

Temprecord MLV User's Manual

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Temprecord MLV User's Manual

Version 1.5

This is the User's Manual for the Temprecord Multiple Logger Validation ("MLV") software utility. The contents of this manual mirror the online help provided with the application, but the format of this PDF file is better suited to printing.

Temprecord MLV User's Manual

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1 Introduction

Temprecord Multiple Logger Validation Utility

The Temprecord Multiple Logger Validation Utility ("MLV") is a program intended to be used in conjunction with the datafiles from Temprecord loggers. Its prime purpose is to assess the accuracy of a group of loggers and provide graphs and reports with a minimum of user input



This help text pertains to versions of Temprecord MLV software from version 1.5 onwards. Earlier versions of MLV may not have some of the features described in this help.

MLV is designed to remove much of the manual labour associated with logger and environment validation. Key points are:

- Any mix of Temprecord logger variants or firmware revisions may be used, including Mon-T loggers.
- The loggers do not all need to be logging data with the same sample period.
- The loggers do not all need to be started together. MLV automatically time-aligns individual data files and any associated reference data.
- The loggers need not be stopped before data analysis can take place.
- Data from any arbitrary group of loggers can be processed.
- MLV does not require physical access to the loggers for analysis, only to the data files produced from them.
- No manual logging or retrieval of Hart reference data is required. MLV can log the meter output continuously and save the logged temperatures to a file.
- A reference is not required - the loggers can be checked against a constant value, against their collective mean, or against another single Temprecord logged data file.
- It is not necessary to interact with MLV between runs.
- Data analysis is more or less completely automatic.
- MLV incorporates a powerful project-based system that enables the user to save and quickly return to previous validation setups, and to quickly change settings and regenerate reports.
- reports and plots are highly configurable.
- optional username and password access control system



All temperature values in the MLV program and the associated documentation are specified in degrees Celsius (°C). All humidity values are specified in terms of percentage relative humidity (%RH).



Temprecord also manufactures loggers for humidity logging. These loggers can be configured to log humidity, temperature, or both. All of the features and reports of MLV discussed in this on-line help also apply to humidity. In this case all humidity values in the MLV program and the associated documentation are specified in units of percentage of [relative humidity](#) (%RH). There are some [special considerations](#) you need to bear in mind when using humidity loggers.



Important

- MLV performs complex statistical analyses. Do not, however, assume that the results you obtain are correct, or your interpretation of them is correct. Always cross-check your results, either with direct examination of the relevant Temprecord data file, or by independent verification. In particular, you should read the section on [factors affecting accuracy of results](#).
- Temprecord is always improving its products. We reserve the right to make improvements to MLV. Some of these improvements may require you to adjust the settings you may have made. We will endeavor to make every attempt to warn users of this, should the need occur.

See also:

[How to use Help](#)

[Getting started](#)

[What's new in this version?](#)

[MLV Startup "Wizard"](#)

[Installation notes](#)

[Your test environment](#)

[MLV Projects](#)

[Project Options](#)

[Preparing data files](#)

[Adding and removing data files](#)

[References](#)

[Humidity](#)

[Reporting](#)

[Factors affecting accuracy of results](#)

[Formatting report filenames](#)

[Printing Options](#)

[Interpreting MLV summary reports](#)

[How MLV determines the reporting interval](#)

[How MLV determines the plot interval](#)

[General Options](#)

[The Log Tab](#)

[The System Tab](#)

[Appendices](#)

[Using the Fluke/Hart Scientific 1502A Thermometer as the reference](#)

[Access Control System](#)

[Example Projects](#)

[About MLV Help](#)

2 Getting started

This topic is designed to get the first-time MLV user started in as little time as possible. It provides step-by-step instructions for creating a new MLV project from scratch and generating a report.

It is assumed that the user is familiar with the Temprecord software for programming Temprecord loggers and saving datafiles. To carry out the steps in this tutorial you will need one or more Temprecord data files. If you have more than one datafile they should have all recorded data over approximately the same time interval.

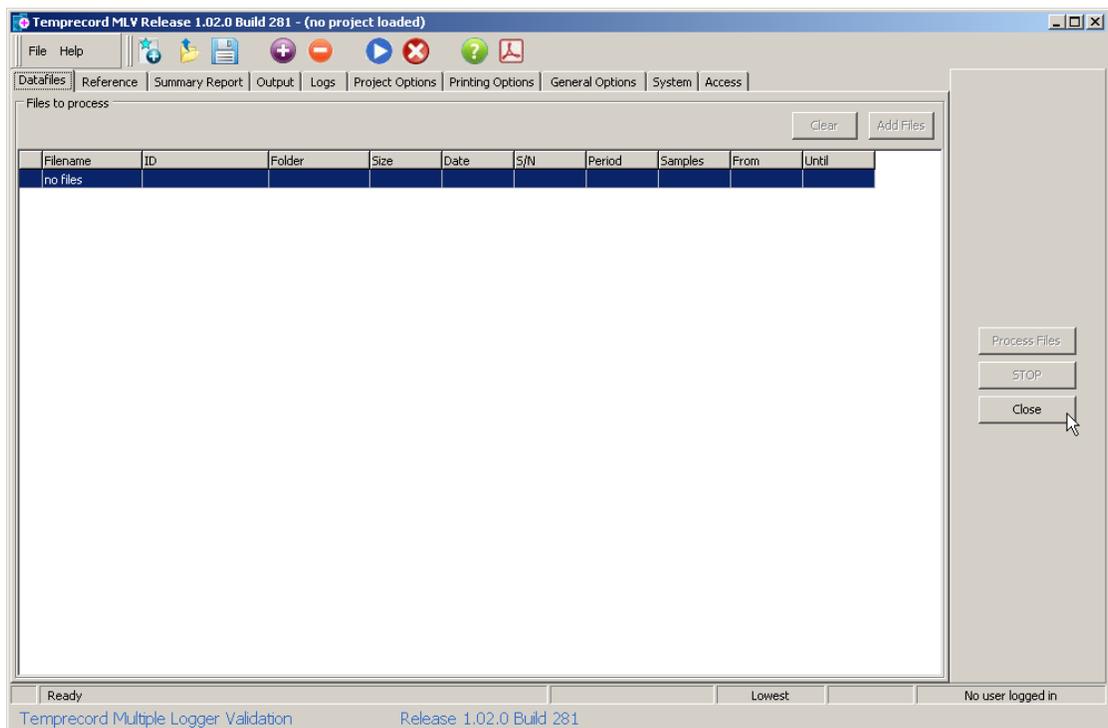
Start MLV by clicking on the quick launch button  on the taskbar, double-clicking the MLV shortcut



on the desktop, or selecting Temprecord MLV/Temprecord Multiple Logger Validation from the Start menu:



You should see the MLV main window:



Click on the panel that displays the access level (When MLV starts up the access level is set to the

10 Temprecord Multiple Logger Validation

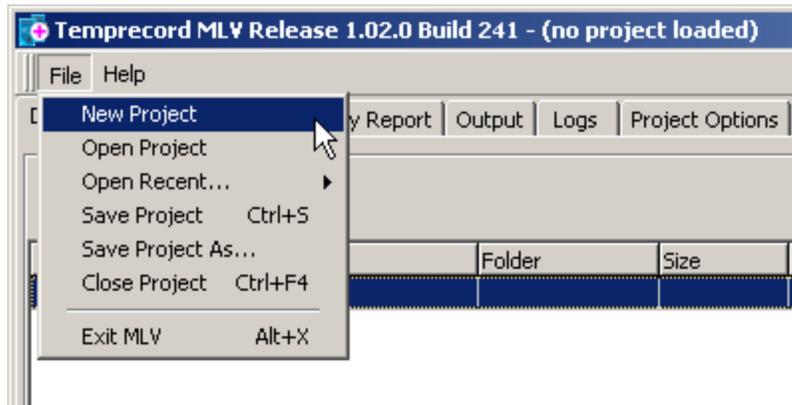
lowest level, so this panel will probably show "Lowest"):



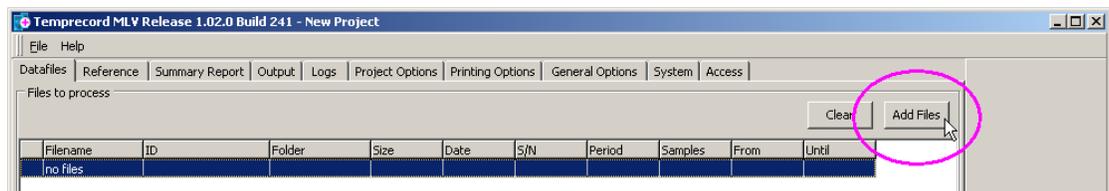
Enter your [username and password](#) into the dialog, and click on the OK button:



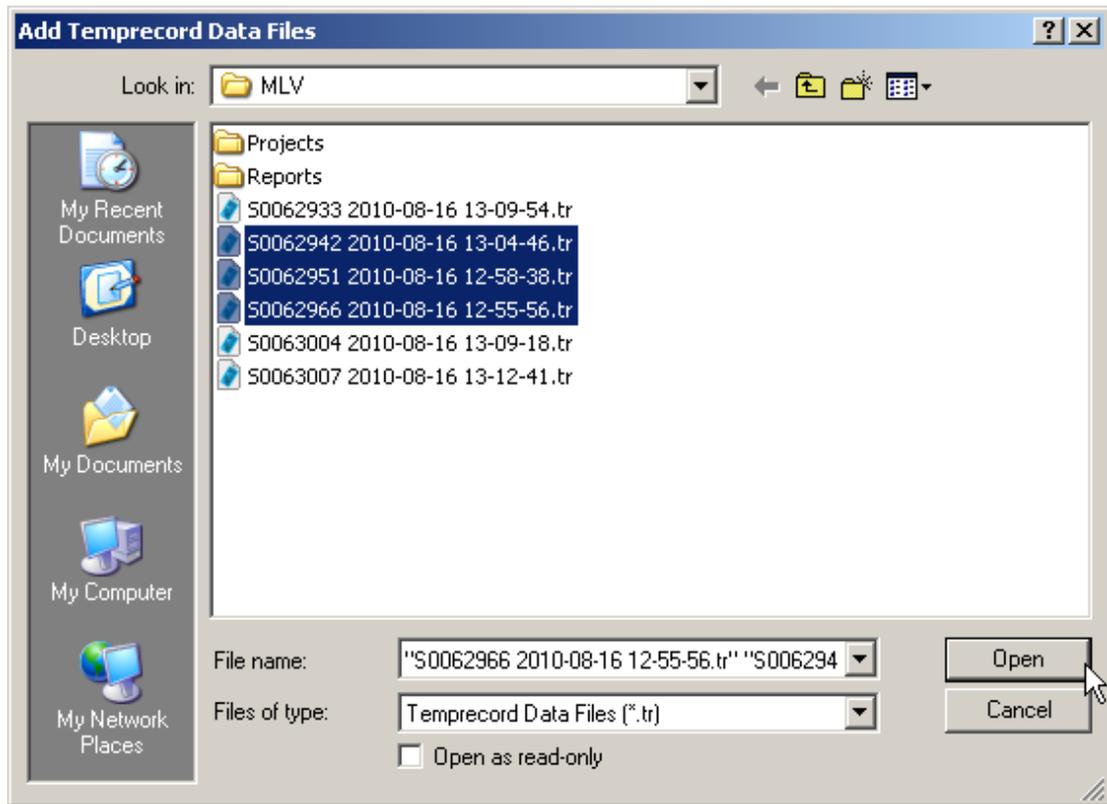
Click on File/New Project:



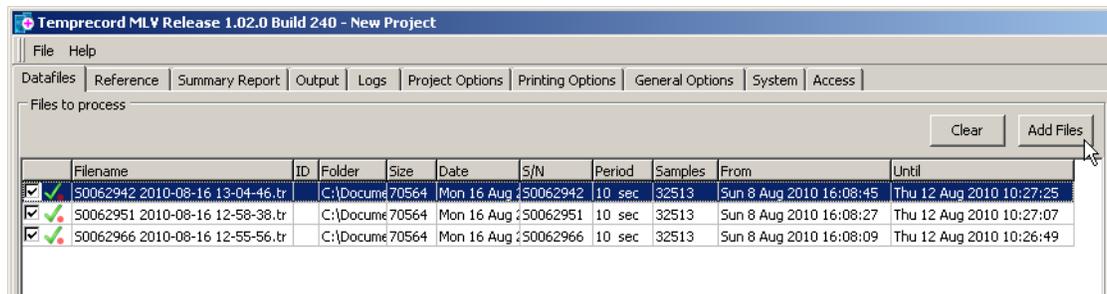
Click the Add Files button:



You will be presented with a dialog that by default only shows Temprecord data files (*.TR):

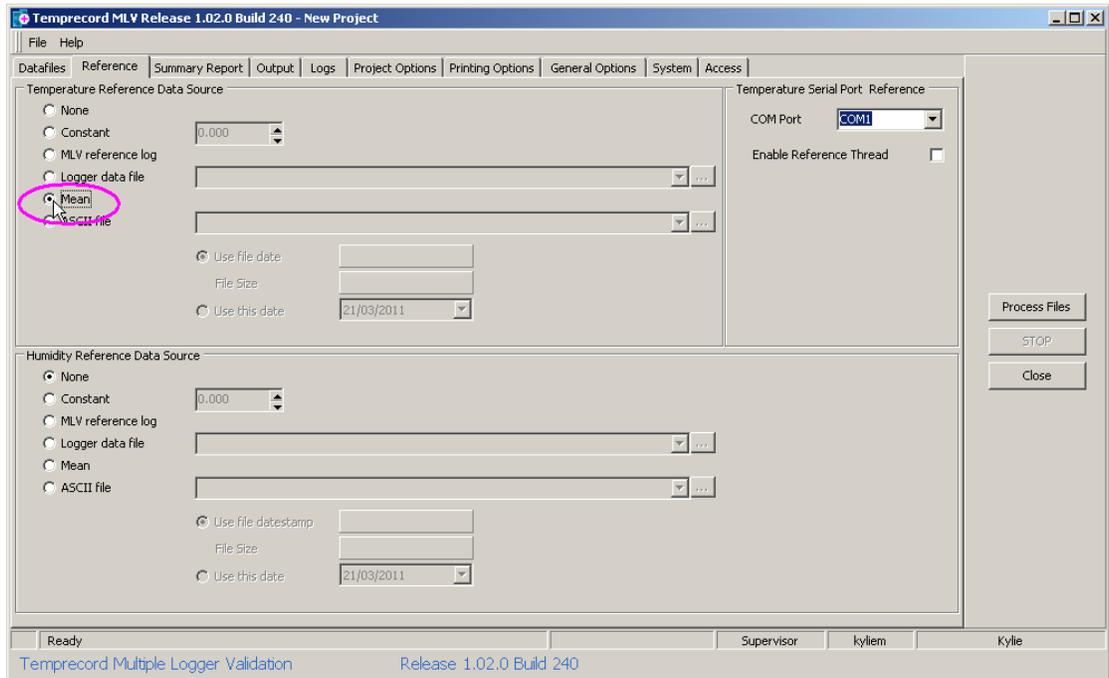


If the folder shown is not the one with the files you wish to analyze you should navigate to that folder. Select one or more files. To select one file, just click on its name. To select multiple files, hold the **Ctrl** key down as you click. When you have selected your data files, click the **Open** button. The files should then appear in the **Files to process** list:

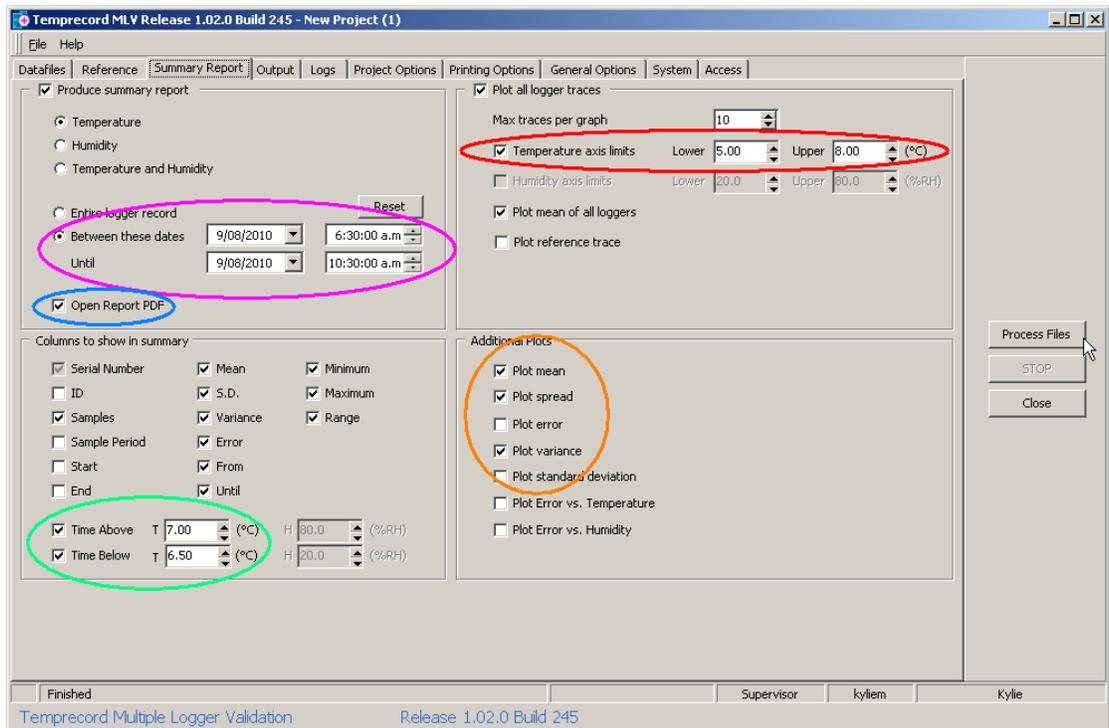


Now click on the **Reference** tab and select **Mean** as the **Temperature Reference Data Source** (this will compare the data in each of the loggers with the average or mean value of the loggers as the reference):

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Now click the **Summary Report** tab, and set the reporting options according to your requirements.



