

# FlowInspector™ Version 2

## Software Guide for the DL76 Data Logger and Logging Meters



FLOWINSPECTOR™ V.2 SOFTWARE GUIDE



**SeaMetrics**

The Leader in Flow Meter Value

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TABLE OF CONTENTS

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Install FlowInspector .....Page 1

    Hardware/Software Requirements

    Installation Instructions

Set Up Your Logger .....Page 2

    First Time Logger Setup

    Initialize Logger

Download Data From the Logger.....Page 5

Customize Display Variables .....Page 6

    Selecting Units

    Selecting Time Period

    Averaging Filter

View and Print Data .....Page 9

Manage Files .....Page 10

    Selecting Files

    Naming Files

    Appending Files

Export and Analyze Data .....Page 11



## INSTALL FLOWINSPECTOR

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FlowInspector software is designed as part of the SeaMetrics DataLogger systems that include the DL75 and DL76 standalone DataLoggers as well as Logging Meters. FlowInspector is used to set up the Logger, to download and manage data files, and to analyze and export data.

### HARDWARE/SOFTWARE REQUIREMENTS

Use of FlowInspector Version 2 requires the following hardware/software:

- SeaMetrics DL75, DL76 DataLogger or Logging Meter
- SeaMetrics DC3 data cable
- PC computer with Windows 98, NT, 2000, XP, or Vista
- CD-ROM drive
- 0.5 MB disk space
- Serial connection port or USB-to-Serial adapter\*

\*Four adapters have been tested for compatibility:

- IO Gear UC-232A
- Keyspan USA-19HS
- Airlink101 AC-USBS
- Goldx GXMU-1200

### INSTALLATION INSTRUCTIONS

1. Close all other programs running on your computer.
2. Insert the FlowInspector CD in your CD-ROM drive. The program should begin auto-loading within about 30 seconds. (If FlowInspector does not automatically start loading, open the CD drive on your desktop and click on setup.exe.)
3. When the “Welcome...Wizard” screen opens, click Next.
- 4a. If this is your first installation of FlowInspector, read the FlowInspector License Agreement, select “I accept” and click Next.
- 4b. If you have an earlier copy of FlowInspector on your computer, follow instructions to Uninstall it. Begin again at Step 1 to install the new copy.
5. Input User Name and Organization, select desired access level, and click Next.
6. At the “Ready to Install” screen, review your selections, use Back to make corrections as necessary. Make note of the target location of your FI Program. Click Install.
7. At “Completed” screen, click Finish.

After installation is complete, FlowInspector will be stored in the FlowInspector folder under the All Programs list in your computer's Start menu.

## SET UP YOUR LOGGER


### FIRST-TIME LOGGER SET-UP

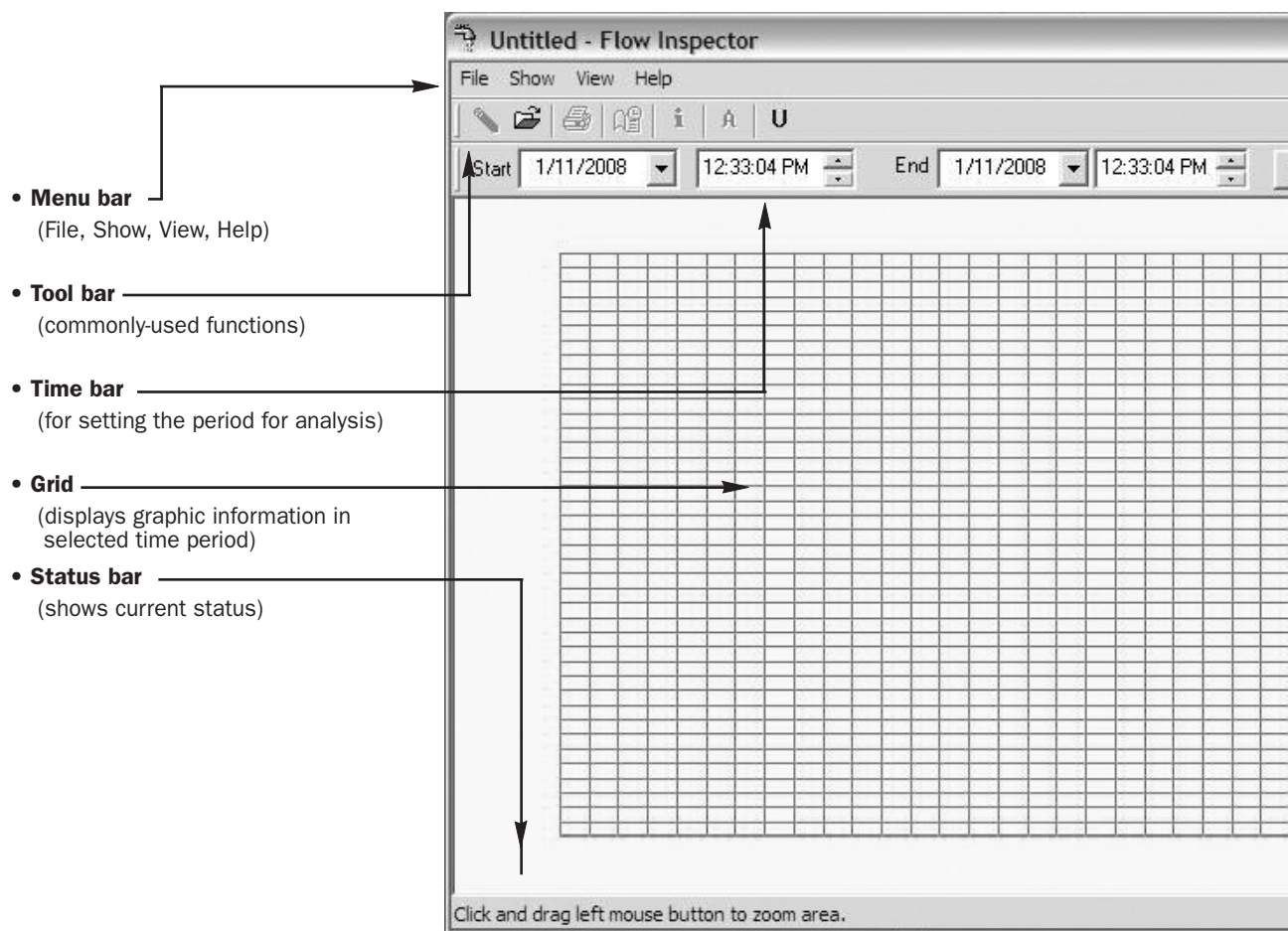
The following instructions apply to **first-time set-up only**. Re-setting procedures are the same **except that** you must first download any data you wish to save.



