Instruction Manual
pH 600/610/620
Waterproof Handheld pH Meter
pH/mV/Ion/ºC/ºF meter

OAKTON®

EUTECH
INSTRUMENTS
Technology Made Easy...

ISO 9001
CERTIFIED

68X415301   Rev 0 JUN 06

Preface

This manual serves to explain the use of the **pH600/610/620 Waterproof Handheld pH 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 pH600/610/620 pH 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.

Copyright ©2006 All rights reserved.

Eutech Instruments Pte Ltd.

Oakton Instruments

Table of Contents

1. Getting Started

1.1 About the Meter

Thank you for purchasing the pH600 series meter.

pH 600 series handheld meters are micro-controller based instruments and are design with many user friendly features for pH/mV/Ion/Temperature measurements.

There are three models in pH 600 series:

pH 600: The basic model with all the features listed below

pH 610: Higher resolution (0.001 pH) and accuracy than pH 600

pH 620: Capable of measuring Ion in addition to features available in pH 610

Special Features:

- pH -2.00 to 20.00 measuring range expandable to pH 0.01 resolution
- Automatic temperature compensated (ATC) pH measurement
- Large monochrome dot matrix graphic display with 110x128 resolution
- User configurable back light (keypad activated or always on)
- Powered by ARM7TDMI-S cored 32-bit RISC microcontroller
- Built-in memory to store calibration data & up to 500 sets of measured data
- Date-and-Time stamping meets Good Laboratory Practice (GLP) standards
- User configurable calibration due alarm
- User configurable HI & LO alarm for pH
- pH probe quality (slope) indicator
- On-screen messages & hints to guide user during calibration
- Auto-buffer recognition of USA, NIST, DIN and PWB standards
- Infrared IrDA wireless connectivity for PC downloading
- User configurable password protection for calibration & setup data
- Waterproof casing & keypad
- Use dual power sources (4xAA Alkaline battery or DC power adapter)
- Power source indicator (Battery/Adapter)
- Low power consumption allows 500 Hrs of operation (without backlight and serial data transfer)
- Battery level indicator

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, pH probe condition, data transmission mode, real-time clock 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-fucntions 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.
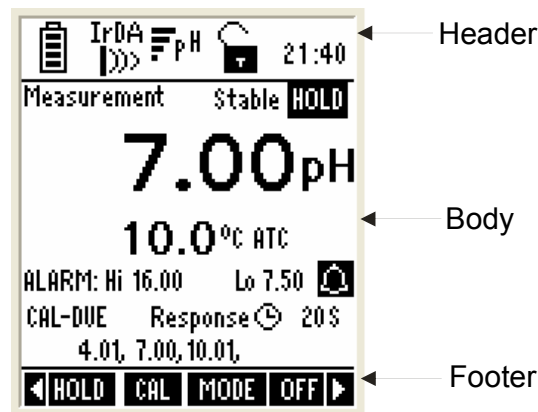
Figure 1: Display

Indicators Used in Header Area			
🔋	Power Source & Battery Level: Battery, level 80%-90%	☰ρH	Average slope of the pH probe
🔌	Power Source: DC Adapter	21:40	Current Time in 24 Hour format
LED))>	Data Transmission mode: LED	🔓	Password Protection: Disable
IrDA))>	Data Transmission mode: Infrared	🔒	Password Protection: Enable

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	Description
F1 F2 F3 F4/ON	▪ 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.
ENTER	▪ 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).
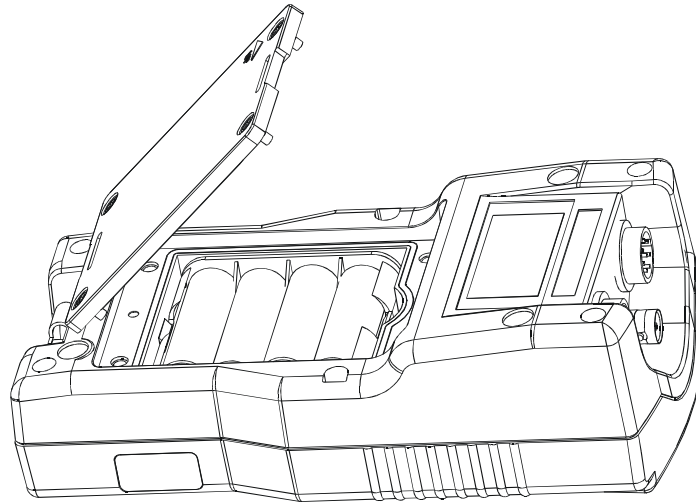
Figure 3 : Battery compartment

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 setup' in page 48 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 of the meter and change the batteries within 30 seconds to avoid resetting the clock.

Number of Bars	Voltage of the Battery (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.

DC Power Adapter (Note the polarity)
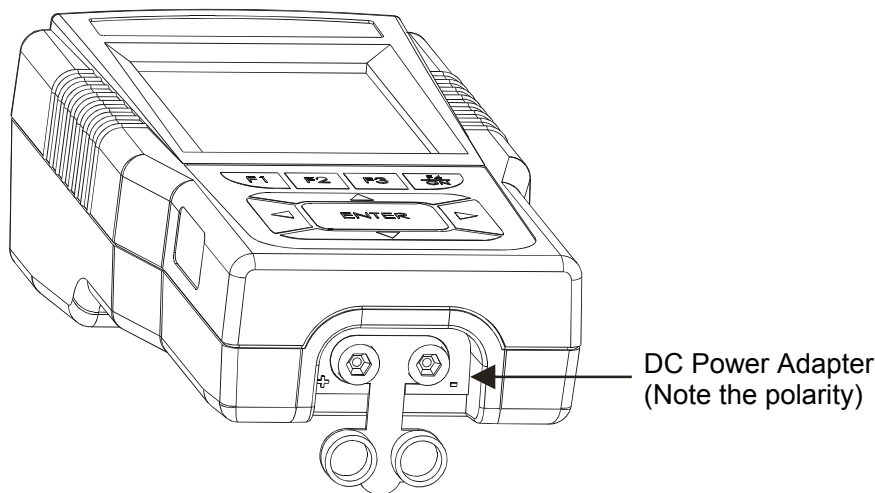
Figure 4 : Connecting DC power adapter

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.
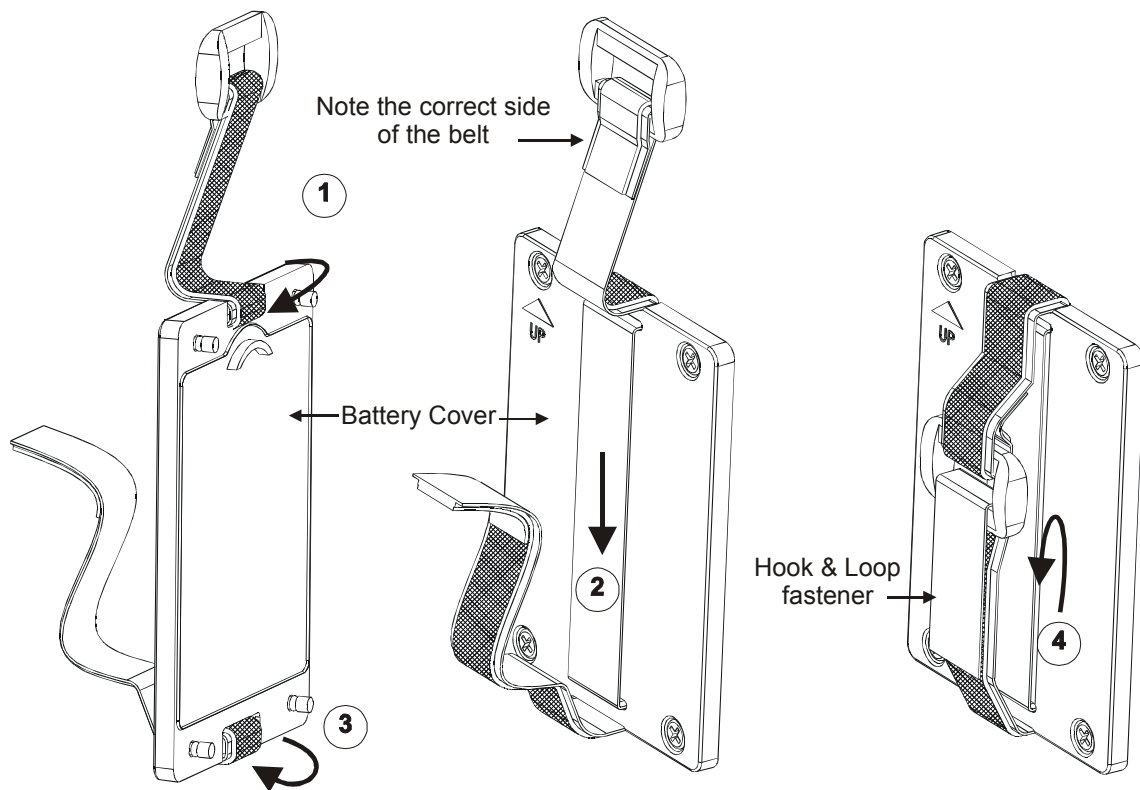
Figure 5 : Attaching safety belt

