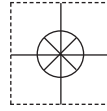
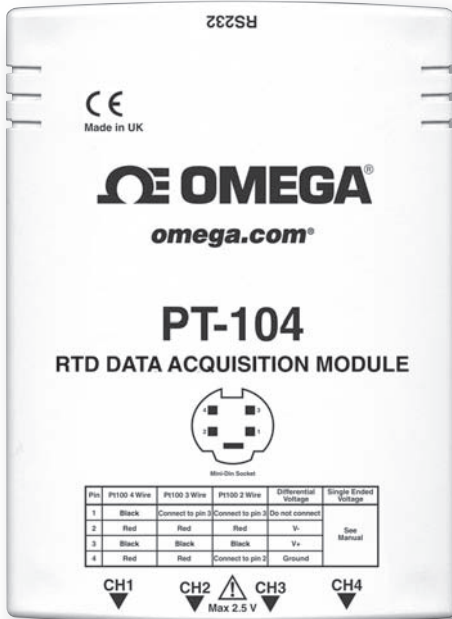


2 YEAR
WARRANTY

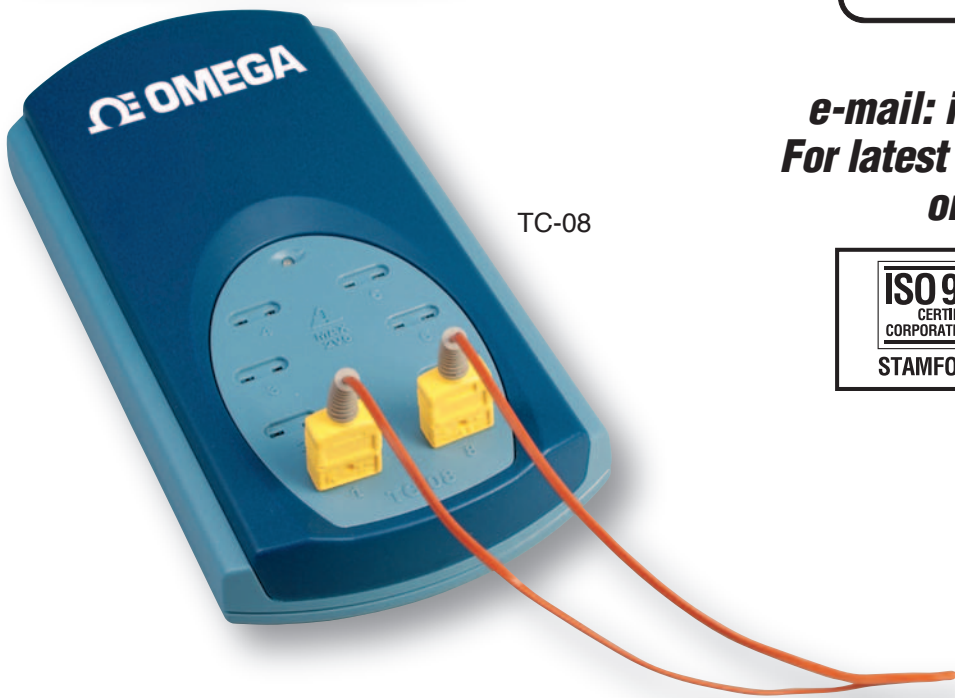


User's Guide



PT-104

Pin	PT100 4 Wire	PT100 3 Wire	PT100 2 Wire	Differential Voltage	Single Ended Voltage	See Manual
1	Black	Connect to pin 2	Connect to pin 2	Do not connect		
2	Red	Red	Red	V _c		
3	Black	Black	Black	V _s		
4	Red	Red	Connect to pin 2	Ground		



TC-08

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Canada:

976 Bergar
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FAX: (001) 203-359-7807
e-mail: espanol@omega.com

Servicing Europe:

Benelux:

Managed by the United Kingdom Office
Toll-Free: 0800 099 3344
FAX: +31 20 643 46 43
TEL: +31 20 347 21 21
e-mail: sales@omega.nl

Czech Republic:

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

France:

Managed by the United Kingdom Office
Toll-Free: 0800 466 342
FAX: +33 (0) 130 57 54 27
TEL: +33 (0) 161 37 29 00
e-mail: sales@omega.fr

Germany/Austria:

Daimlerstrasse 26
D-75392 Deckenpfronn, Germany
Toll-Free: 0 800 6397678
FAX: +49 (0) 7056 9398-29
TEL: +49 (0) 7059 9398-0
e-mail: info@omega.de

United Kingdom:
ISO 9001 Certified

OMEGA Engineering Ltd.
One Omega Drive, River Bend Technology Centre, Northbank
Irlam, Manchester M44 5BD England
Toll-Free: 0800-488-488
FAX: +44 (0)161 777-6622
TEL: +44 (0)161 777-6611
e-mail: sales@omega.co.uk

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

Contents

1 Introduction	1
1 Overview	1
2 Recording	2
3 Safety warning	3
2 Software components	4
1 Introduction	4
2 Recorder	5
3 Logging Player	6
4 Graph	7
5 XY Graph	9
6 Spreadsheet	11
7 Notes	13
3 How to...	14
1 Add new measurements	14
2 Select which measurements to display	14
3 Start a new run	14
4 Repeat an existing run	14
5 Start recording whenever Windows starts	15
6 Display data	15
7 Print data	16
8 Export data to a spreadsheet	16
9 Export a graph to a word processor	16
10 Enable date and time scaling on a graph	17
11 Transfer data over an IP network	18
12 Run multiple recorders	19
4 Menu bar	20
1 File	20
2 Settings	21
3 View	21
4 Help	22
5 Keyboard shortcuts	22
5 Dialogs	23
1 General dialogs	23
1 Recording	23
2 Sampling Rate	24
3 Print	24
4 Confirm File delete	25
5 Converter-related	25
6 IP socket-related	28
7 Parameter-related	31
8 Window-related	37

9 Preferences	40
10 Hardware configuration	42
6 Equipment overview	46
1 PT-104	46
2 USB TC-08	46
3 IP sockets	46
7 Technical information	47
1 .ini preferences file	47
2 .plw data file	48
3 .pls settings file	48
4 Scaling file	50
5 Command line options	51
6 Multiple program instances	51
7 DDE	51
8 Equation notation	52
9 Glossary	52
Index	55

1 Introduction

1.1 Overview

Welcome to the User's Guide for the Logging Software, a data acquisition tool that collects, records, displays and analyses measurement data. The software has the following capabilities:

- Collects blocks of data at high speed from a single logger
- Collects data at low speed over long periods from multiple loggers
- Allows you to adjust [Alarm settings](#)^[33] for measurements you want to take
- Enables you to apply [Parameter scaling](#)^[32], using equations or tables
- Allows you to [Edit calculated parameters](#)^[35]
- Can analyse other files during data collection
- Displays data during slow collection and after collection
- Graphical display in the [XY Graph](#)^[9] and [Graph](#)^[7] windows, and spreadsheet display in the [Spreadsheet](#)^[11] windows
- Transfers data to other applications via clipboard, file or [DDE](#)^[51]
- Transfers data between computers using [IP sockets](#)^[46]



1.2 Recording

The recording mode and repeat functions are selected using the [Recording](#) dialog. Ensure that real time continuous mode is selected. This offers continuous recording over long periods. The data can be displayed in graphical or spreadsheet format during data collection. The fastest sampling rate in realtime mode depends on the speed of the computer and the operating system (it is of the order of a few milliseconds).

There are several options to specify what should happen at the end of a run when the specified maximum number of samples have been collected. The options are as follows:

- Stop
 - Repeat immediately
 - Scroll
 - Repeat after delay
-

1.3 Safety warning

Do not connect the ground input of the converter to anything which may be at some voltage other than ground, as you may risk damage to the converter and your computer. Furthermore, if you connect the converter ground to something which is live, your computer chassis may become live.

If in doubt, check by connecting a channel input to the doubtful ground point, and check that there is no significant AC or DC voltage.

We strongly recommend that you read the general safety information in your installation guide and also the product-specific safety warning in the product manual before using your product for the first time.

2 Software components

2.1 Introduction

The Logging Software is made up of a number of separate components, but you need only activate the components that you wish to use. As a result, the screen is not cluttered with data that you are not using and the computer can easily be used for other applications whilst you are recording.

The application components that are available are as follows:

[Logging Recorder](#)

Enables you to start and stop recording and to specify recording files, the measurements currently being taken and the alarm state.

[Logging Player](#)

Enables you to scroll quickly and easily through stored files to compare results on successive runs.

[Graph](#)

Shows the readings for single or multiple measurements over a period of time.

[XY Graph](#)

Shows the readings of one measurement against another, on the same graph.

[Spreadsheet](#)

Shows detailed or summary information in a format which can be copied to a clipboard.

[Notes](#)

Enables you to enter information for a particular run.

When you start the Logging Software in recorder mode, the computer displays the Logging Recorder . The Logging Player and display windows can be selected from the Window menu.

When you start the Logging Software in player mode, the computer displays the Logging Player . The Logging Recorder and display windows can be selected from the Window menu.







2.2 Recorder

When you start the Logging Software using the Recorder icon, the computer displays the monitor window:






At the top is a menu bar containing the [File](#)^[20], [Settings](#)^[21], [View](#)^[21] and [Help](#) menus. Below the menu bar are two sets of controls, the Recorder controls and the Window controls.

Recorder controls

-  New file. Specify a new file to record to.
-  Re-record. Rewind the current file so that it can be re-recorded.
-  Start recording.
-  Pause/resume.
-  Stop recording.
-  Help. Access the help information for the recorder window (this page).





Window controls

The second group of buttons, on the right, is used to open other windows:

-  View Notes. Open a [Notes](#)^[13] window.
-  View Graph. Open a [Graph](#)^[7] window.
-  View spreadsheet. Open a [Spreadsheet](#)^[11] window.

Range indicators

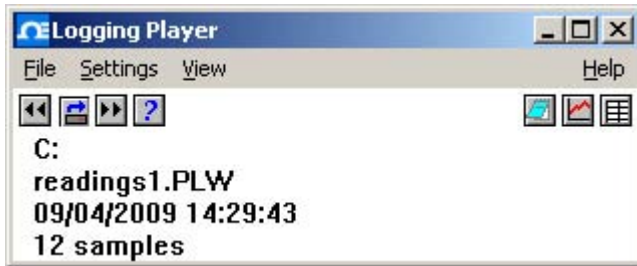
The lower pane of the window contains a line of information for each selected measurement. At the beginning of each line is an indicator lamp that signals the current status of the readings taken by the PT-104 software:

-  The measurement value is within range
-  The measurement value is currently out of range, but has not been out of range long enough to trigger an alarm
-  The measurement value is in an alarm state. To cancel the alarm, use the mouse to click on the lamp
-  The measurement value is in an alarm state, but the alarm has been cancelled

Next to each lamp is the name of the measurement and its current value. If you click on a measurement name, the computer will display the details of the measurement.