In this example, the following specific features have been made use of:

-  Reporting over a specific time interval.
-  Automatically opening the PDF report for inspection when MLV has completed processing.

-  Getting additional statistics for time spend above and below temperature limits (these limits will also be shown as a horizontal dotted line on the graph).
-  Specifying a fixed upper and lower temperature axis range (if this option is not selected MLV will scale the vertical axis to show the full range of the plotted parameters).
-  Specifying additional plots for the mean, spread and variance of the plotted data.

Now all there is left to do is to click the  button, and wait a few seconds for MLV to produce and open your PDF report.

See also:

[MLV Projects](#)

[Project Options](#)

[Preparing Datafiles](#)

[References](#)

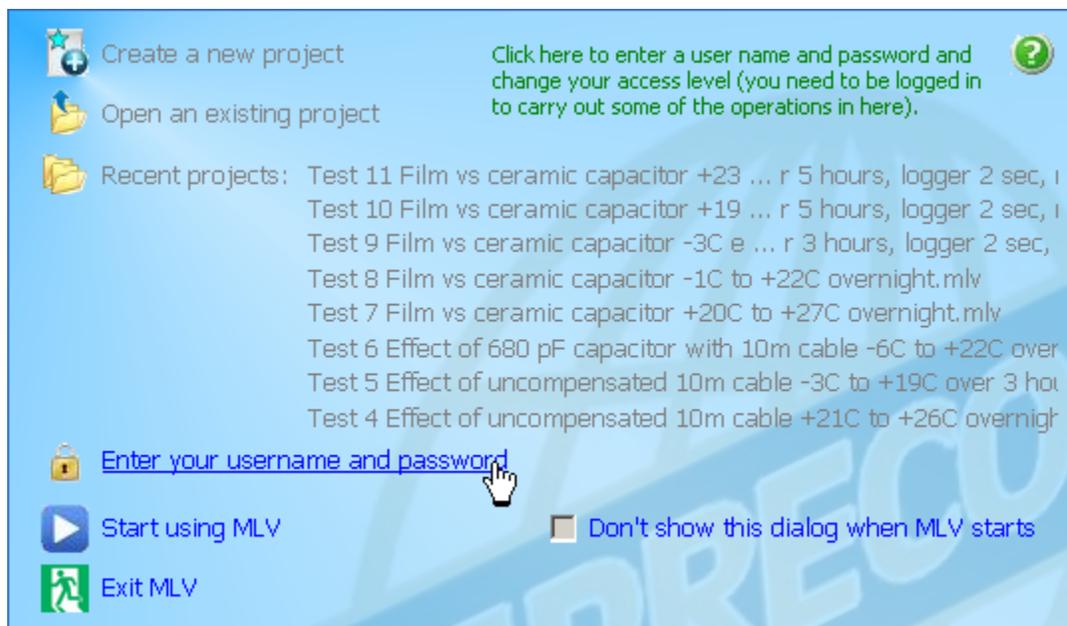
[Reporting](#)

[Printing Options](#)

[Information, Warning and Error Messages](#)

3 MLV Startup "Wizard"

A default installation of MLV will show the following startup "wizard" when you run it. The intention is to provide first-time users a clear indication of the choices available to them:



Create a New Project

Clicking on this choice will cause the MLV to create a "blank" project - one that has default settings for all of the options and has no Tremprecord datafiles loaded. If you are not logged in as a MLV user with [Supervisor](#) or [Administrator](#) access, this entry will be grayed and will not be active.



Open an Existing Project

Clicking on this choice will open a dialog that allows you to select MLV project files. Select a file by clicking on it and click the [Open](#) button.



If there are no files shown it will be because the folder has no MLV project files in it. The MLV Project Files dialog only shows those files with a file type of `.mlv`, even if other files are present.



Recent Projects

MLV will list any recent projects it may have opened in the past. Up to the last 8 projects will be shown. Click on the project you want to open.



Enter your Username and Password

If your MLV installation has been configured to require access rights, you will need to enter a valid MLV username and password before you can perform most functions with MLV.



A default installation of MLV will generally start with no user being logged in. You need to be logged in as an [Operator](#) at least to open projects or choose from the recent projects, and you need to be logged in as a [Supervisor](#) at least to create new projects. Unless you are logged in as a user with these rights, clicking on the items will not work.



Start using MLV

Click on this choice to skip the options offered in this wizard and start using MLV. MLV will load the last project loaded when it was shut down, if any.



Exit MLV

Click on this choice to close the MLV program.

Don't show this dialog when MLV Starts

If you don't want to see this startup wizard each time you start MLV, make sure this checkbox is checked.

The Startup Wizard can also be skipped by checking the [Don't Show Wizard on Startup](#) checkbox in the [General Options](#) tab.

See also:

[Introduction](#)

[Getting started](#)

[General Options](#)

4 Installation Notes

Installation

To install MLV copy the file `mlv-setup.exe` to a temporary folder and run it. The setup file is not needed past installation and can be deleted when installation is successfully completed. MLV must be installed by a user with administrator rights.

Upgrading

Upgrading MLV is just a matter of obtaining the updated version of `mlv-setup.exe` from Temprecord and running it. There is no requirement to uninstall any current version of MLV first. Upgrading MLV will preserve all your folder and project settings.

Installation Options

MLV installation can be carried out in 3 distinct "flavours" by selecting the appropriate option at installation time (the folder names given are the nominal names for installation under Windows XP).

Installing for the current user only

MLV will be installed as an application for the current user only. The program settings are maintained in a configuration file that is stored in the user's local application data folder, nominally at:

```
C:\Documents and Settings\\Local Settings\Application
Data\Temprecord\MLV\
```

A folder tree for MLV project and data files is created off the user's `My Documents\` folder, nominally at:

```
C:\Documents and Settings\\My Documents\Temprecord\MLV\
```

The program Start Menu entries and desktop shortcut will only appear on the current user's Start Menu and desktop. Other users of the computer will only have access to the data files if they are able to navigate to this user's `My Documents\` folder.

Installing for all users, but with separate settings for each user

MLV will be installed as an application for all users of the computer. The program settings are maintained in a configuration file that is stored in the user's local application data folder however, nominally at:

```
C:\Documents and Settings\\Local Settings\Application
Data\Temprecord\MLV\
```

so each user has their own settings and any changes they make to these settings do not affect other users of the computer running MLV.

A folder tree for shared MLV data files and projects is created at installation time at:

```
C:\Documents and Settings\All Users\Documents\Temprecord\MLV\
```

In addition to this a folder tree for MLV project and data files will be created off the user's `My Documents` folder the first time that each user runs the application, nominally at:

```
C:\Documents and Settings\\My Documents\Temprecord\MLV\
```

The first time that the user runs MLV, the default folders for MLV files will be based on this folder. Other users of the computer will only have access to this user's data files if they are able to navigate to this user's `My Documents\` folder.

The program Start Menu entries and desktop shortcut will appear on every user's Start Menu and desktop.

Installing for all users with shared settings

MLV will be installed as an application for all users of the computer. The program settings are maintained in a configuration file that is stored in a common application data folder off the shared documents folder, nominally at:

`C:\Documents and Settings\All Users\Documents\Temprecord\Application Data\MLV\`

so all users will share the same settings. A folder tree for MLV project and data files will be created at installation time off the shared documents folder, nominally at:

`C:\Documents and Settings\All Users\Documents\Temprecord\MLV\`

and the first time that the user runs MLV, the default folders for MLV files will be based on this folder. No folders are created at installation time nor at run-time in the local user's `My Documents\` folder, though any user is free to do so of course. The program Start Menu entries and desktop shortcut will appear on every user's Start Menu and desktop.

Folders

By default, a new installation of MLV will create the following folders, and assign write permissions to them:

<code>C:\Program Files\Temprecord\MLV\</code>	EXE file
<code>C:\Program Files\Temprecord\MLV\Help\</code>	help CHM and PDF files
<code>C:\Program Files\Temprecord\MLV\Startup Log\</code>	startup log file
<code>C:\Program Files\Temprecord\MLV\Installation Logs\</code>	installation logs
<code>C:\Documents and Settings\All Users\Documents\Temprecord\MLV\</code>	data files (*.TR)
<code>C:\Documents and Settings\All Users\Documents\Temprecord\MLV\Projects\</code>	project files
<code>C:\Documents and Settings\All Users\Documents\Temprecord\MLV\Projects\Examples\</code>	example project files
<code>C:\Documents and Settings\All Users\Documents\Temprecord\MLV\Reports\</code>	PDF reports
<code>C:\Documents and Settings\<user name="">\Local Settings\Temp\Temprecord\MLV\</user></code>	temporary files
<code>C:\Documents and Settings\All Users\Documents\Temprecord\Application Data\</code>	master access control file (Master.acf)
<code>C:\Documents and Settings\<user name="">\Local Settings\Application Data\Temprecord\</user></code>	local access control file (Local.acf)
<code>C:\Documents and Settings\<user name="">\Local Settings\Application Data\Temprecord\MLV\</user></code>	settings file (MLV.cfg)
<code>C:\Documents and Settings\<user name="">\Local Settings\Application Data\Temprecord\MLV\Event Log\</user></code>	event log file, reference sample log

If the folders are not found when MLV itself starts, it will attempt to create them again.

Projects can reside in any folder however and if you load a project from a different folder, MLV remembers that folder from then on.

Datafiles can also reside in any folder, and a project can contain datafiles from more than one folder,

though it is good practice to keep all datafiles from a validation run together.

File Associations

Installation of MLV creates an association between the MLV application and MLV project files (*.mlv). This means that double-clicking a *.mlv file (or a shortcut to a *.mlv file) will open the MLV application and load that project file.

Note that there is already normally a file association between .TR files and the Temprecord application, if this is installed. Installation of MLV does not affect this association.

Access Control

MLV implements its own access system to limit access to certain functions of the program to groups of users. The MLV system of users and access levels is completely independent of the system Windows implements for users.

There are four access levels defined in MLV. In order of increasing ability, they are: **No access**, **Operator**, **Supervisor** and **Administrator**. Although the access levels have specific names, the assignment of capabilities to each level within the MLV application is arbitrary.

A new installation of MLV assigns default username and password accounts for each of the access levels. The MLV administrator would then normally create supervisor and operator accounts.

A default installation of MLV will start MLV at the lowest access level, where the only operation possible is to exit MLV again. It is possible to configure MLV to start execution at any access level by specifying command line parameters.

Defeating the Access Control System

If your environment has no need to control access to MLV functions, you can effectively defeat the access control system by the following steps.

- Install MLV
- Create a **Supervisor** user
- Make sure you are logged in to Windows as an administrator user.
- Right click the shortcut to MLV and select **Properties**.
- Click on the **Shortcut** tab. The **Target** field will show something like:

```
"C:\Program Files\Temprecord\MLV\mlv.exe"
```

- Edit the shortcut to read:

```
"C:\Program Files\Temprecord\MLV\mlv.exe /username supervisoruser /password supervisorpassword"
```

- Click on **OK**.
- Start MLV.
- Click on the **Access** tab.
- Set the **Access Timeout** to 999?9 (minutes)

MLV should start up at the access level of the username and password you specified, and the access level will not relegate for approximately one week.

5 Your test environment

Understanding your validation test environment is crucial to obtaining accurate and meaningful results from MLV tests.

Validating loggers

If you are validating several loggers against a known reference, it is important to ensure that all the loggers, and the reference also, are subjected to the same thermal environment. This can be achieved by ensuring there are minimal thermal gradients in the controlled environment, and ensuring there is good airflow around the loggers.

The most common mistake when validating a group of loggers is to place them in a solid "block" or in a "stack". Loggers on the inside of the block will not see the temperature variations seen by loggers on the perimeter, and loggers near the top of the pile will tend to see a higher temperature than those at the bottom. Both of these effects can be minimized by separating the loggers and allowing some airflow between them, and by forcing air to flow around within the environment with a fan, being careful to insulate the heat generated by the fan motor from the environment.

Cross-checking the logger validation results

The most common source of errors in a logger validation is non-uniformity of temperature distribution in the test chamber. The simplest way to check for uniformity of temperature distribution in the test chamber is to place an array of high accuracy Temprecord loggers (i.e. Temprecord loggers with 3-point calibration applied) in the same configuration as is intended to validate the loggers under test. The variation between the loggers should be in the same order as the stated accuracy of the loggers at that temperature. Any variation substantially above this figure will probably be due to non-uniformity of the environment.

In the absence of a set of high-accuracy loggers, you can instead run the logger validation test again with the positions of the loggers within the environment re-arranged. For example, if you were validating 12 loggers by arranging them on a tray in a 3 x 4 logger array, you would run one test at a certain temperature, then rearrange the loggers on the tray and re-run a test at the same temperature. You would then need to compare pairs of files, (for example) one result from logger S1234567 when placed at the front of the tray, and another result from the same logger when placed at the rear of the tray.



Any results obtained from this second method will only be meaningful if the mean environment temperature was the same for both runs of the test. In practice, this can be difficult to achieve.

Validating environments

If you are using Temprecord loggers to record the temperature differentials at various points within an environment, no reference is normally required. As MLV needs a reference source in order to generate reports, the best way to satisfy this requirement is to select "Mean of logger set" as the reference source. Your results will then be presented as a set of validations between each logger, and the mean of all the loggers in the test cohort. The reference trace will then provide a good idea of the mean conditions in the controlled environment, and each individual logger trace will provide you with the temperature at that particular location in the environment you are wanting to test.



Any results from the validation of an environment can only be as reliable as the accuracy of the loggers. For this reason, environment validations should only be carried out using calibrated Temprecord loggers.

Cross-checking the environment validation results

The simplest way to cross-check the results from an environment validation is to place two loggers at every monitoring point in the environment.

Choosing a logger sample period

MLV does not require the loggers used to produce the reports to be sampling at the same rate. If the loggers are sampling at different rates, MLV automatically ensures that the temperature records are correctly aligned in time. Care must be taken however, to ensure that the environment is not undersampled. An example is where an environment's temperature is affected by a thermostatically controlled air conditioning system. The temperature will vary by as much as a few degrees in a cyclical fashion. If the logger sample period is not set to at least around one-tenth of the period of the cycle, the results obtained may be inaccurate.

6 MLV Projects

An MLV "project" is a collection of settings and filenames that MLV "remembers" for you. Projects are named and the name of the project is the same as the project file. When you exit the MLV program, the project you are currently working on is remembered and loaded again the next time MLV is started.

Creating a Project

To create a new project, click on **File**, then **New Project**. The project will be initialised with default values and an empty file list. You should immediately save the new project (use **File/Save Project As**) with a name that will remind you in the future of what the project relates to. A project name can have any of the characters that are valid in a Windows file name.

Opening a Project

Use **File/Open Project** to load a previously saved project.