**CAUTION. To prevent data loss**, if you are re-setting a Logger that has been previously used, follow the procedure for first time set-up EXCEPT that you must first download any data you wish to save. Any prior data will be erased during set-up.

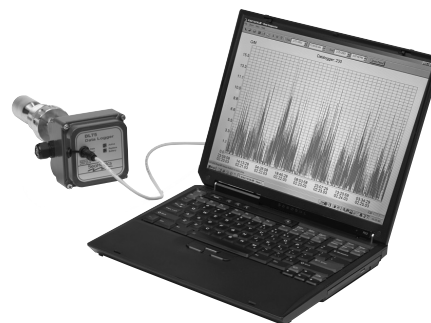
#### Open FlowInspector

To open FlowInspector, double click on the  icon on your computer desktop or in the Programs in your Start menu. The FlowInspector Main Screen will open.



#### Connect Hardware

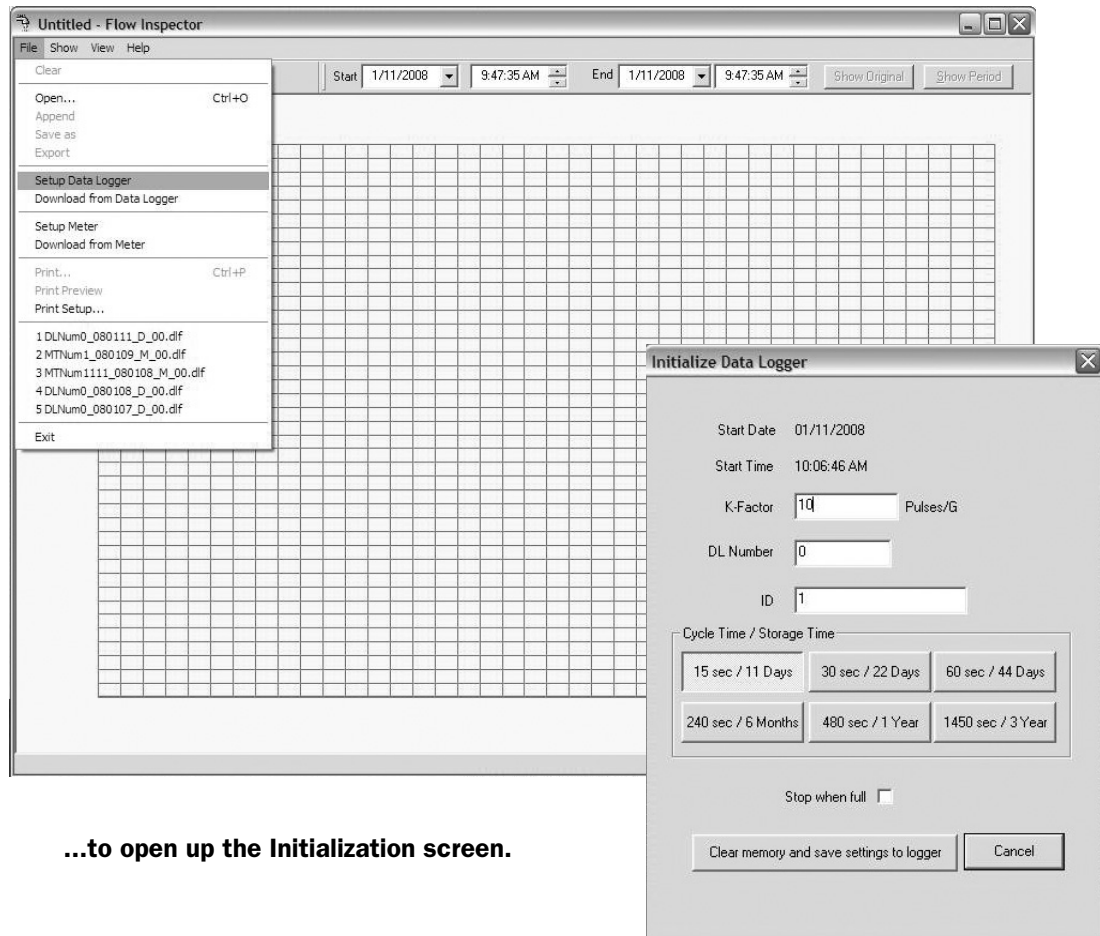
Connect the three-pin end of your SeaMetrics DC3 cable to the matching black socket on the face of your DataLogger or Logging Meter (open the protective cover to insert the cable). Connect the serial connector end of the DC3 cable to your computer. If your computer does not have a serial port, use a compatible USB-to-serial adapter to connect to your USB port (see Hardware/Software Requirements).



