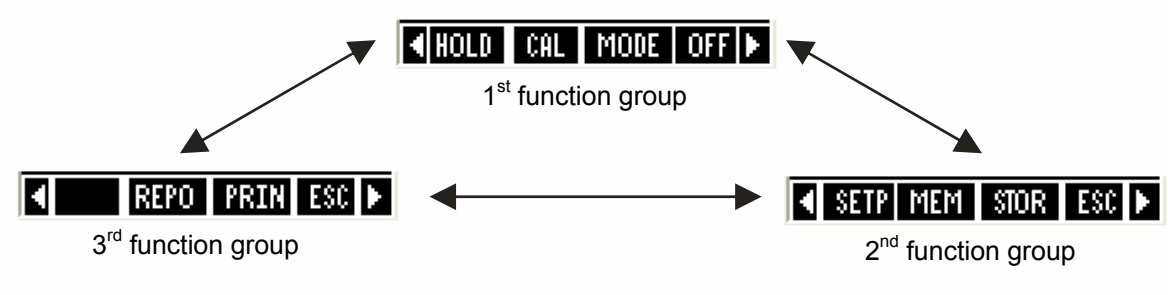


Figure 15 : Use Left ◀ or Right ▶ arrow keys to navigate between function groups

Function Keys available in measurement screen (1st Group):	
HOLD (F1)	Holds the current reading in the display. The 'HOLD' indicator starts blinking. Press HOLD key again to release the reading
CAL (F2)	Goes to corresponding calibration mode (based on the selected measurement mode)
MODE (F3)	Switches between measurement modes COND 600: (Conductivity->TDS->Temperature) COND 610: (Conductivity->TDS->Temperature->Salinity->Resistivity)
OFF (F4)	Power off the meter (press and hold this key for 3 seconds)
◀ ▶	Switches between functions groups available in measurement mode
ENTER	(Not functional)
▲ ▼	(Not functional)

Function Keys available in measurement screen (2nd Group):	
SETP (F1)	Goes to setup mode
MEM (F2)	Shows stored data in the memory
STOR (F3)	Stores the currently displayed reading in the memory
ESC (F4)	Shows 1st Group of functions
Function Keys available in measurement screen (3rd Group):	
REPO(F2)	Shows corresponding calibration report (based on selected measurement mode)
PRIN (F3)	Sends the currently displayed reading to the computer through IrDA. (This key has to be pressed to establish communication with CyberComm PC application through IrDA). If data logging has been selected in System Setup then it sends data automatically to meter's memory.
ESC (F4)	Shows 1st Group of functions

Note: If you press a function key that is not relevant to measurement mode (for example ENTER,▲,▼) the meter shows 'Invalid key!' message in the footer area of the screen as shown in diagram.

Figure 16: Invalid key

2.2 Taking Measurement

2.2.1 Prepare the meter for measurement

Before you start measuring,

- Make sure you have connected a 2-cell or 4-cell conductivity cell with built in ATC probe to the meter.
- Make sure the probes are in good working condition & clean. If required, clean probe with de-ionized water to remove impurities. For more information on probe's conditioning refer page 7.
- Make sure batteries have been installed or the DC adapter is connected to the meter.
- Perform calibration if you change to a new probe.

2.2.2 Taking a reading

1. Press **ON (F4)** key to switch on the meter. The **ON (F4)** key has to be kept pressed until the display comes up.
2. Make sure you are in the required measurement mode. Press **MODE (F3)** to switch between modes.
3. Dip the 2-cell or 4-cell conductivity cell with built in ATC probe into the sample solution.

Note: When dipping the probe into sample, the sensor or the glass bulb of the probe must be completely immersed into the sample. Stir the probe gently in the sample to create a homogeneous sample. Allow time for the reading to stabilize.

4. The LCD shows '**Stable**' indicator if this feature is enabled in setup. (See page 48)
5. Note the reading.

2.2.3 Stable reading indicator

You can configure the meter so that LCD displays a '**Stable**' indicator when the reading does not vary for 2 consecutive seconds. The amount of variations allowed can be set as 'Slow', 'Medium' or 'Fast'. (See page 48)

2.2.4 Holding a reading

In some situations, you may want to freeze (hold) the measured reading in the LCD for a delayed observation. You can hold a reading in two different ways.

Manual Hold – Allows you to hold the reading by pressing **HOLD (F1)** key at any time you want. When you hold a reading, the '**HOLD**' indicator starts flashing. The readings (including temperature reading) will be held until you press any other key again.

Auto-Hold –The meter automatically holds the reading if the reading is '**Stable'** for 5 consecutive seconds. This feature needs to be enabled in the setup (See page 48). Press **HOLD (F1)** key to release the reading.

2.3 Conductivity Measurement Mode

In conductivity measurement mode, the meter displays conductivity and temperature readings. The LCD shows related information for the conductivity measurement such as temperature compensation mode, stable indicator, probe condition, calibration points, response time of the conductivity probe and conductivity alarm conditions. You can customize or enable/disable some of these indicators in the Setup mode.

2.3.1 Indicators in Conductivity measurement screen

Note: Lower display shows '2Cell' or '4Cell' when a 2-cell or 4-Cell conductivity probe is connected.

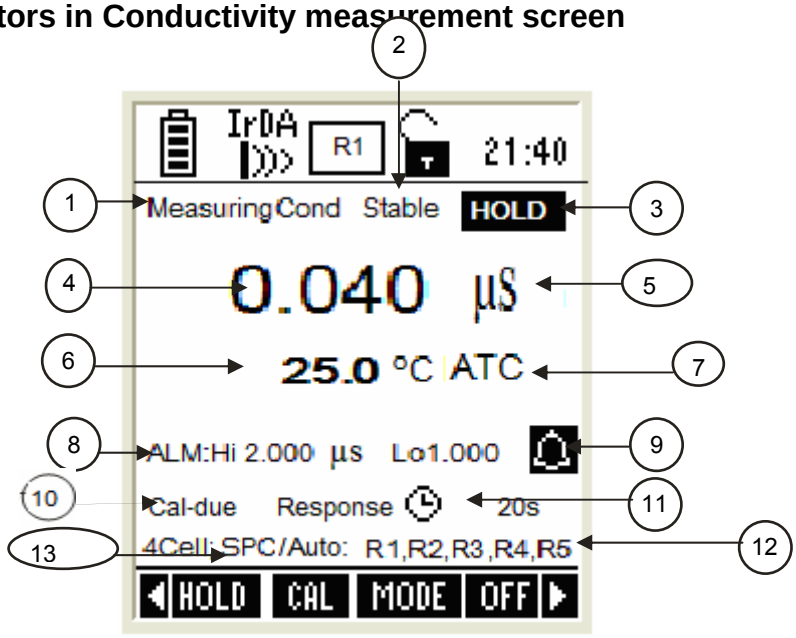


Figure 17 : Conductivity measurement screen

Refer item numbers indicated in Figure 17.

Item	Description	More Details On
1	Measurement mode indicator	-
2	Appears when the reading is stable	Page 48
3	Appears when the reading is on hold	Page 16, 48
4	Conductivity reading	-
5	Units of measurement	-
6	Temperature reading & units	Page 56
7	Temperature compensation mode	Page 18, 56
8	Conductivity HI & LO Alarm limits	Page 55
9	Conductivity Alarm indicator	Page 18, 55
10	Calibration Due indicator	Page 18, 54
11	Response time of the CON probe	Page 48
12	Conductivity ranges	Page 19
13	No of calibration points and method of calibration	Page 19, 54

2.3.2 Automatic Temperature Compensation (ATC)

Connect an appropriate 2-cell or 4-cell conductivity cell with built in ATC probe to the meter and select 'ATC mode' in the temperature setup (See page 56) for the conductivity reading to be automatically compensated for temperature variations.

If you select 'ATC' without connecting a probe to the meter, the LCD shows 'UNDER' for temperature reading.

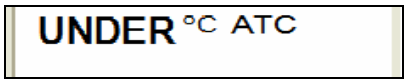


Figure 18: Under range

NOTE: The factory default value for normalization temperature is 25 °C.

2.3.3 Manual Temperature Compensation (MTC)

If a 2-cell or 4-cell conductivity cell with built in ATC probe is not available, you can choose to manually compensate for temperature. This is suitable when the temperature of your sample is sufficiently stable. Select 'MTC mode' in the temperature setup (see page 56). Press **CAL (F2)** and then press **NEXT** key. Press **TEMP (F1)** to go to temperature calibration. Enter the temperature value of your sample. See page 33 for more details on temperature calibration.

2.3.4 Conductivity Alarms

You can set the meter to display an alarm when the conductivity reading goes higher or lower than predefined set points (Hi cond & Lo cond). See page 55 to set alarm points.

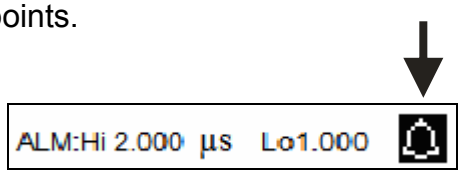


Figure 19 : Hi alarm

2.3.5 Calibration Due (CAL-DUE) Indicator

You can set a reminder to be displayed in the LCD when the next calibration is due. Set the number of days in conductivity Setup (see page 54) and the meter will remind you when the days elapse from your last calibration date.

2.3.6 Calibration mode indicator

This option allows you to select automatic or manual calibration standard. In the automatic calibration mode, the meter automatically detects and verifies the appropriate known calibration standards solutions before accepting these particular calibration standards as one of its calibration values in a specific measurement range.

In the manual calibration, non-standard calibration values can be used for calibration. You can manually input the appropriate values as your desired calibration standards in each specific range. The selected calibration standard will be displayed in the bottom of screen. For example: If manual calibration standard is selected it will display 'Man' in the bottom of screen as shown in Figure 20.

2.3.7 Calibration points indicator

This option allows you to select single or multi point calibration. Single point calibration refers to calibrating one conductivity value and uses it for the entire 5 conductivity ranges. In multi point calibration, you can calibrate one point in each of the measuring ranges (up to 5 points.). The selected calibration point will be displayed in the bottom of screen. For example: If single point calibration is selected it will display 'SPC' in the bottom of screen as shown in diagram.

Figure 20 : Calibration standard & point indicator

2.3.8 Cell constant

This option lets you to adjust cell constant of the conductivity cell that you are using. Cell constant can be adjusted from 0.010 to 10.000 for COND610 and from 0.100 to 10.000 for COND600.

2.3.9 Normalization Temperature (°C)

This option will allow you to select a normalized temperature that the meter will use to normalize its conductivity measurements to a standard temperature.

NOTE: The factory default value for normalization temperature is 25 °C.

2.3.10 Linear temperature Coefficient

The temperature coefficient is a value that reflects the degree to which the conductivity is affected by temperature changes.

NOTE: Your meter is factory set to a temperature coefficient of 2.1% per °C.

If you do not know the temperature coefficient of your solution you can determine the correct value using the formula in page 68 "Calculating Temperature Coefficients".

2.3.11 Pure Water Coefficient

Pure water coefficient will be calculated and applied automatically for ultra pure water measurement if **'ENABLE'** at appropriate set up pages.
For more information regarding pure water coefficient, please refer page 54 and 55.

2.4 TDS Measurement Mode

In TDS measurement mode, the meter displays TDS and temperature reading.

2.4.1 Indicators in TDS measurement mode

Note:
Lower display shows '2Cell' or '4Cell' when a 2-cell or 4-Cell conductivity probe is connected.

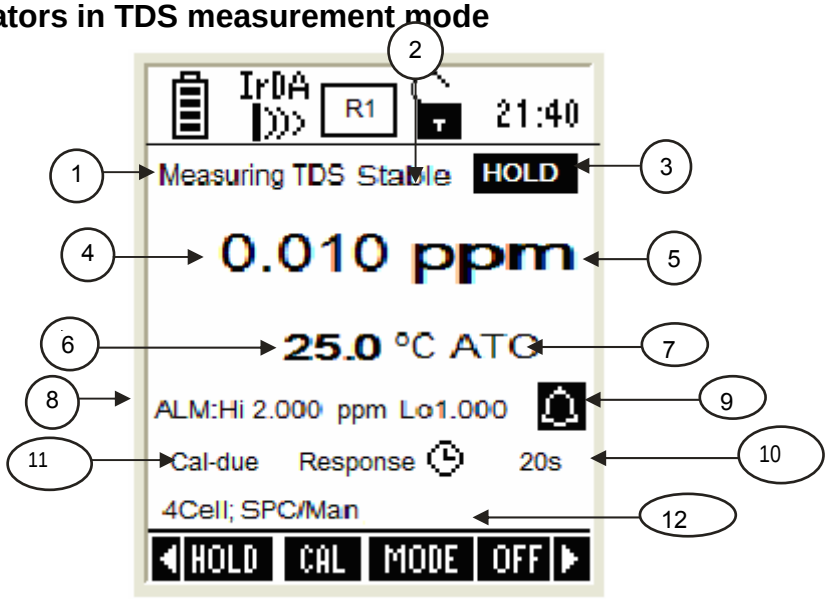


Figure 21 : TDS measurement screen

Refer item numbers indicated in Figure 21.

Item	Description	More Details On
1	Measurement mode indicator	-
2	Appears when the reading is stable	Page 48
3	Appears when the reading is on hold	Page 16, 48
4	TDS reading	-
5	Units of measurement	-
6	Temperature reading & units	Page 56
7	Temperature compensation mode	Page 18, 56
8	TDS HI & LO Alarm limits	Page 56
9	TDS Alarm indicator	Page 18, 56
10	Response time	Page 48
11	Calibration Due indicator	Page 18,57
12	No of calibration points and method of calibration	Page 19,57

Note: The factory default setting for the TDS conversion factor is 0.50. If your solution has a different TDS factor, you can improve calibration accuracy by setting the TDS factor prior to calibration. After setting the correct TDS Factor, you can commence calibration in the TDS mode. For more information regarding TDS conversion factor determination, please refer to page 68.

