

# User's Guide



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## **FMG-1000-DLAUNL** Version 2

### **Software Guide for the FMG-1000-DLA Data Logger**



**OMEGAnet® Online Service**  
**omega.com**

**Internet e-mail**  
**info@omega.com**

**Servicing North America:**

**U.S.A.:** One Omega Drive, P.O. Box 4047  
ISO 9001 Certified Stamford, CT 06907-0047  
TEL: (203) 359-1660 FAX: (203) 359-7700  
e-mail: info@omega.com

**Canada:** 976 Bergar  
Laval (Quebec) H7L 5A1, Canada  
TEL: (514) 856-6928 FAX: (514) 856-6886  
e-mail: info@omega.ca

**For immediate technical or application assistance:**

**U.S.A. and Canada:** Sales Service: 1-800-826-6342 / 1-800-TC-OMEGA®  
Customer Service: 1-800-622-2378 / 1-800-622-BEST®  
Engineering Service: 1-800-872-9436 / 1-800-USA-WHEN®  
TELEX: 996404 EASYLINK: 62968934 CABLE: OMEGA

**Mexico:** En Español: (001) 203-359-7803 e-mail: espanol@omega.com  
FAX: (001) 203-359-7807 info@omega.com.mx

**Servicing Europe:**

**Benelux:** Postbus 8034, 1180 LA Amstelveen, The Netherlands  
TEL: +31 (0)20 3472121 FAX: +31 (0)20 6434643  
Toll Free in Benelux: 0800 0993344  
e-mail: sales@omegaeng.nl

**Czech Republic:** Frystatska 184, 733 01 Karviná, Czech Republic  
TEL: +420 (0)59 6311899 FAX: +420 (0)59 6311114  
Toll Free: 0800-1-66342 e-mail: info@omegashop.cz

**France:** 11, rue Jacques Cartier, 78280 Guyancourt, France  
TEL: +33 (0)1 61 37 2900 FAX: +33 (0)1 30 57 5427  
Toll Free in France: 0800 466 342  
e-mail: sales@omega.fr

**Germany/Austria:** Daimlerstrasse 26, D-75392 Deckenpfronn, Germany  
TEL: +49 (0)7056 9398-0 FAX: +49 (0)7056 9398-29  
Toll Free in Germany: 0800 639 7678  
e-mail: info@omega.de

**United Kingdom:** One Omega Drive, River Bend Technology Centre  
ISO 9002 Certified Northbank, Irlam, Manchester  
M44 5BD United Kingdom  
TEL: +44 (0)161 777 6611 FAX: +44 (0)161 777 6622  
Toll Free in United Kingdom: 0800-488-488  
e-mail: sales@omega.co.uk

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The information contained in this document is believed to be correct, but OMEGA accepts no liability for any errors it contains, and reserves the right to alter specifications without notice.

**WARNING:** These products are not designed for use in, and should not be used for, human applications.

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## INSTALL SOFTWARE

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FMG-1000-DLAUNL V.2 software is designed as part of the Omega FMG-1000-DLA DataLogger system. The software is used to set up the Logger, to download and manage data files, and to analyze and export data.

### HARDWARE/SOFTWARE REQUIREMENTS

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

- FMG-1000-DLA DataLogger
- Omega 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 software CD in your CD-ROM drive. The program should begin auto-loading within about 30 seconds. (If it 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 the version 2 software, read the License Agreement, select “I accept” and click Next.
- 4b. If you have an earlier copy 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, it will be stored in a folder under the All Programs list in your computer’s Start menu.

