Instruction Manual

CyberScan DO 5000

Bench Dissolved Oxygen Meter

(Also Applicable for CyberScan PCD 5500)

EUTECH INSTRUMENTS

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ISO 9001 CERTIFIED

68X292330
Rev. 2 07/03

PREFACE

Thank you for selecting the Eutech Instruments CyberScan DO 5000 bench meter. This meter measures dissolved oxygen and temperature (°C/ °F).

This instruction manual serves to explain the use of the CyberScan DO 5000 bench meter as a step-by-step operational guide to help you familiarize with the meter's features and functions. It is structured sequentially with illustration of diagrams that explains the various functions and setup menus available.

This manual is written to cover as many anticipated applications and uses of the CyberScan DO 5000 Bench meter as possible. If there are doubts in the use of the meter, please do not hesitate to contact the nearest Eutech Instruments' Authorized Distributors or call us at (65) 6778-6876 for Eutech Instruments' Customer Service Dept. for assistance.

Kindly remember to complete the warranty card and mail it back to your Authorized Distributors or Eutech Instruments Pte Ltd.

Eutech Instruments reserve the rights to change, make improvement and modify specifications without prior notice and cannot accept any responsibility for damage or malfunction to the instrument caused by improper use.

Rev 2 07/03

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1 INTRODUCTION

1.1 Introducing the CyberScan Series

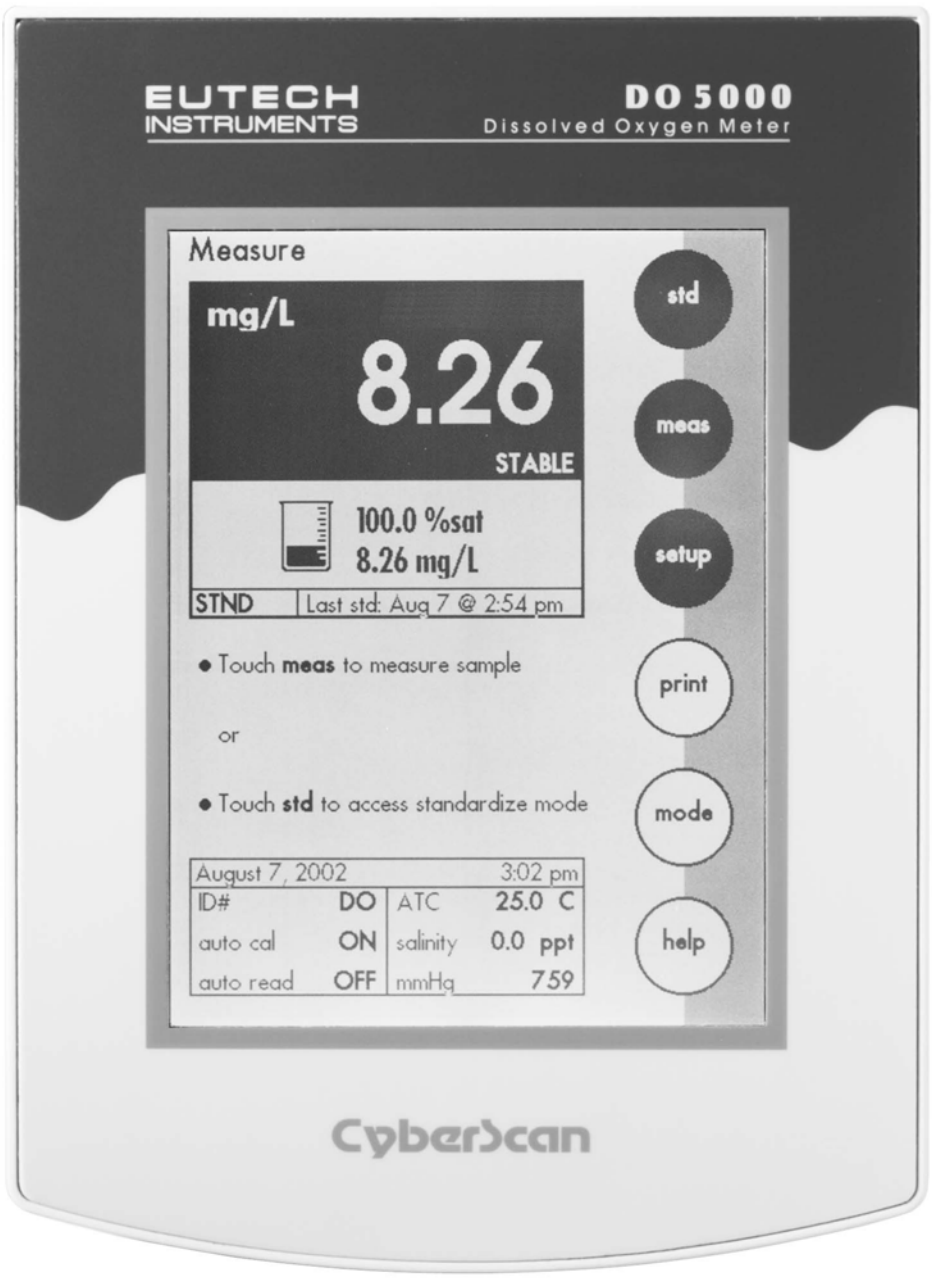
Thank you for selecting a Eutech Instruments CyberScan Bench meter. This manual describes the operation of the CyberScan DO 5000 bench meter. The state-of-art meter that you have purchased is easy to operate and will guide you through the various functions by displaying easy to understand prompts. This instruction manual should answer any questions that might arise in operating your meter, however, do not hesitate to call our Technical Support at (65) 67786876 or fax at (65) 67730836.

The CyberScan DO 5000 bench meter provides microprocessor precision in a compact benchtop design that is easy to use. One touch screen controls all procedures, letting you:

- Measure dissolved oxygen and temperature (°C/ °F)
- Customise your display screen and operating parameters
- Assign operator and sample identification numbers
- Store 250 data points in the meter's memory or transfer data to a computer or printer.
- Access extensive online help with just a touch a button

It all adds up to rapid, completely automatic, intuitive operation.

You will find this symbol appearing in this manual; it indicates useful tips that ease your meter operation.


EUTECH
INSTRUMENTS
DO 5000
Dissolved Oxygen Meter
Measure
mg/L
8.26
STABLE
100.0 %sat
8.26 mg/L
STND
Last std: Aug 7 @ 2:54 pm
• Touch meas to measure sample
or
• Touch std to access standardize mode
August 7, 2002
3:02 pm
ID# DO
auto cal ON
auto read OFF
ATC 25.0 C
salinity 0.0 ppt
mmHg 759
std
meas
setup
print
mode
help
CyberScan

2 UNPACKING THE METER

The following is a listing of what you should have received with your new CyberScan DO 5000 meter.

Meter with kit includes

- Meter
- Power adapter (120 VAC/ 12VDC) **OR** (220 VAC/ 12 VDC) depending on order code.
- BOD Probe
- Instruction Manual

If any of these items are missing, please contact your nearest Authorized Distributor.

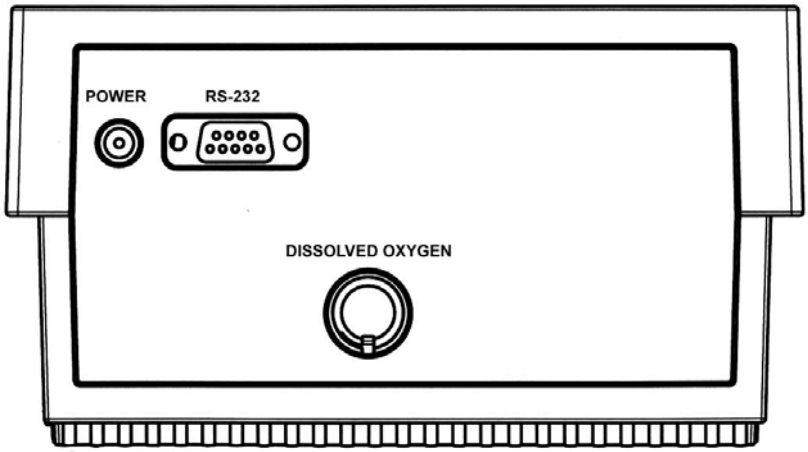
Accessory conductivity probes and ion selective electrodes are available and can be ordered by contacting any Authorized Distributor or Eutech Instruments Marketing (65) 67786876.

3 GETTING STARTED

3.1 Connectors

1. Review the layout and arrangement of the rear connector panel.

2. Connect the power cable to the rear connector panel power jack and to a powers source.



3.2 Dissolved Oxygen Probe

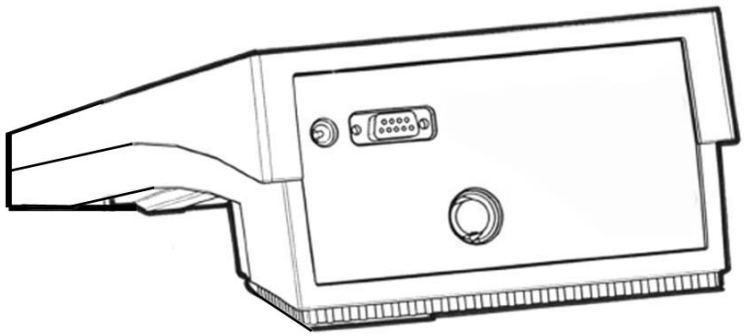
This meter is equipped to use the BOD probe.

1. Carefully review the instruction sheet accompanying the probe for setup and conditioning information.

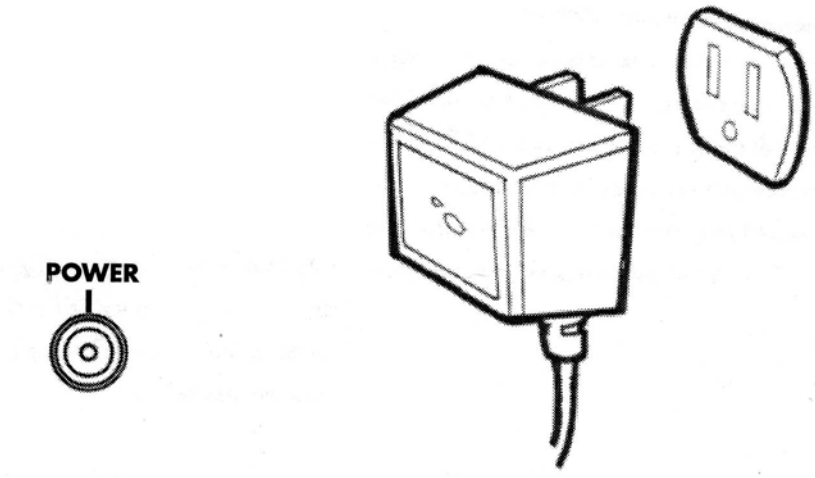
2. Connect the probe to the meter by plugging it into the DIN connector on the back of the meter. Permit the probe to warm up for 30 minutes.

3. Store the DO probe in a BOD bottle filled with 1 inch of water.

1. Connect the electrode arm to the base.

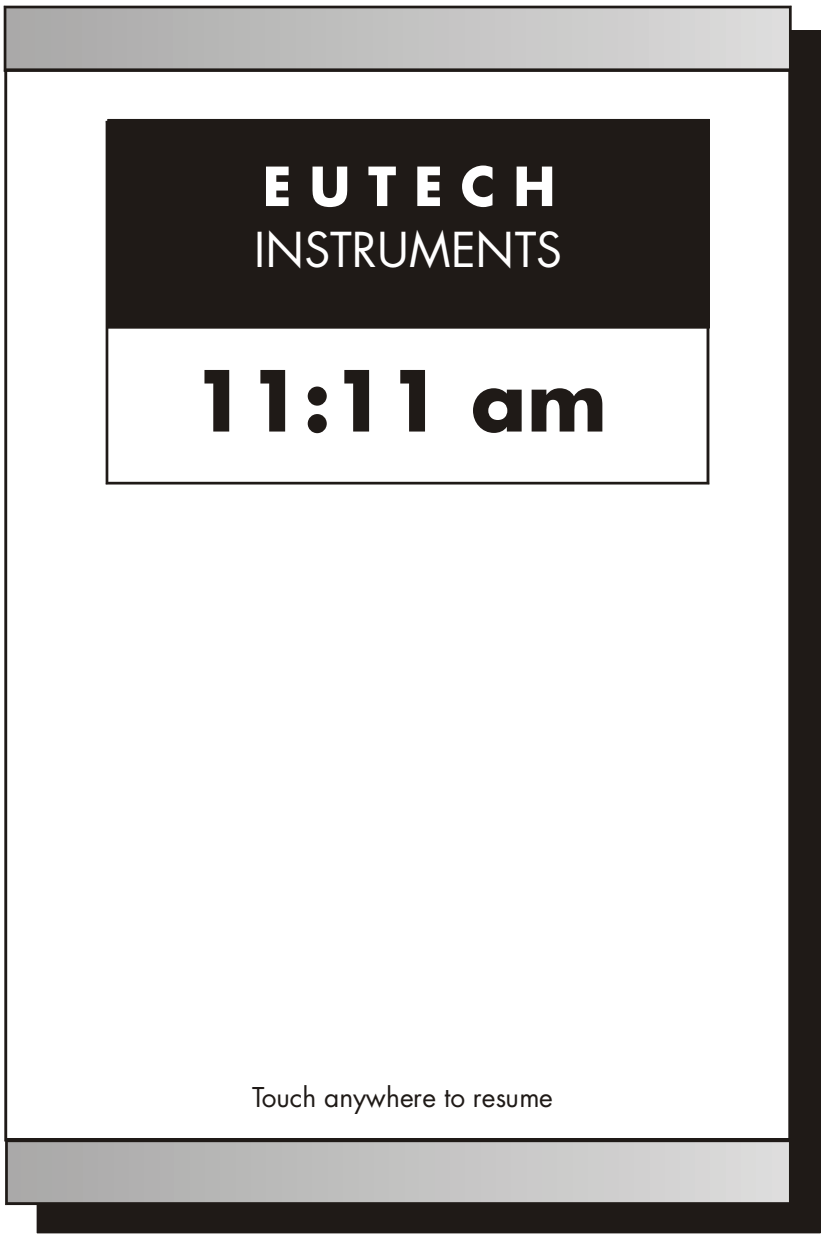


2. Connect the power cable to the connector cable to the rear connector panel power jack and to a power source.

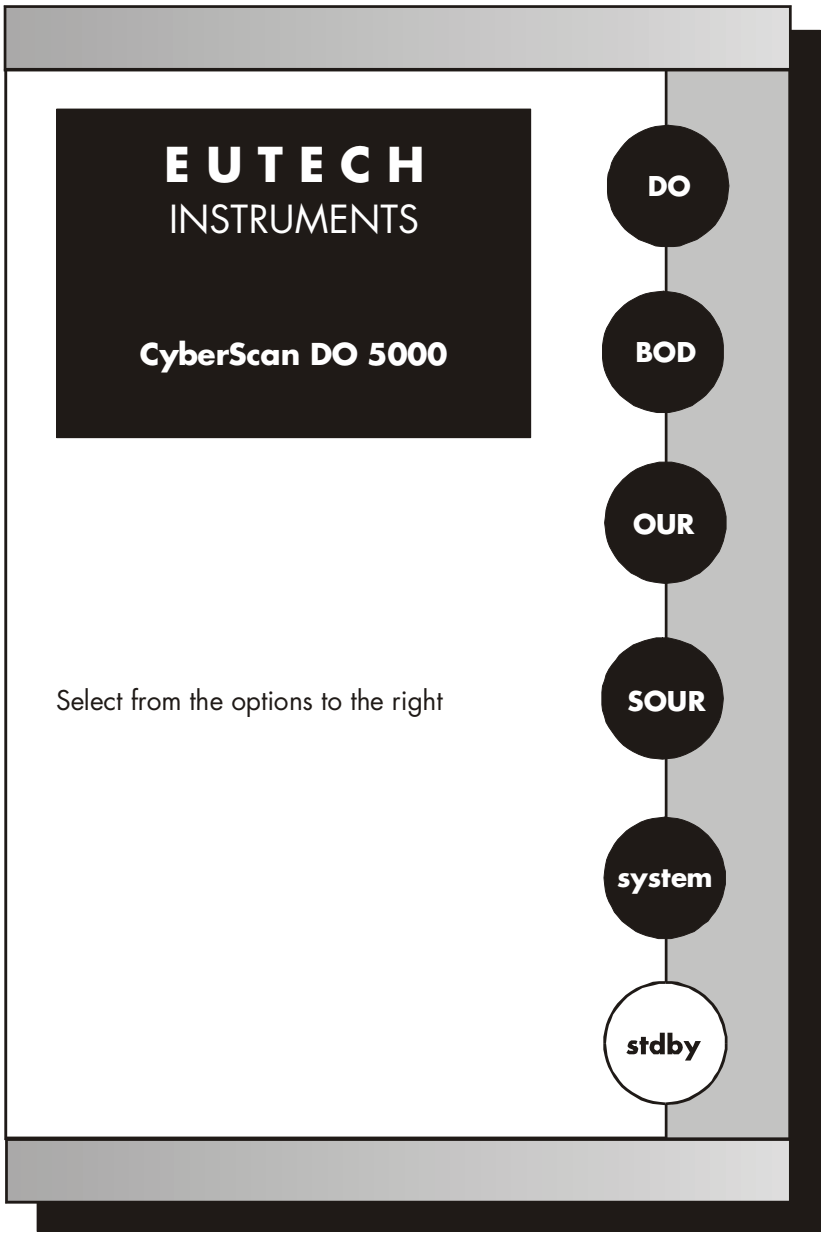


To connect RS232, see Data Management on Section 9 below, page 93.

Standby screen



Meter Main Screen



3.3 Touch Screen Operation

The CyberScan DO 5000 meter operates with a state of art touch screen. The touch screen makes this the easiest meter on the market to operate and care for. When this meter is first plugged in, the STANDBY screen will appear. Touch anywhere on this screen to access the functions of the meter.

The buttons on the right side of the screen control all of the functions of the meter. Alight touch on the screen is all you need to access the various functions. Once you touch a button you will get an audible tone; **the screen will not change until you lift your finger.**

This design prevents rapid uncontrolled scrolling through the various function screens. Easy to understand prompts guide you through the operation of the meter in the selected mode. If you are ever in doubt about what to do, just touch **help** on the bottom right corner of the screen for detailed information about the screen.

The touch screen is made of a durable polyester material that is chemically resistant. Maintenance is simple with this meter. To clean the screen you just need to wipe it with a damp cloth and dry it with a clean dry towel. For additional information, see Cleaning and Troubleshooting sections of the manual (page 92).

3.4 Button functions

The touch screen of your CyberScan research DO meter has “buttons” along the right side of the screen that are common to many of the screens. The following indicates the function of these common buttons.

This is the standby button and it allows you to access the **standby** mode. When in standby, the meter will not take measurements. It is in a state of rest. When you touch **stdby** the meter will return to the standby screen which says “Eutech Instruments” and displays the time.

The **mode** button allows you to switch between the various operations of the meter. These operations include DO, BOD, OUR, SOUR, setup, and stdby.

The **enter** button allows you to accept any changes that you have made on one setup screens or accept values that you have input with keypads. When touched, enter will save the changes and return you to the previous screen.

The **save** button allows you to save multiple changes that you have made on one screen as a group. It functions like the enter button does for an individual changes.

The **exit** button allows you to leave the screen you are currently viewing and return to the previous screen without making any changes.

The **help** button allows you to access helpful information on any screen. When you touch the help button, information about the current screen appears. This information will include step by step instructions for operating the meter from the current screen and possible applications information for that screen.

The **close** key appears on the bottom of all help screens and allows you to exit the help screen and return to the previous screen.

The **more** button appears on the help screens and allows you to advance to the next help screen for additional information.

The **back** button appears on the help screen and allows you to move back to a previous help screen.

This button accesses the standardization screen from the various measurement modes and initiates standardization of the meter once the standardization screen is accessed.

This button is the measure button and directs the meter to measure your sample when in the Auto Read mode.

This button will access he setup screens for the measuring mode that you are currently using. It can also be used to access the system setup screen that allows you to set parameters that are not related to measurements such as the times and the date.

The **print** button sends information to the output device that you have connected to your CyberScan meter. The output device can be a printer, data logger or a computer. In addition to this, touching the print button will also send data to the data storage center of the meter if a sample ID has been assigned to your sample.

The arrow keys on the screen move the cursor up and down in order to highlight parameters that you would like to review or edit.

The **edit** button appears on the setup screens. After you have highlighted a parameter that you would like to change, the edit button allows you to access the available options for that parameter.

The **clear** button allows you to remove a setup parameter or standard buffer value from the meter's memory that may have been entered at a previous time or by a previous user that is no longer of value to you. Touching the clear button erases the value so you may enter a new one. It can also erase the data from the memory of the meter.

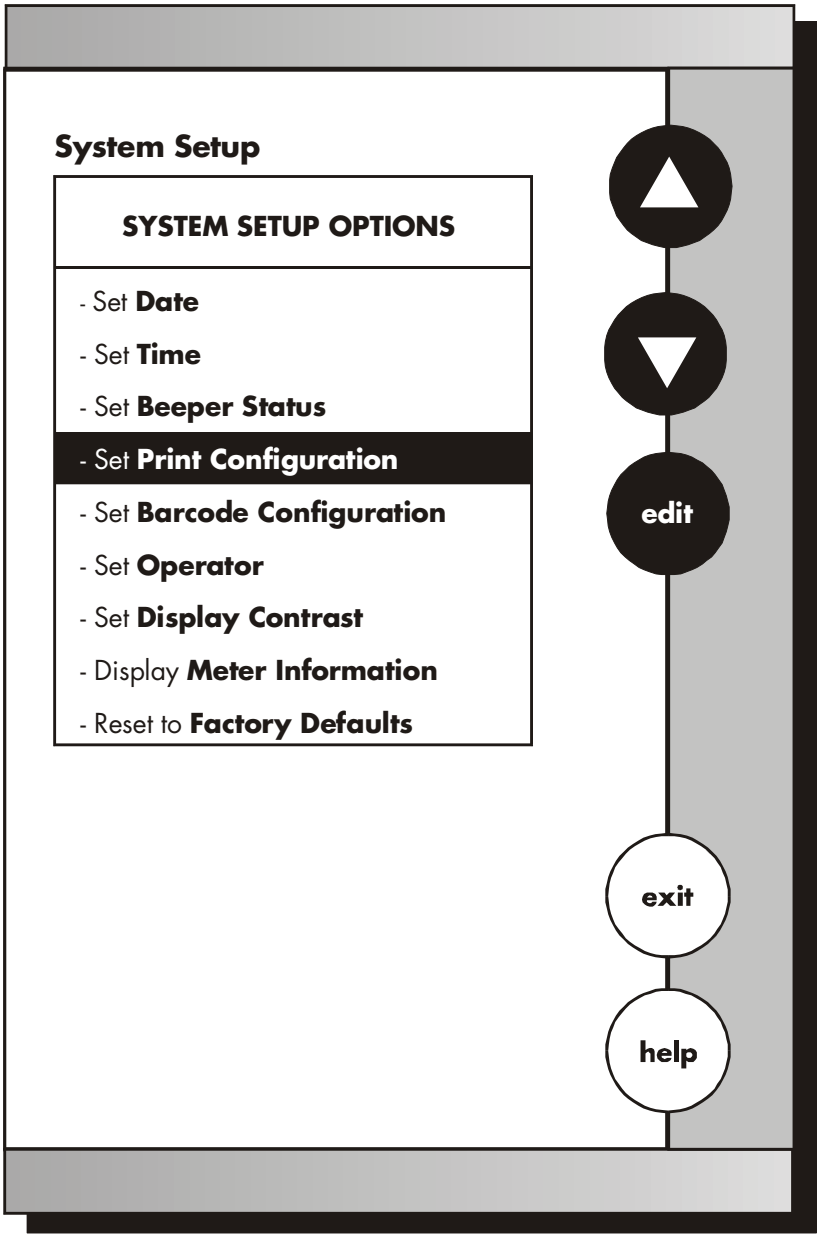
The **BS** button is a backspace button. It appears on keypad screens and it allows you to back up and delete a character entered in error.

