INSTRUCTION MANUAL

DISSOLVED OXYGEN-METER

MODEL CDO-01

CONTECH
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CHAPTER 1

INTRODUCTION

Contech CDO-01 measures Dissolved Oxygen and temperature of liquids. It can be used in a variety of fields such as industrial, agriculture, environmental studies and scientific research laboratory.

ABOUT CDO-01 MODEL.

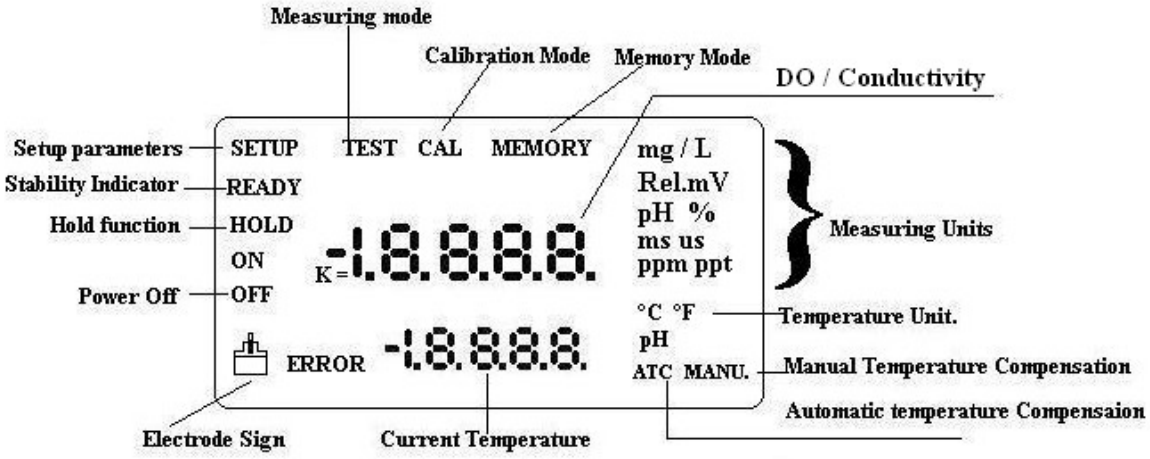
Dissolved Oxygen meter, Model CDO-01, is a microprocessor based instrument, which measures Dissolved oxygen and salinity and temperature of a liquid under test. Meter supports ATC (Automatic temperature compensation) feature which corrects the electrode output changes due to temperature variation of the sample being tested. There is also an option to enter the temperature of measuring solution manually. Also there is an option to enter the Atmospheric Pressure for correcting changes due to it. The following are the salient features of CDO-01 meter.

- Advanced Microprocessor based design.
- DO and Conductivity.
- DO in Saturation % and mg/L.
- DO correction for Temperature, Atmospheric pressure and Salinity.
- Polarographic Electrode
- Automatic and Manual temperature Compensation
- Single or Multi point calibration of Salinity.
- Cell Constant adjustable from 0.1 to 10.0
- Temperature Coefficient adjustable from 0 to 10%/ ^{o}C
- Normalisation temperature adjustable from 15 to 30 ^{o}C.
- Bi directional RS232 interface. Baud rate selectable from 1200,2400,4800 and 9600.
- Single and continuous print out of DO and Conductivity.
- Multiple Printout types. Combinations selectable from Sr. No., DO/Conductivity, Date, time and temperature.
- Real Time Clock.
- Temperature setting (Manual temperature compensation).
- Calibration report as per GLP requirements.
- LCD display with Backlight.
- Memory storage of 100 measurements.
- Data logging facility up to 500 results. Data logging interval selectable from 5S, 10S, 20S, 30S, 1M, 2M and 5M.

- Temperature calibration.
- Atmospheric Pressure Entry.

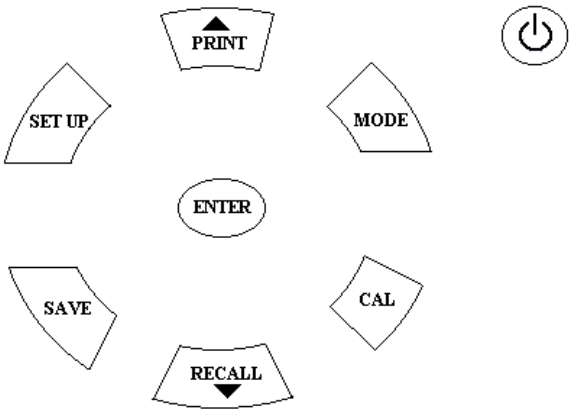
CHAPTER 2

DO METER DISPLAY



DISSOLVED METER DISPLAY

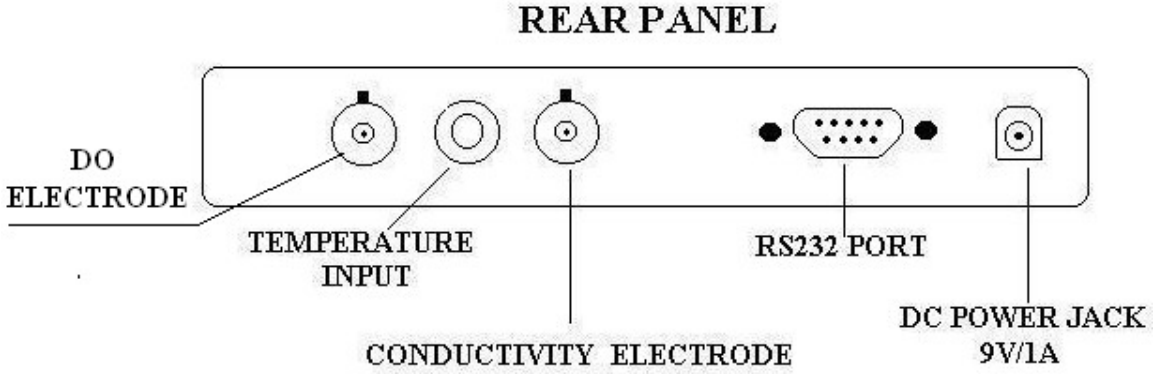
DO METER KEYBOARD



CHAPTER 3
BASIC OPERATION AND SETUP PARAMETERS

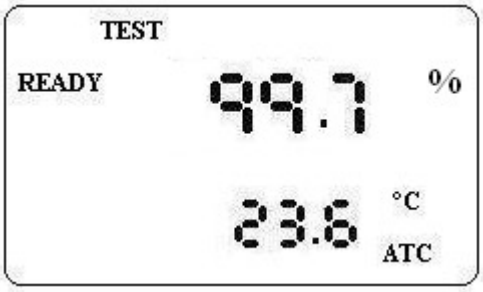
3.1 POWER AND INSTALLATION REQUIREMENTS

The meter requires good stable power. Meter is supplied with a 9V/1A switching adapter. Connect the adaptor to the instrument to the power jack located at the rear side of the meter. Connect the adapter to an AC power outlet. Meter is supplied with a probe. Connect the electrode to the BNC connector provided at the rear side. Connect the temperature probe to the temperature input connector.