2.5 Salinity Measurement Mode

(Available only in 610 models)

In Salinity measurement mode, the meter displays salinity and temperature reading.

2.5.1 Indicators in salinity measurement mode

Note: Lower display shows '2Cell' or '4Cell' when a 2-cell or 4-Cell conductivity probe is connected.

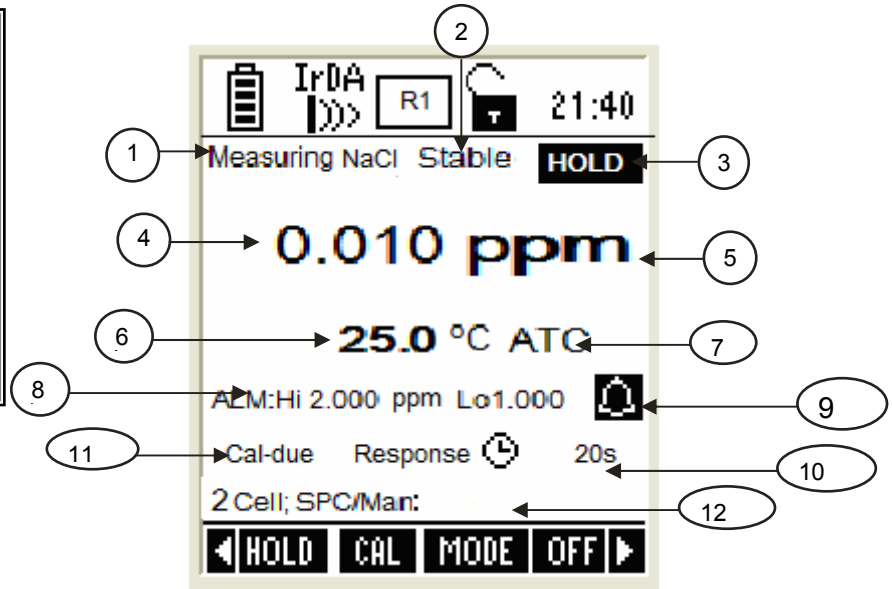


Figure 22 : Salinity measurement screen

Refer item numbers indicated in Figure 22.

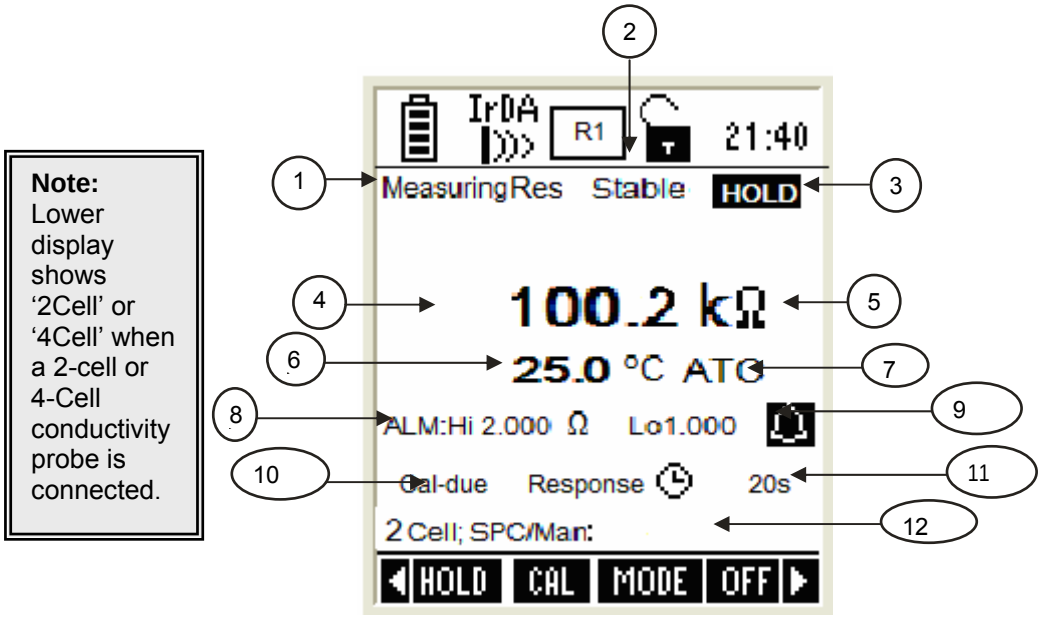
Item	Description	More Details On
1	Measurement mode indicator	-
2	Appears when the reading is stable	Page 48
3	Appears when the reading is on hold	Page 16, 48
4	Salinity reading	-
5	Units of measurement	-
6	Temperature reading & units	Page 56
7	Temperature compensation mode	Page 18, 56
8	Salinity HI & LO Alarm limits	Page 59
9	Salinity Alarm indicator	Page 18, 59
10	Response time	Page 48
11	Calibration Due indicator	Page 18, 59
12	No of calibration points and method of calibration	Page 19, 59

2.6 Resistivity Measurement Mode

(Available only in 610 models)

In Resistivity measurement mode, the meter displays resistivity and temperature reading.

2.6.1 Indicators in Resistivity measurement mode



Note: Lower display shows '2Cell' or '4Cell' when a 2-cell or 4-Cell conductivity probe is connected.

Figure 23 : Resistivity measurement screen

Refer item numbers indicated in Figure 23.

Item	Description	More Details On
1	Measurement mode indicator	-
2	Appears when the reading is stable	Page 48
3	Appears when the reading is on hold	Page 16, 48
4	Resistivity reading	-
5	Units of measurement	-
6	Temperature reading & units	Page 56
7	Temperature compensation mode	Page 18, 56
8	Resistivity HI & LO Alarm limits	Page 61
9	Resistivity Alarm indicator	Page 18, 61
10	Response time	Page 48
11	Calibration Due indicator	Page 18, 61
12	No of calibration points and method of calibration	Page 19, 61

2.7 Transfer Measured Data to Computer (CyberComm)

2.7.1 Sending a single reading

1. Make sure that the CURRENT DATA SET parameter is set to 'SINGLE' in the System Setup (Refer 'System Settings – Page 4' on page 51).
2. Make sure the **CyberComm 600** application is up and running (page 11).
3. Make sure the IrDA port of the meter is closer and in-line with IrDA port of the computer.
4. From measurement mode, press **PRIN (F3)** to send data to CyberComm.
5. In CyberComm screen, press **Find Device** button. CyberComm starts finding the meter.
6. When CyberComm finds the meter, press **Connect** button. The IrDA link is established. The currently displayed measurement reading is transferred to CyberComm. (Figure 24)
7. Once the data transfer is completed, the IrDA link is disconnected automatically.
8. To send another reading, repeat step 3, 4, 5 & 6.
9. To clear the transferred readings from the screen, click **Disconnect** button and the click **Clear Data** button.

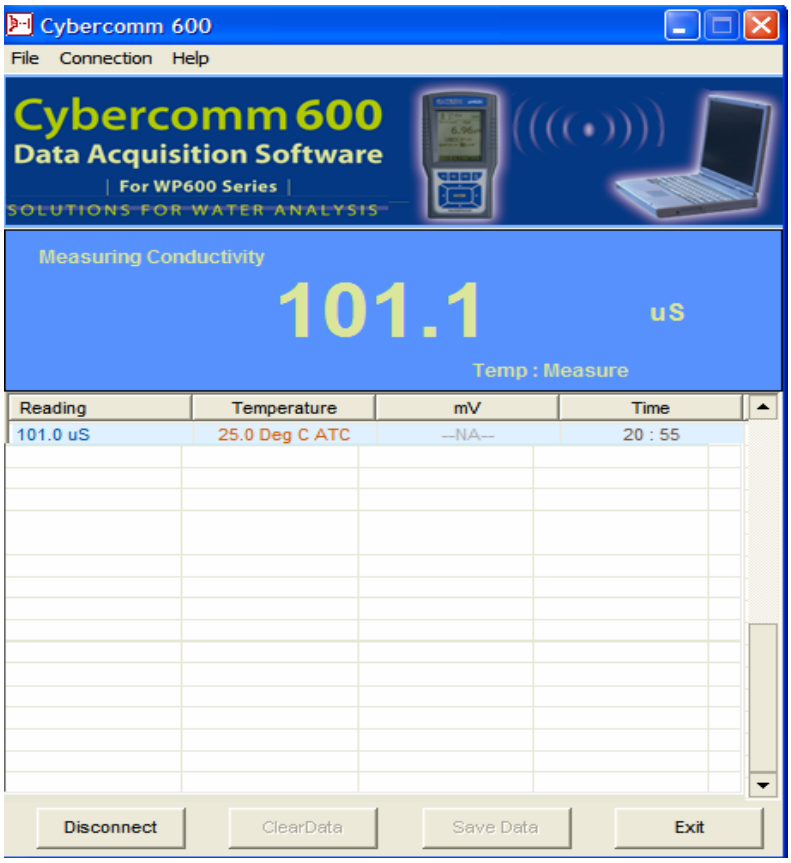


Figure 24 : Transferring a single measurement data

2.7.2 Sending readings continuously

1. Make sure that the CURRENT DATA SET parameter is set to **'TIMED'** in the System Setup. Set the time interval at which you wish to send the data to CyberComm (Refer 'System Settings – Page 4' on page 51).
2. Make sure the **CyberComm 600** application is up and running (page 11).
3. Make sure the IrDA port of the meter is closer and in-line with IrDA port of the computer.
4. From measurement mode, press **PRIN (F3)** to send data to CyberComm.
5. In CyberComm screen, press **Find Device** button.
6. When CyberComm finds the meter, press **Connect** button. The IrDA link is established. The measurement readings are sent to CyberComm continuously at the specified time interval as long as IrDA link is not disconnected. The transferred readings are displayed in the CyberComm screen (Figure 25).
7. To stop data transfer, click **Disconnect** button.
8. To clear the transferred readings from the screen, click **Clear Data** button.

Figure 25 : Transferring measurement data continuously

Note: IrDA link may be disconnected if you move/disorient the IrDA ports during data transfer. Re-align the IrDA ports and press **Connect** button, to re-establish the connection.

2.7.3 Saving data

You can save transferred measurement readings as a text file in your computer. Optionally, these text files can further be analyzed by exporting to spreadsheet application such as Microsoft® Excel.

To save data:

1. Once you transferred data to CyberComm, click **Disconnect** button. (if CyberComm is still connected to the meter)
2. Click **Save Data** button. **User Details** dialog appears to capture user information, file name and additional notes (if any). (Figure 26)

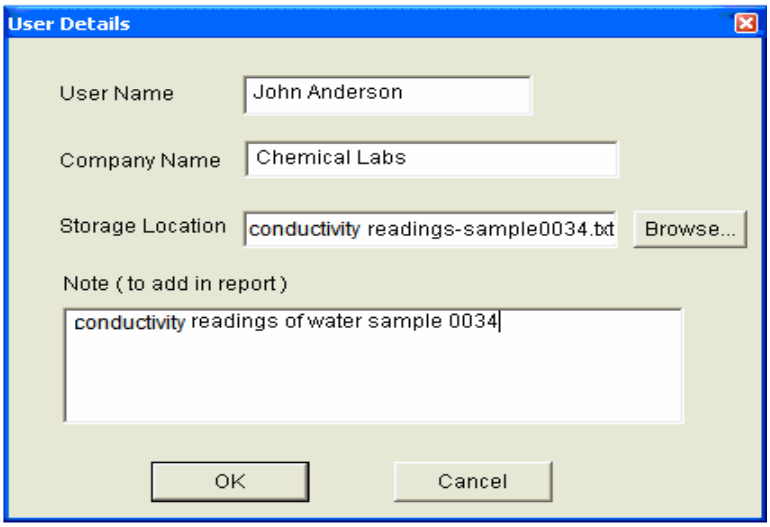


Figure 26 : User Details dialog

3. Enter your name & company name.
4. In **Storage Location**, specify a folder & file name with **.txt** extension.
   - Click **Browse** button. **Save As** dialog appears. Select a folder and specify a name for the file in **File name** field. Make sure you type **.txt** at the end of the file name.
   - If you simply type a file name (example: 'conductivity readings.txt') in the **Storage Location**, the file is saved in the installation folder of CyberComm.

Optionally, you may enter any notes or additional information in the **Notes** field.

5. Click **OK** button to save the data in the specified location/file.

Note: You can open and view the saved file using Windows® Notepad. You need to exit CyberComm before you can open the saved file.

2.8 Working with Memory functions

You can save up to 500 sets of measurement data in the memory. At any time, you can view stored data. Optionally, you can transfer this data to a Computer using wireless Infrared connection.