# SET UP YOUR LOGGER


## FIRST-TIME LOGGER SET-UP

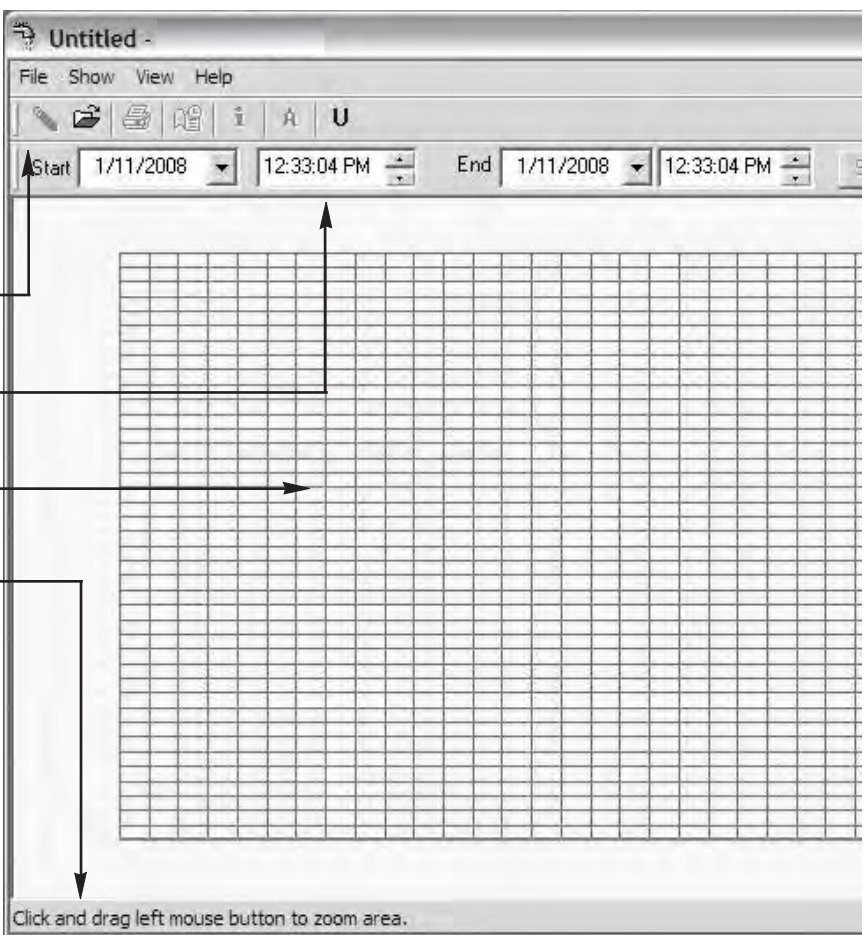
The following instructions apply to **first-time set-up only**. Re-setting procedures are the same **except that** you must first download any data you wish to save.



**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 Software

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

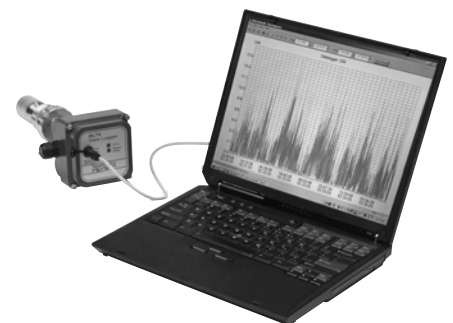


- **Menu bar**  
(File, Show, View, Help)
- **Tool bar**  
(commonly-used functions)
- **Time bar**  
(for setting the period for analysis)
- **Grid**  
(displays graphic information in selected time period)
- **Status bar**  
(shows current status)

Click and drag left mouse button to zoom area.