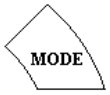


3.2 STARTING THE METER

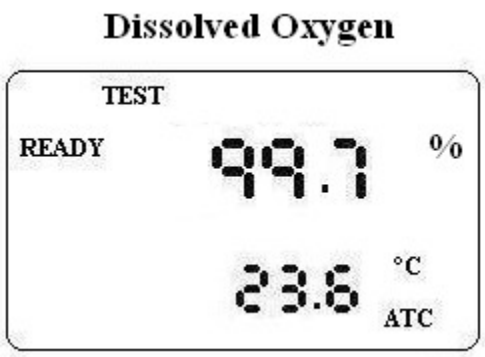
Switch on the meter by pressing the  key. Instrument goes through self-tests and subsequently display the measured Saturated DO say 99.7%.

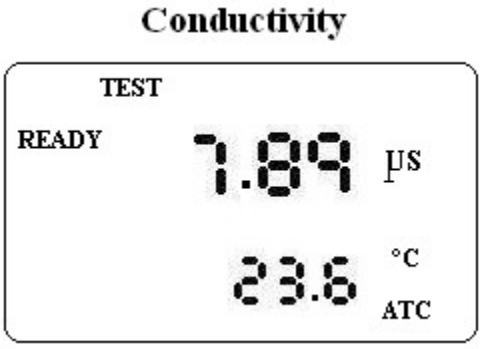


3.3 CHANGING MODES.

Use 

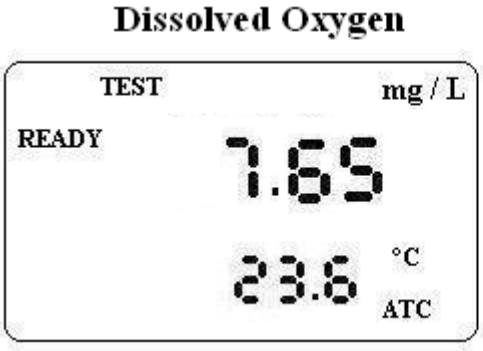
to change between DO and CONDUCTIVITY modes.

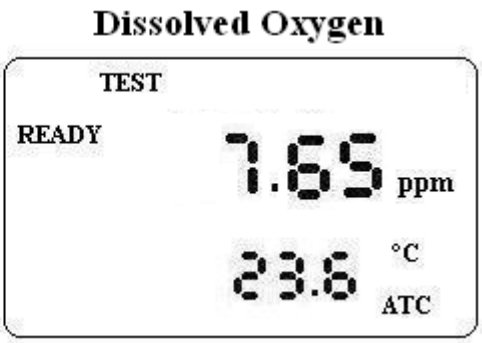




Press 

key to change between Saturated DO %, Do in ppm and mg/L.





3.4 SETUP PARAMETERS

3.4.1 SETTING DATE AND TIME.

Meter has an inbuilt Real Time clock. Hence there is no need to change or update date and time. However it is possible to change date and time.