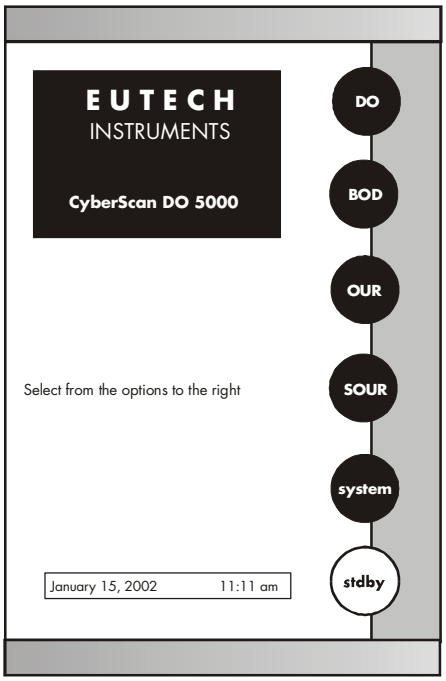
The **delete** button appears on the "View Stored Data" screens. This button allows you to erase the data from the memory of the meter.

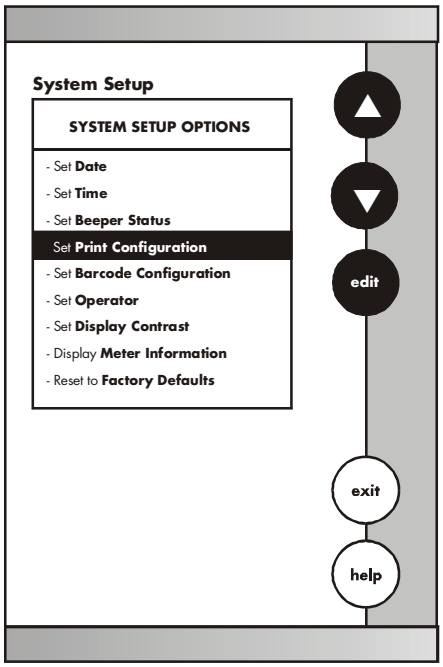
The **prev** button appears on the Data Screens when the data stored in the meter's memory has been accessed. It allows you to scroll through data points sorted and stored prior to the current data point displayed.

The **next** button appears on the Data Screens when the data stored in the meter's memory has been accessed. It allows you to scroll through data points sorted and stored prior to the current data point displayed.

4 SYSTEM SETUP




EUTECH
INSTRUMENTS
CyberScan DO 5000
Select from the options to the right
January 15, 2002 11:11 am
DO
BOD
OUR
SOUR
system
stdby


System Setup
SYSTEM SETUP OPTIONS
- Set Date
- Set Time
- Set Beeper Status
Set Print Configuration
- Set Barcode Configuration
- Set Operator
- Set Display Contrast
- Display Meter Information
- Reset to Factory Defaults
edit
exit
help

Access system setup

System setup can be accessed from the Setup screen (Page 12). The system setup function allows you to customise the meter display options to meet your personal preference. Once set, these will rarely need to be changed.

To Access System Setup

1. Touch anywhere on the standby screen
2. Touch **system** on the setup screen

The system setup options are now displayed on the screen.

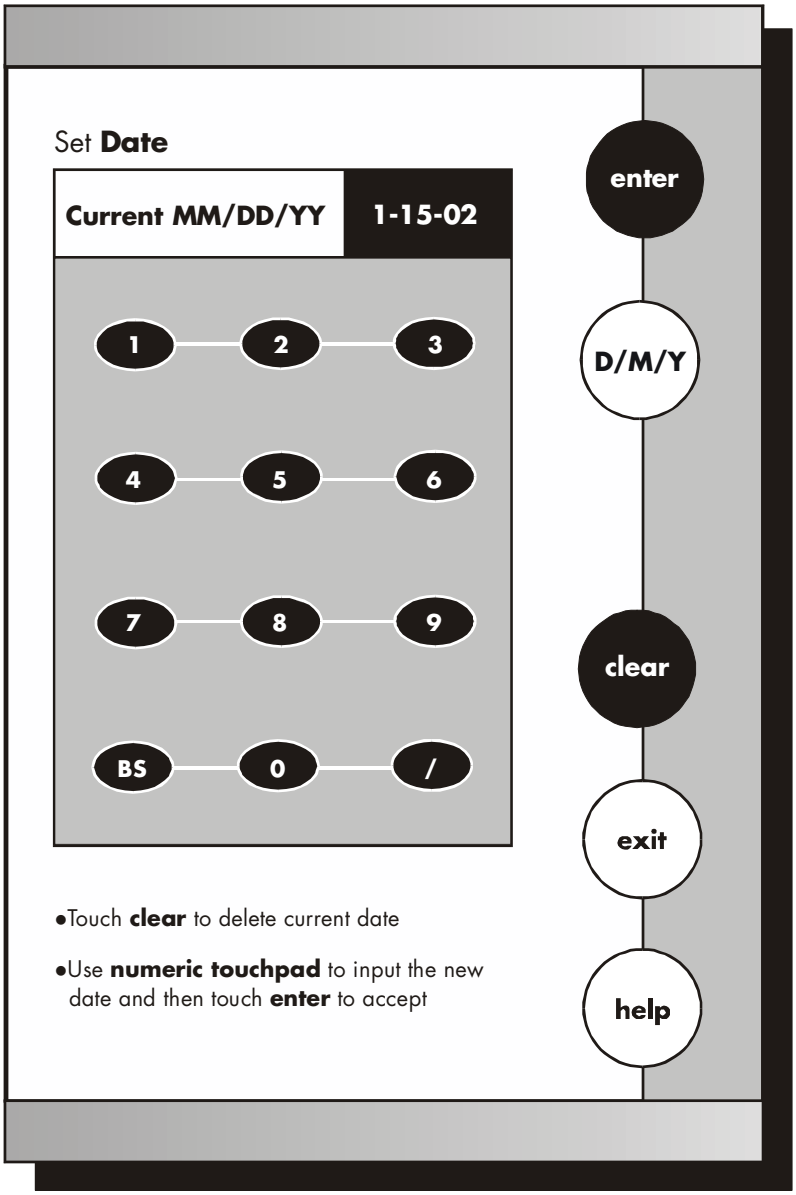
To Access a System Setup Option

1. Use the **arrow keys** to scroll through the setup options and highlight the option to be reviewed.

2. Touch **edit** to view the current status of the selected option.

The following is a detailed description of the system setup option screens

4.1 Set Date


Set Date
Current MM/DD/YY
1-15-02
1
2
3
4
5
6
7
8
9
BS
0
/
enter
D/M/Y
clear
exit
help
•Touch clear to delete current date
•Use numeric touchpad to input the new date and then touch enter to accept

This screen can be used to set the present date which will be displayed on the measure screens. This date will also be printed on demand and stored in the data storage center of the meter when data is saved. There are two format options for the date: month/ day/ year **(M/ D/ Y)** or the European format of day/ month/ year (**D/ M/ Y)**

To set date

1. Access the Set Date screen from the System Setup screen. The current date and numeric keypad are displayed on the screen.

2. Touch **clear** to delete the current entry.

3. Touch **D/ M /Y** or **M/ D/ Y** to set the date format.

4. Use the numeric touch pad to enter the desired date, separating the day, the month and the year by touching the "/" key on the keypad.

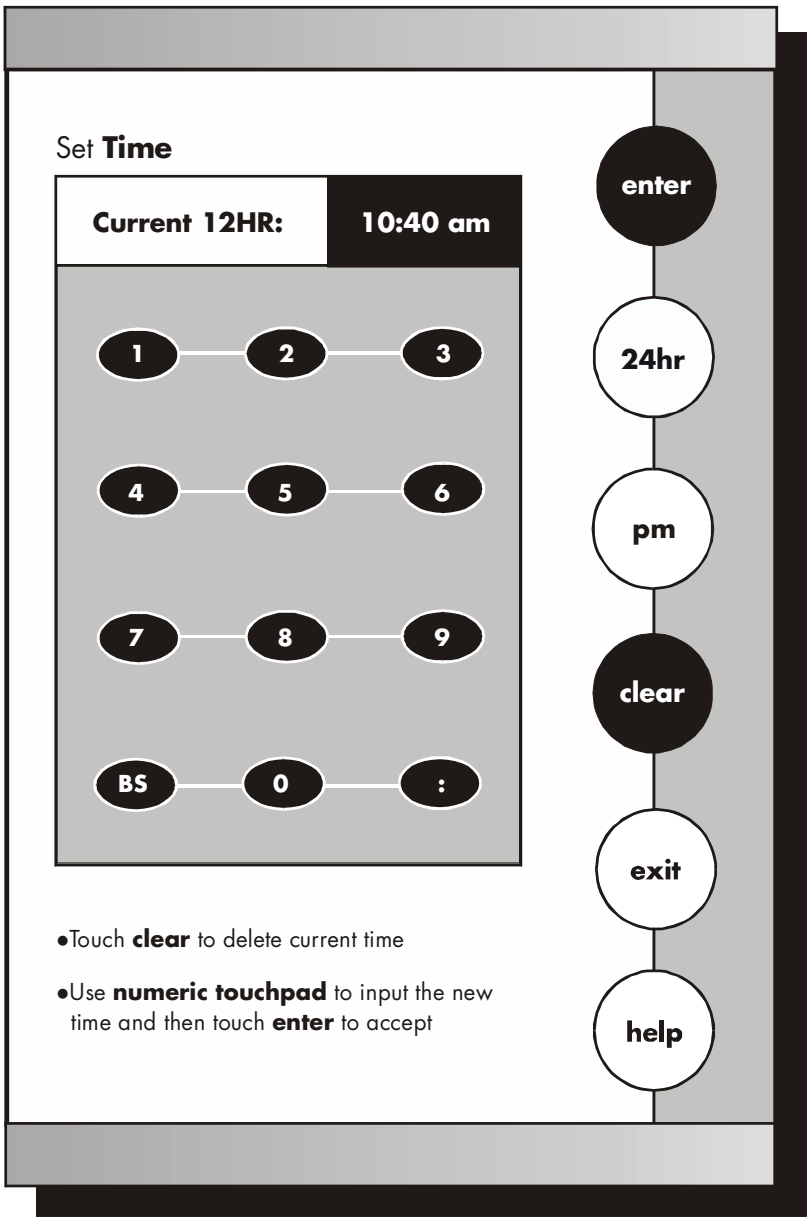
5. Touch **enter** to accept the date in the current format.

   OR

   Touch **exit** to return to the system setup screen, without making any changes.

If you do not use "/", the meter will not accept the date entry.

4.2 Set Time


Set Time
Current 12HR:
10:40 am
1
2
3
4
5
6
7
8
9
BS
0
:
enter
24hr
pm
clear
exit
help
•Touch clear to delete current time
•Use numeric touchpad to input the new time and then touch enter to accept

This screen can be used to set the present time which will be displayed on the measure screens. This time will also be printed on demand and stored in the data storage center of the meter when data is saved. There are two formats options for the time. The clock can be set as either a 12 hour clock or a 24 hour clock.

To set time

1. Access the set time screen from the System Setup screen. The current time and numeric keypad are displayed on the screen.

2. Touch **clear** to delete the current entry.

3. Touch the **24hr** or **12hr** button to format the clock as either a 12 hour or a 24 hour clock.

4. Touch **am** or **pm** to set the appropriate time.

5. Use the numeric touch pad to enter desired time, separating the hour and the minutes by touching the "**:**" key in the keypad.

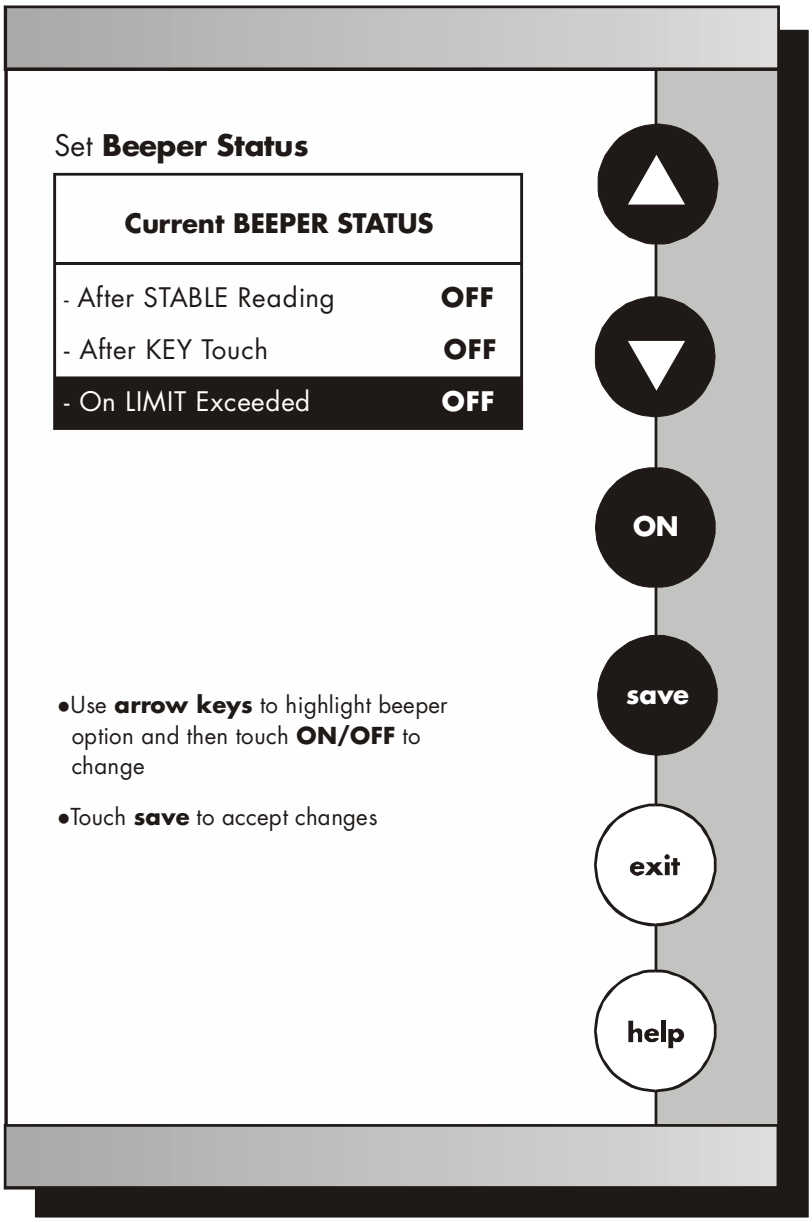
6. Touch **enter** to accept the time in the current format.

OR

Touch **exit** to return to the System Setup screen, without making any changes.

*If you do not use the " **:** ", the meter will not accept the time.*

4.3 Set Beeper Status



This screen allows you to turn on or off the beeper. You may choose to have an audible signal when the meter recognises that the current measurement is stable, each time a function button is touched and/ or when the set limits of a measurement mode have been exceeded.

To Set Beeper Status

1. Access the set beeper status screen from the System Setup screen. The current beeper status is displayed on the screen.

2. Use the **arrow keys** to highlight the beeper status option that you would like to modify.

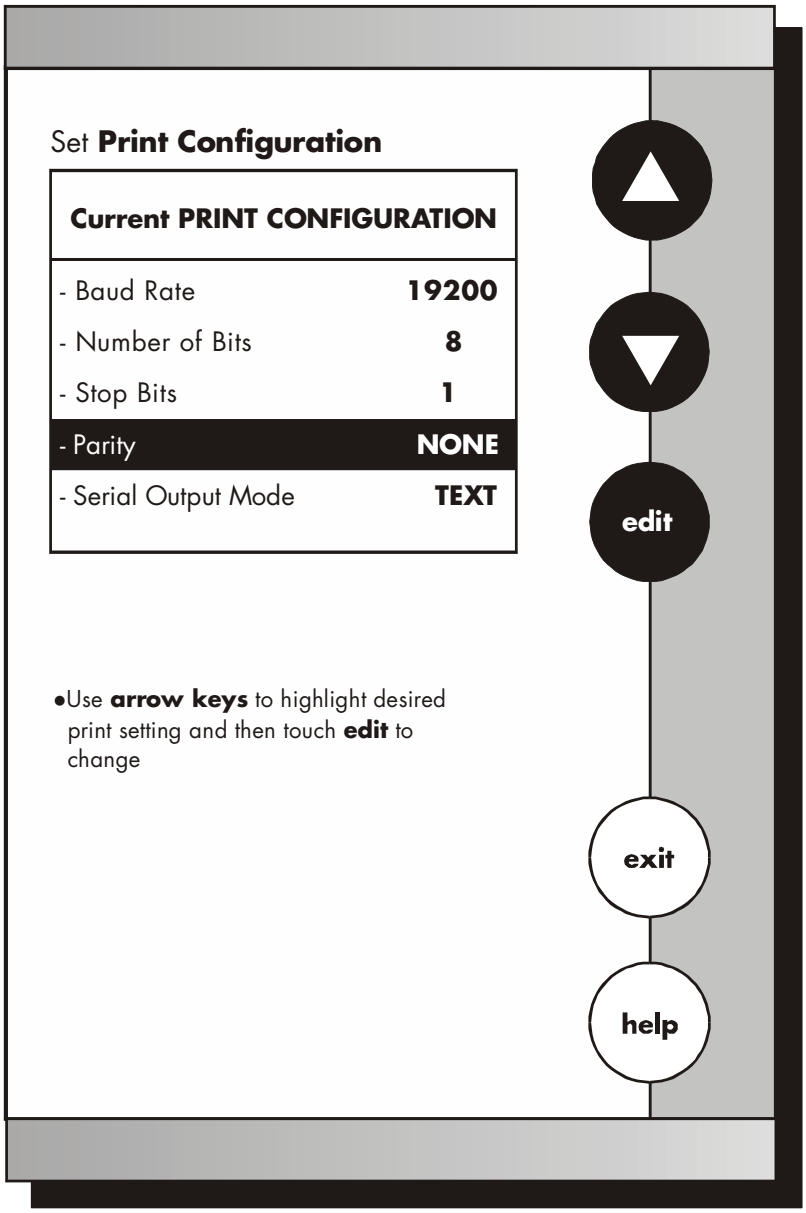
3. Touch **ON** or **OFF** until the desired status is visible in the current beeper status box.

4. Touch **save** to accept the changes and return to the System Setup screen.

   OR

   Touch **exit** to return to the System.

4.4 Set Print Configuration



You can adjust the print configuration of this meter from this screen. The configuration of the following screens must match the configuration of the printer or computer to which the data will be sent.

To Set Print Configuration

1. Access the Print Configuration screen from the System Setup screen. The current Print Configuration is displayed on the screen.

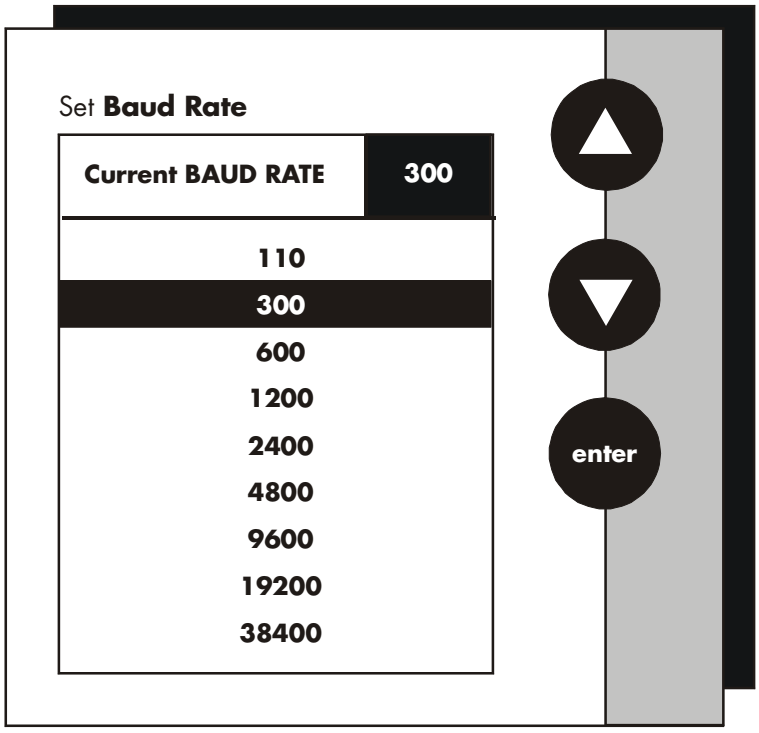
2. Use the **arrow keys** to highlight the configuration option to be modified.

3. Touch **edit** to access the parameters for the highlighted option

   OR

   Touch **exit** to return to the System Setup screen, without making any changes.

4.4.1 Set Baud Rate



This configuration option will control the speed at which the data will be transmitted by the printer. This parameter needs to match the baud rate designated by the printer or computer.

To Set Baud Rate

1. Access the Set Baud Rate screen from the Set Print Configuration screen. The current baud rate is displayed on the screen.

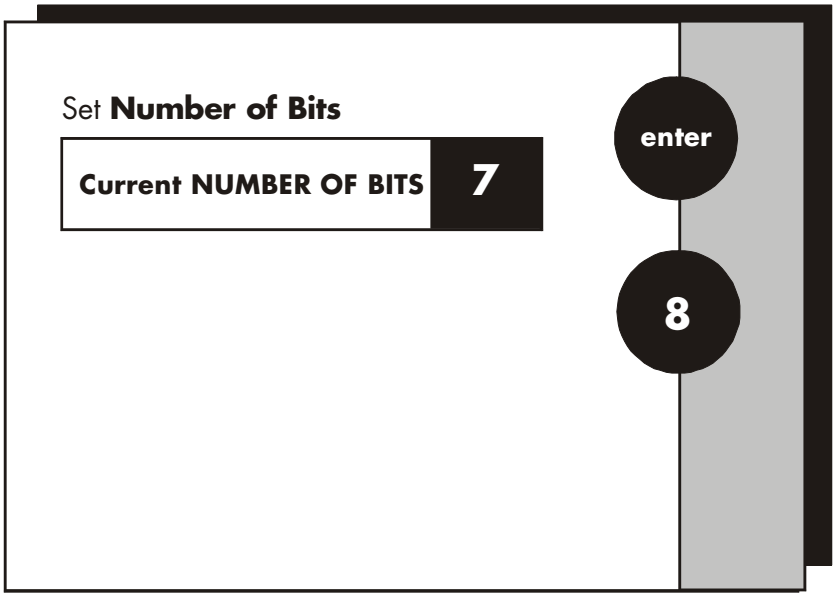
2. Use the **arrow keys** to highlight the baud rate option that matches the baud rate of your printer or computer.

3. Touch **enter** to accept the baud rate and return to the Set Print Configuration screen.

   OR

   Touch **exit** to return to the Set Print Configuration screen, without making any changes.

4.4.2 Set Number of Bits



To Set Number of Bits

1. Access the Set number of Bits screen from the Set Print Configuration screen. The current number of bits is displayed on the screen.

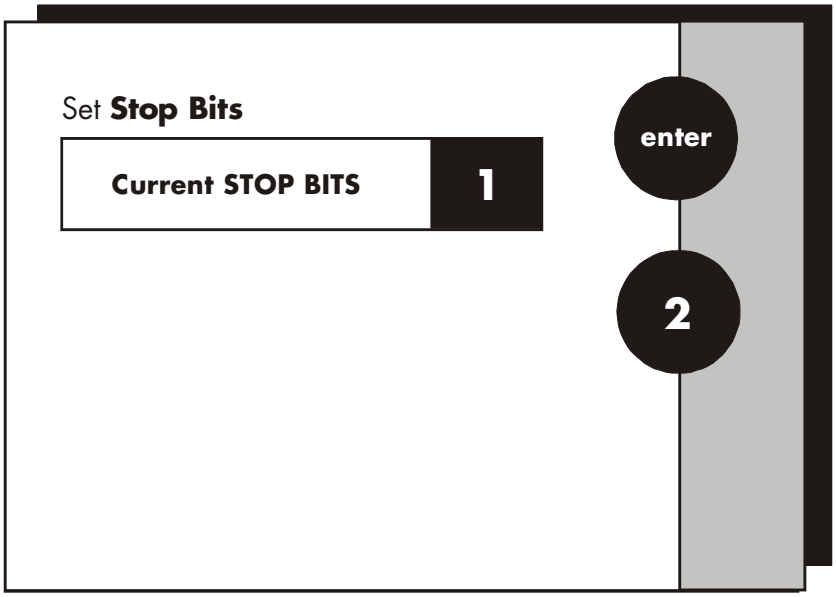
2. Touch **7** or **8** to select the number of bits.

