



**Instrumentation  
Northwest, Inc.**

Protecting our water resources since 1982

# **AquiStar<sup>®</sup> GDL Datalogger**

**With Two 4-20 mA Channels**

**INSTRUCTION  
MANUAL**

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## **Introduction**

### **What is a GDL?**

INW's AquiStar® GDL is a datalogger to which analog sensors can be attached and then read from INW's Aqua4Plus control software. It takes the analog signals and converts them into digital signals. The GDL board 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.

This particular unit is a GDL with two 4-20 mA channels. Output can be displayed in mA, microAmps, or user-defined units.

The GDL is powered with eight AA batteries. 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.

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### **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.

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### **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.

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## Getting Started

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### GDL Connectors

This GDL comes with three connectors - two M6 connectors for connecting 4-20 mA devices and one communication connector for connecting to the computer.

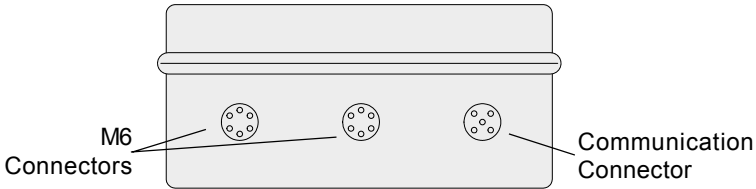


Figure 1: Connectors

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### Connecting Your 4-20 mA Devices to the GDL

Connect your 4-20 mA devices to the M6 connectors.

Pin B	Measurement
Pin D	Signal return
Pin F	Shield

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### Connecting GDL to Computer

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

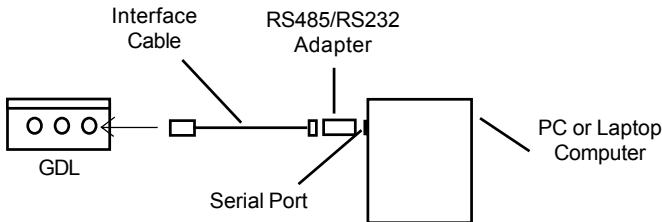


Figure 2: Connecting to computer

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## 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.

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### Warm Up Time

Many analog sensors require a warm-up time before readings are stable. The GDL board has a programmable field for warm-up time. (Note: the GDL reads all channels each time it takes a reading. Therefore, this warm-up time should be set to the longest warm-up time needed by the particular sensors you have connected, even though some may require a much shorter warm up time.)

Set this warm up time by clicking on Warm Up Time... on the Configure menu.

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### User Defined Units

In addition to normal unit selections, the 4-20 mA channels have a User Defined option. For instance, normally a 4-20 mA channel would have mA and microAmps as units options. If the user has a pressure sensor connected to a 4-20 mA channel, output may be desired in psi. For that there is a User Defined Units option.

#### Configure User Defined Units as follows:

1. Connect your GDL box to the computer and start Aqua4Plus.
2. Scan for sensors and select the GDL. (Refer to the Aqua4Plus software manual for details on using Aqua4Plus.)
3. In the Display Units box (under the Options menu), there are three entries for 4-20 mA channels – mA, uA, and User Defined. Select User Defined.

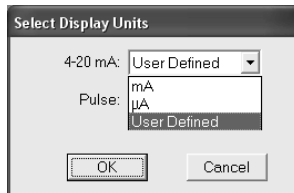


Figure 3: Selecting User Defined Units

4. You can only set field calibration when there are no sessions on the GDL. Be sure to upload any data on the sensor and erase all sessions, before continuing.
5. From the Configure window, select Field Calibration. (Refer to figure 4 for an illustration of Field Calibration window.)
6. In the left panel, highlight the channel you want to configure. Each channel can have its own user defined units. For example, if you have the first channel connected to a pressure sensor, you might want those units to be psi. If you have the second channel connected to a temperature sensor, you might want those units in degrees Celcius.
7. Define your own user units in the Field Calibration window as follows.
  - User Units: Enter a name for your units in the User Units box. For example, you might enter *psi*.
  - Scale: Compute the scale value as follows:
    - $(Total\ range\ of\ measurement\ in\ your\ units) / 16 / 1000$
    - For example: if you want to measure 0 – 15 psi:  
 $15 / 16 / 1000 = .0009375$
    - Enter this value in the box labeled Scale.
  - Offset: Compute the offset value as follows:
    - $scale * 4000 * (-1)$
    - Using our 0 – 5 psi example above, this would be  
 $.0009375 * 4000 * (-1) = -3.75$
    - Enter this value in the Offset box.
  - Dec Places: Enter the number of decimal places you want displayed during readings.
  - Min and Max: Enter the minimum and maximum values for your new units. (These values will define the limits on data graph.)
  - Comment: If desired, enter a comment in this box.
8. Click OK to save to the sensor.

**Field Calibration and Settings**

**GDL: New GDL**

Channels

6: 4-20 mA  
7: 4-20 mA

Channel Label: 4-20 A

Cal Date: 30-Oct-08 09:55

m: 1.000000

b: 0.0000 psi

User Units: psi

Scale: 0.00093750000 psi/ $\mu$ A

Offset: -3.7500 psi

Dec Places: 3

Min: 0.000 psi

Max: 15.000 psi

Comment: Pressure sensor

Calculator

	First Point	Second Point	Cal Values
Ref psi:	<input type="text"/>	<input type="text"/>	m: <input type="text"/>
Measured:	<input type="text"/>	<input type="text"/>	b: <input type="text"/>
	<input type="button" value="Measure"/>	<input type="button" value="Measure"/>	<input type="button" value="Apply"/>

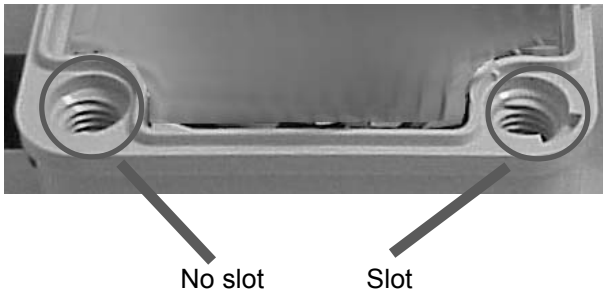
*Figure 4: Setting User Defined Units*

## 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.

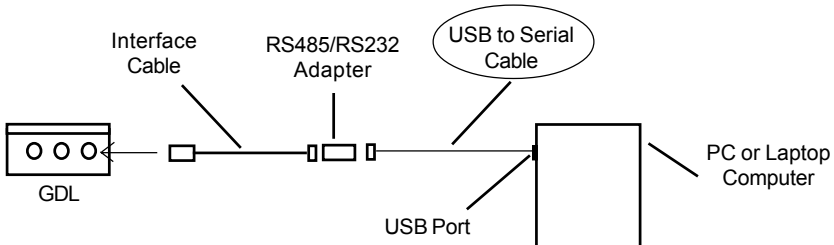
To replace the batteries, remove the four corner screws and lift off the lid. Gently lift out the battery pack. Replace the batteries, and then place the lid on the box, tightening the screws securely. **NOTE: The box is directionally keyed. Failure to replace the lid correctly will prevent a tight seal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



*Figure 5: 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 6.



*Figure 6: 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:  Keyspan USB Serial Port (COM4)
  - Close Manager.
- Connect to the GDL (figure 6 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](http://www.inwusa.com)

**800-776-9355**

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**LIMITED WARRANTY/DISCLAIMER - *AquiStar*<sup>®</sup> GDL  
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.

This limited warranty does not apply to lack of performance caused by abrasive materials, corrosion due to aggressive fluids, mishandling or misapplication. Seller's obligations under this warranty shall not apply to any product which (a) is normally consumed in operation, or (b) has a normal life inherently shorter than the warranty period stated herein.

In the event that equipment is altered or repaired by the Buyer without prior written approval by the Seller, all warranties are void. Equipment and accessories not manufactured by the Seller are warranted only to the extent of and by the original manufacturer's warranty.

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**Notes:**

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**Notes:**



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