Press 

key. The Meter displays

and subsequently displays

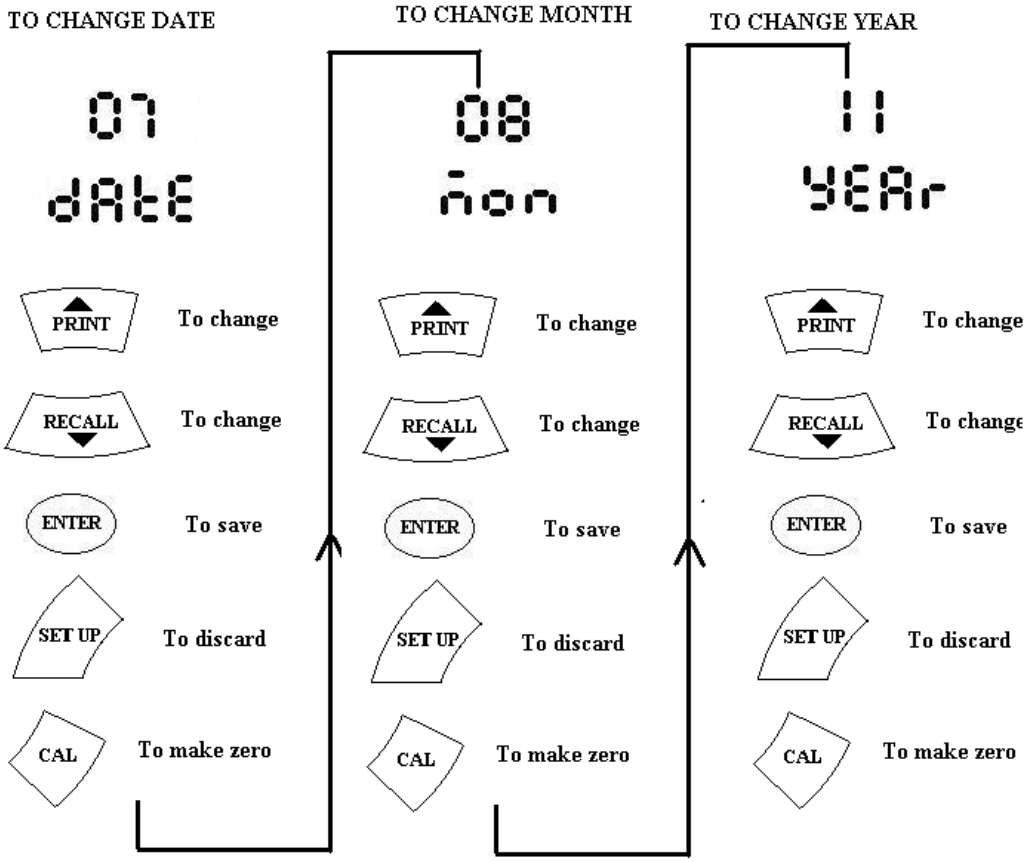
Press 

or 

key till it displays

Press 

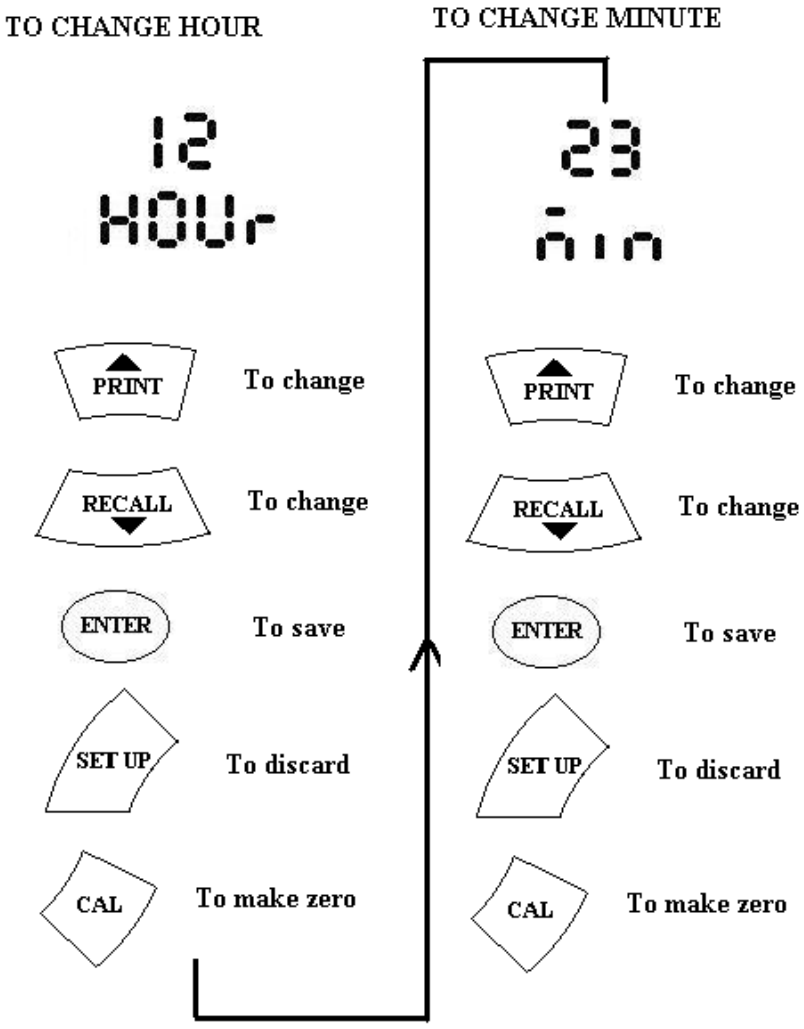
key. Meter displays current date say 07. Follow the instructions below for changing date, month and year.



Meter Displays the current time, say 12.23.45

Press 

key to change hour. Follow the instructions below for changing Hour and Minute



3.4.2 TO SET BAUD RATE

Press 

key. The Meter displays

and subsequently displays

Press ENTER key. Meter displays the set baud rate say 9600.

Press PRINT or RECALL key to change between 1200, 2400, 4800 and 9600 and press ENTER key to save.

Press CAL key to quit without saving

3.4.3 TO SET TEMPERATURE (For Manual Temperature Compensation)

Press SET UP key. The Meter displays

and subsequently displays

Press PRINT or RECALL key till it displays

Press ENTER key.

Meter shows the set or default temperature (25°C)

Press PRINT or RECALL key to change temperature and press ENTER key to save.

Press CAL key to quit without saving

3.4.4 TO SET READING SERIAL NUMBER

Press SET UP key. The Meter displays SEt UP bAud

and subsequently displays

Press PRINT or RECALL key till it displays SEr

Press ENTER key. Meter shows the current serial number. 0003

Press PRINT or RECALL key to change the serial number and press ENTER key to save.

Press SET UP key to quit without saving

Press CAL key to make the reading 0000.

3.4.5 TO SET PRINT OPTION

There are 2 options : OnE and ALL

OnE - Press PRINT key to print current DO/Cond through RS232 port.

ALL - Continuous data transfer to computer/printer through RS232 port.

Press SET UP key. The Meter displays SEt UP bAud

and subsequently displays

Press PRINT or RECALL key till it displays Prnt

Press ENTER key. Meter displays the current mode, say One OnE

Use PRINT or RECALL keys to change between

OnE and ALL and Press ENTER key to save.

Press CAL key to discard changes and quit.

3.4.6 TO SET PRINT FORMAT.

There are 6 print formats available in the meter.

PrF1 - ONLY DO/Cond
PrF2 - SERIAL NO, DO/Cond
PrF3 - SERIAL NO, DATE,DO/ Cond
PrF4 - SERIAL NO, TIME, DO/Cond
PrF5 - SERIAL NO, DATE, TIME, DO/Cond
PrF6 - SERIAL NO, DO/Cond, TEMPERATURE

To change the format,

Press SET UP key. The Meter displays

SEt
UP
bAud
Prnt
FAt

and subsequently displays

Press PRINT or RECALL key till it displays

Press ENTER key. Meter displays the current mode

Use PRINT or RECALL keys to change between PRF-1 to PRF-6 and press ENTER key to save.

Press CAL key to discard changes and quit.

3.4.7. TO SET PRINT TYPE.

Meter can be set to print the results in Horizontal and vertical form

A Typical printout in the horizontal form appears as below.

1. 12.30.34 7.75 mg/L
2. 12.30.45 7.82 mg/L

While a printout in vertical mode is as shown below.

Sr.No. : 1
Time : 12.30.34
Value : 7.75 mg/L
To set the mode,

Press SET UP key. The Meter displays

and subsequently displays

Press PRINT or RECALL key till it displays

Press ENTER key. Meter displays the current mode, say TYPE1

Press PRINT or RECALL key to change between tYPE1 (horizontal) and tYPE2 (Vertical) and press ENTER key to save.

Press CAL key to discard changes and quit.

3.4.8. TO SET MACHINE ID.

Machine identification number can be assigned to the meter using this option.

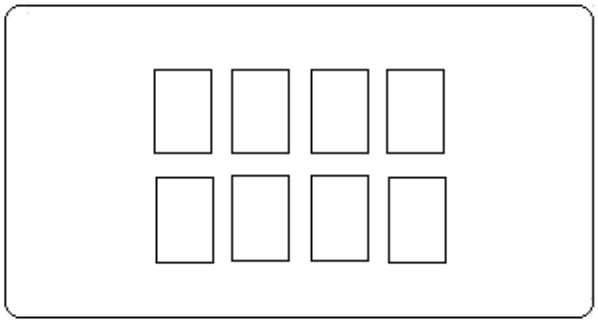
Press SET UP key. The Meter displays

and subsequently displays

Press PRINT or RECALL key till it displays

Press ENTER key. Follow the instructions given below for setting id.

MACHINE ID SETTINGS



SAVE — TO MOVE THE BLINKING CHARACTER LEFT

ENTER — TO SAVE MACHINE ID

CAL — TO MOVE THE BLINKING CHARACTER RIGHT

SET UP — TO QUIT WITHOUT SAVING

PRINT OR RECALL — TO CHANGE THE CHARACTER

3.4.9. TO SET TEMPERATURE COEFFICIENT.

Press SET UP key. The Meter displays

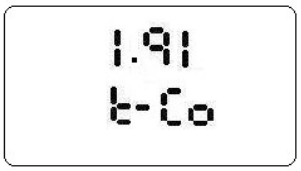
and subsequently displays

Press PRINT or RECALL key till it displays

Press ENTER key. Meter will display the current value of coefficient say 2.00

Use PRINT or RECALL key to change and Press ENTER to save.

Press CAL key to discard changes and quit.



3.4.10. TO SET NORMALISATION TEMPERATURE.

Using Automatic temperature compensation, Meter compensates for temperature variations of a solution from the normalization temperature set. Default normalization temperature is 25ºC. However it can be changed from 15 to 30ºC, if required.

Press SET UP key. The Meter displays

and subsequently displays

Press PRINT or RECALL key till it displays

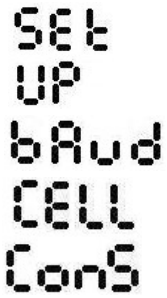
Press ENTER key. Meter will display the current value of temperature say 25

Use PRINT or RECALL key to change and Press ENTER to save.

Press CAL key to discard changes and quit.

3.4.11. TO SET CELL CONSTANT.

Press SET UP key. The Meter displays



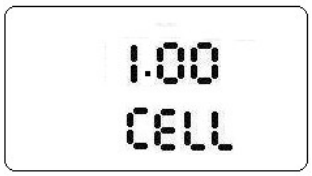
and subsequently displays

Press PRINT or RECALL key till it displays

Press ENTER key. Meter will display the current value of cell constant say 1.00

Use PRINT or RECALL key to change and Press ENTER to save.

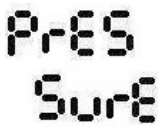
Press CAL key to discard changes and quit.



3.4.12. TO SET ATMOSPHERIC PRESSURE.

Press SET UP key. The Meter displays

and subsequently displays

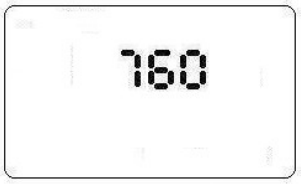


Press PRINT or RECALL key till it displays

Press ENTER key. Meter will display the current value of atmospheric pressure say 760

Use PRINT or RECALL key to change and Press ENTER to save.

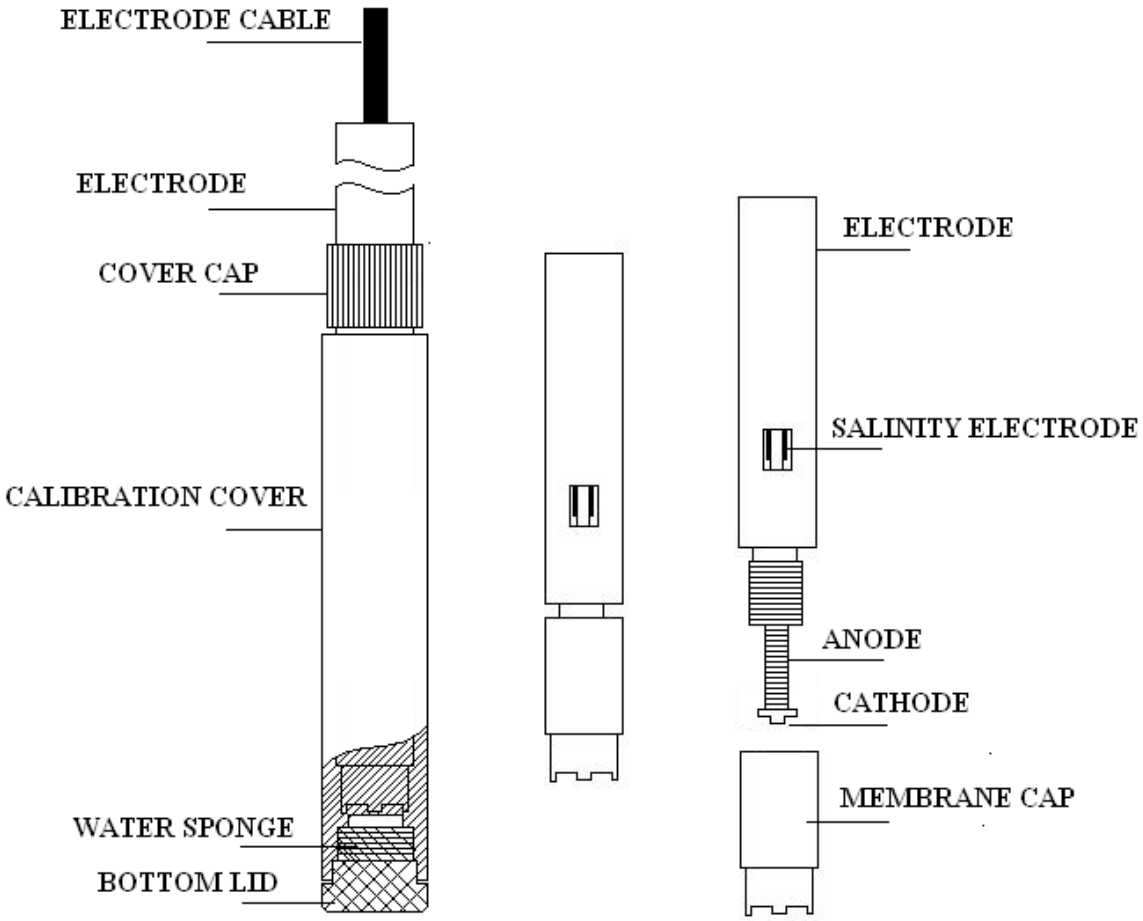
Press 

key to discard changes and quit. 