## SET UP YOUR LOGGER

### INITIALIZE LOGGER

With FlowInspector open and the DC3 cable connected, click on File, and Setup DataLogger... (or if you are using a logging meter, click on Set Up Meter...)



...to open up the Initialization screen.

#### **Start Date / Start Time**

The date/time that the Logger was initialized is based on the real time clock of the computer used, formatted according to its regional date/time conventions (e.g., month/day/year vs. day/month/year and 12-hour vs. 24-hour clock).

**Date and time cannot be changed manually**, but will be automatically updated when you “save settings” at the end of the set-up procedure.

#### **K-Factor, or Meter Output**

**K-Factor (applies to standalone DataLoggers only):** The K-Factor is the number of pulses per gallon produced by the SeaMetrics meter your DataLogger is reading from. Find the K-Factor number in one of three places (depending on meter type): on the meter fitting, in the meter instruction manual, or in the K-Factor calculator on the SeaMetrics website ([www.seametrics.com](http://www.seametrics.com)). **Enter this number** into the Initialize DataLogger screen. (Note: Use the technical bulletin “Field Calibration of SeaMetrics Meters” on our website Downloads page if you wish to field-calculate your own K-factor. If you use this method, be sure to set the K-Factor in pulses-per-gallon, since this is standard for all meters. You will still be able to select other units for viewing and analyzing the data if you wish.)

**Meter Output (applies to Logging Meters only):** Meter output of Logging Meters is factory pre-set in customer-selected units (e.g., gallons-per-pulse, liters-per-pulse) and displayed here. Meter Output units can only be changed by an authorized individual.

## SET UP YOUR LOGGER

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### DL Number

The DL Number you assign here will be included in the Logger file name to differentiate it from other Loggers when you analyze your data. **Assign any number you choose, up to six digits.**

### ID

This is an optional field in which you may **enter an alphanumeric string** that will help to easily differentiate one Logger from another during data analysis (e.g., Pump Station 3).

### Cycle Time / Storage Time

There is an inverse relationship between the frequency of data collection (cycle time) and maximum capacity (storage time). Shorter cycle times provide a more detailed flow curve but shorten the number of days until the logger memory is full. Longer cycle times give less detailed data over a longer time period. **Select the cycle time and storage time best suited to your application.**


Cycle Time (in seconds)	Storage Time (in days)
15	11
30	22
60	44
240	180
480	360
1450	1080

### Stop When Full

When the Logger's memory is full, it can either 1) stop recording data, or 2) return to the beginning of the recorded data and begin overwriting the earliest measurement data points. In the first case, the total will stop accumulating until the Logger has been manually cleared and reset. In the second case, the running total will continue to accumulate even though the earlier specific data points are overwritten. **Choose which condition you prefer by checking or unchecking the "Stop When Full" box.**

### Clear Memory and Save Settings to Logger

Clicking this button will save your chosen settings and end Setup.



**WARNING!** Clicking this button will erase all previous data in the Logger and reset the totalizer. Be sure you have downloaded any stored data you wish to preserve before clicking Clear. Click Cancel if you wish to abort the set-up operation without saving settings.

### Cancel

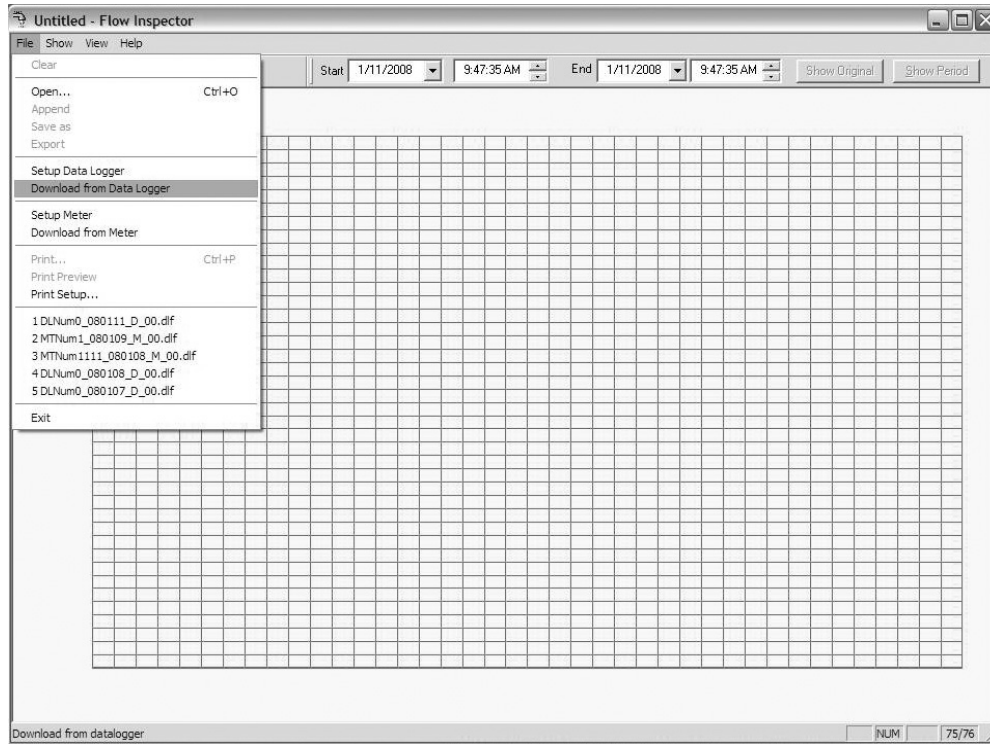
Click this button to exit the screen without saving changes to your Logger settings. Use this button when you have changed your mind about resetting your Logger.