2.8.1 Logging data automatically in meter's memory

1. Make sure that the Print mode is set to data logging mode in the System Setup and you can also specify the time interval in between each transfer. (Refer: "System Settings – Page 4" on page 51)
2. From measurement mode, press **PRIN (F3)** to start saving data automatically in meter's memory. The memory location of the transferred reading is shown in the bottom-left of the screen. (Figure 27)

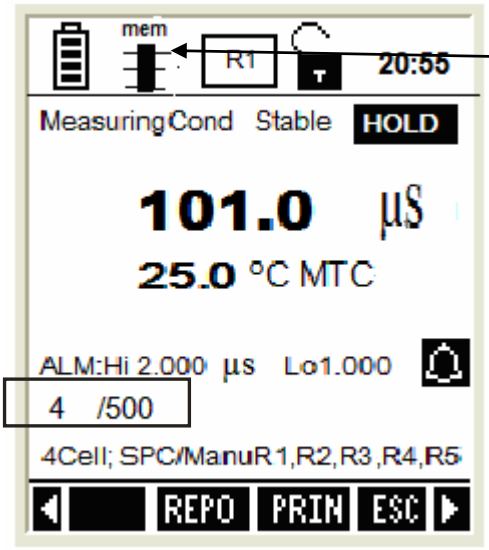


Figure 27 : Saving a reading

2.8.2 Storing currently displayed reading in the memory (In IrDA and LED print mode)

1. Make sure you are in the measurement mode.
2. Press left ◀ or right ▶ arrow key to navigate to other available functions until you see **STOR** function in the LCD.
3. Press **STOR (F3)** key to store the currently displayed reading. The display briefly shows the memory location where this reading is being saved. (Figure 27)

2.8.3 Viewing stored data

1. Make sure you are in measurement mode.
2. Press left ◀ or right ▶ arrow key to navigate to other available functions until you see **MEM** function in the LCD.

3. Press **MEM (F2)** key to view stored data. The last stored data entry is shown in the display (Figure 28). The memory location of the currently showing data entry is shown in the top-right corner of the screen. (Figure 28).

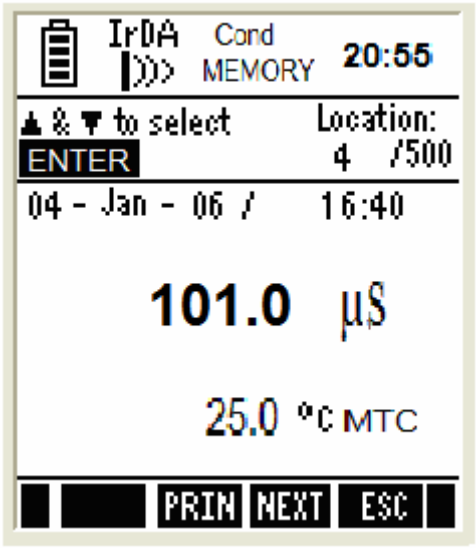


Figure 28 : Viewing stored data

4. To navigate to a particular memory location, press up ▲ or down ▼ arrow key to select memory location you intend to navigate to and then press **ENTER** key. The meter shows the stored data in the memory location you selected.
5. Press **NEXT (F3)** key to return to measurement mode from where you entered to view memory.
6. Press **ESC (F4)** key to return to main screen of the measurement mode.

2.8.4 Transferring stored data to Computer (CyberComm) through IrDA

1. Make sure the **CyberComm 600** application is up and running (page 11).
2. Make sure the IrDA port of the meter is closer and in-line with IrDA port of the computer.
3. Go to 'stored data viewing' screen as described in above section (Figure 28).
4. Press **PRIN (F2)**. The screen appears for you to select printing options (Figure 29).This allows you to choose either all memory locations or the current memory location for transfer.
5. Press up ▲ or down ▼ arrow key to select your choice and then press **ENTER** key.
6. If you have selected 'All locations', then you can specify the time interval in between each transfer. Press up ▲ or down ▼ arrow key to select time interval (1 to 50 seconds) and press **ENTER** key.
7. In CyberComm screen, press **Find Device** button.
8. Once CyberComm finds the meter, click **Connect** button to establish connection.

9. The CyberComm establishes connection with meter through IrDA and sends the data (Figure 30). The connection stops automatically once the data is transferred.
10. You can save the transferred data to a text file. See ‘Saving data’ section in page 25.

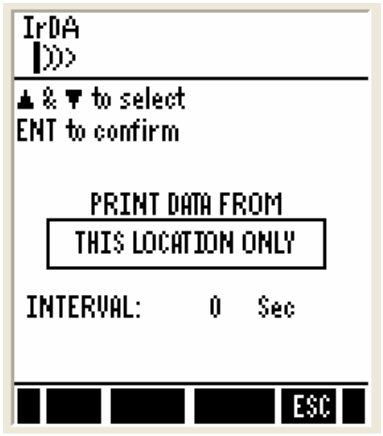


Figure 29 : Selecting options for printing memory locations

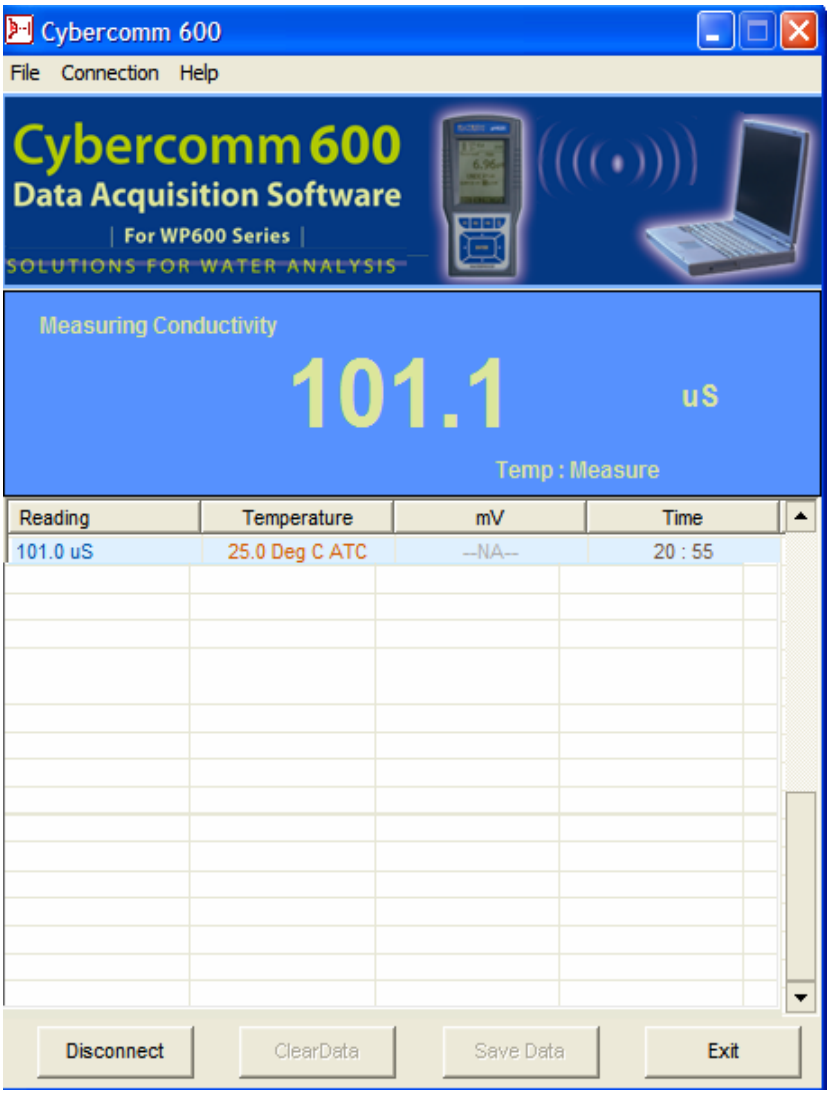


Figure 30 : Transfer Stored data to CyberComm

3. Calibration Mode

3.1 About Calibration

COND 600 series meters are factory calibrated and allows you to measure conductivity, resistivity, TDS (total dissolved solids) and salinity. Calibrate to all measurement ranges to ensure the highest accuracy throughout all measurement range. However, it is recommended that, for higher accuracy, you calibrate your meter before you make measurements for the first time.

Calibration should be carried out each time a new electrode is attached to the meter or when you suspect that the meter/electrode is out of calibration.

3.1.1 About Temperature Calibration

It is important to ensure that temperature calibration is carried out prior to conductivity calibration since temperature readings affect the accuracy of conductivity measurements. You need to perform temperature calibration only if the temperature value displayed on the meter is different from that of a calibrated thermometer or if cell constant setting is changed. A temperature offset calibration of ± 5 °C/± 9 °F from the default reading is allowed for ATC mode.

3.1.2 About Conductivity/Resistivity/TDS/Salinity Calibration

Before measuring conductivity, resistivity, TDS or salinity, you will need to calibrate the meter with known conductivity, resistivity, TDS or salinity values.

This meter is capable of performing either automatic or manual calibration.

In the automatic calibration mode, the meter automatically detects and verifies the appropriate known calibration standards solutions being calibrated before accepting these particular calibration standards as one of its calibration values in a specific measurement range. This automatic calibration mode frees you from cumbersome calibration procedure.

This meter can perform a single- or multi-point calibration. You will need to set your meter to single- or multi-point calibration in the Setup mode for conductivity, resistivity, TDS or salinity.

Refer to the setup section for the particular mode you will be measuring. Instead of calibrating for TDS directly using TDS calibration standard solutions, you can have TDS calibration by using the conductivity calibration method and enter the appropriate TDS conversion factor into the meter.

For more information regarding TDS Conversion Factor determination, please refer to page 68.

3.1.3 Prepare the Meter for Calibration

Before starting calibration, make sure the meter is in the appropriate measurement mode. Connect the conductivity probe with built-in temperature sensor into the 8-pin connector of the meter.

For best results, select a standard value close to the sample value you are measuring. Alternatively use a calibration solution value that is approximately 2/3 the full-scale value of the measurement range you plan to use. For example, in the 0 to 2000 µS conductivity range, use a 1413 µS solution for calibration.

Perform calibration for all measurement ranges to ensure the highest accuracy throughout all measurement range.

If you are measuring in solutions with Conductivity lower than 100 µS/cm or TDS lower than 50 ppm, calibrate the meter at least once a week to get good accuracy. If you are measuring in the mid ranges and you wash the electrode in de-ionized water and store it dry, calibrate the meter once a month. If you take measurements at extreme temperatures, calibrate at least once a week.

Ensure that you use new conductivity standard solutions or sachets during calibration. Do not reuse standard solutions as it may be contaminated and affect the calibration and accuracy of measurements. Use fresh calibration solution each time you calibrate your meter. Keep solutions in a dry and cool environment if possible.

3.1.4 Accessing Calibration mode

From measurement mode, press **CAL (F2)** key. The meter goes to corresponding calibration mode, based on the selected measurement mode. If the meter is password protected, you will be prompted to enter password. (Refer the below section)

3.1.5 Accessing Calibration mode when password protection enabled

Follow the steps below to access the calibration mode, when password protection is enabled (Refer page 52).

1. Make sure you are in measurement mode. If required, press **MODE (F3)** to switch to the measurement mode for which you wish to perform calibration.
2. Press **CAL (F2)** to go to calibration mode. Login Password screen appears (Figure 31). The meter expects the 5-digit password specified in system setup. (Refer ’System Settings – Page 5’ in page 52)

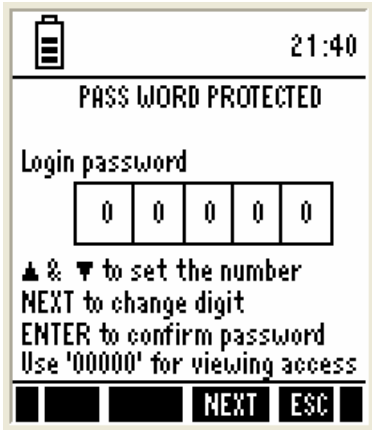


Figure 31 : Login password screen

Note: You can enter '00000' (read-only password) if you wish to view the calibration report of the last calibration. You are not allowed to perform calibration when you enter 'read-only password'.

3. Press up ▲ & down ▼ arrow keys to enter the first digit of the password and then press **NEXT (F3)** key to move to the next digit.
4. The next digit is selected. Press up ▲ & down ▼ arrow keys to enter the second digit of the password.
5. Similarly enter all 5-digits.
6. Press **ENTER** key to confirm the password.
7. When the correct password is entered, the 'Calibration – Rinse Electrode' screen appears (Refer Figure 33-(a)].

Note: If you enter an incorrect password, the screen shows 'Try again'. If an incorrect password is entered for 3 consecutive times, the meter goes to measurement mode.

3.2 Temperature Calibration

The 2-cell conductivity cell with built in ATC probe comes with the meter is factory calibrated. Calibrate the conductivity cell with built in ATC probe only if you suspect temperature errors may have occurred over a long period of time or if you have a replacement probe. This procedure offers offset adjustment of probe to ensure more accurate temperature measurement.

Use a thermometer which is known to be accurate to measure the temperature of your sample.

3.2.1 Temperature Calibration for ATC mode

Make sure you have selected 'ATC' and required unit of measurement (ºC or ºF) in Temperature settings. Refer 'Temperature Setup' section in page 56 for more details.

1. Switch on the meter. Make sure the meter is in measurement mode.
2. Press **CAL (F2)** to go to calibration mode.

> **Note:** If the meter is password protected, you will be prompted to enter a password. Refer 'Accessing Calibration mode when password protection enabled' in page 30.

3. The meter shows 'Calibration-Rinse Electrode' screen Figure 33-(a)] for few seconds and then shows the cell constant adjustment screen.
4. Press **NEXT (F3**) key.
5. Press **TEMP (F1)** to go to temperature calibration. The temperature calibration screen appears (Figure 32).

Figure 32: Temperature calibration screen

6. The screen shows two readings. The upper display shows the temperature reading of the solution with respect to previous calibration (if any) & lower displays shows the temperature reading of the solution without any calibration (default reading). Use ▲ & ▼ keys to adjust the upper display to the temperature reading of the thermometer.