CHAPTER 4

DISSOLVED OXYGEN MEASUREMENTS

4.1.. DO ELECTRODE.



CDO-01 Electrode is illustrated above.

It is a Polarographic type electrode. It needs about 5 minutes of electrode polarization whenever it is switched on. It has a removable electrode cap for convenience.

It has an outer calibration cover which protects the membrane cap. Unscrew the bottom lid and check if the sponge is still soaked. If not add few drops of distilled water. Ensure that the water is just enough to soak the sponge and it should not remain in the calibration cover. Put the bottom lid back into the calibration cover and fix it tightly.

Remove the Calibration cap by unscrewing the cover cap.

Unscrew Membrane Cap from the electrode. Check if contains full electrode solution. If not, add few drops of electrode solution just enough to make it full. Plug the membrane cap back to the electrode. Whenever electrode solution is added or changed, connect the electrode to the meter, put the meter on and polarize it for at least 15 minutes.

Electrode also has sensors for measuring salinity. Ensure that the salinity sensor is completely immersed in the liquid under test for effecting proper salinity correction.

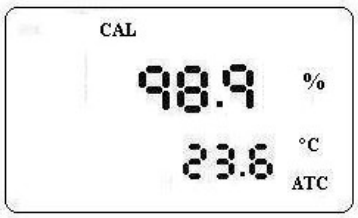
4.2. DO ELECTRODE CALIBRATION.

Put the meter on. Polarize the electrode for atleast 5 minutes by connecting it to the meter. Put the meter in % Saturation Mode.

Keep the Electrode vertically to polarize for at least 5 minutes and wait for the display to become stable.

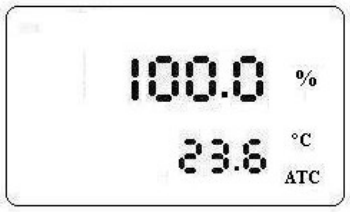
Alternately remove the calibration cover and keep the electrode vertically for at least 5 mintes for polarization.

Wait for the display to become stable



Press 

key. Wait for meter to display



Electrode calibration is now complete.

4.2.1 ZERO OXYGEN CALIBRATION.

Zero Oxygen calibration is required when the electrode/electrode cap is replaced or the meter is unused for long time. Zero oxygen calibration is done at factory and generally

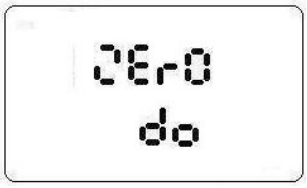
meter need not be calibrated for zero oxygen levels unless the conditions mentioned above occur.

For zero oxygen calibration, mix 5g of anhydrous sodium sulphite (Na_2SO_3) into 100 ml of pure distilled water. Mix it thoroughly to make a homogenous solution.

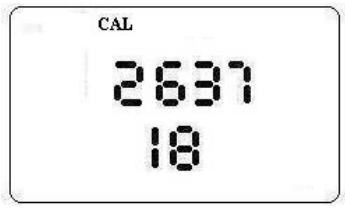
Polarize the electrode for 15 minutes by connecting it to the meter.

Press SET UP key. The Meter displays 

Immediately press SAVE and PRINT keys together.

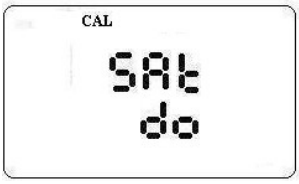
Meter displays 

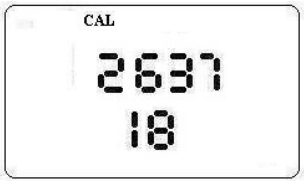
And subsequently displays the current signal value.



Immerse the DO electrode into the above zero oxygen calibration solution and keep it polarized for about 10 minutes.

Wait for the display to become stable and Press ENTER key.

Meter Displays 

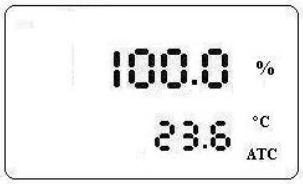
and subsequently displays the current signal value. 

Remove the electrode from the solution and press make it dry and hold it vertically for about 10 minutes.

Wait for the display to become stable and Press 

key.

Meter is now calibrated for zero and saturated oxygen. It displays



4.3. SALINITY ELECTRODE CALIBRATION.

CDO-01 can be calibrated for salinity in both manual and auto modes. Automatic calibration can be done in Conductivity mode only. But Manual calibration also can be performed . Meter also allows Single and Multi point calibration.

In case of Single point calibration, when a calibration is performed in one Range, Calibration of all the 5 ranges will be changed. However in Multi point calibration, new calibration value will be the change in the range of the calibration solution only.

Always use fresh solution for calibration. For optimum results, choose calibration standards close to the values being measured. Use Single point calibration, if measurement is done in one single range. For measurements in different ranges, use multi point calibration. While Calibration solution of 1413 uS/cm takes care of the 0 –2000 us range, 84us/cm solution can be used for 0 – 200 us/cm or 12.88 mS/cm for 0 – 20 ms range. As a thumb rule use a calibration solution which is atleast 60 –70% of the range.

Calibrate the meter frequently atleast once a week for better results. There may be situations where the meter must be calibrated before use.

4.3.1 SETTING AUTO / MANUAL MODES.

Press SET UP key. The Meter displays SEt UP

and subsequently displays bAud

Press PRINT or RECALL key till it displays CAL tYPE

Press ENTER key. Meter will display the current calibration type.

Use PRINT or RECALL keys to change between nAn (Manual) and Auto (Auto)

Press ENTER key to select the mode.

4.3.2 SETTING SINGLE / MULTI MODES.

Press SET UP key. The Meter displays SEt UP

and subsequently displays bAud

Press PRINT or RECALL key till it displays CAL nodE

Press ENTER key. Meter will display the current calibration mode.

Use PRINT or RECALL keys to change between Sin (Single) and AUt (Multiple)

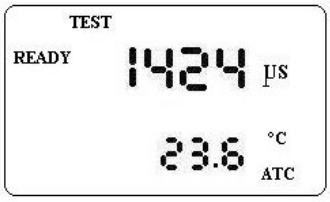
Press ENTER key to select the mode.

4.3.3 SALINITY CALIBRATION.

Meter can be calibrated for Conductivity in Automatic and Manual Modes.

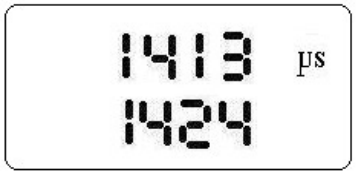
4.3.3.1 Automatic Conductivity calibration.

1. Select AUTO mode as per 4.1 above
2. Select conductivity mode.
3. Select SINGLE or MULTI mode as per 4.2 above
4. Rinse the electrode with distilled water to remove any residue of the previous measurement. Air it dry.
5. Rinse the electrode with the Calibration Solution.
6. Immerse the electrode in the Calibration solution. Ensure that the steel ring of the probe is immersed in the liquid. Stir the liquid gently for consistency.
7. Immerse the temperature probe also into the solution (If provided).
8. Wait for the Conductivity reading to stabilize. Say 1424 uS/cm

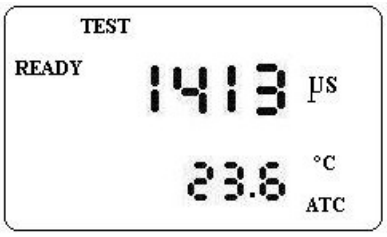


9. Press CAL key.

Meter automatically recognizes the standard and displays



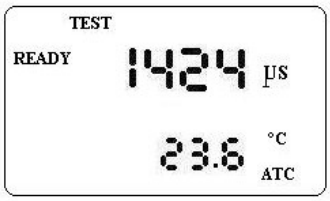
Press ENTER key. Meter calibrates to the new value and displays the results as below.



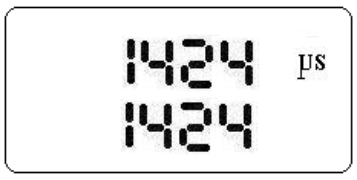
In SINGLE(Sin) mode calibration type, Calibration values of all the ranges will be Changed, while in MULTI(nULt) mode Calibration of only the current range (Range 200 – 2000uS/cm) will be changed.

4.3.3.2 Manual Conductivity calibration.

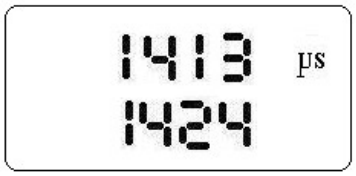
1. Select MANUAL mode as per 4.1 above
2. Select conductivity mode.
3. Select SINGLE or MULTI mode as per 4.2 above
4. Rinse the electrode with distilled water to remove any residue of the previous measurement. Air it dry.
5. Rinse the electrode with the Calibration Solution.
6. Immerse the electrode in the Calibration solution. Ensure that the steel ring of the probe is immersed in the liquid. Stir the liquid gently for consistency.
7. Immerse the temperature probe also into the solution (If provided).
8. Wait for the Conductivity reading to stabilize. Say 1424 uS/cm



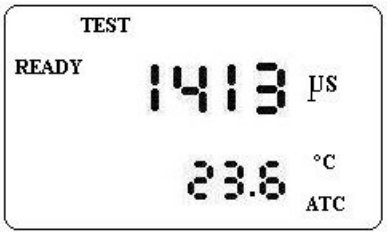
9. Press CAL key. Meter displays



Use PRINT or RECALL key to change the value to the standard value, say 1413



Press ENTER key. Meter calibrates to the new value and displays the results as below.



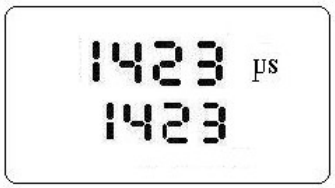
In SINGLE(Sin) mode calibration type, Calibration values of all the ranges will be Changed, while in MULTI(mULt) mode Calibration of only the current range (Range 200 – 2000uS/cm) will be changed.

4.4 TEMPERATURE CALIBRATION

To calibrate the temperature sensor, Keep the meter in Conductivity measurement mode.

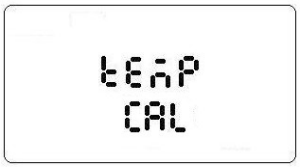
Immerse the temperature probe in to a solution with known temperature.

Press the CAL key. The meter displays CAL

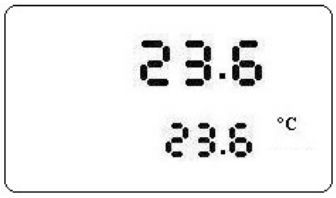


and subsequently starts displaying the conductivity value.

Keep the MODE key pressed , till meter displays



Subsequently meter displays



Upper display shows the measured temperature and lower display shows the temperature to be set.

Press PRINT or RECALL key to change the temperature to the known value and press ENTER key to save the new temperature calibration. Meter will start displaying the new value.

CHAPTER 5

DISSOLVED OXYGEN MEASUREMENT

Switch on the meter and polarize the electrode for about 10 minutes.

Select the required unit (Saturated %, ppm or mg/L)

Do electrode calibration if required.

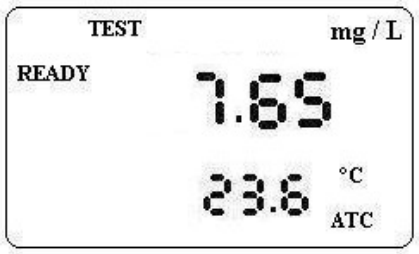
To measure in static water, immerse DO electrode quickly in the water at an angle of 45° to 75°. Also, immerse the temperature sensor, if provided separately, in to the solution. Wait for about 5 minutes and take the reading after it is stabilized.

