



MODEL 3100 DISSOLVED OXYGEN ANALYZER

MODEL 30 OPTICAL DISSOLVED OXYGEN SENSOR

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GENERAL INFORMATION

Product Description

The Model 3100 Dissolved Oxygen Analyzer is a handheld analyzer designed for the measurement of dissolved oxygen (D.O.) in aqueous solutions. The microprocessor-based electronics of the Model 3100 analyzer provide a high degree of flexibility and ease of use. The instrument will display dissolved oxygen content in PPM, MG/L, or %SATURATION. The resolution in PPM or MG/L mode is 0.01 over the range of 0.00 to 3.99 and 0.1 over the range of 4.0 to 25.0. The resolution in %SAT mode is 0.1% over the range of 0.0 to 99.9 %SAT and 1% over the range of 100 to 400 %SAT. Temperature is displayed in 0.1 degree Celsius increments over a 0.0 to 50.0 degree Celsius range or 1 degree Fahrenheit increments over a 32 to 122 degree Fahrenheit range.

The microprocessor based electronics of the Model 30 provide a high degree of flexibility and ease of use. The sensor is an optical type sensor that measures the fluorescence and quenching reactions of a ruthenium complex that is immobilized in a sol-gel matrix. Calibration is not required on a routine basis, nor is calibration required after initial startup and commissioning.

The Model 3100 has built-in data logging. Up to 50 points may be logged with a time stamp. Each point may be labeled with a six character location description.

Packaging

The analyzer is housed in a watertight handheld enclosure and is designed for harsh environments.

Batteries and Charging

The Model 3100 is powered by a three cell rechargeable NIMH battery pack. A battery charger is included with the Model 3100. The red LED on the charger's connector indicates the batteries are in quick charge mode when illuminated or trickle charge when not illuminated. Fully discharged batteries will take about four hours to charge. The Model 3100 may be connected to the charger for extended periods of time without damage.

A fully charged battery can provide approximately 10 to 12 hours of continuous use. A low battery message appears on the display when recharge is necessary.

Automatic Shutoff

If no keys are pressed, the Model 3100 will automatically shut off after 15 minutes.

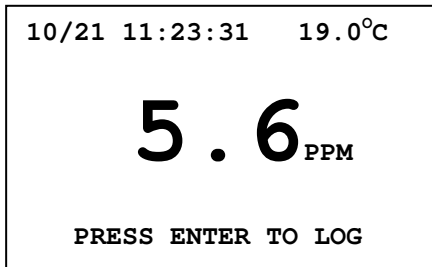
Display Backlighting

The Model 3100 has a backlit display, but this backlighting is the main power consumer of the analyzer. To conserve battery power, this backlight turns itself off after 2 minutes. It can easily be turned on again without disturbing the operating mode of the analyzer by pressing the ON key.

OPERATION

Run Mode

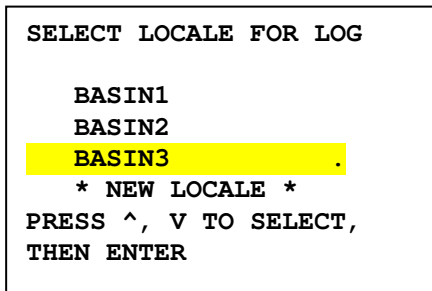
The RUN mode is the normal operating mode of the analyzer and is entered upon power-up. When the Run mode is entered, the analyzer will begin displaying the D.O. value. When running in measurement modes, the D.O. reading takes about 60 seconds to stabilize. The display is continuously updated with the current date, time, temperature and D.O. value. In the event of an error or alarm condition the display will indicate the problem in plain English text.



10/21 11:23:31 19.0°C
5.6 PPM
PRESS ENTER TO LOG

The analyzer and sensor have been fully calibrated at the factory and given a default span characteristics.

Once a D.O. reading is stable, the operator may log the current D.O. value. Pressing the ENTER key will display the Select Log Locale screen.