Note: The meter allows you to adjust the upper display reading up to ±5 ºC or ±9 ºF. (Calibration window)

7. Press **ENTER** key to confirm temperature value.

3.2.2 Temperature Calibration for MTC mode

Make sure you have selected 'MTC' and required unit of measurement (ºC or ºF) in Temperature settings. Refer 'Temperature Setup' section in page 56 for more details.

1. Switch on the meter. Make sure the meter is in measurement mode.
2. Press **CAL (F2)** to go to calibration mode.

Note: If the meter is password protected, you will be prompted to enter a password. Refer 'Accessing Calibration mode when password protection enabled' in page 29.

3. The meter shows 'Calibration-Rinse Electrode' screen Figure 33-(a)] for few seconds and then shows the cell constant adjustment screen.
4. Press **NEXT (F3**) key.
5. Press **TEMP (F1)** to go to temperature calibration. The temperature calibration screen appears.
6. The screen shows two readings. The upper display shows the temperature reading of the solution with respect to previous calibration (if any) & lower displays shows the temperature reading of the solution without any calibration (default reading). Use ▲ & ▼ keys to adjust the upper display to the temperature reading of the thermometer.

Note: The meter allows you to adjust the upper display reading to any value within the measuring range -10.0 ºC to 110.0 ºC (14.0 ºF to 230.0 ºF).

7. Press **ENTER** key to confirm temperature value.

Function Keys available in temperature calibration screen:	
NEXT (F3)	Goes to measurement mode from where you entered calibration
ESC (F4)	Goes to measurement mode from where you entered calibration
ENTER	Confirms calibration
▲ ▼	Increase/decrease temperature reading
◀ ▶	(Not functional)

3.3 Conductivity Calibration

3.3.1 Manual Calibration

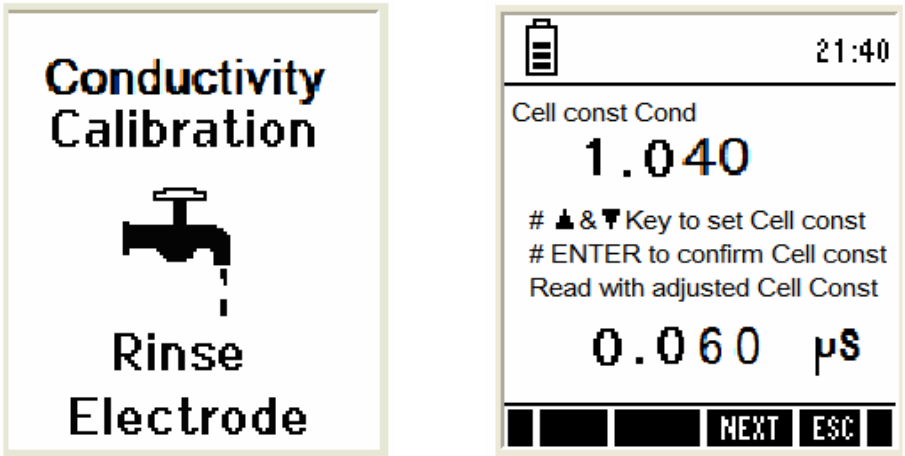
Make sure you have selected a standard solution with which you intend to perform conductivity calibration. Refer 'Conductivity Setup' section in page 54 for more details of setting solution types.

To start manual Calibration for conductivity:
Following is the procedure for single point calibration:

1. Switch on the meter and make sure the meter is in conductivity measurement mode.
2. Dip the probe into the calibration standard. Immerse the probe tip beyond the upper steel band. Stir the probe gently to create a homogeneous sample. Allow time for the reading to stabilize.
3. Press **CAL (F2)** to start calibration.

> **Note:** If the meter is password protected, you will be prompted to enter a password. Refer 'Accessing Calibration mode when password protection enabled' in page 30.

4. The meter shows 'Calibration-Rinse Electrode' screen [Figure 33(a)] for few seconds to prompt user to rinse electrode with de-ionized water before calibration (Refer 'Prepare the Meter for Calibration' section in page 29).



(a) **(b)**

Figure 33 : Calibration Screens

4. The meter then shows cell constant adjustment screen [Figure 33-(b)]. The upper display shows the cell constant of the conductivity cell & lower display shows the measured value of the solution with adjusted cell constant with respect to default calibration. Press ▲ & ▼ keys to adjust the cell constant for your custom solution in upper display.
5. Press **ENTER** key to confirm the calibration.

Note: If you wish to completely re-calibrate the meter, you need to clear previous calibration data. Press **CLR-C (F2)** key to clear previous calibration. The meter shows you confirmation screen. Press **ENTER** key to confirm deleting previous calibration.

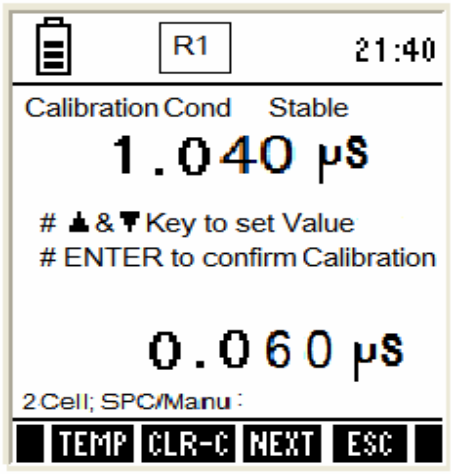


Figure 34 : Conductivity calibration Screen

6. The upper display shows the conductivity reading of the solution with respect to previous calibration (if any) & lower display shows the conductivity reading of the solution without any calibration. Use ▲ & ▼ keys to adjust the upper display of the conductivity value of your custom solution.
7. Press **ENTER** key to confirm the calibration.
8. Press **ESC(F4)** to go to measurement mode.
9. As for the case of multi point calibration, rinse the probe with de-ionized water, and repeat step 1 to 7 for every calibration using the desired calibration solutions until all points have been calibrated.

Function Keys available in Conductivity Calibration mode:	
TEMP (F1)	Goes to temperature calibration
CLR-C (F2)	Clears previous calibration (if any) after ENTER key is pressed in confirmation screen
NEXT (F3)	Shows calibration report
ESC (F4)	Exits from calibration and goes back to conductivity measurement mode
ENTER	Confirms the calibration
▲ ▼	Increases/decreases conductivity cell reading
◀ ▶	(Not functional)

3.3.2 Automatic calibration (For Conductivity Calibration)

In the Automatic Calibration mode, the meter is capable of accepting either single-point or up to 5 points for multi-point calibration with maximum of 1 point per specific measurement range. Select automatic calibration mode in the Conductivity Setup screen. See ‘Conductivity Settings – Page 1’ on page 54 for the set up procedure. Press **(F2)** to start calibration and the meter displays cell adjustment screen as mentioned in the above section.

The following screen is displayed after cell adjustment screen, if you have selected **'Auto'** in Calibration mode and **'MULTI'** in Calibration Point:

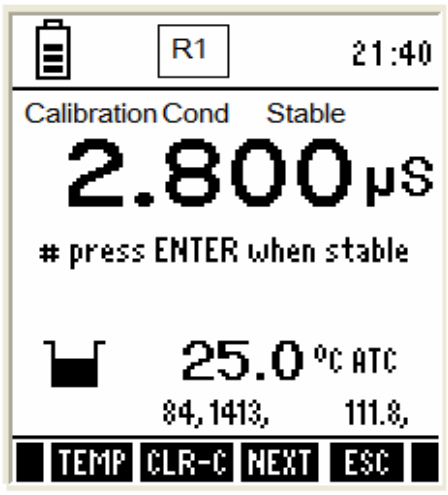


Figure 35 : Conductivity calibration Screen-Auto

1. Rinse the electrode in de-ionized water and prepare electrode for calibration. Refer 'Prepare the Meter for Calibration' section in page 29.

> **Note:** If you wish to completely re-calibrate the meter, you need to clear previous calibration data. Press **CLR-C (F2)** key to clear previous calibration. The meter shows you confirmation screen. Press **ENTER** key to confirm deleting previous calibration.

2. Dip the probe into the calibration standard. Immerse the probe tip beyond the upper steel band. Stir the probe gently to create a homogeneous sample. Allow time for the reading to stabilize.
3. Press **CAL (F2)** to go to calibration mode. The screen shows conductivity reading. The meter scans through all the available points for the selected solution group until it finds a close match within its acceptable calibration window. Once found a match, the display shows 'Stable' indicator.
4. Press **ENTER** key to confirm the calibration.
5. Rinse the probe with de-ionized water. Place it in the next solution and follow the steps 2, 3 and 4 to calibrate other points.

Function Keys available in Conductivity Calibration mode:	
TEMP (F1)	Goes to temperature calibration
CLR-C (F2)	Clears previous calibration (if any) after ENTER key is pressed for the confirmation screen
NEXT (F3)	Shows calibration report
ESC (F4)	Exits from calibration and goes back to conductivity measurement mode
ENTER	Confirms the calibration
▲ ▼ ◀ ▶	Not functional

6. Press **ESC(F4)** to go to measurement mode.

Note: If the user has selected '**SINGLE'** point calibration and **'AUTO'** calibration mode, the meter will go to measurement mode after step 4.

3.3.3 Calibration Report

Calibration report gives you detailed information on calibration. It includes date & time, calibration points, range, factor and cell constant.

To View calibration Report:

1. From conductivity measurement mode, press left ◀ or right ▶ arrow key to navigate to other available functions until you see **REPO** function in the LCD.
2. Press **REPO (F2)** key. The calibration report is shown in the display.
3. Press **PRIN (F2)** to transfer the calibration report to computer through IrDA. (Refer page 27 to print data).

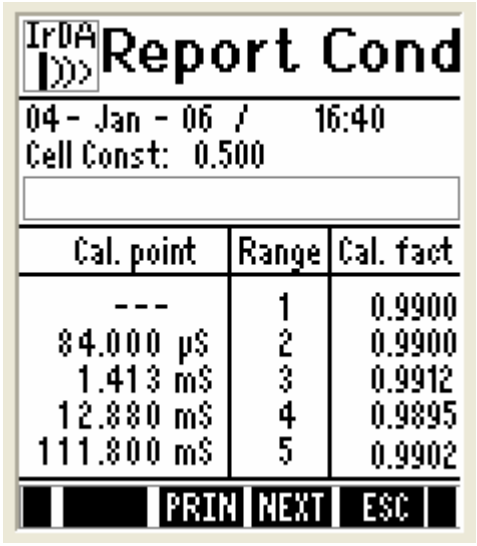


Figure 36: Conductivity Calibration Report

Function Keys available in conductivity calibration report screen:	
PRIN (F2)	Transfers calibration report to Computer through IrDA
NEXT (F3)	Goes to conductivity measurement mode
ESC (F4)	Goes to conductivity measurement mode
ENTER	(Not functional)
▲ ▼ ◀ ▶	(Not functional)

Note: Auto calibration can also be done for electrode with cell constant 0.4 – 2.

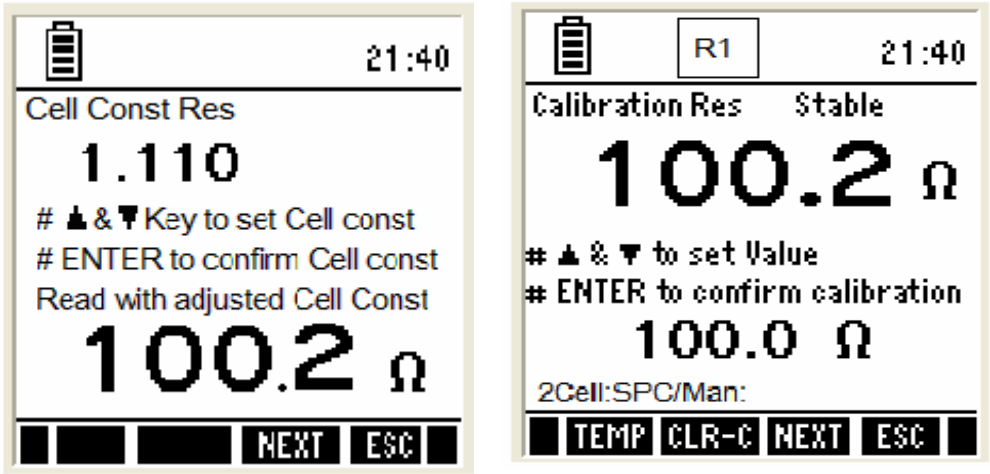
3.4 Resistivity Calibration

Use a standard solution of known value for calibration. Use the single-point standardization option to measure samples that close in value and multi-point standardization to measure wide range of samples.

1. Switch on the meter. Make sure the meter is in resistivity measurement mode.
2. Press **CAL (F2)** to go to calibration mode.

> **Note:** If the meter is password protected, you will be prompted to enter a password. Refer 'Accessing Calibration mode when password protection enabled' in page 30.

3. The meter shows 'Calibration-Rinse Electrode' screen [Figure 33-(a)] few seconds and then shows the cell constant adjustment screen [Figure 37-(a)].



(a) **(b)**

Figure 37 : Resistivity Cell constant & resistivity calibration

4. The upper display of the resistivity cell constant screen [Figure 37-(a)] shows the resistivity cell constant of your solution & lower display shows the measured value of the solution with adjusted cell constant. Press ▲ & ▼ keys to adjust the cell constant for your custom solution in upper display.
5. Press **ENTER** key to confirm the entered value and to go to resistivity calibration screen.
6. The screen shows two readings. The upper display shows the resistivity reading of the solution with respect to previous calibration (if any) & lower display shows the resistivity reading of the solution without any calibration. Use ▲ & ▼ keys to adjust the upper display of the resistivity value of your custom solution.
7. Press **ENTER** key to confirm the entered value.