1.5 Connecting Peripherals

1.5.1 Probes

Attach the probes with correct type of connectors as indicated in the figure bellow.

pH Probe
(BNC)

Temperature Probe
(8-pin Connector)
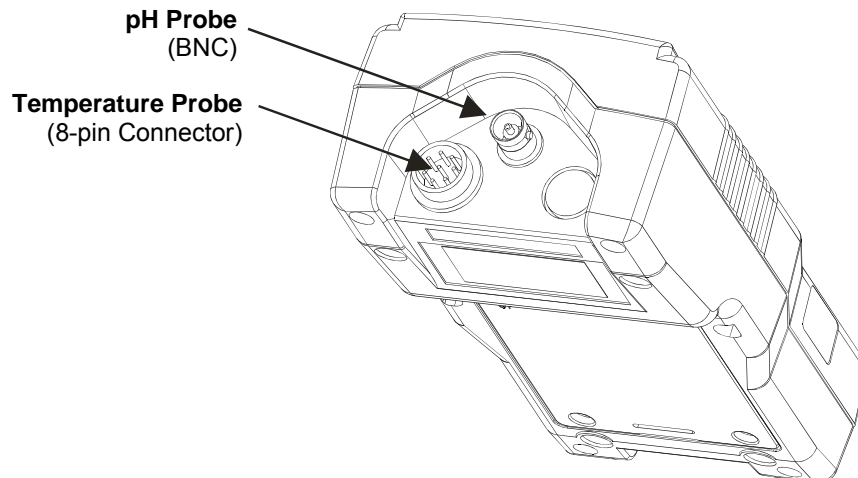
Figure 6 : Connecting Probes

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.
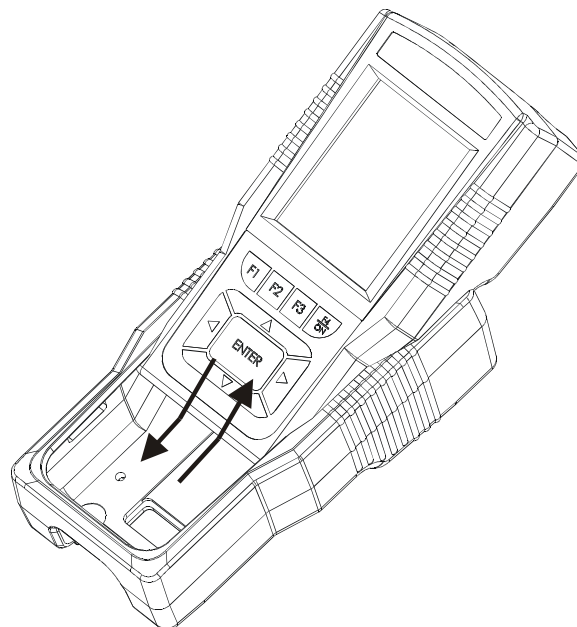
Figure 7 : Inserting/removing the rubber boot

1.5.3 Multi Probe Holder

Multi probe holder provides a convenient means to hold pH and temperature probes together.

1. Insert the two probes into the multi probe holder as shown in Figure 8.

2. Insert the two connectors of the probes through the cover, one at a time.

3. Push the cover onto the multi probe holder to fasten it.
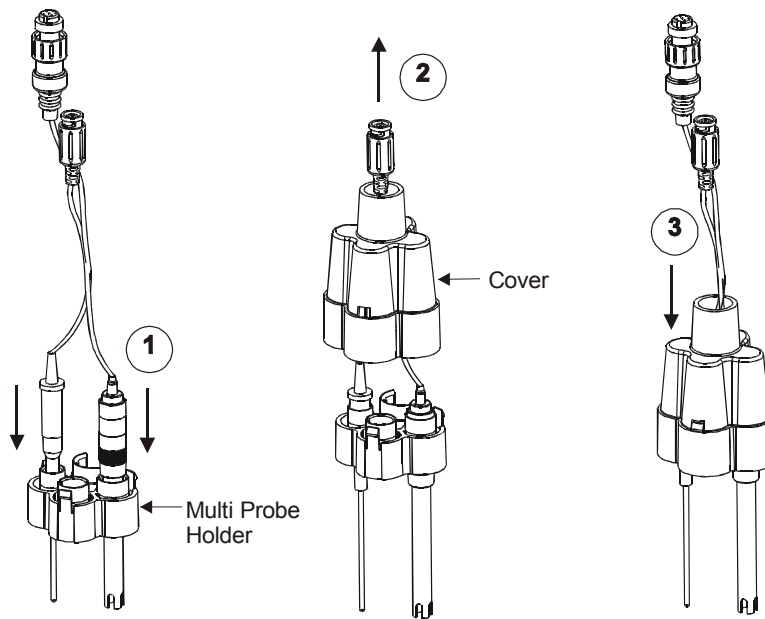
Figure 8 : Using multi probe holder

1.6 CyberComm 600 Data Acquisition Software

1.6.1 About CyberComm 600 DAS Application

The pH 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 pH 600 series meters and save them in your PC in text (.txt) files.

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 installer creates a Desktop shortcut 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 page 50 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 pH 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.
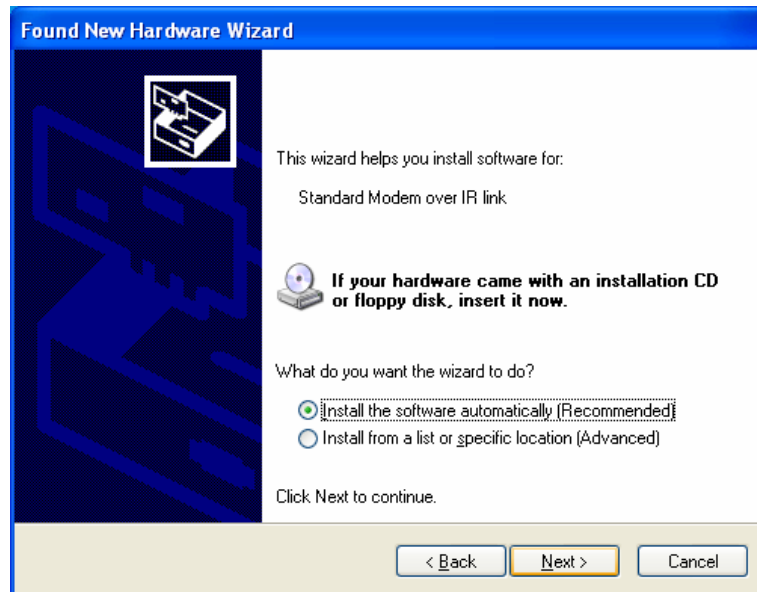
Figure 11 : First screen of 'Found New Hardware Wizard'

6. Once the wizard completed the installation, (Figure 12) click **Finish** to close the wizard.
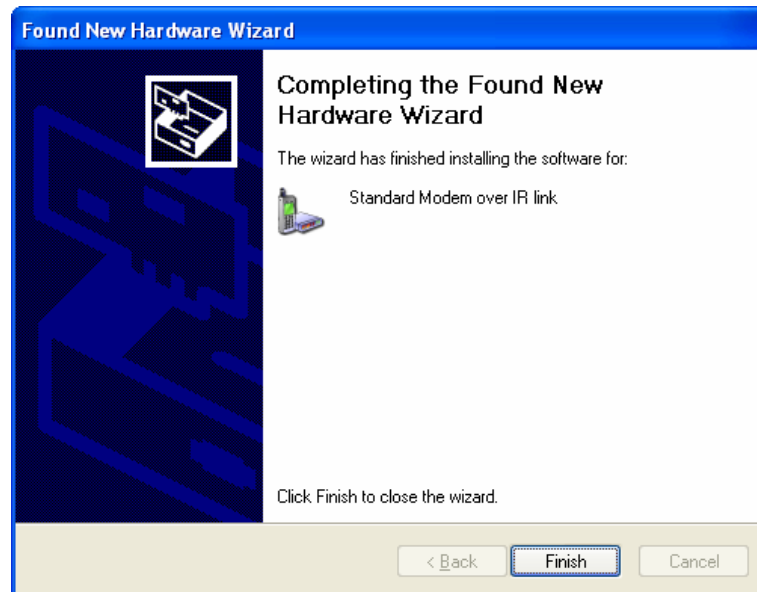
Figure 12 : 'Found New Hardware Wizard' completed

7. In CyberComm 600 application screen, click **Find** 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 starts animating as the meter sends data to computer through IrDA.