2.3 Logging Player




When you start the Logging Player, or you select Player from the View menu of the Logging Recorder, the computer opens a new window:



This shows you the name of the current Logging Player file and the number of samples taken so far.




Logging Player controls

The buttons on the left are used to specify a filename and to go forwards or backwards in a file sequence. The controls are as follows:

-  Open file. Load a new file into the player.
-  Back a file. Go to the previous file in a sequence.
-  Forwards a file. Go to the next file in a sequence.

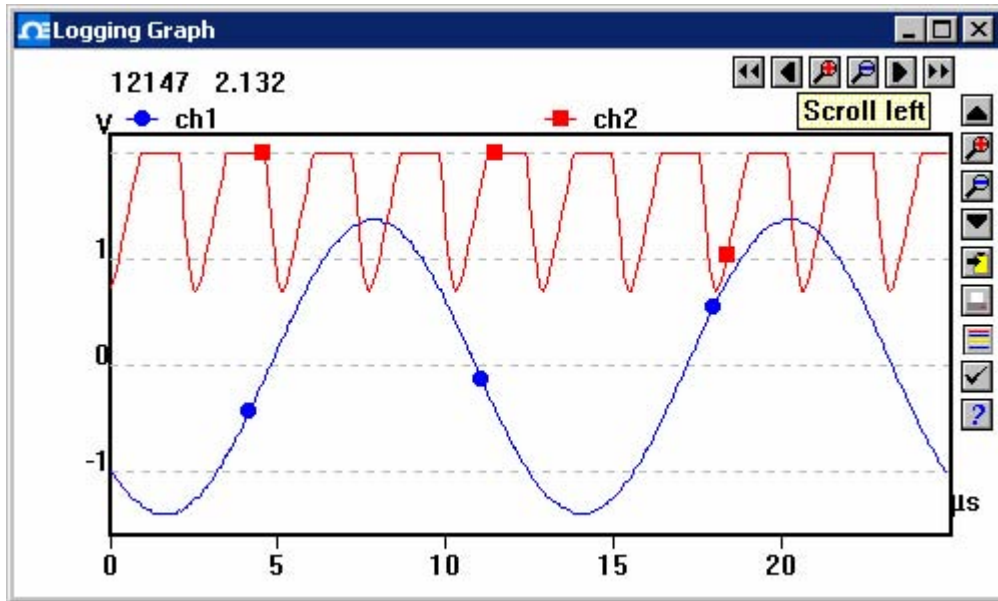
Window controls

The buttons on the right are used to open other windows:

-  View Notes. Open a [Notes](#) ^{F13} window.
-  View Graph. Open a [Graph](#) ^{F7} window.
-  View spreadsheet. Open a [Spreadsheet](#) ^{F11} window.







2.4 Graph

From the [View](#)²¹ menu of the Logging Recorder or Logging Player, select Graph.







Note that there are several [graph options](#)³⁷ that affect the way that the graph is displayed and the format of the axis scales.

The group of horizontal buttons in the top right corner of the screen selects what time interval is displayed:







-  Scroll left. Move a whole display left.
-  Scroll quarter left. Move a quarter display left.
-  Expand horizontal axis. Magnify the middle half of the display to fill the whole width.
-  Shrink horizontal axis. Shrink the current display to half size, so that more is displayed before and after.
-  Scroll quarter right. Move a quarter display right.
-  Scroll right. Move a whole display right.

The upper group of vertical buttons controls the vertical range displayed. If there is more than one graph frame, the buttons control the frame with the thicker border. To switch to a different frame, point inside the new frame with the cursor and click the left mouse button.

-  Scroll up. Move a whole display up.
-  Expand vertical axis. Magnify the middle half of the display to fill the whole height.
-  Shrink vertical axis. Shrink the current display height to half size, so that more is displayed above and below.
-  Scroll down. Move a whole display down.

Note that if you use these controls to change the time or vertical range, auto-scaling for that axis is turned off automatically. Use the options to turn auto-scaling back on again (see button below).

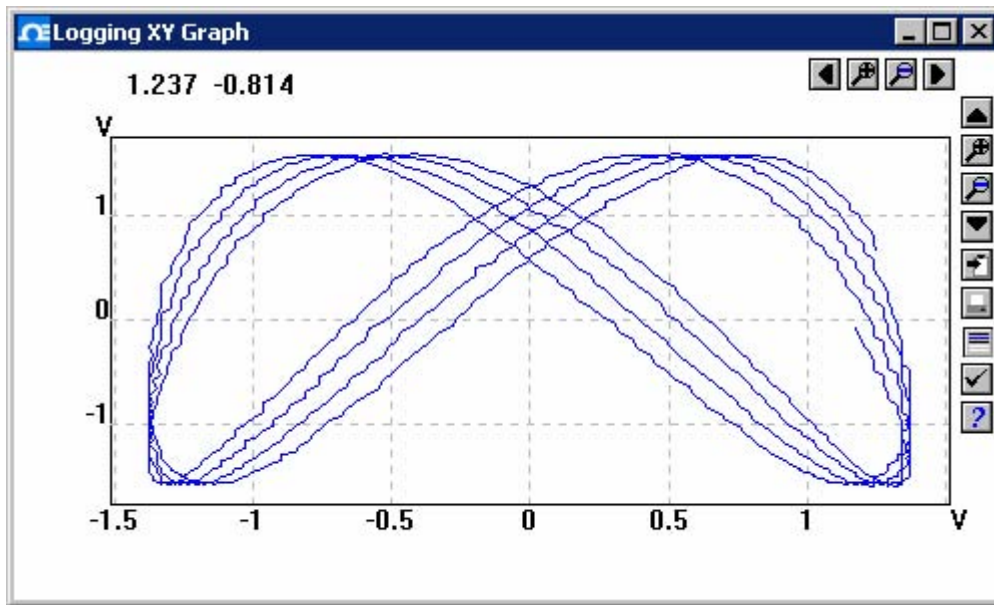
The remaining vertical controls are:

-  Copy to clipboard. Copy the graph to the clipboard.
-  Print view. Print the graph.
-  New file. Write graph to file in [.bmp](#)^[52], [.jpg](#)^[52], or [.wmf](#)^[53] format.
-  [Select channels](#)^[33]. Select the measurements to display on the graph.
-  [View options](#)^[37]. Specify the options for the graph.
-  Help. Access the help info for the graph window (this page).





If you move the mouse cursor onto the graph part of the screen, the computer will display the measurement value and time at the current cursor position. If you click the left mouse button, the graph will zoom in, centred on the mouse cursor. If you click the right mouse button, the graph will zoom out, centred on the mouse cursor.

2.5 XY Graph





From the [View](#) menu of the Logging Recorder or Logging Player, select XY Graph.



There are several buttons in the top right corner of the screen. The top row of buttons controls the horizontal range displayed:






-  Scroll quarter left. Move a quarter display left.
-  Expand horizontal axis. Magnify the middle half of the display to fill the whole width.
-  Shrink horizontal axis. Shrink the current display to half size, so that more is displayed.
-  Scroll quarter right. Move a quarter display right

The upper group of buttons in the column on the right controls the vertical range displayed:

-  Scroll up. Move a whole display up.
-  Expand vertical axis. Magnify the middle half of the display to fill the whole height.
-  Shrink vertical axis. Shrink the current display height to half size, so that more is displayed above and below.
-  Scroll down. Move a whole display down.

Note that if you use these controls to change the horizontal or vertical range, auto-scaling for that axis is turned off automatically. Use the options to turn auto-scaling back on again (see buttons below).

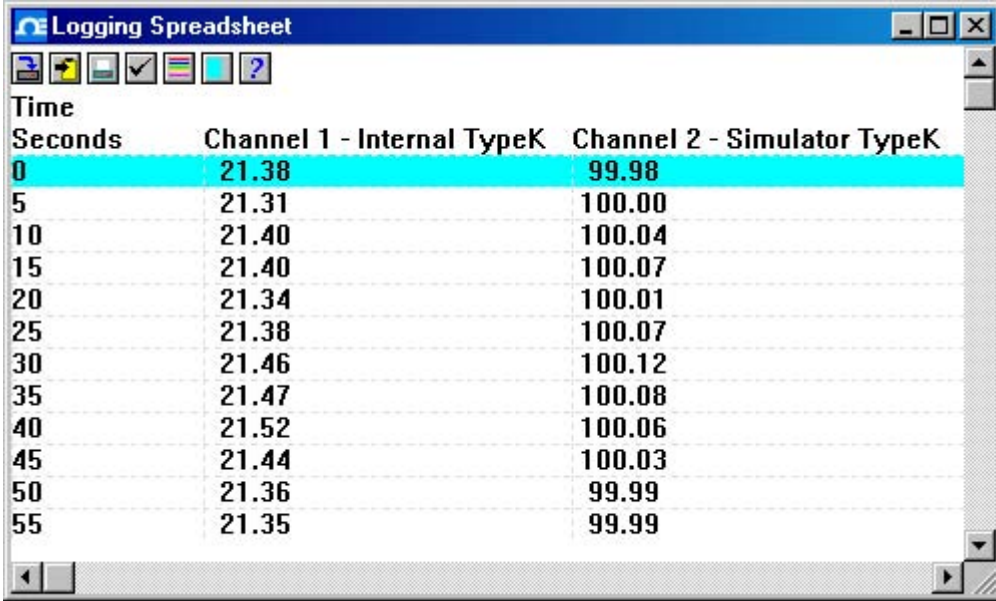
The remaining vertical controls are:

-  Copy to clipboard. Copy the graph to the clipboard.
-  Print view. Print the graph.
-  Select channels. Select the measurements to display on the XY graph (only two).
-  View options. Specify the options for the graph.
-  Help. Access the help info for the graph window (this page).

If you move the mouse cursor onto the graph part of the screen, the computer will display the measurement values at the current cursor position.

2.6 Spreadsheet


From the [View](#) menu of the Logging Recorder or Logging Player, select Spreadsheet.