Note: The function of the keys available on the resistivity cell constant/calibration/ report screen is same as previously described in conductivity calibration.

8. Rinse the probe with de-ionized water. Place it in the next solution and follow the steps 2 to 7 to calibrate other points, if 'MULTI' point calibration is selected.
9. Press **ESC(F4)** to go to measurement mode. The meter shows the resistivity reading of the solution in measurement mode.

3.4.1 Resistivity Calibration Report

Calibration report gives you information on calibration. It includes date & time on which the last calibration was done and the offset.

To View resistivity Report:

1. From resistivity measurement mode, press left ◀ or right ▶ arrow key to navigate to other available functions until you see **REPO** function in the LCD
2. Press **REPO (F2)** key. The calibration report is shown in the display [Figure 38].
3. Press **PRIN (F2)** to transfer the calibration report to the computer.(Refer page 27 to print data)

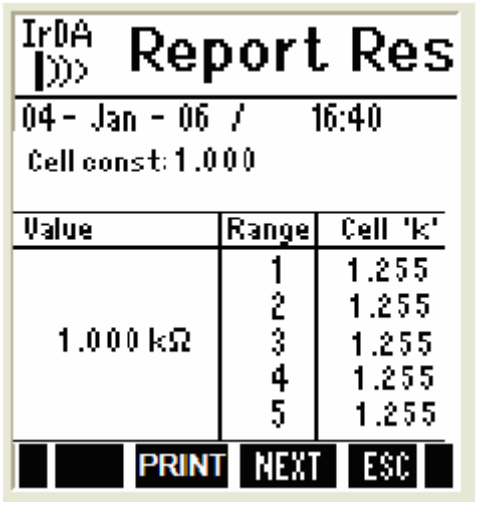


Figure 38 : Resistivity report screen

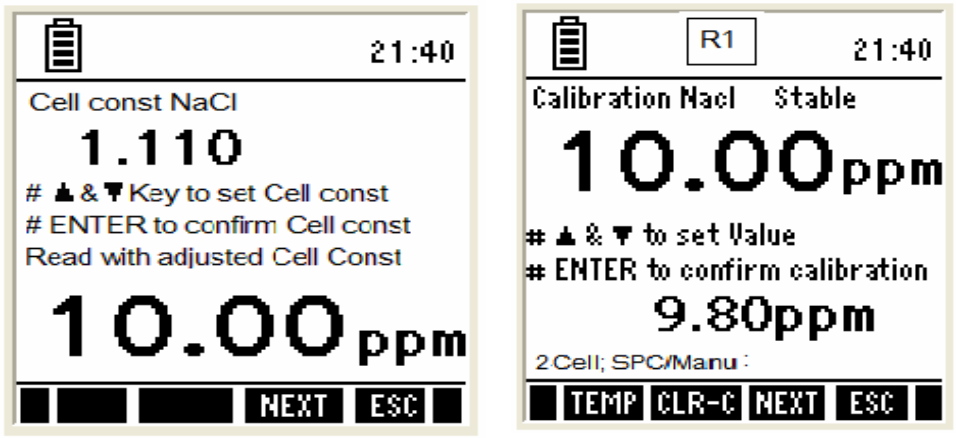
3.5 Salinity Calibration

Use a standard solution of known value for calibration. Use the single-point standardization option to measure samples that close in value and multi-point standardization to measure wide range of samples.

1. Switch on the meter. Make sure the meter is in salinity measurement mode.
2. Press **CAL (F2)** to go to calibration mode.

Note: If the meter is password protected, you will be prompted to enter a password. Refer 'Accessing Calibration mode when password protection enabled' in page 30.

3. The meter shows 'Calibration-Rinse Electrode' screen [Figure 33-(a)] few seconds and then shows the cell constant adjustment screen [Figure 39-(a)].



(a) (b)

Figure 39 : Salinity Cell constant & salinity calibration

4. The upper display of the cell constant adjustment screen [Figure 39-(a)] shows the salinity cell constant of your solution & lower display shows the measured value of the solution with adjusted cell constant. Press ▲ & ▼ keys to adjust the cell constant for your custom solution in upper display.
5. Press **ENTER** key to confirm the entered value and to go to salinity calibration screen.
6. The screen shows two readings. The upper display shows the salinity reading of the solution with respect to previous calibration (if any) & lower display shows the salinity reading of the solution without any calibration. Use ▲ & ▼ keys to adjust the upper display of the salinity value of your custom solution.
7. Press **ENTER** key to confirm the entered value.

Note: The function of the keys available on the salinity cell constant/calibration/ report screen is same as previously described in conductivity calibration.

8. Rinse the probe with de-ionized water. Place it in the next solution and follow the steps 2 to 7 to calibrate other points, if 'MULTI' point calibration is selected.
9. Press **ESC (F4)** to go to measurement mode. The meter shows the salinity reading of the solution in measurement mode.

3.5.1 Salinity Calibration Report

Calibration report gives you information on calibration. It includes date & time on which the last calibration was done and the offset.

To View salinity Report:

1. From salinity measurement mode, press left ◀ or right ▶ arrow key to navigate to other available functions until you see **REPO** function in the LCD
2. Press **REPO (F2)** key. The calibration report is shown in the display [Figure 40].
3. Press **PRIN (F2)** to transfer the calibration report to the computer.(Refer page 27 to print data)

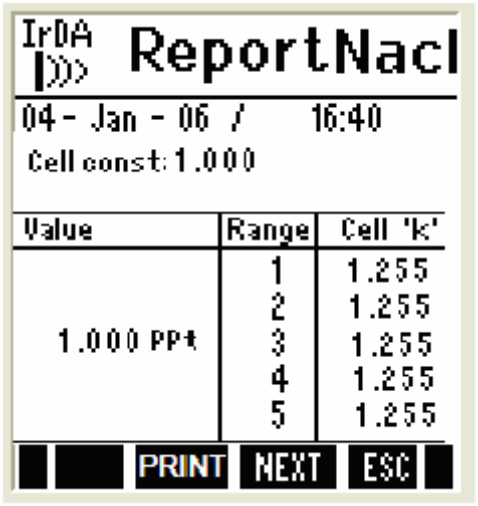


Figure 40 : Salinity report screen

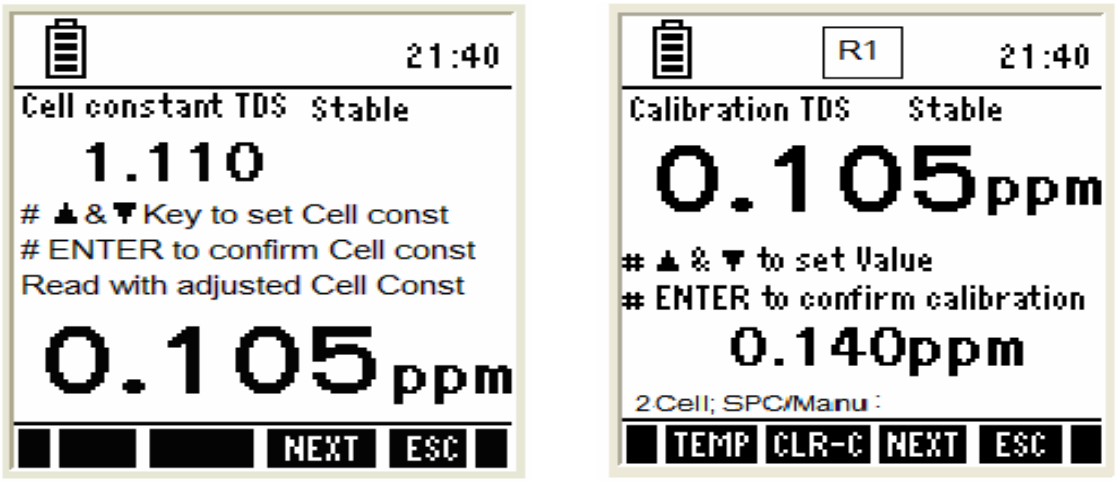
3.6 TDS Calibration

You can commence calibration in the TDS mode by using the conductivity calibration method and after setting the correct TDS factor. For more information regarding TDS conversion factor determination, please refer to page 68. For the rest of the calibration process, follow steps as mentioned in the section of manual calibration on page 29. Use a standard solution of known value for calibration. Use the single-point standardization option to measure samples that close in value and multi-point standardization to measure wide range of samples.

1. Switch on the meter. Make sure the meter is in TDS measurement mode.
2. Press **CAL (F2)** to go to calibration mode.

> **Note:** If the meter is password protected, you will be prompted to enter a password. Refer 'Accessing Calibration mode when password protection enabled' in page 30.

3. The meter shows 'Calibration-Rinse Electrode' screen [Figure 33-(a)] few seconds and then shows the cell constant adjustment screen for TDS [Figure 41(a)].



(a) (b)

Figure 41 : TDS Cell constant adjustment & TDS calibration screen

4. The upper display of the TDS cell constant screen [Figure 33-(a)] shows the TDS cell constant of your solution & lower display shows the measured value of the solution with adjusted cell constant. Press ▲ & ▼ keys to adjust the cell constant for your custom solution in upper display.
5. Press **ENTER** key to confirm the entered value and to go to TDS calibration screen.
6. The screen shows two readings. The upper display shows the TDS reading of the solution with respect to previous calibration (if any) & lower display shows the TDS reading of the solution without any calibration. Use ▲ & ▼ keys to adjust the upper display of the TDS value of your custom solution.
7. Press **ENTER** key to confirm the entered value.

Note: The function of the keys available on the TDS cell constant/calibration/ report screen is same as previously described in conductivity calibration.

8. Rinse the probe with de-ionized water. Place it in the next solution and follow the steps 2 to 7 to calibrate other points, if 'MULTI' point calibration is selected.
9. Press **ESC (F4)** to go to measurement mode. The meter shows the TDS reading of the solution in measurement mode.

3.6.1 TDS Calibration Report

Calibration report gives you information on calibration. It includes date & time on which the last calibration was done and the offset.

To View TDS Report:

1. From TDS measurement mode, press left ◀ or right ▶ arrow key to navigate to other available functions until you see **REPO** function in the LCD.
2. Press **REPO (F2)** key to go to calibration report screen. (Refer page 43)
3. Press **PRIN (F2)** to transfer the calibration report to the computer. (Refer page 27 to print data).

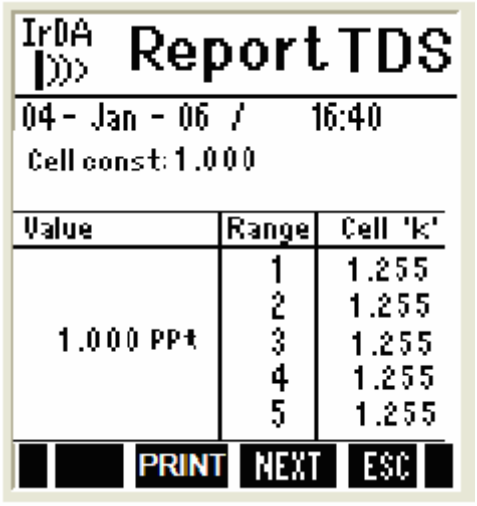


Figure 42 : TDS report screen

4. Setup Mode

4.1 About Setup Mode

The setup mode lets you configure various parameters & settings of the meter. You can choose to password-protect your settings, so that other users who may use the meter will not be able to change the settings.

Setup mode consists of the following sub-groups:

- **System** – General settings of the meter
- **Conductivity/TDS/Salinity/Resistivity** – The Conductivity/TDS/Salinity/Resistivity's Setup screen presents many options to control the operating parameters of their respective mode.
- **Temperature** - Temperature measurement & calibration related settings.

4.1.1 Accessing Setup mode (no password protection enabled)

1. Switch on the meter. The meter goes to measurement mode.
2. Press left ◀ or right ▶ arrow key on the keypad to navigate to other available functions until you see **SETUP** function in the LCD.
3. Press **SETP (F1)** and Setup Key Function screen appears. This page describes the keys functions for configuring various parameters and settings of the meter.

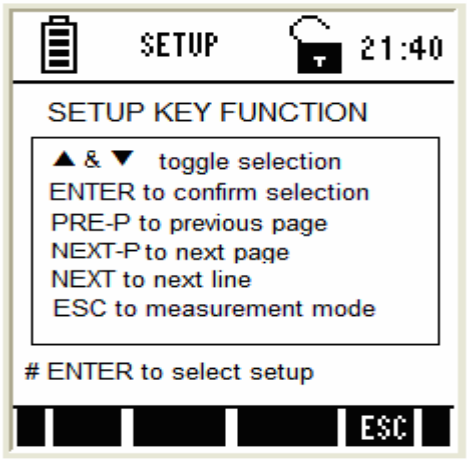


Figure 43: Setup Key Function screen

Note: If the meter is password protected, you will be prompted to enter a password before accessing Setup Key Function screen. Refer 'Accessing Setup mode when password protection enabled' in page 46 for details.

Function Keys available in setup key function screen:	
▲ ▼	To select individual setup
ENTER	To select or confirm the selection.
NEXT-P	To navigate to next page.
NEXT	To go to next parameter without saving the changed parameter.
ESC	To go back to measurement mode.

4. Press **ENTER** key to select Setup Selection screen.
5. Press up ▲ or down ▼ arrow key to go to required setup sub-group.
6. Press **ENTER** key to select the currently shown sub-group.