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

(a)   (b)
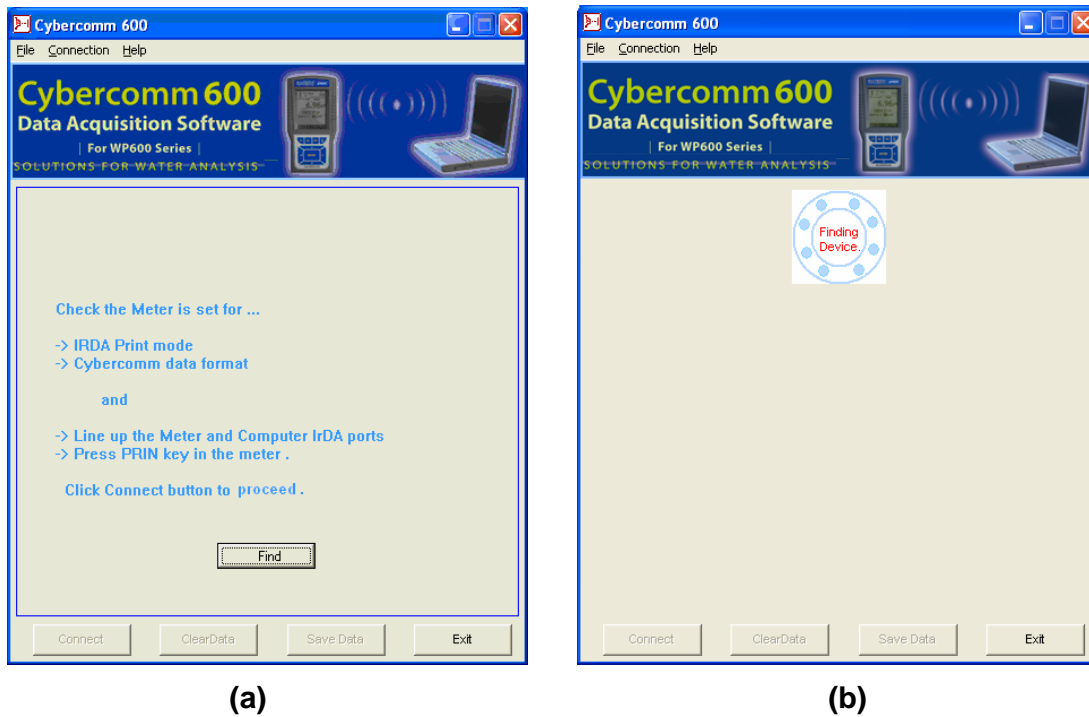
Figure 13 : CyberComm finds the meter

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

(a)   (b)
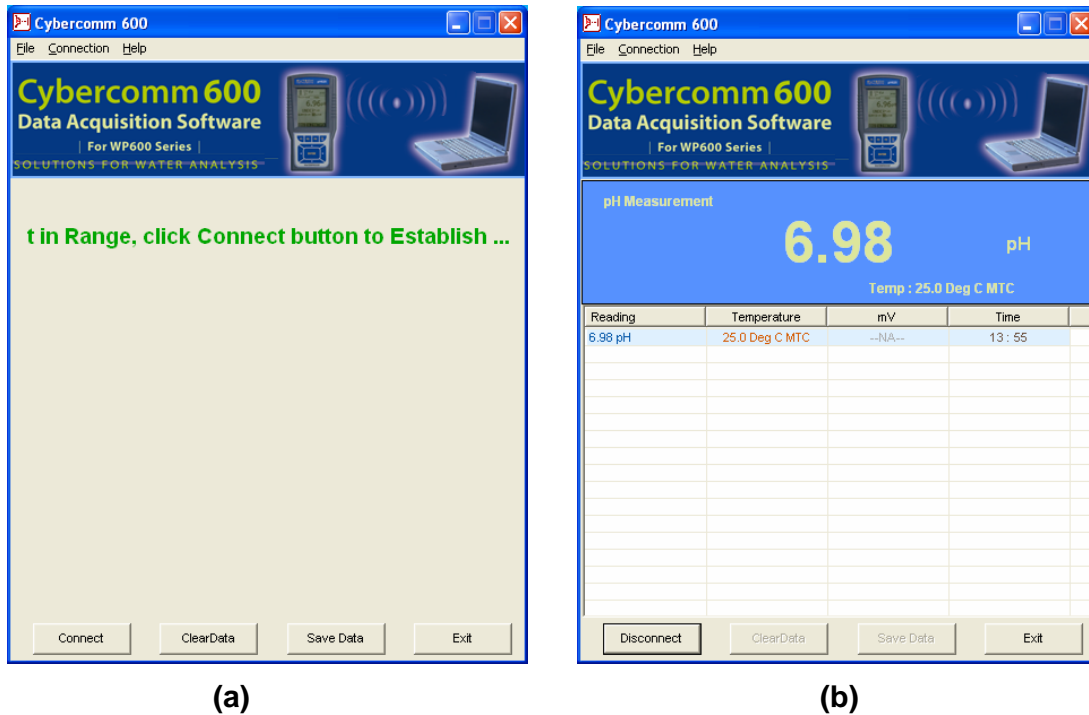
Figure 14 : CyberComm establishing connection with the meter

5. The connection is established and data is transferred.

Notes:
- The communication between CyberComm and the meter is one-directional. The connection is initiated by the meter when you press **PRIN** key. When CyberComm found the meter, press **Connect** button. Once the connection is established the data is transferred to CyberComm and then the IrDA link is disconnected automatically.
- 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 49)

- For single transfer of measurement reading, set CURRENT DATA SET parameter to 'SINGLE' in System Setup (page 49)

2. Measurement Mode

2.1 About Measurement Mode

There are three measurement modes available:
- pH measurement mode
- mV measurement mode
- Ion measurement mode (available only in pH 620 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 pH measurement mode, if the meter was in pH 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. .
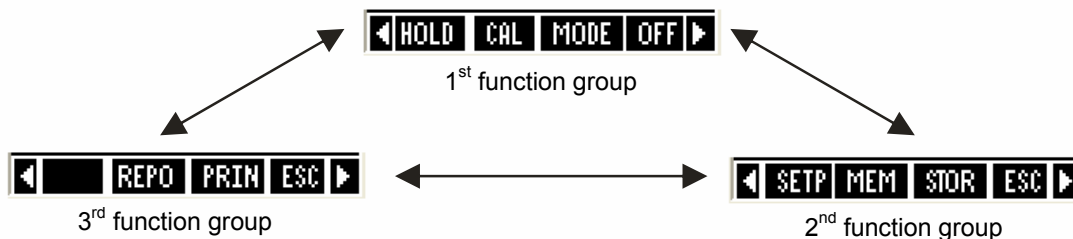
Figure 15 : Use Left ◀ or Right ▶ arrow keys to navigate between function groups

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 (pH->mV->Ion)
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 pH 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 pressed to establish communication with CyberComm PC application through IrDA)
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.

2.2 Taking Measurement

2.2.1 Prepare the meter for measurement

Before you start measuring,

- Make sure your have connected a suitable probe (pH, OPR or Ion Selective Electrode-ISE) and a temperature probe to the meter

- Make sure the probes are in good working condition & clean. If required, clean pH electrode with de-ionized or distilled water to remove impurities. If the pH probe is dehydrated, soak it for 30 minutes in electrode storage solution

- 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. If required, increase/decrease resolution of the pH reading. (See page 54 for details)

4. Dip the pH/ORP/Ion probe and temperature probe (for ATC) in 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.

5. The LCD shows 'Stable' indicator if this feature is enabled in setup. (See page 47)

6. 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 47)

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 release it by pressing the **HOLD (F1)** 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 47). Press **HOLD (F1)** key to release the reading.

2.3 pH Measurement Mode

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

2.3.1 Resolution of pH Reading

By default, the resolution is set to 0.00. You can change the resolution in the setup mode. (See page 54)

2.3.2 Automatic Temperature Compensation (ATC)

Connect an appropriate temperature probe to the meter and select 'ATC mode' in the temperature setup (See page 55) for the pH reading to be automatically compensated for temperature variations. Dip the temperature probe in the liquid you are measuring.

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

2.3.3 Manual Temperature Compensation (MTC)

If a temperature 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 55). Press **CAL (F2)** and then press **TEMP (F1)** to go to temperature calibration. Enter the temperature value of your sample. See page 38 for more details on temperature calibration.

2.3.4 pH Alarms

You can set the meter to display an alarm when the pH reading goes higher or lower than predefined set points (Hi pH & Lo pH). See page 53 to set alarm set points.

ALARM: Hi 12.00 ▲ Lo 5.50

Figure 16 : 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 pH Setup (see page 54) and the meter will remind you when the days elapse from your last calibration date.