When you open another project, MLV automatically saves the currently loaded project for you. If the currently loaded project is "New Project", MLV will prompt you to save it with another name. Similarly if there is no project loaded, but you have made changes to the settings, MLV will ask if you want to create a new project with those settings and save it.



You can also open a project by "drag and drop", that is, if you have Windows explorer open, and you drag a file of extension ".MLV" (i.e. an MLV project file) and drop it onto the MLV window, it will be opened as if you had selected it from the Open Project dialog.



There is nothing to stop you dragging and dropping a mixture of TR and MLV files onto the MLV window. If you do this however, MLV will process each of the files in order, just as if you had drag-and-dropped them one at a time. In other words, the result is unpredictable.

Saving a Project

Use **File/Save Project** to save the current project.



When you open another project or exit MLV, MLV automatically saves the currently loaded project for you, so there is theoretically no need to explicitly save a project.

Saving a Project As a New Name

Use **File/Save Project As** to save the current project under a new name. The new project will be a "clone" of the currently loaded project.

Closing a Project

Use **File/Close Project** to save the current project and close it. MLV then is treated as having no project loaded.

See also[Getting started](#)[Project options](#)[Preparing datafiles](#)[References](#)

7 Project Options

Project options 'travel with' the project file. Any changes you make to the project options will affect only the currently loaded project, or any project created from the currently loaded project using [File/Save Project As](#). In addition to the project options described here, the [Summary Report](#) settings, the [Reference](#) settings, and the [list of datafiles](#) are also specific to a project.

Client

Enter the name of the client the MLV data analysis is being done for. If it is not blank, the client name is included in the initial part of the summary reports, and can also be included in the report header or footer, and also be used to construct report filename or destination folders that include the client name by using the `%Client%` meta-string.

Site

Enter the site name where the MLV data was collected. If it is not blank, the site name is included in the initial part of the summary reports, and can also be included in the report header or footer, and also be used to construct report filename or destination folders that include the site name by using the `%Site%` meta-string.

Project Description

The project description is a free-form text field that you can use to provide additional documentation for the project should you find that the project name is not sufficiently descriptive. If the project description is not blank, the first line of the description is included in the summary report.

Project Description

The project description is a free-form text field that you can use to provide additional documentation for the project should you find that the project name is not sufficiently descriptive. If the project description is not blank, the first line of the description is included in the summary report.

Report Notes

The report notes field is a free-form text field that you can use to provide additional notes for the reports generated from this project. The report notes are much like the project description, except that the report notes are reproduced in full in the report, whereas only the first line of the project description is included in the summary reports.

See also[Getting started](#)[MLV Projects](#)[Preparing datafiles](#)[References](#)

8 Datafiles tab

The datafiles tab is simply a list of all the datafiles in the current project. MLV keeps the list of datafiles in the project file, so that when you reload the project at a later time, MLV can read the datafiles again.



MLV does not store the full absolute location of the datafiles in the project file, but instead stores the path and name of the datafile relative to the path of the project file.

Storing the file's location in this way means that the project file and datafiles can be copied to another location or another computer, and provided the datafiles are in the same location relative to the project file, MLV will be able to locate the datafiles.

Each datafile occupies a row on the list and is split into several columns. You can resize these columns by moving the mouse to the line between the column headers and clicking and dragging. The new column widths are saved and restored when you exit the MLV program. Datafiles are always sorted by filename.



If a column width is too small to show all the text, you can hover the mouse over the text and the full text of that column will be shown in a "hint"

	Filename	ID	Folder	Size	Da.
<input checked="" type="checkbox"/>	2011-01-02 14-38-17 R0010462.tr	Freezer #1 above d	C:\PROJECT	13208	
<input checked="" type="checkbox"/>	2011-01-02 14-38-29 R0000043.tr		C:\PROJECT	13208	S.
<input type="checkbox"/>	2011-01-02 14-38-42 R0000004.tr	Freezer #1 above door	C:\PROJECT	13208	Sun
<input type="checkbox"/>	2011-01-02 14-38-53 R0000002.tr		C:\PROJECT	13208	Sun .
<input type="checkbox"/>	2011-01-02 14-39-05 R0000005.tr		C:\PROJECT	13208	Sun 2
<input checked="" type="checkbox"/>	2011-01-02 14-39-51 G0019797.tr		C:\PROJECT	13210	Sun 2
<input type="checkbox"/>	2011-01-02 14-40-54 H7654321.tr		C:\PROJECT	18310	Sun 2
<input type="checkbox"/>	2011-01-02 14-41-25 S0000100.tr		C:\PROJECT	9874	Sun

Enable

In the left-most column is a checkbox which can be used to temporarily remove a datafile from any reports generated from the currently loaded project. The entry for that datafile and any associated location ID you might have entered still remains in the project. The checkbox provides a quick way of trying out the effect on the statistical results of removing or including particular datafiles.

Status

This column displays an icon showing the file status. When a project is opened or a datafile is added, MLV tries to open the file and read the data.

Status	Meaning
?	Unknown. MLV could not identify or read the datafile
	Found. The file is present but not yet read.
	Info. The file has had size information read.

	Summary. The file has had summary information read (sample rate, serial number etc.) but no data.
	Read. The file has been successfully read and contains temperature data.
	Read. The file has been successfully read and contains humidity data.
	Read. The file has been successfully read and contains both temperature and humidity data.
	Not found. MLV could not find the file. This is usually because the file was moved, renamed or deleted after the project was created, or the project file originates from another computer where the pathname to the datafile is different..
	Not a TR file. MLV could not read the file because it did not conform to the Temprecord datafile format.
	Error. MLV encountered an error reading the file.

For a correctly loaded project where all the datafiles were read successfully, each file should show  (temperature),  (humidity), or  (both temperature and humidity). Any file that doesn't show this will not be processed and will generate a warning at the end of processing.

Filename

The name of the datafile, minus the file path.

ID

The "ID" field is for entering any character string that identifies the data in this datafile. For example, if a datafile is from a logger placed in a blast freezer, you might enter "Blast freezer #2" here. The ID field is stored with the filename in the project.

If the ID field has been filled in, the contents of this field are used in place of the serial number in the summary report and in the graph traces key, otherwise the logger serial number is used..



- When datafiles are first added to a project, the "ID" field is empty.
- If you try to add the same file again to a project, the attempt is ignored, and the ID field of the existing file entry is left intact.
- The contents of the ID field are not stored with the datafile itself, but with the project.
- If you have the same file added to two different projects, they each have separate ID fields, i.e. changing the contents of the ID field in one project does not affect the ID field of the same file in a different project.
- When you remove a file from a project, the contents of the ID field are lost.

Folder

The folder from which the datafile was read from. The files in a project do not need to all be in the same folder.

Size

The size (in bytes) of the file.

Date

The datestamp of the file. Normally this will be the time the file was saved to disk.

S/N

The serial number of the logger. Used to annotate reports unless the ID field above is not blank.

Period

The sample period of the logged data.

Samples

The number of samples in the datafile.

From

The date and time of the first (oldest) sample in the datafile.

Until

The date and time of the last (most recent) sample in the datafile.

See also

[Adding and removing data files](#)

9 Preparing data files

MLV processes Temprecord datafiles. There are several steps involved in producing those datafiles. They are: setting up one or more loggers, starting them, placing them in the controlled environment, retrieving them, stopping them, reading them and saving the logged data to a set of files for MLV analysis. Some of the steps seem obvious, and some are optional. We suggest you read the following before trying your first MLV run. We also recommend that you become familiar with "Auto Mode" in the Temprecord software ("TRW"). as this eliminates virtually all of the drudgery and opportunity for errors when dealing with a large number of loggers.



Temprecord data files produced with TRW versions 5.xx and prior will have a filetype .TR. Temprecord data files produced with TRW versions 6.xx and later will have a filetype .TRX. MLV is able to read and process both of these filetypes. You can mix .TR and .TRX files in the same project, and you can mix files produced with different loggers (i.e. Temprecord Mk2, Mk3, Mk3a, Mon-T, and LCD loggers) in the same project.

Programming the loggers

Sample Period

The most important part of this step is choosing an appropriate sample period. Unless you have good reason otherwise, we recommend you use the same sample period for all the loggers. The sample period should be sufficiently low to ensure that the environment is not undersampled. As a general rule, the sample period should be no more than one tenth of the time period of the fastest periodic event in the environment. For example, if you have a thermostat that cycles around every 3 minutes, the sample period should be no more than 18 seconds.

Start Delay

Normally you would set the start delay to give sufficient time to deploy the loggers but there is no need to do this as MLV allows you to define the time interval over which the validation is to be carried out. This also gives you some flexibility over when you deploy the loggers

Start on Time and Date

Similar comments as for the start delay apply here. There is no need to start all the loggers at the same time so this option should be left off.

User Data

You may find it useful to program the intended deploy location into one line of the shipping data, but once again, if you do this then the onus is on you to ensure that the logger is deployed in the correct location.

Starting the loggers

As mention earlier, starting the loggers at the same time is not important as MLV takes care of the time-alignment of the data. If "Auto Mode" is used to start the loggers, this step can be combined with the previous one.

Deploying the loggers

If you are validating a group of loggers against a reference, the loggers should be placed on a flat surface (preferably a rack) in the temperature-controlled environment. The position of each logger (i.e. the row and column, taking care to make it clear which is the "front" row) should be recorded, so that a subsequent run can be carried out to assess whether there are temperature gradients in the

environment.

If you are validating an environment, each logger should have its serial number along with the location it is deployed in recorded.

Retrieving the loggers

As the loggers are retrieved, the serial number should be checked against the information recorded when it was deployed.

Stopping the loggers, reading and saving the logged data

These three steps should be combined and carried out using Temprecord's Auto Mode. While it is also possible to use Auto Mode to reuse and reprogram the loggers for another trip, we advise against carrying out these steps until the data read from the loggers has been verified (once a Temprecord logger has been reused, the data that was stored in it is lost).



When using Auto Mode to save the logger data, make sure Temprecord is configured to [generate a unique filename](#), so that previously saved data is not overwritten. For example, the default filename specifier of:

```
L YYYY-MM-DD hh-nn-ss
```

could be used to generate a unique filename based on the logger serial number and the date:

```
S1234567 2010-12-05 07-31-22.TR
```

Alternatively, you can simply tag each filename with a sequence number. The default filename specifier of:

```
L (#)
```

would generate a unique filename of the form:

```
S1234567 (1001).TR  
S1234567 (1002).TR
```

etc.

We recommend that the files generated from a MLV test run be stored in a separate folder named to reflect the nature of the test.

See also

[Getting started](#)

[MLV Projects](#)

[Project options](#)

[References](#)

[Formatting report filenames](#)

[Factors affecting accuracy of results](#)

10 Adding and removing data files

Using the "Add files" function of MLV

Select the tab marked Datafiles and click on the Add Files button. A dialog will open allowing you to choose a file. Click on the file you want to load, and then click on Open. The file will be added to the list of files in that project.

You can select several files in the dialog (hold the Ctrl key down as you click each file) and they will all be added to the list of files in the project when you click on Open.

If the file was already present in the list, trying to add it again will have no effect.

Adding files by "Drag and drop"

You can also drag and drop your data files to the currently loaded project. If you select several data files in Windows Explorer and drop them, they will all be added to the project.



There is nothing to stop you dragging and dropping a mixture of TR (data files) and MLV (project files) files onto the MLV window. If you do this however, MLV will process each of the files in order, just as if you had drag-and-dropped them one at a time. In other words, the result is unpredictable. Probably better if you don't.

Removing Files

To remove a single file from the list, right-click it and select Remove file from the pop-up menu. To remove a group of files, select the files you want to remove and right-click. To select a group of files, select the first file you want to remove by clicking on that row, then click on the row with the last file you want to remove with the Shift key held down. All files from the first row you clicked on to the last row will be selected. You can then remove them by clicking the Del key, or right-clicking and selecting Remove from the pop-up menu.

Removing All Files

To remove all the files from the list:

- select them all and press the **Del** key.
- select them all and right-click, then select **Remove** from the pop-up menu.
- click on the **Clear** button



You will always be asked to confirm removal of more than one file.



Removing a file from the list does not delete the file. It merely removes the file from that project. You can easily add the file again. Removing a file does however "lose" anything you might have entered into the "ID" field.

See also

[The Datafiles tab](#)

11 References

Choosing a reference

The reference is what MLV uses to compare the output of the loggers with. Usually the reference will be derived from a data source of known accuracy, but MLV allows considerable flexibility with the choice of reference data.

References are configured by selecting the References tab.

Using a constant value reference

If you are validating loggers in a known constant environment, or you do not have access to a reference source, you can select "constant value" as the reference source and enter a temperature value. The loggers will then be compared against this constant value. For example, if you are validating the loggers in a refrigerated environment that you know is maintained very close to 4C, you can enter a constant value of 4.00. All the loggers will be validated against this temperature.

Using an ASCII data file as the reference

Often you will be validating several loggers in a controlled environment but do not know the exact temperature. If you have access to a precision electronic thermometer that is able to output its measured temperature values through a serial port. See [Using the Fluke/Hart Scientific 1502A as a reference](#) for more information.



MLV does not store the full absolute location of the ASCII reference datafile in the project file, but instead stores the path and name of the datafile relative to the path of the project file.

Storing the file's location in this way means that the project file, datafiles and reference files can be copied to another location or another computer, and provided the files are in the same location relative to the project file, MLV will be able to locate all the files it needs.

Apply Reference Correction

Check this option if you want the [correction coefficients](#) specified in the general options tab to be applied to the values read from the ASCII file. You will generally want this option enabled if the data in the ASCII file originated from a thermometer that you have calibration data for.



When using an ASCII data file as the reference source for your report, the reference samples are assumed to have been recorded "raw" from a Hart or other thermometer and will not have any correction applied. This correction is calculated when the temperature data is read from the ASCII file. You should be aware that the correction applied to those samples will be derived from the settings for [correction coefficients](#) at the time the data is read from the ASCII file (i.e. when the report is generated). Obviously it is important that those correction coefficients correspond to the actual reference thermometer that was used to generate the ASCII file.

Using a logger data file as the reference

If you are validating a group of loggers and one of those loggers is a high-accuracy calibrated Temprecord Logger, you can select this option and enter the path and name of the datafile that was

produced by this logger.



The reference datafile should not be added to the list of datafiles to validate. If it is present in the datafile list as well, the statistics for the group of loggers under test will include the reference logger, which will result in incorrect statistical results.



When you select a TR data file to use as the reference, MLV will show the serial number of the logger in the report summary and in the plotted data key.

Using the mean of the validation group of loggers as the reference

Select this option if you are only interested in the performance of the loggers with themselves. Each logger will be compared against a reference sample set derived from the mean of the values of each logger. The sample period of the reference sample set will be set to the minimum sample period of all the loggers in the datafile list.

Using the MLV log as the reference

MLV has the capability of monitoring the serial output of a reference thermometer and storing the temperature values in its own log file. If a project is loaded that includes Temprecord data files containing logged data over a time period corresponding to the period over which the reference samples were logged, MLV can be instructed to use these logged reference values.



When using the MLV reference log as the reference source for your report, the reference samples will already have a correction applied. This correction is calculated when the temperature serial data is written to the log. You should be aware that the correction applied to those samples will be derived from the settings for [correction coefficients](#) at the time the data was written to the log. Obviously it is important that those correction coefficients correspond to the actual reference thermometer that was used to record the samples to the log.

Using a CSV file as the reference

When you are validating loggers in a controlled environment that is also monitored by another system, if the other system can produce CSV files, they can be used as the reference for a MLV report.

The CSV files should consist of at least 2 columns of data - the datetime, and the temperature (or humidity). MLV will use the date-times to align the reference data with the data in the loggers. There are additional options described below you may need to set in order for MLV to correctly locate and read the data in the CSV file.



MLV does not store the full absolute location of the CSV reference datafile in the project file, but instead stores the path and name of the datafile relative to the path of the project file.

Storing the file's location in this way means that the project file, datafiles and reference files can be copied to another location or another computer, and provided the files are in the same location relative to the project file, MLV will be able to locate all the files it needs.



When you select a column of data from a CSV file to use as the reference, MLV will show the ID for the channel used (i.e. the column header for that column) in the report summary and in the plotted data key.

CSV File Column Number

Select this option to allow you to specify which column in the CSV file contains the reference data. The columns number from zero, with the column containing the date and time information being column zero, so the data columns are numbered from 1. If you don't know the column identifier (the channel ID), or the CSV file has no header row, you will need to inspect the CSV file to see which column has the reference data you wish to use and enter the column number (1..N) here.

CSV File Column Header (Channel ID)

If you know the channel identifier, rather than the column number in the file, you can enter it here. If you enter only part of the channel ID, MLV attempts to match it against each of the ID fields in the CSV file header. If a reasonable match is found, the column containing the closest match is used.



MLV shows the actual name and column number of the CSV file that it read the reference data from in the header part of the report, so you can confirm the channel chosen is correct.

Reporting Interval (H)	Wed 11 Jul 2012 12:00:29 to Tue 17
Reporting Duration (H)	141:48:31
Humidity Reference	Samples from CSV file PEMS.csv
CSV Column	1
CSV Channel ID	HT-31015-01
Upper Limit	80.0
Lower Limit	20.0



If the CSV file contains no header row, MLV cannot determine the channel ID for the reference, so the reference channel must be specified in terms of a column number. MLV will complain if the option to choose the reference channel by channel ID is selected.

CSV Date Format

Enter the date format for the datetime column of your CSV reference files. You may need to set this if it appears that MLV is unable to read the date information from the first column, e.g. if the dates in your CSV file have the month before the day, the contents of this field may need to be changed to suit (to, for example, `mm/dd/yy`).

CSV Time Format

Enter the time format for the datetime column of your CSV reference files. You may need to set this if it appears that MLV is unable to read the time information from the first column.

CSV Date Separator

This field should be set to whatever character is used between the date elements (year/month/day) in your CSV files. "/" is the usual setting.

CSV Time Separator

This field should be set to whatever character is used between the time elements (hour/minutes/seconds) in your CSV files. ":" is the usual setting.

See also

[Getting started](#)

[MLV Projects](#)

[Project options](#)

[Preparing datafiles](#)

12 Humidity

All of the MLV functions are also available for humidity, where it has been logged. You need to be aware of the following considerations however:

- When a logger is recording both temperature and humidity samples, the logger's capacity is halved.
- MLV will complain if you ask for a humidity report and none of the files in the project contain humidity data. Likewise for temperature.
- If reporting for both temperature and humidity is requested, and the option to process the entire record is set, the reporting intervals for temperature and humidity are worked out separately, but any plots will be set so they span from the earlier of the temperature reporting interval start and the humidity reporting interval start, to the later of the temperature reporting interval end and the humidity reporting interval end. This is done so that direct comparisons between temperature and humidity graphs is possible.

For example, if the temperature reporting interval in a project spans 08:00 to 13:00, and the humidity reporting interval in the same project spans 09:00 to 15:00, the plot will be scaled from 08:00 and 15:00 for both the temperature and humidity plots, even though neither file has samples that span this complete range.

See also

[How MLV determines the reporting interval](#)

[How MLV determines the plot interval](#)

13 Reporting

Summary Report

Use the summary report to produce a short (one or two pages) report on the logged data in a group of Temprecord loggers. Each logger in the project group is reported on a single line, showing the number of samples, the time spanned, the minimum, maximum and mean values, and the standard deviation of the samples.



The descriptions of the summary report options below generally only list those concerned with temperature. There are corresponding options for humidity also.

What to Report

MLV accepts data files from both temperature and humidity loggers. A Temprecord humidity logger is capable of logging temperature, humidity, or both. MLV therefore provides an option for selecting what to report on,

Temperature

If this option is selected, MLV will generate reports for temperature only. If there are files containing only humidity samples in the project they will be ignored. If there are files containing both humidity and temperature, only the temperature data in that file will be reported on. If no files in the project contain temperature data, an error is issued and processing halts with no report being generated.

Humidity

If this option is selected, MLV will generate reports for humidity only. If there are files containing only temperature samples in the project they will be ignored. If there are files containing both humidity and temperature, only the humidity data in that file will be reported on. If no files in the project contain humidity data, an error is issued and processing halts with no report being generated.

Temperature and Humidity

If this option is selected, MLV will generate reports for both temperature and humidity. The summary data is grouped so that the files containing temperature data are listed first, then the files containing humidity data. Then the plots are presented in the same order. If no files in the project contain temperature data, a warning is issued, and if no files in the project contain humidity data, a warning is issued.

Entire Record

Select this option if you want a report and plot for the entire range of samples in each logger. If the loggers have recorded samples over differing periods of time, the time axis of the plot (if enabled) will be scaled so that both the oldest sample of any logger and the newest sample are visible.

Between these Dates

Select this option if you want the report and plot only over a prescribed time interval. You would use this option if you had started a group of loggers and then placed them in an environment to be monitored, and then retrieved them and stopped them. To avoid the times when the loggers were not in the environment of interest affecting the results, you could exclude those times by explicitly specifying a time period over which you know the loggers were in the environment.



The controls to set the start and end of the reporting interval are initialised to the time extents (date and time of the oldest and newest samples in the logger sample record) of the first datafile loaded for that project.



You can click on the Reset button if you want to quickly set the date and times of these controls back to the oldest and newest sample of the logger data set.

Column Enables

Check these options if you want the respective parameter to be displayed in the summary report. MLV includes a rich set of parameters that can be displayed in the table of results of a summary report. See [Interpreting MLV summary reports](#) for more information on this topic.

As you select more columns to include in the summary report the space required across the page will grow. If the text in the summary results table grows to be too large to print within the paper margins, MLV will automatically reduce the font size to accommodate the text. You may also find it is preferable to select landscape orientation on your printer if you are displaying a large number of parameter columns.

Serial Number

The serial number of the logger is always printed in summary reports. This option cannot be disabled.

ID

If this option is checked, a column in the summary report is set aside for the ID field contents. The ID field is optional and is entered by you in the datafile list display. If it is not blank, it is used instead of the logger serial number to annotate the trace key.

Samples

Check this option to set aside a column for the display of the total samples in the logger that are contributing to the displayed statistics.

- If the Entire Record option above is checked, the contributing samples consist of all the samples in the logger.
- If the Entire Record option above is not checked, the contributing samples consist of all those samples that fall between the summary report start and end date and time, as specified on the summary report tab.

Note that MLV adjusts the samples used to produce the report so that the reporting interval includes times which are common to all the loggers in the test, and the selected reference source. In most cases this will tend to shorten the time interval of the report.

Start, End

Check either or both of these options if you want MLV to include the start and end samples of the sample range in that logger that has been used to produce the results. See the topic [How MLV determines the reporting interval](#) for more details.

Period

Check this option to set aside a column for the display of the sample period of the logger. MLV will warn you if you try to produce a report which includes loggers with a mixture of sample periods, which can lead to misleading results if some loggers are undersampled. The report will still be

produced.

From, Until

Check either or both of these options if you want MLV to include the start and end time and date of the reporting interval that has been used to produce the results. These times will vary between loggers because MLV selects the nearest sample to the start and end times of the reporting interval. See the topic [How MLV determines the reporting interval](#) for more details.

Minimum, Maximum

Check either or both of these options if you want MLV to include the minimum and maximum temperatures seen by the logger over the reporting interval.

Range

Check this option to set aside a column for the display of the difference between the minimum and maximum temperatures seen by the logger over the reporting interval. Also sometimes referred to as "spread".

Time Below, Time Above

Check either or both of these options if you want MLV to include the time spent above an upper temperature limit and the time spent below a lower temperature limit in the report. Checking these options will also cause the limits to be displayed on the graph as red (upper limit) or blue (lower limit) dashed horizontal lines.

Mean

Check this option to set aside a column for the display of the mean temperature seen by the logger over the reporting interval

Standard Deviation

Check this option to set aside a column for the display of the standard deviation of the samples seen by the logger over the reporting interval

Variance

Check this option to set aside a column for the display of variance of the samples seen by the logger over the reporting interval

Error

Check this option to set aside a column for the display of the difference between the mean temperature of the logger over the reporting interval, and the mean temperature of the reference over the reporting interval. A positive value means that the logger reading was greater than the reference reading. If Mean is selected as the [reference source](#), this figure represents how far above or below the average temperature of the loggers over the reporting interval. If no reference source is selected, this column does not display.

Plot All Logger Traces

Check this option if you want a composite plot of the logger data, as well as a summary report. All the logger data will be shown on the one graph, with a different trace for each logger. When this option is selected, the key denoting which trace colour is associated with each logger is printed following the summary data.

Temperature Axis Limits

MLV normally plots temperature graphs so that the Y axis extends approximately 5% further than the maximum and minimum temperature excursions of the plotted data. This is so that you are

guaranteed of seeing all the temperature data.

If you want to display the data over a reduced (or increased) span, you can check this option and specify the required temperature upper and lower limits of the temperature on the Y axis. Any data outside these limits is truncated.

Temperature Span

Instead of setting fixed limits for your plot, you can instruct MLV to plot a given temperature span. The plot will be centred about the mid-point value (a value half-way between the maximum and minimum plot values). This option is useful when you can't predict what the range of data is going to be.

Plot Mean Trace

Check this option if you would like the mean trace to be plotted along with the composite logger plot. The mean trace is shown in magenta, and is plotted with a thicker line width than the logger traces. You can also request a separate trace of the mean values (see the option below).

Plot Reference Trace

Check this option if you would like the reference trace to be plotted along with the composite logger plot. The reference trace is shown in green, and is plotted with a thicker line width than the logger traces. You can also request a separate trace of the reference values (see the option below).

Max Traces per Graph

If you have a large number of loggers, it becomes cumbersome to plot all of their samples on the one graph. This option allows you to split the plots up into groups of 3, 5, 10, whatever. The reference and mean traces still plot on all the graphs, and the colours for each logger's trace will not change.



The colours used for the traces match the default line colours used for Microsoft Excel charts. These are defined for 32 traces, after which the colours used repeat.



When you split the plots up into groups, the horizontal and vertical scaling of the axes is kept the same for all of the plots, so that meaningful comparisons can be made between plots on different pages.

Other Trace Options

The following report options can be used to obtain separate plots of data derived from the logger data and statistical calculations. The time axis for these graphs is always the same as the composite logger plots.

In general, the data for these plots is obtained by creating sample records from the temperature samples across the loggers at a given time. The statistics are then calculated on this set of samples and the process repeated for each sample time.

Plot Mean

Check this option if you wish to produce a separate graph of the mean across the loggers. This option will be ignored if there is only one data file in the project, as the mean trace would be identical to the trace for that logger.

Plot Reference

Check this option if you wish to produce a separate graph of the reference values used. This option will be ignored if there was no reference selected.

Plot Spread

Check this option if you wish to produce a separate graph of the spread (range of values) across the loggers. This option will be ignored if there is only one data file in the project, as spread has no meaning in this case.

Plot Variance

Check this option if you wish to produce a separate graph of the variance (σ^2) across the loggers. This option will be ignored if there is only one data file in the project, as variance has no meaning in this case.

Plot Standard Deviation

Check this option if you wish to produce a separate graph of the standard deviation (σ) across the loggers. This option will be ignored if there is only one data file in the project, as standard deviation has no meaning in this case.

Plot Error

Check this option if you wish to produce a separate graph of the logger error (the difference between the logged value and the reference value at the same time) vs. time. This option will be ignored if there is more than one data file in the project, or there is no reference selected.

Plot Error vs Temperature

Check this option if you wish to produce a separate graph of the logger error (the difference between the logged value and the reference value at the same time) vs temperature. This option will be ignored if there is more than one data file with temperature samples in the project, or there is no temperature reference selected.

Plot Error vs Humidity

Check this option if you wish to produce a separate graph of the logger error (the difference between the logged value and the reference value at the same time) vs humidity. This option will be ignored if there is more than one data file with humidity samples in the project, or there is no humidity reference selected.



The plots produced by the above two options are not plots of any parameter vs. time. They are "XY" plots, with the error between the logger value and the reference value on the Y axis, and the temperature or humidity on the X axis. They will only make sense (and only produce valid results) if the reference selected was accurate, and the temperature or humidity was constant for a long period of time. If the temperature or humidity is "stepped" at regular intervals, or changed over a range very slowly, these plot options will yield a graph of error vs temperature/humidity.

Open Report PDF

Check this option if you want MLV to open the PDF report produced with [Adobe Reader](#) when the data has been processed. If there is already a PDF file with the same name opened (e.g. if you have previously carried out a MLV run and viewed the PDF file) the existing file will be closed so that the new one can be created and opened.

See also

[Report Formatting Options](#)

[Interpreting MLV summary reports](#)

[How MLV determines the reporting interval](#)

14 Factors affecting accuracy of results

The importance of sound experimental technique cannot be over-emphasized when dealing with precision temperature and humidity measurement.

Sampling Period

The sampling period for the loggers providing the MLV data needs to be sufficiently short to faithfully record the variations in temperature in the environment. If the sample period is too great, an effect known as aliasing is observed. Aliasing can be particularly problematic if the sample period happens to be set close to a natural period of the environment, such as the cycle time of a thermostat.

To take an extreme example, if you were wanting to find the average temperature of a room over a period of one month, you would not set the sample period of the logger to 24 hours, as this would mean it would sample at the same time each day, and the average of all the samples for the month is going to be very dependent on when the logger was started (e.g. at 4 a.m. versus at 2 p.m.)

As a general rule, the sample period should be set to at least ten times the highest periodic variation expected in the environment.

Stem Effect

Thermal stem effect error occurs when part of the temperature sensor housing is at a different temperature to the section where the sensor is located or when the sensor assembly leads conduct heat to the sensor from another source. Thermal stem effect errors are normally reduced by ensuring that the sensor is immersed into the sample medium to a proper depth. As a general rule, the immersion depth should be 10 to 20 times the diameter of the probe.

Logger Response Time

The logger response time refers to the ability of the logger to respond to rapid variations in the temperature. Temprecord probe loggers have a faster response time than loggers with an internal sensor.

Logger response time is also relevant when characterizing a large number of loggers. If the loggers are placed in the controlled environment in the form of a "block", those loggers inside the block will tend to see smaller temperature excursions than those on the periphery.

Temperature Gradients

Temperature gradients will be found in most closed environments, particularly where there is little air movement. In a refrigerator for example, the temperature near the top of the space will be greater than that at the bottom.

15 Formatting Report Filenames

MLV has the ability to automatically create report filenames based on the time and date, and other variable parameters.

There are two sorts of formatting options: formatting characters, and meta-strings.

Formatting characters make use of some special characters and character combinations which are translated at the time a filename is used. As an example, when MLV sees the character "d" in a

filename, it replaces it with the current day of the month. Likewise, when MLV sees the character combination "ddd" in a filename, it replaces it with a 3-character abbreviation of the current day of the week (e.g. "Wed").

Meta-strings are similar, but they consist of special words surrounded by percent signs (e.g. "%Project %") which are translated at the time a filename is used.

Anything that you don't want to be treated as a formatting character must be enclosed in double-quotes. Meta-strings on the other hand are recognised everywhere.

The most common use of this option is to provide filenames that identify the project name, the date and time a report was created, or the name of the operator using the computer at the time.

Formatting Characters

The following table shows how each of the formatting characters is used. Any other character or character group not shown in the table below is currently used unchanged in the filename, i.e it is not converted into some other collection of characters.



Don't assume that a character not mentioned in the table below will never be used as a formatting character. Temprecord reserves the right to define additional formatting characters in the future. If you don't intend characters to be interpreted as formatting characters, it is good practice to always include them in double quotes ("like this").

Characters	Meaning
c	Displays the date using the format given by the Windows short date format, followed by the time using the format given by the Windows long time format, as specified for that computer in Windows Control Panel. The time is not displayed if the date-time value indicates midnight precisely.
d	Displays the day as a number without a leading zero (1-31).
dd	Displays the day as a number with a leading zero (01-31).
ddd	Displays the day as an abbreviation (Sun-Sat).
dddd	Displays the day as a full name (Sunday-Saturday).
dddddd	Displays the date using the format given by the Windows short date format (nominally M/d/yyyy in the US locale).
dddddd	Displays the date using the format given by the Windows long date format (nominally dddd, MMMM dd, yyyy in the US locale)
e	Displays the year in the current period/era as a number without a leading zero (Japanese, Korean and Taiwanese locales only).
ee	Displays the year in the current period/era as a number with a leading zero (Japanese, Korean and Taiwanese locales only).
g	Displays the period/era as an abbreviation (Japanese and Taiwanese locales only).
gg	Displays the period/era as a full name. (Japanese and Taiwanese locales only).
m	Displays the month as a number without a leading zero (1-12). If the m

	specifier immediately follows an h or hh specifier, the minute rather than the month is displayed.
mm	Displays the month as a number with a leading zero (01-12). If the mm specifier immediately follows an h or hh specifier, the minute rather than the month is displayed.
mmm	Displays the month as an abbreviation (Jan-Dec).
mmmm	Displays the month as a full name (January-December).
yy	Displays the year as a two-digit number (00-99).
yyyy	Displays the year as a four-digit number (0000-9999).
h	Displays the hour without a leading zero (0-23).
hh	Displays the hour with a leading zero (00-23).
n	Displays the minute without a leading zero (0-59). Note that this the 'n' character, not the 'm' character.
nn	Displays the minute with a leading zero (00-59). Note that this the character string 'nn', not 'mm'.
s	Displays the second without a leading zero (0-59).
ss	Displays the second with a leading zero (00-59).
t	Displays the time using the format given by the Windows short time format (nominally h:nn in the US locale).
tt	Displays the time using the format given by the Windows long time format (nominally h:nn:ss in the US locale).
U	Displays the currently logged in Windows user
#	Displays a unique sequence number. The sequence number is stepped on each time it is used to generate a filename, and it remembered between MLV sessions. It thus provides a convenient way of ensuring unique filenames are generated.



If you don't want Temprecord to use these date formatting rules on the filename you specify, enclose the entire template in double quotes ("...").



Note that the specifier for "minutes" is "n" (not "m", which means "months").

Meta-Strings

Meta-strings are like formatting characters except that they must be inserted in the "quoted" part of the file specifier. Meta-strings are always surrounded by percent (%) signs.

Meta-string	Use
%Company%	replaced by the string entered in the "Company" field in General

	options.
%Site%	replaced by the string entered in the "Site" field in General options.
%User%	replaced by the currently logged in Windows user name.
%Computer%	replaced by your computer's name.
%Workgroup%	replaced by your computer's workgroup.
%Project%	replaced by the name of the currently loaded project.
%Version%	replaced by the MLV software version, e.g. 1.5
%Build%	replaced by the MLV software build number (an internal version number used by Temprecord).
%% <env var> %%	replaced by the Windows environment variable called <code>env_var</code>



Don't forget to include the meta-string specifier inside the quoted part of the filename specifier, otherwise the expanded meta-string will be interpreted as a sequence of formatting characters, with confusing results!

Examples

Here are some examples of the filenames generated using formatting characters and meta-strings:

Filename Format Specified	Report Filename Generated	Feature Demonstrated
"data"	data.PDF	No formatting
"User" U "Report"	User Joe Bloggs Report.PDF	Logged-in user in filename
mmm dd yyyy	Jan 31 2007.PDF	Date in filename
mmm dd yyyy hh-mm	Jan 31 2007 12-34.PDF	Date and time in filename
yyyy-mmm-dd hh-mm z	2007-Jan-31 12-34 CST.PDF	Date and time, timezone in filename.
"Report" #	Report 678.PDF	Logger serial number and sequence number in filename.
"Report" # "(Project %Project%)"	Report 678 (Project Freezer Validation).PDF	Sequence number and meta-string in filename.

Once again, note the use of double quotes around any part of the filename that you don't want to be interpreted as a formatting character.

16 Interpreting MLV summary reports

Summary reports are always presented as one row per logger, with up to 12 or so columns shown. There are project options for selectively displaying all of the columns with the exception of the logger serial number, which always shows in a summary report.

Loggers

The first section of the summary report presents the results for each logger, one logger per line. The values reported should be self-explanatory



Sometimes the parameter in a given column makes no sense for the data source, and in this case the contents of the column for that row will be blank. As an example, the statistics presented for All Loggers are derived from a composite data set consisting of the samples from each logger concatenated. As the sample set does not represent any read-world data series, the concept of "Start Sample" and "End Sample" do not apply, and there is nothing sensible that could be shown, and these columns are left blanks.

Serial Number

The serial number of the logger is always printed in summary reports. This option cannot be disabled in a summary report.

ID

The ID field is optional and is entered by you in the datafile list display. If it is not blank, it is used instead of the logger serial number to annotate the trace key.

Samples

This column displays the count of the total samples in the logger that are contributing to the displayed statistics.

- If the Entire Record option above is checked, the contributing samples consist of all the samples in the logger.
- If the Entire Record option above is not checked, the contributing samples consist of all those samples that fall between the summary report start and end date and time, as specified on the summary report tab.

Note that MLV adjusts the samples used to produce the report so that the reporting interval only includes times which are common to all the loggers in the test, and the selected reference source, if any. In most cases this will tend to shorten the time interval of the report. These values may differ by 1 or 2 samples between loggers as there will be small differences in the sample periods. If the sample periods of the loggers are different these sample ranges will of course be different. See the topic [How MLV determines the reporting interval](#) for more details.

Start, End

This column displays the start and end samples of the sample range in that logger that has been used to produce the results. These values will likely differ between loggers as there will be small differences in the times the loggers were started. See the topic [How MLV determines the reporting interval](#) for more details.

Period

This column displays the sample period of the logger. MLV will warn you if you try to produce a

report which includes loggers with a mixture of sample periods, which can lead to misleading results if some loggers are undersampled. The report will still be produced.

From, Until

This column displays the start and end time and date of the reporting interval that has been used to produce the results. These times will vary between loggers because MLV selects the nearest sample to the start and end times of the reporting interval. See the topic [How MLV determines the reporting interval](#) for more details.

Minimum, Maximum

This column displays the minimum and maximum temperatures seen by the logger over the reporting interval.

Range

This column displays the difference between the minimum and maximum temperatures seen by the logger over the reporting interval. Also sometimes referred to as "spread".

Time Below, Time Above

This column displays the time spent above an upper temperature limit and the time spent below a lower temperature limit in the report. Checking these options will also cause the limits to be displayed on the graph as red (upper limit) or blue (lower limit) dashed horizontal lines.

Mean

This column displays the mean temperature seen by the logger over the reporting interval

Standard Deviation

This column displays the standard deviation of the samples seen by the logger over the reporting interval

Variance

This column displays the variance of the samples seen by the logger over the reporting interval

Error

This column displays the difference between the mean temperature of the logger over the reporting interval, and the mean temperature of the reference over the reporting interval. A positive value means that the logger reading was greater than the reference reading. If Mean is selected as the [reference source](#), this figure represents how far above or below the average temperature of the loggers over the reporting interval. If no reference source is selected, this column does not display.

Aggregate Results

The section following the Logger results contains statistical data derived from the results across all the loggers under test. The meanings of the reported statistics for this section is not as straight-forward as it is for individual loggers, and you are advised to consult this section before using any of these results.

Mean of Loggers

Immediately below the group of logger results is a results row for the mean value of the loggers. This row shows the statistical results for a notional logger which contains data points constructed by taking the average of the sample values from each logger at each of the sample times. Where the loggers have differing sample periods, the sample period of the "mean of loggers" logger is set equal to the lowest sample period of the loggers under test. This row will only display if there is more than one logger data file being analyzed.

Reference

This row presents the statistical results for the reference samples over the reporting interval.

Variance

This row shows the statistical results for a notional logger which contains data points constructed by taking the variance of the sample values from each logger at each of the sample times. Where the loggers have differing sample periods, the sample period of the "variance" logger is set equal to the lowest sample period of the loggers under test.

Spread

This row shows the statistical results for a notional logger which contains data points constructed by taking the spread of the sample values from each logger at each of the sample times. Where the loggers have differing sample periods, the sample period of the "spread" logger is set equal to the lowest sample period of the loggers under test. This row will only display if there is more than one logger data file being analyzed.

All Loggers

This row shows the statistical results for a notional logger which contains all of the data points of the loggers under test "joined end on end". Note that there is no justification in physical terms for doing this - particularly if the loggers are not sampling with the same sample period - it just provides a convenient way of obtaining the overall maximum and minimum values, and an overall mean value. Where the loggers do have differing sample periods, the sample period of the "All Loggers" logger is set equal to the lowest sample period of the loggers under test. This row will only display if there is more than one logger data file being analyzed.

Error

As well as presenting an average error value for each of the loggers, MLV also calculates the difference between the reference and the average value from all of the loggers at each given sample time. This list of error values vs time is calculated by the following procedure:

- The minimum sample period of all of the loggers in the project is selected.
- An interval equal to an interval that is present in all of the loggers is selected.
- For each sample period over this interval:
 - Take the nearest sample from each logger sample record.
 - Calculate the average value of these samples.
 - Take the nearest sample from the reference sample record.
 - Subtract them to obtain the error at that sample time.
 - Add that error value to the error sample record.

The result is a series of error values versus time and "Error" row shows the statistical results for this list of error values.

17 How MLV determines the reporting interval

In the most common reporting environment, MLV deals with a collection of Temprecord data files that are all programmed with the same sample period, and containing samples that more or less cover the same time span. This is not always the case however, and MLV tries to make intelligent decisions when it is presented with logger and/or reference sample logs that do not exactly align, have differencing sample periods, or contain a mixture of temperature data, humidity data, or both. The important thing to remember is that MLV will only report over a time span where it can derive sensible data from all the sources it is presented with.

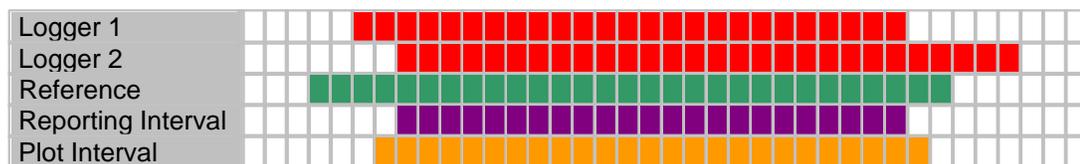
When MLV generates a report, it calculates statistics only for the time period where it has data from all logger sources and the reference source, if any. In addition, this time interval is checked against the summary start and end period date-times, if the option to process the entire record is not checked.

The summary report produced by MLV can include information about the actual sample range and date/times used to produce the results if you wish. We call this period of time that is used to generate the results of a test the **reporting interval**. This interval will probably be different from the interval that is actually plotted by MLV, although in most cases they will be similar. See the topic [How MLV determines the plot interval](#) for more information.

To determine the reporting interval, MLV takes the following steps:

- The date and time of the first sample in each logger record is checked and the latest one recorded. This becomes the start time of the reporting interval.
- The date and time of the last sample in each logger record is checked and the earliest one recorded. This becomes the end time of the reporting interval.
- If a reference was used the date and time of the first sample in the reference sample record is checked and the latest one recorded. If this time is later than the start time of the reporting interval, the reference start time becomes the start time of the reporting interval.
- If a reference was used the date and time of the last sample in the reference sample record is checked and the earliest one recorded. If this time is earlier than the end time of the reporting interval, the reference end time becomes the end time of the reporting interval.
- If the option to process the entire record is not checked and a specific summary report start time has been entered and this time is later than the start time of the reporting interval, the specific summary report start time becomes the start time of the reporting interval.
- If the option to process the entire record is not checked and a specific summary report end time has been entered and this time is earlier than the end time of the reporting interval, the specific summary report end time becomes the end time of the reporting interval.

The following chart should serve to illustrate how MLV determines the reporting and plot intervals.



Here, each square represents an arbitrary time interval. There are two loggers with temperature records that overlap, and a reference source with records that partly overlap the loggers. The reporting interval can be seen to be only that time where the data from all three sources (2 loggers plus the reference) was coincident. The plot interval in turn is the reporting interval with a little bit of "headroom" added before and after.



MLV will warn you if you have specified reporting interval start and end times and this interval does not lie fully within each logger sample record interval and the reference sample record interval. If the reporting interval lies completely outside the logger data, an error will be reported and no report generated.

See also

[How MLV determines the plot interval](#)

18 How MLV determines the plot interval

For any given set of datafiles, MLV will determine a [reporting interval](#), that is, the interval over which the statistics are calculated. When the results are plotted, MLV similarly determines a sensible start and end date and time for the plot, based on the reporting interval.

For the purposes of the following explanation, the **overall data interval** is defined as the time from the earliest sample of any temperature or humidity sample in any file, to the most recent sample of any temperature or humidity sample in any file.

- If the option to process the entire record is checked, the plot start date and time will be the time of the earliest sample of any temperature or humidity sample in any file, minus 5 percent of the overall data interval span. The plot end date and time will be the time of the most recent sample of any temperature or humidity sample in any file, plus 5 percent of the overall data interval span.
- If the option to process the entire record is not checked and a specific summary report start and end time have been entered, the plot start date and time will be the specified start time of the reporting interval, minus 5 percent of the reporting interval span. The plot end date and time will be the specified end time of the reporting interval, plus 5 percent of the reporting interval span.

See also

[How MLV determines the reporting interval](#)

19 Printing Options

Print Header and Print Footer Options

Enable Print Header

Check this option if you want a page header included with the PDF reports. The page header is repeated for every new page. It can include text that is printed left-justified at the left margin, centered, and right-justified at the right margin. The right-hand header is offset to the left to allow for the Temprecord logo.

Use header space for content

Check the Use header space for content option if you want the space on the page normally occupied by the header to be included in the body of the printed report. If this option is not checked and the Enable Print Header option is also not checked, the header will not print, but the space normally occupied by the header/footer is left blank.

Enable Print Footer

Check this option if you want a page footer included with the PDF reports. The page footer is repeated for every new page. It can include text that is printed left-justified at the left margin, centered, and right-justified at the right margin.

Use footer space for content

Check the Use footer space for content option if you want the space on the page normally occupied by the footer to be included in the body of the printed report. If this option is not checked and the Enable Print Footer option is also not checked, the footer will not print, but the space normally occupied by the footer is left blank.

Header and Footer Text

Fill in the three fields with the text you want displayed in the left-hand side (L), the center (C), and the right-hand side (R) respectively of the header/footer. The left hand text is aligned with the left margin. The center text is centered between the left and right margins. The right-hand text is right-justified against the right-hand margin.

Any of the text fields may overflow into the adjacent fields, and it is your responsibility to make sure they do not overlap. Thus it is possible to have a left-hand header or footer that extends right across the page, provided the corresponding center and right-hand header/footer are set to blank strings.

Meta-string Substitution

Header and footers may include "meta-strings". These strings are expanded (i.e. substituted by another string) at the time of report generation.

Meta-string	Use	Example	Example Output
%Page%	current page	P%Page%	P1
%Pages%	total pages	Page %Page% of %Pages%	Page 1 of 4
%Filename%	name of the PDF file	File %Filename %	File MLV Summary Report.pdf
%User%	logged in Windows	Printed by user %User%	Printed by user Fred

	user		
% Computer %	computer name	Printed from PC "% Computer %"	Printed from PC "Fred's Computer"
% Workgroup %	computer workgroup	This report is from the % Workgroup% group	This report is from the Administration group
% Client%	as configured in Project Options	Report for % Client%	Report for Smith and Jones Pharmaceuticals
% Site%	as configured in Project Options	% Site% Site	Tauranga Site
% Company %	as configured in General Options	% Company%	Temprecord International Ltd
% PrintDate %	date and time report printed	Printed on % PrintDate%	Printed on 1/2/2010 12:55:02
% Version%	MLV software version	% Version%	1.5
% Build%	MLV software build number	% Build%	456
%% <env var> %%	Windows environment variable	%% SystemDrive% %	C:

Max Past Report Entries

When MLV generates a report, it logs the report PDF filename, the folder the report was written to, the file size and the date. This log can be inspected by selecting the Log tab and the clicking on Reports on the left-hand edge of the tab. Once the number of reports has reached this limit, older reports are "dropped off" the end and will no longer appear in the log.



When a report "drops off" the report log, the report itself is not deleted. You can still access the report, provided you can remember where it was stored.

Sequence Number

MLV can include a sequence number as part of a PDF report filename. See [Formatting Report Filenames](#) for more information. The sequence number increases by one every time a report is written to disk. You can edit the sequence number here and force the next report to start with a particular sequence number.

Trace Thicknesses

You can use these options to modify the trace thicknesses MLV uses when generating the graph PDF files. Note that printers vary as to what the minimum line thickness they can plot is, and you may find that:

- below a certain trace thickness, some printers will not print at all, others may default to a minimum trace thickness.
- printers will vary as to the resolution of the trace thickness that can be specified. You may need to experiment.

T, H

Specify the thickness of the temperature or humidity traces.

Mean

Specify the thickness of the mean temperature or humidity trace when this is plotted along with the logger temperature or humidity traces.