Time Seconds	Channel 1 - Internal TypeK	Channel 2 - Simulator TypeK
0	21.38	99.98
5	21.31	100.00
10	21.40	100.04
15	21.40	100.07
20	21.34	100.01
25	21.38	100.07
30	21.46	100.12
35	21.47	100.08
40	21.52	100.06
45	21.44	100.03
50	21.36	99.99
55	21.35	99.99

There is one line for each reading. The first column shows the time in seconds, while the remaining columns show the selected measurements.

The following options buttons are available:

-  Select channels. Select the measurements to display.
- View options. Spreadsheet options specify whether to display individual readings, or first reading, average, minimum and maximum for a period.

If you select a range of readings, you can use the following buttons:

-  Write to disk. Write the readings to a print file ([.prn](#)) or a text file (.txt) - Both are tab-separated value files.
-  Copy to clipboard. Write the readings to the clipboard.
-  Print view. Print the graph.

You can select a range in one of three ways:

If all of the readings that you want to select are on the screen:


- Point the mouse at the first reading
- Press and hold down the left mouse button
- Drag the mouse to the last reading (the selected readings will be highlighted as you go) and
- Release the left mouse button.

If the readings are a long way apart:

- Point the mouse at first reading
- Click the left mouse button (this will highlight the first reading)
- Scroll down to the last reading
- Point at the last reading and

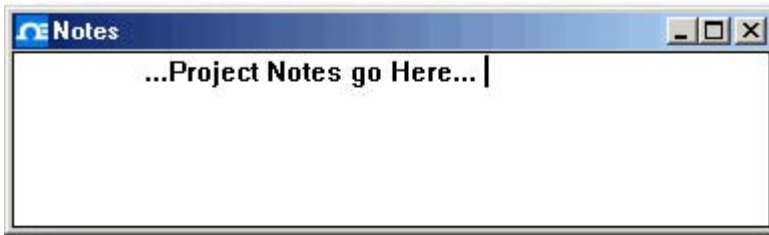
- Press the shift key and click the left mouse button.

If you wish to select all of the readings for one day:

- Point the mouse at any reading during the required day
 - Click the left mouse button (this will highlight the reading) and
 - Click on the 'select day' icon: 
-

2.7 Notes

From the [View](#) menu of the Logging Recorder or Logging Player, select Notes.



This window enables you to enter information for a particular run. This is useful if you carry out a number of similar runs. The report title can be the same for every run, but the notes contain information specific to each run.

If you have a Notes window open when you use the player to browse through several runs, the notes for each run will be displayed. The notes also appear on printed reports.


3 How to...

3.1 Add new measurements

1. Select the converter in the normal way
2. At the measurement list dialog, select Add (for the PT-104, for example, this would be the [Pt104 Channels](#)^[42] dialog)
3. Enter the details for the measurement
4. Click the Scaling button
5. Enter the scaling details (see [Parameter scaling](#)^[32] dialog for details).

3.2 Select which measurements to display

When you first open a graph or spreadsheet window, the computer displays only the first measurement. To select a different measurement or to add further measurements:



1. Click on the Select channels button: . The computer will display the [Select parameters](#)^[33] dialog, with a list of all of the measurements and which ones are in use
2. Click on each measurement that you wish to be active
3. Click OK

3.3 Start a new run

To start a new run from scratch, select New settings from the File menu. The Logging Software will take you through the steps necessary to define what you want to collect:

- [Recording](#)^[23] method ([real time continuous](#)^[2] only)
- [Sampling Rate](#)^[24], including sampling interval and maximum number of samples
- [Converter details](#)^[25]
- Measurement setup: for example, if you are using the PT-104, you will see the [PT-104 Channel List dialog](#)^[42]


Once you have entered these details, check that the monitor window in the [Logging Recorder](#)^[5] is displaying the measurements that you wish to record, and that the correct values are showing.

1. If you are in the Logging Player, go to the View menu and select Recorder, otherwise go straight to step 2
2. The [Logging Recorder](#)^[5] window has buttons like a tape recorder, to start, stop, rewind etc.
3. Click on the New file button: 
4. Type the name of the file to which you wish to record
5. Click OK (the filename will appear in the recorder window)
6. Click the Start recording button: 

The sample number will increase on every sample interval.



3.4 Repeat an existing run

If you have just recorded a run, and you wish to retain the data, yet start a new run:

1. Click on the New file button: . Note: Do not attempt to save your data directly to a floppy disk. The computer will display the next sequence-numbered file name.
2. If you do not wish to use the default filename, type in a different name.
3. Click OK

4. Click the Start recording button: 

If you have just recorded a run, and you wish to discard the data and start a new run:

1. Click the Re-record button: 
2. Click the Start recording button: 

If you wish to repeat a run:

1. From the File menu, select Open.
2. Select the file that you wish to repeat.
3. From the View menu, select Recorder. This displays the recorder window.
4. Proceed according to the retain or discard options described above.

3.5 Start recording whenever Windows starts

First, save the settings for the type of run that you wish to start:

1. Define the type of run that you wish to carry out
2. Select Save as... from the File menu
3. Type in a filename for these settings
4. Change the file type to `.pls`^[52]
5. Click OK

Note: Do not attempt to save your data directly to a floppy disk.




Now run the program:

1. Click the Windows Start button
2. Select Settings or Control Panel
3. Select Taskbar and Start Menu
4. Click Start Menu
5. Click Add
6. Type `c:\omega\plw32.exe -r settings.pls` (or whatever your settings file is called) and click OK
7. Select the startup folder (programs in the startup folder are run automatically when Windows starts) and click OK
8. Click the Finish button

3.6 Display data

To display the data in graphical or spreadsheet format, you should first [Start a new run](#)^[14].


You can then display the data by clicking on the appropriate button in the recorder window:

-  View Notes. Opens a [Notes](#)^[13] window.
-  View Graph. Opens a [Graph](#)^[7] window.
-  View spreadsheet. Opens a [Spreadsheet](#)^[11] window.


Alternatively, select the window type from the View menu.

3.7 Print data

To print a graph:


1. Open a graph window
2. Alter the settings to display the data that you wish to print
3. Click the Print view button: 


To print a spreadsheet:

1. Open a spreadsheet window
2. Alter the settings to display the measurements that you wish to print
3. Point at the first reading that you wish to print
4. Click the left mouse button to highlight the reading
5. Point at the last reading that you wish to print
6. Hold down the shift key and click the left mouse button to highlight the whole block
7. Click on the Print view button: 

3.8 Export data to a spreadsheet

To export data to a spreadsheet:

1. Open a Logging Player spreadsheet window
2. Alter the settings to display the measurements that you wish to export
3. Point at the first reading that you wish to print
4. Click the left mouse button (this reading will be highlighted)
5. Point at the last reading that you wish to print
6. Hold down the shift key and click the left mouse button (the whole block will be highlighted)
7. Click the Copy to clipboard button: 
8. Move to the spreadsheet program
9. Point at the top left of the area you wish to fill
10. Select Paste from the Edit menu


Alternatively, you can click the New file button, , then write the data to a text file. You can then import the text file into a spreadsheet.

Note: Do not attempt to save your data directly to a floppy disk.


If you wish to have the readings in the spreadsheet updated continuously with the current readings, you can use [DDE](#) ^[51].

3.9 Export a graph to a word processor

To export a graph to a word processor:


1. Open a graph window
2. Alter the settings to display the graph that you wish to export
3. Click the Copy to clipboard button: 
4. Move to the word processor program
5. Point at the place to insert the picture
6. Select Paste from the Edit menu

Note: Do not attempt to save your data directly to a floppy disk.

Alternatively, you can click the New file button: , then write the data to a [.wmf](#) ^[53] file. You can then import the graphics file into the word processor.

3.10 Enable date and time scaling on a graph

The time axis of a graph normally shows the time (in the selected sample interval units) since the start of the run. Whilst this is convenient for short runs, it is not ideal when collecting data over longer periods.

1. Click on the View options button: 
2. Change the time format to Date/Time

Other axis scale formats can be selected in the same way - see the [Graph options](#) ³⁷ dialog for more details.

3.11 Transfer data over an IP network

The Logging Software [IP socket](#)^[53] facility is used to take measurements on one or more computers and record the data on another computer.

The measurements are taken by the Logging Software on the [Server](#)^[53]. Another computer, the [Client](#)^[53], requests the data via an IP network.

On the server:

1. Click Start
2. Right-click My Computer
3. Click Properties
4. Windows XP: Click Computer Name and note the name listed after "Full computer name"
5. Windows Vista: Note the name listed after "Computer name"

On the client:

1. Open a command box (click Start button, click Run..., type `cmd`)
2. Type `ping` followed by the server name
3. The computer will display the time taken to send a message to the server and receive a response
4. Check that it is working and note the time

On the server:

1. Start the Logging Software
2. From the File menu, select Preferences
3. Select IP Sockets
4. Check the Enable Server box
5. Click OK
6. Set up the to measure the channels that you require

On the client:

1. Start the Logging Software
 2. From the File menu, select Preferences
 3. Select IP Sockets
 4. Check the Enable Client box
 5. Exit and restart the PT-104 software
 6. Select New Settings
 7. Enter recording details and click OK
 8. Enter the sampling details and click OK
 9. Select Socket in the Converter type box
 10. Click OK
 11. Type the server name, e.g. `server1`
Note: Server names are case sensitive! `Server1` is not the same as `server1`.
 12. Click Connect
 13. The computer should now display the channels from the server
 14. Click one of the channels
 15. If you want to change the name, type the local name
 16. Click OK
 17. The channel you selected is marked with an X
 18. Repeat for each of the channels
 19. Click OK
 20. The monitor window should now display the readings from the server
-

3.12 Run multiple recorders

There are two limitations to using the multiple converters mode in the Logging Software:

- Data is collected at the same rate for each device
- A single trigger will start the recording for all converters

If you need to overcome these limitations, two separate instances of the Logging Recorder can be loaded. If you have tried this before, you will have noticed that simply attempting to load the Logging Recorder from the Start menu twice will load the Logging Player.

You will need to create settings files for the configuration of each converter or each set of converters (use multiple converters mode):

1. Attach one (or the first set) of the converters to the PC
2. Start the Logging Software, select New Settings from the File menu, then follow the sequence of dialogs to set up your converter(s)
3. Select Save as... from the File menu, and from the drop down box, select `.pls` (settings file), then save
4. Disconnect the first converter and attach the second (or the second set) , then repeat the steps above.