2.3.6 Indicators in pH measurement screen
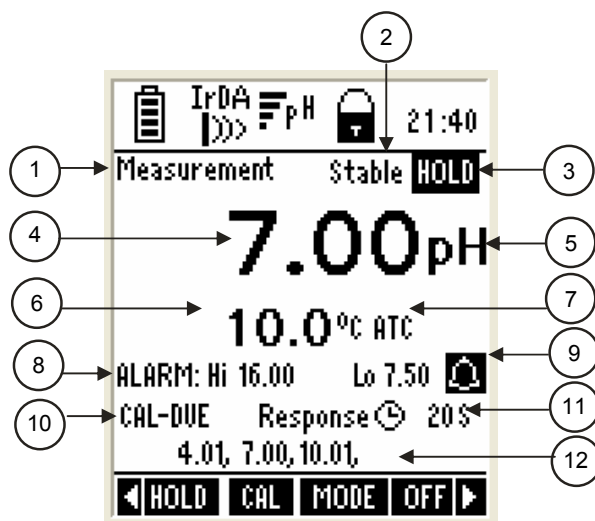
Figure 17 : pH measurement screen

Refer item numbers indicated in Figure 17.

Item	Description	More Details On
1	Measurement mode indicator	-
2	Appears when the reading is stable	Page 47
3	Appears when the reading is on hold	Page 17, 47
4	pH reading	Page 54
5	Units of measurement	-
6	Temperature reading & units	Page 55
7	Temperature compensation mode	Page 18, 55
8	pH HI & LO Alarm limits	Page 53
9	pH Alarm indicator	Page 18, 53
10	Calibration Due indicator	Page 19, 54
11	Response time of the pH probe	Page 47
12	Calibrated Points	Page 32,33

2.4 mV Measurement Mode

In mV measurement mode, the meter displays mV and temperature reading. Depending on application, you can connect a suitable ORP probe to the meter or use the pH probe.

2.4.1 Indicators in mV measurement mode
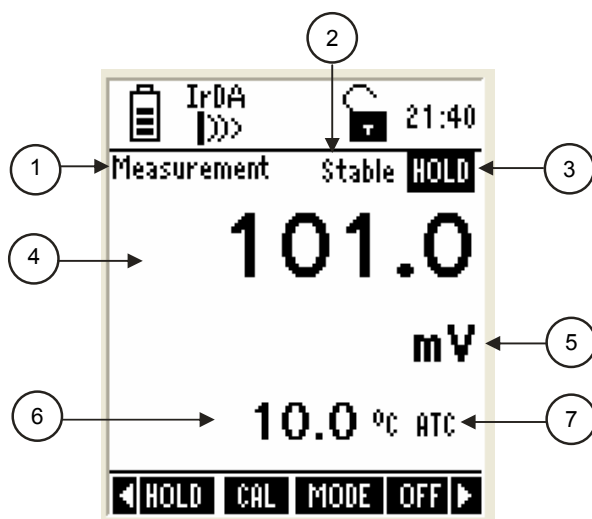
Figure 18 : mV measurement screen

Refer item numbers indicated in Figure 18.

Item	Description	More Details On
1	Measurement mode indicator	-
2	Appears when the reading is stable	Page 47
3	Appears when the reading is on hold	Page 17, 47
4	mV reading	-
5	Units of measurement	-
6	Temperature reading & units	Page 55
7	Temperature compensation mode	Page 18, 55

2.5 Ion Measurement Mode

This mode is available only in **pH 620** model.

In Ion measurement mode, the meter displays Ion concentration (in ppm, molar or mg/L) and mV reading. Depending on application, you can connect a suitable Ion Selective Electrode (ISE) to the meter.

2.5.1 Changing unit of measurement

By default the measuring unit is ppm. You can select either molar or mg/L in the setup mode (See page 56).

2.5.2 Indicators in Ion measurement mode
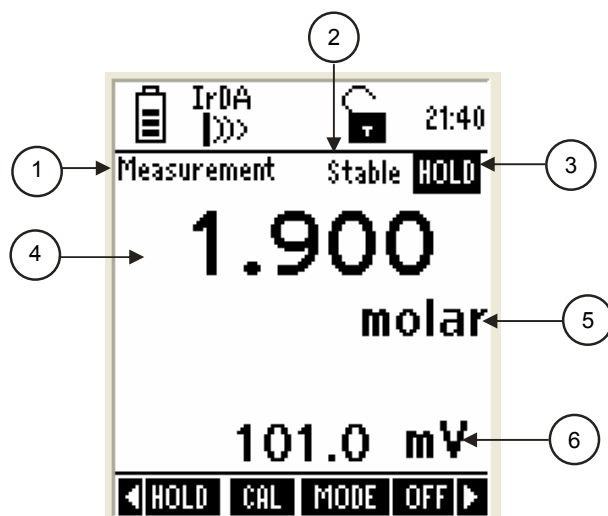
Figure 19 : Ion measurement screen

Refer item numbers indicated in Figure 19.

Item	Description	More Details On
1	Measurement mode indicator	-
2	Appears when the reading is stable	Page 47
3	Appears when the reading is on hold	Page 17, 47
4	Ion reading	-
5	Units of measurement	Page 56
6	mV reading	-

Note: If ion calibration has not been done, the display shows '- - -'.

2.6 Transfer Measured Data to Computer (CyberComm)

2.6.1 Sending a single reading

1. Make sure that the CURRENT DATA SET parameter is set to 'SINGLE' in the System Setup (page 50).

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** 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 20)

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.
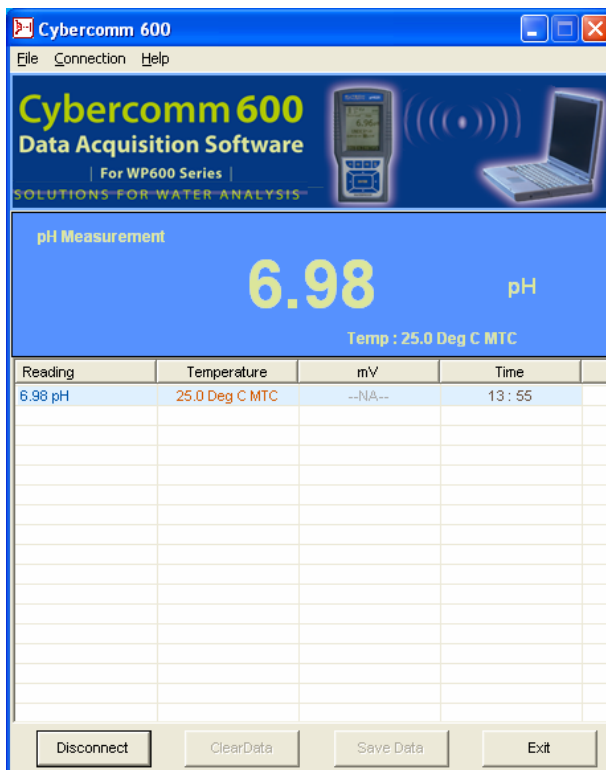
Figure 20 : Transferring a single measurement data

2.6.2 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 (page 50).

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** 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 21).

7. To stop data transfer, click **Disconnect** button.

8. To clear the transferred readings from the screen, click **Clear Data** button.
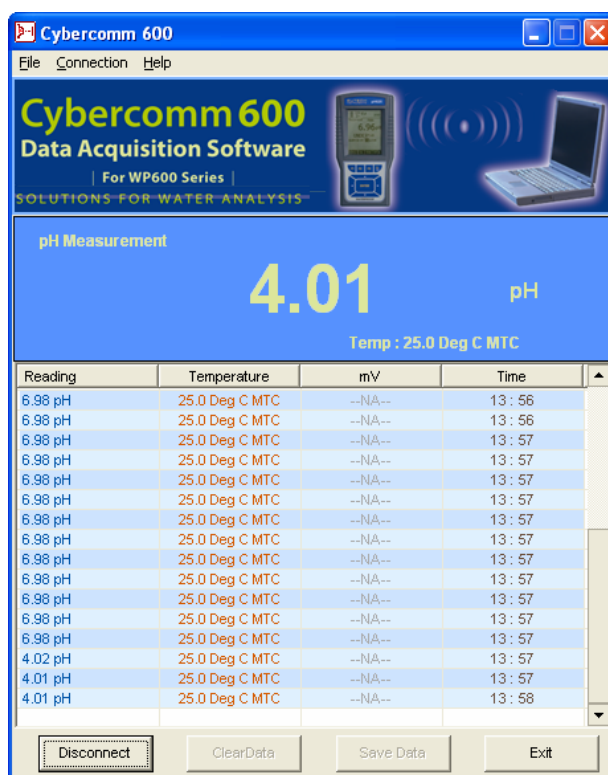
Figure 21 : Transferring measurement data continuously

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.