Reference

Specify the thickness of the reference temperature or humidity trace when this is plotted along with the logger temperature or humidity traces.

Other Traces

Specify the thickness of the trace when the additional graphs, such as mean, variance, standard deviation, etc are plotted.

Page Format

Paper Size

Select the paper size to be used whenever a PDF report file is created. The report will be formatted to be suitable for that paper size, so that when the PDF report is printed it will be easy to read.

Orientation

Select the orientation to be used whenever a PDF report file is created. You may find landscape orientation is more suitable for summary reports that have a large number of columns enabled.

20 General Options



A screenshot of a dialog box with a light gray background. It contains two text input fields. The first field is labeled "Company" and the second is labeled "Site". Both fields are currently empty.

Company

Enter the name of your company here. Whatever you enter here will be used to expand the meta-string `%Company%` wherever it appears in a [header or footer specification](#), or in a [report filename format specifier](#).

Site

Enter the name of your company site here. Whatever you enter here will be used to expand the meta-string `%Site%` wherever it appears in a [header or footer specification](#), or in a [report filename format specifier](#).



A screenshot of a dialog box with a light gray background. It contains three controls: a spin box for "Max Past Report Entries" set to 200, a spin box for "Sequence Number" set to 1010, and a checkbox labeled "Don't Show Wizard on Startup" which is currently unchecked.

Max Past Report Entries

This option specifies the maximum number of reports shown in the Report Log. When the number of reports generated exceeds this number, the oldest report is evicted from the list.

The report PDF file itself is not deleted.

Sequence Number

Sets the number that is inserted into a report filename when the '#' meta-character is used in a report filename specification. MLV automatically increments this number each time a report is generated. If you want to reset the sequence number, or start numbering from a particular value, enter the number here.

Don't Show Wizard on Startup

If this box is checked, MLV will start at the main form, rather than displaying the "wizard" first.

Temperature and Humidity Reference Options

Description

Enter a short text description of any reference thermometer currently in use by MLV. The description is not necessary, but if specified it will be included in the first part of the summary report.

Thermometer Unit ID

Enter the serial number or other unique identifying string of the reference thermometer currently in

use by MLV. The unit identifier if specified will be included in the first part of the summary report.

Probe Unit ID

Enter the serial number or other unique identifying string of the reference thermometer probe currently in use by MLV. The probe unit identifier if specified will be included in the first part of the summary report.

Polynomial Coefficients



The correction specified by these coefficients is only applied when reference data is being read from the reference sample log, or when reference data is being read from an ASCII text file, and only then if the corresponding [apply reference correction](#) option on the [reference tab](#) is checked. When the reference source selected is neither of these two choices, these polynomial correction coefficients are not used.

These four numbers comprise the coefficients of a polynomial that defines the error characteristic of the reference thermometer. The coefficients are obtained by comparing the output of the thermometer with a traceable reference and are used to adjust the reading obtained from the reference. This adjustment is only performed when MLV is monitoring the reference and logging the temperatures to the reference log, or when MLV is reading the reference data from an ASCII text file.

The corrected temperature is calculated by this expression:

$$T_C = T_U + A + BT_U + CT_U^2 + DT_U^3$$

where T_U is the uncorrected temperature, T_C is the corrected temperature, and A , B , C and D are the four polynomial correction coefficients. Note that the correction calculation assumes the temperatures are in degrees C. If the data originates from a Hart/Fluke thermometer unit the data will be tagged with the units specifier C or F or K (Kelvin) and MLV will make the necessary conversion to Celsius if required before applying the correction.



After a new installation of MLV, the values of all 4 of these coefficients default to zero, and the corrected value will be the same as the uncorrected value.

In MLV, the correction derived from these polynomial coefficients is applied in two instances:

- when MLV is generating a report and an ASCII file is specified as the reference, the correction is applied to the reference data values read from the file. This can be disabled by unchecking the [apply reference correction](#) option next to the ASCII filename.
- when MLV is reading the data from a Hart thermometer, the serial data stream is read by a background thread and written to the reference sample log. The correction is applied to the samples read from the Hart before writing to the log. When MLV is generating a report and the MLV reference log is specified as the reference, the correction has therefore already been applied to the reference data values (if the option to [apply reference correction](#) next to the reference COM port is enabled) and no further correction is needed or applied therefore.



When using the polynomial coefficients to correct the temperature values read from a Hart reference thermometer and written to the MLV reference sample log, or to correct the temperature samples read from an ASCII text file, the coefficients

specified must correspond to the reference thermometer that was in use.

See also:

[MLV Startup "Wizard"](#)

21 System Tab

The system tab displays information relevant to the computer system MLV is running on. It includes the actual location of some of the folders that MLV uses to store data files and program settings.



Some of the information on the system tab will be useful to Temprecord when diagnosing problems and will be sent to Temprecord if you use the Send Diagnostic Report function.

Command Line

This is actual command line passed to Windows in order to start the MLV program.

File Paths

The file paths to key folder locations and files used by MLV are shown here. This can be useful if you wish to locate or inspect a file for some reason.



By right-clicking on a file or folder name, you can open a pop-up menu that enables you to open a Windows Explorer window positioned in that folder. If the entry denotes a file that is able to be inspected or edited with a text editor such as [NotePad](#), the pop-up menu will also have an entry that allows you to open the file.

File Paths	
Executable:	C:\Program Files\Temprecord\MLV\mlv.exe
Help File:	C:\Program Files\Temprecord\MLV\Help\MLV.CHM
Startup Log	C:\Documents and Settings\jrm\Local ... cord\MLV\Startup Log\MLV Startup.log
Installation Logs	C:\Program Files\Temprecord\MLV\Installation Logs\
Datafiles Folder	C:\Documents and Settings\jrm\My Documents\Temprecord\
Projects Folder	N:\PROJECTS\MONITOR\trw\Probe Compensation Capacitor Tests\
Project File	N:\PROJECTS\MONITOR\trw\Probe Comp ... hours, logger 2 sec, ref 2 sec.mlv
Reports Folder	N:\PROJECTS\MONITOR\trw\Probe Compensation Capacitor Tests\
Temp. Files:	C:\DOCUME~1\jrm\LOCALS~1\Temp\Temprecord\MLV\
Local Access File:	C:\Documents and Settings\jrm\Local ... cation Data\Temprecord\MLV\Local.acf
Configuration File:	C:\Documents and Settings\All Userp ... MLV\MLV.CFG
INI File:	C:\Documents and Settings\All Users ... MLV\MLV.INI
Event Log	C:\Documents and Settings\All Use ... nt Log\MLV EVENTS 110506151314.LOG
Reference Log	C:\Documents and Settings\All Us ... EREFERENCE SAMPLES 110506151314.LOG



Just because MLV allows you to modify these files doesn't mean you should! All the files shown in the [System](#) tab are files maintained by MLV and are necessary for correct program operation. Modifying them is likely to cause unpredictable program operation.

Last Exception

Sometimes internal errors occur during the operation of MLV. Some of these errors are serious and will result in the MLV program halting and displaying the error reporting dialog. Others errors are less serious errors that can be expected from time to time during program operation and the MLV program is able to continue. Whenever one of these less serious errors occurs the most recent one is reported here.

Reference

If MLV is monitoring a reference thermometer, the data stream from the thermometer is shown here.

Send Diagnostic Report

Only use this function if requested by Temprecord to send a diagnostic report.

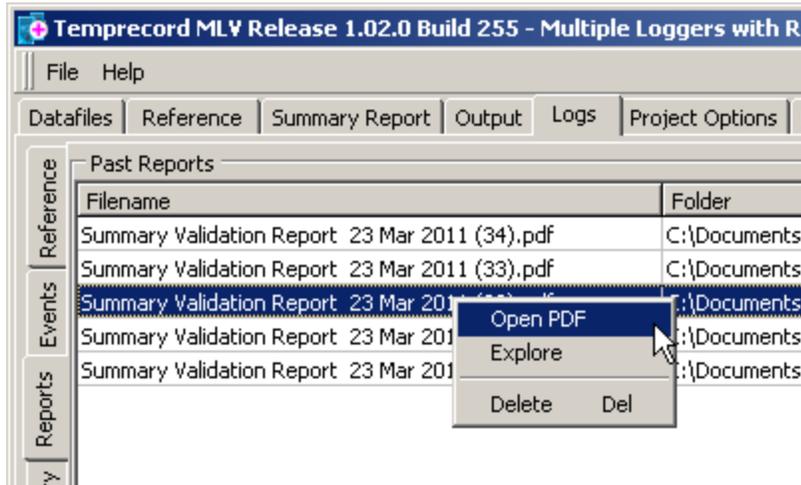
22 Log Tab

The Log tab provides access to five operational logs MLV maintains.

Reports Log

The Reports Log provides a list of past PDF reports generated by MLV. The name, folder, size, and date of the reports is shown, and you can sort the entries either ascending or descending in order by clicking on the column header.

If you right-click in the reports log the following choices are displayed in a pop-up menu:



Open PDF

Select this option to open the selected PDF files. [Adobe Acrobat Reader](#) must be installed on the PC.

Explore

Select this option to open a Windows Explorer view of the folder containing the selected report.

Delete

Select this option to delete the selected report files.



Files deleted with this function are not recoverable through the recycle bin. If you want to be able to recover files that you delete from the recycle bin, use the delete function in Windows Explorer.



You can select a range of files by using the following procedure:

- Click on the first file in the range.
- Hold the **Shift** key down and click on the last file in the range.

All files between the first and the last (including the first and last files of the range) will be selected. If you right-click within the selected files, the [Open PDF](#) and [Delete](#) operations will be carried out on all files in the range.

Event Log

This is a log of all significant events that have occurred during MLV operation, such as startup, generating reports, etc.

Reference Samples Log

MLV is able to log samples from compatible references, and these samples can then be used as the reference source for logger data analysis. When MLV is logging the reference data, each sample is written to the reference log.

Startup Log

When MLV starts up, entries are added to this log as execution proceeds. When troubleshooting MLV operation it can be useful to refer to this log.

Memory Report Log

If MLV encounters a serious program error during execution, a dump of relevant data is written to a memory log file. The next time MLV starts, that file is loaded and displayed here.

23 Appendices

[Using the Fluke/Hart Scientific 1502A Thermometer as the reference.](#)
[Access Control System](#)
[Example Projects](#)
[Error Messages](#)

23.1 Using the Fluke/Hart Scientific 1502A Thermometer as the reference.

When performing validations on loggers it is useful to have a precision reference monitoring the same environment. If the precision reference output is logged to a file, MLV is able to read this file and compare the loggers' output with the reference output over the same time period.

This appendix details how to set up a popular precision thermometer - the Fluke/Hart Scientific 1502A - as a reference for MLV validation test runs. There are two ways this can be achieved with MLV.

Logging the Fluke thermometer output to a disk file

With this method, the output of the Fluke thermometer is captured via a computer's serial port to a disk file. The Fluke thermometer needs to be set up as follows:

Logging of the Fluke's output to a disk file can be accomplished by various means, but the simplest way is to use HyperTerminal or a similar application.

Once logging has been started you should see the temperature data scrolling past on the HyperTerminal window. Each line should look like this:

```
t: 11.058 C 12:00:12  
t: 11.642 C 12:00:22  
t: 11.685 C 12:00:32  
t: 11.433 C 12:00:42  
t: 11.094 C 12:00:52
```

MLV will parse this incoming data and log each sample as it arrives. The reference thermometer can be configured in degrees C or F and can be sending the data at whatever rate you require, and is supported by the Hart unit. If the incoming data is in degrees F, MLV will convert it to degrees C before storing it.

Logging can be ended by pressing the Esc key. If necessary the disk file produced should be moved to the same folder that the Temprecord TR files will be placed when the loggers are read (this is not necessary but it is good practice to keep the logger files and the reference file they relate to in the same folder).

Logging of the Fluke's output need not be started and stopped synchronously with the loggers, but MLV will be unable to produce any validation results against the Fluke reference for periods where logging of the Fluke data was not underway.

Using MLV to log the Fluke thermometer output

MLV can take the output of the Fluke thermometer directly and log it to its own log file. MLV can then fetch the reference samples as needed directly without needing any separate file of logged data to be present.



If your Fluke/Hart thermometer has been calibrated by a measurement standards laboratory you should have correction data supplied by the laboratory, usually in the form of four polynomial coefficients. MLV can apply this polynomial correction automatically when an ASCII data file produced by a Fluke/Hart Scientific 1502A is read as the reference. MLV can also apply the correction when data is logged from a Fluke/Hart Scientific 1502A to the MLV reference sample log. The polynomial correction coefficients are specified in the [general options](#) tab.

23.2 Access Control System

(Configurable at Administrator Level only)

Overview



The access control system implemented in MLV can be shared amongst other Temprecord applications that also implement it, such as TAD (Temprecord Active Display). This means that usernames created with MLV will be available when running TAD also. In order for this sharing to work properly, both applications must reference the same Master.acf file. The default installation location of this master file is such that this will be the case, but earlier versions of TAD and MLV did not store the master file in a shared location and it may be necessary to move it. See the topic [Moving the master password file](#) location for the procedure to follow.

A user with MLV [Administrator](#) rights will need to configure the MLV users and passwords before any configuration changes can be applied to the MLV application.

When the [Access](#) tab is selected, the following screen is displayed:

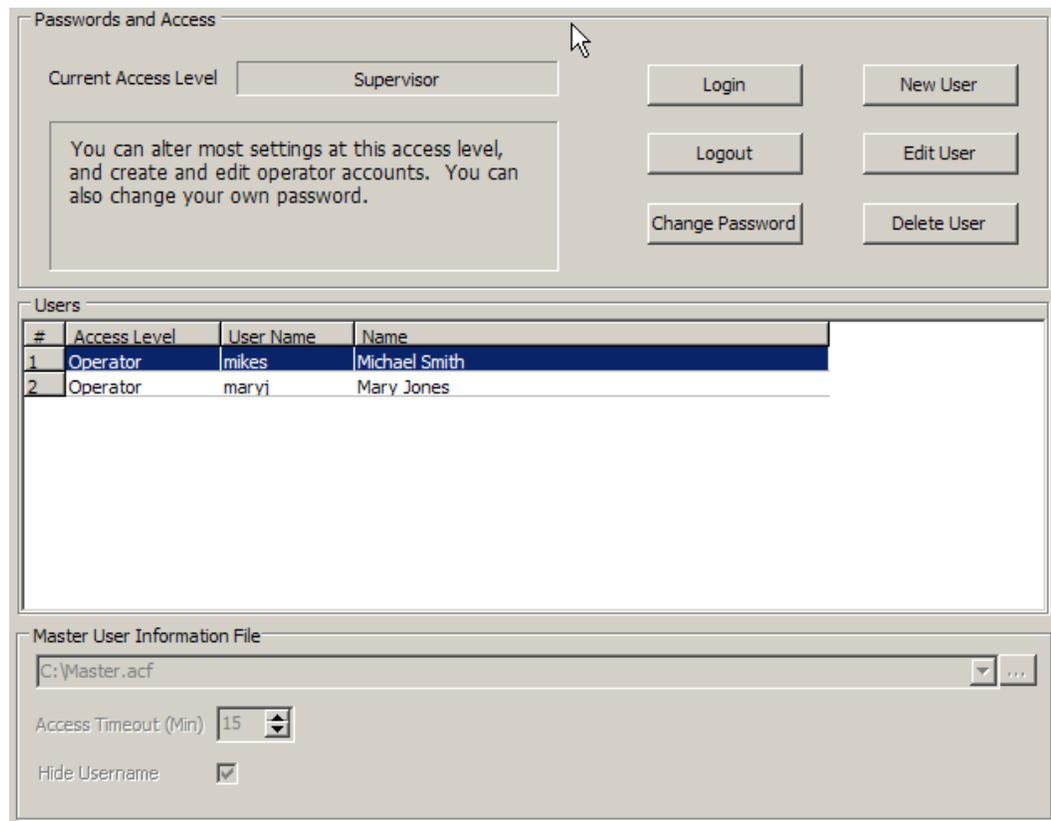


Figure 5: Options Tab: Access Screen

This screen allows creation, deletion and editing of user accounts, and login and logout of users.

MLV implements its own access system to limit access to certain functions of the program to groups of users. The MLV system of users and access levels is completely independent of the system Windows implements for users.

There are four access levels defined in MLV. In order of increasing ability, they are: **No access**, **Operator**, **Supervisor** and **Administrator**. Although the access levels have specific names, the assignment of capabilities to each level within the MLV application is arbitrary.

No access (for anyone with physical access to the computer running MLV)

When MLV first starts, the access level is set to the lowest level - i.e. no access. In general it is not possible to carry out any operations from this access level, apart from view the various tabs in MLV. There is no reports access and MLV does not allow shutdown of the application. The MLV application will degrade to the **Lowest** level after a 15-minute timeout period where there is no keyboard or mouse activity. This timeout may be set to a different duration by your administrator

Operator Access (for Authorised site operators)

A minimal set of capabilities is implemented at the **Operator** access level, such as generation of reports. Operators have no access level or user administration capabilities, other than the ability to change their own password. Configuration/setup access is not allowed. Shutdown of the MLV application is not allowed.

Supervisor Access (Authorised site supervisors / management)

The **Supervisor** access level allows you to change most settings in MLV concerned with report configuration. **Supervisors** can create and modify projects, create and modify **Operator** accounts, change **Operator** passwords, and change their own passwords. Shutdown of the MLV application is permitted.

Access is restricted to some of the site configuration options.

Administrator Access (for authorised site personnel and Temprecord administrators only.)

This is the highest access level and provides the capability to alter installation settings and low-level hardware settings. **Administrator** access will not normally be required by Temprecord customers and is usually restricted to Temprecord personnel. **Administrators** can create and delete **Operators** and **Supervisors** and change **Operator** and **Supervisor** passwords, and change their own passwords.



No user can find out the password of another user, regardless of access level. Users of any given access level can change passwords of users of lower access levels, and change their own password, but they cannot inspect passwords.

Login

Click the **Login** button to enter the user name and password for your **Access Level** in the dialog box as per the following screen:

Figure 6: Options Tab: Access / Change Access Level Screen

Logout

Click the **Logout** button to reset MLV to the lowest access level. MLV will also logout if a period of inactivity expires (see the **Access Timeout** below).



Another way of quickly logging out is to click the **OK** button in the **Login** dialog with both username and password fields left blank.



If you open the **Login** dialog by mistake, make sure you click on the **Cancel** button to close it again. If you click on the **OK** button with blank entry fields you will be logged out!

Changing your Password

Click the [Change Password](#) button to alter your own password:

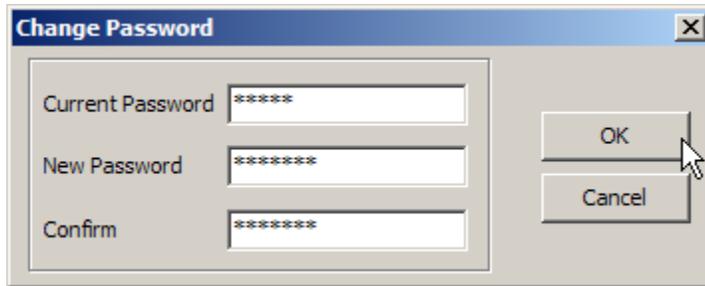


Figure 7: Options Tab: Access / Change Password Dialog

To alter your own password, you must enter your current password, and enter the new password, and a confirmation of the new password. The password will be changed if you supply the correct current password, and the new password and confirm fields are the same. Passwords are not case sensitive, may contain letters and digits and some "special" (punctuation) characters, but may not contain embedded spaces.



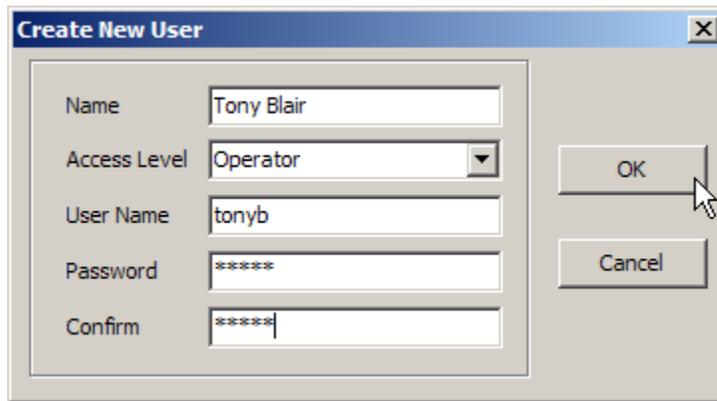
When choosing a new password or editing an existing password, there may be restrictions on the form the password may take. Specifically, MLV may enforce:

- a minimum password length
- a minimum number of letters ("A".."Z", "a".."z")
- a minimum number of digits ("0".."9")
- a minimum number of "special" characters ("!@#\$%^&*()_+ -=")

In addition, passwords containing spaces are not allowed. Any leading or trailing spaces are ignored. The minimum numbers of characters in each of the requirements listed above will be set by your administrator at the time of installation. The maximum number of characters in a password is 32.

New User

Click the [New User](#) button to create another user account.



The 'Create New User' dialog box contains the following fields and controls:

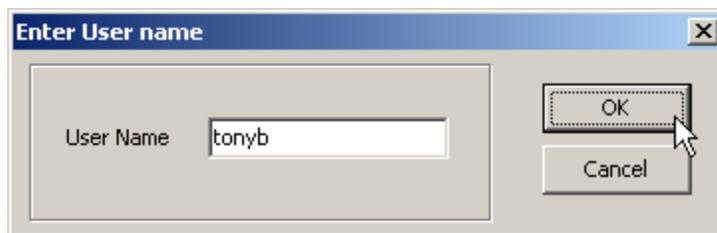
Name	Tony Blair
Access Level	Operator
User Name	tonyb
Password	*****
Confirm	*****

Buttons: OK, Cancel

You can only create users at access levels lower than your own access level. For example, Supervisor users can only create Operator users

Edit User

Click the [Edit User](#) button to change the details of another user account.

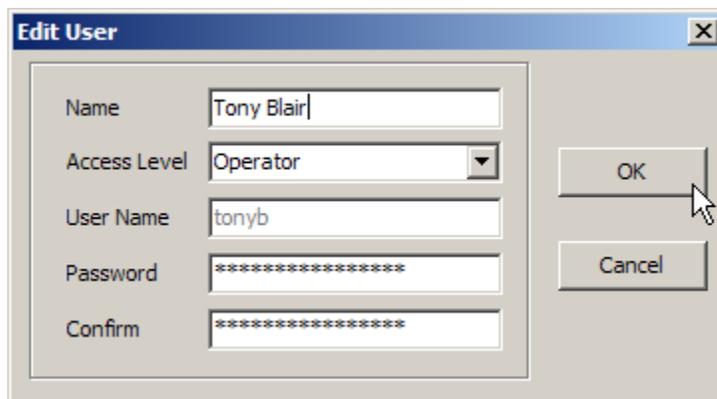


The 'Enter User name' dialog box contains the following fields and controls:

User Name	tonyb
-----------	-------

Buttons: OK, Cancel

Enter the user name of an existing user and click the [OK](#) button. Case is not important when specifying usernames. The following dialog will display:



The 'Edit User' dialog box contains the following fields and controls:

Name	Tony Blair
Access Level	Operator
User Name	tonyb
Password	*****
Confirm	*****

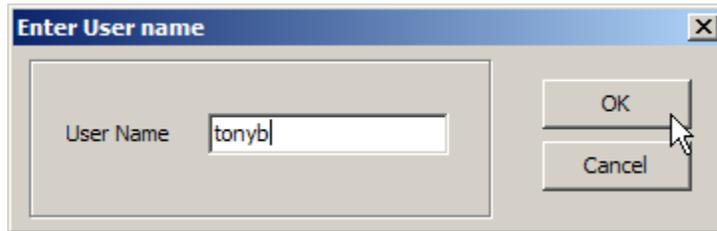
Buttons: OK, Cancel

- You can only edit the details of users of a lower access level than yourself. If you need to change your own password you should click on the [Change Password](#) button instead.
- Note that you cannot change the username. If you want to change a username, delete the old user and create a new user with the desired new name.
- You can change the access level of the user, but you cannot set the access level to any level higher than the level below your own. For example, if you are logged in as a [Supervisor](#), you can only edit [Operator](#) accounts, and you cannot change the access level of those users.

Administrators can only edit Operator and Supervisor accounts, and can only change the access level to Operator or Supervisor.

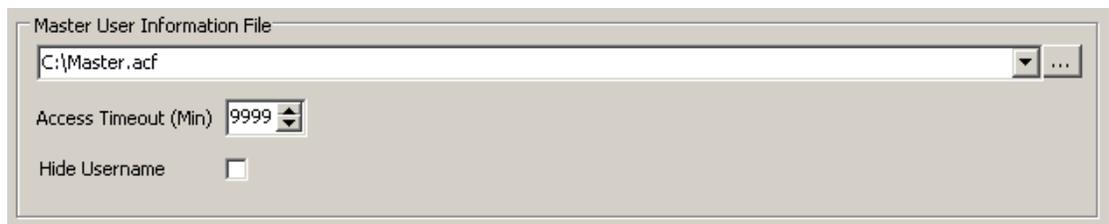
Delete User

Click the **Delete User** button to remove a user account.



You can only delete the accounts of users of a lower access level than yourself.

Master User Information File



The **master information file** is the name and path of the file that contains the user account information for the MLV users. The account information is encrypted and it is not possible to find out user names or passwords by inspecting this file.



Most of the functions that MLV carries out require a user to be logged in to the access control system (note this is independent of the Windows users). If the file **Master.acf** should ever become damaged or unavailable it may not be possible to log in to the MLV access control system. MLV attempts to protect against this by saving a backup copy of the file called **Local.acf**. If the **Master.acf** file is not found, the local copy is used. The local copy is kept "up to date" with the master copy at all times where possible. See [Changing the Location of the Master User Information File](#) for more details.

Access Timeout

The **access timeout** determines how long before MLV relegates the access level to the lowest level after a period of inactivity.

Hide Username

If the **Hide Username** checkbox is checked, then usernames are displayed with '*' characters as you type them, and the currently logged in user is not shown on the status line at the bottom of the MLV main form.

Passwords are never shown as you enter them.

See Also[Changing the access level](#)[Moving the master password file](#)[Recovering from lost or damaged password files](#)

23.3 Changing the Access Level



MLV implements its own access system to limit access to certain functions of the program to groups of users. The MLV system of users and access levels is completely independent of the system Windows implements for users.

There are four access levels defined in MLV. In order of increasing ability, they are: [No access](#), [Operator](#), [Supervisor](#) and [Administrator](#). Although the access levels have specific names, the assignment of capabilities to each level is arbitrary.

No access

When MLV first starts, the access level is set to the lowest level - i.e. no access. In general it is not possible to carry out any operations from this access level, apart from view the various tabs in MLV

Operator Access

A minimal set of capabilities is implemented at the [Operator](#) access level, such as generation of reports. Operators have no access level or user administration capabilities, other than the ability to change their own password. Operators can select projects, but not edit them or create new projects.

Supervisor Access

The [Supervisor](#) access level allows you to change most settings in MLV concerned with project selection and editing and reporting setup. [Supervisors](#) can create and delete [Operators](#) and change [Operator](#) passwords, and change their own passwords.

Administrator Access

This is the highest access level and provides the capability to alter installation settings and low-level hardware settings. [Administrator](#) access will not normally be required by Temprecord customers and is usually restricted to Temprecord personnel. [Administrators](#) can create and delete [Operators](#) and [Supervisors](#) and change [Operator](#) and [Supervisor](#) passwords, and change their own passwords.



No user can find out the password of another user, regardless of access level. Users of any given access level can change passwords of users of lower access levels, but they cannot see them.

User Name

Enter the username assigned to you by your administrator. Usernames are case-insensitive, i.e. you can enter *Fred*, *fred*, *FRED*, *fRED*, etc. Usernames may display as you type, depending on the setting of the [Hide Username](#) access option.

Password

Enter the password assigned to you by your administrator. Passwords are case-insensitive and will not display as you type.

OK

Click the **OK** button to submit the username and password to the access control system. If the username and password match any user in the access control file, the access level will be changed to the access level of that user. If the username and/or password do not match, an error message is displayed and the access level is not changed.



If the **OK** button is clicked with blank username and password fields, the access level is changed to the lowest level. If you open the [Change Access Level](#) dialog by mistake, make sure you press **ESC** or click the **Cancel** button to exit if you want to preserve your current logged in access level.

Cancel

Click the **Cancel** button to exit the [Change Access Level](#) dialog without doing anything. Any access level that was in effect will remain.



You can also press the **ESC** key to exit the [Access Level](#) dialog without doing anything.

See Also

[Access Control System](#)

[Changing the Access Level](#)

[Moving the master password file](#)

[Recovering from lost or damaged password files](#)

23.4 Moving the master password file

The access control system implemented in MLV can be shared amongst other Temprecord applications that also implement it, such as TAD (Temprecord Active Display). This means that usernames created with MLV will be available when running TAD also. In order for this sharing to work properly, both applications must reference the same *Master.acf* file. The default installation location of this master file is such that this will be the case, but earlier versions of TAD and MLV did not store the master file in a shared location and it may be necessary to move it.

The following procedure assumes you have an existing installation of MLV and the master password file *Master.acf* (containing your existing users and password) is stored in *C:\Documents and Settings\All Users\Documents\Temprecord\Application Data\MLV* (which is where previous versions of MLV stored the file).

- Open Windows Explorer and navigate to the folder where *Master.acf* is currently stored.

- Make a backup copy of the file.
- Start MLV and click on the Access tab
- Note the name of the folder and filename specified in the Master Password File control. This should show:

C:\Documents and Settings\All Users\Application Data\Temprecord\Master.acf

after a new installation, but it may also be filled in the location of your current Master.acf file.

- If the location shown in the Master Password File control is the location of your current file you need to copy Master.acf to the folder

C:\Documents and Settings\All Users\Application Data\Temprecord\Master.acf

and edit the Master Password File control contents to this file and pathname also.

- Exit MLV.
- Start MLV again. Check that the location shown in the Master Password File control is now:

C:\Documents and Settings\All Users\Application Data\Temprecord\Master.acf

and that MLV "knows" about your existing user names and passwords.

The key points to remember about the access control system are:

- MLV checks for the master file first. If this is not found, it checks for the backup copy, normally stored at

C:\Documents and Settings\\Local Settings\Application Data\Temprecord\Local.acf

- If MLV doesn't find a Master.acf file at:

C:\Documents and Settings\All Users\Application Data\Temprecord\Master.acf

or a Local.acf file at:

C:\Documents and Settings\\Local Settings\Application Data\Temprecord\Local.acf

at installation time, it installs a "starter" password file containing one administrator user called "admin" with a password of "admin". The intention here is to provide you with temporary administrator access which is required to change the path of the Master.acf file.

Once you have changed the path, exited MLV, started MLV again and finally, exited MLV again, this "start" file should have been overwritten with your existing user set details.

- If you make any changes to the user set (adding or deleting users, changing passwords, etc) MLV always saves the changes back to the location it read the Master.acf file from. If you change the location of the Master.acf file, the new location will not be used until you exit MLV and start it again. For this reason, you should exit MLV and restart MLV as soon as you have altered the path to the Master.acf file.

See also:
[Access Control System](#)

[Changing the Access Level](#)
[Recovering from lost or damaged password files](#)

23.5 Recovering from lost or damaged password files

It may be that you need to recover from a lost or damaged password file. Once MLV "loses" the path to a password file and is unable to read the backup copy you will be unable to gain the administrator access needed to reset the path to the Master Password Information file.

The following steps should get you going again. You will most likely require Windows administrator access to perform this task.

- Using Windows explorer to search for files, locate all copies of the files [Master.acf](#) and [Local.acf](#) on your computer.
- If you can't find any, you will need to start afresh and use the procedure headed Installing a Clean Password File below.
- If you do find a copy of [Master.acf](#), and it is in the folder specified by the [Master Password File](#) control, but you can't log in with any of the users and passwords you thought existed, the file may be damaged. Try recovering the file from a backup. If you still can't login, you will need to start afresh and use the procedure headed Installing a Clean Password File below.
- If you do find a copy of [Master.acf](#), and it is not in the folder specified by the [Master Password File](#) control, then copy it to that folder. MLV should then start up and work normally from then on.

Installing a Clean Password File

If nothing seems to work, you may need to re-install MLV and reset your users and passwords. A default "clean" installation of MLV creates a single [Administrator](#) user named "admin" with a password of "admin".



The following procedure will delete all your existing Temprecord MLV and TAD users. You will need to re-create them "from scratch". Note that [Windows](#) users are unaffected.

