



User's Guide



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OM-EL-WIN

EASYLOG FOR WINDOWS SOFTWARE



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

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I) OM-EL-WIN Software Installation

The following procedure details the installation of the OM-EL-WIN control software onto your computer's hard disk.

- a) Start Windows and insert the OM-EL-WIN floppy disk into drive A or B.
- b) Choose the *Run* command from the *File* menu in *File Manager*.
- c) Type *a:install* (or *b:install* if your disk is in drive B) in the *Run* dialogue box and click *OK*.
- d) The installation program automatically creates an *Easylog* directory on your computer's hard drive, drive C, and all EL-WIN files are copied to that directory.
- e) The installation program automatically creates a new *EasyLog* program group. Within this program group an *EasyLog* program icon is created.
- f) Double-click on the *EasyLog* program icon to start the program and click on *Easy Guide*.

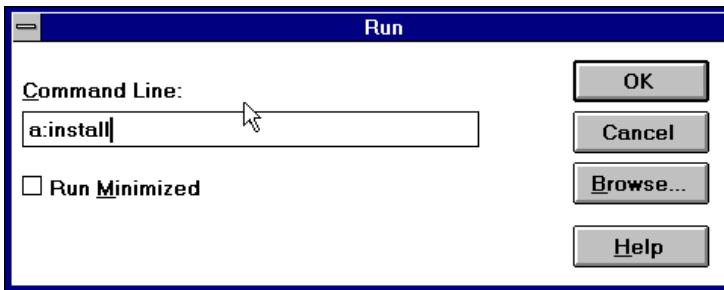


Figure 1: Installing OM-EL-WIN

OM-EL-WIN displays the *Connecting EasyLog* dialogue box and is now ready for use. If this is your first encounter with OM-EL-WIN, then follow the instructions on the tear-out Easy Guide card in the centre of this manual.

II) Configuring the EasyLog Module

1) Choosing and connecting an appropriate sensor

Choose an appropriate sensor for your measurement application. If you are in doubt about the required technical specifications for your sensor then consult the datasheet that was supplied with your EasyLog module. If doubt persists, then contact OMEGA for further technical assistance.

Insert the 3.6V Lithium battery into the EasyLog module or connect an external power supply. At this stage, do NOT connect a voltage across the EasyLog module's inputs, as the module has not yet been correctly configured to accept an input signal.



Figure 2: Connecting a sensor to an EasyLog module

2) Connecting the EasyLog module to a computer : Communications

a) Hardware Link

Connect the OM-EL-WIN communications cable, supplied with your OM-EL-WIN control software, between your computer's 9-way COM port (RS232 serial port at the rear of your computer) and your EasyLog module. If your only free COM port is a 25-way one, then you will require a 9-way to 25-way converter.

If you are in doubt about the types of port present at the rear of your computer, then consult your computer's user manual.

b) Software Link : COM port, Baud rate, Address

COM port

Once you have connected your EasyLog module to your computer via the communications cable, you will need to tell OM-EL-WIN which COM port you are using. As COM 1 is usually free on most computers, this is the default setting in the OM-EL-WIN software.

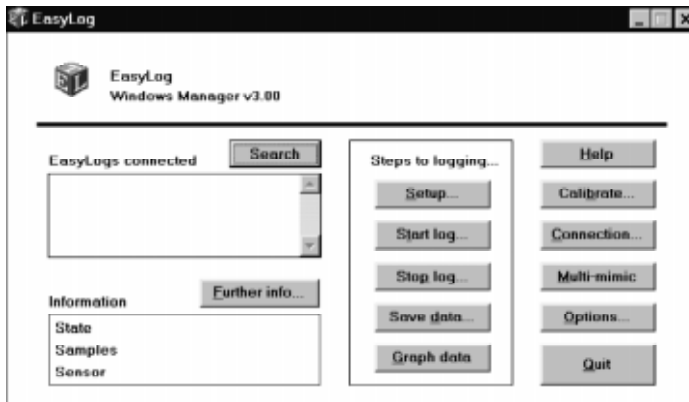


Figure 3: The main OM-EL-WIN Screen

If you are using a different COM port on your computer, then change the COM port setting in OM-EL-WIN by clicking on the desired *COM port* and clicking OK. The computer will now scan the selected COM port for attached EasyLog modules. Any modules found on that port will be listed in the *Loggers connected* box. For additional information on a module, click on its entry in the *Loggers connected* box and click on *Further info*.

If a search fails, you will receive the general communications failure message. If you get this message, then check your EasyLog system and click on *Search* to try again.

Baud rate

The Baud rate specifies the speed at which communication occurs between the computer running OM-EL-WIN and the attached EasyLog module(s).

In an EasyLog system, individual Baud rate settings are specified for the computer running OM-EL-WIN and the EasyLog module. The factory default setting is 9600 Baud for both the OM-EL-WIN software and the EasyLog module. In an EasyLog system, Baud rate settings are governed by three simple rules :

- All EasyLog modules, linked together in a system, must feature the same Baud rate setting.
- The Baud rate setting for the computer must always be identical to the Baud rate setting of the attached EasyLog module(s).
- Always change the Baud rate of the module (Click on *Setup, Advanced, Comms*) before changing the Baud rate of the OM-EL-WIN software in *Connection*. Changing the module's Baud rate will automatically change OM-EL-WIN's Baud rate.