3. Touch **enter** to accept the bit value and return to the Set Print Configuration screen.

   OR

   Touch **exit** to return to the Set Print Configuration screen, without making any changes.

4.4.3 Set Stop Bits



To Set Stop Bits

1. Access the Set Stop Bits screen from the Set Print Configuration screen. The current number of bits is displayed on the screen.

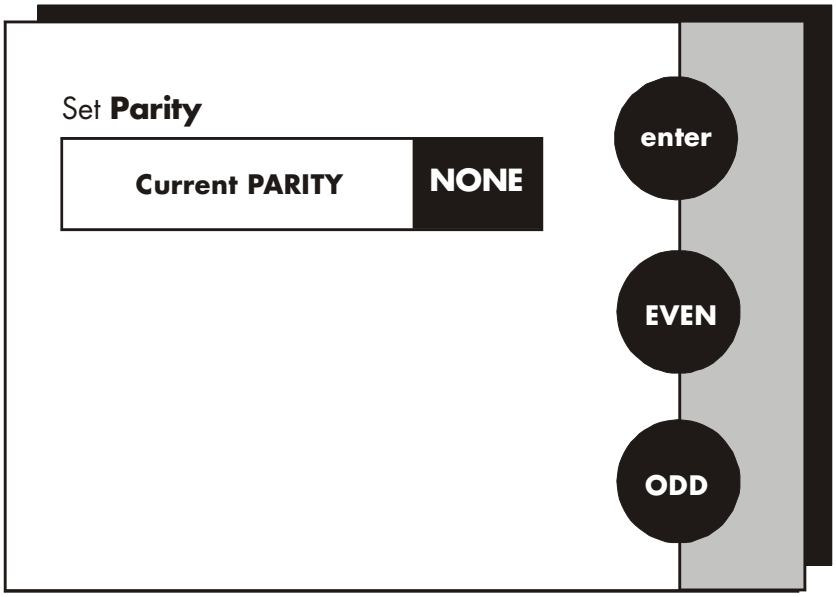
2. Touch **1** or **2** to set the desired number of stop bits.

3. Touch **enter** to accept the stop bit value and return to the Set Print Configuration screen.

   OR

   Touch **exit** to return to the Set Print Configuration screen, without making any changes.

4.4.4 Set Parity



To Set Parity

1. Access the Set Parity screen from the Set Print Configuration screen. The current Parity is displayed on the screen.

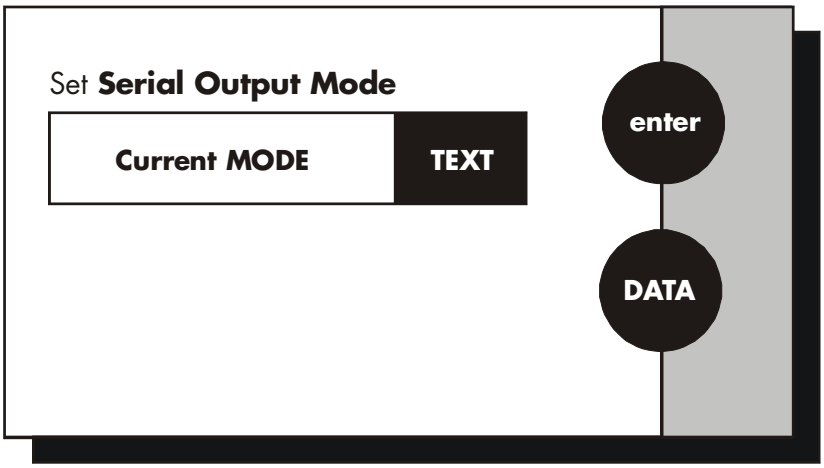
2. Touch **ODD** or **EVEN** or **NONE** to set the desired parity.

3. Touch **enter** to accept the parity setting and return to the Set Print Configuration screen.

OR

Touch **exit** to return to the Set Print Configuration screen, without making any changes.

4.4.5 Set Serial Output Mode



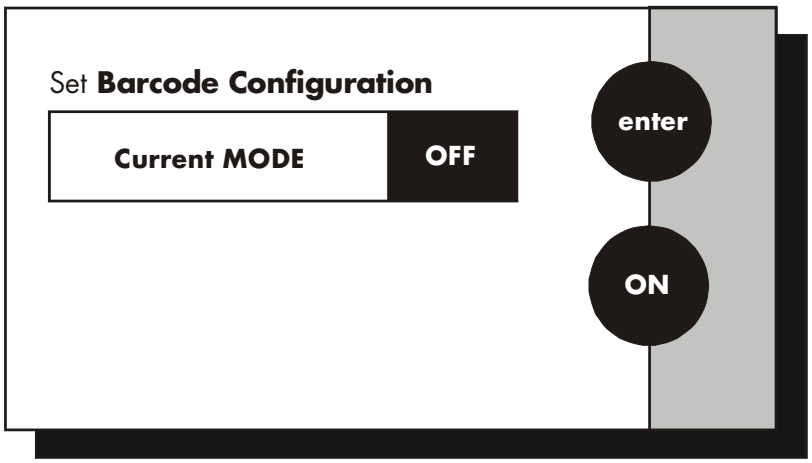
To Set Serial Output Mode

1. Access the serial output mode from the set print configuration screen. The current mode is displayed.

2. Touch **Data** or **Text** on your selection

3. Touch **enter** to accept the choice and return to the Set Print Configuration screen.

4.5 Set Barcode Configuration

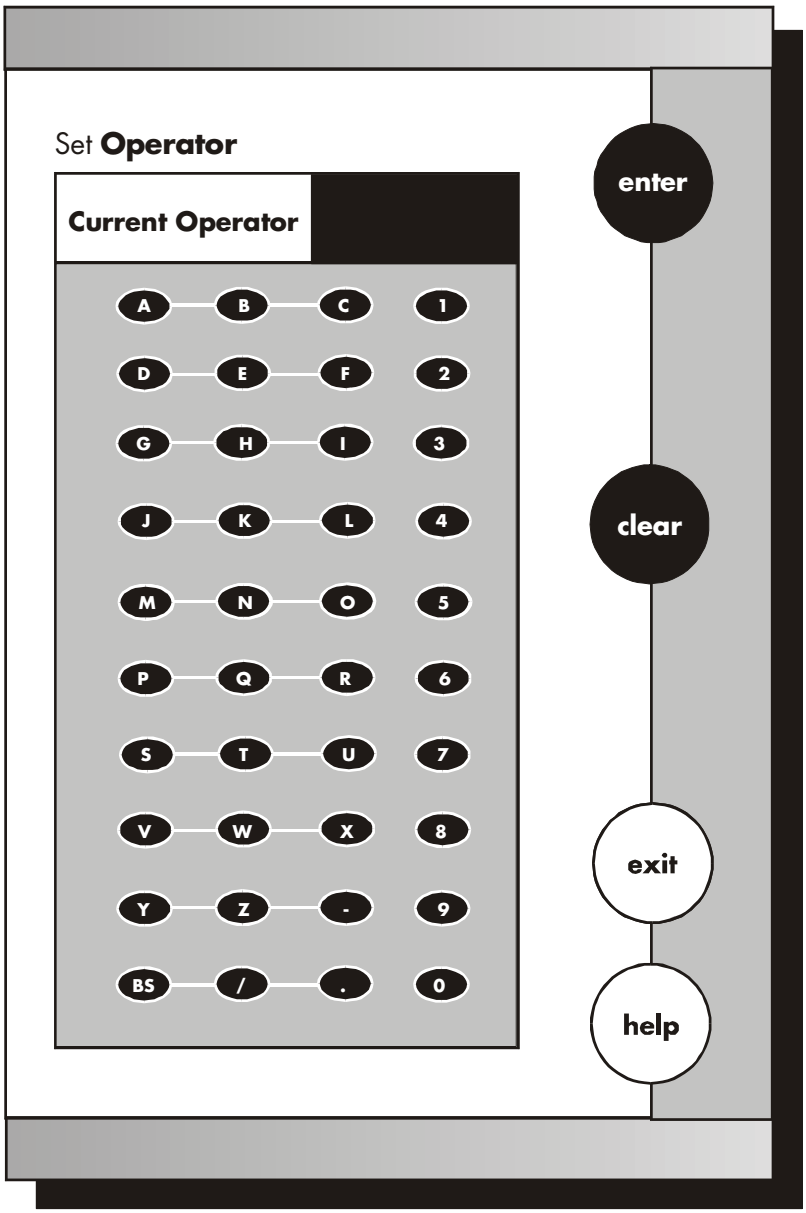


Use this option, as well as Set Print Configuration, to prepare the meter for use with a barcode scanner. Set to “ON” is using a barcode scanner.

To Set Barcode Configuration

1. Access the Set Barcode Configuration screen from the System Setup screen. The current mode is displayed.
2. Touch **ON** or **OFF** on your selection
3. Touch **enter** to accept the mode.

4.6 Set Operator



This option allows you to identify the user of the meter. This information can be saved in the meter's memory. It can also be printed out with measurement data on demand. The operator identification can be up to 9 characters.

To Set Operator

1. Access the Set Operator screen from the System Setup screen. The current operator identification is displayed on the screen.

2. Touch **clear** to remove the current operator identification.

3. Use the alphanumeric keys on the touch screen to enter the desired operator identification. The **BS** button will allow you to backspace to remove a character that was incorrectly entered. The operator identification code can be a maximum of 9 characters in length.

4. Touch **enter** to accept the new operator identification.

   OR

To deactivate the operator identification

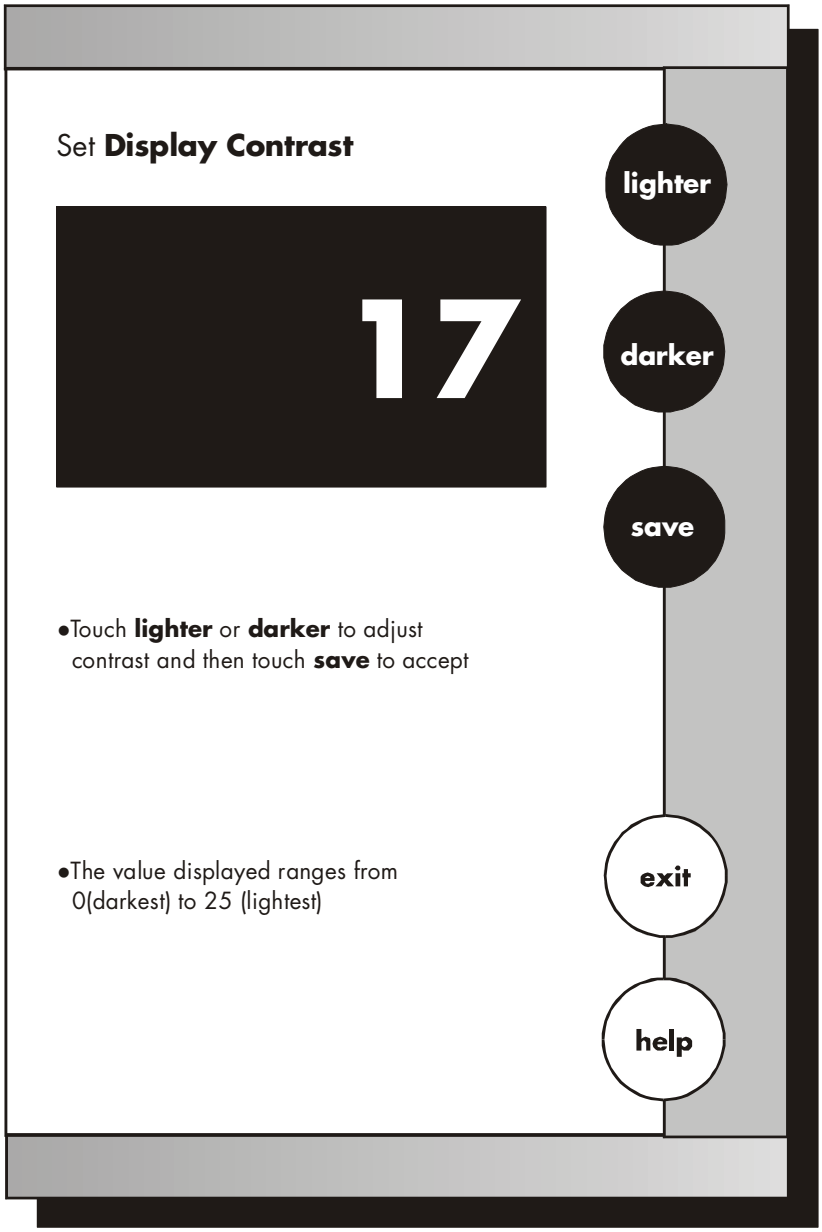
1. Touch **clear** to erase the current user identification.

2. Touch **enter** to return to the System Setup screen.

   OR

   Touch **exit** to return to the System Setup screen, without making any changes.

4.7 Set Display Contrast



This option allows you to change the contrast on the screen to improve the readability of the information presented on the screen. The numbering system that appears on the screen is from 0 to 25. The darkest setting is 0 and the lightest setting is 25.

To Set Display Contrast

1. Access the Set Display Contrast screen from the System Setup screen. The current display contrast value is displayed on the screen.

2. Use the **lighter** or **darker** button to adjust the contrast of the screen to the desired level.

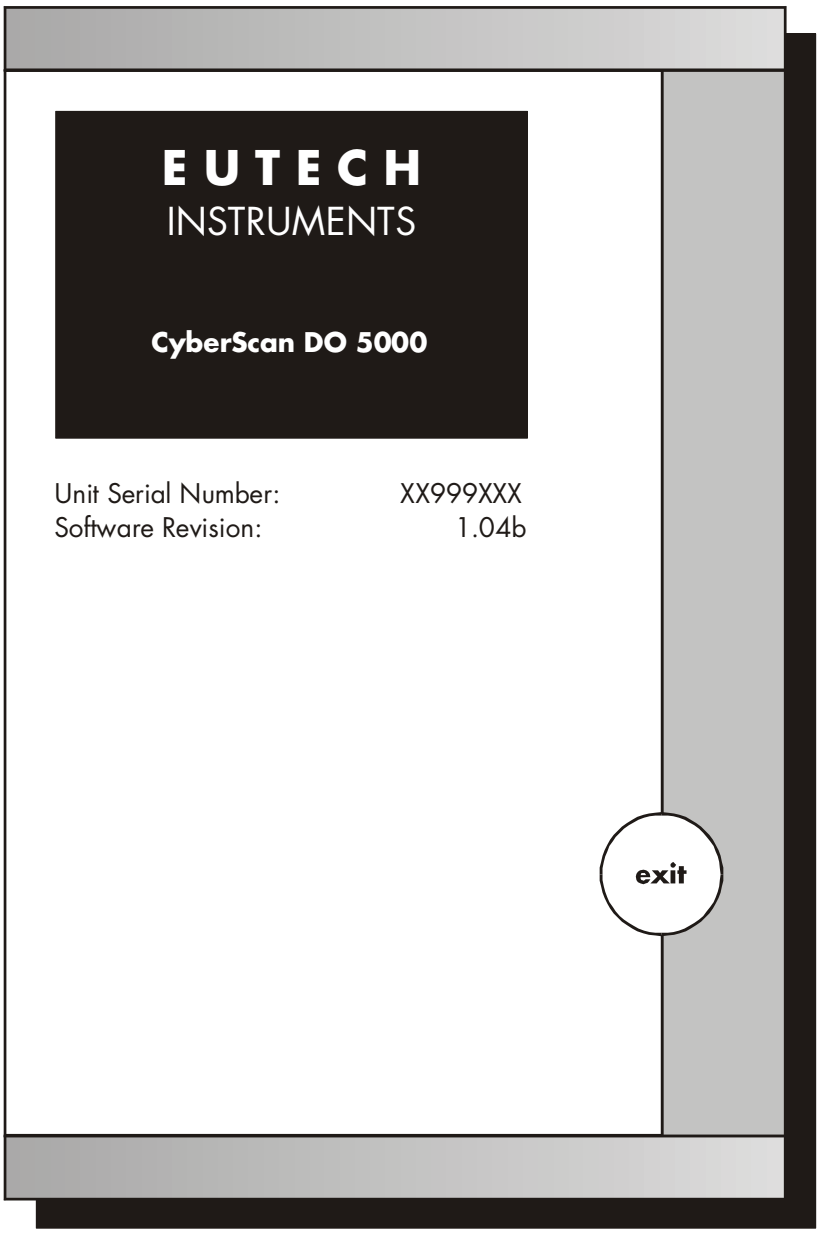
3. Touch **save** to accept the contrast setting and return to the System Setup screen.

   OR

   Touch **exit** to return to the System Setup screen, without making any changes.

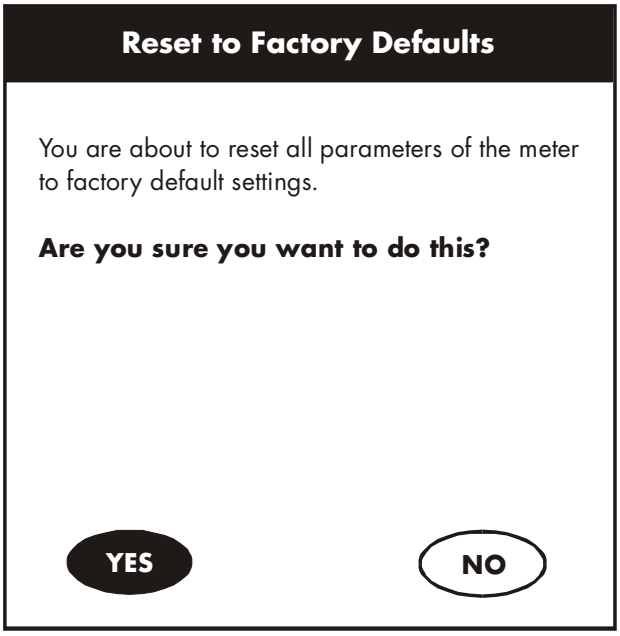
The display contrast of the screen is affected by the internal temperature of the meter. The meter will warn up after being plugged in. during this period (approximately 20 minutes), the display contrast of the screen will get lighter. You may need to adjust the contrast during this period to meet your specifications.

4.8 Display Meter Information



This screen displays the model number, serial number and current software revision of your meter.

4.9 Reset to Factory Defaults



This screen allows you to reset all functions and setup parameters of the meter of the settings originally programmed at the factory.

To Reset to Factory Defaults

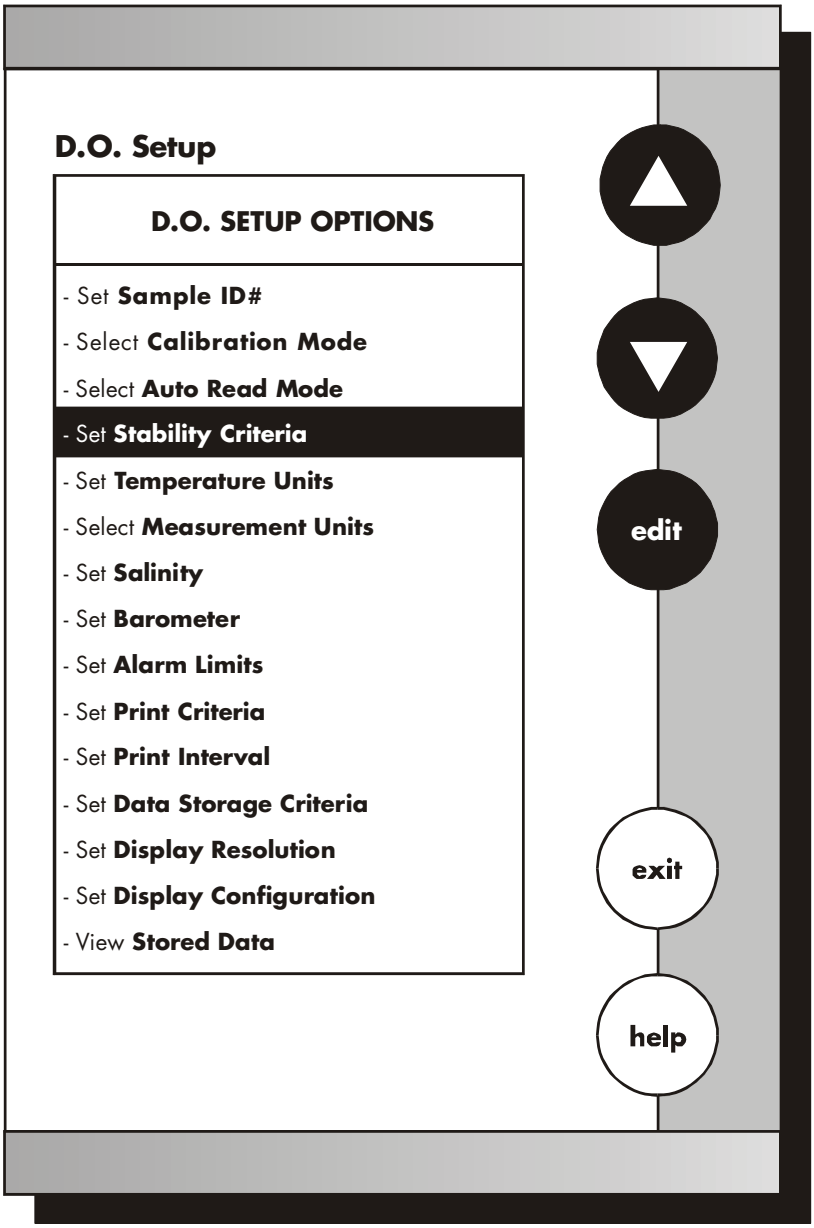
1. Access the Reset to Factory Defaults screen from the System Setup screen.

2. Touch **Yes** to reset all parameters to the original factory default settings.

   OR

   Touch **NO** to return to the System Setup screen, without making any changes.

5 D.O. / BOD/ OUR/ SOUR SETUP



The operating parameters of the DO/ BOD/ OUR/ SOUR modes are common for all (**ONCE SET, SETUP OPTIONS WILL BE SET FOR ALL MODES**). The parameters can be set and controlled from the setup screen. The following sections well guide you through the various options available for the setup mode.

5.1 To Access Setup

From the DO, BOD, OUR and SOUR screens

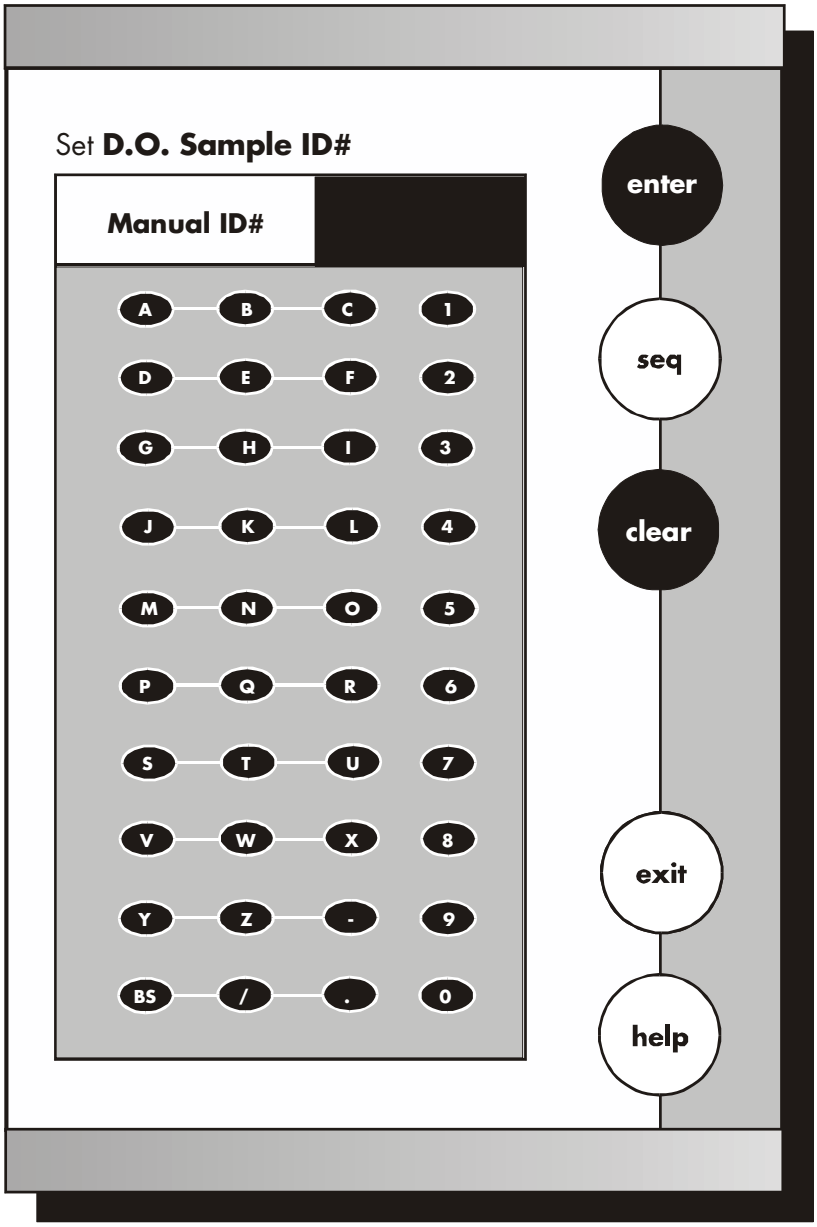
1. Touch **DO**, **BOD**, **OUR**, or **SOUR** from the main screen to access any of these modes.