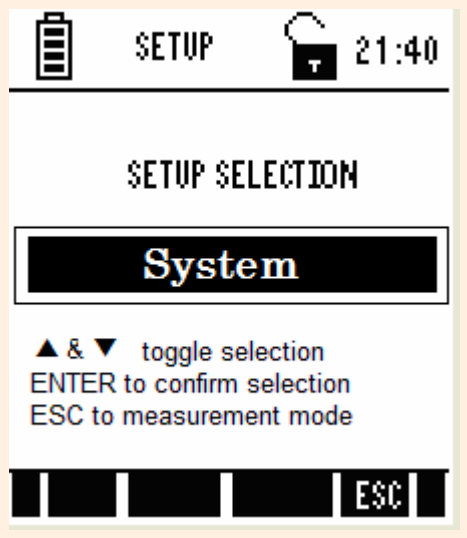


Figure 44: Setup Selection screen

Function Keys available in setup selection screen:	
(F1)	(Not functional)
(F2)	(Not functional)
(F3)	(Not functional)
▲ ▼	Goes to required setup sub-groups
ENTER	Selects the current sub-group
ESC (F4)	Goes to measurement mode from where you entered setup
◀ ▶	(Not functional)

4.1.2 Accessing Setup mode when password protection enabled

Follow the steps below to access the setup mode, when password protection is enabled.

1. Switch on the meter. The meter goes to measurement mode.
2. Press right arrow key ▶ to navigate to other functions on the right-side of LCD.
3. Press **SETP (F1)** to go to Setup mode. Login password screen appears (Figure 45). The meter expects the 5-digit password specified in system setup. (Refer in page 52)

Figure 45 : Login password screen

> **Note:** You can enter ‘00000’ (read-only password) if you wish to view the setup parameters. You are not allowed to modify any parameter when you enter ‘read-only password’.

4. Press up ▲ & down ▼ arrow keys to enter the first digit of the password and then press **NEXT (F3)** key to move to the next digit.
5. The next digit is selected. Press up ▲ & down ▼ arrow keys to enter the second digit of the password. Enter all 5-digits.
6. Press **ENTER** key to confirm the password.

> **Note:** If you enter an incorrect password, the screen shows ‘Try again’. If an incorrect password is entered for 3 consecutive times, the meter goes to measurement mode. If you forget the password there is no way to access the system setting and calibration.

7. When the correct password is entered, the Setup Key Function Screen appears.(Figure 43)
8. Press **Enter** key to launch Setup Selection Screen. (See Figure 44)
9. Press up ▲ or down ▼ arrow key to go to required setup sub-group.
10. Press **ENTER** key to select the sub-group.

4.1.3 Modifying Setup parameters

Follow the steps below to modify setup parameters, when you enter a setup sub-group.

1. Press **NEXT (F3)** key to select individual setup parameters sequentially.
2. Press ▲ (Up) or ▼ (Down) arrow key to change the value of a selected parameter.
3. Once you changed a value:
   - Press **ENTER** key to save the change, or
   - Press **NEXT (F3)** key to go to the next parameter without saving the changed parameter.
4. Press **NEXT-P (F2)** or **PRE-P (F1)** to navigate to next or previous page.
5. Press **ESC (F4)** to exit from setup mode.

Function Keys available in setup sub-group screens:	
PRE-P (F1)	Goes to the previous page of the same sub-group
NEXT-P (F2)	Goes to the next page of the same sub-group
NEXT (F3)	Goes to the next parameter of the same sub-group
ESC (F4)	Goes to measurement mode
▲ ▼	Modify the selected parameter value
ENTER	Confirms/saves the changes made to the currently selected parameter and then goes to the next parameter of the same sub-group
◀ ▶	(Not functional)

4.2 System Setup

System setup sub-group allows you to configure general settings of the meter. The settings are displayed in 6 pages. Press **NEXT-P (F2)** and **PREV-P (F1)** to navigate through these pages.

4.2.1 System Settings – Page 1

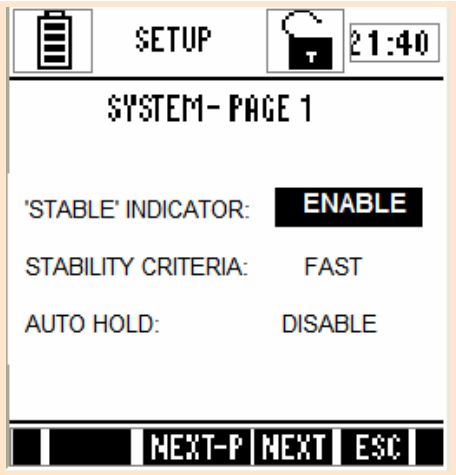


Figure 46: System Settings - Page 1

Parameter	Description	Factory Default
STABLE INDICATOR	ENABLE - The meter displays 'Stable' indicator in the measurement screen as per the 'STABLE CRITERIA' defined below. DISABLE – 'Stable' indicator does not appear.	ENABLE
STABLE CRITERIA	SLOW – The reading is stabilized slowly and exhibits good repeatability MEDIUM – Reading stability is averaged between slow & fast stability FAST – Reading is stabilized quickly at the cost of repeatability. (This parameter has no effect if 'STABLE' parameter is disabled)	FAST
AUTO HOLD	ENABLE - The meter holds the reading in the measurement screen, if the reading is 'Stable' for consecutive 5 seconds. If this is enabled, 'Response time' appears in the measurement screen, indicating the average response time of the conductivity probe. DISABLE – The reading is not held (This parameter has no effect if 'STABLE' parameter is disabled. The response time may not work if the system time has not been set as described in page 49)	DISABLE

4.2.2 System Settings – Page 2

Figure 47 : System Settings - Page 2

This page allows you to set the date & time of the meter.

Parameter	Description	Factory Default
YEAR	Sets the current year	2006
MONTH	Sets the current month	Jan
DATE	Sets the current date	01
HOUR	Sets the hour (24 Hours) for the current time	00
MINUTE	Sets the minute for the current time	00
SECOND	Sets the second for the current time	00

Note: The battery or DC adapter must always be connected to the meter for the system clock to run. The system time might be reset during the battery change. To prevent that happening, always connect the DC adapter during battery change.
Alternatively, if the DC adapter is not available, switch off the meter and change the batteries within **30** seconds to avoid resetting the clock.

4.2.3 System Settings – Page 3

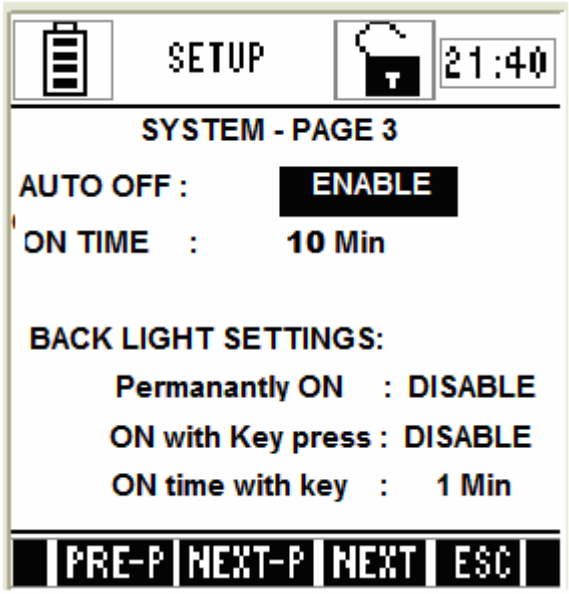


Figure 48 : System Settings - Page 3

This page allows you to set auto-off and back light related parameters.

Parameter	Description	Factory Default
AUTO OFF	ENABLE – Turns off the meter automatically if no key is pressed for the time period specified in 'ON TIME' below. DISABLE – Does not turns off the meter automatically	ENABLE
ON TIME	After the last key is pressed, no. of minutes the meter should wait before automatically shuts down the meter. Maximum range: 30 min (This parameter has not editable if 'AUTO OFF' parameter is disabled)	10 min
BACK LIGHT (permanently ON)	ENABLE – Sets the back light always on. DISABLE – Sets the backlight always off.	DISABLE
BACK LIGHT ON with (Key press)	ENABLE – The back light of the LCD is automatically on when any key is pressed. DISABLE – Does not turn on the back light automatically.	DISABLE
ON TIME with (Key press)	Sets the meter to wait for specified number of minutes before automatically turning off the back light after the last key is pressed. (This parameter is not editable when 'BACK LIGHT (Key press)' is disabled) (This parameter has no effect if 'BACK LIGHT (Always)' parameter is set to ON)	1 min

Note: The above settings may not work if the system time has not been set as described in page 49.

4.2.4 System Settings – Page 4

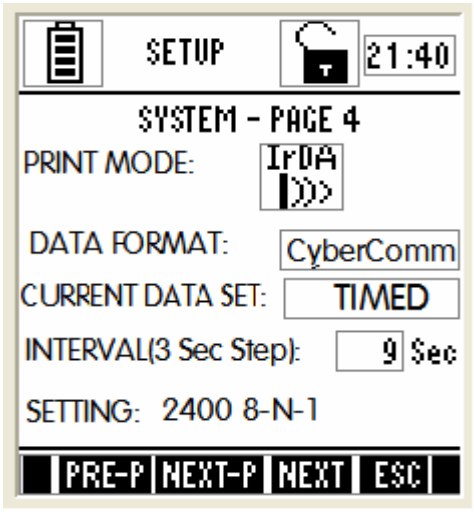


Figure 49 : System Settings - Page 4

This page allows you to set wireless serial data communication related parameters.

Parameter	Description	Factory Default
PRINT MODE	IrDA – Sets serial data communication protocol to IrDA LED – Sets serial data communication protocol to RS232C MEM- Logs data to meter's memory.	IrDA
DATA FORMAT	CyberComm – Select this format if you use CyberComm Data Acquisition Software (DAS) TEXT – Select this format if you use any other method (such as Windows® Hyperterminal) This parameter is used when downloading data from the meter through IrDA	CyberComm
CURRENT DATA SET	TIMED – Prints measurement data continuously at the interval specified in 'INTERVAL' parameter below. SINGLE – Prints only the currently measured reading This parameter applies when PRIN key is pressed from measurement mode to send the currently measured readings to the computer.	TIMED
INTERVAL (3 Sec Step)	Time interval at which the meter should send currently measured data to the printer/CyberComm/PC Acceptable range : 3 sec to 600 sec (in 3 sec steps) (This parameter is applicable when 'CURRENT DATA SET' is set to 'TIMED' and this is not editable when 'CURRENT DATA SET' is set to 'SINGLE')	9 Sec
SETTING	Indicates serial communication settings in the format of 'Baud rate, Data bits-Parity bits-Stop bits'. This parameter is not editable.	2400 8-N-1

4.2.5 System Settings – Page 5

This page allows you to enable password protection for the setup mode & calibration mode.

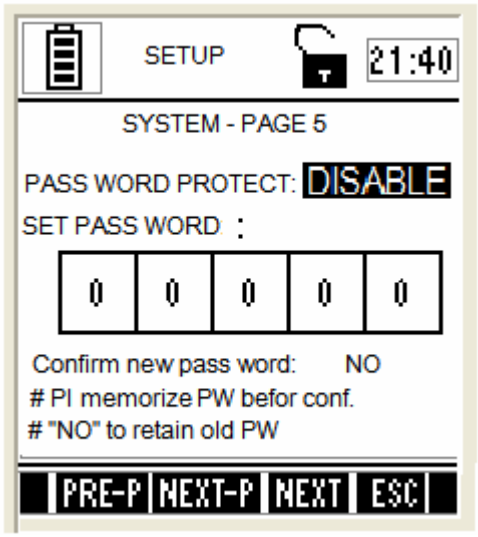


Figure 50 : System Settings - Page 5

When you enable password protection, the meter prompts to enter the password whenever you try to access the Setup or Calibration mode. (See figure 37. Login password screen).The meter does not allow you to edit setup parameters or perform a new calibration unless you enter the correct password. If an incorrect password is entered for 3 consecutive times, the meter goes to measurement mode.

Parameter	Description	Factory Default
PASSWORD PROTECT	ENABLE – Sets password protection for the setup & calibration mode. If this is enable you need to specify a 5-digit password in the 'SET PASSWORD' parameter below DISABLE – Disable password protection of the meter	DISABLE
SET PASSWORD	Specify your 5-digit password here. Use ▲ (Up) & ▼ (Down) key to select a number and then press **ENTER** key to confirm and move to the next digit. Do not set your password to '00000' as this is reserved for 'read-only' password. (This parameter is not editable when 'PASSWORD PROTECT' is disabled)	88888
CONFIRM PASSWORD	YES – Select this if you have made changes to the password and you wish to confirm the changes. NO – Select this if you wish to ignore the changes made to the password and to store the default password.	NO

Important:

1. Please memorize the password that you have entered after enabling the password protection because without entering password, neither you can disable the password protection or reset the meter to factory defaults. However, **if the user forgets his password, he can contact the nearest distributor or Eutech Instruments/Oakton Instruments to request for meter password**. This would be unique to each instrument and would be tied to the serial number of the unit.
2. Default password '88888' is valid only if it is not changed with new password.
3. You can enter '00000' (read-only password) if you wish to view the setup parameters. You are not allowed to modify any parameter when you enter 'read-only password'.

4.2.6 System Settings – Page 6

Figure 51 : System Settings - Page 6

This page allows you to clear the memory and reset the meter to factory defaults.