2.6.3 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 22)
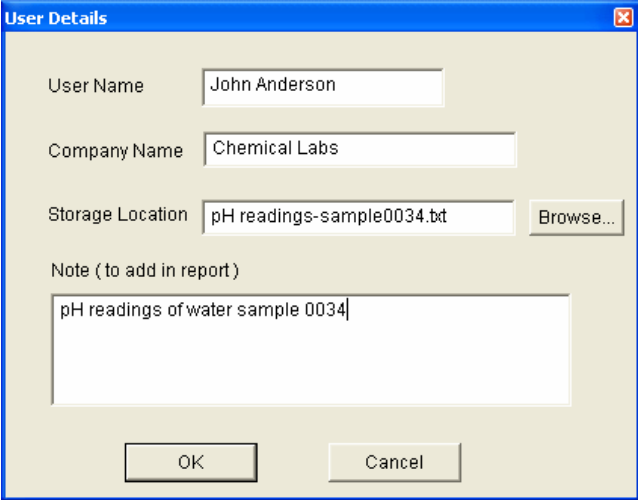
Figure 22 : User Details dialog

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: 'pH-Readings.txt') in the **Storage Location**, the file is saved in the installation folder of CyberComm.

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

6. 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.

2.7 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.

2.7.1 Saving a reading in the memory

1. Make sure you are in 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 23)

Memory Location where this reading is being saved ➡
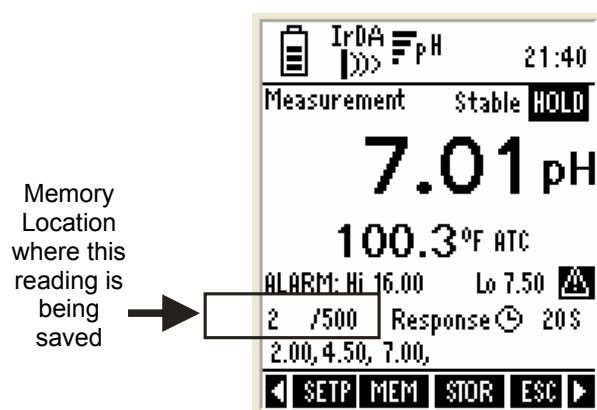
Figure 23 : Saving a reading

2.7.2 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 24). The memory location of the currently showing data entry is shown in the top-right corner of the screen.
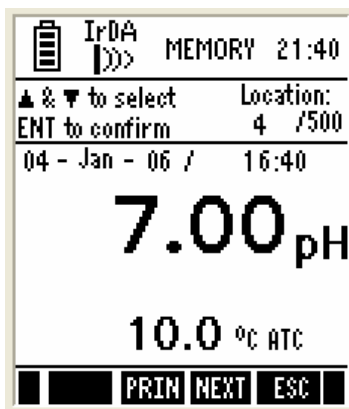
Figure 24 : Viewing stored data

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 **PRIN (F2)** to send the current data entry to computer through IrDA.

6. Press **NEXT (F3)** key to return to measurement mode from where you entered to view memory.

7. Press **ESC (F4)** key to return to main screen of the measurement mode.

2.7.3   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.

4. Press **PRIN (F2)**. The screen appears for you to select printing options (Figure 25).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** 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 26)

10. You can save the transferred data to a text file. See 'Saving data' section in page 24.
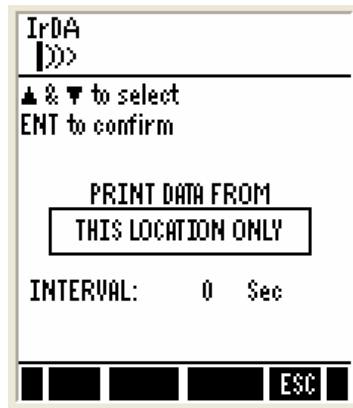
Figure 25 : Selecting options for printing memory locations
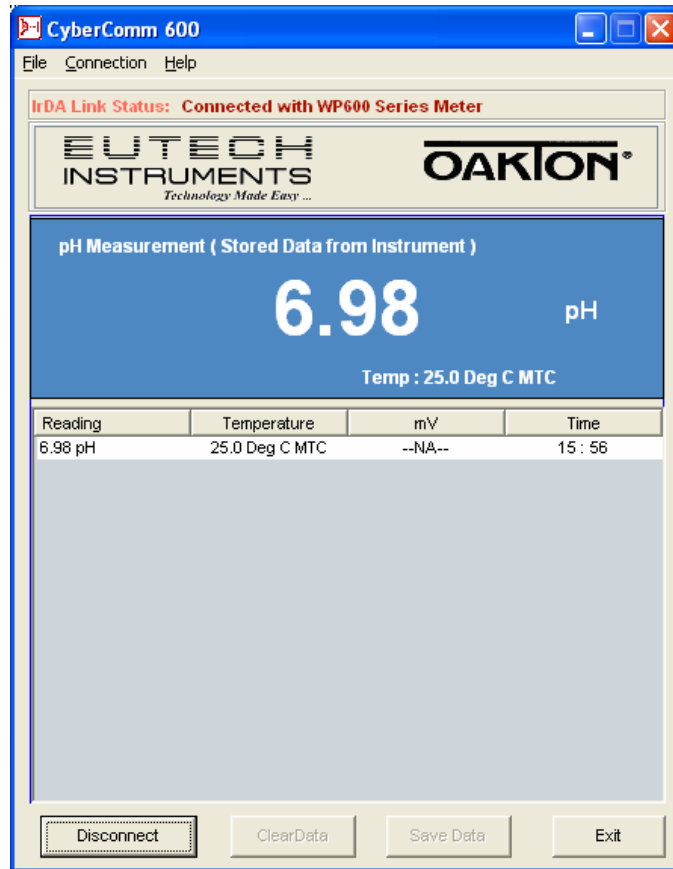
Figure 26 : Transfer Stored data to CyberComm

3. Calibration Mode

3.1 About Calibration

pH 600 series meters are factory calibrated. 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. The meter allows you to perform pH, mV, Ion (only for pH 620 model) and temperature calibration.

3.1.1 About Temperature Calibration

It is important to ensure that temperature calibration is carried out prior to pH calibration since temperature readings affect the accuracy of pH measurements. It is recommended that temperature calibration should be carried out only if the temperature value displayed on the meter is different from that of a calibrated thermometer. A temperature offset calibration of ± 5 °C/± 9 °F from the default reading is allowed for ATC mode. Once a temperature calibration is performed, pH calibration should be carried out to ensure the accuracy of pH measurements.

3.1.2 About pH Calibration

When you re-calibrate your meter, previous pH calibration points are replaced on a point by point basis. For example, if you previously calibrated your meter at pH 4.01, 7.00, and 10.01, and you have now re-calibrated at pH 7.00, the meter retains the old calibration data at pH 4.01 and pH 10.01. The meter shows previously calibrated points in the display when the meter is in pH measurement mode.

To completely re-calibrate the meter, or when you use a replacement probe, it is best to clear the previous calibration and re-calibrate the meter at all points. Refer 'pH Calibration' section in page 32 for information on how to clear previous pH calibration.

The meter supports four internationally recognized standard buffer groups: USA, NIST, DIN & PWB. The default buffer group is USA. Refer 'pH Setup' section in page 53 for information on how to set the meter to a particular buffer group.

The meter is capable of calibrating up to 6 points, depending on the standard buffer selected. When completely re-calibrating the meter, the first point of calibration should be one of the following, depending on your choice of standard buffer group.

Buffer Group	First Point of Calibration (when complete re-calibration)	Other Available Calibration Points
USA	pH 7.00	pH 1.68, 4.01, 10.01, and 12.45
NIST	pH 6.86	pH 4.01, 6.86, 9.18, and 12.45
DIN	pH 6.79	pH 1.09, 3.06, 4.65, 9.23, and 12.75
PWB	pH 6.97	pH 4.10

Table 2: Buffer Groups and Calibration Points

The meter automatically recognizes and calibrates to these standard pH buffer values, which makes pH calibration faster and easier.

Optionally, you can choose to have custom buffers with 2 to 5 points. Refer 'pH Setup' section in page 53 for information on how to set the meter to a custom buffer.

3.1.3 About Ion Calibration

The meter supports Ion calibration up to 8 points with minimum of 2-points. The available 8-points are 0.001, 0.01, 0.1, 1, 10, 100, 1000 & 10000.

The meter guides your through the calibration process with on-screen instructions and hints. If the second point and subsequent points are not within the allowable calibration window (15mV/decade to 90mV/decade), the meter does not accept the calibration.

When you try to re-calibrate the meter with ISE, the meter gives you 2 options:

- **Clear the previous calibration** (choose this if you wish to delete all previously calibrated points and re-calibrate with a new type of Ion)
- **Retain the previous calibration** (choose this if you wish to retain previously calibrated points and re-calibrate new points or overwrite existing points with same type of Ion).

3.1.4 Prepare the Meter for Calibration

Before starting calibration, make sure the meter is in the appropriate measurement mode.

For pH

Connect the pH probe to the BNC connector of the meter.