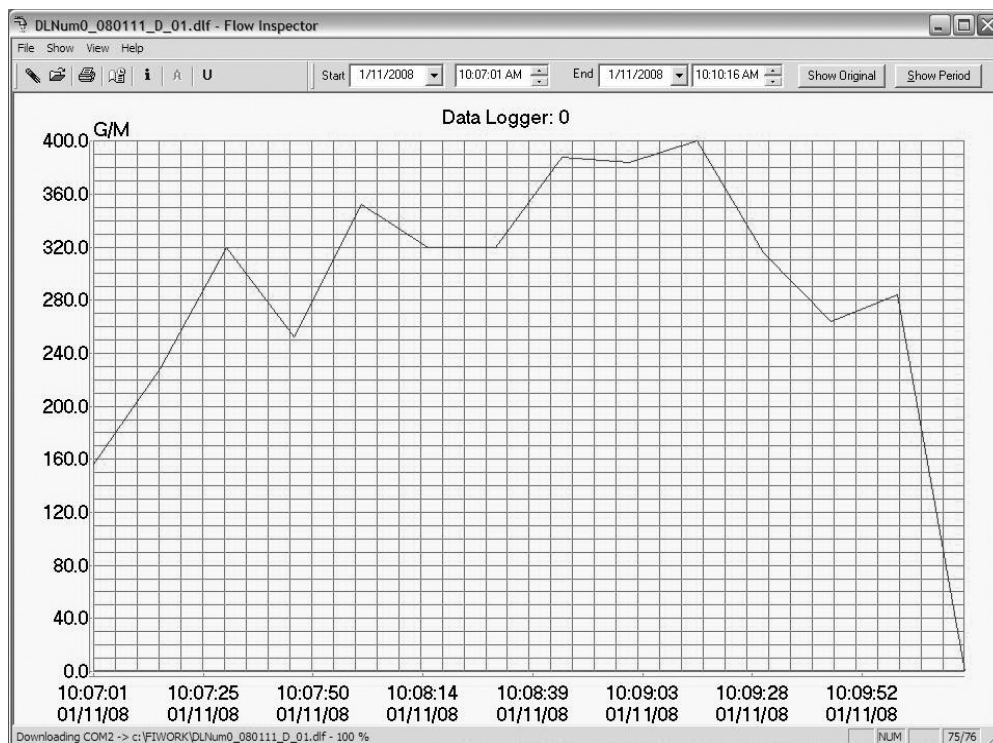
## DOWNLOAD DATA FROM THE LOGGER

### DOWNLOAD DATA

**Open FlowInspector** and **Connect Hardware** as described in Set-Up section. On the FlowInspector Main Screen, click on File, then Download from DataLogger (or Download from Meter if you are using a Logging Meter.) FlowInspector automatically names your file (see Naming Convention, in File Management section). If you download twice from the same Logger on the same date, you will have a choice of overwriting the first data set or incrementing the file name to save both data sets.



**When your download is complete, a graph line will appear on the empty grid.**



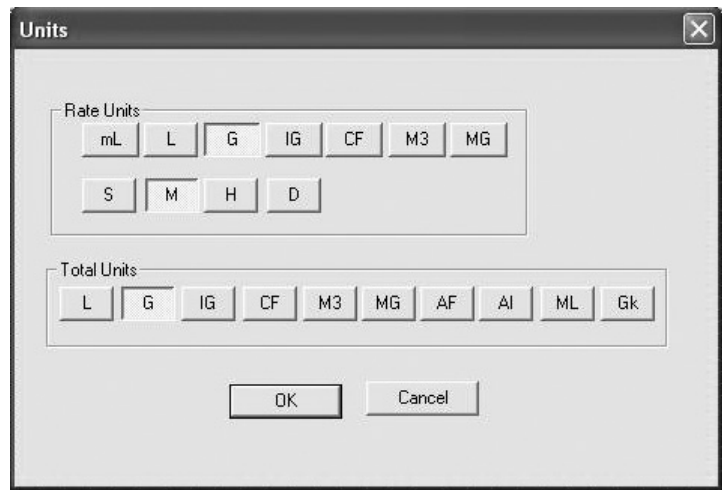
CUSTOMIZE DISPLAY VARIABLES

CUSTOMIZE VARIABLES

With FlowInspector, you can customize the variables displayed on your flow graph, including the flow rate units (displayed on the X axis), the flow total units, and the portion of the data collection period that you wish to view (displayed on the Y axis).