Parameter	Description	Factory Default
CLEAR MEMORY	YES – Select this to clear all the stored data from the meter's memory NO – Select this if you do not wish to clear the stored data from the meter's memory	NO
FACTORY RESET	YES – Select this if you wish to reset the meter to its factory default settings. This includes: ▪ Deleting your calibration data ▪ Resetting setup parameters to factory defaults (except date & time) ▪ Deleting your stored data in the memory NO – Select this if you do not wish to reset the meter. When 'YES' is selected and confirmed by pressing ENETR key, the meter is reset to factory defaults and then the meter goes to measurement mode.	NO

4.3 Conductivity Setup

Conductivity setup screen present many options to control the operating parameters, which can be controlled and set from the conductivity setup screen. The settings are displayed in 2 pages. Press **NEXT-P (F2)** and **PREV-P (F1)** to navigate through these pages.

4.3.1 Conductivity Settings – Page 1

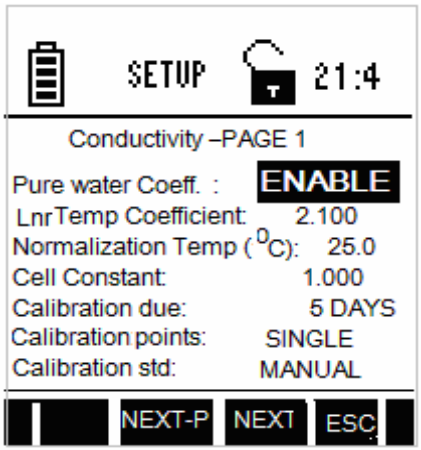


Figure 52 : Conductivity Settings - Page 1

This page allows you to set operating parameters for the conductivity measurement mode:

Parameter	Description	Factory Default
Pure water Coeff.	Pure water coefficient will be calculated and applied automatically for ultra pure water measurement if enabled. (For more information, please refer page 55)	ENABLE
Lnr Temp Coefficient	Specify temperature coefficient to measure temperature corrected conductivity	2.100
Normalization Temp	Select a default temperature that the meter will use along with the temperature coefficient to calculate a temperature corrected conductivity measurement.	25
Cell Constant	Select the appropriate cell constant of the conductivity cell. Available cell constants: 0.1 to 10	1.000
Calibration due	Specify number of days for the Conductivity calibration alarm. The meter shows CAL DUE indicator after calibration date. Available range : 0 to 30	5 days
Calibration points	**Single** - In single point calibration one calibrated conductivity value can be used for the entire 5 conductivity ranges. **Multi** - In multi point calibration, you can calibrate one point in each of the measuring ranges (up to 5 points.)	Single
Calibration mode	**AUTO**- In the automatic calibration mode, the meter automatically detects and verifies the appropriate known calibration standards solutions. **Manual**- In the manual calibration, you can manually input the appropriate values as your desired calibration standards in each specific range.	Auto

Note: 1. If pure water coefficient is **'ENABLE',** the meter will apply pure water compensation automatically below 2 μS and switch back to linear compensation for above 2 μS.

2. If pure water coefficient is **'DISABLE',** Lnr Temp Coefficient applies throughout the measurement.

4.3.2 Conductivity Settings – Page 2

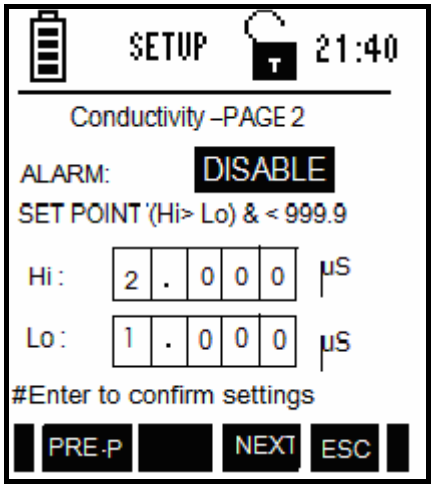


Figure 53 : Conductivity Settings - Page 2

This page allows you to set alarm limits for the conductivity measurement mode. A visual alarm symbol will appear on the screen, if the conductivity value of the measurement is outside of the boundaries set by the minimum and maximum limits.

Parameter	Description	Factory Default
ALARM SET POINTS	Set alarm limits for the conductivity measurement mode: ENABLE – The measurement screen shows HI or LO alarm indicators when the meter reading is above 'HI alarm value' or below 'LO alarm value' specified in HI & LO μS parameters (below) DISABLE – HI and LO alarms are not shown in the LCD	DISABLE
Hi ms	Specify Hi alarm value here. The Hi alarm occurs when the conductivity reading goes above this value Available range: Hi μs (specified below) to 2.000 μs (This parameter is not editable when 'ALARM SET POINT' is disabled)	2.000 μs
Lo μs	Specify Lo alarm value here. The Lo alarm occurs when the conductivity reading goes below this value Available range:1.00 μS to Hi mS (specified above) (This parameter is not editable when 'ALARM SET POINT' is disabled)	1.000 μs

4.4 Temperature Setup

Temperature setup sub-group allows you to configure temperature measurement & calibration related settings of the meter.

4.4.1 Temperature Setting Page

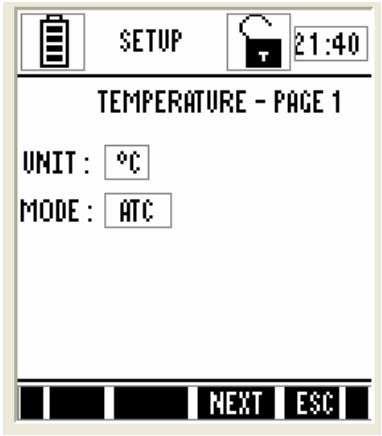


Figure 54 : Temperature Settings Page

Parameter	Description	Factory Default
UNIT	Sets the unit of measurement for temperature. Available units: °C and °F	°C
MODE	Sets the temperature compensation mode. ATC – Automatic Temperature Compensation MTC – Manual Temperature Compensation	ATC

☞ Press ▲ (Up) or ▼ (Down) arrow key to change unit of measurement and temperature compensation mode.

4.5 TDS Setup

TDS setup screen present many options to control the operating parameters, which can be controlled and set from the TDS setup screen. The settings are displayed in 2 pages. Press **NEXT-P (F2)** and **PREV-P (F1)** to navigate through these pages.

4.5.1 TDS Settings – Page 1

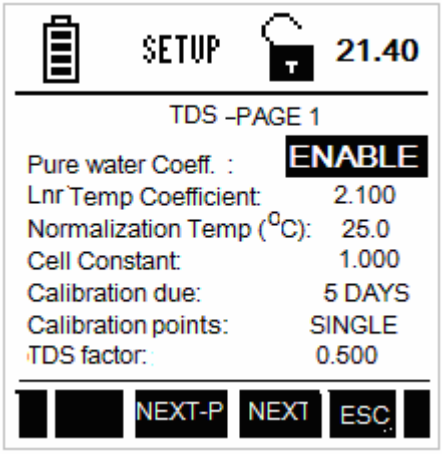


Figure 55 : TDS Settings - Page 1

This page allows you to set operating parameters for TDS measurement mode:

Parameter	Description	Factory Default
The Pure water coeff, Lnr Temp Coefficient, normalization temperature, cell constant, calibration due, calibration points are set the same way as previously described in Conductivity set up. See 'Conductivity Settings – Page 1' on page 54.		
TDS factor	The TDS conversion factor is the number used by the meter to convert from conductivity to TDS. The TDS conversion factor automatically adjusts the reading. The TDS conversion factor can be set from 0.40 to 1.00. For more information on TDS refer pages 20 and 68	0.500

NOTE: The factory default setting for the TDS conversion factor is 0.50.

4.5.2 TDS Settings – Page 2

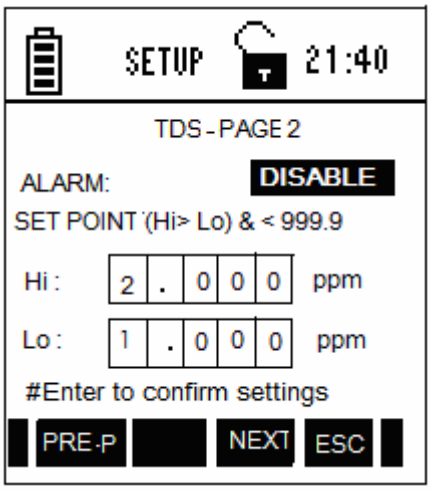


Figure 56 : TDS Settings - Page 2

This page allows you to set alarm limits for the TDS measurement mode:

Parameter	Description	Factory Default
ALARM SET POINTS	Set alarm limits for the TDS measurement mode: ENABLE – The measurement screen shows HI or LO alarm indicators when the meter reading is above 'HI alarm value' or below 'LO alarm value' specified in HI & LO ***ppm*** parameters (below) DISABLE – HI and LO alarms are not shown in the LCD	DISABLE
Hi ppm	Specify Hi alarm value here. The Hi alarm occurs when the TDS reading goes above this value Available range: Hi ***ppm*** to 2.00 ***ppm*** (This parameter is not editable when 'ALARM SET POINT' is disabled)	2.00 ppm
Lo ppt	Specify Lo alarm value here. The Lo alarm occurs when the TDS reading goes below this value Available range: 1.00 ppt to Hi ***ppm*** (specified above) (This parameter is not editable when 'ALARM SET POINT' is disabled)	1.00 ppt

☞ Press ▲ (Up) or ▼ (Down) arrow key to set high or low alarm point.

4.6 Salinity Setup

Salinity setup screen present many options to control the operating parameters, which can be controlled and set from the salinity setup screen. The settings are displayed in 2 pages. Press **NEXT-P (F2)** and **PREV-P (F1)** to navigate through these pages.

4.6.1 Salinity Settings – Page 1

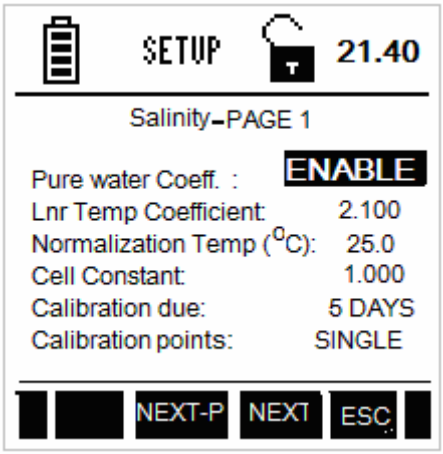


Figure 57: Salinity Settings - Page 1

This page allows you to set operating parameters for salinity measurement. The Pure water coeff, Lnr Temp Coefficient, normalization temperature, cell constant, calibration due, calibration points are set the same way as previously described in Conductivity set up. See 'Conductivity Settings – Page 1' on page 54.

4.6.2 Salinity Settings – page 2

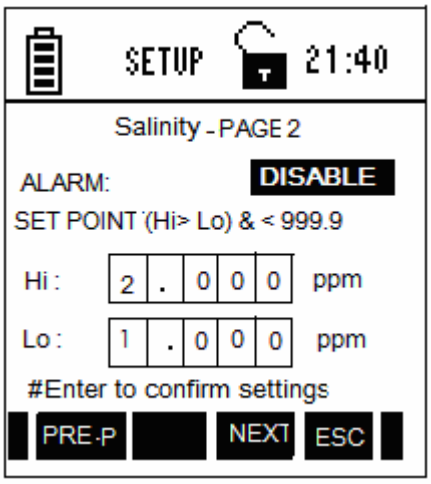


Figure 58: Salinity Settings - Page 2

This page allows you to set alarm limits for the salinity measurement mode:

Parameter	Description	Factory Default
ALARM SET POINTS	Set alarm limits for the salinity measurement mode: ENABLE – The measurement screen shows HI or LO alarm indicators when the meter reading is above 'HI alarm value' or below 'LO alarm value' specified in HI & LO ***ppm*** parameters (below) DISABLE – HI and LO alarms are not shown in the LCD	DISABLE
Hi ppm	Specify Hi alarm value here. The Hi alarm occurs when the salinity reading goes above this value Available range: Hi ppm to 2.00 ppm	2.00 ppm
Lo ppt	Specify Lo alarm value here. The Lo alarm occurs when the salinity reading goes below this value Available range:1.00 to Hi ***ppm*** (specified above) (This parameter is not editable when 'ALARM SET POINT' is disabled)	1.00 ppt

☞ Press ▲ (Up) or ▼ (Down) arrow key to set high or low alarm point.

4.7 Resistivity Setup

Resistivity setup screen present many options to control the operating parameters, which can be controlled and set from the resistivity setup screen. The settings are displayed in 2 pages. Press **NEXT-P (F2)** and **PREV-P (F1)** to navigate through these pages.

4.7.1 Resistivity Settings – Page 1

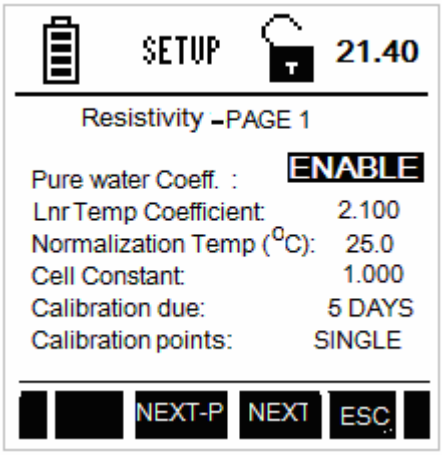


Figure 59: Resistivity Settings - Page 1

This page allows you to set operating parameters for resistivity measurement mode. The Pure water coeff, Lnr Temp Coefficient, normalization temperature, cell constant, calibration due, calibration points are set the same way as previously described in Conductivity set up. See 'Conductivity Settings – Page 1' on page 58.