Figure 4: General Communication Failure Message

In most applications, a setting of 9600 Baud works very reliably. However, in applications where long communications cables are used, or where there is a lot of electromagnetic interference, communication errors may occur. The occurrence of these errors can be reduced as follows :

- Remove or attenuate the source of electromagnetic interference.
- Make cable runs as short as possible.
- Use high quality, low capacitance, shielded cable.
- Lower the Baud rate settings of the EasyLog module and of the OM-EL-WIN software.

Address

Each EasyLog module should be given its own unique address in the range 0 to 7. Using unique addresses ensures that, when multiple modules are daisy-chained, no two modules will respond simultaneously to an OM-EL-WIN command and cause a communication error to occur. To change a module's address, click on *Setup, Advanced* and *Comms*, and select a new address in the range 0 to 7.

To check the availability of free addresses, click on *Search* (ensure *Search limit* in *Options* is set to 8). Any modules found will be listed together with their address in the 'Loggers Connected' box.

c) Smart search, Search limit

Smart search

If, at the moment of pressing *Search*, the EasyLog module being addressed is taking a reading, then it is possible that the search will fail. You will receive a communication failure message. This is because, in general, the action of taking a reading and logging is more important than allowing you to interrupt what may potentially be an important logging exercise. To reduce the occurrence of search failures, select *Smart search* in *Options*. This has the result of scanning twice in succession for each module address, thus increasing the chance that a given module is free to respond.

When searching for multiple EasyLog modules, it is possible that some of the modules will not respond if they are currently logging. You will NOT receive a General Communications Failure Message (See Figure 4). Selecting Smart search reduces the risk of one or more modules not responding.

Search limit

The OM-EL-WIN software normally scans a COM port with a view to locating modules with addresses between 0 and 7. If you are confident that all module addresses are at the lower end of the scale (e.g.: addresses 0, 1, 2, 3) then you can substantially increase the search speed by selecting *Search limit* in *Options* and typing the highest module address +1 that you expect to find.

- Note :
- *Search limit* does NOT allow you to specify the amount of modules to search for.
 - Setting the *Search limit* too low with high-address EasyLog modules attached will result in no modules being found and a communications failure message to appear.

3) Configuring the EasyLog module

Before using an EasyLog module in your application, the module must be configured to accept the correct sensor type or input signal. In addition, the module is given a name, a sample rate and a storage mode.

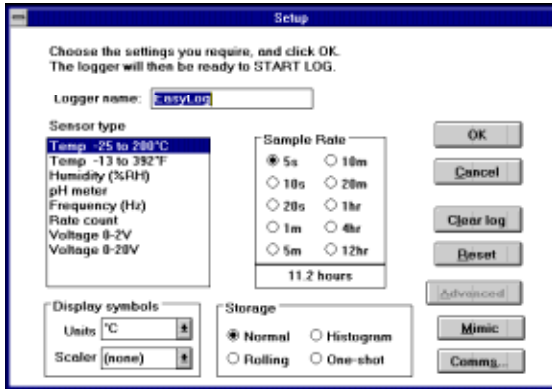


Figure 5: Setup

a) Module name

During manufacture, each EasyLog module is programmed with its own unique serial number. This serial number cannot be changed by the user, but is ideal for tracking modules.

To associate an EasyLog module with an application, it is possible for the user to assign an intelligent name to the module. This name can be up to 14 characters long, and may consist of most characters, using upper and lower case, e.g.: ‘Water Pressure’, ‘Room Humidity’, ‘Pump-1’, etc. The chosen name is entered in the *Logger name* box in *Setup*.

Unlike the serial number, the *Logger name* is not fixed and can be changed when required, as long as the module is not logging and has been *Reset* or *Cleared*.

b) Sensor type

The *Sensor type* box allows you to configure the EasyLog module to accept a voltage signal (Voltage, Current, Frequency, Rate count) or the output from a sensor (Temperature, Humidity, pH). When your choice of *Sensor type* is downloaded from computer to EasyLog module, the module will configure its input circuitry accordingly. Selecting the wrong *Sensor type* may result in one of the following :

- The EasyLog module does not display and record expected readings.
- The EasyLog module is constantly showing overrange ('1' on display).
- The inputs to the EasyLog module may be permanently damaged.

Select the correct *Sensor type* in OM-EL-WIN before applying a signal or connecting a sensor to the EasyLog module. Choosing a particular *Sensor type* will cause the OM-EL-WIN software to select an appropriate *Unit* in *Display symbols*. Click on *Advanced* to see a choice of display symbols, or to override the automatic choice. Not all display symbols are available on all EasyLog module types.

c) Display symbols : Unit, Scaler

The *Display symbols* box is displayed by clicking on *Advanced* in the main OM-EL-WIN window. It is divided into two sections : *Units* and *Scaler*. Before choosing your combination of *Unit* and *Scaler*, you must check that the required symbols are indeed available on the type of EasyLog module being used. The choice of display symbol is automatically updated when you choose a particular *Sensor type*. Click on *Advanced* to see the choice of display symbols, or to override the automatic choice.

d) Sample rate

The sample rate is the time interval between two successive logging procedures, where a logging procedure consists of the following steps:

- Measuring the module's input.
- Displaying the corresponding value.
- Storing that value in the module's non-volatile memory.
- Activating alarm levels if these have been set.