To measure DO of flowing water, place DO electrode into the flowing water at an angle of 45° to 75°. Also, direct the temperature sensor, if provided separately, in to the flowing solution. Wait for about 5 minutes and take the reading after it is stabilized.

In both cases ensure that the salinity sensor is immersed fully into the solution under test.

During the DO measurement, please check the following.

1. Check if there are any air bubbles in the DO electrode solution. Fill the electrode solution in the cap.
2. Keep the surface of electrode moist by keeping the sponge wet.
3. If there is large difference in the temperature of air and the solution, then immerse the electrode in the sample solution for about 10 minutes, then insert the electrode back into the calibration cover for another 5 to 10 minutes. Perform electrode calibration before reading.
4. Each time the meter is switched on polarize the electrode for about 5 minutes.
5. DO reading are affected by Atmospheric pressure. Set the pressure using SETUP functions (Refer section 3.4.12)
6. DO measurement is affected by the temperature of the solution under test. Immerse the Temperature probe (if provided separately) into the solution along with DO electrode. In case of manual temperature compensation, Set the correct temperature. (Refer 3.4.3 for more details)
7. Meter automatically compensates DO readings with Salinity changes. Ensure to completely immerse the salinity sensor in the DO electrode.



CHAPTER 5

CONDUCTIVITY MEASUREMENT

CDO-01 measures conductivity of a solution in 5 measurement ranges, 0.00 – 20.00uS/cm, 20.0 – 200.0 uS/cm, 200 – 2000 uS/cm, 2.00 – 20.00 mS/cm, 20.0 – 200.0 mS/cm. Meter shifts the range automatically whenever measured value crosses the limits.

Meter is also provided with Automatic Temperature compensation(ATC) feature, where in it corrects the variation of conductivity due to temperature changes. Meter is switched to ATC mode automatically when a Pt-100 temperature probe is attached to it. It measures the liquid temperature and applies necessary correction to the readings.

Temperature Coefficient:
Temperature compensation factor or Temperature Coefficient is factory set to a temperature coefficient of 2.00 % per °C. This is good enough for majority of the applications. However, it can be changed if required. Refer to section 3.4.9 for details.

Temperature coefficient can also be calculated by using the following formula.

$$\frac{(C2 - C1)}{C1(T2-25) - C2(T1-25)} \text{ X } 100$$

C1 = Conductivity of a solution at T1 °C
C2 = Conductivity of a solution at T2 °C

If the meter does not detect the temperature probe, meter switches to Manual temperature compensation mode. There is a provision to manually enter the liquid temperature, if required. Refer to section, 3.4.3 for changing the temperature.

Normalisation Temperature:
Using Automatic temperature compensation, Meter compensates for temperature variations of a solution from the normalization temperature set. Default normalization temperature is 25°C. However it can be changed from 15 to 30°C, if required. Refer to section 3.4.11 for details.

Cell Constant:
Meter is supplied with an electrode of Cell constant 1.00. However, it can be changed to suit a particular electrode. Refer to section 3.4.12 for more details.

Conductivity Electrode:
CDO-01 meter DO electrode is used for measuring salinity. DO electrode has inbuilt sensor for measuring salainit. The sensor portion should be fully immersed in the liquid under test.

To ensure accurate and reliable analytical measurements, a routine care and maintenance regime should be adopted. In addition to giving the correct measurement result, correct care and maintenance of electrodes will result in improved electrode performance and prolonged working life. It also reduces the necessity for corrective intervention, thus saving time and money.

During use the following points should be borne in mind:

- Electrodes should be calibrated using calibration buffers that bracket the expected value of the sample. Calibration should be performed on a daily basis or more frequently if sample throughput is high.
- Stirring the sample during measurement is recommended but is not essential. But same procedure must be followed for both calibration and measurement.
- The electrode should be rinsed with a wash bottle of purified water between measurements.
- Keep the electrical parts of the electrode (the cable and connector) dry at all times.
- After a measurement is completed, remove the electrode from the sample.

While taking measurements,

- Rinse the electrode with distilled water to remove any residue of the previous measurement. Air it dry.
- Rinse the electrode with the measuring sample.
- Immerse the electrode in the measuring solution. Ensure that the steel ring of the probe is immersed in the liquid. Stir the liquid gently for consistency.
- Immerse the temperature probe also into the solution (If provided).
- Wait for the Conductivity reading to stabilize.
- Note down the Conductivity readings along with temperature.

CHAPTER 5
DATA LOGGING

Data logging is useful for studying the pattern of DO/Conducivity changes over time. Meter stores the DO/Cond values along with temperature at a preset time interval. A maximum of 500 readings can be stored and recalled.

5.1 SET DATA LOGGING INTERVAL

Press SET UP key. The Meter displays

and subsequently displays

Press PRINT or RECALL key till it displays

Press ENTER key. Meter displays the set baud rate say 5 seconds

Press PRINT or RECALL key to change between 5S, 10S, 20S, 30S, 60S, 120S, 300S

and press ENTER key to save.

Press CAL key to quit without saving

5.2 START DATA LOGGING.

Press SET UP key. The Meter displays

Immediately press SAVE key. Meter Displays

Meter starts storing the DO/CONd and temperature values at the set interval.

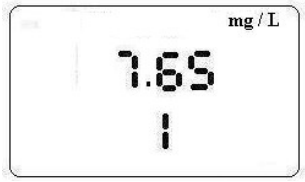
Meter displays - - - - every time it stores data.

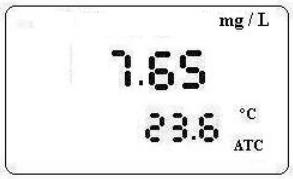
A maximum of 500 readings can be stored. When the data reaches 500, meter displays

and it stops saving further data.

5.3 DATA RECALL.

Press 

key. Meter displays 



and followed by

Press 

or 

key to scan through the saved data.

Press 

to quit.

TO PRINT DATA

Press 

key . A sample printout appears as below.