Selecting Flow Rate and Total Units

The Flow Rate is expressed as a volume of flow over a period of time. FlowInspector allows you to choose from a list of volume units, and a list of time units, to express your flow rate in the most useful format for your application. From the Main Screen, click on Show, then Units (or click the **U** button on the Tool Bar), to bring up this screen:



Units screen, showing Flow Rate setting of Gal/Min and Total Flow in Gallons.

On the Units screen, select Units, referring to the abbreviations below.

Rate Units

Volume		Time	
mL	milliliters	S	Seconds
L	Liters	M	Minutes
G	Gallons	H	Hours
IG	Imperial Gallons	D	Days
CF	Cubic Feet		
M3	Cubic Meters		
MG	Million Gallons		

Total Units

Volume	
L	Liters
G	Gallons
IG	Imperial Gallons
CF	Cubic Feet
M3	Cubic Meters
MG	Million Gallons
AF	Acre-Feet
AI	Acre-Inches
ML	MegaLiters
Gk	Gallons x 1000

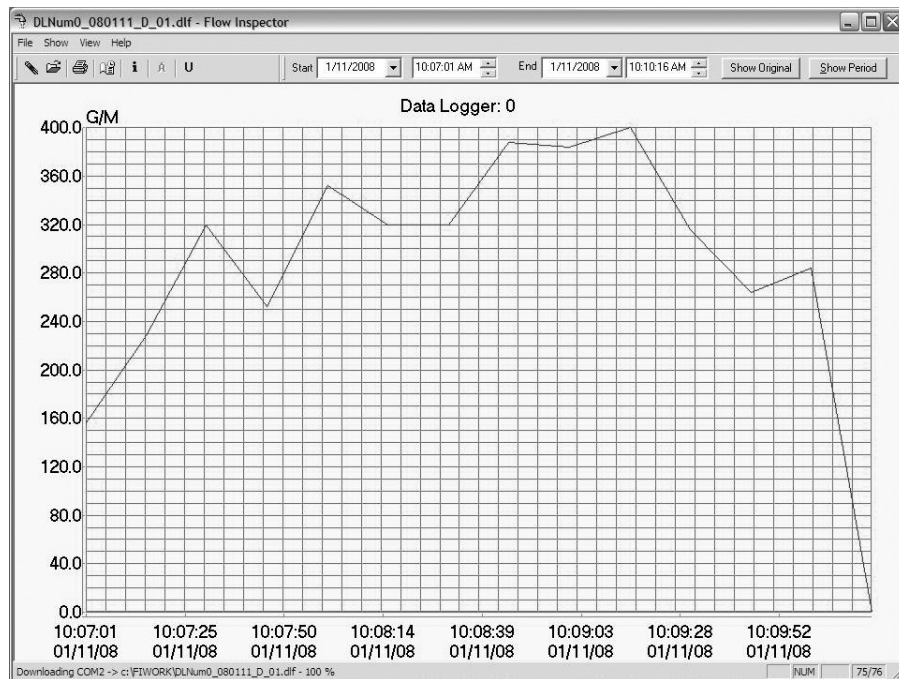
When your Flow Rate and Flow Total units have been selected, **Click OK**. Your data will now display in the rate and total units you have selected. At any time, these choices can be changed and the data viewed with different units of your choice. If you wish to exit the screen without selecting or changing units, **Click Cancel**. No data will be lost.

## CUSTOMIZE DISPLAY VARIABLES

### Selecting a Time Period to View

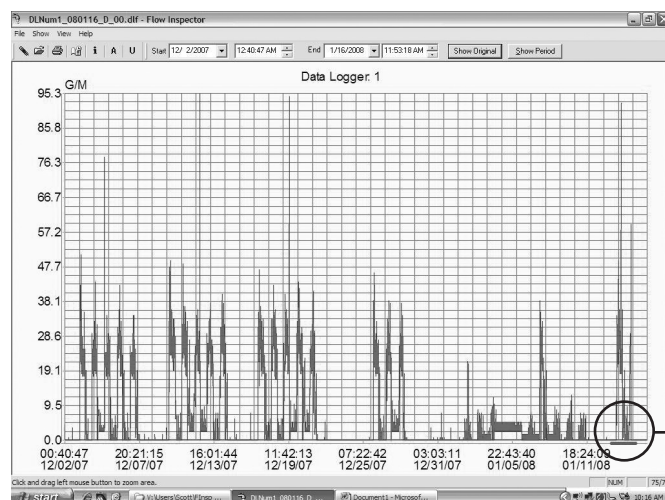
There are several ways to select and refine the desired portion of your collected data to view.

**Viewing the Entire Time Period:** When you download your data, a graph line will appear on the empty grid. On the Time Bar, click on Show Original to be sure that the entire file is displayed.



Depending on how much data was collected over what time period, the graph may have a spiky appearance and be difficult to read. If more detail is desired, it will be important to select a smaller portion of the data to view, by one of the methods described on the following page.