The *Sample rate* can be selected from a set of ten pre-defined values. Below the set of sample rates, the duration of a complete logging exercise is displayed. The duration of a logging exercise depends on the *Storage mode* selected, as follows.

- *Normal* Duration of logging exercise until module memory is full.
- *Rolling* As Normal mode. Module will then overwrite oldest data.
- *Histogram* Duration of logging exercise cannot be predicted.
- *One-shot* Duration of logging exercise cannot be predicted.

e) Storage modes : Normal, Rolling, Histogram, One-shot

Data can be stored inside an EasyLog module's non-volatile memory in one of four different ways, depending on the *Storage mode* selected.

Normal mode

This is the conventional method for recording data over a period of time. In *Normal mode*, readings are taken at a regular time interval, as selected in *Sample rate*. These readings are related to time and date and are stored in the EasyLog module's non-volatile memory as a sequence of values. Logging stops and the module shuts down once its memory is full of readings. The module will then display either '---' or 'FULL' on its LCD. Data accumulated in *Normal mode* can be graphed in OM-EL-WIN.

Rolling mode

Rolling mode is similar to *Normal mode*, in that data is recorded over a period of time. The readings are taken at a regular time interval, as selected in *Sample rate*. These readings are related to time and date and are stored in the EasyLog module's non-volatile memory as a sequence of values.

The main difference is that in *Rolling mode*, logging does not stop once the memory is full. Instead, the oldest recorded data is overwritten with new readings. The EasyLog module continues to log data until the user tells it to stop in OM-EL-WIN, or until the voltage of the module's on-board battery has reached a very low level. Data accumulated in *Rolling mode* can be graphed in OM-EL-WIN.

Histogram mode

In *Histogram mode*, as in *Normal mode* and *Rolling mode*, readings are taken at a regular time interval, as selected in *Sample rate*. In *Histogram mode*, the values of individual readings are not related to time and date. Instead, the occurrence of each reading is recorded. This means that, when compared to *Normal mode* or *Rolling mode*, many more readings can be stored over a much longer period of time. Potentially, many millions of readings can be stored before the module is full. Data accumulated in *Histogram mode* can be graphed in OM-EL-WIN.

One-shot mode

Whereas in *Normal mode*, *Rolling mode* and *Histogram mode*, readings are taken at regular time intervals, in *One-shot mode*, a reading is only taken and stored in the EasyLog module's non-volatile memory when the one-shot button is pressed. Each reading is stored together with the time and date at which the button was pressed. This means that, in *One-shot mode*, far fewer readings can be stored than in *Normal mode* or *Rolling mode*. Logging stops and the module shuts down once its memory is full of readings. The module will then display either '---' or 'FULL' on its LCD. Because, in *One-shot mode*, readings are not taken at regular time intervals, they cannot be graphed in OM-EL-WIN. Instead, export this data to a spreadsheet (see Graphing) for further processing.

f) Clear log

Before an EasyLog module can be used for a new datalogging exercise, any old stored readings must be erased. This is done by clicking on *Clear log*. Although all old readings are erased, the module's configuration parameters (*Logger name*, *Sensor type*, *Display symbols*, *Sample rate* and *Storage mode*) and the *Autocue* setting remain unchanged. If the EasyLog module is logging when *Clear log* is clicked, then a warning message appears to indicate that the logger will be stopped and any data will be cleared. Clicking on *OK* will then stop the logging process and erase all the stored readings.

g) Reset

To reset an EasyLog module's configuration parameters (*Module name*, *Sensor type*, *Display symbols*, *Sample rate* and *Storage mode*) to factory defaults and erase any stored readings, click on *Reset*. The *Autocue* setting remains unchanged. If the EasyLog module is logging when *Reset* is clicked, then a warning message appears to indicate that the EasyLog will be stopped and reset to factory defaults and that any data will be lost. Clicking on *OK* will then stop the logging process and reset the module.

h) Mimic, Multi-mimic

To view 'live' readings from an EasyLog module on your computer screen, click on *Mimic*. To use this feature, the EasyLog module must not be logging. Click on *Multi-mimic* in the main window to view the readings of all connected EasyLog modules on screen.

III) Calibrating the EasyLog module

Once an EasyLog module has been configured, it needs to be calibrated. The calibration process ensures that any errors, introduced by connecting a sensor to an EasyLog module, are reduced.

Click on *Calibrate* to open the calibration window. This offers you a choice of two calibration methods : *Default* calibration and *User calibration*.

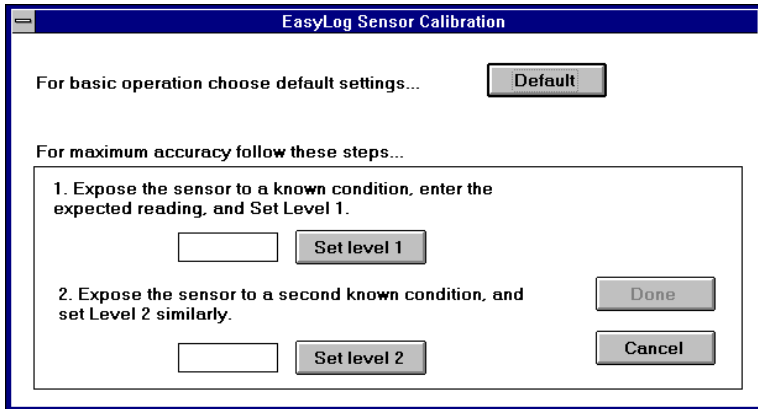


Figure 6: Calibration

1) Default calibration

Default calibration uses factory calibration settings, and can be used for the ranges : Voltage (0 to 2V and 0 to 20V), Current (0 to 2A and 0 to 20A), and Frequency.

Note : Humidity (%RH) and pH can only be calibrated in *User calibration*.
Rate count cannot be calibrated by the user.

2) User calibration

- i) Apply a known input to the EasyLog module.
 - If you are using a sensor, then subject the sensor (Temperature, Humidity, pH) to a known condition.
 - If you are measuring Voltage or Current, then apply a known voltage or current.
 - If you are measuring Frequency, then apply a known frequency.
- ii) Enter the value you would like to display on the EasyLog module for the input you have applied.
- iii) Click on *Set level 1*.
- iv) Apply a second known input to the EasyLog module.
- v) Enter the value you would like to display on the EasyLog module for the input you have applied.
- vi) Click on *Set level 2*.
- vii) Click on *Done* to download the calibration settings to the EasyLog module.

IV) Start logging

Once an EasyLog module has been configured and calibrated, it can start logging. Three starting modes are available : Immediate start, Push to start and Delayed start. In each of these starting modes, an activity symbol can be displayed to show that the module is active. Once configured for one of the starting modes, the EasyLog module(s) may be disconnected from the computer.

Because the computer's internal time and date are downloaded to the module when *Start log* is selected, it is important for you to check that your computer's system time and system date are correct before you start a logging exercise. In addition, you must ensure that, in *Windows Program Manager, Main, Control panel, International*, the date format has been set to *DMY* format and the time format has been set to *24 Hour* format. To view the current system time and system date together, click on *Start log, Options* and tick the *Delayed start* box. The current system time is shown in the starting window.

1) Show active

When an EasyLog module is configured with a long Sample rate, the time interval between consecutive display updates will be relatively long. To indicate visually that the module is fully operational, click on Start log and tick the Show active box prior to Starting the module.

Note: The setting of Show active may introduce inaccuracies in the EasyLog module's sample rate. While the majority of applications are mostly unaffected by these inaccuracies, time-critical applications should have Show active switched off.

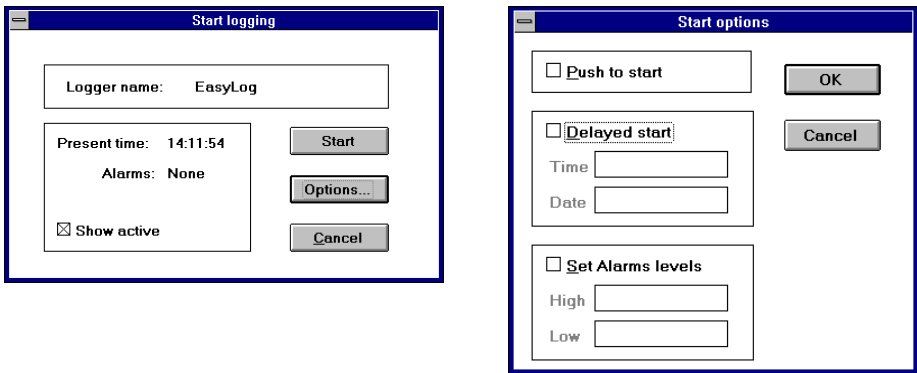


Figure 7: Start Logging

2) Immediate start

By far the easiest method to start logging is achieved by clicking on *Start log* and then on *Start*. The EasyLog module will then start logging immediately.

When an EasyLog module has been configured to log in Histogram mode, the action of clicking on *Start log* and then on *Start* will not cause the module to start immediately. Instead, there is a 20 second delay, during which the module is being set up for Histogram mode.

3) Push to start

Some applications require that an EasyLog module is primed and ready to start at the push of a button, without the need for a computer. This may be the case, for example, if you want to configure the EasyLog module in the office or laboratory, but only want to start logging when you are at the location where you want to accumulate data, maybe a shop floor or a storage area. To select Push to start mode, click on *Start log* and *Options*, then tick the *Push to start* box, and click on *OK* and *Start*.

Once the EasyLog module has started logging, the push button takes on its secondary function. It effectively becomes a *Push to read* button. When in *Push to read* mode, every push of the button updates the reading on the display, but does not log that reading, nor does it indicate the exceeding of an alarm level. *Push to read* is especially useful with long sample rates, where you may want to update the display without affecting the logging cycle.

4) Delayed start

Delayed start is ideal for those applications that require an EasyLog module to be primed and ready to start at a pre-defined time and date in the future, without the need for a computer. As there is no 'group start' command in OM-EL-WIN, Delayed start will ensure that multiple EasyLog modules start logging at the same time.

To select Delayed start mode, click on *Start log* and *Options*, then tick the *Delayed start* box. This will cause the *Time* and *Date* boxes to show the current time and date, as defined by your computer's clock. If the time and/or date are incorrect, then you must correct these before proceeding. (See intro of Chapter IV : Start logging)

5) Set alarm levels

EasyLog modules can be programmed to give a visual indication when the reading exceeds one of two pre-programmed alarm levels.

In addition, the status of these alarm levels has been made available on EasyLog modules via 2 output pins, one for each alarm level. These pins can be connected to external electronic circuitry to turn the EasyLog module into a comprehensive measurement, logging and control system. For further information on the pin-out, consult the EasyLog module's datasheet.

Alarm levels are by default switched off, but can be set by clicking on *Start log, Options* and ticking the *Set Alarm levels* box. This activates the two alarm level boxes, allowing you to enter a *High* alarm and a *Low* alarm value.

It is not possible to enter two identical alarm levels or to enter only one alarm level. If only one alarm level is required, then enter the other as an end-of-scale value in such a way that it is opposite to the only required alarm level.

In Multi-mimic mode, any alarm levels reached will be indicated on screen by a ‘HI!’ or ‘LO!’ message next to the reading, together with a red bar across the reading. In addition, the computer will beep every time the logger’s reading exceeds an alarm level. To switch off this beep, go to *Windows Program Manager, Main, Control panel, Sound* and untick the *Enable System Sounds* box.

Note: The setting of alarm levels may introduce inaccuracies in the EasyLog module’s sample rate. While the majority of applications are mostly unaffected by these inaccuracies, time-critical applications should have the alarms switched off.

V) Stop logging

Once sufficient data has been accumulated, an EasyLog module can be told to stop logging.

To stop a datalogging exercise, click the *Stop log* button. Before OM-EL-WIN tells the EasyLog module to stop logging, you will be asked for confirmation that you do indeed want to stop logging. This important safety measure has been included because, once a logging exercise has been terminated, it cannot be re-started.

VI) Downloading data from EasyLog module to computer

Once a datalogging exercise has been terminated, the stored data can be downloaded to computer for analysis.

To download data from an EasyLog module to your computer, click on *Save data*. A window opens, allowing you to specify a directory and filename for the downloaded data. The selection of an appropriate filename will ensure that the desired file can be easily identified at a later date.

VII) Analyzing the downloaded data

Once data has been downloaded from an EasyLog module to a computer, it can be analyzed. This can be done by using OM-EL-WIN's built-in graphing module, or by exporting the data to another software application (e.g.: Spreadsheet, Wordprocessor, Database, Statistical Process Control package, etc.).

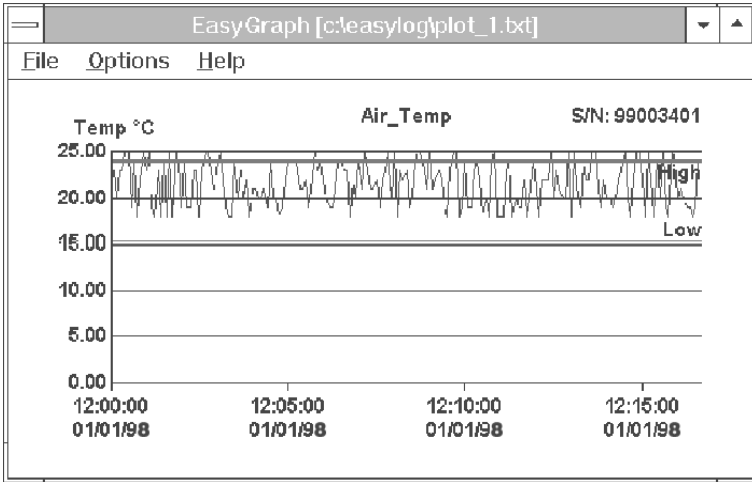


Figure 8: Graphing

1) Graphing with OM-EL-WIN

OM-EL-WIN has been designed in such a way that most datalogging exercises can be performed from beginning (Start logging) to end (Graphing of downloaded data), without the need for third party software.

Data accumulated in *Normal mode*, *Rolling mode* and *Histogram mode* can be graphed using OM-EL-WIN's graphing module. Data accumulated using *One-shot mode* cannot be graphed in OM-EL-WIN, this data must be processed using a spreadsheet (See Chapter VIII Part 2). It is theoretically possible for data, accumulated in *Normal mode*, *Rolling mode* and *One-shot mode*, to be converted into a histogram. You will require a spreadsheet to do this. Data accumulated in *Histogram mode* does not contain any time or date information, it can therefore not be converted (either in OM-EL-WIN or in another software application) into a 'Normal mode' or 'Rolling mode' graph.

a) Viewing graphs

To view an EasyLog datafile, click on the *Graph data* button and select the datafile that you wish to graph. If you gave the datafile an appropriate name during the download procedure, then your file should be easy to identify.

Once you have clicked on OK, your datafile will be graphed. Click the maximize button in the top right hand corner to view the graph full-screen. You will notice instantly that the following information is automatically included on your graph :

i) for data recorded in Normal mode and Rolling mode

- The EasyLog module's serial number is displayed in the top right hand corner.
- The graph title, up to 30 characters long, is displayed above the graph.
- Any Alarm levels are displayed as horizontal red lines.
- The Y-axis is automatically scaled to display the two largest recorded values.
- The X-axis displays time and date.
- Any fault conditions are displayed as black vertical lines.

ii) for data recorded in Histogram mode

- The EasyLog module's serial number is displayed in the top right hand corner.
- The graph title, up to 30 characters long, is displayed above the graph.
- The Y-axis is automatically scaled to display count total.
- The X-axis displays the measured parameter, divided into sample groups.

Clicking near a point on the graph will result in the nearest plot point being temporarily highlighted with a black dot. That point's value together with the time at which it was logged are displayed in the top left hand corner of the graph.

b) Overlaying multiple graphs

Up to three graphs can be graphed together as an overlay of plots. For this to be possible, the three following conditions must be adhered to.

- Logging must have started at the same time for each EasyLog module.
- Each EasyLog module must have been set up with the same sample rate.
- Each EasyLog module must have been set up for the same logging mode

To overlay a graph over an existing one, click on *Options, Plot over* and select the second datafile for which you want to plot the graph.

To distinguish between multiple plots, click on *Options, Colours* and assign a different colour to each plot. The bottom right hand corner of the screen will then show an index of the colours used. It is important that colours are chosen in such a way that they not only look correct on screen, but are also distinguishable as a grey scale on a laser printer.

If a mono plot has been selected in *Options, Colours*, then a different line type is automatically assigned to each plot. The bottom right hand corner of the screen will show an index of the line types used.

2) Customizing graphs

Graphs can be customized to add detail and meaning to the plotted data. To ensure the integrity of EasyLog datafiles, the files cannot be re-saved with customized graph settings.

a) Fonts

When incorporating EasyLog graphs into reports, it is sometimes important to copy the style of that report. In OM-EL-WIN, it is possible to customize the font, font style and font size on your EasyLog graphs. Click on *Options, Font* and make your selection.

b) Adding detail to the graph

Append info

Clicking on *Options, Append info* displays information about the downloaded data from an EasyLog module in the bottom left hand corner of the screen.

- Sensor* : The sensor type or input type used.
- Readings* : The amount of readings that were accumulated and which are represented on this graph.
- Every* : The sample rate.

Mark points

A graph consists of individual plot points that represent actual readings, connected by mathematically calculated straight lines. It is important to remember that these straight lines do not represent actual readings. In order to distinguish between actual readings and mathematically calculated ones, click on *Options, Mark points*. This adds a set of small circles to the graph, each circle indicating an actual reading. To toggle *Mark points* on and off, click on *Options, Mark points*.

When *Filter: Mean of last 5* has been enabled, the small circles indicate the calculated means, and again it is important to remember that these do not represent actual readings.

Alarm levels

Alarm levels are indicated on a graph by a thick red line for each alarm level, accompanied by the words High or Low to indicate the level of each alarm. To toggle the display of the alarm levels on and off, click on *Options, Alarm levels*.

Show warnings

Some EasyLog modules will memorize certain error conditions, encountered during the logging process. These can later be displayed on the graph, by selecting *Options, Show warnings*.

- The first occurrence of a low battery voltage condition is indicated as a vertical line on the graph and the letters *LB*. The value of any readings towards the right of this line may be incorrect.
- The first occurrence of an interruption of the module's power supply is indicated as a vertical line on the graph and the letters *PF*. The time and date of any readings towards the right of this line may be incorrect.

Zoom in & out

When a graph contains many readings, it becomes cluttered. In order to view the detail in a graph, it is possible to zoom in. The factor by which you can zoom in will depend on the amount of readings on the graph.

To zoom in, click on *Options, Zoom in*. A scroll bar at the bottom of the screen allows you to view adjacent parts of the graph.

To view all the readings in a single window, zoom out again by clicking on *Options, Zoom out*. This is also the default view when a graph is first plotted.

Graph axes

To add more meaning to a graph's axes, they can be customized as follows.

- Graph title*: A name, up to 30 characters long, to appear above the graph.
Y label : A name, up to 30 characters long, to appear above the Y axis.
X label : A name, up to 30 characters long, to appear below the X axis.

Y axis

- Tick every* : With the *Y grid* box ticked, this shows the vertical grid interval.
Min : Shows the lower limit of the Y axis scale.
Max : Shows the upper limit of the Y axis scale.
Y grid : When ticked, enables the vertical grid interval setting.

X axis (not available in Histogram mode)

- Tick every* : With the *X grid* box ticked, this shows the horizontal grid interval. Use the adjacent list box to select the time unit.
Clock Time : When ticked, the X axis displays the time and date at which the readings were taken.
Elapsed time : When ticked, the X axis displays accumulative time and date, starting from zero time and zero date.
X Grid : When ticked, enables the horizontal grid interval setting.

c) Filtering data

In certain applications, the actual value of a reading at a given time and date is less important than the underlying trend that is hidden in the graph. To bring out this underlying trend and, in the process, reduce the amount of 'noise' on a graph, click *Options, Filter: Mean of last 5*. A new graph is displayed, showing far fewer fluctuations.

Filter: Mean of last 5 must be switched off before overlaying graphs, using *Plot over in File*. Once graphs have been overlaid, they can be filtered using *Filter: Mean of last 5*.

To differentiate between true readings and filtered readings (*Filter: Mean of last 5*) on a graph, whether on screen or on a print-out, the text "Filtered data" is added next to the Y axis label.

d) Histograms

Data accumulated in *Histogram mode* is not related to time or date. In a histogram, it is the frequency of occurrence of a particular reading that is of importance.

A histogram is a graphical representation of grouped data. The X axis is divided into segments with lengths proportional to each sample group interval. On these segments, rectangles are drawn with areas proportional to the numbers in the sample group intervals. As all sample group intervals are of equal size, the heights of the rectangles (Y-axis) are proportional to the number of occurrences.

By clicking *Options, Histogram style*, the following settings become available.

Y axis

| | | |
|--------------------------|---|---|
| <i>Count totalizer</i> | : | Displays the total amount of occurrences in a class. |
| <i>Accumulated hours</i> | : | Displays the total time of the occurrences in a class. |
| <i>% of total time</i> | : | Displays the total amount of occurrences in a class as a percentage of the total amount of occurrences of all readings. |

Sample group interval: Choose the width of class interval (sample group interval). (similar effect to *Filter: Mean of last 5* in *Normal mode* and *Rolling mode*.)

VIII) Exporting data

Data, stored inside an EasyLog module, can be downloaded via OM-EL-WIN and exported to other software applications for further processing. This may be necessary when OM-EL-WIN's graphing features, though extensive, are not sufficient for the intended purpose.

1) EasyLog datafile formats

To convert data into a format that is acceptable by another application, there are different procedures to follow, depending on the storage mode initially chosen for the data (*Normal mode, Rolling mode, Histogram mode, One-shot mode*).

2) Exporting data

Normal and Rolling mode

Data accumulated in *Normal mode* and *Rolling mode* can be exported into a format that is acceptable by most third party applications, by using OM-EL-WIN as the translating medium.

- Download the data from the EasyLog module to the computer using OM-EL-WIN by clicking on *Save data*.
- Enter the graphing module by clicking on *Graph data*. Select the file that you want to export and click on *OK*. The data in that file will be graphed.
- Select *Options, Export data*.
- Enter a new filename for the exported data. To ensure integrity of the original datafile, do not use the same filename as that of the originally datafile.
- The new file now contains the logged data in tabular format, ready for use in your target application. The four columns in the table show Reading number, Date, Time and Reading value.

Histogram mode

Data accumulated in *Histogram mode* cannot be exported to another application using OM-EL-WIN. Instead, proceed as follows.

- Download the data from the EasyLog module to computer using OM-EL-WIN by clicking on *Save data*.
- Open the file containing the saved data in a spreadsheet.
- Analyze the data, using the data in Appendix A.

One-shot mode

Data accumulated in *One-shot mode* cannot be exported to another application using OM-EL-WIN. Instead, proceed as follows.

- Download the data from the EasyLog module to computer using OM-EL-WIN by clicking on *Save data*.
- Open the file containing the saved data in a spreadsheet.
- Analyze the data, using the data in Appendix A.
- The file now contains the logged data in tabular format, ready for use in your target application. The three columns in the table show Date, Time and Reading value.

Appendix A : File Header Description

Documented below is a typical File Header (plus brief explanatory comments) for a Normal OM-EL-WIN datalogger file. For compressed data files, the file header is similar, but the data format is different. OMEGA recommends that compressed files are expanded within OM-EL-WIN and re-saved in uncompressed format, before attempting to manipulate them.

```

EASYDATA      Generic File Name
3             (Data) File Type **
EasyLog      EasyLog Module's Logger Name *
10          Number of Samples in this Data File : $$
0076832041   EasyLog Module's Serial No
1           Units Annunciator (0=none, 1=°C, 2=V, 3=Hz, 4=°F,
              5=A, 6=%RH, 7=pH, 8=Ohm)
2           Scaler Annunciator (0=μ, 1=m, 2=none, 3=k, 4=M)
0           Sensor Type (0=T°C, 1=T°F, 2=RH, 3=pH, 4=Freq,
              5=Count, 6=2V, 7=20V )
0           Sample Rate (0=5s, 1=10s, 2=20s, 3=1m, 4=5m,
              5=10m, 6=20m, 7=1Hr, 8=4Hr, 9= 12Hr)
0           Storage mode (0=Normal, 1= Histogram, 2=Rolling,
              3=One-Shot)
1.00        Calibration Multiplier **
-40.00      Calibration Offset **
20.00      High Alarm Level
10.00      Low Alarm Level
0           Alarm Mode (0=Off, 1=On)
0           Sample No of 1st Low Battery Warning ***
0           Sample No of 1st Power Fail Warning ***
145042030896 Start Time and Date ****
20.000     First Reading Value --      |
20.000     Next Reading Value |
24.000     .                       |
23.000     .                       |
24.000     .                       |          $$ Total No of samples =10
23.000     .                       |
24.000     .                       |
23.000     .                       |
24.000     .                       |
23.000     .                       |
24.000     .                       |
23.000     .                       |

```

* The Logger Name supports upper and lower case characters. As the first 8 characters are later used as a DOS file name, it is recommended that, where possible, these 8 characters form a unique name. This will minimize the risk of accidentally overwriting an existing file.

