INSTRUCTION MANUAL

AquiStar® GDL

Dissolved Oxygen Datalogger

AquiStar™
Data Collection Systems

INW™

True data, measure by measure

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Introduction

What is a GDL?

INW's AquiStar® GDL is a datalogger to which various sensors can be attached and then read from INW's Aqua4Plus control software. The GDL can read the sensors in real time or record sessions of data for later upload. This industry standard digital RS485 interface device records thousands of records, operates on low power, and features easy-to-use software with powerful features.

The GDL Dissolved Oxygen version connects to our Modbus dissolved oxygen sensor and returns a dissolved oxygen reading in ppm and a temperature reading in either degreees Celsius, Fahrenheit, or Kelvin.

The GDL is powered by either an internal 12 VDC supply (eight AA batteries) or an external 12 VDC supply. This supply also powers the dissolved oxygen sensor - supplying power to it only as needed to conserve power. The unit is programmed using a laptop or desktop Windows® based computer via its RS485/RS232 connector and easy to use Aqua4Plus software. Once programmed the unit will measure and collect data on a variety of time intervals.

Initial Inspection and Handling

Upon receipt of your datalogger, inspect the shipping package for damage. If any damage is apparent, note the signs of damage on the appropriate shipping form. After opening the carton, look for concealed damage. If concealed damage is found, immediately file a claim with the carrier.

Do's and Don'ts

Do handle the device with care.

Don't install the device such that the box or any of its connectors are submerged.

Don't support the device with the connector or with the connectors of an attached cable.

Don't bang or drop the device on hard objects.

GDL Connectors

This GDL comes with two connectors - one for connecting the DO sensor and one communication connector for connecting to the computer.

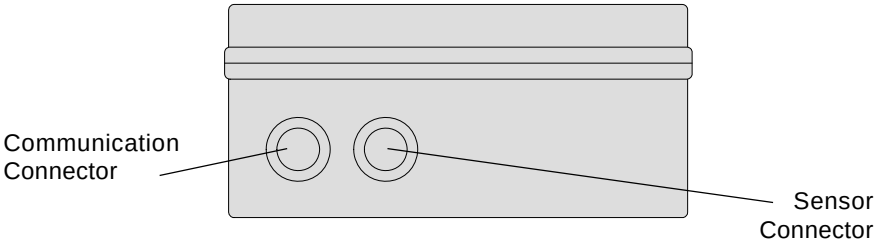


Figure 1: Connectors

Connecting Your DO Sensor to the GDL

Connect the sensor to the female 5 pin connector.

The connector is wired as follows:

Connector Pin	Sensor wire Color Code	Function
1	Red	Power
2	Green	D-
3	White	D+
4	n/c	
5	Black & Shield	Grd

Connecting GDL to Computer

Connect the GDL to your computer's serial port, as shown below. (For USB connections, see Appendix A.)

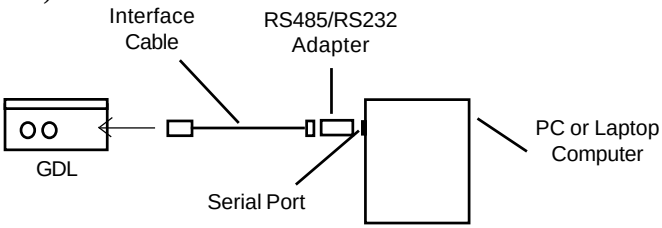


Figure 2: Connecting to computer

Aqua4Plus Software

The GDL comes with the Aqua4Plus host software that is installed on your PC or laptop. This software is used to program the datalogger, to retrieve data from the logger, to view collected data, and to export data to external files for use with spreadsheets or databases. Refer to the Aqua4Plus software manual for details on installing and using Aqua4Plus.

Warm Up Time

The DO sensor requires a warm-up time of five seconds before readings are stable. The GDL board has a programmable field for warm-up time.

Set this warm up time by clicking on Warm Up Time... on the Configure menu. Settings are in milli-seconds so set to 5000 mS.

Output

The dissolved oxygen channel returns readings in ppm. All readings should be positive. Readings below zero indicate an error code. If you get a reading of -90, double check your connection to the sensor. This error indicates that the GDL cannot read the sensor. If you get any other negative readings, contact INW technical support.

The temperature channel returns readings in degrees Celsius, Fahrenheit, or Kelvin. Set your desired units from the Display Units selection on the Options menu.

Calibration

The dissolved oxygen sensor is calibrated at the factory and should rarely need recalibration. If you want to make slight adjustments to the calibration on either the dissolved oxygen channel or the temperature channel, do so from the Field Calibration option on the Configure Menu. (Note that these adjustments are saved on the GDL unit, NOT on the sensor itself. If you remove the sensor and replace it with a different sensor, you should re-do the field calibration or return them to the default values of m=1 and b=0.)

If you want to do a field calibration, follow the instructions below. You can select to do either a one- or a two-point calibration.

Dissolved Oxygen

One-Point Calibration:

--Computing Calibration Value--

- Place sensor in water. Allow time for sensor to reach equilibrium.
- Using an accurate alternative measuring device, measure the dissolved oxygen content of the water.
- In the ***Ref deg*** box for the first point, enter this value.
- Click first ***Measure*** button.
- When readings have stabilized to your satisfaction, click the ***OK*** button in the pop-up box.

--Applying Calibration Value--

- Click the ***Apply*** button to apply calibration value.
- The computed b value will be transferred to the calibration field.
- Click ***OK*** to save the value to the sensor.

Two-Point Calibration:

--First Calibration Point--

- Place sensor in water with first concentration. Allow time for sensor to reach equilibrium.
- Using an accurate alternate measuring device, measure the dissolved oxygen content of the water.
- In the ***Ref deg*** box for the first point, enter this value.
- Click first ***Measure*** button.
- When readings have stabilized to your satisfaction, click the ***OK*** button in the pop-up box.

--Second Calibration Point--

- Place sensor in water with second concentration. Allow time for sensor to reach equilibrium.
- Using an accurate alternate measuring device, measure the dissolved oxygen content of the water.
- In the ***Ref deg*** box for the second point, enter this value.
- Click second ***Measure*** button.
- When readings have stabilized to your satisfaction, click the ***OK*** button in the pop-up box.

--Applying Calibration Values--

- Click the ***Apply*** button to apply calibration values.
- The computed m and b values will be transferred to the calibration fields.
- Click ***OK*** to save the values to the sensor.

Temperature

One-Point Calibration:

--Computing Calibration Value--

- Place sensor in water. Allow time for sensor to reach thermal equilibrium.
- Using an accurate alternate measuring device, measure the temperature of the water.
- In the ***Ref deg*** box for the first point, enter this temperature.
- Click first ***Measure*** button.
- When readings have stabilized to your satisfaction, click the ***OK*** button in the pop-up box.

--Applying Calibration Value--

- Click the ***Apply*** button to apply calibration value.
- The computed b value will be transferred to the calibration field.
- Click ***OK*** to save the value to the sensor.

Two-Point Calibration:

--First Calibration Point--

- Place sensor in water at first temperature. Allow time for sensor to reach thermal equilibrium.
- Using an accurate alternate measuring device, measure the temperature of the water.
- In the ***Ref deg*** box for the first point, enter this temperature.
- Click first ***Measure*** button.
- When readings have stabilized to your satisfaction, click the ***OK*** button in the pop-up box.

--Second Calibration Point--

- Place sensor in water at second temperature. Allow time for sensor to reach thermal equilibrium.
- Using an accurate alternate measuring device, measure the temperature of the water.
- In the ***Ref deg*** box for the second point, enter this temperature.
- Click second ***Measure*** button.
- When readings have stabilized to your satisfaction, click the ***OK*** button in the pop-up box.

--Applying Calibration Values--

- Click the ***Apply*** button to apply calibration values.
- The computed m and b values will be transferred to the calibration fields.
- Click ***OK*** to save the values to the sensor.

Changing Batteries

Because changing the batteries involves opening the weather-tight seal, **this must be done in a clean, dry environment to avoid contamination or moisture damage to the circuitry.**

The GDL runs on eight AA alkaline batteries.