Be sure to remove the protective electrode storage bottle or rubber cap of the electrode before calibration or measurement. If the electrode has been stored dry, wet the electrode in tap water for 10 minutes before calibrating or taking readings to saturate the pH electrode surface and minimize drift.

Wash your electrode in de-ionized water after use, and store in electrode storage solution. If storage solution is not available, use pH 4.01 or 7.00 buffer solution.

Do not reuse buffer solutions after calibration. Contaminants in the solution can affect the calibration, and eventually the accuracy of the measurements.

It is recommended that you perform at least a 2-Point Calibration using standard buffers that adequately cover the expected measurement range, prior to measurement.

For Ion (only for pH 620 model)

Connect the ISE to the BNC connector of the meter.

Remove plastic protective cap of ISE. Briefly rinse the electrode with clean de-ionized water to remove any residues.

Rinse ISE before and after each calibration or sample measurement to avoid cross-contamination. Ensure that you use new or fresh standard solutions during calibration. Do not reuse Ion standard solution as it may be contaminated and affect the calibration and accuracy of measurements.

3.1.5 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)

3.1.6 Accessing Calibration mode when password protection enabled

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

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.

3. Login Password screen appears (Figure 27). The meter expects the 5-digit password specified in system setup. (Refer 'System Settings – Page 5' in page 51)

Figure 27 : 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'.

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.

6. Similarly enter all 5-digits.

7. Press **ENTER** key to confirm the password.

8. When the correct password is entered, the 'Calibration – Rinse Electrode' screen appears. [
    Figure 28-(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 pH Calibration

3.2.1   pH Calibration with a Standard Buffer

Make sure you have selected a standard buffer with which you intend to perform pH calibration. Refer 'pH Setup' section in page 53 for more details of setting buffer types.

To start pH Calibration:

1. Switch on the meter and make sure the meter is in pH measurement mode.

2. 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 29.

3. The meter shows 'Calibration-Rinse Electrode' screen [Figure 28-(a)] for few seconds and then shows the pH calibration screen [Figure 28-(b)].

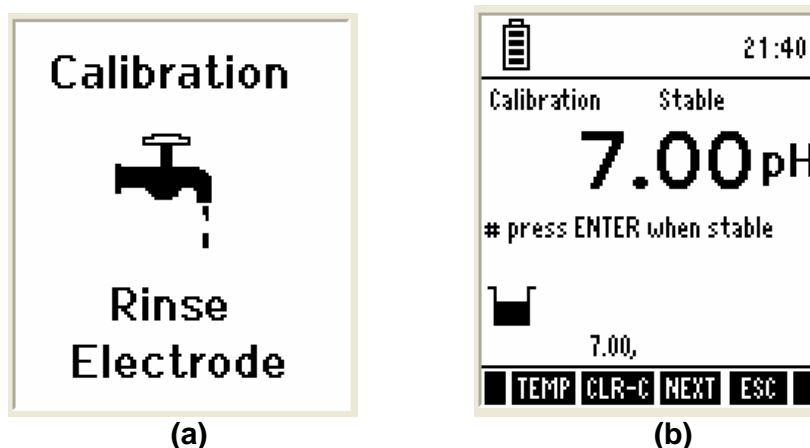(a)   (b)

Figure 28 : Calibration Screens

4. 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. Once cleared, you need to calibrate the first point that corresponds to your selected buffer group, as mentioned in Table 2.

5. Dip the probe in calibration buffer. The tip of the probe must be completely immersed into the solution. Stir the probe gently to create a homogeneous solution.

6. The display shows the pH reading. The meter scans through all the available (un-calibrated) points for the selected buffer group until it finds a close match within its acceptable calibration window. (Refer Specification section in page 57 for calibration window values). Once found a match, the display shows 'Stable' indicator.

7. Press **ENTER** key to confirm the calibration.

8. Rinse the probe with de-ionized water. Place it in the next buffer and follow the steps 5 and 6 to calibrate other points.

Function Keys available in pH 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 pH measurement mode
ENTER	Confirms the calibration
▲ ▼ ◄ ►	(Not functional)

3.2.2 pH Calibration with a User-defined Buffer

If you selected 'USER' (Custom) buffer in the pH Setup, the following screen is shown when you enter calibration mode. You need to prepare at least 2 custom buffers of known pH values.

> **Note:** Custom buffer solution values should be at least **1 pH** unit apart from each other. Otherwise, the meter will not accept the buffer values.
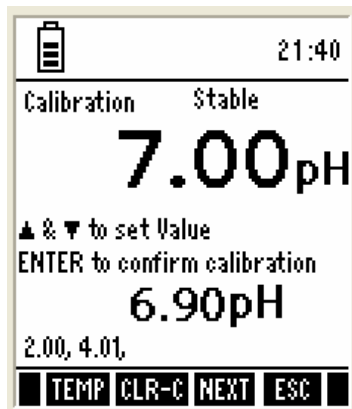
Table 3 : Calibration screen for user-defined buffer

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 in custom calibration buffer. The tip of the probe must be completely immersed into the solution. Stir the probe gently to create a homogeneous solution.

3. The screen shows 2 readings. The upper display shows the pH reading of the solution with respect to previous calibration (if any) & lower display shows the pH reading of the solution without any calibration. Use ▲ & ▼ keys to adjust the upper display to the pH value of your custom buffer.

4. Press **ENTER** key to confirm the calibration.

5. Rinse the probe with de-ionized water. Place it in the next buffer and follow the steps 2, 3 and 4 to calibrate other points.

Function Keys available in pH 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 pH measurement mode
ENTER	Confirms the calibration
▲ ▼	Increases/decreases pH buffer reading
◄ ►	(Not functional)

3.2.3 Calibration Report

Calibration report gives you detailed information on calibration. It includes date & time, buffer group, offset, temperature, number of days calibration is over due and slope information.

To View calibration Report:

1. From pH 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 first page of calibration report is shown in the display.

3. Press **PAGE (F1)** to view the second page of the report.

4. Press **PRIN (F2)** to transfer the calibration report to computer through IrDA.
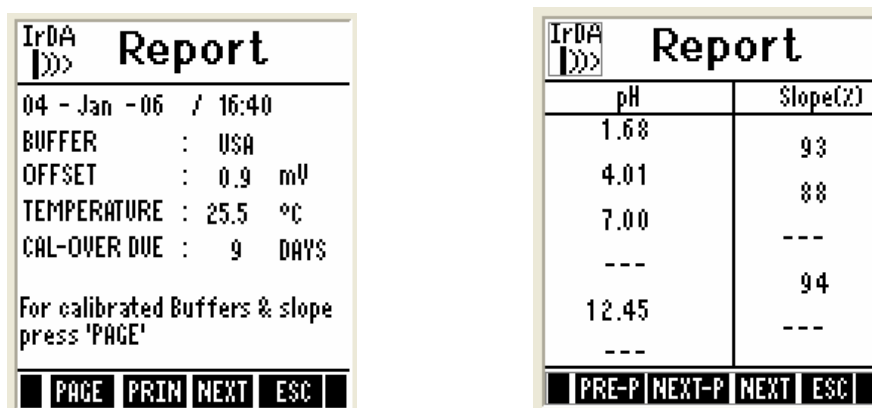
Figure 29: pH Calibration Report

Example: In the given pH calibration report (Refer Figure 29), 4-point calibration has been done for USA buffer group (pH 1.68, pH 4.01, pH7.00 & pH12.45).

- The slope is 93 for the range enveloped from pH1.68 to pH4.01.

- The slope is 88 for the range enveloped from pH4.01 to pH7.00.

- The slope is 94 for the range enveloped from pH7.00 to pH12.45 where pH 10.01 calibration point has been skipped.

Function Keys available in pH calibration report screen:	
PAGE (F1)	Goes to the second page of the calibration report
BACK (F1)	Goes to the first page of the calibration report
PRIN (F2)	Transfers calibration report to Computer through IrDA
NEXT (F3)	Goes to pH measurement mode
ESC (F4)	Goes to pH measurement mode
ENTER	(Not functional)

▲ ▼ ◀ ▶   (Not functional)

3.2.4 Average Slope Indicator of pH Probe

Each time you perform pH calibration; the meter calculates the average slope of your probe and graphically indicates it in the header section of the LCD screen.
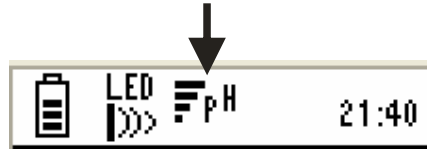
Figure 30 : Average slope indicator

Number of bars in the indicator shows the slope value:

Number of Bars	Average Slope of the pH Probe
4	Above 90%
3	90% to 80%
2	80% to 70%
1	Below 70%

3.3 Temperature Calibration

The temperature probe comes with the meter is factory calibrated. Calibrate the temperature probe only if you suspect temperature errors may have occurred over a long period of time or if you have a replacement temperature 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.