1. 7.85 mg/L 26.9ºC
2. 7.93 mg/L 26,7ºC
3. 8.25 mg/L 25.2ºC
4. 8.35 mg/L 24.3ºC
5. 6.35 mg/L 20.9ºC

CHAPTER 6

SAVE AND RECALL OF DATA

A maximum of 100 numbers of measurement data including DO/Cond , Date, Time and temperature can be stored and recalled.

6.1 TO CLEAR MEMORY:

Press 

key. The Meter displays 

and subsequently displays 

Press 

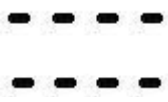
or 

key till it displays 

Press 

key. Meter displays 

Press 

key again, Meter displays 

.

All the stored data will be cleared.

6.2 TO STORE DATA.

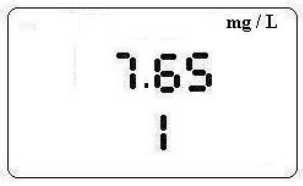
Press 

key. Meter displays 

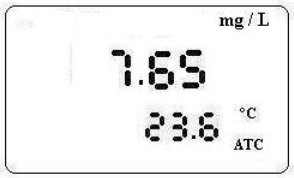
. The measurement data along with date, time and temperature will be stored in memory.

6.3 TO RECALL DATA:

Press 

key. Meter displays 

and followed by



Press PRINT or RECALL key to display saved data.

Press CAL to quit.

6.4 TO PRINT DATA

Press SET UP key. Printout format can be selected by 3.4.6 and 3.4.7 in Chapter 3.

Selected Format Print output

PrF1 - ONLY DO/Cond
PrF2 - SERIAL NO, DO/Cond
PrF3 - SERIAL NO, DATE,DO/ Cond
PrF4 - SERIAL NO, TIME, DO/Cond
PrF5 - SERIAL NO, DATE, TIME, DO/Cond
PrF6 - SERIAL NO, DO/Cond, TEMPERATURE

CHAPTER 7
DATA PRINT AND RS232 INTERFACE

7.1 BIDIRECTIONAL RS232 INTERFACE

Bi-directional RS-232 interface is provided in the meter to communicate with devices like computer, printer etc. The interface is provided through a nine pin D-type connector provided at the rear side. Connections are as below.

Pin 2 – RXD – Receive Data
Pin 3 - TXD – Transmit Data
Pin 7 – Ground.

The Serial data transmitted and received are in standard ASCII mode (+/- 12V) - ASYNCHRONOUS , 8 BITS, NO PARITY, 1 STOP BIT.

Baud rate: Selectable from 1200, 2400 ,4800 and 9600.

The data format is

<+/->PPPPPP.PPb <bUU> <CR><LF> (15 characters)

where PPPPPP.PP - DO or Cond value
b – blank space - 20 hex
CR- Carriage Return – 0D hex
LF – Line feed - 0A hex

for example, a DO value of 7.65 mg/L will be sent as

+bbbb 07.65mg/L <0D><0A>

Meter could be controlled by an external device like computer with the following commands.

P# - Number of times, a stable DO/conductivity data is to be transmitted through the serial port.
can be any number from 1-9.

7.2 PRINT OPTIONS.

Meter can be attached to a serial printer for your printing needs. Print out can be programmed to suit most of the printing requirements. See sections 3.4.2, 3.4.4, 3.4.5, 3.4.6 and 3.4.7 for setting parameters required for printing.

Press 

key to print data through the serial port.

Printing option and patterns are controlled by 3 SETUP parameters. They are

a) Prnt : There are 2 options : OnE and ALL

OnE - Press PRINT key to print current DO/Cond through RS232 port.

ALL - Continuous data transfer to computer/printer through RS232 port.

b) Prnt Fmt option:

PrF1 - ONLY DO/Cond
PrF2 - SERIAL NO, DO/Cond
PrF3 - SERIAL NO, DATE,DO/ Cond
PrF4 - SERIAL NO, TIME, DO/Cond
PrF5 - SERIAL NO, DATE, TIME, DO/Cond
PrF6- SERIAL NO, DO/Cond, TEMPERATURE

c) Prnt tYPE Print type (Horizontal or Vertical)

i) tYPE1– Horizontal
Details will be printed horizontally.

A Typical printout in the horizontal form appears as below.

1. 12.30.34 8.95 mg/L
2. 12.30.45 8.96 mg/L

ii) tYPE2 – Vertical
Details will be printed vertically in a slip form.

Sr.No. : 1
Time : 12.30.34
Value : 8.95 mg/L

CHAPTER 8
ELECTRODE PERFORMANCE AND GLP

8.1 GLP CALIBRATION REPORT

Report of the last calibration done, is available as per GLP requirements.

Press 

key. The Meter displays SEt UP

and subsequently displays bAud

Press 

or 

key till it displays CAL rPt

Press 

key. Meter Prints report of last calibration as below.

CONTECH
DISSOLVED OXYGEN METER
MODEL : CDO-01
MACHINE ID : ABCDEFGH
CAL. DATE :
CAL. TIME :

SPECIFICATIONS

1. Model	:	CDO-01
2. DO Range	:	0 – 40 mg/L, 0 – 200%, Temp. 0 – 45°C
3. Conductivity Range	:	0 to 20.00, 20-200.0, 200-2000 µS/cm; 0 to 20.00, 20.0 -200.0 mS/cm
4. Auto ranging	:	Yes.
5. Resolution	:	0.05 % Full Scale

6. Calibration Mode : Single or Multiple
7. Dissolved Oxygen : Zero and Saturated % calibration
8. Accuracy : ±1% Full Scale
9. Temperature compensation : Auto or Manual
10. Temperature range : 0 to 100°C in 0.1 deg increments
11. Cell Constant : 0.1 to 10.0 adjustable.
12. Temperature Coefficient : 0 to 10%/°C in 0.1% increments
13. Normalisation Temeperature : 15 °C to 30 °C
14. Memory : 100 nos.
15. Data logging : 500 nos.
16.Power : +9V/1A power adapter (Input 100-260V AC, 50Hz)
17. Operating temperature : 15 to 45° c
18. Dimensions : 165(L) x 190(D) x 60(H)
19. Meter weight : 700g
20. Electrodes : 1. Glass Conductivity Electrode.
2. Temperature Probe.

Box Contents : Meter, DO electrode, Temperature Probe, 9V adapter, Instruction manual, Electrode stand, Rod and holder.