2. Touch **setup**

3. Use the **arrow keys** to highlight the setup option that you would like to review

4. Touch **edit** to access the screen for the selected option.

5.2 Set Sample ID#

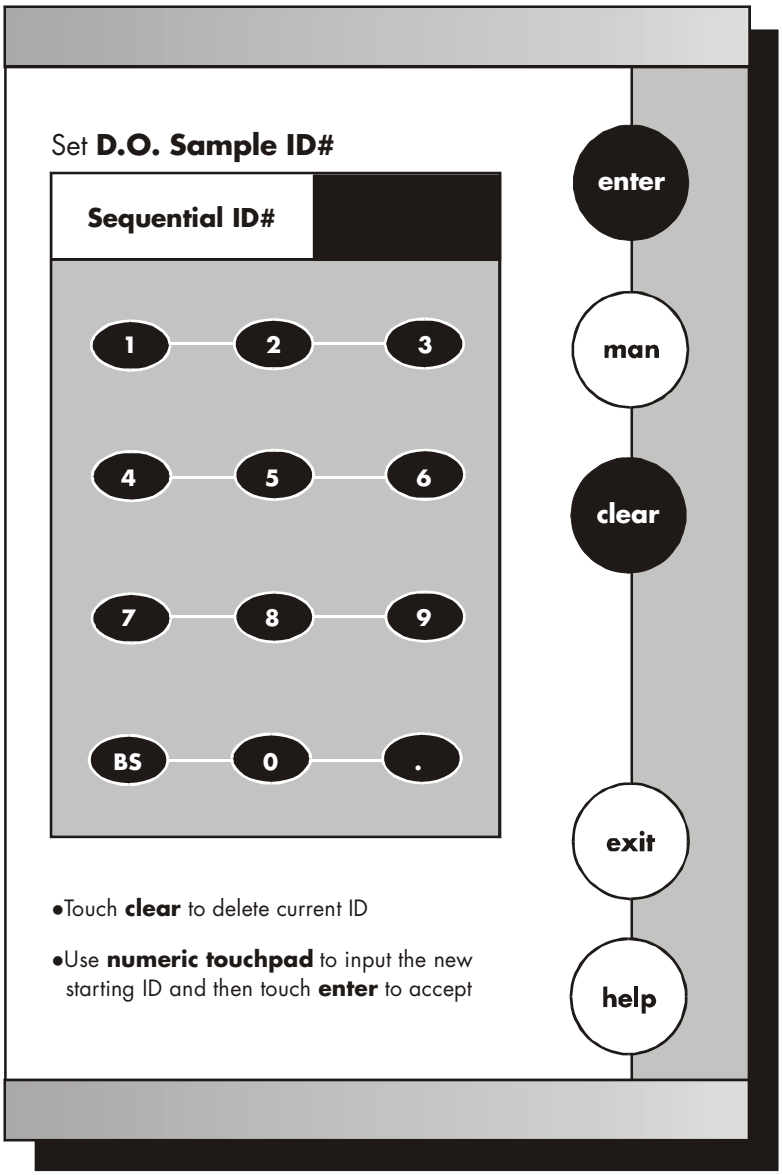


When this option is active, each time you touch print on the Measure Screen the DO values along with date/time and the sample ID will be sent to data storage. You can manually enter an alphanumeric identification of up to 9 characters for any sample or you can have the meter sequentially number your samples beginning at the number of your choice. You may also choose to deactivate the sample ID.

To Set Sample ID

Manual ID Assignment

1. Access the Set Sample ID screen from the Setup screen.
2. Touch **auto** or **Man** to choose the desired mode.
3. Touch **enter** to accept the choice and return to the setup screen.
4. Use the keypad to enter the new sample ID.
5. Touch **enter** to accept the first sequential ID# and return to the Setup screen.


Set D.O. Sample ID#
Sequential ID#
1
2
3
4
5
6
7
8
9
BS
0
.
enter
man
clear
exit
help
•Touch clear to delete current ID
•Use numeric touchpad to input the new starting ID and then touch enter to accept

Sequential ID# Assignment

1. Access the Set Sample ID# screen from the Setup screen.

2. Touch **seq** for sequential ID# assignment. The current ID# is displayed on the screen.

3. Touch **clear** to delete the current ID#.

4. Use the alphanumeric keypad on the screen to enter the number that you would like your sequential ID# assignment to begin with. Every time you touch **print** on the measure screen, the ID# will increase by 1. The **BS** key will allow you to backspace to remove a character that was incorrectly entered.

5. Touch **enter** to accept the first sequential ID# and return to the Setup screen.

OR

To deactivate the Sample ID# Assignment

1. Access the Set Sample ID# screen from the Setup screen.

2. Touch **man** for manual ID# entry. The current ID# is displayed on the screen.

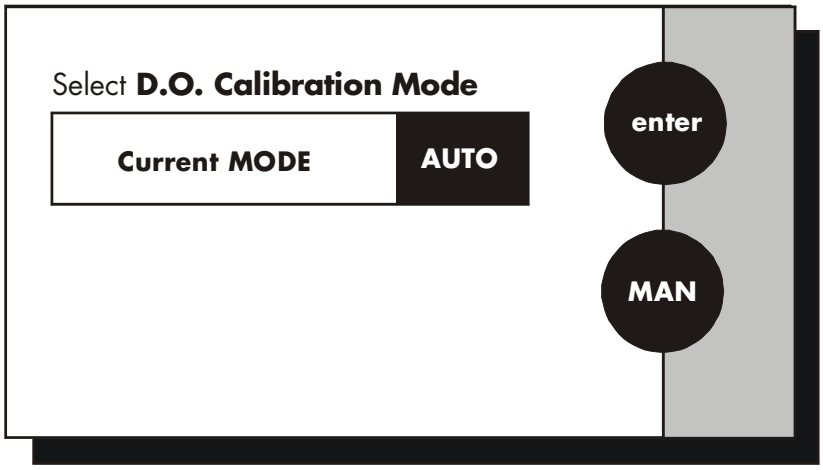
3. Touch **clear** to delete the current ID#.

4. Touch **enter**. The ID# assignment is now deactivated. No number will be assigned to your samples. The meter will return to the Setup screen.

OR

Touch **exit** to return to the Setup screen, without making any changes.

5.3 Select Calibration Mode



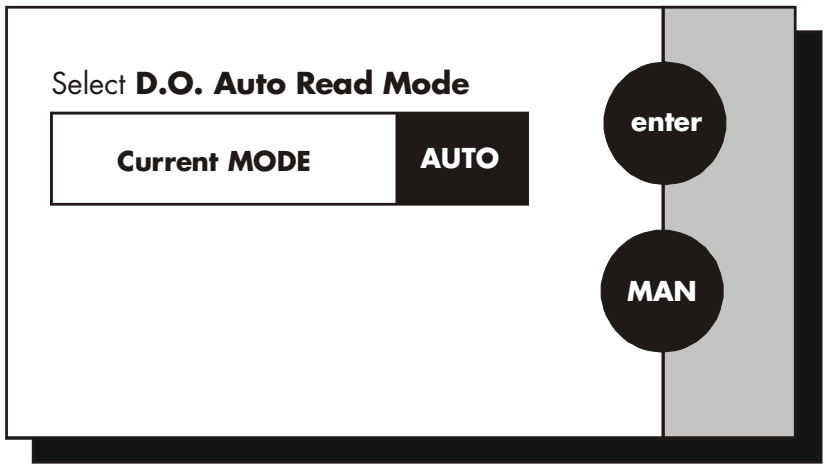
This mode permits a choice between automatic and manual standardization. In most case, automatic calibration is preferred. However, if the standard is not saturated and the oxygen concentration is known, (by titration, for example), manual calibration offers the user capability of entering the known oxygen concentration via a numeric keypad.

1. Access the Select Standardization Mode from the Setup screen. The current mode is shown on the screen.

2. Touch **AUTO** or **MAN** to choose the desired mode.

3. Touch **enter** to accept the choice and return to the setup screen.

5.4 Select Auto Read Mode (Only available in D.O. mode)



You can use this meter when the Auto Read Mode function is active or when it is inactive. When the Auto Read function is active, the meter will lock onto a reading when the meter recognises it as stable. The meter will not deviate from this reading until **meas** is touched. If the auto Read function is inactive, then the meter will continuously monitor the DO of the sample and the Measure screen display will indicate any fluctuation that reading.

To Select Auto Read Mode

1. Access the Select Auto Read Mode screen from the DO Setup screen. The current Read Mode id displayed on the screen.

2. Touch **AUTO** or **MAN** to choose the desired read mode.

3. Touch **enter** to accept the read mode and return to the DO setup screen.

   OR

4. Touch exit to return to the DO Setup Screen, without making any changes.

5.5 Set Configurations for BOD/ OUR and SOUR (Not applicable in D.O. mode)

Set BOD Configuration

This option allows the user to select certain parameters that define the criteria for seed and sample acceptance. Theses parameters are Seed Minimum Data DO ($DO_{initial}$- DO_{final}). Seed minimum endpoint DO, Sample minimum Delta DO, and sample Minimum endpoint DO. These parameters will aid the user to disregard “bad” samples. This setup option appears only when the meter is in the BOD mode.

1. Access the Set BOD Configuration from the Setup screen while on BOD mode.

2. Use the arrow keys to highlight to parameter you wish to change.

3. Touch **edit**.

4. Use the numeric keypad that appears to key in the value desired for the chosen parameter.

5. Touch **enter** to accept the value.

Set OUR Configuration

This option allows the user to select parameters that define the criteria for the Oxygen Uptake Rate (OUR) test. These include Dilution Factor, Minimum Time (minutes) duration of the test, Maximum Time duration, Minimum Starting DO, and Minimum Ending DO. This setup option appears only when the meter is in the OUR mode.

1. Access the Set OUR Configuration from Setup screen while in OUR mode.

2. Use the arrow keys to highlight to parameter you wish to change.

3. Touch **edit**.

4. Use the numeric keypad that appears to key in the value desired for the chosen parameter.

5. Touch **enter** to accept the value.

Set SOUR Configuration

This option allows the user select parameters that define the criteria for the Specific Oxygen Uptake Rate (OUR) test. These include Dilution Factor, Minimum Time (minutes) duration of the test, Maximum Time duration, Minimum Starting DO, Minimum Ending DO, and Solids Weight (g/L). This setup option appears only when the meter is in the SOUR mode.

1. Access the Set SOUR Configuration from the Setup screen while in SOUR mode.

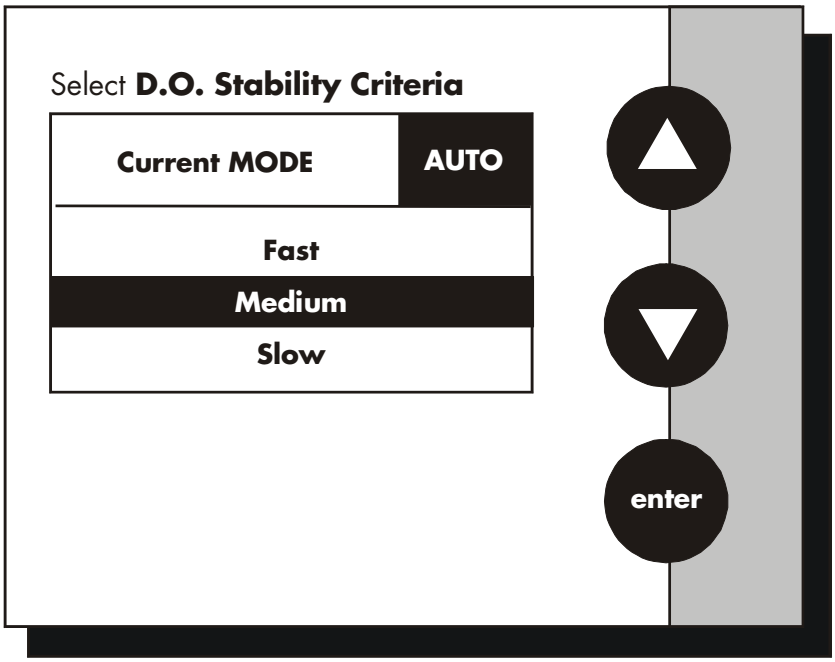
2. Use the arrow keys to highlight the parameter you wish to change.

3. Touch **edit**.

4. Use the numeric keypad that appears to key in the value desired for the chosen parameter.

5. Touch **enter** to accept the value.

5.6 Set Stability Criteria



This setup screen allows you to choose how quickly the meter will accept a reading as stable.

There are three settings: fast, medium, and slow.

To set Stability Criteria

1. Access the Set Stability Criteria screen from the DO/ BOD/ OUR/ SOUR Setup screen. The current stability setting is displayed on the screen.

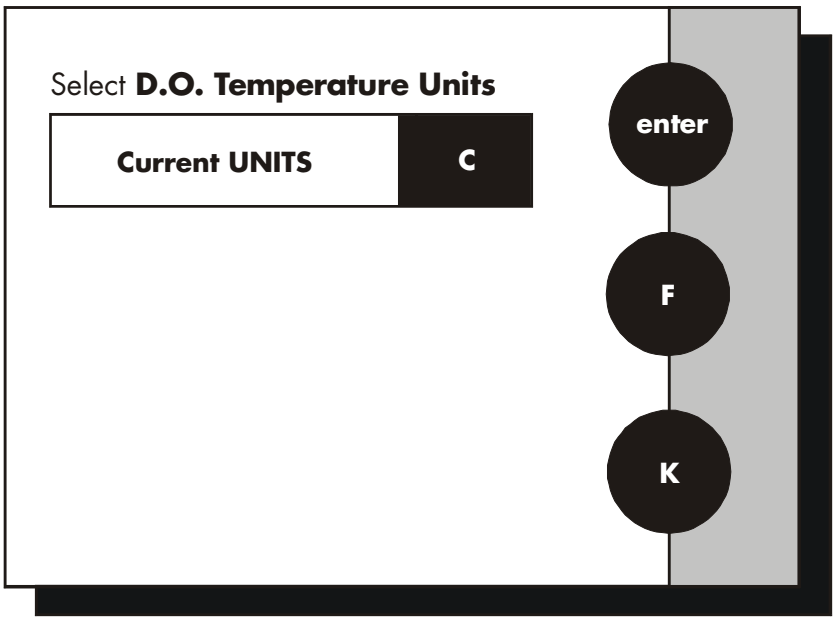
2. Use the arrow keys to highlight the parameter you wish to change.

3. Touch **enter** to accept the stability criteria and return to the Setup screen.

   OR

   Touch **exit** to return to the Setup screen, without making any changes.

5.7 Set Temperature Units



1. Access the Select Temperature Units screen from the DO/ BOD/ OUR/ SOUR Setup screen. The current temperature unit is displayed on the screen.

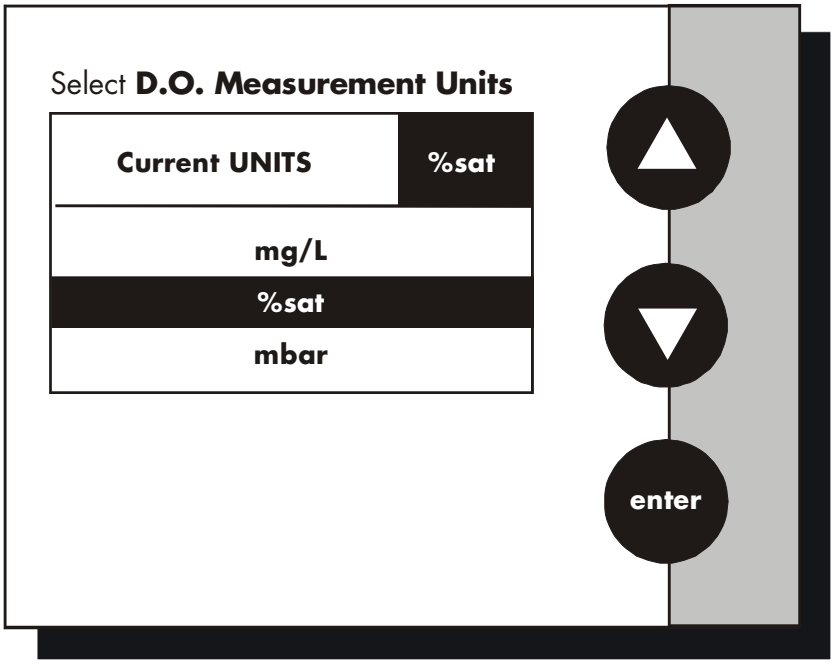
2. Use the arrow keys to highlight the parameter you wish to change.

3. Touch **enter** to accept the temperature unit and return to the Setup screen.

   OR

   Touch **exit** to return to the Setup screen, without making a change.

5.8 Set Measurement Units



1. Access the Select Measurement Units screen from the DO/ BOD/ OUR/ SOUR Setup screen.

2. Use the arrow keys to highlight desired unit.

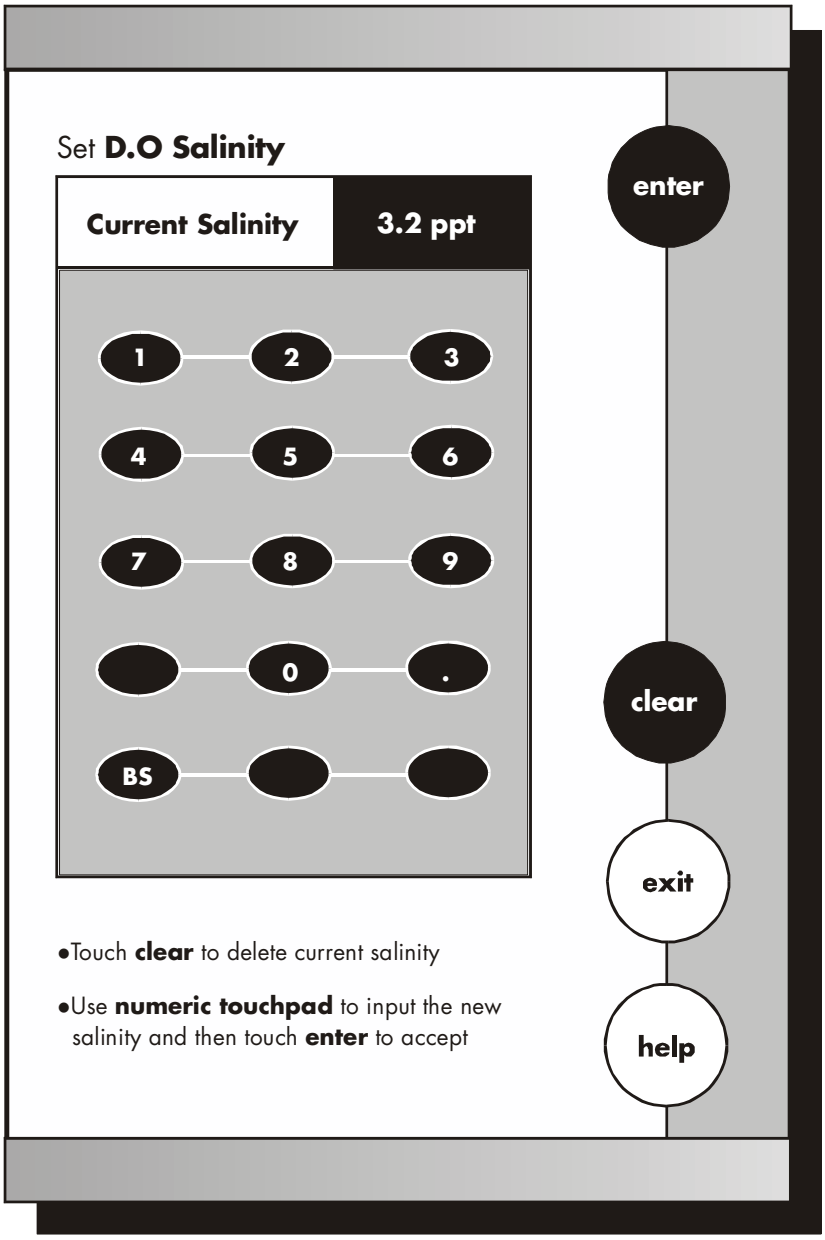
3. Touch **enter** to accept the measurement unit and return to the Setup screen.

   OR

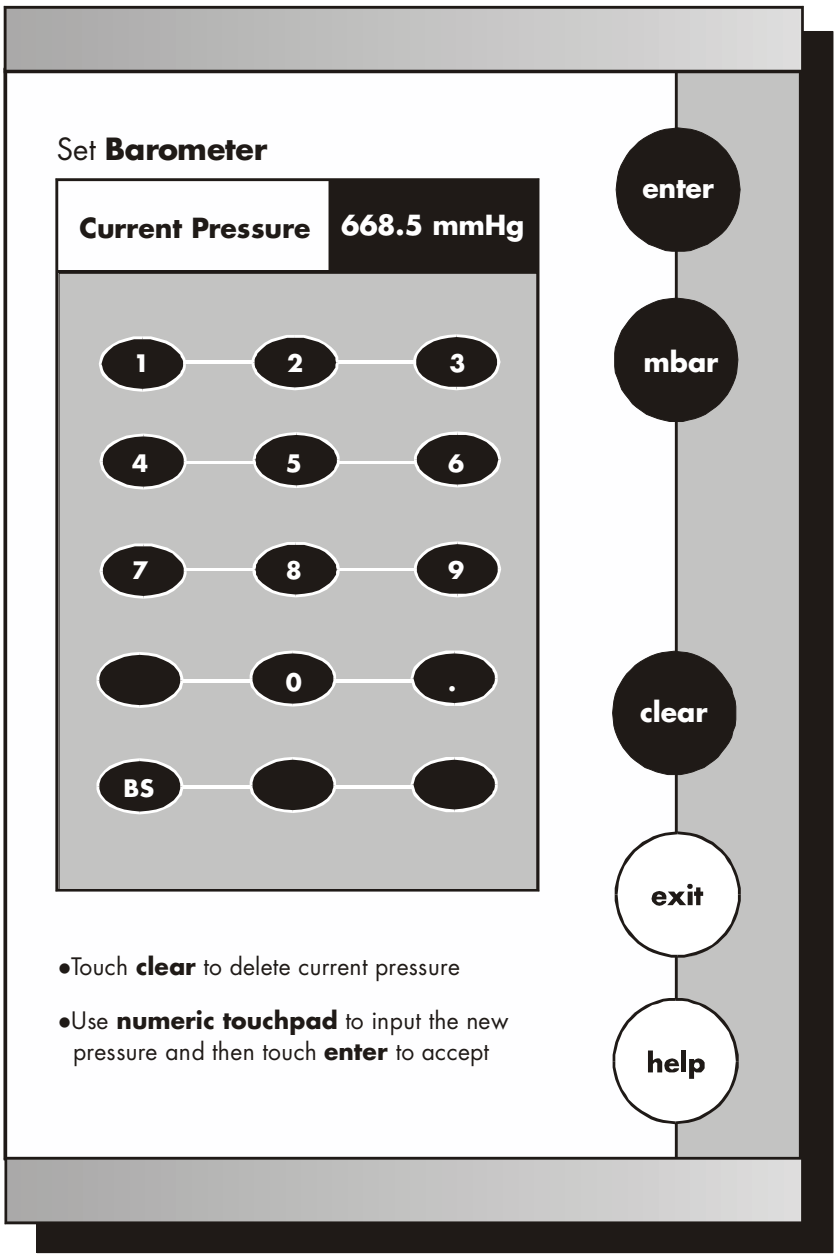
   Touch **exit** to return to the Setup screen, without making a change.