### Connect Hardware

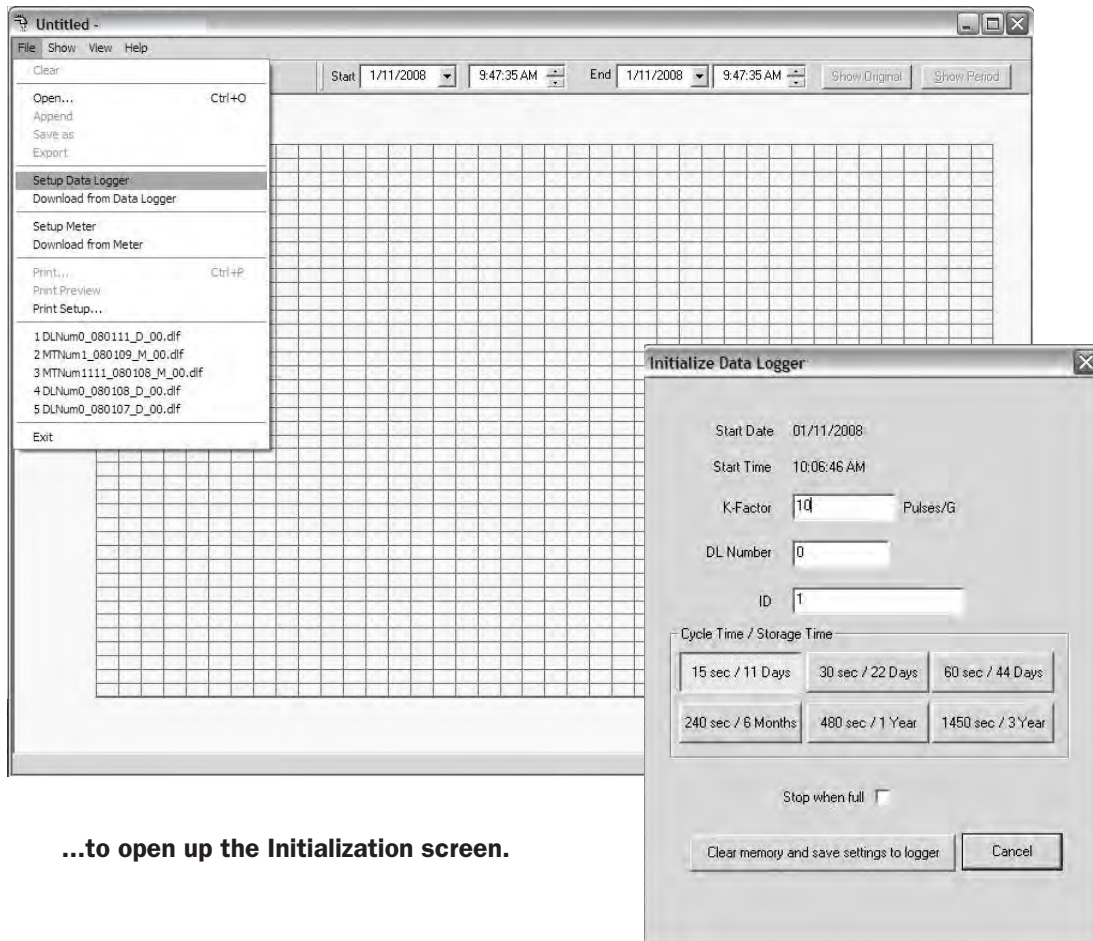
Connect the three-pin end of your Omega data cable to the matching black socket on the face of your DataLogger (open the protective cover to insert the cable). Connect the serial connector end of the data cable to your computer. If your computer does not have a serial port, use a compatible USB-to-serial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



# SET UP YOUR LOGGER

## INITIALIZE LOGGER

With the version 2 software open and the data 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 meter your DataLogger is reading from. Find the number below that matches your selection. **Enter this number** into the Initialize DataLogger screen. You will still be able to select other units for viewing and analyzing the data if you wish.)

<b>High Frequency Output/K-Factor</b>		
Meter Size	Pulses per Gallon	Pulses per Liter
4"	16.362	4.323
6"	6.307	1.666
8"	3.344	0.883
10"	2.150	0.568

**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.

	<p><b>WARNING!</b> 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.</p>
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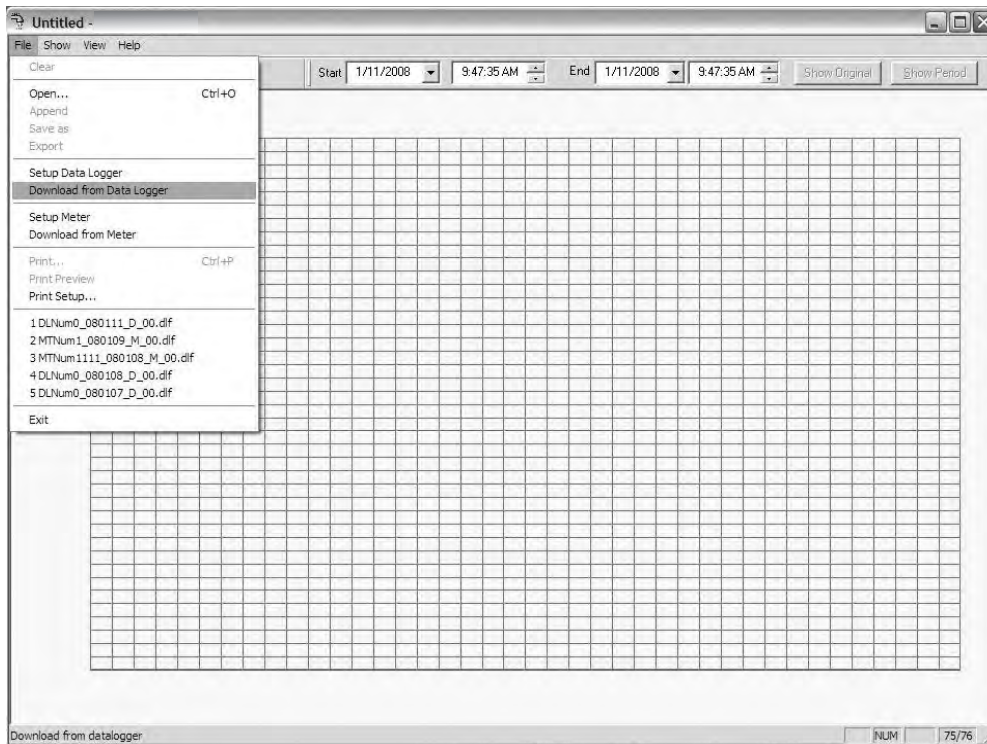
### **Cancel**