**If your data is too condensed to read...**



**Zoom in on a time period for improved readability.**




## CUSTOMIZE DISPLAY VARIABLES

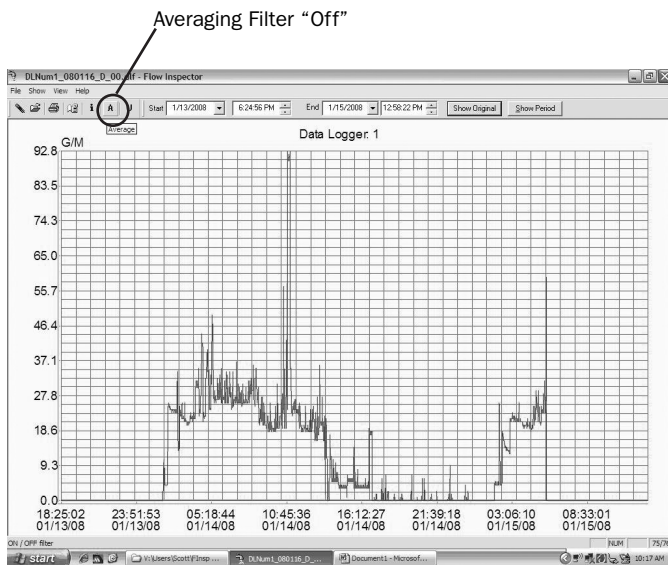
**Shortening Time Period (Selecting by Zoom):** The simplest and most intuitive way to select a smaller time period is by using the Zoom feature. Choose the approximate start date and time desired, position your cursor at that point on the baseline of the main grid, left-click the mouse and hold the button down as you drag to the right. As you drag the mouse, a blue line will expand until you reach the desired end point, then release. The time period defined by the blue line will expand to fill the entire grid. You can repeat this process several times, to narrow your view to as short a time period as you wish (down to a minimum of two data points). [NOTE: You may return to the full time period by clicking on Show Original at any time.]

**Shortening Time Period (Selecting by Date/Time Entry):** This is the preferred method if the desired time period is known precisely. Locate the date and time boxes at the top of the screen. Define the period you want to view in the Start and End Date/Time boxes, and click the Show Period button on the Time Bar. FlowInspector will select data collection points nearest your chosen Start and End selections, and the selected time period will appear on the main grid. FlowInspector will prevent you from selecting a date/time outside of your data set. [NOTE: Use Show Original to return to the full time period.]

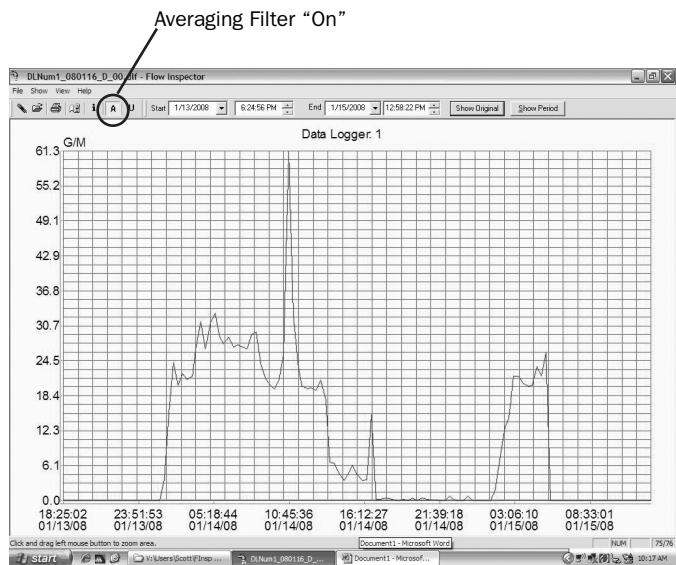
### Averaging Data Points (Filtering)

When it is more important to see trends than details, the Averaging Filter can be employed. With the filter turned on, a selected time period can be viewed with individual data points averaged to create a smoother curve. The user can choose the “smoothness” of the curve by selecting the number of data points that are averaged together.

To use the filter, select the Show menu, then Averaging Filter. Choose the number of data points you wish to average together, click OK. (You may need to adjust this number a few times to achieve the best curve for your purposes.) The graph will adjust accordingly. Note that the Filter button  on the main screen now appears activated; clicking on this button will turn the filter off and on, toggling between the raw data and the averaged data.