5.9 Set the Salinity Value of Your Sample

1. Access the Set Salinity screen from the DO/ BOD/ OUR/ SOUR Setup screen
2. Touch **clear** to delete the current value
3. Key in the desired new value using the numeric keypad
4. Touch **enter** to accept the new value and return to the Setup screen



5.10 Set Barometer



The DO 5000 has an internal barometer. When it is no longer reflects the true barometer pressure, it must be calibrated. The Set Barometer option allows you to do this.

To Set Barometer

1. Access the Set Barometer screen from the DO/ BOD/ OUR/ SOUR setup screen. The current pressure is displayed on the screen

2. Choose the pressure units desired by touching one of the two unit buttons, **mm Hg** or **mbars**.

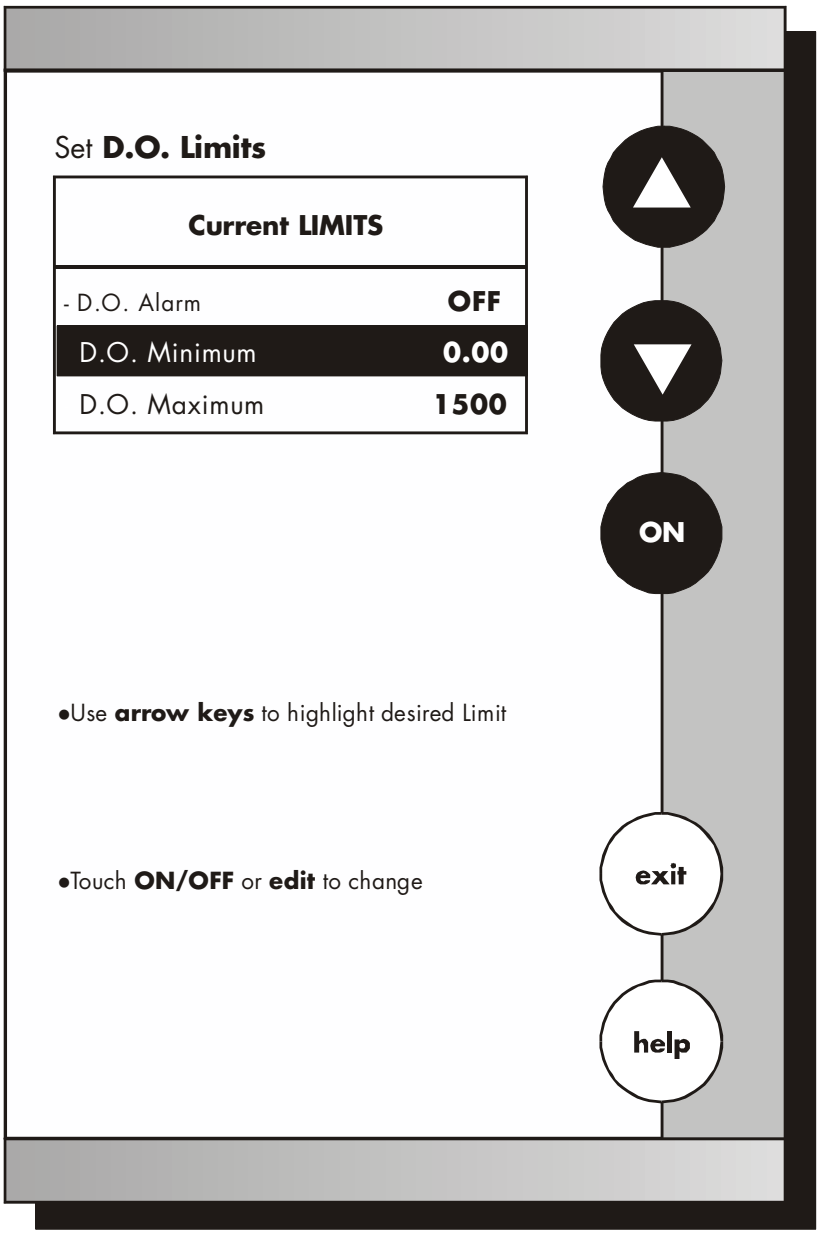
3. Use the **keypad** to enter the local barometric pressure, obtained from a barometer. Do not use weather bureau pressure, as it is corrected to sea level.

4. Touch **enter** to accept the reading and exit to the Setup screen.

   OR

   Touch **exit** to return to the DO/ BOD/ OUR/ SOUR Setup screen, without making a change.

5.11 Set Alarm Limits



This option allows you to set alarm limits for the DO/ BOD/ OUR/ SOUR measuring mode. If the DO value of the measurement is outside the boundaries set by the minimum and maximum limits, an audible alarm and/ or a visual warning will appear to let you know that your sample measurement was outside of the set limits.

To Set Alarm Limits

1. Access the Set Alarm Limits screen from the DO/ BOD/ OUR/ SOUR Setup screen. The current alarm limits are displayed on the screen.

2. Use the **arrow keys** to highlight the Alarm option you want to modify.

3. Touch **ON**, **OFF** or **edit** to set the status of the alarm.

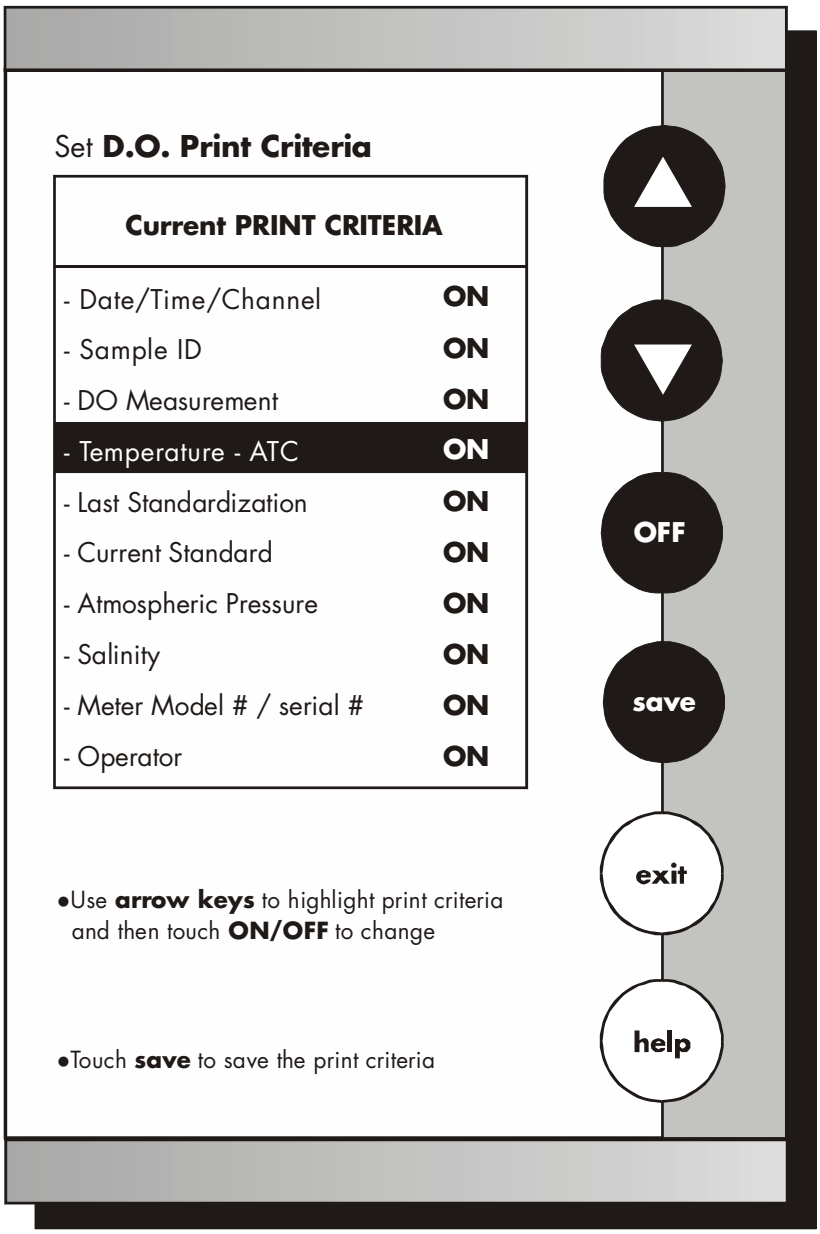
4. Use the keypad to enter the new limit value

5. Touch **enter** on the keypad to accept this limit and return to the set DO limits screen. If you do not want to change the limit value, you can touch exit on the keypad and return to the Set DO/ BOD/ OUR/ SOUR limits screen.

   OR

   Touch **exit** to return to the Setup screen, without making any changes.

5.12 Set Print Criteria



This screen allows you to select which criteria are printed with the measurement when you print the data or send it to the computer. The status of the current print criteria is displayed on the screen. The criteria option is active if "**ON**" appears to the right of the option. It is inactive if "**OFF**" appears to the right of the option. Any active criteria will be printed on demand.

To Set Print Criteria

1. Access the Set Print Criteria screen from the DO/ BOD/ OUR/ SOUR Setup screen. The current print criteria are displayed on the screen.

2. Use the **arrow keys** to highlight the print criteria option you want to modify.

3. Touch **ON** or **OFF** change the status of the criteria.

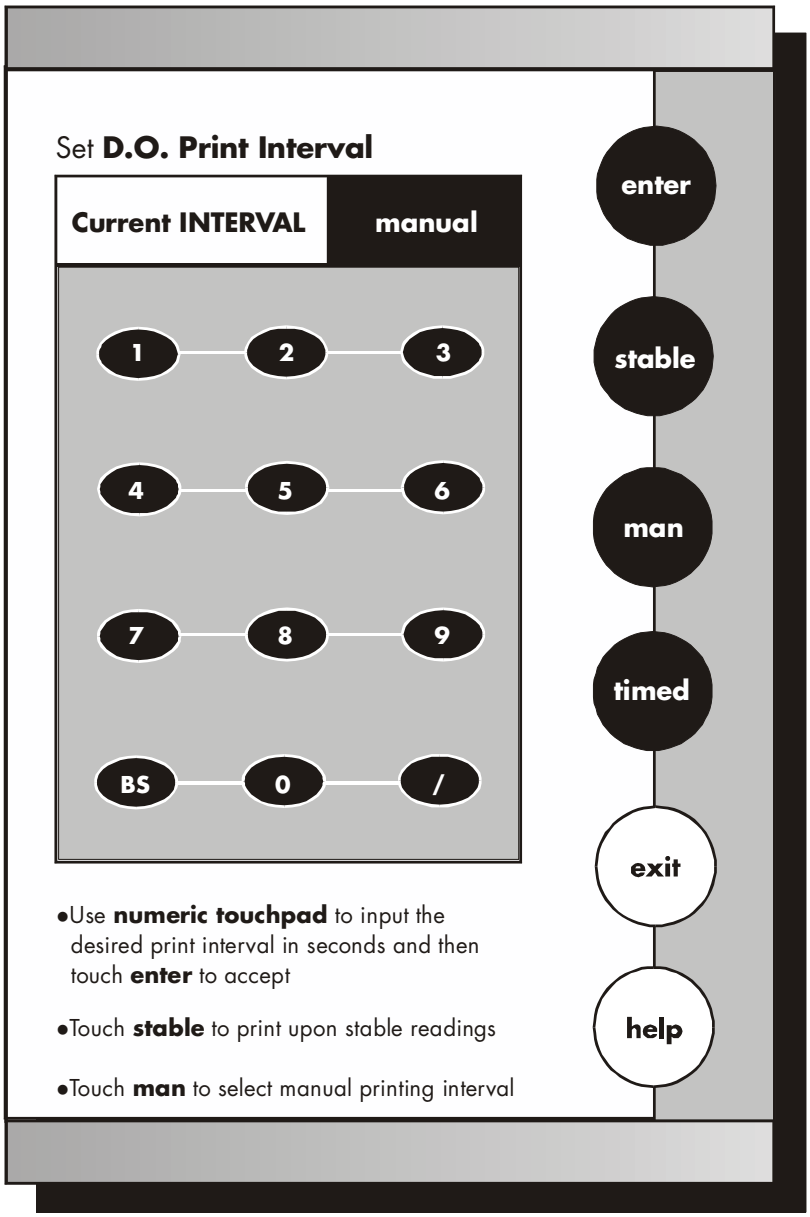
4. Repeat steps 2 and 3 with the remaining criteria.

5. Touch **save** to save the entire group of print criteria and return to the Setup screen.

   OR

   Touch **exit** to return to the Setup screen, without making any changes.

5.13 Set Print Interval



You have three options for setting the print interval: manual printing, stable reading printing, and timed interval printing.

For Manual Printing

In this mode, data is printed only when you touch **print** on the Measure screen.

1. Access the Set Print Interval screen from the DO/ BOD/ OUR/ SOUR Setup screen. The current print interval is displayed on the screen.

2. Touch **MAN** to set the meter for manual printing. Touch **enter** to accept the print interval mode and return to the Setup screen.

   Printing is now done manually by touching **print** on the Measure screen.

   OR

   Touch **exit** to return to the Setup screen, without making any changes.

For Stable Reading Printed

In this mode, data is printed every time the meter recognises the current measurement as stable.

1. Access the Set Print Interval screen from the DO/ BOD/ OUR/ SOUR Setup screen. The current print interval is displayed on the screen.

2. Touch **stable** to set the meter for stable reading printing.

3. Touch **enter** to accept the print interval mode and return to the Setup screen.

   Printing is now done when the meter recognises the present reading as stable.

   OR

   Touch **exit** to return to the Setup screen, without making any changes.

For Timed Interval Printing

In this mode, data is printed at the timed interval that you select.

1. Access the Set Print Interval screen from the DO/ BOD/ OUR/ SOUR Setup screen. The current print interval is displayed on the screen.

2. Touch **timed** to access the timed interval mode and delete the current print interval time.

3. Use the keypad to enter the desired time for the print interval.

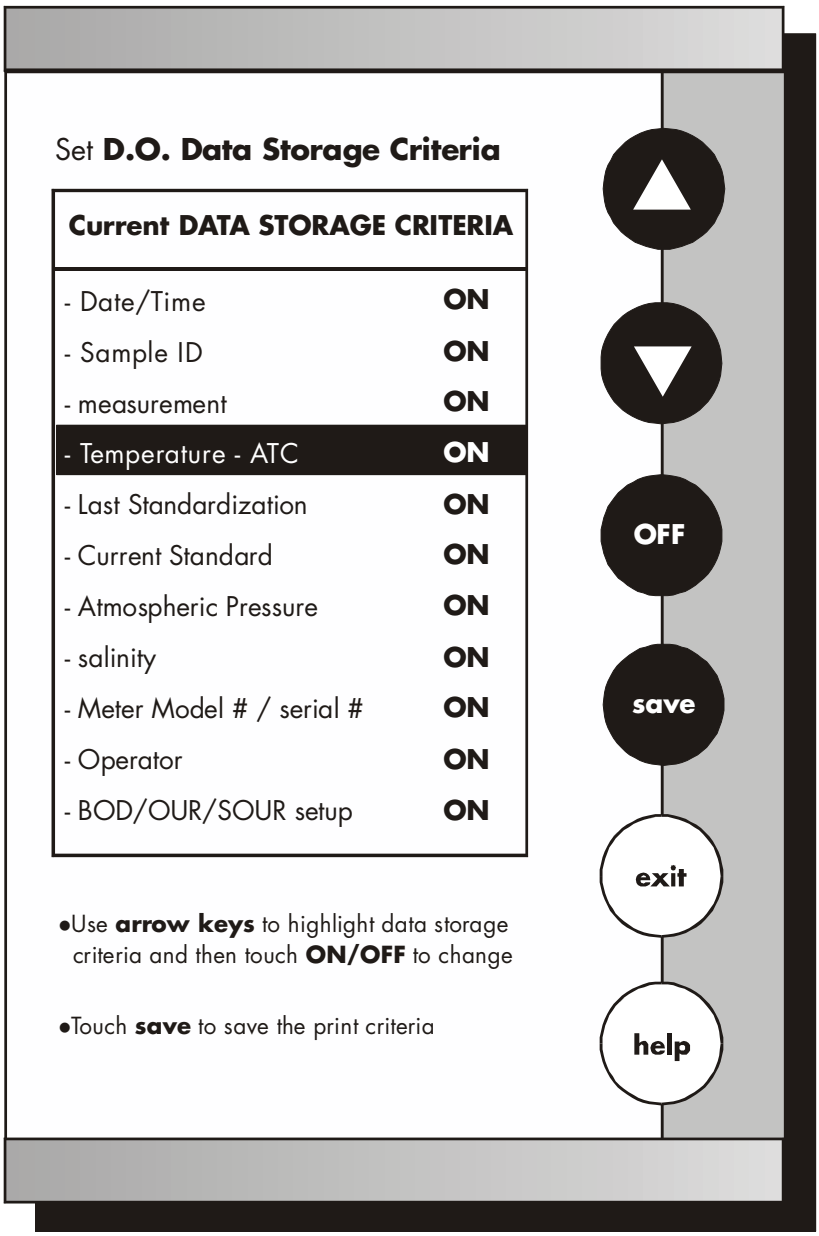
4. Touch **enter** to accept the new time interval for printing and return to the Setup screen.

   Printing is now done at the set timed interval.

   OR

   Touch **exit** to return to the Setup screen, without making any changes.

5.14 Set Data Storage Criteria



This screen allows you to select what criteria are stored in the meter's memory with the measurement when you save the data. **Data is stored only if a Sample ID has been assigned.** The status of the current data storage criteria is displayed on the screen. The criteria option is active if "**ON**" appears to the right on the screen. It is inactive if "**OFF**" appears to the right of the option. All storage criteria will be stored in the meter's memory with the measurement. However, only active items will appear on the View Stored Data screens. Changing the status of the storage criteria to active from inactive will allow the criteria to be displayed with the previously stored data.

To Set Data Storage Criteria

1. Access the Set Data Storage Criteria screen from the DO/ BOD/ OUR/ SOUR Setup screen. Current criteria are displayed on the screen.

2. Use the **arrow keys** to highlight the data storage criteria you want to modify.

3. Touch **ON** or **OFF** to change the status of the criteria.

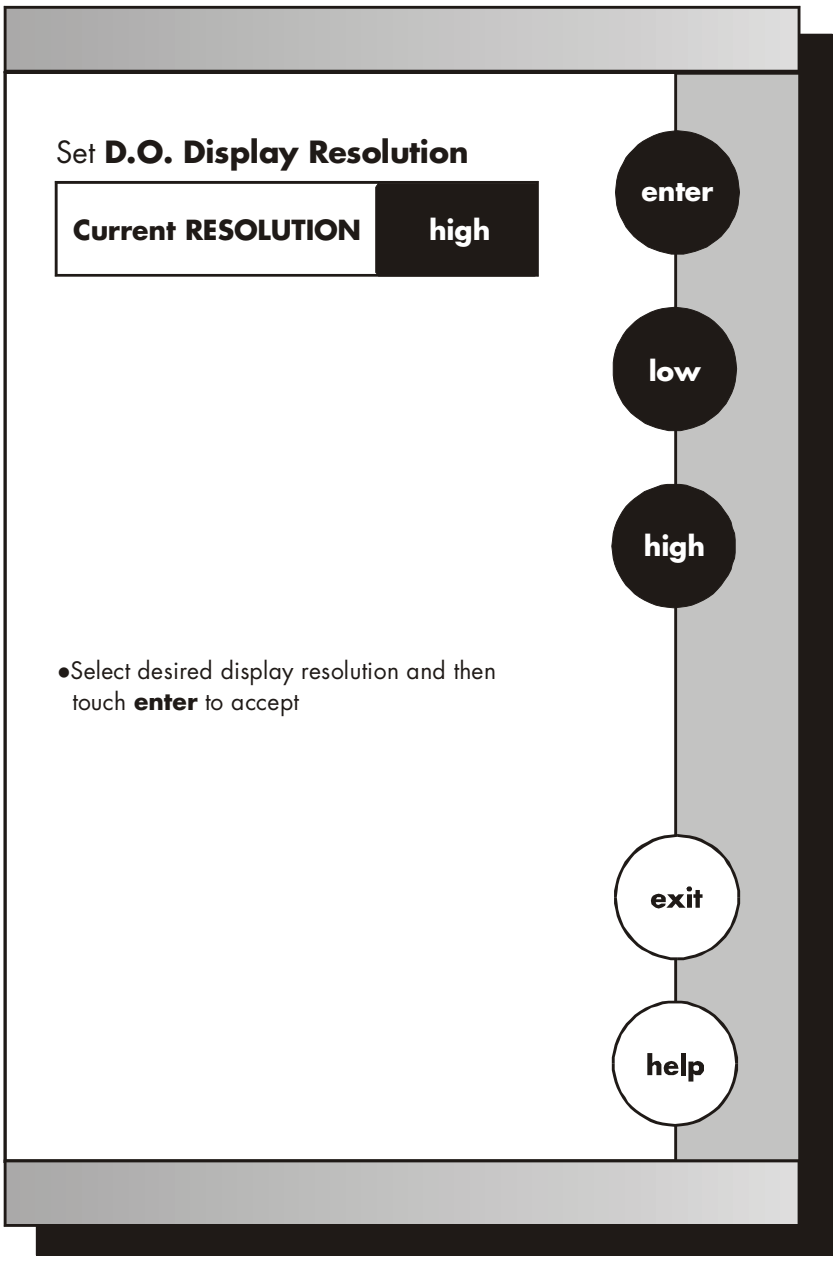
4. Repeat steps 2 and 3 with the remaining criteria.

5. Touch **save** to save the entire group of Data Storage Criteria and return to the Setup screen.

   OR

   Touch **exit** to return to the Setup screen, without making any changes.

5.15 Set Display Resolution



Here you can set the display resolution on the screen. Choose high for two decimal points in mg/L, and for one decimal point in % sat and mbar. Choose low for one decimal point in mg/L and one unit resolution in % sat and mbar.

To Set Display Resolution

1. Access the Set Display resolution screen from the DO/ BOD/ OUR/ SOUR Setup screen.

2. The current Display Resolution is displayed on the screen.

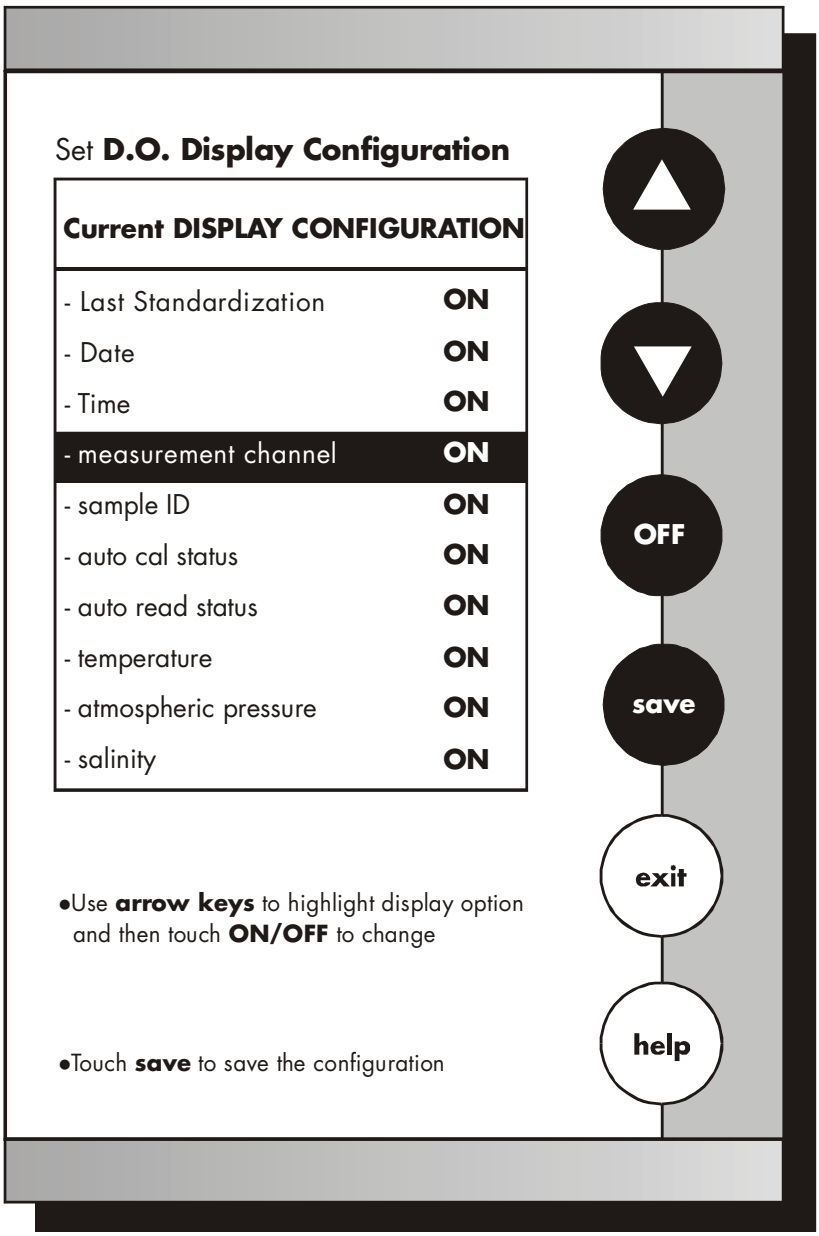
3. Touch **high or low to** select the desired resolution.