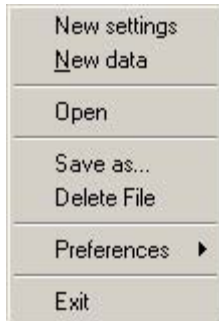
Once you have a settings file for each converter or set of converters, you will need to start Logging Recorder from the command line.

1. From the Windows Start menu, select Run...
2. Type:
`"C:\Program Files\Omega\omega.exe" "C:\Program Files\Omega\mysettings1.pls"`
(where `C:\Program Files\Omega\` is your installation directory, and `mysettings1.pls` is your first settings file)
3. Repeat the steps above for each of your settings files (e.g. `mysettings2.pls`)

4 Menu bar

4.1 File

To access this menu, select File from the menu bar of the [Recorder](#)^[5].



New settings. Erases the current settings and then takes you, step by step, through the process of setting up the Logging Software to collect some data.

New data. Enables you to open a new file to record your data. If you save the file as a setup file, only the settings are stored. If you save it as a data file, both the settings and data are stored. You can also save the file as a text file only.

Open. Closes all active windows and then opens a data or setup file.

If you open a data file, the settings and data are copied from the file, and the data is displayed. If you open a setup file, only the settings are recovered, and no data is displayed until you start the Logging Software running.

Save as... Asks for a filename and then writes the data to that file.

If you save the file as a setup file, only the settings are stored. If you save it as a data file, both the settings and data are stored. You can also save the file as a text file only.

Note: Do not attempt to save your data directly to a floppy disk, as this would cause the Logging Software to operate unacceptably slowly.

Delete File. Enables you to delete a file. Select the file and then click OK to delete it.

Preferences. This group of menu options enables you to customise the Logging Software:



[Colours](#)^[40] - enables you to select the colours that the Logging Software will use.

[Sound](#)^[40] - enables you to select the sounds for certain events.

[Temperature](#)^[41] - enables you to select the units for temperature measurements.

[IP Sockets](#)^[28] - activates the IP network facility, allowing you to transfer data between two computers running the Logging Software.

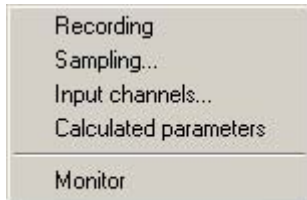
[Converter](#)^[27] - used to specify what converter is to be used.

[Recorder](#)^[41] - used to specify whether the Re-record and Pause buttons are displayed in the Recorder window.

Exit. Exits from the program.

4.2 Settings

To access this menu, select Settings from the menu bar of the Recorder.



The settings menu appears on the menu bar at the top of the monitor window in the [Recorder](#)^[5].

[Recording](#)^[23]. Enables you to choose the recording method for your measurements.

[Sampling...](#)^[24] Enables you to specify the sampling rate and the action at the end of a run.

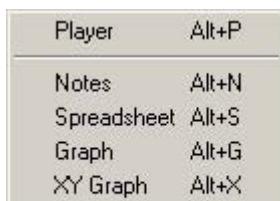
[Input channels...](#)^[26] Enables you to specify the converter and [port](#)^[53] that will take the measurements.

[Calculated parameters](#)^[34]. Enables you to enter details for measurements which are calculated from one or more other measurements. This can be done either during data collection or after the data has been collected.

[Monitor](#)^[33]. Enables you to select the measurements that you wish to display in the monitor window. To select a measurement, highlight it and then click OK.

4.3 View

To access this menu, select View from the menu bar of the [Logging Recorder](#)^[5] or [Logging Player](#)^[6].



Player. Creates a new [Player](#)^[6] window.

Notes. Creates a new [Notes](#)^[13] window.

Spreadsheet. Creates a new [Spreadsheet](#)^[11] window.

Graph. Creates a new [Graph](#)^[7] window.

XY Graph. Creates a new [XY Graph](#)^[9] window.

4.4 Help

To access this menu, select Help from the menu bar of the [Recorder](#)^[5].



Index. Takes you to the index of the Logging Software help file.

Contents. Takes you to the contents page of the Logging Software help file.

Using help. Explains how to use the Logging Software help file.

This view. Explains the operation of the monitor window in the [Recorder](#)^[5].

Guided tour. Shows you the main features of the program. A converter need not be connected.

About... Gives the version and serial number of this instance of the Logging Software.

4.5 Keyboard shortcuts

You can control some of the Logging Software's functions using the following keys on the keyboard:

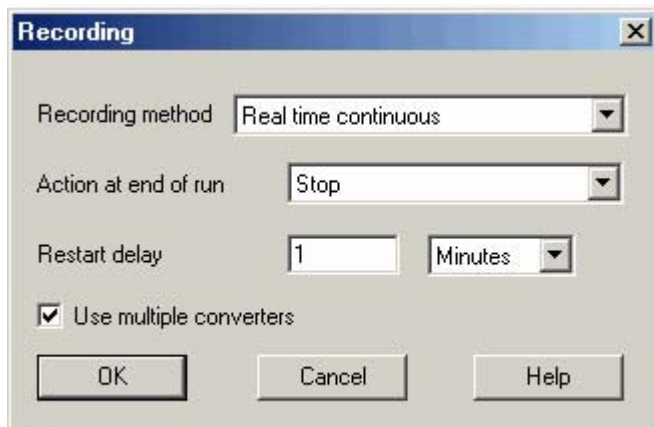
Key	Function
Alt-P	open Player View ^[6]
Alt-N	open Notes View ^[13]
Alt-S	open Spreadsheet View ^[11]
Alt-G	open Graph View ^[7]
Alt-X	open XY Graph View ^[9]
F1	view Help ^[22] index

5 Dialogs

5.1 General dialogs

5.1.1 Recording

To access this dialog, open the [Settings](#)  menu of the Recorder and select Recording.



The recording method must be set to "real time continuous". In this mode you can record the data at the same time as displaying it in graphical or spreadsheet form. The maximum sampling rate is one per millisecond. With this method, you can use multiple converters.

Use multiple converters. Check this box if you wish to use more than one converter.

Action at end of run. This defines what happens when all the samples have been collected. Choose one of the following options:

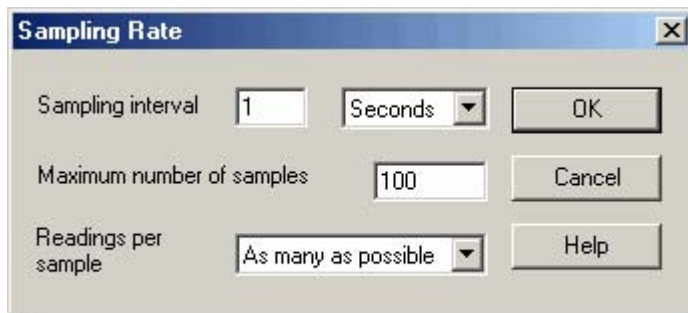
- Stop. Means stop collecting
- Repeat immediately. Means start a new run immediately after completing the current run
- Repeat after delay. Means start a new run after the restart delay has elapsed. This could be used to collect a one-minute block of data once per hour
- Scroll. Means that new samples will be recorded and the oldest samples will be discarded. This is useful if you only wish to have a record of the most recent samples

When you select a repeat option, the computer automatically increments a sequence number at the end of the filename.

Restart delay. When in 'repeat after delay' mode, this is the time interval from the start of one run to the start of the next run.

5.1.2 Sampling Rate

To access this dialog, open the [Settings](#)  menu of the Recorder and select Sampling...



This dialog sets the sampling rate and defines the action to take at the end of a run.


Sampling interval. To set the interval between samples, type a number in the box and select the required units. The interval must be a whole number so, for example, 30 seconds must be specified rather than 0.5 minutes.

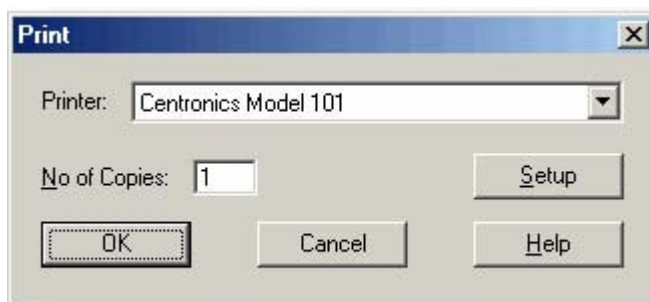
Note: When you have set sampling intervals of less than a second, displaying a graph whilst data recording is possible, but may interfere with recording.

Maximum number of samples. To set the maximum number of samples to be collected during a run, enter the number in this box. The maximum can be up to a million samples. During real-time data collection, the sampling can be stopped at any time, so you can enter a large number and then stop the run early.

Readings per sample. Normally the Logging Software takes as many readings as possible during each sample period, then saves the average of the readings. If you need an instantaneous measurement, (for example, if you wish to calculate standard deviations), change this option to Single.

5.1.3 Print

To access this dialog, click  when one of the display windows is open.



Printer. At the top is a box with the name of the default printer. You can select a different printer if you wish.

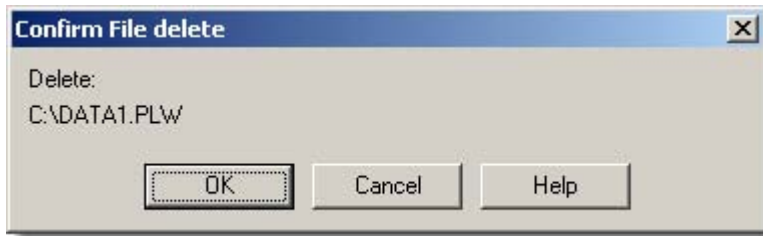
Setup. Use the Setup button to open a dialog with setup information specific to the selected printer.

Once all the details are correct, click OK to start printing.

5.1.4 Confirm File delete

If you want to delete a Recorder file you have saved on your hard disk, open the [File](#) ^[20] menu in the Recorder and select Delete File. A window appears showing you the list of files in the active directory.

Double-click on the name of the file you want deleted. The following dialog appears.