**Before Averaging**



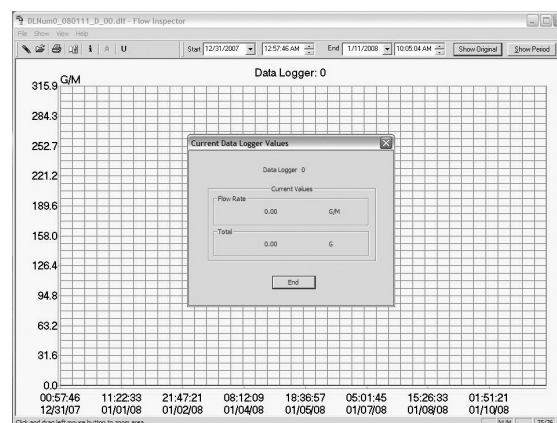
**After Averaging (20 data points)**




## VIEW AND PRINT DATA

### Viewing Current Values

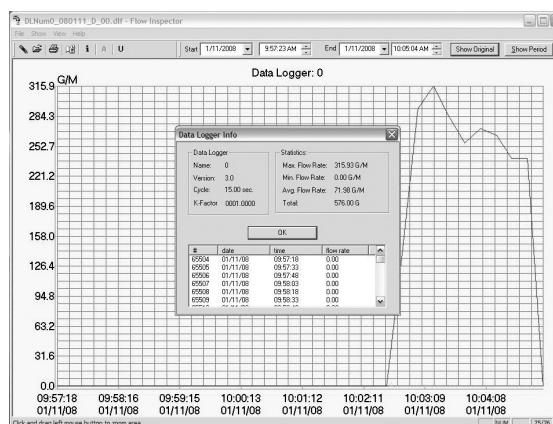
If all you need is a quick look at the current status of your Logger, click Show/Current Data Logger Values to view real-time flow rates and totals. This feature allows you to read data in the field without downloading first. See illustration at right.




### Viewing Raw Data Table

To view the raw data that underlies the graphic presentation, click on Show/Data Logger Info (or the  button on the Tool Bar). This brings up a box that displays the set-up parameters (upper left), flow statistics (upper right), and individual data points (bottom window) over the time period currently displayed on the graph. Click OK to close window.

[NOTE: The version number on this screen refers to the logging device, not to the FlowInspector software.]

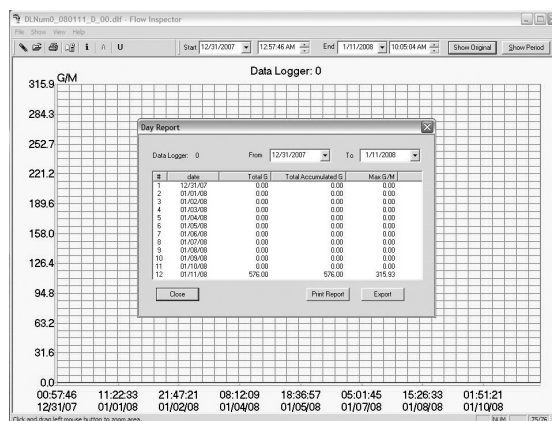


### Viewing Day Report

The Day Report shows daily flow totals and maximum rates. Access the screen by clicking on Show/Day Report (or the  button on the Tool Bar). Use the "From" and "To" boxes to change the time period you wish to view. The data can be printed or exported as a .csv or .txt file.

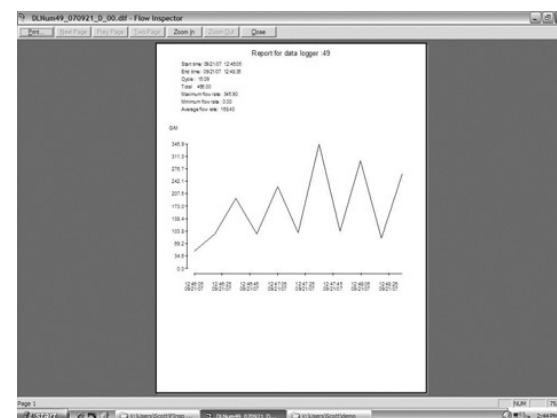
### Printing Day Report

The Day Report can be printed in table form, showing daily total, daily maximum flow rate, and accumulated total flow to date. With the Day Report on the screen, click Print Report.



### Printing Graphed Data

The graphed data from the main screen can be printed using the File/Print menu or the printer icon on the Tool Bar. This graphic representation also includes the time period; cycle time; total flow; and maximum, minimum and average flow rates.



## MANAGE FILES

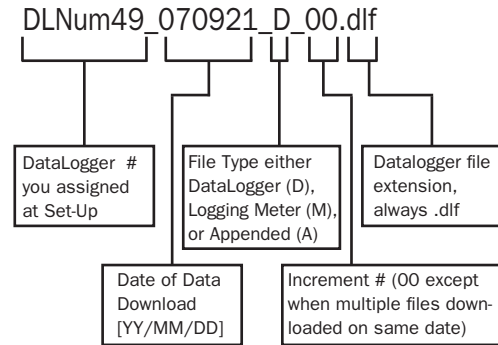
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### SELECTING A FILE TO VIEW

Unless you have instructed it otherwise, FlowInspector has automatically saved your data in a folder called FIWORK on your C drive. From the main screen, click on File, then Open. The FIWORK folder will open and you will see all your data files. Select the file you wish to work with, click Open. When it opens, click on the Show/Original menu to assure that you are viewing the complete file.


#### **Naming Convention**

Understanding the file naming convention will allow you to easily select the file you wish to view. See diagram at right.



### APPENDING A FILE

Sometimes it is convenient to combine two or more data files from the same Logger to create a single continuous data set over a long period of time.

1. From a clear graph screen (use File/Clear or the  button on the Tool Bar if necessary), click on File/Open to select the oldest file you wish to combine (either the older date, or if same date, earlier increment – see file naming convention above). Click Open. The first data set appears as a graph on your main screen.
2. Now open the next file you wish to combine, using the File/Append menu. Select the file, click Open. The graph will include both data sets.
3. You may continue to append additional files in the same way. When you have appended all the files you wish, click on the Show/Original menu to be certain you are viewing the entire file.