4. Touch **enter** to accept this choice and return to the Setup screen.

   OR

   Touch **exit** to return to the Setup screen, without making any changes.

5.16 Set Display Configuration



This particular function will allow you to choose what information you would like to be displayed on the DO/ BOD/ OUR/ SOUR Measure screen, particularly the information contained in the data box at the bottom of that screen.

To Set Display Configuration

1. Access the Set Display Configuration screen from the DO/ BOD/ OUR/ SOUR Setup screen.

2. Use the **arrow keys** to highlight the item you want to change.

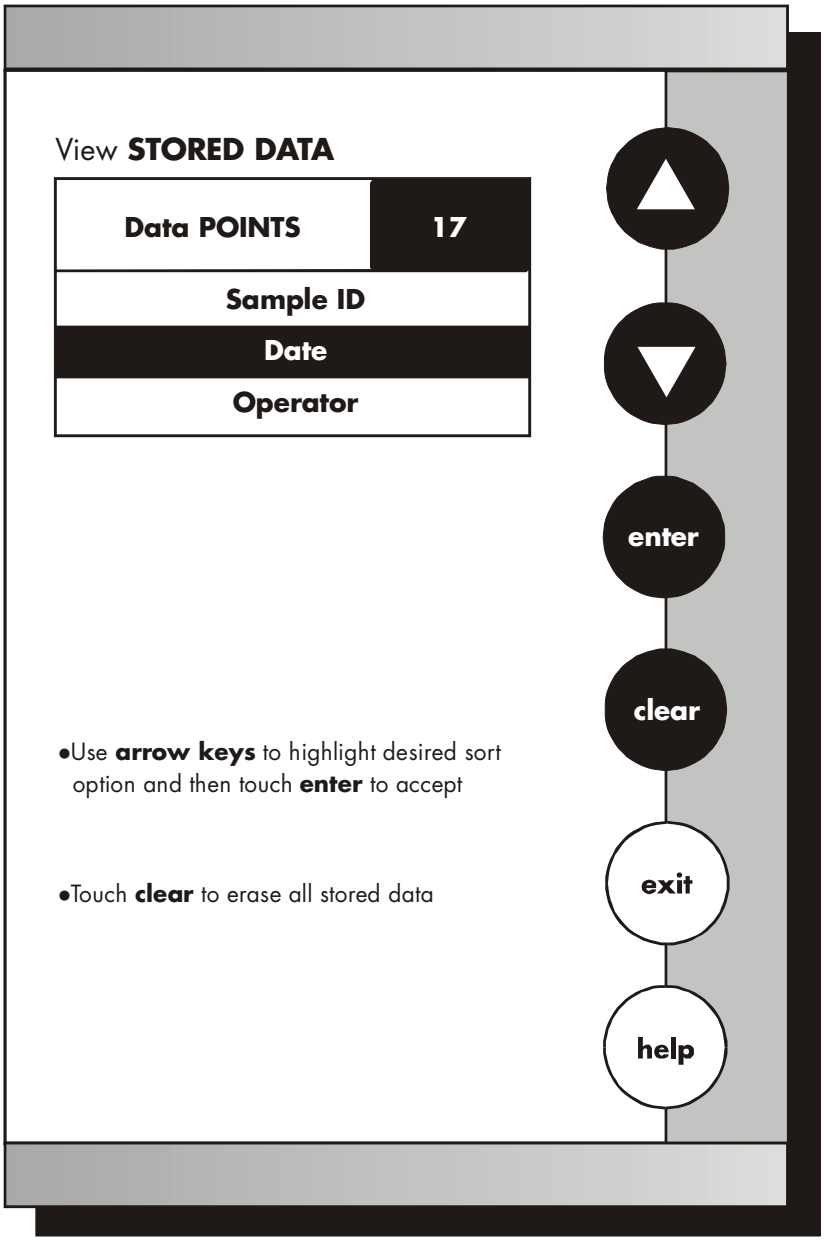
3. Touch **ON** or **OFF** to change the status of the criteria

4. Touch **save** to save the entire group of display configuration criteria and return to the Setup screen.

   OR

   Touch **exit** to return to the Setup screen without making any changes.

5.17 View Stored Data



The meter has memory capacity of up to 250 data points. The view stored data screen allows you to sort and look at specific data points. The stored data can be sorted by sample identification number, date or operator identification number.

To View Stored Data

1. Access the view stored data screen from the DO/ BOD/ OUR/ SOUR Setup screen. The number of data points in the memory and the sorting options are now displayed on the screen.

2. Use the **arrow keys** to highlight the desired data sort option.

3. Touch **enter** to access the sort option screen.

NOTE: Touch **clear** to erase all stored data at once.

<u>To sort by Sample ID#</u>

1. Access the Sample ID option from the View Stored Data screen.

2. Use the keypad to enter the sample ID# entered in error and re-enter the ID#

3. Touch clear to delete a Sample ID# entered in error and re-enter the ID#.

4. Touch **enter**. All data will be sorted by the meter and the first data point displayed on the screen will be the most recent data point saved under the selected Sample ID#.

5. Touch **next** or **prev** to scroll through additional data points saved in the memory of the meter.

6. Touch **print** to send the data to a printer or computer, OR touch **delete** to erase the data point from the meter's memory, OR touch **exit** to return to the Setup screen.

If a sample ID# is entered and no data points are stored with that sample ID#, you will see a message indicating the sample ID# was not found. Touch **OK** to return to the sample ID# keypad and enter new sample ID #.

To sort by Date

1. Access the Date sort option from the View Stored Data screen.

2. Touch **clear** to delete the current date.

3. Use the numeric keypad to enter the date on which the data points you want to view were saved. Be sure to use/ to separate the month, the day and the year.

4. Touch **enter**. All data will be sorted by the meter and the first data point displayed on the screen will be the most recent data point saved under the selected Date.

5. Touch **next** or **prev** to scroll through additional data points saved in the memory of the meter.

6. Touch **print** to send the data to a printer, OR touch delete to erase the data point from the meter's memory, OR touch **exit** to return to the Setup screen.

If a sample date is entered and no data points are stored with that date, you will see a message indicating the date was not found. Touch **OK** to return to the operator ID keypad and enter a new date.

To sort by Operator

1. Access the Operator sort option from the View sort data screen

2. Use the keypad to enter the Operator ID of the data point(s) that you want to view.

3. Touch **enter**. All data will be sorted by the meter and the first data point displayed on the screen will be the most recent data point saved under the selected Operator ID.

4. Touch **next** or **prev** to scroll through additional data points saved in the memory of the meter.

5. Touch **print** to send the data to a printer, OR touch **delete** to erase the data point from the meter's memory, OR touch **exit** to return to the Setup screen.

If an operator ID is entered and no data points are stored with that operator ID, you will see a message indicating the operator ID was not found. Touch **OK** to return to the operator ID keypad and enter a new operator ID.

Note:

Even if you do not know the appropriate information to access a specific data point, you can access the stored data through any of the sort options. Highlight the sort option of interest and touch **enter** to access the sort screen. Touch **enter** again and the meter will place you at a data point.

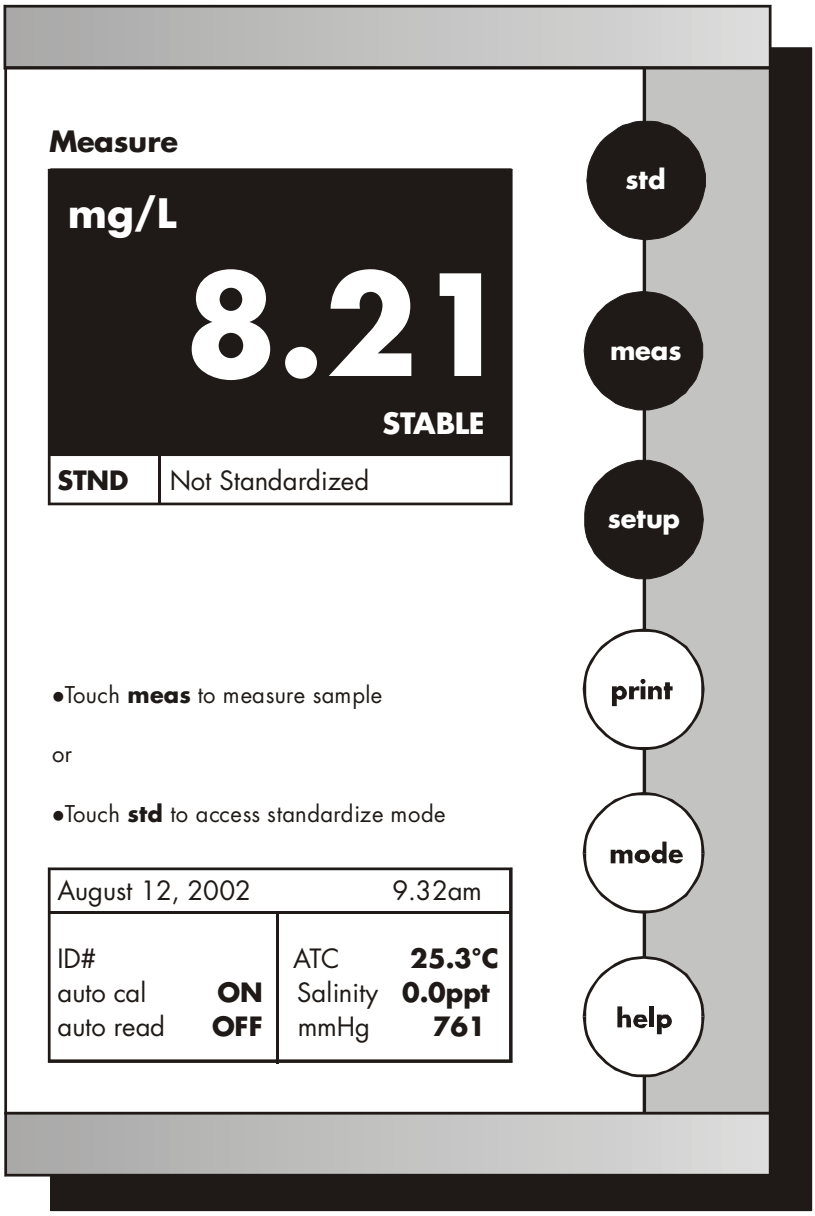
- The sample ID# sort option will place you at the first data point in numeric order by sample ID#.

- The operator sort option will place you at the first data point of the first operator ID in alphabetic order.

- The date sort option will place you at the most recent point on the last date that data was stored.

Once you access the data storage center, you can touch **prev** and **next** to scroll through the additional data points stored in memory.

6 D.O. OPERATION



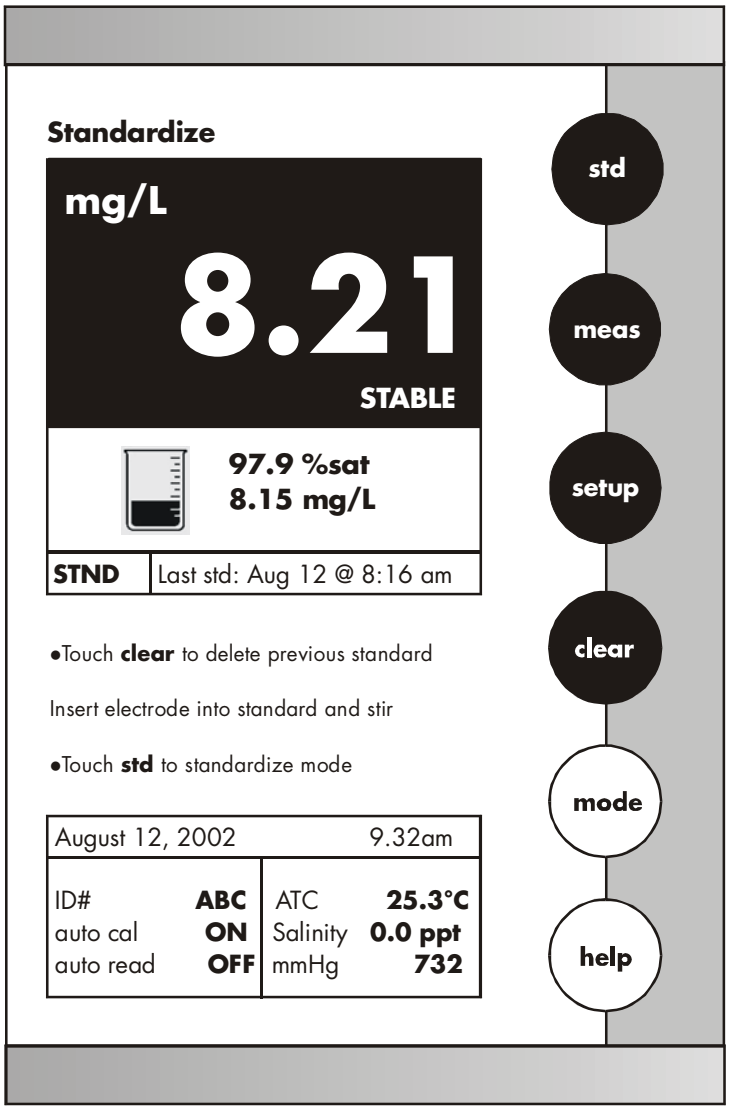
6.1 DO Standardization

The CyberScan DO 5000 has two standardization modes. There is auto- standardization, merely requiring the touch of a button to complete. There is also manual standardization. Here the DO value, in either % Saturation or mg/L units, of the standard will be entered manually by means of a keypad, which appears on the screen.

It is necessary to standardize the meter when the probe is in an environment with a known concentration of oxygen. One such environment is water-saturated air. Most commonly, this involves placing the DO probe into a BOD bottle filled with about 1 inch of water. Stirring is not required. Another environment is air-saturated water, achieved by aerating 300 – 500 ml of water for at least 15 minutes. The probe can be placed into the water with stirring provided. Lastly, the probe is placed into an environment whose oxygen content has been determined by a Winkler titration. The meter is standardized in the manual mode.

Prior to standardization, adequately prepare the probe as recommended in its operation manual.

ONCE STANDARDIZATION IS SET, IT WILL BE APPLICABLE IN OTHER MODES.


Standardize
mg/L
8.21
STABLE
97.9 %sat
8.15 mg/L
STND
Last std: Aug 12 @ 8:16 am
•Touch clear to delete previous standard
Insert electrode into standard and stir
•Touch std to standardize mode
August 12, 2002
9.32am
ID# ABC
auto cal ON
auto read OFF
ATC 25.3°C
Salinity 0.0 ppt
mmHg 732
std
meas
setup
clear
mode
help

To Standardize the meter in the Automatic Standardization Mode

1. Insert the DO probe into a BOD bottle containing about 1 inch of water.

2. Touch **STD** on the DO or BOD Measure screen to access the standardized screen

3. Touch **clear** to delete a previous standardization.

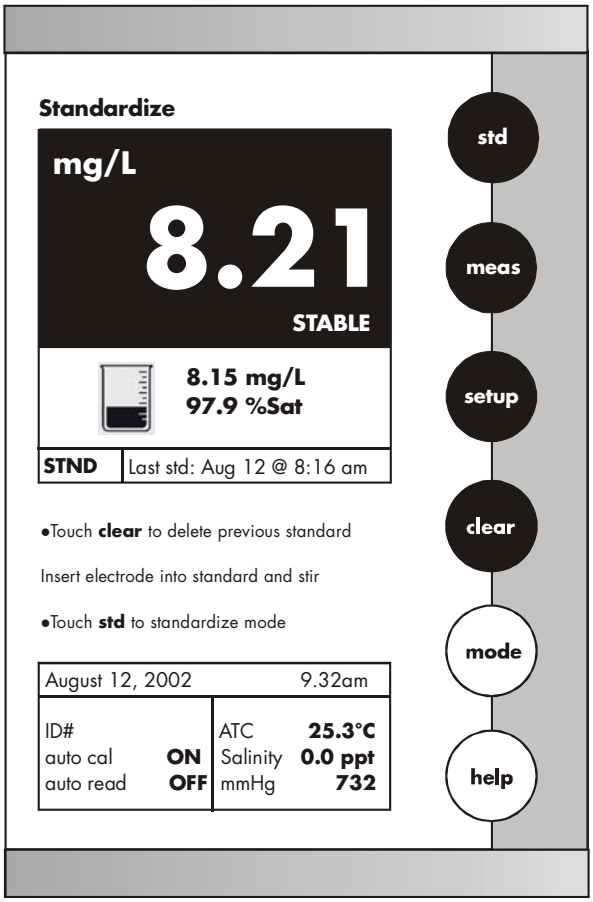
   OR

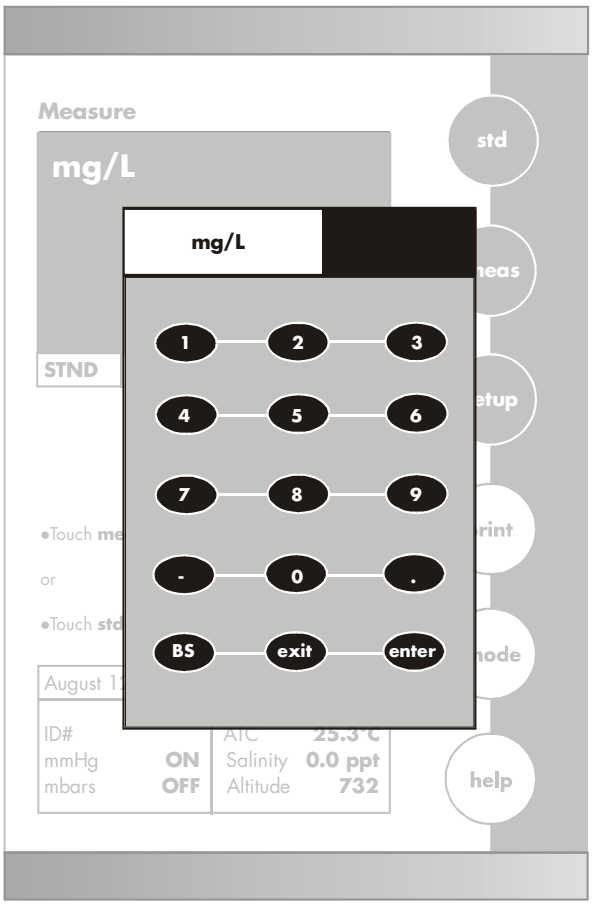
   If the screen says “Not standardized” proceed to step 4.

4. Touch **std** again to standardize the meter using this buffer. The word **MEASURING** will flash until the signal is stable. The meter will accept the value once it recognizes that the reading is stable. At that time, **STABLE** will appear on the screen at this time. A beaker icon and the entered DO value will also appear on the screen at this time. The meter will then return to the measure screen.

Allow the probe to warm up for 30 minutes after connecting it to the meter, and prior to standardization.

Once standardization is set, it will be applicable in other modes.


Standardize
mg/L
8.21
STABLE
8.15 mg/L
97.9 %Sat
STND
Last std: Aug 12 @ 8:16 am
•Touch clear to delete previous standard
Insert electrode into standard and stir
•Touch std to standardize mode
August 12, 2002
9.32am
ID#
auto cal ON
auto read OFF
ATC 25.3°C
Salinity 0.0 ppt
mmHg 732
std
meas
setup
clear
mode
help


Measure
mg/L
mg/L
1
2
3
4
5
6
7
8
9
-
0
.
BS
exit
enter
STND
•Touch me
or
•Touch std
August 1
ID#
mmHg ON
mbars OFF
ATC 25.3°C
Salinity 0.0 ppt
Altitude 732
std
help

To Standardize the meter in the Manual Standardization Mode

1. Insert the DO into your choice of standard.

2. Touch **std** on the DO or BOD Measure screen to access the standardized screen

3. Touch **clear** to delete a previous standardization.

   OR

   If the screen says “Not standardized” proceed to step 4.

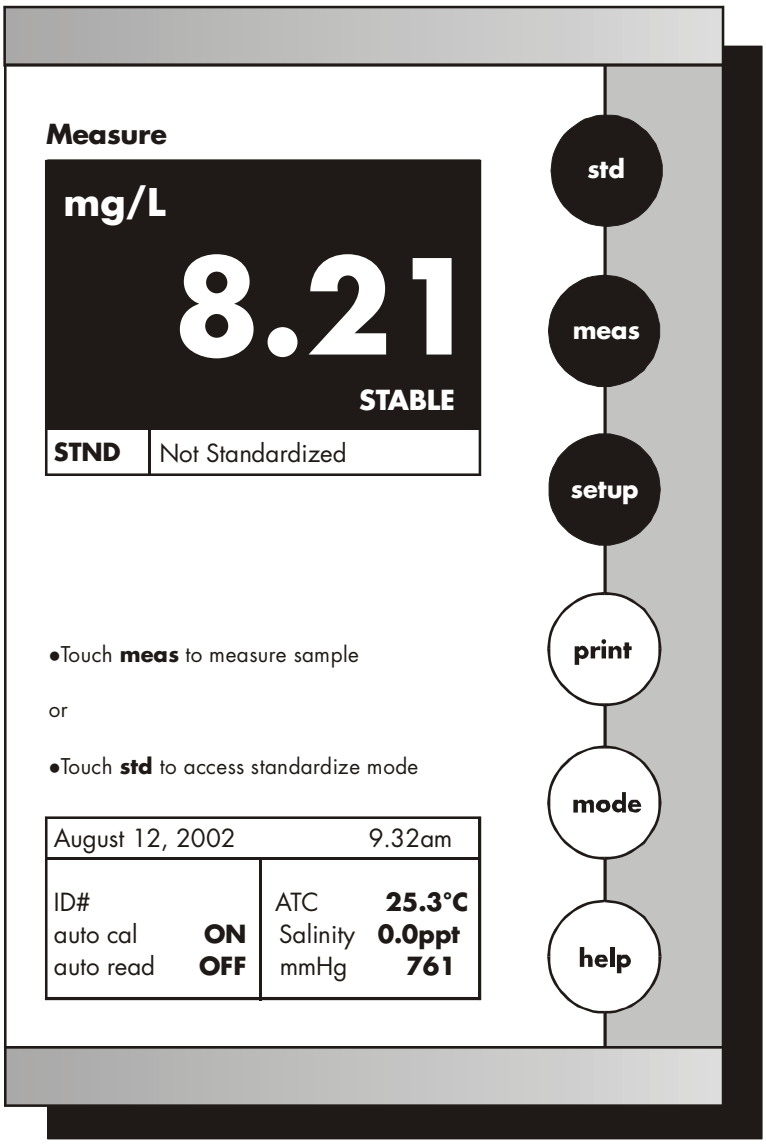
4. Touch **std** again to initiate standardization

5. Using the touch pad, input the value of the DO standard in % Saturation, or mg/L.

6. Touch **enter** to accept the DO value of the standard. MEASURING will flash until the signal is stable. The meter will accept the value once it recognizes that the reading is stable. At that time, STABLE will appear on the screen at this time. A beaker icon and the entered DO value will also appear on the screen at this time. The meter will then return to the measure screen.

Barometer Calibration

The CyberScan DO 5000 internal barometer provides pressure compensation for both auto and manual standardization. For most accurate results, the barometer reading should be checked occasionally for accuracy. If the meter’s barometer reading is inaccurate, refer to DO setup to calibrate the barometer.