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.

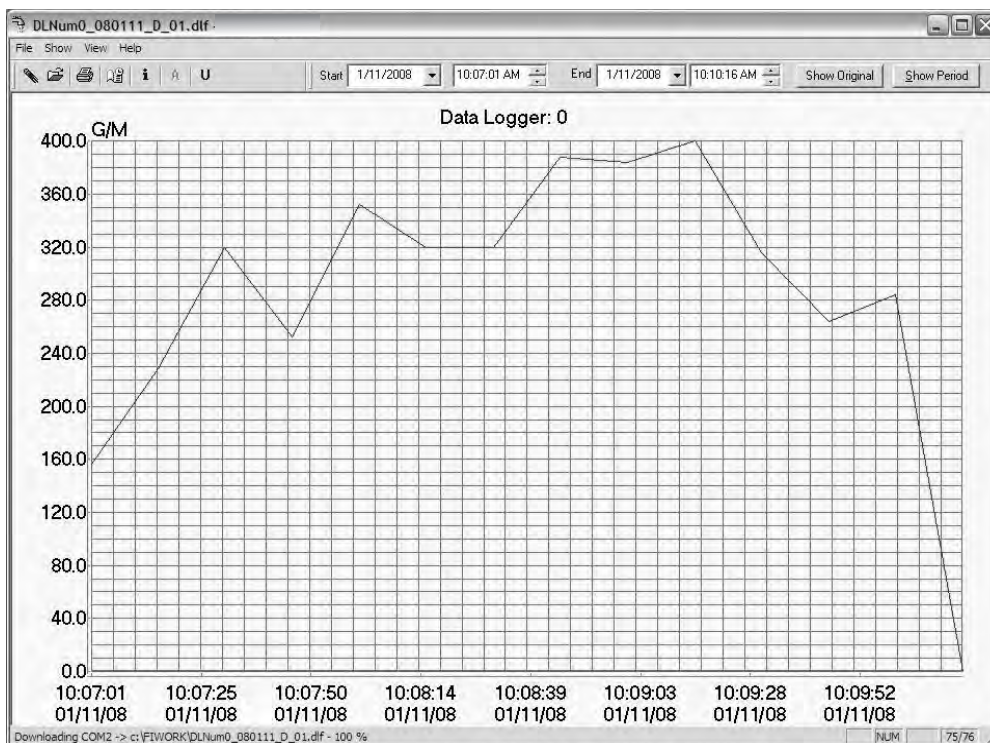
# DOWNLOAD DATA FROM THE LOGGER

## DOWNLOAD DATA

**Open Software** and **Connect Hardware** as described in Set-Up section. On the Main Screen, click on File, then Download from DataLogger (or Download from Meter if you are using a Logging Meter.) The software 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.**





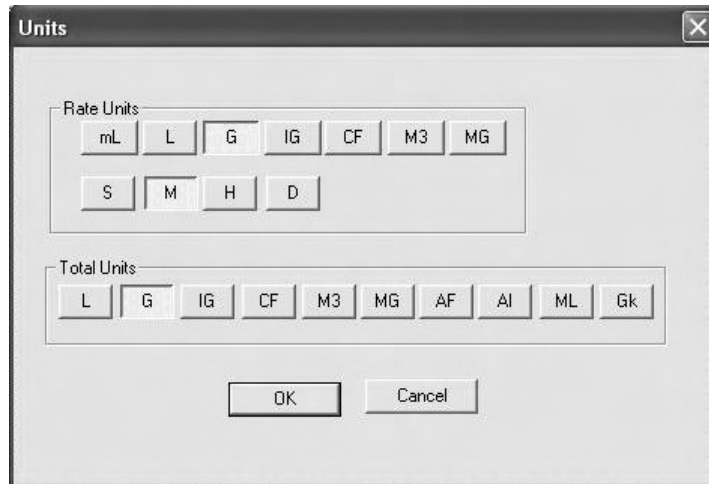
# CUSTOMIZE DISPLAY VARIABLES

## CUSTOMIZE VARIABLES

With your software, 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. The software 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

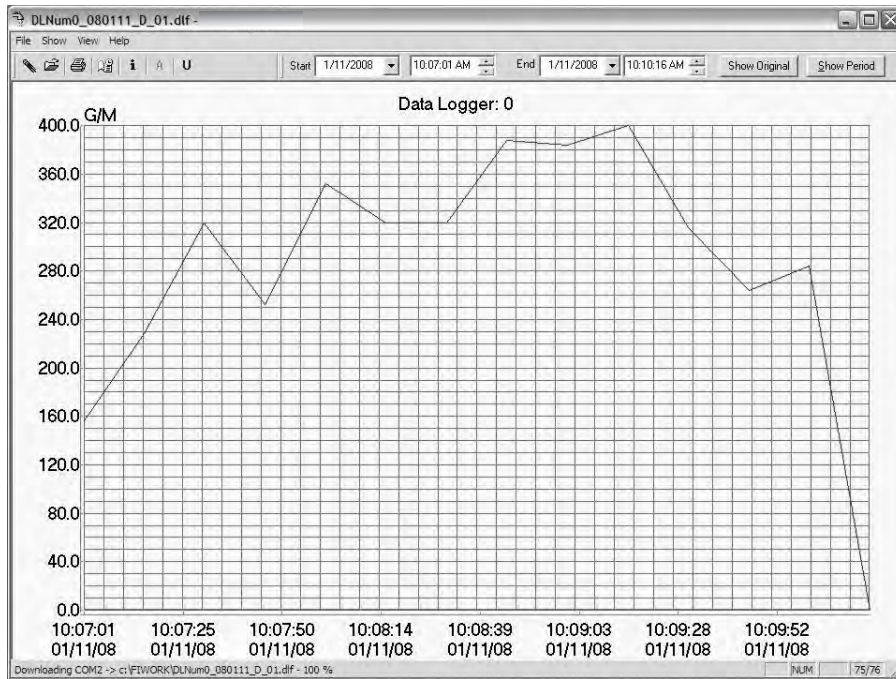
When your Flow Rate and Flow Total units have been selected, **Click OK**. Your data will now display in the rate and total units you have selected. At any time, these choices can be changed and the data viewed with different units of your choice. If you wish to exit the screen without selecting or changing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

# CUSTOMIZE DISPLAY VARIABLES

## Selecting a Time Period to View

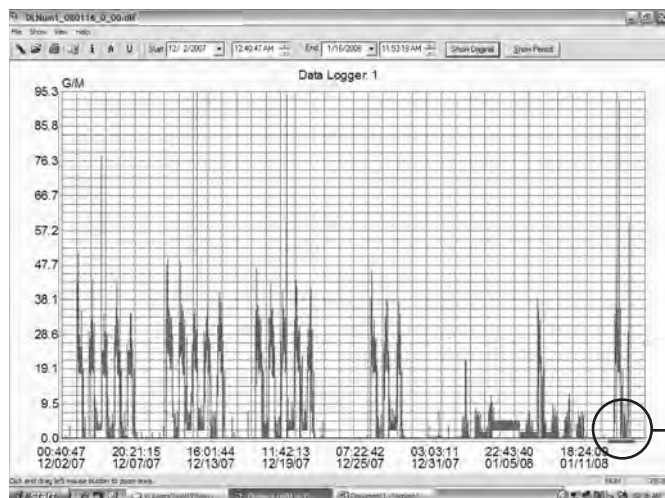
There are several ways to select and refine the desired portion of your collected data to view.

**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

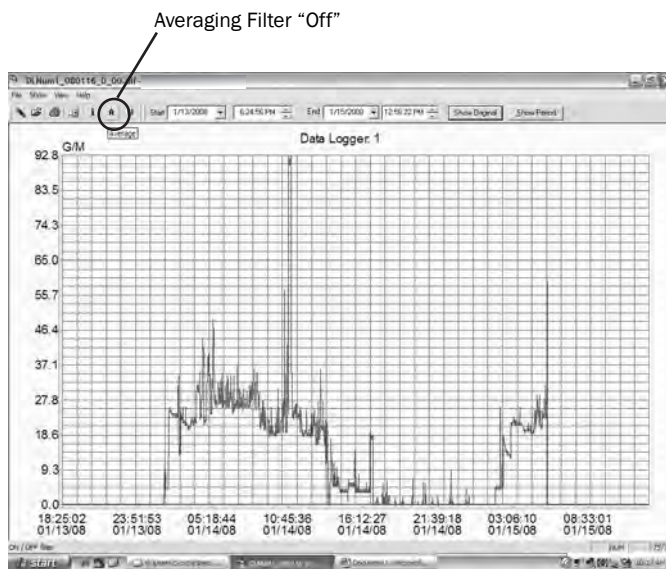
**Shortening Time Period (Selecting by Zoom):** The simplest and most intuitive way to select a smaller time period is by using the Zoom feature. Choose the approximate start date and time desired, position your cursor at that point on the base-line of the main grid, left-click the mouse and hold the 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. The software will select data collection points nearest your chosen Start and End selections, and the selected time period will appear on the main grid. The software will prevent you from selecting a date/time outside of your data set. [NOTE: Use Show Original to return to the full time period.]

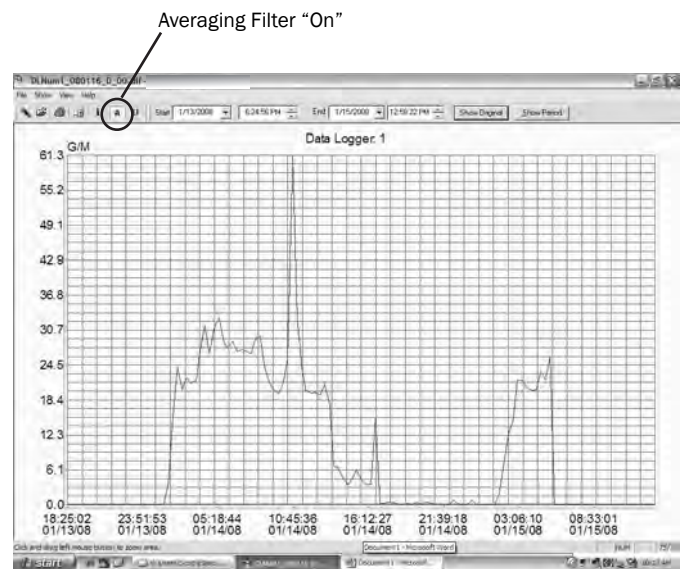
### **Averaging Data Points (Filtering)**

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**

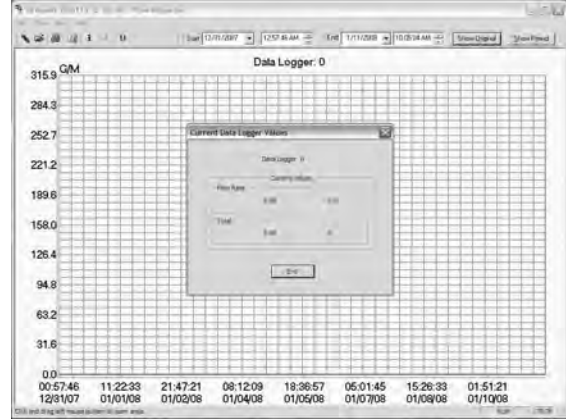


**After Averaging (20 data points)**

# VIEW AND PRINT DATA

## Viewing Current Values

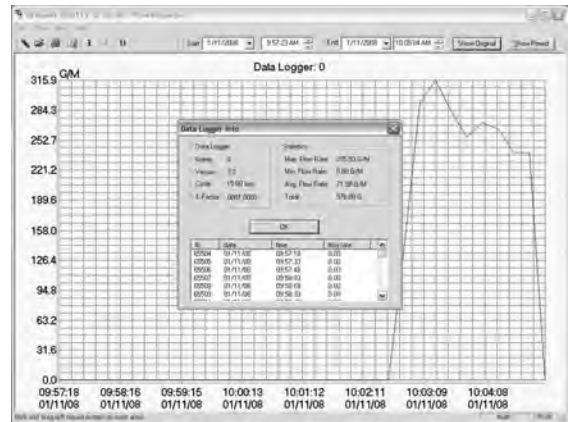
If all you need is a quick look at the current status of your Logger, click Show/Current Data Logger Values to view real-time flow rates and totals. This feature allows you to read data in the field without downloading first. See illustration at right.