To replace the batteries, remove the four corner screws and lift off the lid. Gently lift out the battery pack. Replace the batteries, and then place the lid on the box, tightening the screws securely. **NOTE: The box is directionally keyed. Failure to replace the lid correctly will prevent a tight seal and will result in water leakage.**

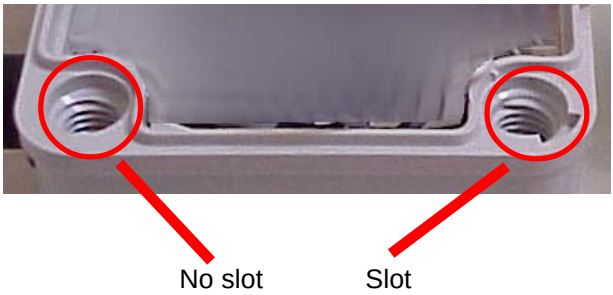


Figure 3: Note keyed slot in box before replacing lid.

Appendix A: Using USB to Serial Cables

The standard communication cable/RS485-232 adapter that comes with the GDL plugs into a 9-pin serial port on the PC or laptop. Many new computers, especially laptops, do not come with 9-pin serial ports. If you have one of these computers, or if all of your serial ports are in use, you can connect to a GDL using a USB to Serial cable, as shown in figure 4.

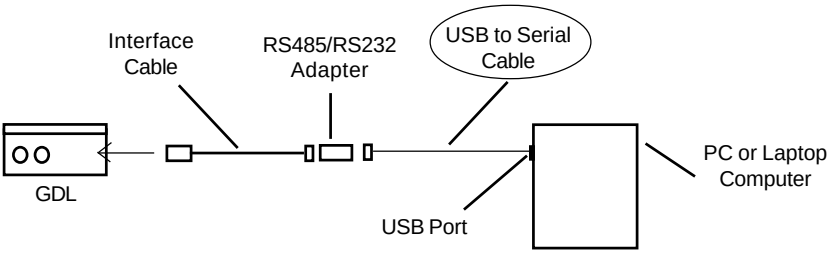
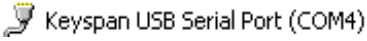


Figure 4: Connection using a USB to Serial Cable

USB-to-Serial cables are readily available from many electronics and computer stores, as well as numerous sites on the Internet. INW has tested and recommends the Keyspan USA-19HS. It is available from INW as well as from many sites on the Internet. Install as follows:

- Plug into USB port.
- Install the drivers provided with the particular unit.
- Determine the port number to which the adapter is assigned.
  - Right-click on My Computer.
  - From the popup menu, select Manage to open the Computer Management window.
  - On left panel, click on Device Manager.
  - On right panel, double-click on Ports.
  - A list of active COM ports will be displayed. Note the COM number assigned to the adapter you just installed.

    For example: 

  - Close Manager.
- Connect to the GDL (figure 4 above).
- On the Aqua4Plus software, select the COM port noted above. (If you do not see your new COM port in the drop-down box, open the Communications dialog box from the Options menu. Increase the Highest COM port number, up to a maximum of 15.)

Reordering Information

For sales & service offices, please contact:

Instrumentation Northwest, Inc.
www.inwusa.com
800-776-9355

LIMITED WARRANTY/DISCLAIMER - AquiStar® GDL/DO DATALOGGER

A. Seller warrants that products manufactured by Seller when properly installed, used, and maintained, shall be free from defects in material and workmanship. Seller's obligation under this warranty shall be limited to replacing or repairing the part or parts or, at Seller's option, the products which prove defective in material or workmanship within ONE (1) year from the date of delivery, provided that Buyer gives Seller prompt notice of any defect or failure and satisfactory proof thereof. Any defective part or parts must be returned to Seller's factory or to an authorized service center for inspection. Buyer will prepay all freight charges to return any products to Seller's factory, or any other repair facility designated by Seller. Seller will deliver replacements for defective products to Buyer (ground freight prepaid) to the destination provided in the original order. Products returned to Seller for which Seller provides replacement under this warranty shall become the property of Seller.

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