Measure
mg/L
8.21
STABLE
STND
Not Standardized
std
meas
setup
print
mode
help
•Touch meas to measure sample
or
•Touch std to access standardize mode
August 12, 2002
9.32am
ID#
auto cal ON
auto read OFF
ATC 25.3°C
Salinity 0.0ppt
mmHg 761

Measuring DO with Auto Read ON

The measure screen provides a readout of the current sample measurement. If Auto Read is active, the meter will lock onto a reading until **meas** is touched. If Auto Read is inactive, the meter will continuously monitor the DO and the reading will indicate any change in the DO level, Regardless of the status of the Auto Read mode, a STABLE message is displayed when the measurement meets the stability criteria chosen.

Once the meter has been standardized, you are ready to take DO measurements.

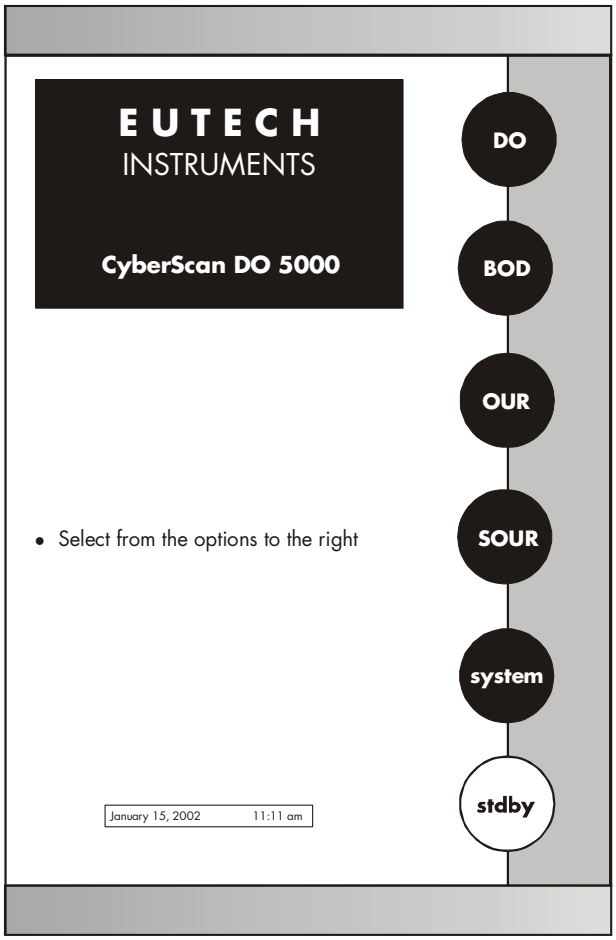
To Measure DO with Auto Read ON

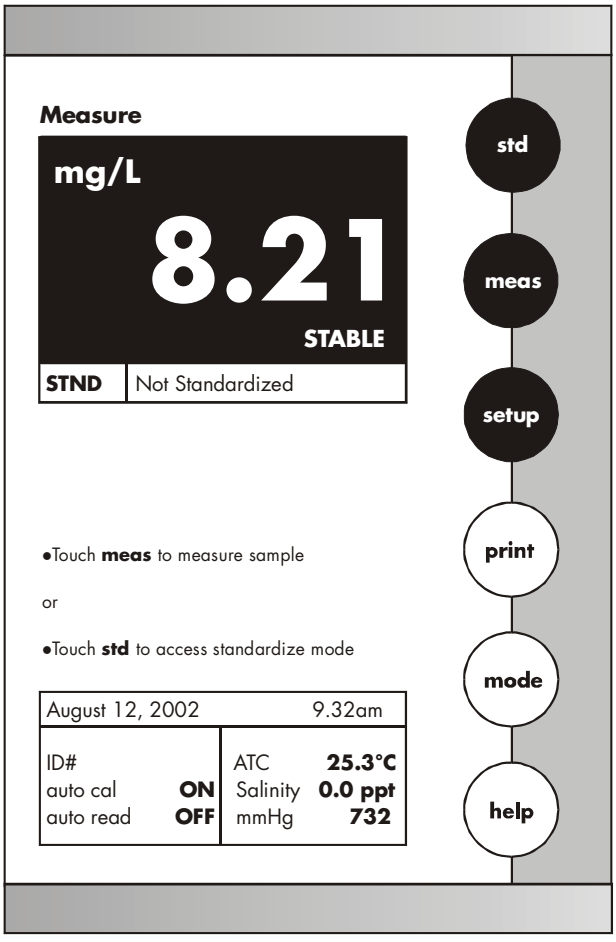
1. Insert the probe into the sample
2. Provide stirring, such as that provided by the self-stirring BOD probe.
3. Touch **meas**, and permit the reading to stabilize
4. Record the reading

Prior to sample measurement, it is important to verify the salinity of the sample and enter that's salinity value using the DO setup menu.

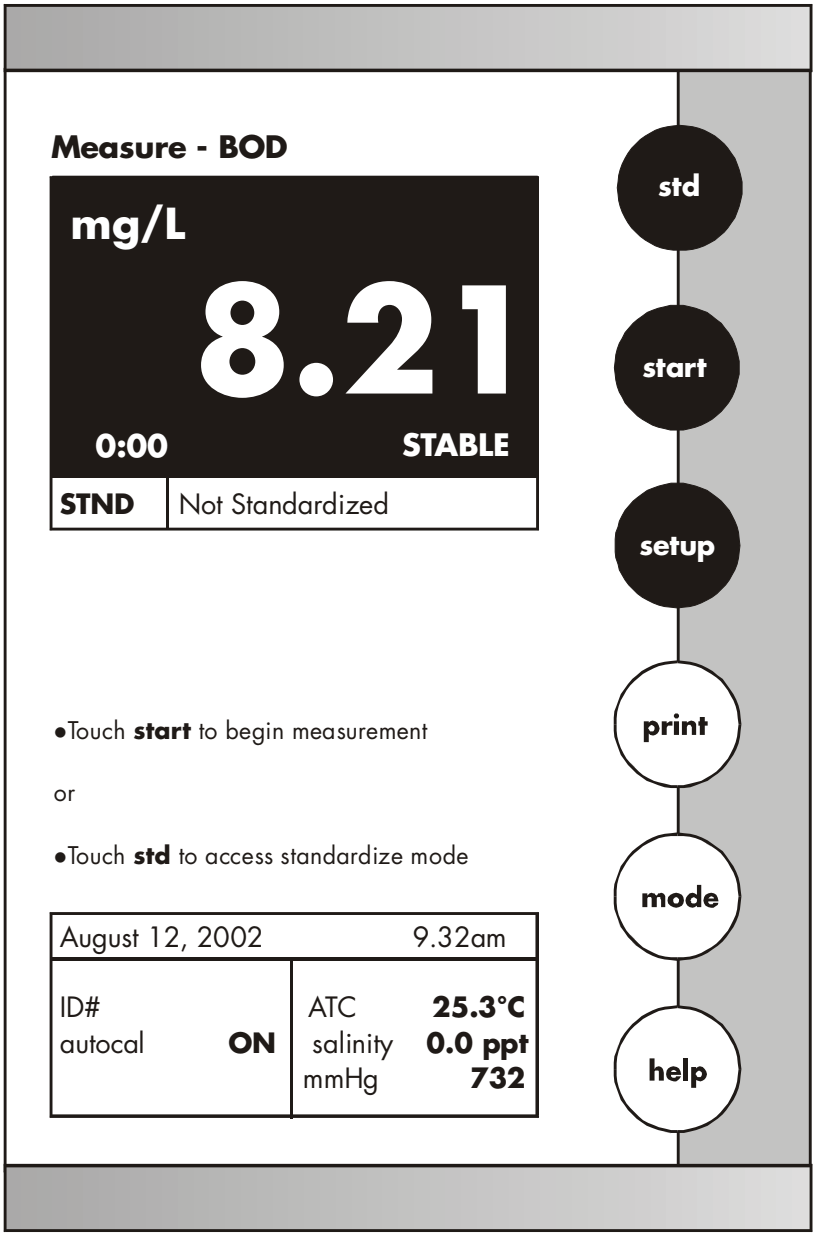
To Measure DO with Auto Read OFF

1. Insert the probe into the sample
2. Provide stirring, such as that provided by the self-stirring BOD probe.
3. Record the reading when the STABLE message appears.


EUTECH
INSTRUMENTS
CyberScan DO 5000
DO
BOD
OUR
SOUR
system
stdby
• Select from the options to the right
January 15, 2002 11:11 am


Measure
mg/L
8.21
STABLE
STND
Not Standardized
std
meas
setup
print
mode
help
•Touch meas to measure sample
or
•Touch std to access standardize mode
August 12, 2002 9.32am
ID#
auto cal ON
auto read OFF
ATC 25.3°C
Salinity 0.0 ppt
mmHg 732

6.2 Biological Oxygen Demand (BOD) Measurement



To measure BOD, a sample is seeded and incubated in the dark at 20°C for five days. The dissolved oxygen concentration is then measured and subtracted from the initial, pre-incubation, dissolved oxygen concentration. The difference is a measure of the biochemical oxygen demand, or BOD of the sample.

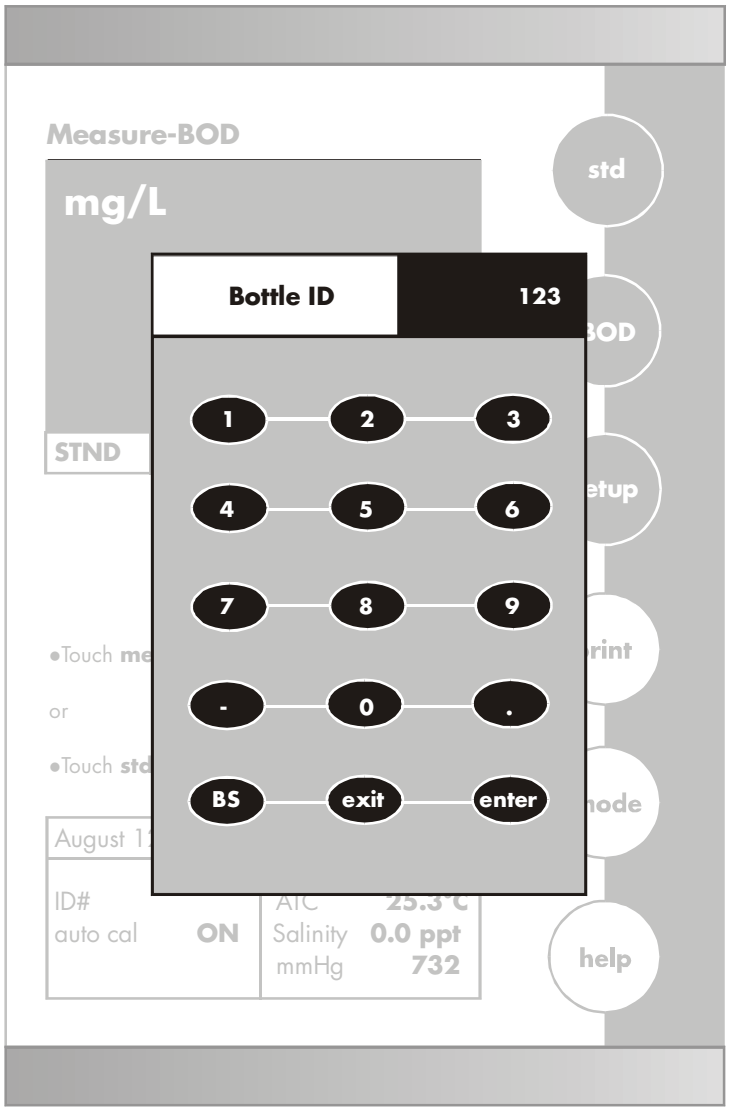
With the CyberScan DO 5000, BOD calculations are automatic. When the BOD button is touched, a variety of meter screens will sequentially appear, allowing you to enter information essential to a BOD calculation. Among these are the sample description, ID number, and date. If a search of the memory does not match the current sample ID, the meter treats the sample's DO reading as an initial reading. If the sample ID is matched in the data log, and at least one day has passed, the meter treats the sample's DO reading as a final reading, and based on parameters previously entered, calculates and displays the sample BOD, along with all relevant information.(If the sample ID is matched on the same day as the initial DO reading, the meter will assume a new reading, and offer information includes a sample description, sample bottle ID volume), final dilution (ml sample: ml bottle volume), initial and final DO values, and the average BOD value. The average is derived from all BOD values with the same sample description and date.

Once the meter has been standardized, you are ready to measure DO for a BOD measurement.

To Measure the BOD of the Seed

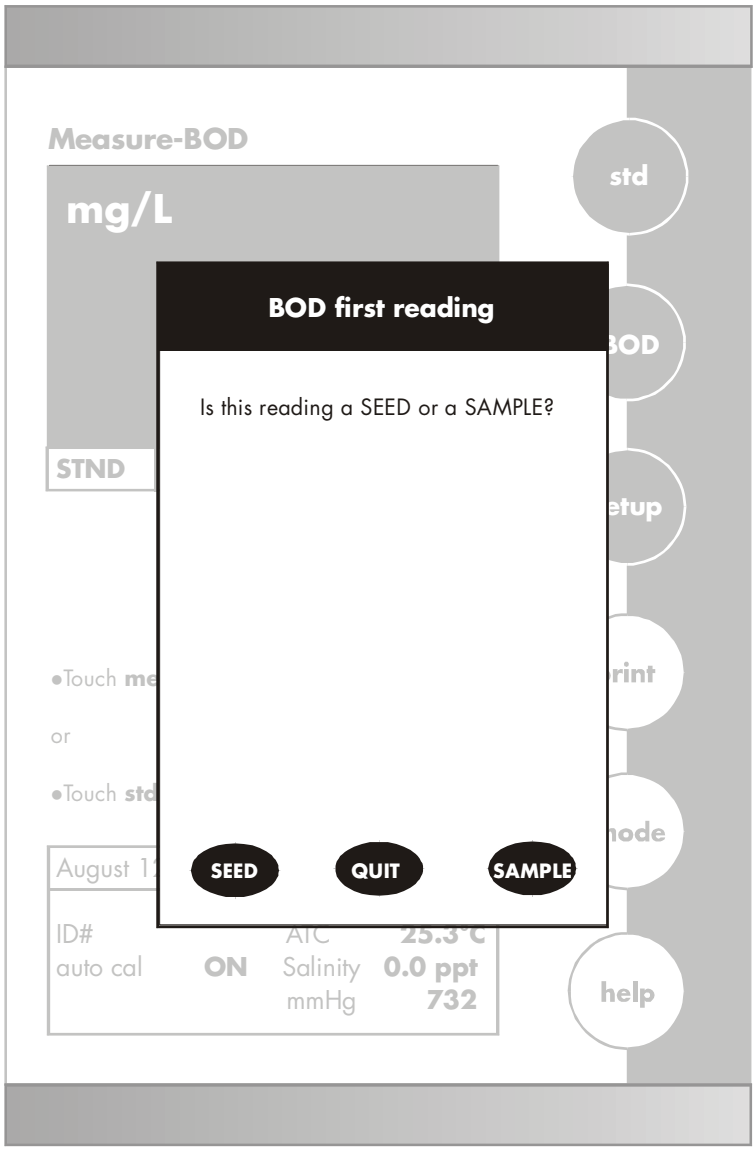
Initial DO Measurement

1. Access the **BOD** mode from the main mode screen
2. Once the DO reading is stable, touch **BOD**.
3. Using the bottle ID numeric touch pad, key in a sample bottle ID number
4. Touch **enter** to accept the sample description.



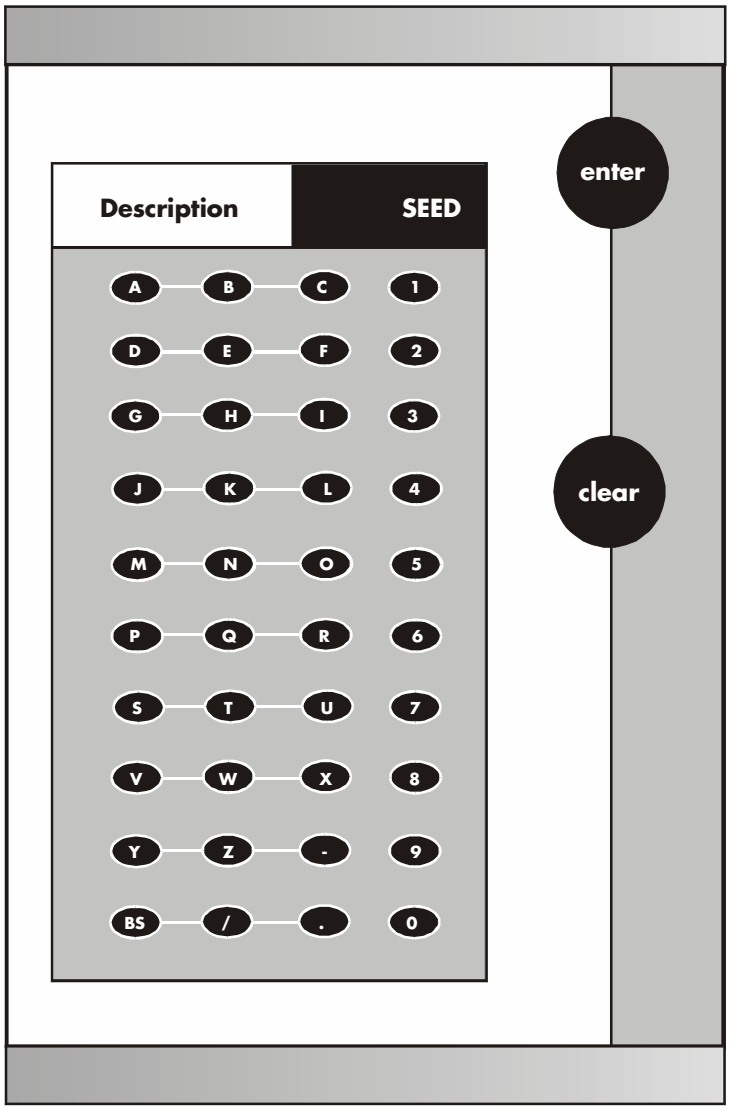
If the meter's barcode scanning feature is employed, simply scan the bottle to record its ID number.

5. If the sample is new, the **BOD** first reading screen appears. Touch **SEED**.

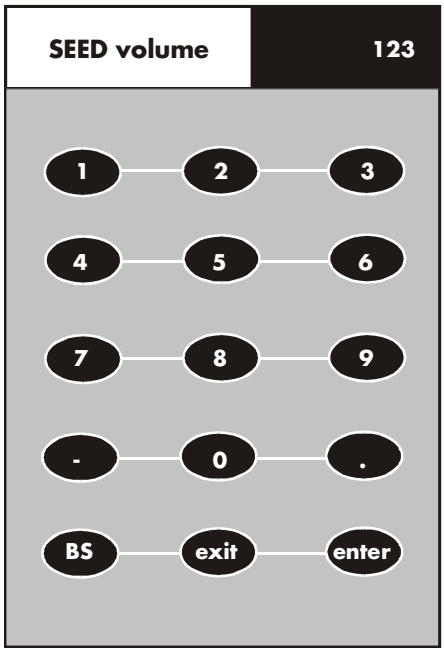


6. Key in a sample description using the alphanumeric touch pad, **SEED**, for example.

7. Touch **enter** to accept the sample description.

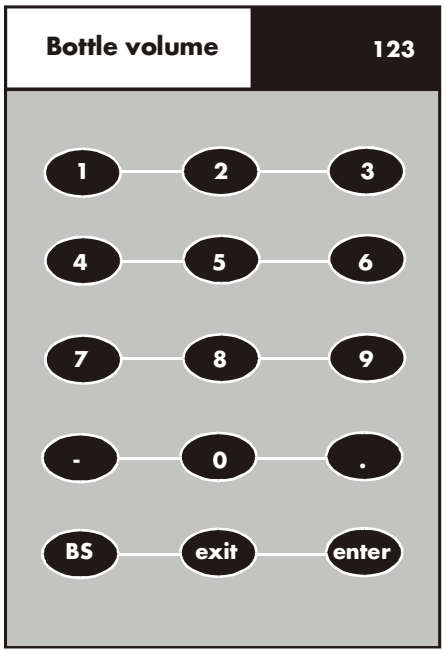


8. Key in the volume of the SEED sample using the alphanumeric touch pad. Touch **enter** to accept the SEED volume.



9. Touch **enter** to accept the Seed dilution ratio.

10. Use the bottle volume touch pad to key in the mL volume of the BOD bottle.



11. Touch **enter** to accept the bottle volume and return to the BOD measure screen.

Final DO Measurement

1. Access the BOD mode from the main mode screen

2. Once the DO reading is stable, touch **BOD**.

3. Using the bottle ID numeric touch pad, key in a sample bottle ID number

4. Touch **enter** to accept the bottle ID number.

If the meter's barcode scanning feature is employed, simply scan the bottle to record its ID number.

If, at this point, the meter matches the seed's identification parameters with those stored in the memory and at least one day has passed*, it accepts the current DO measurement as a final measurement. Using this value along with the initial DO value and associated information, a BOD for the seed is calculated, and stored in memory (See Viewed Stored Data). An average BOD calculated from all seed vales on this date will be used to calculate the seed correction value used in all subsequent sample therefore necessary to run seed samples on the same day as the BOD samples. Seed BOD data will be used only if the DO loss and the final DO exceed the criteria set under the Set BOD configuration option in setup.

*If a second BOD value is taken on the same day as the first BOD value, the meter will ask the user if he or she wants to repeat the first BOD measurement. Touch **OK** to do so and overwrite the first measurement. Touch **Quit** to return to the BOD measurement screen.

To Measure BOD of a Sample

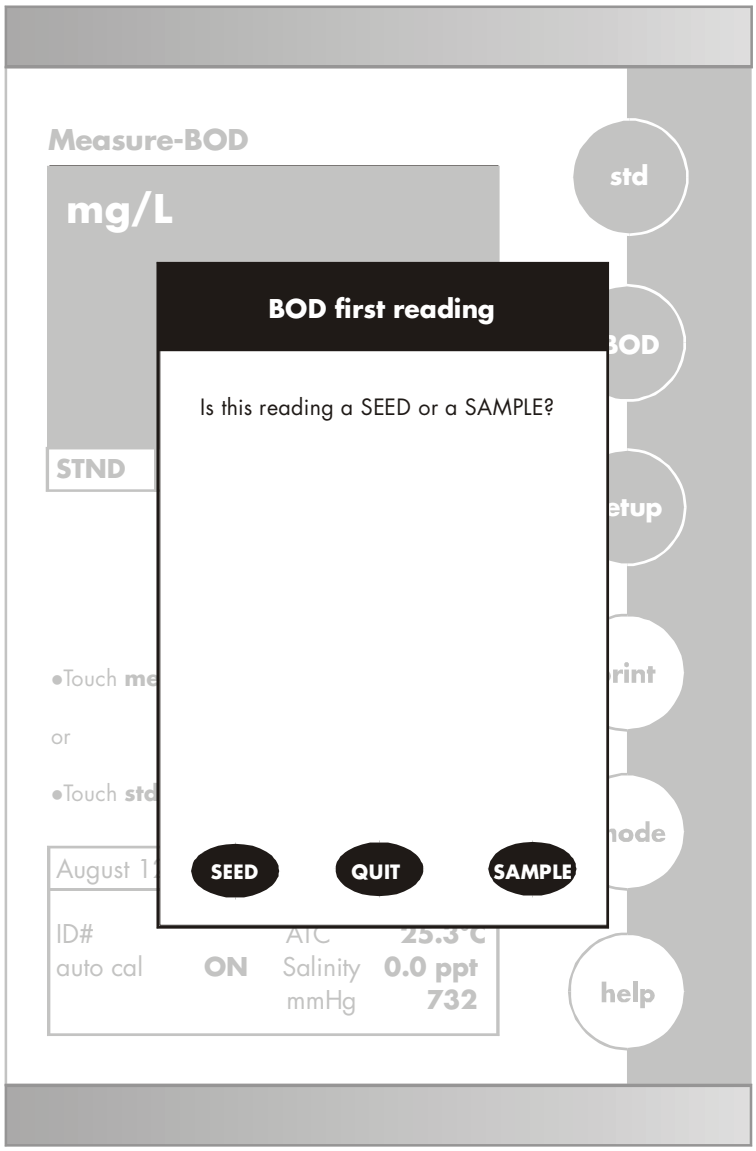
Initial DO measurement

1. Access the BOD mode from the main mode screen
2. Once the DO reading is stable, touch BOD
3. Using the bottle ID numeric touch pad, key in a sample bottle ID number
4. Touch enter to accept the bottle ID number.