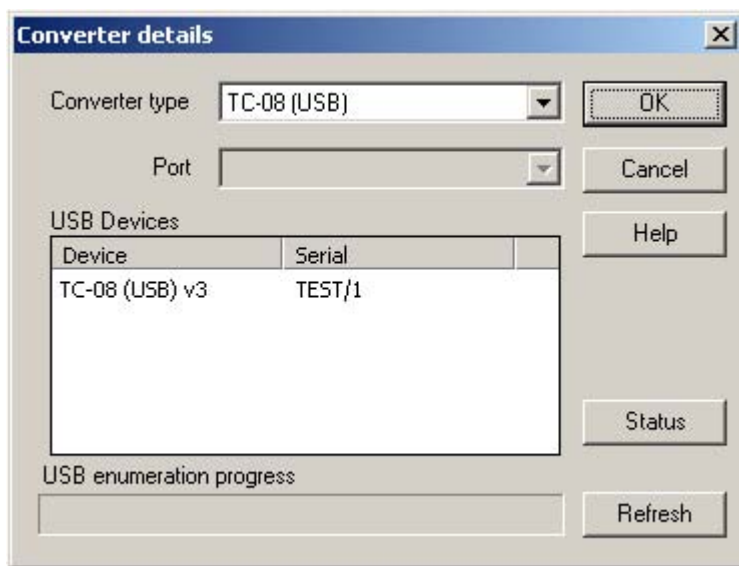


If you are certain you want to go ahead with deletion, click the OK button.

5.1.5 Converter-related

5.1.5.1 Converter details

To access this dialog, select Input channels... from the [Settings](#) ^[21] menu.



This dialog is used to specify the details for a converter. Note that it is not displayed if you set the [Converter preferences](#) ^[27] to automatically select a particular converter.

Converter type. This lists the types of converter that can be used with the program. Please note that not all the converters will be available if an incompatible mode has been selected from the [Recording](#) ^[23] dialog.

Port. Select the [port](#) ^[53] to which the converter is connected if the attached converter uses one of the following connection methods:

- Parallel port
- Serial port
- USB-parallel port adapter (these are allocated in the order in which units are connected to the PC)

USB Devices. When a USB product is selected from the Converter type list, the Port field will be unavailable and a list of USB devices of the selected type that are currently attached to the PC will be displayed.

When attempting to edit the settings of a currently opened unit, the unit that you are editing will appear highlighted at the bottom of the list. If unhighlighted units appear at the top of this list, these represent other available devices of this type attached to the PC. You can freely switch between these available units, but the settings of the unit you are editing will not be saved.

Note: Enumerating USB devices can take some time, especially if a number of USB devices are attached to the PC. The Logging Software may appear to lock up during this period, but this is normal.

Refresh. After you have selected a converter from the Converter type drop-down list, click this button to scan for new USB devices.

Status. This informs you of the status of any converters you have attached to your computer. To ensure that your hardware is setup correctly, see the section on hardware setup.

OK. When you click the OK button, the computer will open the measurement dialog for the selected converter. A double-click with the mouse on the desired USB device will also have the same effect.

5.1.5.2 Converters

To access this dialog, click the OK button in the [Converter details](#) ^[25] dialog.

Note: If the Use multiple converters box is ticked in the [Recording](#) ^[23] dialog, selecting Input channels... from the [Settings](#) ^[21] menu will take you directly to the Converters dialog.



This dialog is used to build up a list of [converters](#) ^[46] to use. In the pane on the left will be a list of the converters that are currently active.

Add... To add another converter to the list, click Add... This will open the [Converter details](#) ^[25] dialog so you can enter the type and [port](#) ^[53] for the new converter.

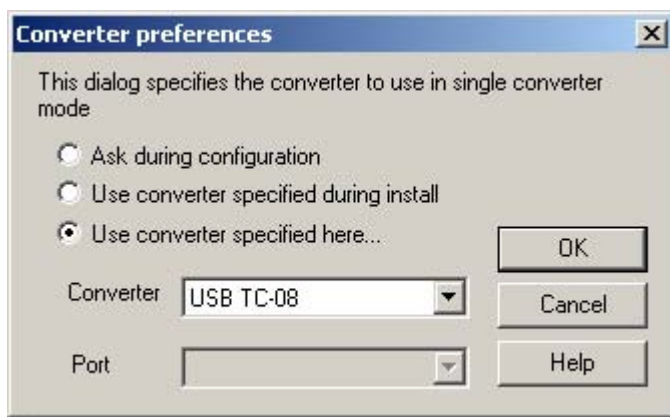
Edit... To edit the details for an existing converter, highlight the entry for it and click Edit... This will open the Converter details dialog.

Delete. To remove a converter from the list, highlight the converter and click Delete

Parameters... To specify the measurements to be measured for a converter, highlight the converter and click Parameters...

5.1.5.3 Converter preferences

To access this dialog, open the [Preferences](#)^[20] submenu in the [File](#)^[20] menu and select Converter.



So that the computer does not ask each time you define new settings, you can specify in advance which converter to use. The options available are as follows:

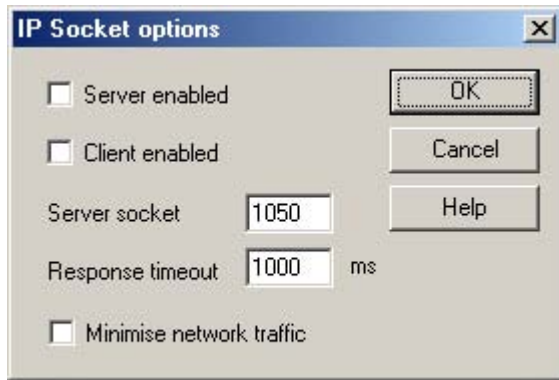
- Ask during configuration. Ask for the converter every time you enter new settings
- Use converter specified during install. Use the converter specified when the Logging Software was installed
- Use converter specified here... Use the converter specified in this dialog

When you select the last option, the computer enables the converter and [port](#)^[53] fields on the dialog.

5.1.6 IP socket-related

5.1.6.1 IP Socket options

To access this dialog, open the [Preferences](#) submenu in the [File](#) menu and select IP Sockets.



This dialog is used to specify the details required to establish a link between computers via an IP network.

One computer is referred to as the [server](#). This is the computer supplying data. The other computer is referred to as the [client](#). This is the computer receiving data. It displays the measurements as if they are being collected locally. A server can support any number of clients, and a client can get data from up to 10 servers.

Server enabled. When this option is selected, the PT-104 software will start responding to requests for data from any clients that contact it.

Client enabled. This sets this computer to act as a client. When it is checked, the socket device appears in the Select Device dialog.

Server socket. This specifies what [IP socket](#) the server will use. It is not normally necessary to change it, unless the socket is already in use by another application. If you change it, you must do so on the server and on all clients.

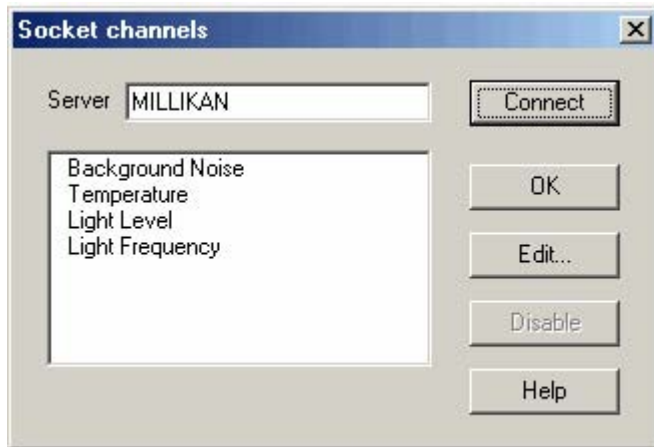
Response timeout. This only has an effect on the client. It controls how long the client will wait for a response from the server. You can use the `ping` command to find out how long a round trip normally takes.

Minimise network traffic. If this box is not checked, the client will continuously request data from the server. This is OK over a local network, but could cause a dial-up bridge between two subnets to stay active all the time. If you check this box, the client only asks for data once per sample period. With a sample period of an hour, the client will only contact the server once per hour.

5.1.6.2 Socket channels

Accessed from the [Converter details](#) ^[25] dialog.

Note: Only accessible when Client enabled has been checked in the [IP Socket options](#) ^[28] dialog and the Converter type has been set to Socket in the [Converter details](#) ^[25] dialog.



This dialog is used to establish a connection to another instance of the Logging Software running on a remote [server](#) ^[53] computer, and then to select the channels that are to be imported to this instance of the Logging Software.

Server. This is the name of the server. If it is on your local network, the computer name should be enough (for example, "carnot"). If you want to communicate via a large network or the internet, you will need to put the full name of the computer, for example, "alpha.omega.com".

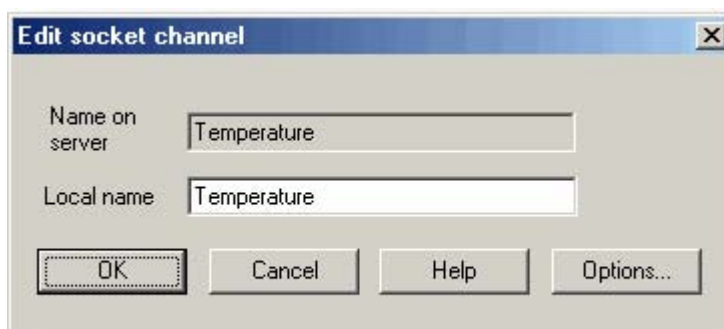
Connect. Having entered a server name, click Connect to establish a link to the server. If successful, a list of channels (corresponding to measurements) available on the server will appear. If someone changes the details on the server, you can click this button to update the details locally.

Edit... To edit a channel, first select it, then click this button. The [Edit socket channel](#) ^[29] dialog will appear so that you can enter the details.

Disable. To disable a previously selected channel, highlight it and click this button.

5.1.6.3 Edit socket channel

To access this dialog, click the Edit... button in the [Socket channels](#) ^[29] dialog.



This dialog is used to enter the details for a channel.

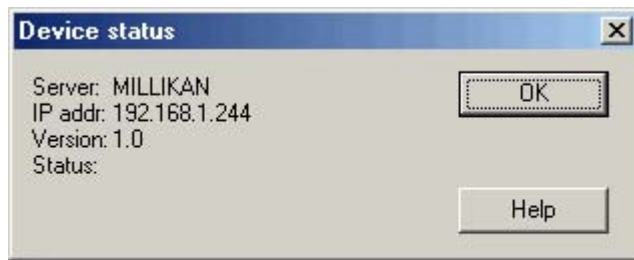
Name on server. This is the name of the channel on the remote [server](#)^[53] computer. It cannot be changed from the local computer.

Local name. This is the name of the channel as it will appear locally.

Options... To set the [Parameter options](#)^[31], click Options...