3.3.1 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 55 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 28-(a)] for few seconds and then shows the calibration screen. Press **TEMP (F1)** to go to temperature calibration. The temperature calibration screen appears (Figure 31).

Figure 31: Temperature calibration screen

4. 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)

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

3.3.2 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 55 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.

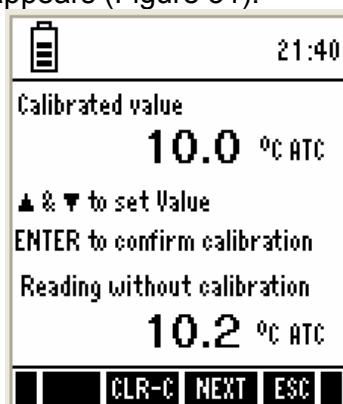3. Press **TEMP (F1)** to go to temperature calibration.

4. 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).

5. 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)

3.4 mV Calibration

Use a standard ORP solution of known value for calibration. You need to calibrate only 1-point.

1. Switch on the meter. Make sure the meter is in mV 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 28-(a)] few seconds and then shows the mV calibration screen [Figure 32-(a)].
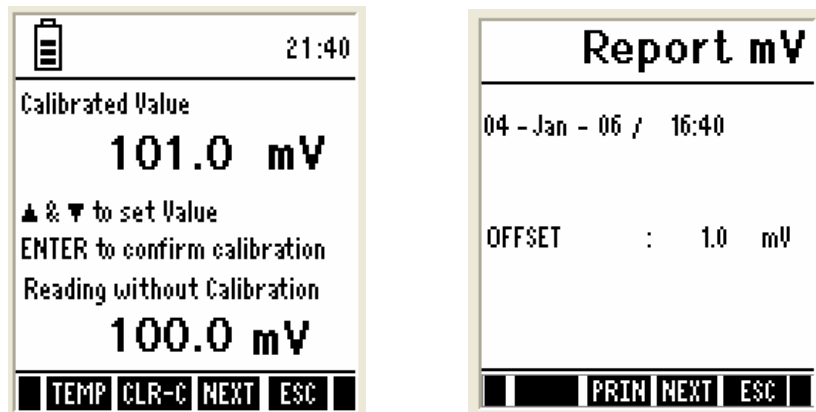
                        (a)   (b)
              Figure 32 : mV calibration screen & calibration report

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

> **Note:** The meter allows you to adjust the upper display reading up to ±150 mV with respect to the default reading.

5. Press **ENTER** key to confirm the entered value.

6. The calibration is completed. The meter shows the calibration report [(Figure 32-(b)].

Function Keys available in mV calibration screen:	
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 mV measurement mode
ENTER	Confirms the calibration
▲ ▼	Increases/decreases mV reading
◄ ►	(Not functional)

3.4.1 mV 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 calibration Report:

1. From mV 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 32-(b)].

3. Press **PRIN (F2)** to transfer the calibration report to the computer.

Function Keys available in mV calibration report screen:	
(F1)	(Not functional)
PRIN (F2)	Transfers calibration report to computer through IrDA
NEXT (F3)	Goes to mV measurement mode
ESC (F4)	Goes to mV measurement mode
ENTER	(Not functional)
▲ ▼ ◄ ►	(Not functional)

3.5 Ion Calibration

This is available only in **pH 620** model.

Use standard solutions of 0.001, 0.01, 0.1, 1, 10, 100, 1000 & 10000 ppm for calibration. You need to calibrate minimum of 2-points. Follow the instruction in 'Prepare the Meter for Calibration' section in page 29.

1. Switch on the meter. Make sure the meter is in Ion 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 28-(a)] few seconds and then shows the Ion calibration screen [Figure 33-(b)]

(a)   (b)
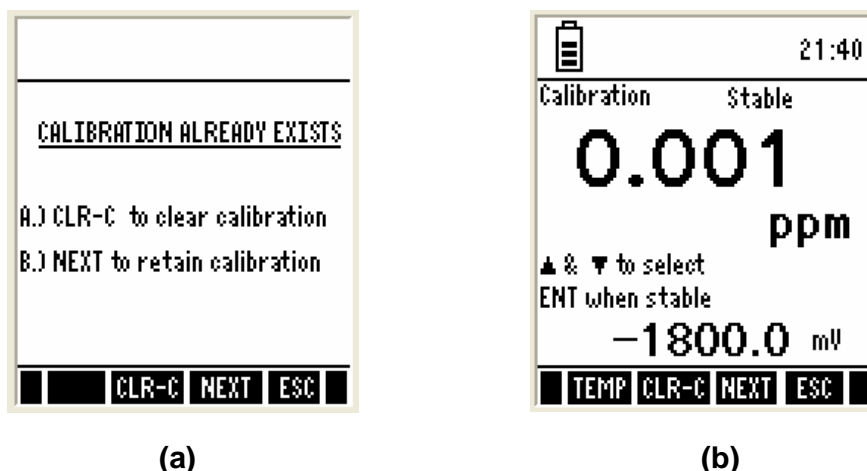
Figure 33 : Ion calibration screens

> **Note:** If there is an existing ion calibration in the meter, you will be given two options. [Figure 33-(a)]
> - **Clear the previous calibration (CLR-C) –** choose this if you wish to delete all previously calibrated points and re-calibrate with a new type of ion.
> - **Retain the previous calibration (NEXT) –** choose this if you wish to retain previously calibrated points and re-calibrate new points (or overwrite existing points) with same type of ion.

4. Dip the ISE in calibration solution. The tip of the probe must be completely immersed into the solution. Stir the probe gently to create a homogeneous solution.

5. The calibration screen displays two readings. The upper display shows the lowest calibration point 0.001 ppm. The lower display shows the absolute mV reading of the solution without any calibration (default reading). Use ▲ & ▼ keys to select the required calibration point in the upper display.

6. Allow time for the reading to stabilize. Press **ENTER** key to confirm the selected point. The meter flashes the upper display to acknowledge the first point calibration.

7. The upper display shows the next calibration point.

8. Rinse the ISE with de-ionized water. Place it in the next calibration solution and follow the steps 4 through 6 to calibrate other points.

> **Note:** The meter accepts the second and subsequent points only if the mV readings are within the calibration window (**15mV/decade to 90mV/decade**).

Function Keys available in Ion calibration screen:	
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 Ion measurement mode
ENTER	Confirms the calibration
▲ ▼	Selects calibration points
◄ ►	(Not functional)

3.5.1 Calibration Report

Calibration report gives you detailed information on calibration. It includes date & time, calibration points (Ion concentrations), absolute mV reading for each point and slope.

Figure 34 : Ion calibration report

Example: In the given Ion calibration report (Refer Figure 34), calibration has been done for 0.01, 0.1 & 10 Ion concentrations. The corresponding absolute mV readings are 0.0mV, 56.0mV & 156mV. The slope is 56 mV/decade for the range enveloped from 0.01 to 0.1 ppm. Similarly, the slope is 50 for the range enveloped from 0.1 to 10ppm where 0.1 calibration point has been skipped.

To View calibration Report:

1. From mV 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.

Function Keys available in Ion calibration report screen:	
(F1)	(Not functional)
PRIN (F2)	Transfers calibration report to computer through IrDA
NEXT (F3)	Goes to Ion measurement mode
ESC (F4)	Goes to Ion measurement mode
ENTER	(Not functional)
▲ ▼ ◀ ▶	(Not functional)

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
- **pH** - pH measurement & calibration related settings
- **Temperature** - Temperature measurement & calibration related settings
- **mV** - (no settings available)
- **Ion** – Ion measurement & calibration related settings (available only for **pH 620** model)

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 to navigate to other available functions until you see **SETUP** function in the LCD.
3. Press **SETP (F1)** to go to Setup mode.
4. Setup Selection screen appears (Figure 35)

> **Note:** If the meter is password protected, you will be prompted to enter a password. Refer 'Accessing Setup mode when password protection enabled' section in page 45 for details.

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 35: Setup Selection screen

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

4. Login Password screen appears (Figure 36). The meter expects the 5-digit password specified in system setup. (Refer 'System Settings – Page 5' in page 51)

Figure 36 : 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'.

5. 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.

6. The next digit is selected. Press up ▲ & down ▼ arrow keys to enter the second digit of the password. Enter all 5-digits.

7. Press **ENTER** key to confirm the password.

8. When the correct password is entered, the Setup Selection screen appears (Figure 35).

> **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.