SELECT LOCALE FOR LOG
BASIN1
BASIN2
BASIN3
* NEW LOCALE *
PRESS ^, V TO SELECT,
THEN ENTER

A log locale may be selected by pressing the UP and DOWN keys until the desired locale is highlighted. Pressing the ENTER key will display a Log conformation screen.

```
LOG 5.6 TO BASIN3

PRESS ENTER TO LOG,
PRESS MENU TO CANCEL.
```

Pressing the ENTER key a second time will log the D.O. value and temperature to the selected locale along with a timestamp. Up to 50 D.O. values may be logged at any one time. If 50 values have been logged and a new value is desired to be logged, a Log Full message will be displayed. The operator will have the option of overwriting the oldest log entry or cancel the log operation.

If a new locale entry is desired, highlight the NEW LOCALE selection and press the ENTER key. The operator is prompted to enter a six character locale description. Up to 50 locales may be entered. To return to the normal Run screen, press the MENU key.

```
LOCALE ENTRY
BASIN4

ENTER A LABEL OF
UP TO 6 CHARACTERS
USING ^, V AND ENTER
```

Main Menu

The Main Menu is accessed by pressing the "MENU" key while in the RUN mode of operation. There are five options available from the main menu. Use the arrow keys to switch between RUN, VIEW LOG, PC EXTRACT, SETUP, & TEST and then press the "ENTER" key to select.

```
MAIN MENU
  RUN
VIEW LOG
PC EXTRACT
SETUP
TEST
PRESS ^, V TO SELECT,
THEN ENTER.
```

To return to the RUN MODE from the MAIN MENU, use the "ARROW" keys to move the cursor to the run option, then press the "ENTER" key.

View Log

This mode of operation allows the operator to view all logged D.O. values with locales and timestamps.

LOGGED DATA			
LOCALE	PPM	DAY	TIME
BASIN1	2.48	05	08:38
BASIN2	3.26	05	08:02
BASIN3	5.6	05	07:32
BASIN4	4.8	05	06:29

PRESS ^, V TO SELECT,
THEN ENTER TO REMOVE.

The operator may scroll through the logged values by using the UP and DOWN arrow keys. The logged value may be removed by first highlighting the value and then pressing the ENTER key. Pressing the ENTER key a second time will remove the selected entry or pressing the MENU key will cancel the remove.

PC Extract

When the Model 3100 is in the “PC Extract” mode, the logged data within the meter may be copied to a connected personal computer for the purposes of printing the data or saving it in a spreadsheet or word processor compatible format on the PC. The supplied download kit includes a communications cable, a USB-to-serial port adapter, and the “PortaLog” software application for extracting the data.

The PC to be used must be operating under the Windows XP, Vista, 7, or 8 operating systems to run the PortaLog software. Earlier versions of Windows are not compatible. InsiteIG freely distributes PortaLog, and it may be installed on multiple computers as needed. Insert the supplied USB “Manuals and Software” flash drive and navigate to the “InsiteIGPortaLogSetup.exe” file. This program will guide you through the installation of the PortaLog application to the PC, and create an icon and start menu program entry for PortaLog.

The PC must be connected to the portable meter through a standard serial (COM) port. Since many recently built computers and laptops do not include this type of port as a standard feature, a USB-to-Serial adapter has been supplied by InsiteIG with the portable download kit. If the computer to be used already has a working serial port (a COM port with a 9 pin “D” connector that matches our supplied cable), it is not necessary to use the adapter provided by InsiteIG, simply connect the portable meter to your existing port and start PortaLog. However, if you need to use the adapter, Windows will need to install 2 hardware drivers for the adapter when it is plugged into a USB port for the first time. On some newer versions of Windows 7 and 8, these drivers will already be resident on your computer, and Windows will complete their installation automatically. On most computers, however, plugging the adapter into the port for the first time will cause Windows to start a hardware installation routine. One of the first Windows that will appear as part of this routine will ask if you would like Windows to check for drivers using Microsoft Windows Update over the internet. If you have an internet connection, choose this option and the correct and most up-to-date drivers will be installed automatically. If the computer does not have an internet connection, you should direct Windows to look for drivers on the supplied USB flash drive. The drivers are in a subdirectory on the flash drive called “data\software\USB_to_Serial_Port_Drivers”.

PortaLog may be started at any time by double-clicking its desktop icon or Start Menu entry under the InsiteIG folder. The application begins by checking the computer for the correct serial port hardware. If all is well, PortaLog will display a procedure for copying the data from the portable meter to the PC. Once the data is transferred, clicking the HELP menu item in PortaLog will display a Help window that explains options for printing, sorting, or saving the data in various formats.

Please Note: When logging data with the portable meter, do not use a Location Name that is completely blank. While data saved in this way may be viewed on the meter itself, those logs cannot be copied to the computer with PortaLog.

Setup Mode

This mode of operation allows the user to customize the unit to the specific operation and needs of the facility. There are a total of ten options that may be adjusted.

```
      SETUP
CALIBRATION
CLEAR ALL LOGS
REMOVE LOCALE
REMOVE ALL LOCALES

PRESS ^, V TO SELECT,
THEN ENTER.
```

Operation of the Setup MODE proceeds as follows:

First, after pressing the "MENU" key, use the "ARROW" keys to move the cursor to the setup option, then press the "ENTER" key. A menu with four of the ten options will be displayed. The options are;

```
CALIBRATION
CLEAR ALL LOGS
REMOVE LOCALE
REMOVE ALL LOCALES
SET LOG MODE
TEMP. UNITS
SET SALINITY
SET DISPLAY MODE
SET POWER FILTER
SET CLOCK
```

Second, use the "ARROW" keys to move the cursor to the desired setup option, then press the "ENTER" key. When the user is finished making the adjustment, press the "MENU" key to return to the previous page.

Finally, to return to the RUN MODE, press the "MENU" key until the MAIN MENU is displayed. Use the "ARROW" keys to move the cursor to the run option, then press the "ENTER" key.

Calibration

This option will display the sensor calibration option menu.

Clear All Logs

This option will erase all logged data entries (but not the locale names).

Remove Locale

This option will remove a single locale and its data. After choosing this option, the list of locale names is presented. The operator may then choose the locale to remove.

Remove All Locales

This option will erase all locales and data from the log memory.

Set LOG Mode

This option is used to select either manual or automatic log mode (see autolog mode section).

Temp. Units

This option will toggle between Celsius and Fahrenheit by pressing the arrow keys.

Set Salinity

This option allows for the correction of salts in the water. The salinity correction range is 0 to 45 ppt with a resolution of 1 ppt.

Set Display Mode

This option allows the dissolved oxygen to be displayed in PPM, MG/L, or %SAT.

Set Power Filter

This option allows the power line noise rejection filter to be set to either 50 Hz or 60 Hz.

Set Clock

This option is used to set the real time clock used for time stamping of the logged data.

Sensor Calibration

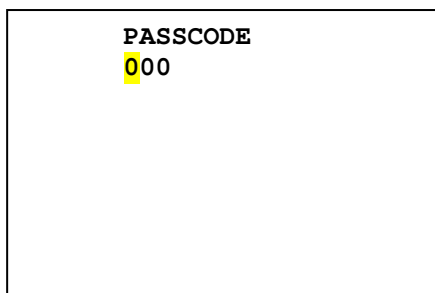
The three setup options for sensor calibration are Sensor Calibration to a Reference, "SENSOR REF CAL", Sensor Slope Adjustment, "SENSOR SLOPE", and Factory Default, "DEFAULT SPAN".

Note: The Model 30 sensor undergoes a thorough and accurate test and calibration procedure before shipment from the factory. Calibration of the system at startup is not necessary and is not recommended.

The Model 30 sensor has been designed to require very infrequent calibration. Unlike polarographic systems, light fouling of the sensing element should not affect the accuracy of the reading, but should only slow the response time of the system. (However, heavy biological fouling that prevents reasonable sensor contact with the water will cause erroneous readings.) With the sensor kept reasonably clean, the calibration should hold for 6 months to 2 years, depending upon conditions.

The Model 3100 analyzer allows the user to select from 2 different calibration procedures. The procedure can be selected by choosing CALIBRATION from the SETUP menu.

All calibration options are passcode protected which will disallow unauthorized access. Note: Setting the passcode to 000 will disable the passcode function and skip the passcode screen.



Use the "ARROW" keys to enter the first digit of the passcode, then press the "ENTER" key to proceed to the next digit. Repeat until all three passcode digits are entered.