4.7.2 Resistivity Settings – Page 2

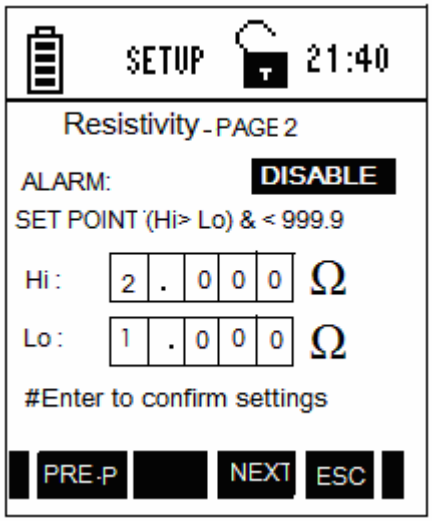


Figure 60: Resistivity Settings - Page 2

This page allows you to select alarm limits for resistivity measurement mode.

Parameter	Description	Factory Default
ALARM SET POINTS	Set alarm limits for the resistivity measurement mode: ENABLE – The measurement screen shows HI or LO alarm indicators when the meter reading is above 'HI alarm value' or below 'LO alarm value' specified in HI & LO Ω parameters (below) DISABLE – HI and LO alarms are not shown in the LCD	DISABLE
Hi Ω	Specify Hi alarm value here. The Hi alarm occurs when the resistivity reading goes above this value Available range: Lo Ω to 20.00 MΩ ohm (This parameter is not editable when 'ALARM SET POINT' is disabled)	2.00 Ω
Lo Ω	Specify Lo alarm value here. The Lo alarm occurs when the resistivity reading goes below this value Available range:0.000 to Hi Ω (This parameter is not editable when 'ALARM SET POINT' is disabled)	1.00 Ω

☞ Press ▲ (Up) or ▼ (Down) arrow key to set high or low alarm point.

5. Technical Specifications

Model	COND 600 meter	COND 610 meter
Conductivity		
Mode	Conductivity/TDS	Conductivity/ TDS / Salinity/ Resistivity
Conductivity Range	0 to 200 mS	0 to 500 mS
Salinity		80 ppt
Resistivity		0 to 20.00MΩ
TDS	200 ppt (depending on the TDS factor)	500 ppt (depending on the TDS factor)
Resolution	0.05 % full scale	
Accuracy	1% full scale	
Conductivity Cell constant	0.100 to 10.000	0.010 to 10.000
Conductivity Cell	2 & 4 Cell	
TDS Conversion Factor	0.400 to 1.000	
Temperature Comp.	Linear	Linear & Pure
Cal-Auto/Manual	Yes	
Cal-Single/Multi	Yes	
Cal Due Alarm	Yes (max-30 days)	
Set Point Alarm	Yes	
Input Conductivity	8 Pin Round	
Temperature		
Range	-10.0 ºC to 110.0 ºC (14.0 ºF to 230.0 ºF)	
Resolution	0.1 ºC/ 0.1 ºF	
Relative Accuracy	± 0.5 ºC / ± 0.9 ºF	
Temp. Input Connector	8-pin Round	
Temperature Sensor	30K Thermistor	
Display		
Display type	Dot matrix LCD with backlighting	
Screen resolution	110 x 128	
Viewing area	68 x 74 mm	
Backlit	Yes	
Other		
Data logging	500 data sets	
Data communication	IrDA / RS232C-Infrared	
Data logging	Yes	
GLP (Good Lab Practice)	Yes	
Ingress protection	IP 67	
Dimensions	95mm (W) x 185mm (L) x 58.5mm (H) - Without Rubber Boot 101mm (W) x 191mm (L) x 61mm (H) - With Rubber Boot	
Weight	380g (Without Rubber Boot)	
Power Input		
Battery	4 x Alkaline AA size, 1.5 V	
Batter Life	200 Hrs (without backlight & serial data transfer)	
Power adapter	Input: 100-240V AC Output: DC 9-12V, 6W Max	

6. Accessories

6.1 Replacement Accessories

Eutech Instruments

Product Description	Eutech Instruments Order Code
2 Stainless Steel Rings Ultem-body Electrode with ATC (3m cable length)	ECCONSEN9103J
4-cell, Graphite, Epoxy-body Electrode with ATC (3m cable length)	ECCONSEN9203J

Oakton Instruments

Product Description	Oakton Instruments Order Code
2-cell Electrode with ATC, cell constant K=1.0	35408-52
4-cell Electrode with ATC, cell constant K=0.3	35408-56
2-cell Electrode with ATC, cell constant K=10.0	35408-54
2-cell Electrode with ATC, cell constant K=0.1	35408-50

6.2 Optional Accessories

Eutech Instruments

Product Description	Eutech Instruments Order Code
Waterproof CyberScan COND 610 Conductivity/TDS/Resistivity/Salinity Meter with 3m cable 4-cell electrode , DAS software, power adapter & Conductivity/TDS carrying kit set	ECCONWP61043K
Waterproof CyberScan COND 610 Conductivity/TDS/Resistivity/Salinity Meter with 3m cable 4-cell electrode & DAS software	ECCONWP61003
Waterproof CyberScan COND 610 Conductivity/TDS/Resistivity/Salinity Meter only with DAS software	ECCONWP61000
Waterproof CyberScan COND 600 Conductivity/TDS Meter with 3m cable 4-cell electrode , DAS software, power adapter & Conductivity/TDS carrying kit set	ECCONWP60043K
Waterproof CyberScan COND 600 Conductivity/TDS Meter with 3m cable 4-cell electrode & DAS software	ECCONWP60003
Waterproof CyberScan COND 600 Conductivity/TDS Meter only with DAS software	ECCONWP60000
Rubber Boot for 600 series meters	ECRUBBERBT600
100-240VAC Power Adapter	01X030132

Oakton Instruments

Product Description	Oakton Instruments Order Code
Rubber Boot for 600 series meters	35418-86
100-240VAC Power Adapter	35418-83

7. APPENDIX

7.1 Conductivity theory

Conductance is a quantity associated with the ability of primarily aqueous solutions to carry an electrical current, I, between two metallic electrodes when a voltage E is connected to them. Though water itself is a rather poor conductor of electricity, the presence of ions in the water increases its conductance considerably, the current being carried by the migration of the dissolved ions. This is a clear distinction from the conduction of current through metal, which results from electron transport. The conductance of a solution is proportional to and a good, though nonspecific indicator of the concentration of ionic species present, as well as their charge and mobility. It is intuitive that higher concentrations of ions in a liquid will conduct more current. Conductance derives from Ohms law, E = IR, and is defined as the reciprocal of the electrical resistance of a solution.

C = 1/R **C** is conductance (siemens)

R is resistance (ohms)

One can combine Ohms law with the definition of conductance, and the resulting relationship is:

C = I/E **I** is current (amps)

E is potential (volts)

In practice, conductivity measurements involve determining the current through a small portion of solution between two parallel electrode plates when an ac voltage is applied. Conductivity values are related to the conductance (and thus the resistance) of a solution by the physical dimensions - area and length - or the cell constant of the measuring electrode. If the dimensions of the electrodes are such that the area of the parallel plates is very large, it is reasonable that more ions can reside between the plates, and more current can be measured. The physical distance between the plates is also critical, as it affects the strength of the electric field between the plates. If the plates are close and the electric field is strong, ions will reach the plates more quickly than if the plates are far apart and the electric field is weak. By using cells with defined plate areas and separation distances, it is possible to standardize or specify conductance measurements.

Thus derives the term specific conductance or conductivity.

The relationship between conductance and specific conductivity is:

Specific Conductivity, S.C. = (Conductance) (cell constant, k) = siemens * cm/cm^2 = siemens/cm

C is the Conductance (siemens)
k is the cell constant, length/area or cm/cm^2

Since the basic unit of electrical resistance is the ohm, and conductance is the reciprocal of resistance, the basic unit of conductance was originally designated a “mho“- ohm spelled backwards - however, this term has been replace by the term “siemen“. Conductivity measurements are reported as Siemens/cm, since the value is measured between opposite faces of a cell of a known cubic configuration. With most aqueous solutions, conductivity quantities are most frequently measured in micro Siemens per cm (µS/cm) or mill Siemens per cm (mS/cm).

The COND600 series meter not only measures conductivity readings from micro or milli Siemens but also reads resistivity (Ohms, kOhms and MOhms), TDS (ppm and ppt), and salinity (ppt).

The salinity scale which ranges from 0 to 80 ppt is a measure of all salts, not just sodium chloride. This scale was originally devised for seawater, and is based on seawater at 15 degrees Centigrade has a conductivity equivalent to that of a potassium chloride solution of a known concentration. This solution (0.44 molar) is defined as having a salinity of 35 ppt.

Note: ppm = parts per million, ppt = parts per thousand, 1000 ppm = 1 ppt

The total dissolved solids scale approximates the ppm TDS in surface waters by multiplying the conductivity of a sample by a factor, 0.66.

Some users prefer the use of resistivity units to describe their water, particularly where high purity water is involved. The unit most often used to describe resistivity is megohm•cm., which is simply the reciprocal of conductivity (µS/cm). The chart below shows the relationship between these units.

Conductivity, µS/cm	Resistivity, megohm. cm
0.056	18.0
0.1	10.0
1.0	1.0
2.5	0.4
10.0	0.1

Conductivity and Temperature

Conductivity in aqueous solutions reflects the concentration, mobility, and charge of the ions in solution. The conductivity of a solution will increase with increasing temperature, as many phenomena influencing conductivity such as solution viscosity are affected by temperature.

The relationship between conductivity and temperature is predictable and usually expressed as relative % change per degree centigrade. This temperature coefficient (% change per degree) depends on the composition of the solution being measured. However, for most medium range salt concentrations in water, 2% per degree works well. Extremely pure water exhibits a temperature coefficient of 5.2%, and concentrated salt solutions about 1.5%.

Since temperature effects the conductivity measurement so profoundly, the usual practice is to reference the conductivity to some standard temperature. This is typically 25°C, but the COND600 series meter lets the operator select any value between of 25°C and 20°C in the Setup menu option.

Both meters permit you to enter the temperature coefficient which best suits your sample and use an ATC probe to automatically temperature compensate back to the chosen reference temperature.

7.2 Calculating TDS Conversion Factor

You can calibrate your meter using TDS calibration standard solutions. The calibration standard only needs to give the TDS value at a standard temperature such as 25 °C. To determine the conductivity-to-TDS conversion factor use the following formula:

Factor = Actual TDS ÷ Actual Conductivity @ 25 °C

Definitions:

- Actual TDS: Value from the solution bottle label or as a standard you make using high purity water and precisely weighed salts.
- Actual Conductivity: Value measured using a properly calibrated Conductivity/Temperature meter.

Both the Actual TDS and the Actual Conductivity values must be in the same magnitude of units. For example, if the TDS value is in ppm the conductivity value must be in µS; if the TDS value is in ppt the conductivity value must be in mS.

Check your factor by multiplying the conductivity reading by the factor in the above formula. The result should be in TDS value.

7.3 Calculating Temperature Coefficients

To determine the temperature coefficient of your sample solution use this formula:

$$tc = 100 \text{ x } \frac{C_{T2} - C_{T1}}{C_{T1}(T_2 - 25) - C_{T2}(T_1 - 25)}$$

Where:

tc = Temperature coefficient **25** = 25 °C

$\mathbf{C_{T1}}$ = Conductivity at Temp 1 $\mathbf{C_{T2}}$ = Conductivity at Temp 2

$\mathbf{T_1}$ = Temp 1 $\mathbf{T_2}$ = Temp 2

NOTE: A controlled temperature water bath is ideal for this procedure.

1. Immerse the probe into a sample of your solution and adjust the temperature coefficient to 0%
2. Wait for 5 minutes. Note $\mathbf{T_1}$ and $\mathbf{C_{T1}}$ (conductivity at $\mathbf{T_1}$).
3. Condition the sample solution and probe to a temperature ($\mathbf{T_2}$) that is about 5 °C to 10 °C different from $\mathbf{T_1}$, and note the conductivity reading $\mathbf{C_{T2}}$.

NOTE: Record your results for future reference. Ideally $\mathbf{T_1}$ and $\mathbf{T_2}$ should bracket your measurement temperature, and should not different by more than 5 °C.

8. General Information

8.1 Warranty

Eutech Instruments/ Oakton Instruments warrant this product to be free from significant deviations in material and workmanship for a period of three years from the date of purchase. If repair is necessary and not the result of abuse or misuse within the warranty period, please return by freight pre-paid and amendment will be made without any charge. Eutech Instruments/ Oakton Instruments Customer Service Dept. will determine if the product problem is due to deviations or customer abuse. Out-of-warranty products will be repaired on an exchange basis at cost.

Exclusions

The warranty on your instrument shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer
- Unauthorized modification or misuse
- Operation outside of the environment specifications of the products

8.2 Return of Goods

Before returning goods for any reason whatsoever, the Customer Service Dept. has to be informed in advance. Items must be carefully packed to prevent damage during shipment, and insured against possible damage or loss. Eutech Instruments/ Oakton Instruments will not be responsible for any damage resulting from careless or insufficient packing.

Warning: Shipping damage as a result of inadequate packaging is the user's/distributor's responsibility. Please follow the guidelines below before shipment.

8.3 Guidelines for Returning Unit for Repair

Use the original packaging material if possible when shipping the unit for repair. Otherwise wrap it with bubble pack and use a corrugated box for additional protection. Include a brief description of any faults suspected for the convenience of Customer Service Dept., if possible.

For more information on Eutech Instruments'/ Oakton Instruments' products, contact your nearest distributor or visit our website listed below:

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