9. Press up ▲ or down ▼ arrow key to go to required setup sub-group.

10. Press **ENTER** key to select the currently shown 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:

   a. Press **ENTER** key to save the change, or

   b. 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 37: System Settings - Page 1

Parameter	Description	Factory Default
STABLE	ENABLE - The meter displays 'Stable' indicator in the measurement screen as per the 'STABLE LIMIT' defined below. DISABLE – 'Stable' indicator does not appear	ENABLE
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 pH 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 48)	DISABLE
STABLE LIMIT	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

4.2.2 System Settings – Page 2

Figure 38 : 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	Not Applicable
MONTH	Sets the current month	Not Applicable
DATE	Sets the current date	Not Applicable
HOUR	Sets the hour (24 Hours) for the current time	Not Applicable
MINUTE	Sets the minute for the current time	Not Applicable
SECOND	Sets the second for the current time	Not Applicable

> **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 39: 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. (This parameter has not editable if 'AUTO OFF' parameter is disabled)	5 min
BACK LIGHT (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 (Key press)	After the last key is pressed, no. of minutes the meter should wait before automatically turning off the back light. (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
BACK LIGHT (Always)	ON – Sets the back light always on. OFF – Sets the backlight always off	NO

> **Note**: The above settings may not work if the system time has not been set as described in page 48.

4.2.4 System Settings – Page 4
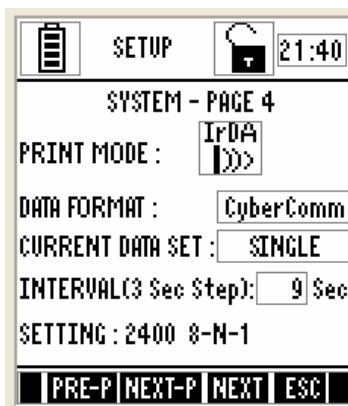
Figure 40: System Settings - Page 4

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	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	SINGLE – Prints only the currently measured reading TIMED – Prints measurement data continuously at the interval specified in 'INTERVAL' parameter below. This parameter applies when PRIN key is pressed from measurement mode to send the currently measured readings to the computer.	SINGLE
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

Figure 41 : System Settings - Page 5

This page allows you to enable password protection for the setup mode & calibration mode. When you enable password protection, the meter prompts to enter the password whenever you try to access the Setup or Calibration mode. The meter does not allow you to edit setup parameters or perform a new calibration unless you enter the correct password. However, any user can view setup parameters or view calibration report by entering '00000' (read-only password)

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.	NO

> **Note**: Once password protection is enabled, there is no way you can retrieve your password if you have forgotten it. Without entering password, neither you can disable the password protection or reset the meter to factory defaults.

4.2.6   System Settings – Page 6

Figure 42 : 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 pH Setup

pH setup sub-group allows you to configure pH measurement & calibration related settings of the meter. The settings are displayed in 2 pages. Press **NEXT-P (F2)** and **PREV-P (F1)** to navigate through these pages

4.3.1 pH Settings – Page 1
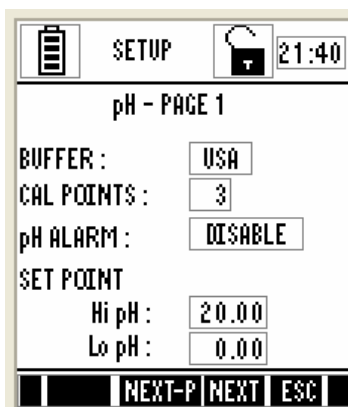
Figure 43 : pH Settings - Page 1

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

Parameter	Description	Factory Default
BUFFER	Select you preferred pH standard buffer group for calibration & auto-recognition. Available groups: USA, NIST, DIN, PWB & USER Select 'USER' if you need to use a custom buffer for calibration.	USA
CAL POINTS	Select the number of calibration points you intend to calibrate the meter using the selected buffer group. Available points: depends on the selected buffer group	5
ALARM SET POINT	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 pH & LO pH parameters (below) DISABLE – HI and LO alarms are not shown in the LCD	DISABLE
HI pH	Specify HI alarm value here. The HI alarm occurs when the pH reading goes above this value Available range: LO pH (specified below) to 20.00 (This parameter is not editable when 'ALARM SET POINT' is disabled)	20.00pH
LO pH	Specify LO alarm value here. The LO alarm occurs when the pH reading goes below this value Available range: 0.00 to HI pH (specified above) (This parameter is not editable when 'ALARM SET POINT' is disabled)	0.00pH

4.3.2 pH Settings – Page 2

Figure 44 : pH Settings - Page 2

Parameter	Description	Factory Default
pH CALIBRATION DUE	Specify number of days for the pH calibration alarm. The meter shows CAL DUE indicator after calibration due days are passed from the last calibration date. Available range: 0 to 30	5 Days
pH RESOLUTION	Sets the resolution for pH measurement Available range: 0.0, 0.00 (for pH 600 model) 0.0, 0.00, 0.000 (for pH 610 & pH 620 models)	0.00

4.4 Temperature Setup

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

4.4.1 Temperature Settings Page

Figure 45 : Temperature Settings Page

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

4.5 Ion Setup

Ion setup sub-group allows you to configure Ion measurement & calibration related settings of the meter. This sub-group is available only in pH 620 model.

4.5.1 Ion Settings Page

Figure 46 : Ion Settings Page

Parameter	Description	Factory Default
UNIT	Sets the unit of measurement for Ion. Available units: ppm, molar and mg/L	ppm

5. Technical Specifications

Model	pH 600 meter	pH 610 meter	pH 620 meter
pH			
Range	-2.00 to 20.0 pH	-2.000 to 20.000 pH	-2.000 to 20.000 pH
Resolution	0.1/0.01 pH	0.1/0.01/0.001 pH	0.1/0.01/0.001 pH
Relative Accuracy	± 0.01 pH + 1 LSD	± 0.002 pH + 1 LSD	± 0.002 pH + 1 LSD
mV			
Range	± 2000mV		
Resolution	0.1 mV		
Relative Accuracy	± 0.2 mV + 1 LSD		
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		
Ion			
Range	-	-	0.001 to 19900
Units	-	-	ppm, molar, mg/L
Resolution	-	-	2 or 3 digits
Relative Accuracy	-	-	0.5% FS (monovalent) 1% FS (divalent)
pH Features			
Calibration points	1 (offset) to 6 points		
Calibration due alarm	User configurable (up to 30 days)		
Set point alarm	User configurable		
Auto buffer recognition	Yes		
pH buffer Groups & Calibration Points	USA : 1.68, 4.01, 7.00, 10.01, 12.45 NIST: 1.68, 4.01, 6.86, 9.18, 12.45 DIN : 1.09, 3.06, 4.65, 6.79, 9.23, 12.74 PWB : 4.10, 6.97		
Calibration Window			
USA	± 1.5 pH (for 7.00pH), ±1 pH (for all other buffers)		
NIST	± 1.35 pH (for 6.86pH), ±1 pH (for all other buffers)		
DIN	± 0.8 pH (for 1.09, 3.06, 4.65pH), ±1 pH (for 9.23, 12.74pH), ±1.34 pH (for 6.79pH)		
PWB	± 0.8 pH		
Custom buffer calibration	Yes (2 to 5)		
Slope/Offset display	Yes (Display + Icon)		
pH Input connector	BNC		

Display	
Display type	Dot matrix LCD with backlighting
Screen resolution	110 x 128
Viewing area	68 x 74 mm
Other	
Data logging	500 data sets
Data communication	IrDA / RS232C-Infrared
Data logging (To PC)	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	500 Hrs (without backlight & serial data transfer)
Power adapter	Input: 100-240V AC Output: DC 9-12V, 6W Max

6. Accessories

6.1 Replacement Accessories

Product Description	Eutech Instruments Order Code
Multi Probe Holder	15X415701
Rubber Boot for 600 series meters	OKRUBBERBT600
100-240VAC Power Adapter	01X030132

6.2 Optional Accessories

Eutech Instruments

Product Description	Eutech Instruments Order Code
8 pin connector Temperature probe	ECPHWPTEM01J
General Purpose Plastic-Body, Double Junction, Ag/AgCl pH electrode	ECFC7252201B
General Purpose Plastic-Body, 3-in-1,pH/Temp Ag/AgCl pH electrode	ECFC7352901J

Oakton Instruments

Product Description	Oakton Instruments Order Code
8 pin connector Temperature probe	OKPHWPTEM01J
General Purpose Plastic-Body, Double Junction, Ag/AgCl pH electrode	OKFC7252201B
General Purpose Plastic-Body, 3-in-1,pH/Temp Ag/AgCl pH electrode	OKFC7352901J

7. General Information

7.1 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

7.2 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.

7.3 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:

Oakton Instruments	Eutech Instruments Pte Ltd.	Distributed by:
P.O Box 5136,	Blk 55, Ayer Rajah Crescent,	
Vernon Hills, IL 60061, USA	#04-16/24 Singapore 139949	
Tel: (1) 888-462-5866	Tel: (65) 6778 6876	
Fax: (1) 847-247-2984	Fax: (65) 6773 0836	
E-mail: info@4oakton.com	E-mail: marketing@eutechinst.com	
Web-sites: www.4oakton.com	Web-site: www.eutechinst.com	