If the meter's barcode scanning feature is employed, simply scan the bottle to record its ID number.

---

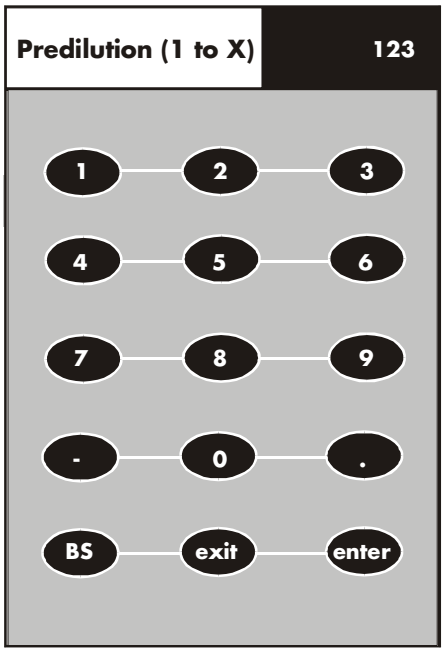
5. If the sample is new, the BOD first reading screen appears. Touch SAMPLE.



6. Key in a sample description using the alphanumeric touch pad.

7. Touch **enter** to accept the sample description.

8. Use the Predilution Ratio touch pad to key in the ml ratio of sample to final volume. If there is no predilution, use the ratio 1:1, and key in the value 1. If the ratio is 1:100, key in 100.



9. Touch **enter** to accept the Seed Volume.

10. Use the Seed Volume touch pad to key in the mL volume of the sample.

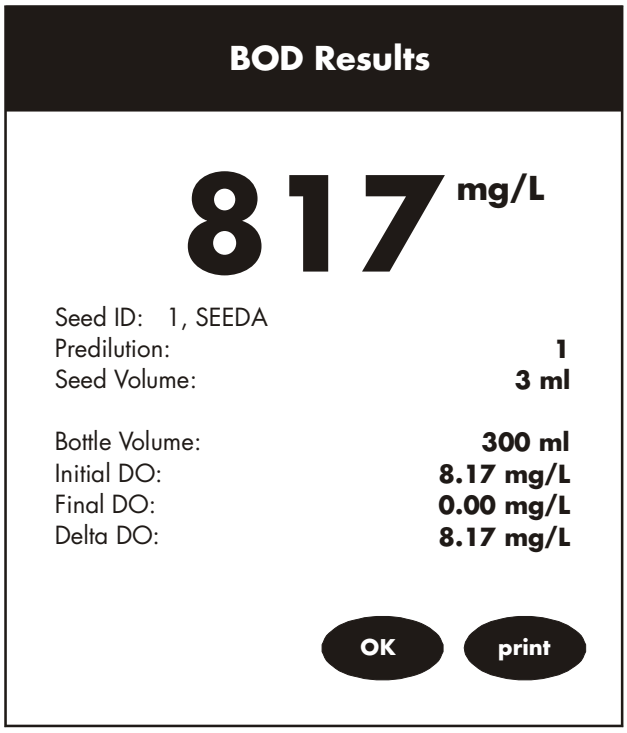
11. Touch **enter** to accept the Seed Volume.

12. Use the Sample Volume touch pad to key in the mL volume of the sample.

13. Touch **enter** to accept the Sample volume.

14. Use the Bottle volume keypad to key in the mL volume of the BOD bottle.

15. Touch **enter** to accept the bottle volume and return to the BOD measure screen.


BOD Results
817 mg/L
Seed ID: 1, SEEDA
Predilution: 1
Seed Volume: 3 ml
Bottle Volume: 300 ml
Initial DO: 8.17 mg/L
Final DO: 0.00 mg/L
Delta DO: 8.17 mg/L
OK
print

At this point, the initial DO and all of the above information about the sample will be stored in the data log. After an incubation period of at least one day, the DO of the sample must be measured again.

Final DO Measurement

1. Access the BOD mode from the main mode screen.

2. Once the DO reading is stable, touch **BOD**.

3. Using the Manual ID numeric touch pad, key in the sample bottle ID number.

If the meter's bar code feature is employed, simply scan the bottle to record its bottle ID number.

If, at this point, the meter matches the above sample parameters in the memory and the sample date, it accepts the current DO measurement as a final measurement. Using this value along with the initial DO value and associated information, a BOD for the sample is calculated, and displayed on the screen along with associated test parameters, including the average BOD value based on all samples that have the same description and starting date.

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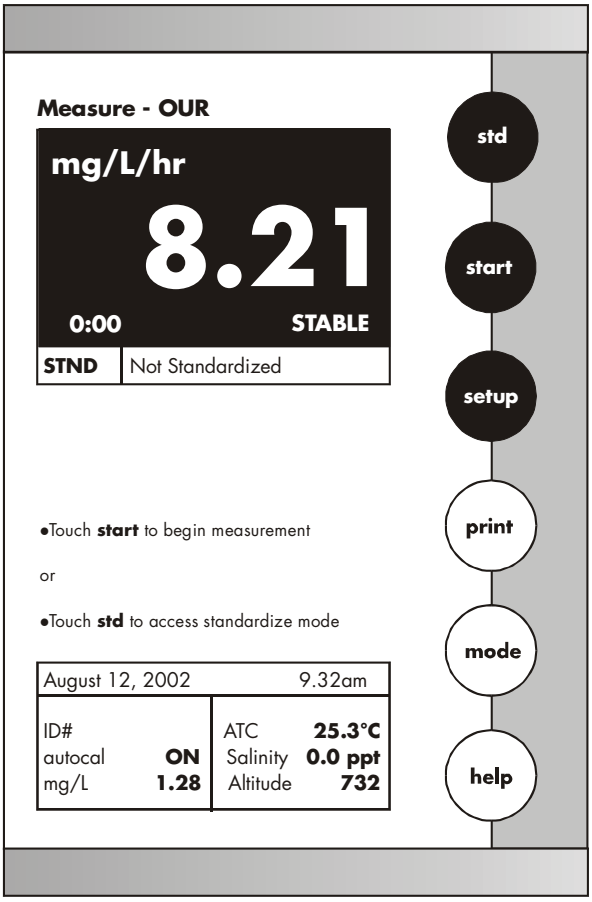
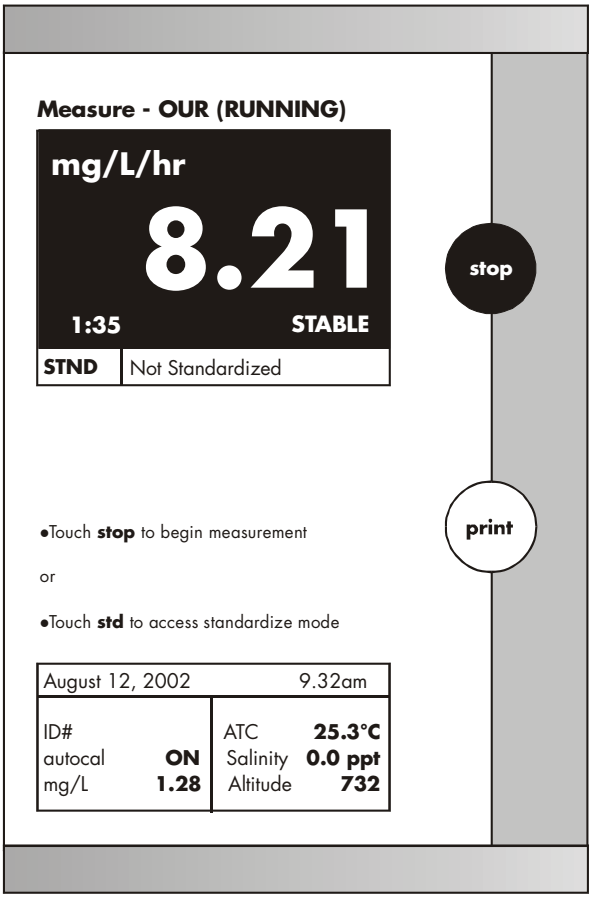
6.3 Oxygen Uptake Rate (OUR) Measurement





1. Touch **OUR** on the main mode screen.

2. Touch **setup** to set parameters essential for the OUR calculation. These include dilution ratio, minimum run time, maximum run time, minimum DO required to end the test.

3. Touch **start** to initiate the OUR test.

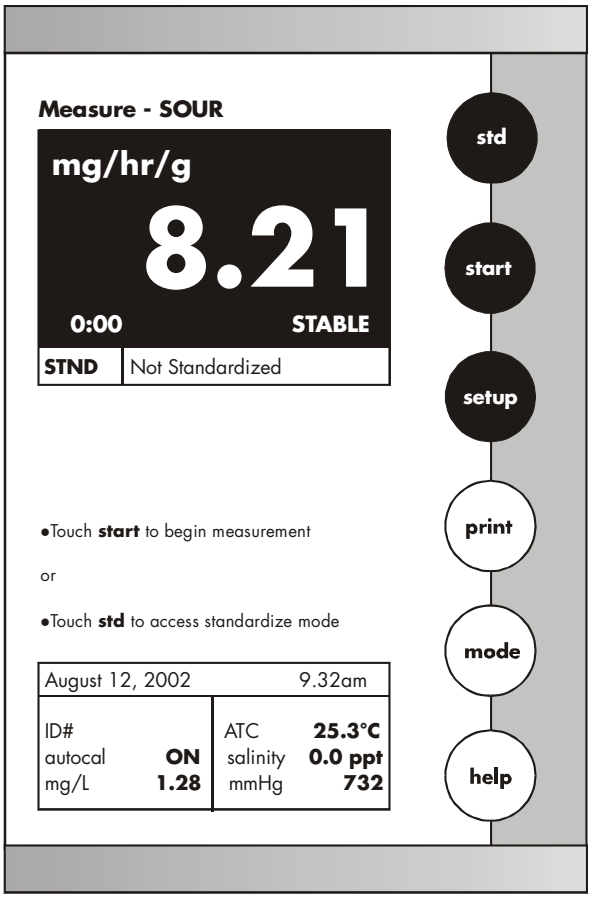
4. Touch **stop** to terminate the test at any time.

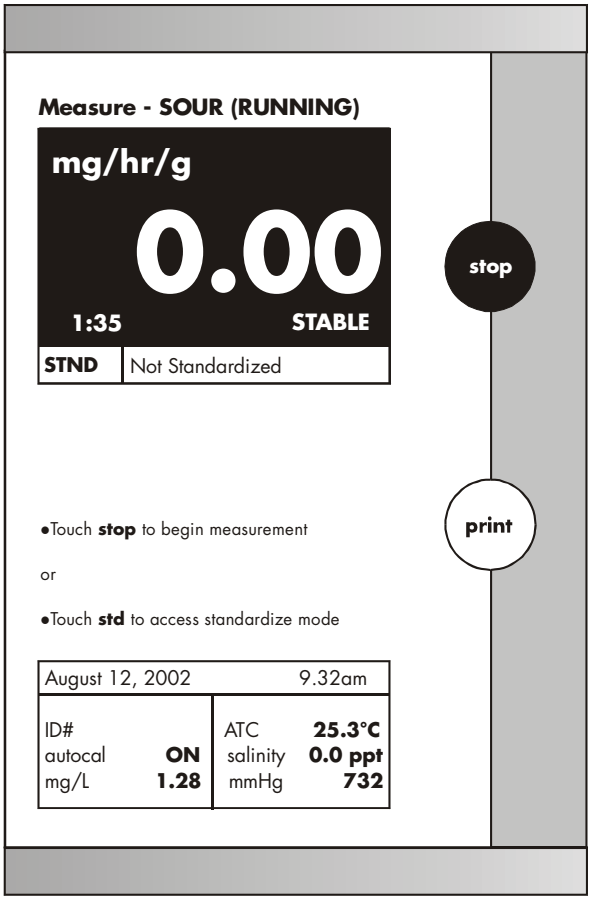
A timer on the OUR screen will display the time of the test. When the test concludes, the OUR results in mg/L/hr will be displayed. Touch print to save the data into the data log, or touch **OK** to return to the OUR screen.

The calculation employed for the OUR result is:

$OUR = [DO_{start}\ (mg/L) - DO_{end}\ (mg/L) / T_{duration}\ (sec)] * (3600 sec/hr) * \text{dilution ratio} = mg/L/hr$

6.4 Specific Oxygen Uptake Rates (SOUR)





1. Touch **SOUR** on the main mode screen.

2. Touch **setup** to set parameters essential for the SOUR calculation. These include dilution ratio, minimum run time, maximum run time, minimum DO required to start the test, the minimum DO required to end the test and the total solids of the sample in g/L.

3. Touch **start** to initiate the SOUR test.

4. Touch **stop** to terminate the test at any time.

A timer on the SOUR screen will display the time of the test. When the test concludes, the SOUR results in mg/L/hr will be displayed. Touch **print** to save the data into the data log, or touch **OK** to return to the SOUR screen.

The calculation employed for the SOUR result is:

SOUR= OUR / solids weight (g/L) = mg/hr/g

7 CLEANING

The touch screen should be kept as clean as possible to preserve optical properties. Attempt to keep the screen free of dirt, dust fingerprints, etc. long term contact with abrasive materials will scratch the surface, and impair image quality. To clean, use a damp nonabrasive cloth towel and any commercially available window cleaner. The cleaning solution should be applied to the towel rather than the surface of the touch screen.

The case is made out of durable ABS plastic. It can be cleaned with a damp cloth and a mild detergent. Do not use chemical solvents on the case.

8 TROUBLE SHOOTING

The CyberScan DO 5000 displays pertinent error messages to guide you should an error occur with a measurement or meter operation (touch pad and input errors). The messages come with a brief description of the error, and in some cases advice on how to correct it.

Error messages displayed by the meter include:

- Data Log full
- Data log empty
- Unrecognized date
- Unrecognized time
- Invalid DO limit
- Invalid limit
- Limit exceeded
- Invalid temperature
- Invalid Isopotential
- Invalid Print interval
- Invalid DO value
- Sample ID not found

Also, whenever possible, touch **help** for complete information about the meter operation in which you are currently engaged,

9 DATA MANAGEMENT

Your CyberScan DO 5000 meter is equipped with an RS-232 port for sending measurement data to a printer. The printer must be capable of receiving data within the following guidelines.

Baud rates	110 to 38400 bps
Data Bits	7 or 8
Parity	even, odd or none
Stop Bits	1 or 2

The meter and the external device must be configured to match with respect to these parameters.

A shielded RS-232 cable must be used. The RS-232 connector on the back panel of the meter is a female DB9 style. Is the external device has a 25 pin connector, an adapter is required. The meter's pin configuration is:

Pin	Description
1	Buffers analog copy of input
2	Send data from meter
3	Receive data to meter
5	Signal Common
9	Signal Common

To initiate printing, touch **print** if in the manual print mode, or set the print interval for stable readings or at a timed interval. Refer to the Setup sections, Set Print Interval and Set Print Criteria.

To download data stored in memory to a printer, access the View Stored Data option in the setup screens. Access the desired data point by sorting the data via one of the three sorting options. Touch **print** on the screen displaying the data.

The following is a list of factory default settings for the CyberScan DO 5000 meter. You can reset your meter to the factory default settings by accessing the Reset to Factory Default screen from the System Setup screen.

Mode	Screen	Default Setting
System Setup	Time	12 hour time mode
	Date	month/date/year
	Print Configuration	Baud Rate 19200
	Parity	None
	Data Bits	8
	Stop Bits	1
	Operator ID	none
	Beeper Status	ON
	Display Contrast	15
DO Setup	Print Configuration	All parameters ON
	Data Configuration	All parameters ON
	Sample ID	none
	Print Interval	manual
	Display Resolution	X.XX
	Auto Read Mode	OFF
	Temperature Units	Celsius
	Stability Criteria	Medium
	Alarm Limits	OFF
	Alarm Limit Low	0
	Alarm limit High	1500

10 DO FUNDAMENTALS

Meter Operation

The CyberScan DO 5000 meter uses the polarographic method of determining dissolved oxygen concentration. A voltage is maintained across two electrodes (a gold cathode and a silver anode) and an electrolyte separated from the sample solution by an oxygen permeable membrane. Oxygen diffuses form the sample across the membrane where it is reduced at the cathode.

1) $\mathbf{0_2 + 2H_20 + 4e^-\ 4OH^-}$

The current generated, I, by such an electrode is proportional to the oxygen concentration of the sample. The rate of oxygen reduction at the cathode is significantly faster than the rate of diffusion to the electrode. Therefore, the rate of oxygen reduction is diffusion limited.

2) $\mathbf{I = k\ D\ [O2]}$

I is the measured current
K is a proportionally constant
D is the diffusion coefficient of oxygen

Equation 2 is a simplified description of current generated by the oxygen electrode. Many other factors such as electrode surface area, membrane thickness, membrane permeability coefficient, incorporated into the constants k and D. as the partial pressure of oxygen in the water is equal to that in the atmosphere, the electrode output is an indicator of oxygen partial pressure. The oxygen partial pressure differential between the sample and the electrolyte inside the electrode is the driving force bringing oxygen to the electrode.

Oxygen Solubility

Oxygen Solubility in water is a critical parameter in many arenas including biochemistry, industrial processes, and particularly environmental science and engineering. Sufficient dissolved oxygen is an absolute requirement for good water quality. It is essential for aerobic life and the natural purification processes to which they contribute. Dissolved oxygen concentrations below 5 ppm will result in substantial damage to the aquatic ecosystem, and concentration below 2 ppm can result in fish kills and growth of harmful bacteria.

11 METER SPECIFICATIONS

Feature	Details	DO 5000	PCD 5500
Display	640X480 back-lit dot-matrix LCD	●	●
Screen size	114.3(W) X 152.4(H) mm	●	●
Measurement display height	19.1 (H) mm	●	●
Temp/etc. display height	6.4 (H) mm	●	●
Menu options	Extensive	●	●
Help screens	Extensive	●	●
Configurable display		●	●
Interface	Context specific		
Keypad controls	Touch screen	●	●
Memory	data points	250	1000
Internal diagnostics		●	●
Programmable data storage	Store on stable, time, manual	●	●
Programmable data output	Output on stable, time, manual	●	●
Print interval	1 to 9,999 sec	●	●
Programmable alarm		●	●
Dissolved Oxygen			
Range, mg/L	0 – 60	●	●
Range, % saturation	0 - 600	●	●
Accuracy, mg/L	0.1% + 1 lsd	●	●
Accuracy, % saturation	0.1% + 1 lsd	●	●
Resolution, mg/L	0.01	●	●
Resolution, % saturation	0.1	●	●
Temperature for DO			
Range	0.0 to 45.0°C	●	●
Resolution	0.1°C	●	●
Accuracy	±0.1°C	●	●
Temperature for other parameters			
Range	-5.0 to 105.0°C	●	●
Resolution	0.1°C	●	●
Accuracy	±0.1°C	●	●
Automatic Barometric Pressure			
Range, mm Hg	450 – 825	●	●
Accuracy, mm Hg	±1 + 1 lsd	●	●
Resolution, mm Hg	1	●	●
Salinity Correction			
Range, ppt	0 – 40	●	●

Feature	Details	DO 5000	PCD 5500
pH mode			
Range	-2.000 to ±20.000	~	●
Resolution	0.1/ 0.01/ 0.001	~	●
Relative Accuracy	±0.002	~	●
Calibration points	5	~	●
Incremental methods	KA,KS,AA,AS	~	●
FET		~	●
mV mode			
Range	±1800.0	~	●
Resolution	0.1	~	●
Accuracy	±0.1	~	●
Ion mode			
Range	1×10^{-6} to 9.99×10^{10}	~	●
Resolution	0.1/ 0.01/ 0.001	~	●
Relative accuracy	±0.17n%	~	●
Calibration points	5	~	●
Incremental methods	KA, KS, AA, AS	~	●
Conductivity Mode			
Cell constants range	0.1, 1.0, 10	~	●
Conductivity	0 to 300 mS/cm	~	●
Resistivity	30 megohm.cm to 100 megohm.cm	~	●
Salinity	2 to 42 ppt	~	●
Accuracy	±0.5%	~	●
Operating Conditions			
Operating temperature	- 5 to 45°C	●	●
Operation humidity	5-80% non-condensing	●	●
Maximum operating altitude	3000m	●	●

Feature	Details	DO 5000	PCD 5500
General			
Password Protection		~	●
Input/ output	DIN/ RS232	●	●
	2BNC/ 2 socket pin(reference, 2-pin conductivity)/ 2.5mm phono jack(ATC), 2DIN (ISFET, 4-cell or DO)	~	●
Electrical requirements	Input: 115VAC or 230 VAC		
	Output: 12VDC, 500 mA (center negative)	●	●
Line voltage tolerance	± 10%	●	●
Input impedance	$>10^{12}$ ohms	●	●
Meter size (Meter only)	165 (W) X 235 (L) X 89 (H) mm	●	●
Meter size (Boxed)	280 (W) X 490 (L) X 160 (H) mm	●	●
Meter weight (Meter only)	1.1 kg	●	●
Meter weight (Boxed)	3.7 kg	●	●

12 ACCESSORIES

Consult your Authorized Distributors for these items and other range of specialized pH electrodes or Ion Selective Electrodes.

12.1 Replacement Meters and Accessories

CODE NO.	DESCRIPTION
EC-DO5000/12	**CyberScan DO 5000 Bench DO/BOD Meter (Touch screen)** with self stirring BOD probe (EC-620-SSP) and 110VAC power adapter, 2-flat pin US type (center negative)
EC-DO5000/22	**CyberScan DO 5000 Bench DO/BOD Meter (Touch screen)** with self stirring BOD probe (EC-620-SSP) and 220VAC power adapter, 2-round pin EURO type (center negative)
EC-PCD5500/14S	**CyberScan PCD 5500 Bench pH/ mV/ EC/ DO/ BOD/ RS232 Meter (Touch screen)** with integral electrode stand, 2-cell Cond. Electrode K=1.0 (EC-620-155), with self stirring BOD probe (EC-620-SSP) and 110VAC power adapter, 2-flat pin USA type (center negative)
EC-PCD5500/24S	**CyberScan PCD 5500 Bench pH/ mV/ EC/ DO/ BOD/ RS232 Meter (Touch screen)** with integral electrode stand, 2-cell Cond. Electrode K=1.0 (EC-620-155) with self stirring BOD probe (EC-620-SSP) and 220VAC power adapter, 2-round pin EURO type (center negative)
EC-620-19	Temperature probe for CyberScan DO5000 and other CyberScan Series 5000 meters (1m cable)
60X030115	110/120 VAC power adapter (50/60 Hz) 2-flat pin type center negative, US
60X030117	220/230 VAC power adapter (50/60 Hz) 3-flat pin type center negative, UK
60X030118	220/230 VAC power adapter (50/60 Hz) 2-round pin type center negative, Euro
EC-CA01M09F09	RS232 Communication cable: 9-pin male to 9-pin female connector (1m cable)

* *General-purpose and specialty pH electrodes, Ion selective electrodes, Conductivity electrodes and calibration solutions are available and can be ordered separately.*

12.2 Dissolved Oxygen / BOD Electrode

CODE NO.	DESCRIPTION
EC-620-SSP	Dissolved Oxygen electrode with self-stirring mechanism

13 WARRANTY

Eutech Instruments supplies the bench meters with a **3-year** warranty and **6-month** warranty for probes against manufacturing defects from the date of purchase. If repair or adjustment is necessary and has not been the result of abuse or misuse within the warranty period, please return, freight prepaid, and correction will be made without charge. Out of warranty items will be repaired on a charge basis.

Exclusions to the Warranty

The warranty shall not apply to defects resulting from:

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

Return of Items

Authorization must be obtained from your Eutech Instruments' Authorized Distributor or Eutech's Customer Service Dept. before returning items for any reason. When applying for authorization, please include data regarding reason the items are to be returned.

Packing the item for repair should be done using the original packaging or material, with information about any fault identified.

Shipment damage as a result of inadequate packaging is your or your distributor's responsibility, whoever applicable.

Eutech Instruments reserves the rights to make improvements in design, construction and appearance of products without notice.

NOTES

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

Manufactured by:

Eutech Instruments Pte Ltd
Blk 55, Ayer Rajah Crescent,
#04-16/24 Singapore 139949
Tel: (65) 6778 6876
Fax: (65) 6773 0836
E-mail: marketing@eutechinst.com
Web-site: www.eutechinst.com

Distributed by: