



Dissolved Oxygen Assistant

For HOBOWare® Pro Software

User's Guide

License Agreement

This software is furnished in accordance with a separate license agreement included with the software, and subject to any restrictions set forth therein. For more information about Onset's licensing terms and policies, contact Onset Customer Service at 1-800-LOGGERS, or visit <http://www.onsetcomp.com/legal>.

About Data Assistants

Data assistants are plug-in utilities for HOBOWare Pro. They let you create new data series by combining data recorded by the logger with additional data that you enter before you display the plot.

If your logger or datafile contains data that supports a data assistant, you will see a Data Assistants section at the bottom of the Plot Setup dialog. Select an assistant and click **Process** to continue. Some Data Assistants are also available when launching the logger.

For information about installing and managing data assistants, refer to the following page at the Onset web site:

<http://www.onsetcomp.com/dataAssistants>

© 2012 Onset Computer Corporation. All rights reserved.

Doc #: 15604-A

Onset, HOBO, and HOBOWare Pro are trademarks or registered trademarks of Onset Computer Corporation. RDO is a registered trademark of In-Situ® Inc., Fort Collins, CO USA. All other trademarks are the property of their respective companies.

Dissolved Oxygen Assistant

The Dissolved Oxygen Data Assistant corrects for measurement drift from fouling and provides salinity-adjusted DO concentration as well as percent saturation data.

1. Read out a U26 series logger or open a datafile from a U26 logger.
2. From the Plot Setup window, select the Dissolved Oxygen Assistant and click the Process button.
3. With the Dissolved Oxygen Data Assistant, you can adjust the data for salinity (step 4), enter barometric pressure information for percent saturation calculation (step 5), select the resultant series you wish to generate (step 6), and enter field calibration data (step 7).

The screenshot shows the 'Dissolved Oxygen Data Assistant' dialog box with the following settings:

- Adjust for salinity:** Checked. Radio buttons for 'Salinity' (selected) and 'Specific conductance'. 'Salinity value' is 0.0000 ppt. 'Salinity datafile' is empty.
- Use barometric pressure (for percent saturation):** Checked. 'Barometric data value' is 760.00 mm Hg. 'Barometric Datafile' is empty. 'For sea level barometric pressures, enter elevation' is unchecked. 'Elevation' is 0.00 meters.
- Resultant Series Information:** 'DO Adj. Conc.' and 'DO Percent Sat.' are checked. Series names are 'DO Adj Conc' and 'DO Percent Sat'. 'User Notes' field is empty.
- Perform field calibration:** Checked. 'Using Dissolved Oxygen Meter or Dissolved Oxygen Titration' is selected. 'Using 100% Water-Saturated Air' is unselected.
 - Starting calibration point:** Checked. Date/Time: 03/01/12 01:55:22 PM GMT-05:00 [8.16 mg/L, 23.70 °C]. Meter/Titration DO Measurement: 0.00 mg/L. Barometric pressure: from the left, 760.00 mm Hg.
 - Ending calibration point:** Checked. Date/Time: 03/12/12 04:15:22 PM GMT-05:00 [12.33 mg/L, 6.76 °C]. Meter/Titration DO Measurement: 0.00 mg/L. Barometric pressure: from the left, 760.00 mm Hg.
- Buttons:** 'Help', 'Cancel', and 'Create New Series'.

4. **Adjust for salinity.** If you deployed the logger in saltwater, you must adjust for salinity to get either a DO concentration or percent saturation. To do this, select the "Adjust for Salinity" checkbox (you will also need to select the checkboxes under Resultant Series Information for the series you would like). Select whether the series should be adjusted based on salinity or specific conductance.

- **If you chose salinity:** Select “Salinity value” if you have a specific value from a conductivity meter reading or other source; type the value in ppt as shown below. This works well if the salinity is constant during the deployment. If the salinity changes during the deployment, select “Salinity datafile” to use a data file from a U24 conductivity logger or a text file. Click the Choose button and select the file. (See the Important note for more details about using files.)

Adjust for salinity

Salinity Specific conductance

Salinity value 32.0000 ppt ▼

Salinity datafile

 Choose...

- **If you chose specific conductance:** Select “Sp. cond. Value” if you have a specific conductance value from a meter reading or other source; type the value in either $\mu\text{S}/\text{cm}$ or mS/cm as shown below. This works well if the specific conductance is constant during the deployment. If it is not constant, select “Specific conductance datafile” to use a data file from a U24 conductivity logger or a text file. Click the Choose button and select the file. (See the Important note for more details about using files.)

Adjust for salinity

Salinity Specific conductance

Sp. cond. value 40600.0 $\mu\text{S}/\text{cm}$ ▼

Specific conductance datafile

 Choose...

IMPORTANT: When using a file for salinity or specific conductance data, you can select either a .hobo file from a HOBO U24 Conductivity Logger or a .txt file from a U24 logger after it has been calibrated with the Conductivity Assistant. Using a U24 .hobo file is the easiest while a calibrated U24 text file provides the highest accuracy. Follow these steps to create a text file from a U24 Conductivity Logger in the proper format:

- Click Cancel to close the DO Assistant and Plot Setup windows if they are open.
 - From the File menu, select Preferences.
 - In the General Preferences, select Export Settings.
 - Click the “Use default BoxCar Pro export settings” button and click OK. This will ensure the text file you create is the proper format for the Dissolved Oxygen Assistant.
 - From the File menu, select Open Datafile and select the U24 .hobo file.
 - In the Plot Setup window, select the Conductivity Assistant and click Process.
 - In the Conductivity Assistant, create a calibrated specific conductance or salinity data series.
 - Back in the Plot Setup window, select the specific conductance or salinity series only. Click None under Select Internal Events to Plot so that no events are plotted.
 - Click the Plot button.
 - From the File menu, select Export Table Data. Choose “Export to single file” if prompted.
 - To use the calibrated conductivity file, open the DO file again. In the Plot Setup window, select the Dissolved Oxygen Assistant and click Process. Select the text file you just created in the previous step for the salinity or specific conductance datafile. This file will be used to generate the series adjusted for salinity.
5. **Use barometric pressure (for percent saturation).** Check the “Use barometric pressure (for percent saturation)” box if you want to generate a DO percent saturation series (you will also need to select the DO Percent Sat. checkbox under Resultant Series Information). For the best accuracy, use a data file from a HOBO Water Level logger deployed in the air or a nearby weather station. Select “Barometric Datafile”

and click the Choose button to select the .hobo or .txt file. **Important:** If you are using a .txt file from a non-HOBO device, it must follow specific requirements as described in Import Text File Requirements in the HOBOWare Help.

If you do not have a barometric pressure file, then select “Barometric data value” and type in the average barometric pressure during your deployment in one of the five available units.

If the barometric pressure readings are from barometric data that has been adjusted to sea level readings (such as those taken from a National Weather Service weather station), then you must also select the “For sea level barometric pressures, enter elevation” checkbox and type the elevation where the logger was deployed in either meters or feet. Absolute pressure values, such as those obtained from a HOBO Water Level logger, do not need to be adjusted for elevation.

The screenshot shows a dialog box titled "Use barometric pressure (for percent saturation)". It contains the following elements:

- A checked checkbox labeled "Use barometric pressure (for percent saturation)".
- Two radio buttons: "Barometric data value" (selected) and "Barometric Datafile".
- A text input field next to "Barometric data value" containing the number "760".
- A dropdown menu next to the input field showing "mm Hg".
- A "Choose..." button next to the "Barometric Datafile" radio button.
- An unchecked checkbox labeled "For sea level barometric pressures, enter elevation".
- A text input field next to the checkbox containing "0.0".
- A dropdown menu next to the input field showing "meters".

6. **Resultant Series Information.** Make sure the series you want to plot are selected in the Resultant Series Information pane. To generate a series for adjusted DO concentration, check the “DO Adj Conc.” box. To generate a series for percent saturation, check the “DO Percent Sat.” box. The default series names display automatically to the right of the selected series. Edit those series names as needed. You can also type up to 250 characters of optional user notes.

The screenshot shows a dialog box titled "Resultant Series Information". It contains the following elements:

- Two checked checkboxes: "DO Adj. Conc." and "DO Percent Sat.".
- Two text input fields for "Series Name": "DO Adj Conc" and "DO Percent Sat".
- A "User Notes" section with a text area containing the placeholder text "Enter user notes here".

7. **Perform Field Calibration.** Use field calibration to compensate for measurement drift due to fouling or if the logger was not lab calibrated. (Lab calibration typically remains accurate for the full 6-month life of the sensor cap if there is no fouling.) Check the “Perform field calibration” checkbox and select the type of field calibration: either “Using Dissolved Oxygen Meter or Dissolved Oxygen Titration” or “Using 100% Water-Saturated Air.”
 - **For calibration using a dissolved oxygen meter or titration:** Select the “Starting calibration point” checkbox and select the date/time of the calibration reading. View the logged data values shown in the drop-down box to be sure that the logger readings have stabilized. It is more important that you use a good stabilized logger reading than exactly matching the times. Type in the Meter/Titration DO Measurement in mg/L taken at that date/time. If you are using an ending calibration reading, select the “Ending calibration point” checkbox and select the date/time of that calibration reading. Make sure the logger reading you use for calibration is one from when the logger was in the water, keeping in mind that the logger time may be slightly different from the time used for your field readings. You can usually see the data points that were recorded when the logger was out of the water. Type in the Meter/Titration DO Measurement in mg/L for this ending calibration point.

Perform field calibration

Using Dissolved Oxygen Meter or Dissolved Oxygen Titration
 Using 100% Water-Saturated Air

Starting calibration point

03/01/12 01:56:02 PM GMT-05:00 [8.15 mg/L, 24.42 °C] ▼

Meter/Titration DO Measurement mg/L

Barometric pressure mm Hg ▼

Ending calibration point

03/12/12 04:11:02 PM GMT-05:00 [13.60 mg/L, 5.82 °C] ▼

Meter/Titration DO Measurement mg/L

Barometric pressure mm Hg ▼

Only report data between selected points

- Note:** If only an “Ending calibration point” is entered (“Starting calibration point” not checked), then the assistant will use the logger calibration for the starting calibration. This assumes you are starting with an accurately calibrated logger and saves you from having to do your own starting point calibration. However, if you select a “Starting calibration point” and no “Ending calibration point,” the series will be adjusted for the one calibration point. This may be accurate enough for applications where there is no significant fouling during the deployment time.
- **For calibration using 100% water-saturated air:** Select the “Starting calibration point” checkbox and select the date/time for the first calibration reading. View the values shown in the drop-down list to be sure the readings are stable at this calibration point (using a calibration point from when the logger is in air or has not reached temperature equilibrium will result in incorrect calibration). Select the source of the barometric pressure readings. From the Barometric Pressure drop-down list, select "from the left" to use the barometric pressure data file already entered in the assistant or select "entered here" to enter a specific barometric pressure value in one of five available units. If you are using an ending calibration reading, select the “Ending calibration point” checkbox and select the date/time of that calibration reading following the same guidelines as you did for the starting calibration point. For the ending point, enter the barometric pressure information (select “from the left” or “entered here” as described above).

Perform field calibration

Using Dissolved Oxygen Meter or Dissolved Oxygen Titration

Using 100% Water-Saturated Air
 Barometric pressure required for each calibration time.
 Uses elevation if entered at the left.

Starting 100% saturation measurement time

03/01/12 01:56:02 PM GMT-05:00 [8.15 mg/L, 24.42 °C]

Meter/Titration DO Measurement mg/L

Barometric pressure mm Hg

Ending 100% saturation measurement time

03/12/12 04:11:02 PM GMT-05:00 [13.60 mg/L, 5.82 °C]

Meter/Titration DO Measurement mg/L

Barometric pressure mm Hg

Only report data between selected points

Check the “Only report data between selected points” if you want the new series to only include data between the selected calibration points. Leave this option unchecked to include all data.

8. Click the Create New Series button when finished entering information in the data assistant.
9. Depending on which series you selected to add, the Plot Setup dialog lists two news series: DO Adj Conc and DO Percent Sat (or the names you entered for Series Names). The default units for the DO Adj Conc series are mg/L. You can change the units to ppm if desired.

Plot Setup

Description: 90000007

Select Series to Plot

All None

| Series | Measurement | Units | Label |
|---------------------------------------|----------------|-------|-------|
| <input checked="" type="checkbox"/> 1 | DO conc | mg/L | |
| <input checked="" type="checkbox"/> 2 | Temp | °F | |
| <input checked="" type="checkbox"/> 3 | DO Adj Conc | mg/L | |
| <input checked="" type="checkbox"/> 4 | DO Percent Sat | % | |
| <input checked="" type="checkbox"/> 5 | Batt | V | |

Select Internal Logger Events to Plot

All None

| Event | Event Type | Units |
|---------------------------------------|------------------|-------|
| <input checked="" type="checkbox"/> 1 | Coupler Detached | |
| <input checked="" type="checkbox"/> 2 | Coupler Attached | |
| <input checked="" type="checkbox"/> 3 | Host Connected | |
| <input checked="" type="checkbox"/> 4 | End Of File | |

Offset from GMT (+/- 13.0 hours, 0 = GMT)

Data Assistants

- Dissolved Oxygen Assistant
- Growing Degree Days Assistant

Buttons: Process..., What's This?, Manage..., Load..., Help, Cancel, Plot

10. Click the Plot button to plot the data. After the plot is displayed, you may apply minimum, maximum, and average filters to the scaled series as you would for any sensor data series in HOBOWare Pro.
11. Save this data and plot setup as a Project to preserve the new series you created for future use.

Field Values

These are the minimum and maximum values allowable in the fields in this assistant.

| Measurement, Units | Minimum | Maximum |
|---|-----------|----------|
| pressure, mm Hg | 380.00 | 836.00 |
| pressure, in Hg | 14.9700 | 32.9100 |
| pressure, millibars | 507.0 | 1,114.0 |
| pressure, kPa | 51.000 | 112.000 |
| pressure, Pa | 51,000 | 112,000 |
| pressure, psi | 7.3480 | 16.1600 |
| elevation, m | -304.80 2 | 2,438.40 |
| elevation, ft | -1000.00 | 8,000.00 |
| salinity, ppt | 0.0000 | 42.0000 |
| sp. cond., $\mu\text{s}/\text{cm}$ | 0.0 | 65,000.0 |
| sp. cond., ms/cm | 0.0000 | 65.0000 |
| meter/titration DO conc, mg/L | 0.00 | 30.00 |