Operation of the Calibration MODE proceeds as follows:

```
CALIBRATION
DEFAULT SPAN
SENSOR REF CAL
SENSOR SLOPE
PASSCODE

PRESS ^, V TO SELECT,
THEN ENTER.
```

Use the “ARROW” keys to move the cursor to the calibration option, and then press the “ENTER” key. A menu with the four options will be displayed. The options are;

```
DEFAULT SPAN
SENSOR REF CAL
SENSOR SLOPE
PASSCODE
```

To return to the RUN MODE, press the “MENU” key until the MAIN MENU is displayed. Use the “ARROW” keys to move the cursor to the run option, and then press the “ENTER” key.

Fact. Default

The Factory Default parameter allows the user to restore the sensor characteristic values of zero and slope to the original factory settings.

Sensor Calibration to a Reference

Calibration to a known reference is the easiest, simplest, and also the preferred method of calibration when calibration is required. Calibration option “SENSOR REF CAL” allows the operator to make adjustments to the D.O. reading to agree with any other source of D.O. information. THIS CALIBRATION PROCEDURE MUST ONLY BE USED ON A CLEAN SENSOR. IF THE SENSOR IS READING ERRONEOUSLY DUE TO HEAVY BIOLOGICAL FOULING, USE OF THIS CALIBRATION METHOD WILL RESULT IN UNRELIABLE RESULTS. The sensor must be stable in the water to be used as a reference before beginning this procedure. From the SETUP menu, choose the “SENSOR REF CAL” option, and press ENTER. The analyzer will now read the sensor for the period of time indicated by the dampening, and display the result as D.O. in PPM. If this result matches the reference, simply press ENTER to exit. Otherwise, use the arrow keys to adjust the reading to match the reference value, and then press ENTER to store this new value. This procedure is primarily an adjustment to the offset value of the sensor, but an adjustment in slope will also be made when this procedure is performed.

Sensor Slope Adjustment (NOT RECOMMENDED)

If performed correctly, the previously described “Sensor Calibration to a Reference” should be all that is required by the user. “Sensor slope adjustment” should only be attempted upon recommendation from the factory.

Sensor calibration option “Sensor Slope” allows the user to adjust the span of the sensor, but this procedure must only be used immediately AFTER the sensor has been “zeroed” using “SENSOR REF CAL” option with the sensor submerged in a zero oxygen solution. This zero solution may be prepared by adding

two tablespoons of sodium sulfite salt to a gallon of tap water in an open container (bucket). The sodium sulfite salt will remove all oxygen from the water as it dissolves. Stir the water for about one minute to dissolve the salt. Note that some of the salt may not dissolve, but will sink to the bottom of the container. This is normal and of no concern. Submerge the Model 30 sensor in this water and allow it to rest for at least 30 minutes. For best accuracy, the sensor should be resting face down in the bottom of the container. (The solution stratifies over time at rest, and the dissolved oxygen content will be closest to zero at the bottom of the container, while slightly above zero nearer the surface.) Also make sure that no air bubbles are trapped on the face of the sensing element during the soak. Once the sensor is stable, use the "Sensor Calibration to a Reference" procedure described previously to set the D.O. reading to 0.00 PPM. **YOU MUST ACTUALLY PERFORM THE CAL TO REFERENCE PROCEDURE IN ZERO WATER EVEN IF THE SENSOR READS ZERO FROM THE RUN MODE.**

[NOTE: If the user's application requires a zero that is absolutely accurate (frequent readings below 0.5 PPM), then the zero solution needed for this procedure should be mixed 12 to 24 hours before use, and distilled water should be used in place of tap water. Freshly mixed solution actually has a value of about 0.10 PPM, but a calm solution at rest for 12 hours will drop down very close to absolute zero.]

Once a sensor has been properly zeroed, a slope adjustment may be made. Place the sensor in a solution of known D.O. concentration, and allow about 15 minutes to fully stabilize. Choose the sensor slope adjustment calibration procedure as option "SENSOR SLOPE" from the SETUP menu, and press ENTER. Press ENTER again to bypass the "!Warning! Proper Zero Required" message. The analyzer will now read the sensor for the period of time indicated by the dampening, and display the result as D.O. in PPM. If this result matches the reference, simply press ENTER to exit. Otherwise, use the arrow keys to adjust the reading to match the reference value, and then press ENTER to store this new value.