5.1.6.4 Device status

To access this dialog, click the Status button in the [Converter details](#)^[25] dialog.

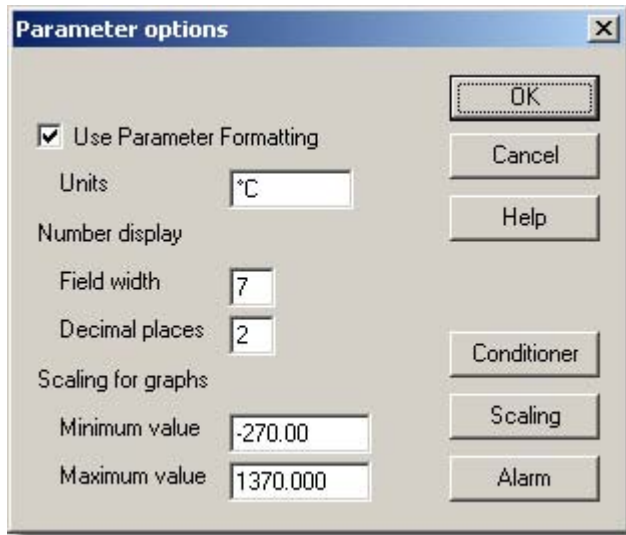


This dialog displays the details about the [IP socket](#)^[53] connection to the [server](#)^[53].

5.1.7 Parameter-related

5.1.7.1 Parameter options

To access this dialog, click the Options... button in the Measurement dialog for the converter.



This dialog is used to set up measurement definitions.

Use Parameter Formatting. By default, the measurement or channel that has been setup will use its own default values for formatting. If you want to use your own scaling, click the Scaling button. We recommend that you tick the Use Parameter Formatting check-box and enter your own values in the fields described below.

Units. The units you enter here will appear on spreadsheets and graphs.

Number display. This defines the format of the information for spreadsheet entries and graph scales. For example, with a field width of 6 and 2 decimal places, a number will appear in the format ddd.dd. The field width must be between 1 and 8, and the number of decimal places must be less than the field width.

Scaling for graphs. This defines the maximum and minimum values to be used for graphical displays.

Note: Any scrolling in the [Graph](#) window is based on these numbers, and limited by them. Once you have saved your data, these cannot be changed, so ensure that these limits extend up to or beyond the maximum data values you expect to capture.

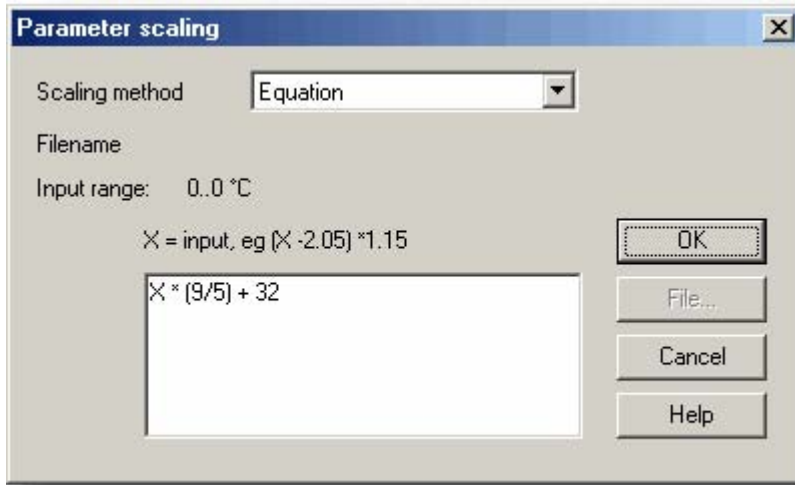
Scaling.

Conditioner. These buttons have no function in the current version of the software.

Alarm. The Alarm button opens the [Alarm settings](#) dialog for this measurement definition.

5.1.7.2 Parameter scaling

To access this dialog, click the Scaling button in the [Parameter options](#) dialog.



This dialog is used to specify how to convert a measurement value into some other unit, for example from volts to temperature. It is invoked when you click the Scaling button in the [Parameter options](#) dialog.

Scaling Method. There are three scaling methods: None, Table lookup, and Equation. You can also read in a lookup table or an equation from a file.

Table lookup. This is useful for a set of input readings corresponding to different values of the measurement to be scaled. You can put two or more pairs of values in the box below. For example, to convert a 0 to 2.5V input to -40 to 100°C , enter the following details in the box:

```
0      -40
2.5    100
```

Two pairs are sufficient if there is a linear relationship between the raw and scaled values. For non-linear relationships, the required number of pairs depends on the maximum acceptable interpolation error. If you wish to enter more than half a dozen pairs of values, it is better to enter the table into a file, and then use file scaling (see below).

Equation. This can be used when it is possible to calculate the relationship between the input reading and the measurement value. The raw measurement values is represented by x . For example, to convert a temperature from Fahrenheit to Celsius, the equation would be:

$$(x-32) * 5 / 9$$

For more information on equations, see [equation notation](#).

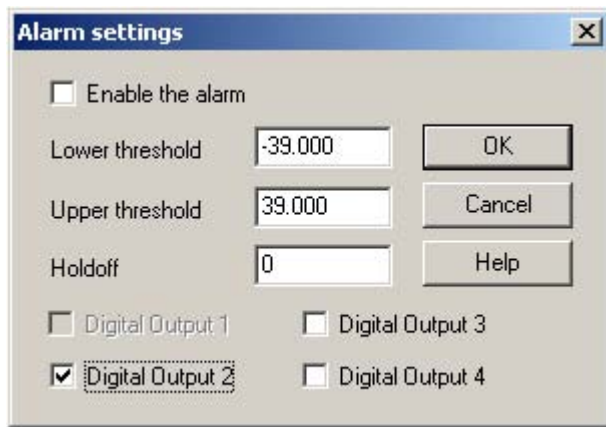
File. When you specify that you wish to use a file for scaling, this button is enabled. When you click this button, the computer opens up a dialog to select a scaling file.

Scaling from file

If you wish to scale the inputs from a number of identical measurements using the same method, or if you wish to set up a large lookup table. See [Scale file format](#) for more information on the format.

5.1.7.3 Alarm settings

This dialog defines the alarm settings for each measurement. It is invoked when you click the Alarm button in the [Parameter options](#) dialog. To access it, click the Alarm button in the [Parameter options](#) dialog.




Enable the alarm. If you wish to enable alarm limits for this measurement, check this box.

Lower and upper thresholds. If the measurement goes out of this range, the alarm will sound.

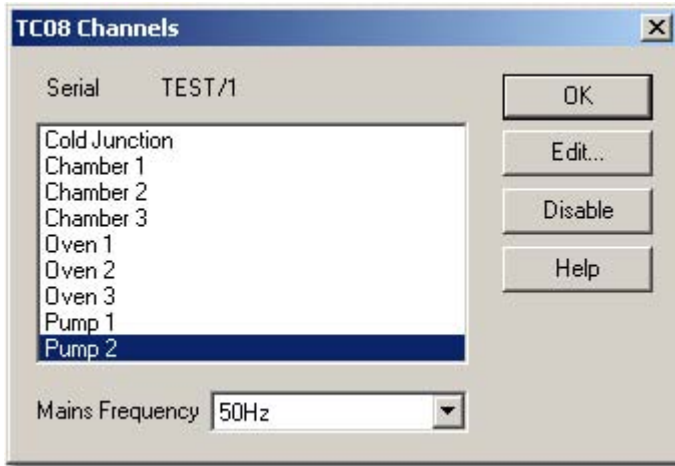
Holdoff. If the measurement value occasionally goes out of range for short periods, you can prevent this causing an alarm by setting a holdoff period. The alarm will then sound only if the measurement stays out of range for longer than the holdoff period, measured in seconds.

Digital Output 1...4. These options have no function in the current version of the software.

5.1.7.4 Select parameters

In the context of the monitor window in the [Recorder](#), you access this dialog by selecting Monitor from the Settings menu. In the [Graph](#), [XY Graph](#) and [Spreadsheet](#) windows, click the  (measurement selection) button.

The selected measurements are highlighted. To select or deselect a measurement, simply point and click.



This dialog is used to select the measurements which will be displayed in a window.

Group. At the bottom is the Group list box. You can use this to save and restore a number of named groups of measurements.

To save the current measurement selection as a group, type the group name and click Save.

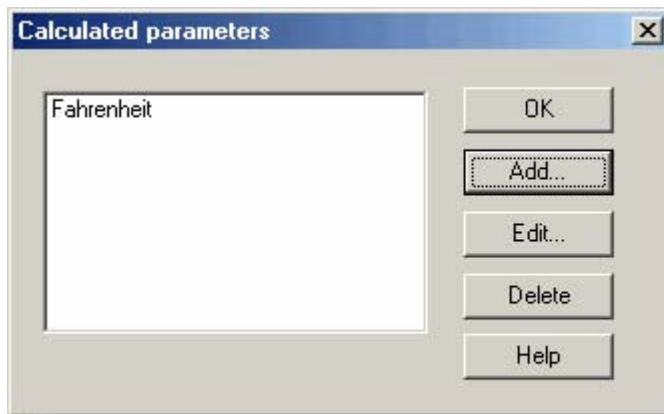
To select a saved group, open the list box and double-click the requested group.

To modify an existing group, make the changes to the measurement selection then type the group name and click Save.

To remove an existing group, deselect all measurements, type the group name and click Save.

5.1.7.5 Calculated parameters

To access this dialog, select Calculated parameters from the [Settings](#)  menu.



This dialog is used to add or edit calculated parameters. Calculated parameters are readings that need some action performed on them before they can be presented as measurements. For instance, PT-100 voltage readings cannot be turned into temperature measurements without the aid of a scaling table.

Unlike raw measurements, with calculated measurements, it is possible to change their details once a run is completed.

On the left is a list of calculated measurements and on the right are some buttons which enable you to add, edit or delete calculated measurements.

Add. To add a new calculated measurement, click the Add... button. This will open the [Edit calculated parameter](#) dialog.

Edit. To edit the details for a calculated measurement, first highlight it and then click the Edit... button. This will open the [Edit calculated parameter](#) dialog so that you can enter the details.

Delete. To remove a calculated measurement, first highlight it, then click the Delete button.

5.1.7.6 Edit calculated parameter

To access this dialog, click on the Add... or Edit... button in the [Calculated parameters](#) dialog.