The resulting graph contains all the data points from the appended files, with flat lines in the interim periods when no data was being recorded. *At the top of the graph, notice that the Logger number is now followed by a plus sign (+), indicating that this is an appended file.*

The newly appended file will be automatically saved in the FIWORK folder, with a new file name that includes the date of the last appended file, and File Type A (appended). NOTE that it can infrequently happen that appended file names might duplicate each other; in this case, you can manually change the increment number in the file name. (See Naming Convention, above.)

If you do not wish to save the Appended file, you may delete it after you are done working with the data. It can always be recreated as long as you save the original Logger files from which it was constructed. If you do save the Appended file, you may add another Logger file to it in the future.

## EXPORT AND ANALYZE DATA

### EXPORTING THE DATA FOR ANALYSIS

Sometimes it is desirable to create a spreadsheet using the raw flow readings; data exported to a spreadsheet can be manipulated to produce a wide variety of reports. With FlowInspector, you can export data in two formats: 1) .csv (automatically recognized by Excel) or 2) .txt (read by Notepad or convertible to Excel or other spreadsheet programs).

#### **Exporting the Day Report** (i.e., saving it with a different file extension)

1. Start with the main screen open to the graphed data that you want to capture and export.
2. Click Show/Day Report.
3. Click Export button. The FIWORK folder will open to the data file you are working with.
4. The “File Name” box will be auto-filled with a file named according to the convention described earlier, with the word “day” inserted into the name to indicate “day report”.
5. In the “Save as Type” box at the bottom of the screen, use the arrow to select either .csv or .txt.  
[NOTE: In .csv, if the file contains more than 65536 data points (the maximum allowed by Excel), you will receive a pop-up message that your file is too large. Click OK if you wish to continue exporting the file in full, realizing that when the file is opened in Excel, only the first 65536 records will be there. Alternatively, click CANCEL, use the Averaging Filter to reduce the number of data points in your file, and try exporting the file again.]
6. Click Save. Your data file is now saved to your computer in the format you chose.

#### **Exporting the Graphed Data** (i.e., saving it with a different file extension)

1. Start with the main screen open to the graphed data that you want to capture and export.
2. Click on the File/Export menu.
3. The “File Name” box will be auto-filled with a file named according to the convention described earlier.
4. In the “Save as Type” box at the bottom of the screen, use the arrow to select either .csv or .txt.
5. Click Save. Your data file is now saved to your computer in the format you chose.

### OPENING EXPORTED FILES

#### **Opening .csv Files**

Open your copy of Excel. Using the Excel File/Open menu, locate your exported .csv file in the FIWORK folder on the C drive of your computer. Select the file you wish to analyze, click Open. The .csv file will open directly in Excel.

#### **Opening .txt Files**

To open the .txt file in Notepad, locate the file in the FIWORK folder on your C drive; doubleclick on the file name.

To open the .txt file in Excel or another spreadsheet, first open your spreadsheet program. Using the spreadsheet’s File/Open menu, locate your exported .txt file in the FIWORK folder on the C drive of your computer. Select the file you wish to analyze, click Open. A Text Import Wizard box will open. You will need to navigate through a series of screens. The only change you need to make to the defaults on these screens is to select the “Comma” box at one point. *Only experienced spreadsheet users should use the .txt option.*

### ANALYZING THE DATA

The spreadsheet will format in columns (date, time, flow rate, incremental volume, totalized volume). All normal spreadsheet functions can be used on this data, for instance, custom averaging and oddtime totalization (average flow rate and multiple by time span). Refer to Excel instructions on performing various functions. A representative spreadsheet page appears at right.

Index	Date	Time	Flow Rate (G/Hr)	Incremental Volume (G)	Totalized Volume (G)
1	9/21/2007	12:46:05	48	12	12
2	9/21/2007	12:46:20	48	12	24
3	9/21/2007	12:46:35	48	12	36
4	9/21/2007	12:46:50	48	12	48
5	9/21/2007	12:47:05	48	12	60
6	9/21/2007	12:47:20	48	12	72
7	9/21/2007	12:47:35	48	12	84
8	9/21/2007	12:47:50	48	12	96
9	9/21/2007	12:48:05	48	12	108
10	9/21/2007	12:48:20	48	12	120
11	9/21/2007	12:48:35	48	12	132
12	9/21/2007	12:48:50	48	12	144
13	9/21/2007	12:49:05	48	12	156
14	9/21/2007	12:49:20	48	12	168
15	9/21/2007	12:49:35	48	12	180
16	9/21/2007	12:49:50	48	12	192
17	9/21/2007	12:50:05	48	12	204
18	9/21/2007	12:50:20	48	12	216
19	9/21/2007	12:50:35	48	12	228
20	9/21/2007	12:50:50	48	12	240
21	9/21/2007	12:51:05	48	12	252
22	9/21/2007	12:51:20	48	12	264
23	9/21/2007	12:51:35	48	12	276
24	9/21/2007	12:51:50	48	12	288
25	9/21/2007	12:52:05	48	12	300
26	9/21/2007	12:52:20	48	12	312
27	9/21/2007	12:52:35	48	12	324
28	9/21/2007	12:52:50	48	12	336
29	9/21/2007	12:53:05	48	12	348



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