## Viewing Raw Data Table

To view the raw data that underlies the graphic presentation, click on Show/Data Logger Info (or the **i** 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 software.]

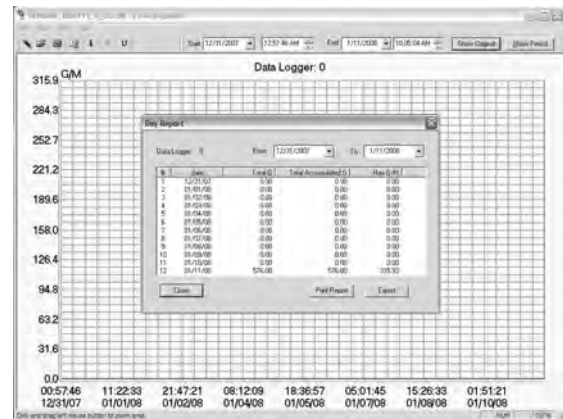


## Viewing Day Report

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.

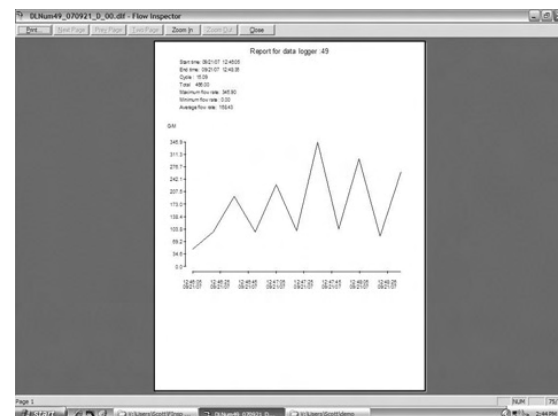
## Printing Day Report

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

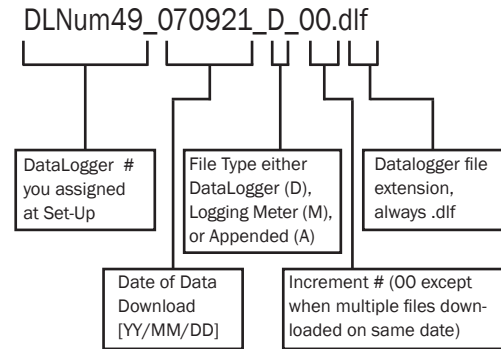
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### SELECTING A FILE TO VIEW

Unless you have instructed it otherwise, the software 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. 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/M)	Incremental Volume(G)	Totalized Volume(G)
2	0 9/21/2007	12:46:05	48	12	12
3	1 9/21/2007	12:46:20	96	24	24
4	2 9/21/2007	12:46:35	196	48	48
5	3 9/21/2007	12:46:50	96	24	109
6	4 9/21/2007	12:47:05	228	57	166
7	5 9/21/2007	12:47:20	160	24	191
8	6 9/21/2007	12:47:35	348	87	278
9	7 9/21/2007	12:47:50	104	26	304
10	8 9/21/2007	12:48:05	300	75	379
11	9 9/21/2007	12:48:20	84	21	400
12	10 9/21/2007	12:48:35	264	66	466
13	11 9/21/2007	12:48:50	0	0	466
14	12 9/21/2007	12:49:05	0	0	466
15	13 9/21/2007	12:49:20	0	0	466
16	14 9/21/2007	12:49:35	0	0	466
17	15 9/21/2007	12:49:50	0	0	466
18	16 9/21/2007	12:50:05	0	0	466
19	17 9/21/2007	12:50:20	0	0	466
20	18 9/21/2007	12:50:35	0	0	466
21	19 9/21/2007	12:50:50	0	0	466
22	20 9/21/2007	12:51:05	0	0	466
23	21 9/21/2007	12:51:20	0	0	466
24	22 9/21/2007	12:51:35	0	0	466
25	23 9/21/2007	12:51:50	0	0	466
26	24 9/21/2007	12:52:05	0	0	466
27	25 9/21/2007	12:52:20	0	0	466
28	26 9/21/2007	12:52:35	252	63	529
29	27 9/21/2007	12:52:50	362	98	627
30	28 9/21/2007	12:53:05	124	31	658



## WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

**OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.**

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

## RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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