- Using Windows Explorer, ensure there are no copies of [Master.acf](#) or [Local.acf](#) in the folders:

[C:\Documents and Settings\All Users\Application Data\Temprecord\](#)
[C:\Documents and Settings\\Local Settings\Application Data\Temprecord](#)

and ensure there are no other [.acf](#) files in old locations from previous MLV or TAD installations. If you don't want to delete any files that you think might be useful, rename them to something other than [Master.acf](#) or [Local.acf](#).

- Install MLV again. You existing data, reports and program settings should be unaffected.
- Start MLV. Click on the access tab. Click on the Login button and log in with the username "admin", password "admin".
- If you can't login with this username and password, MLV has most likely "found" another password file. It will either be in the folder

[C:\Documents and Settings\\Local Settings\Application Data\Temprecord](#)

or in the folder specified by the [Master Password File](#) control on the [Access](#) tab. You will need to find it and rename or delete it, and then repeat the installation.



MLV will not install the "starter" password files if it finds any existing password files.

- When you have MLV starting and allowing access with the default "starter" user name and password, Create the users, access levels ([Supervisor](#) or [Operator](#)) and passwords you require.

See also:

[Access Control System](#)

[Changing the Access Level](#)

[Moving the master password file.](#)

23.6 Example Projects

Some example projects are included to get the MLV user started.

You can use these projects as a starting point when designing your own projects. Start with the example project that comes the closest to providing the output report you would like. Create a copy of it by using [File/Project Save As](#) and give your project a name that will help you refer to it later.

Single Logger with No Reference

This project demonstrates generating a report from a single logger, with no reference used. The information presented in the summary will be the same as that presented in the statistics view of the Temprecord software.

Project Filename	Single Logger No Reference.mlv
Relevant Statistical Data Reported	Mean of samples in the logger Maximum of samples in the logger Minimum of samples in the logger Range (Spread) of samples in the logger Variance of samples in the logger Standard Deviation of samples in the logger
Notes	As no reference is specified in this project, it is not possible to obtain an error plot. As there is only one data file being processed, there are no statistics for the mean, variance, standard deviation or spread across loggers available.

Single Logger with Reference Logger

This project demonstrates generating a report from a single logger, but with another logger providing a reference. Normally, the logger providing the reference source would be a higher-accuracy calibrated logger.

Project Filename	Single Logger With Reference.mlv
Relevant Statistical Data Reported	Mean of samples in the logger Maximum of samples in the logger Minimum of samples in the logger Range (Spread) of samples in the logger

	Variance of samples in the logger Standard Deviation of samples in the logger Average Error during the reporting interval
Notes	As there is only one data file being processed in this project, there are no statistics for the mean, variance, standard deviation or spread across loggers available.

Multiple Loggers with No Reference

This project demonstrates generating a report from several loggers, with no reference used. The information presented in the summary now includes statistical data relevant to the group of loggers, such as the overall mean temperature, the spread, and variance/standard deviation.

Project Filename	Multiple Loggers No Reference.mlv
Relevant Statistical Data Reported	Mean of samples in each of the loggers Maximum of samples in each of the loggers Minimum of samples in each of the loggers Range (Spread) of samples in each of the loggers Variance of samples in each of the loggers Standard Deviation of samples in each of the loggers Mean of samples across all of the loggers Maximum of samples across all of the loggers Minimum of samples across all of the loggers Range (Spread) of samples across all of the loggers Variance of samples across all of the loggers Standard Deviation of samples across all of the loggers
Notes	As more than one logger is specified in this project, it is not possible to obtain an error plot.

Multiple Loggers with Reference Logger

This project demonstrates generating a report from several loggers, and with a higher-accuracy logger providing a reference.

Project Filename	Multiple Logger With Reference.mlv
Relevant Statistical Data Reported	Mean of samples in each of the loggers Maximum of samples in each of the loggers Minimum of samples in each of the loggers Range (Spread) of samples in each of the loggers Variance of samples in each of the loggers Standard Deviation of samples in each of the loggers Average Error during the reporting interval Mean of samples across all of the loggers Maximum of samples across all of the loggers Minimum of samples across all of the loggers Range (Spread) of samples across all of the loggers Variance of samples across all of the loggers Standard Deviation of samples across all of the loggers
Notes	As more than one logger is specified in this project, it is not possible to obtain an error plot, even though a reference was specified.

The example MLV projects can be found in the folder:

C:\Documents and Settings\All Users\Documents\Temprecord\MLV\Projects\Examples

23.7 Information, Warning and Error Messages

[CRC error in data file: <filename>](#)
[Clear all files from this project?](#)
[Error <number> reading data file : <filename>](#)
[Error computing region stats: <error>](#)
[Error <error> reading reference logger file <filename>](#)
[Error saving project file: <filename>](#)
[Exception importing file: <filename>](#)
[File not found: <filename>](#)
[Format error in time value at line:<number>](#)
[Humidity loggers have different sample periods](#)
[Last loaded project file not found: <filename>](#)
[MLV has no project currently loaded. Would you like to create a new project and save it?](#)
[New project not saved. Save now?](#)
[No humidity samples for use as reference in file: <filename>](#)
[No reference samples for test interval found in log](#)
[No temperature samples for use as reference in file: <filename>](#)
[No valid enabled Temprecord data files found](#)
[Project file not found: <filename>](#)
[Reading of reference data aborted at line:<number>](#)
[Reference logger datafile not found: <filename>](#)
[Remove these 4 files from this project?](#)
[Summary report period is outside and after logger sample records](#)
[Summary report period is outside and prior to logger sample records](#)
[Summary report start date is after summary end date](#)
[Temperature loggers have different sample periods](#)
[The data from the reference source does not overlap the logger humidity data](#)
[The data from the reference source does not overlap the logger temperature data](#)
[Unable to create report: <filename> \(is the PDF file already open?\)](#)
[Unable to create report folder: <foldername>](#)
[Unable to delete file: <filename>](#)
[Unable to find command line project file: <filename>](#)
[Unable to open command line project file: <filename>](#)
[Unable to open PDF help file: <filename>](#)
[Unknown command line option: <option>'](#)
[Unrecognised filetype: <filetype>'](#)
[You have changed some settings, but have not saved them in a project. 'Would you like to create a new project and save it?'](#)
[You have requested that a diagnostics report be sent to Temprecord. Continue?](#)
[You must give your project a name other than "New Project"](#)

23.7.1 Clear all files from this project?

You have requested that all Temprecord data files be cleared from the current project. Click **Yes** to empty the project of Temprecord data files. Click **No** to do nothing.



Clearing the files from the project does not delete the Temprecord datafiles themselves.

See also:

[Information, Warning and Error Messages](#)

23.7.2 CRC error in data file: <filename>

The Temprecord data file indicated has a CRC error. This indicates that the file is damaged and cannot be used. Temprecord datafiles are protected against damage and tampering by a CRC (Cyclic Redundancy Code).

If you have access to the logger that produced the file you should try reading the data again.

See also:

[Information, Warning and Error Messages](#)

23.7.3 Error <number> reading data file : <filename>

MLV has encountered an error reading the data from a Temprecord data file. There will be additional text with this error message which should indicate the source of the problem.

See also:

[Information, Warning and Error Messages](#)

23.7.4 Error computing region stats: <error>

MLV encountered an internal arithmetic error while processing the logger data.

See also:

[Information, Warning and Error Messages](#)

23.7.5 Error <error> reading reference logger file <filename>

MLV encountered an error reading the reference data from the Temprecord data file. The error message should provide additional information.

See also:

[Information, Warning and Error Messages](#)

23.7.6 Error saving project file: <filename>

MLV could not save the project file to disk. Make sure you have sufficient rights to create files on your computer.

See also:

[Information, Warning and Error Messages](#)

23.7.7 Exception <error> importing file: <filename>

MLV has encountered an unknown error while processing the ASCII data file.

See also:

[Information, Warning and Error Messages](#)

23.7.8 Report file not found: <filename>

MLV could not delete the report file because the file was not found. This is most likely because the file was deleted in Windows Explorer.

See also:

[Information, Warning and Error Messages](#)

23.7.9 Format error in time value at line:<number>

MLV could not read the time data from the ASCII data file. The error message will supply more details on the nature of the format error.

See also:

[Information, Warning and Error Messages](#)

23.7.10 Humidity loggers have different sample periods

MLV has detected that the Temprecord data files in the project are not all set to the same sample period. This is normally not a cause for concern, provided the sample period is set sufficiently short to avoid [aliasing](#) problems.

See also:

[Information, Warning and Error Messages](#)

23.7.11 Last loaded project file not found: <filename>

The project file last opened by MLV could not be opened.

When MLV exits, it saves the name and folder of the project file it has opened. When MLV starts up next, it tries to open that file (unless a filename is specified on the command line).

See also:

[Information, Warning and Error Messages](#)

23.7.12 MLV has no project currently loaded. Would you like to create a new project and save it?

You have tried to save the currently loaded project, but there is no project loaded. If you want to create a new project, answer **Yes** and you will be able to create the project and give it a name. Click on **No** to do nothing.

See also:

[Information, Warning and Error Messages](#)

23.7.13 New project not saved. Save now?

You have created a new project, but not yet saved the project. If you answer **Yes**, MLV will ask you for the project name. Enter the name and click on **Save**. If you click on **No**, the current project will not be

saved. If you click on **Cancel**, the current operation (exiting MLV or loading another project) will be abandoned.



When MLV asks you for the name of a new project, it fills in the name with a suggested name like **New Project (1).mlv**. If a project file of this name is already present in the folder, it chooses the next name in sequence i.e. **New Project (2).mlv**, etc. You can overtype these suggested names with a name of your choosing (and you should do so, so that your project name is more meaningful).

See also:

[Information, Warning and Error Messages](#)

23.7.14 No humidity samples for use as reference in file: <filename>

A Temprecord data file has been specified as the source for the humidity reference for the analysis, but the file does not contain any humidity samples.

See also:

[Information, Warning and Error Messages](#)

23.7.15 No reference samples for test interval found in log

The current project has specified that the MLV reference sample log be used to supply the reference for the data analysis, but MLV was unable to find any logged reference data in the reference sample log for the specified test interval.

See also:

[Information, Warning and Error Messages](#)

23.7.16 No temperature samples for use as reference in file: <filename>

A Temprecord data file has been specified as the source for the temperature reference for the analysis, but the file does not contain any temperature samples.

See also:

[Information, Warning and Error Messages](#)

23.7.17 No valid enabled Temprecord data files found

There are no datafiles loaded in the [Datafile Tab](#), or the files loaded in the tab are not Temprecord data files.

See also:

[Information, Warning and Error Messages](#)

23.7.18 Project file not found: <filename>

MLV could not find the project file you have specified.

Check the spelling of the name. MLV expects project files to have the file extension **mlv**.

See also:

[Information, Warning and Error Messages](#)

23.7.19 Reading of reference data aborted at line:<number>

Reading of the reference data from an ASCII file was interrupted by the user.

No analysis or report generation will take place.

See also:

[Information, Warning and Error Messages](#)

23.7.20 Reference logfile not found: <filename>

The current project specifies a Temprecord logfile as the reference source but MLV was unable to find the file.

No analysis will take place and no report produced.

See also:

[Information, Warning and Error Messages](#)

23.7.21 Remove these 4 files from this project?

If you attempt to delete more than one Temprecord data file from the Datafile List, MLV asks if you really wanted to do so. Answer **Yes** and the files will be cleared from the project. Answer **No** or **Cancel** to do nothing.

See also:

[Information, Warning and Error Messages](#)

23.7.22 Summary report period is outside and after logfile sample records

You have specified that the report be generated over a specific interval, but both the start date and the end date are after the latest sample contained in any of the Temprecord data files.

See also:

[Information, Warning and Error Messages](#)

23.7.23 Summary report period is outside and prior to logfile sample records

You have specified that the report be generated over a specific interval, but both the start date and the end date are prior to the earliest sample contained in any of the Temprecord data files.

See also:

[Information, Warning and Error Messages](#)

23.7.24 Summary report start date is after summary end date

You have specified that the report be generated over a specific interval, but the start date is after the end date.

See also:

[Information, Warning and Error Messages](#)

23.7.25 Temperature loggers have different sample periods

MLV has detected that the Temprecord data files in the project are not all set to the same sample period. This is normally not a cause for concern, provided the sample period is set sufficiently short to avoid [aliasing](#) problems.

See also:

[Information, Warning and Error Messages](#)

23.7.26 The data from the reference source does not overlap the logger humidity data

The humidity data from the specified reference source does not overlap any humidity data records in the Temprecord data files. No analysis will take place and no reports produced.

See also:

[Information, Warning and Error Messages](#)

23.7.27 The data from the reference source does not overlap the logger temperature data.

The temperature data from the specified reference source does not overlap any temperature data records in the Temprecord data files. No analysis will take place and no reports produced.

See also:

[Information, Warning and Error Messages](#)

23.7.28 Unable to create report: <filename> (is the PDF file already open?)

MLV was unable to produce the PDF report file. The error message may contain more information.

Check that you do not have a PDF file with the same name as the new report file open.

23.7.29 Unable to create report folder: <foldername>

MLV was unable to create the folder name specified. The error message may contain more information.

Check that you have sufficient rights to create a folder in the location indicated.

See also:

[Information, Warning and Error Messages](#)

23.7.30 Unable to delete report file: <filename>

MLV was unable to delete the report file. This is most likely because the report file has been opened with [Adobe Reader](#).

Close Adobe Reader to release the file and try repeating the operation.

See also:

[Information, Warning and Error Messages](#)

23.7.31 Unable to find command line project file: <filename>

A project file was submitted on the command line but MLV was unable to locate the file.

See also:

[Information, Warning and Error Messages](#)

23.7.32 Unable to open command line project file: <filename>

A project file was submitted on the command line but MLV was unable to open the file. The file may be held open by another application, or may be damaged.

See also:

[Information, Warning and Error Messages](#)

23.7.33 Unable to open PDF help file: <filename>

MLV could not open the PDF manual form of the on-line help. The file (MLV.PDF) is normally installed in the folder C:\Program Files\MLV\Help.

You may need to reinstall MLV.

See also:

[Information, Warning and Error Messages](#)

23.7.34 Unknown command line option: <option>

The command line option submitted to MLV is unrecognized.

Valid command line options are:

/HELP	Starts MLV and displays the online help
/USERNAME <username>	Starts MLV and submits the supplied username
/PASSWORD <password>	Starts MLV and submits the supplied password

See also:

[Information, Warning and Error Messages](#)

23.7.35 Unrecognised filetype: <filetype>

A file has been dropped onto the MLV main window that MLV does not recognise as a file it is able to process.

MLV can only process data from Temprecord data files (.tr extension) and load projects from MLV project files (.mlv extension).

See also:

[Information, Warning and Error Messages](#)

23.7.36 You have changed some settings, but have not saved them in a project. Would you like to create a new project and save it?

You do not have a project currently loaded, but have changed some project settings. If you want to create a new project and save these settings, answer **Yes** and you will be able to create the project and give it a name. Click on **No** to do nothing.

See also:

[Information, Warning and Error Messages](#)

23.7.37 You have requested that a diagnostics report be sent to Temprecord. Continue?

You should only use this function if instructed to do so by Temprecord personnel. The diagnostic report contains information about MLV's execution that can assist Temprecord in tracking down errors in the program.

The information may include:

- A "screen shot" of the computer, i.e. a copy of the screen displayed screen contents as an image file.
- Configuration files used by MLV
- Installation logs generated when MLV was installed on the computer.
- Information on the internal state of the computer processor's registers.

If you click on the **Send Report** button, the information is attached to an email message and sent to Temprecord.

If you click on the **Print Report** button, the information is sent to the printer. Not all the data is printed in this case.

If you click on the **Save Report** button, the information is saved as a disk file on your computer. If MLV experiences problems sending the diagnostic email, then you should compose a message yourself, attach the report file you have saved, and email the message to diagnostics@temprecord.com.



A diagnostic report may contain information identifying your site, computer name, or logged in Windows username. Any information of this type received by Temprecord will be treated with the utmost confidence.

See also:

[Information, Warning and Error Messages](#)

23.7.38 You must give your project a name other than "New Project"

You cannot name a project "New Project", as MLV reserves this name for a project that has not yet been saved. Choose another name.

See also:

[Information, Warning and Error Messages](#)

24 About MLV

Temprecord Multiple Logger Validation Utility ("MLV")
Version 1.5
Windows 2000/NT/XP/7/Vista
English-Language HTML Help

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