The screenshot shows a dialog box titled "Edit calculated parameter". It features a "Name" text box containing "Fahrenheit". Below this is an "Input parameters" section with five dropdown menus labeled A, B, C, D, and E. Dropdown A is set to "Temperature", while B, C, D, and E are empty. To the right of these dropdowns are four buttons: "OK", "Cancel", "Help", and "Options...". At the bottom, there is a text area for an equation, labeled "Equation (for example, A*2.65 + B)", which contains the formula "A * (9/5) + 32".

This dialog enables you to edit the details for a calculated measurement. A calculated measurement is calculated from up to five other measurements, using an equation.

Fields A to E. These fields enable you to select up to five measurements (raw or calculated) which are to be used in a calculated measurement. If you require less than five input measurements, unused measurements should be left blank.

Equation. Here you enter the equation that explains how to calculate this measurement from the input measurements. The input measurements are represented by A,B,C,D and E. For example, to calculate the power output from a boiler, the input measurements might be

- A = inlet temperature
- B = outlet temperature
- C = flow rate

and the equation would be

$$(A-B) * C * 4120$$

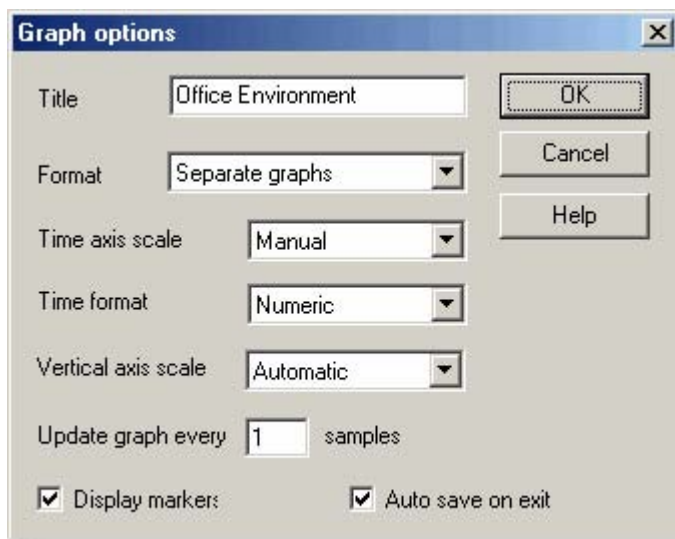
See the [Equation Notation](#)^[52] topic for more information.

Options. Set the options (units, range etc) for this measurement from [Parameter options](#)^[31].

5.1.8 Window-related

5.1.8.1 Graph options

To access this dialog, click in the [Graph](#) window.



This dialog is used to set the options for the Graph window.

Title. This is the title of the graph that will appear on the graphical reports.

Format. This specifies how traces are to be divided between graphs. The choices are:

- Automatic - the traces are allocated by the computer, putting traces with the same units on the same graph.
- Separate graphs - each measurement is displayed on a separate graph.
- All traces on same graph - each measurement is displayed on the same graph

Time axis scale. This allows you to choose how the time axis is scaled:

- Automatic - the scaling is set by the computer.
- Maximum - the time axis is set to the maximum sampling time
- Scroll - the display is scrolled across the screen
- Manual - the scale can be changed by clicking on the scroll left/right tool buttons on the Graph window.

The time axis scale is automatically set to Manual if you click any of the time scrolling buttons.

Time Format. This allows you to choose the format for the time axis:

- Numeric - the time in the selected sampling time units since the start of the run
- Time since start - the time in hours and minutes since the start of the run
- Time of day - the real time
- Date/time - the real time including the date

Vertical axis scale. This allows you to choose how the vertical axis is scaled:

- Automatic - the scaling is set by the computer.
- Maximum - the axis is set to the maximum

- Manual - the scale can be changed by clicking on the vertical scrolling buttons on the Graph window.

The Vertical axis scale is automatically set to Manual if you click any of the vertical scrolling buttons.

Display every xxx samples. If you are displaying a graph while collecting data, this controls how frequently the graph is updated. It has no effect after you have finished recording, or when using the player.

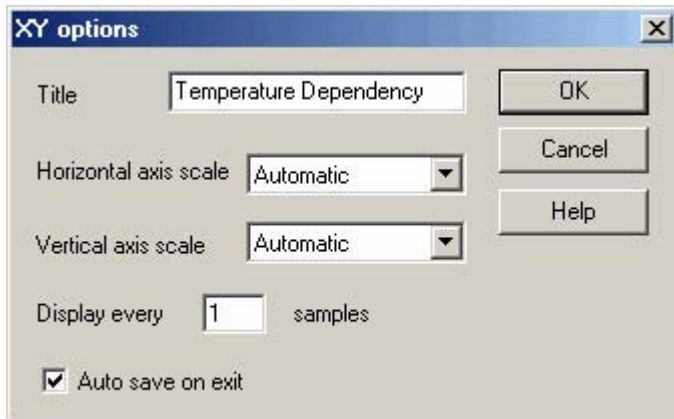
When collecting fewer than a thousand samples, leave it set to 1. When collecting a large number of points, it may take some time to update the graph, so updating every time a new reading is taken would be a waste of effort.

Display Markers. When this box is checked and there is more than one trace on the graph, the computer displays markers (triangles, circles etc) on the traces to help identify the traces.

Auto save on exit. When this box is checked, all graph window settings are saved automatically when you close the graph window.

5.1.8.2 XY options

To access this dialog, click in the [XY Graph](#) window.



Title. This is the title of the graph that will appear on graphical reports.

Horizontal/Vertical axis scale. This allows you to choose how the axes are scaled:

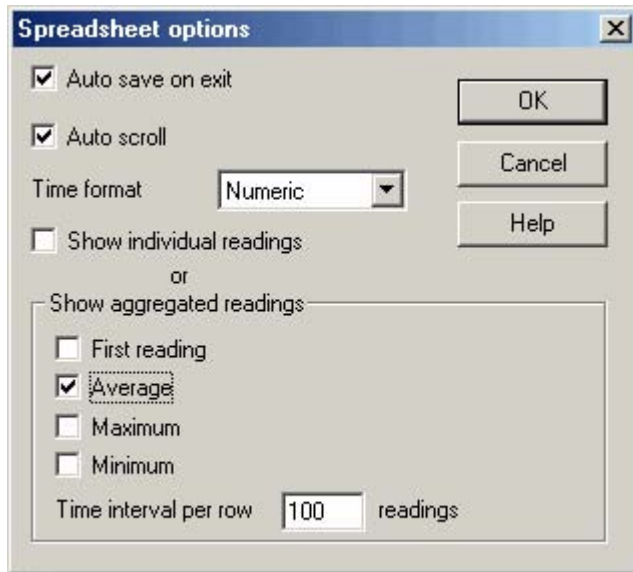
- Automatic - the scaling is set by the computer.
- Maximum - the axis is set to the maximum
- Manual - the scale can be changed by clicking on the scroll buttons on the XY Graph window.

The axis scale is automatically set to Manual if you click any of the scroll buttons.

Auto save on exit. When this box is checked, all XY graph window settings are saved automatically when you close the XY Graph window.

5.1.8.3 Spreadsheet options

To access this dialog, click in the Spreadsheet window.



Auto save on exit. When this box is checked, all event window settings are saved automatically when you close the event window.

Auto scroll. When auto scroll is enabled whilst sampling is in progress, the windowed range is updated automatically to keep the latest reading visible.

Time Format. This allows you to choose the format for the time:

- Numeric - the time in the selected sampling time units since the start of the run
- Time since start - the time in hours, minutes and seconds since the start of the run
- Time of day - each sample is labelled with the time it was taken
- Date/time - each sample is labelled with the date and time it was taken

Show individual/aggregated readings. When Show individual readings is checked, the spreadsheet window shows each individual reading.

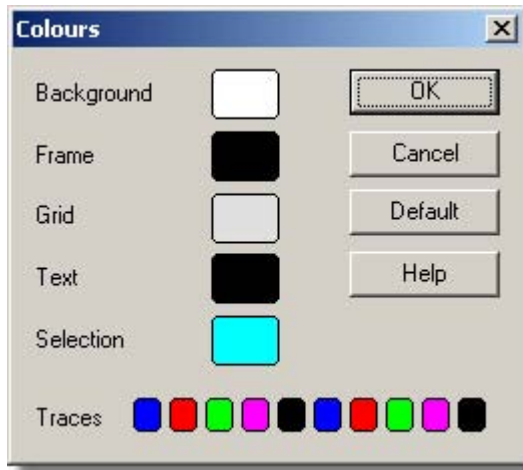
When the box is cleared, the computer displays results which are aggregates (1st reading/average/maximum/minimum) of the readings for the time interval specified below. The controls in the Show aggregated readings box are then enabled. If you select more than one control, the computer displays the corresponding number of columns for each sensor in the spreadsheet, and adds a heading (1st reading/average/maximum/minimum) to each column.

Time interval per row. This specifies the time interval between each of the rows on the spreadsheet. If, for example, the sampling interval was set for every minute, and you set the time interval per row to 60, each row will be the (1st reading / average / maximum / minimum) of 60 readings.

5.1.9 Preferences

5.1.9.1 Colours

To access this dialog, select Colours from the [Preferences](#) ^[20] submenu in the File menu.



This is used to specify the colours for the background, text and traces for the graph and spreadsheet windows. To change a colour, click on the colour button to open the colour selection dialog.

Background. This is the colour for the background on graphs, and for non-selected readings on the spreadsheet.

Frame. This is the colour of the frame around graphs.

Grid. This is the colour for the grid on the graphs.

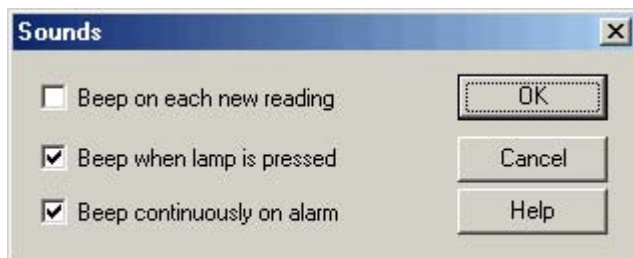
Text. This is the colour for text.

Selection. This is the colour for the selected readings on the spreadsheet.

Traces. A graph can display up to ten traces: the ten buttons along the bottom of the dialog are the colours for each trace.

5.1.9.2 Sounds

To access this dialog, select Sound from the [Preferences](#) ^[20] submenu in the File menu.



For some events, the Logging Software can make a sound when an event occurs. This dialog allows you to enable the sounds for each type of event.