Passcode

The passcode is a three digit security number which will disallow unauthorized access to the setup mode. To change the passcode, press UP or DOWN until the desired code is displayed, and then press ENTER. The value of "000" will disable the passcode function.

Autolog Mode

The Autolog Mode will cause the Model 3100 to automatically log up to 50 entries at the selected interval. After 50 entries are logged the Model 3100 will turn off.

Note: The Model 3100 should be fully charged prior to the start of an auto log session, because it must remain on for the entire auto log session.

To select the AUTOLOG mode select Log Mode from the Setup menu, then select auto.

```
      SETUP
REMOVE ALL LOCALES
SET SALINITY
SET DISPLAY MODE
SET LOG MODE

PRESS ^, V TO SELECT,
THEN ENTER.
```

```
      LOG MODE
      AUTO

PRESS ^, V TO CHANGE,
THEN ENTER.
```

Note: When auto log mode is selected, all previous logged entries will be erased.

The Model 3100 will prompt for the log interval and then the locale.

```
      LOG MODE
LOG INTERVAL  5  MIN

PRESS ^, V TO CHANGE,
THEN ENTER.
```

After the log interval and the locale have been selected, the Model 3100 will return to the main menu.

```
MAIN MENU
AUTOLOG START
VIEW LOG
PC EXTRACT
SETUP
TEST
PRESS ^, V TO SELECT,
THEN ENTER.
PRESS ^ V TO CHANGE
```

The RUN selection is replaced by the AUTOLOG START selection. When AUTOLOG START is selected, the Model 3100 will log the current D.O. and temperature readings and 49 additional readings at the selected interval. After 50 entries have been logged, the Model 3100 will return to the manual log mode and turn off.

```
04/09 09:34:14
AUTOLOG LOC. BASIN1

LOG 1 OF 50
PPM TEMP DAY TIME
3.56 19.7 09 09:34

NEXT LOG 09:39
```

Pressing the MENU while in the autolog mode, will display the main menu and the options available. Logging is suspended until the AUTOLOG RESUME is selected.

Test Mode

This mode of operation allows the user to perform basic test functions to aid in troubleshooting. There are four tests which may be performed.

Operation of the Test MODE proceeds as follows. From the Main Menu use the arrow keys to move the cursor to the TEST option, then press the "ENTER" key. Use the arrow keys to select the desired test, and then press the "ENTER" key.

View Sensor Data

This test is intended primarily to aid the Insite IG technical support engineers in troubleshooting. This test displays the values for "MIAN", "REF", "TEMP", and "TAU". Press the MENU key to exit.

View Sensor Char.

This test displays the sensor characteristics. This is primarily to aid the Insite IG technical support engineers in troubleshooting. Press the MENU key to exit.

View Sensor Cal.

This test displays the sensor calibration factors, "R" & "G". This is primarily to aid the Insite IG technical support engineers in troubleshooting. Press the MENU key to exit.

Software Version

Software Version displays the current version of software in the analyzer. To exit, press the "MENU" key.

ERROR MESSAGES

During operation, the Model 3100 analyzer may determine that an error condition exists. If this happens, the display will contain an error message. The 3 possible error messages are as follows:

****Sensor not Responding****

This error message indicates that the analyzer is not receiving any data from the sensor. This would most likely be caused by a faulty sensor cable or possibly a faulty sensor or analyzer electronics.

****Sensor Error****

The analyzer is indicating that the sensor is unable to report valid data. Call the factory for further information.

MAINTENANCE

The analyzer does not require any periodic maintenance. The sensor must be kept clean for accurate readings.

GUARANTEE AND REPAIR POLICY

Model 3100 Dissolved Oxygen Analyzer & Model 30 Dissolved Oxygen sensors and related items are guaranteed for two years against defective materials and workmanship. They will be replaced or repaired free of charge during the guarantee period. Call the factory at 985-639-0006 for a return authorization number for traceability. Mark the package to the attention of the R/A number and address it to the factory at 80 Whisperwood Blvd., Suite 107, Slidell, LA 70458. Freight to the factory is to be paid by the customer and items should be insured in case of damage or loss of shipment.

All shipments are insured. If you receive a damaged unit, please notify InsiteIG Instrument immediately at 985-639-0006.

Repairs to the equipment not covered by the guarantee will be billed per standard service charges.