** These parameters are completely omitted from Type 3 data files, unless Storage Mode=1. For Type 4 data files, these values are always present.

*** If not zero (0=No Error), then this is the Sample Number of the first sample where the specified error occurred. Data from this Sample Number onwards should be treated as suspect.

**** EasyLog stores the date in the UK convention (ddmmyy) with one important exception. The value shown for the month is referenced from zero, i.e.: Jan=00 . . . Dec=11. If you are manipulating an EasyLog Data File directly, then True Month = EasyLog Month +1.

—%—
 % of total time (graph) 23

—A—
 Accumulated hours (graph) 23
 Activity symbol (~) 14, 15
 Address (module) 8
 Advanced button 7, 8, 10
 Alarm beep 17
 Alarm levels 10, 16, 17
 Alarm levels (default) 16
 Alarm levels (graph) 21
 Alarm output pins 16
 Append info 20
 Autocue 12

—B—
 Battery 5, 11
 Baud rate 77
 7

—C—
 Calibration 13, 14
 Clear log 9, 12
 Clock Time (graph) 22
 Colours (graph) 20
 COM port 5, 6
 Communication errors 7
 Communications 5
 Communications failure message 6, 8
 Configuration settings (module) 12
 Connection 7
 Count totalizer (graph) 23

—D—
 Daisychaining modules 8, 16
 Data storage (module) 11, 12
 Date (Computer internal) 14
 Date format 14
 Default calibration 13
 Default settings 12
 Default settings (module) 12
 Display symbols 10, 12
 Downloading data 17
 Duration (log) 10

—F—
 Filter (Mean of last 5) 21, 22
 Font (graph) 20
 Full (module) 11, 12
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—G—
 Graph axes 22
 Graph title 19, 22
 Graphing (Histogram mode) 11
 Graphing (Normal mode) 11
 Graphing (One-shot mode) 12
 Graphing (Rolling mode) 11

—H—
 High alarm 16
 Histogram 23
 Histogram style (graph) 23

—L—
 Line type (graph) 20
 Low alarm 16
 Low battery (graph) 21

—M—
 Mark points 21
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 Measurement Input (frequency) 10, 13
 Measurement Input (humidity) 10, 13
 Measurement Input (module) 5, 9, 10, 14
 Measurement Input (pH) 10, 13
 Measurement Input (rate count) 10, 13
 Measurement Input (temperature) 10
 Measurement Input (voltage) 5, 10, 11, 13
 Mimic 12
 Min (graph) 22
 Module name 9, 12
 Multi-mimic 12, 17
 Multiple EasyLog modules 7

—O—
 Options box 7

—P—

| | |
|-----------------------|----|
| Plot over | 19 |
| Power failure (graph) | 21 |

—R—

| | |
|--------|-------|
| Reset | 9, 12 |
| RS 232 | 5 |

—S—

| | |
|-------------------------------|--------------------|
| Sample group interval (graph) | 23 |
| Sample rate | 9, 10, 11, 12, 15 |
| Save data button | 17 |
| Scaler symbols | 10 |
| Search | 6 |
| Search failure | 6, 8 |
| Search limit | 7, 8 |
| Sensor | 5 |
| Sensor type | 5, 9, 10, 12, 13 |
| Serial number (module) | 9, 19 |
| Serial port | 5 |
| Set level 1 button | 14 |
| Set level 2 button | 14 |
| Show warnings (graph) | 21 |
| Smart search | 8 |
| Software installation | 4 |
| Start logging | 14, 15 |
| Starting mode (Delayed) | 14, 16 |
| Starting mode (Immediate) | 14, 15 |
| Starting mode (Push to start) | 14, 16 |
| Stop logging | 12, 17 |
| Storage mode (Normal) | 11, 19, 24 |
| Storage mode | 9, 10, 11, 12 |
| Storage mode (Histogram) | 11, 15, 19, 23, 24 |
| Storage mode (One-shot) | 11, 12, 25 |
| Storage mode (Rolling) | 11, 19, 24 |
| System time (checking) | 14 |

—T—

| | |
|--------------------------|----|
| Tick every (graph) | 22 |
| Time (computer internal) | 14 |
| Time format | 14 |

—U—

| | |
|------------------|--------|
| Unit symbols | 10 |
| User calibration | 13, 14 |

—X—

| | |
|----------------|--------|
| X axis | 22, 23 |
| X Grid (graph) | 22 |
| X label | 22 |

—Y—

| | |
|----------------|--------|
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| Y grid (graph) | 22 |
| Y label | 22 |

—Z—

| | |
|----------|----|
| Zoom in | 21 |
| Zoom out | 21 |

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