Beep on each new reading. This option is useful if there is a problem and you need to keep a close check on it. If you select a graph or spreadsheet window, the computer beeps each time a new reading is added to the graph or spreadsheet.

Beep when lamp is clicked. When there is an alarm set, the lamp on the monitor window turns red. You can click on the lamp to cancel the alarm. When this box is checked, the computer beeps to confirm it has accepted your request to cancel the alarm.

Beep continuously on alarm. When this box is checked, the computer produces a continuous tone while an alarm is active.

5.1.9.3 Temperatures

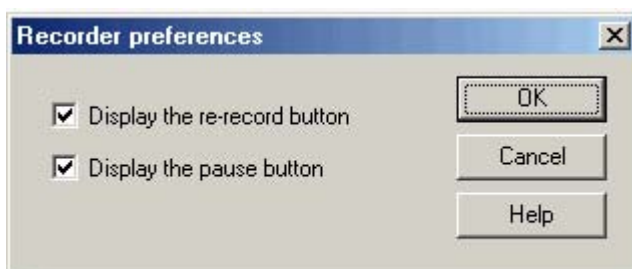
To access this dialog, select Temperature from the [Preferences](#) ^[20] submenu in the File menu.




This is used to specify the units for temperature measurements. The options are Fahrenheit or Celsius (Centigrade).


5.1.9.4 Recorder preferences

To access this dialog, select Recorder from the [Preferences](#) ^[20] submenu in the File menu.



Some buttons can be disabled to prevent the accidental erasure of data.

Display the re-record button. Chooses whether  is visible in the [Recorder](#) ^[5] window.

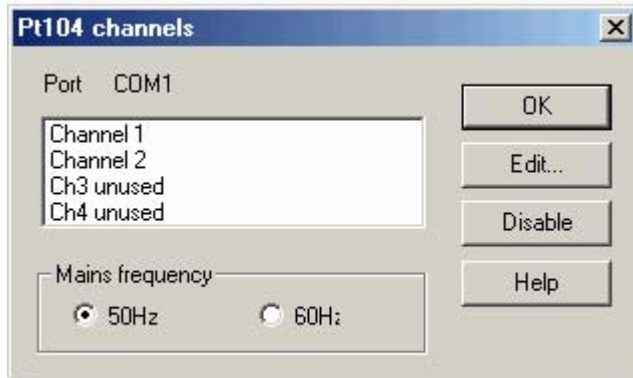
Display the pause button. Chooses whether  is visible in the [Recorder](#) ^[5] window.

5.1.10 Hardware configuration

5.1.10.1 PT-104

5.1.10.1.1 PT-104 channels

To access this dialog, once you have set up the Logging Software with a PT-104 unit, select Input channels... from the [Settings](#) ^[21] menu.



This dialog is used to select the channels that will be used to take measurements.

Edit. To select a channel, first highlight it, then click the Edit... button. This will open the [Edit PT104 Channel](#) ^[42] dialog so that you can enter the details.

Disable. To disable a previously selected channel, highlight it and then click the Disable button.

Mains Frequency. Select the mains frequency according to your location.

5.1.10.1.2 Edit PT-104 Channel

Accessed via the Edit button in the [Pt104 channels](#) ^[42] dialog.



This dialog is used to enter the details for a channel.

Name. This is the name of the channel. This name will appear on all reports.

Data type / Circuit. Select the appropriate settings for the sensor you are using.

Filter enable. If you want to use a filter to reduce the effects of electrical noise, check this box.

Options. To set the [options for a parameter](#)^[31], click the Options... button.

5.1.10.1.3 Device status

Accessed via the Status button in the [Converter details](#)^[25] dialog.

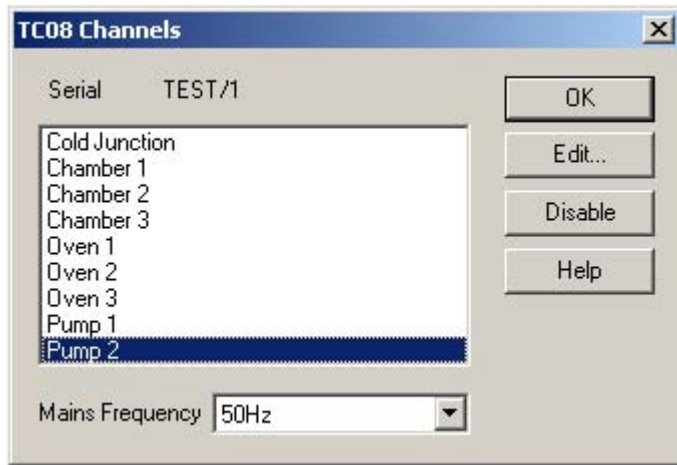


This dialog displays details of the [converter](#)^[53] status.

5.1.10.2 USB TC-08

5.1.10.2.1 USB TC-08 Channels

To access this dialog, assuming you have already set up Logging Software with a USB TC-08 unit, select Input channels... from the [Settings](#) menu.



This dialog is used to select the channels that will be used to take measurements.

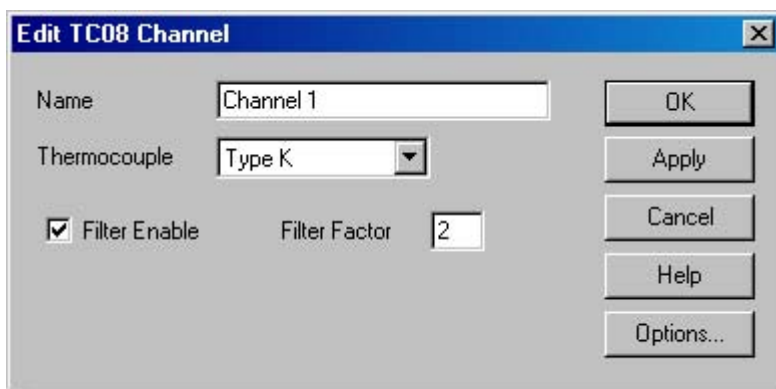
Edit. To select a channel, first highlight it, then click the Edit... button (or double-click with the mouse). This will open the [Edit TC08 Channel](#) dialog so that you can setup the channel.

Disable. To disable a previously selected channel, highlight it in the list window and click Disable.

Mains Frequency. The USB TC-08 can filter out the noise associated with mains. Select the option corresponding to the frequency of the mains (house current) in your location.

5.1.10.2.2 Edit USB TC-08 Channel

Accessed via the Edit button in the [TC08 Channels](#) dialog.



This dialog is used to enter the details for a channel.

Name. This is the name of the channel. This name will appear on all reports.

Thermocouple. This is the thermocouple type connected to the channel. There are eight valid thermocouple types: B, E, J, K, R, S, T, and N. There is also a ± 78.125 millivolt range.

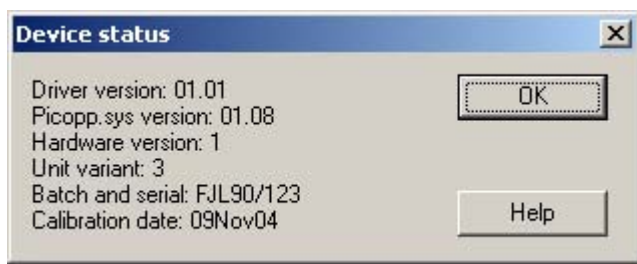
Filter enable. If you want to use a filter to reduce the effects of electrical noise, check this box.

Filter factor. A median filter is applied when 'filter factor' number of samples have been collected, returning the middle value. Filtered values are more stable, but respond more slowly to real changes in temperature. The higher the factor, the stronger the filtering effect will be.

Options. To set the [options for a parameter](#)^[31], click Options...

5.1.10.2.3 Device status

Accessed via the Status button in the [Converter details](#)^[25] dialog.



This dialog displays details of the [converter](#)^[53] status. The calibration date will help you keep track of when the unit should be returned to Omega for optional annual recalibration.

6 Equipment overview

The Logging Software takes measurements using one or more [converters](#)^[53]. These devices connect to your computer and convert electrical signals into measurements.

The software can work with up to 20 converters at the same time.

6.1 PT-104

The PT-104 platinum resistance thermometer data logger works with PT100 and PT1000 sensors, and can also be used to measure voltages up to 2500 mV and resistances up to 375 Ω . The conversion time for the PT-104 is 720 ms for full accuracy.

- Each PT-104 unit provides four inputs.
- You can use 2, 3 or 4-wire sensors.
- You can connect up to 20 PT-104 units to the same computer, if it has enough serial ports

6.2 USB TC-08

The USB TC-08 works with thermocouples of any standard type, and you can also use any combination of channels to measure a voltage range of ± 70 mV. The thermocouples are cold-junction compensated (the cold junction temperature can be monitored as an extra channel in the Logging Software).

You can connect up to 20 USB TC-08s to the Logging Software simultaneously, giving a maximum of 160 thermocouple channels.

6.3 IP sockets

The Logging Software has built-in support for transferring data over an [IP network](#)^[53].

One computer supplies the data and is referred to as the server. The other computer (referred to as the [client](#)^[53]) receives data from the [server](#)^[53] and displays the measurements as if they were collected locally. A server can support any number of clients and a client can get data from up to 10 servers.

A client needs two pieces of information to talk to a server: the name of the server and a socket number (normally 1050). The server does not need to know anything about the client.

The link uses the UDP/IP protocol. This is very efficient but does not guarantee that every message will get through. On large networks, a lost message would result in a delayed data update on the client.

See the [Transfer data over an IP network](#)^[18] section for detailed instructions on setting up a link.

7 Technical information

7.1 .ini preferences file

The preference file, `plw.ini`, contains two sections: `[General]` and `[Preferences]`. These sections contain the following items:

`[General]`

- `DataPath`
Alternate path for data files. Note: Do not attempt to save your data directly to a floppy disk, as this would cause the Logging Software to operate unacceptably slowly.
- `UserName`
Text to display in the footer for printed reports
- `Language`
Language code
- `Serial`
Serial number for the Logging Software
- `VersionWarning`
Version warning state (tells to check web for update)

`[Preferences]`

- `Colour0` - (0 to 16)
Colour of a graph component in `COLORREF` format (see `Colours` dialog)
- `CustomColour0` - (0 to 15)
Custom colors used by the standard Windows colour selection dialog in `COLORREF` format (see `Colours` dialog)
- `BeepOnReading`
- `BeepOnLamp`
- `BeepOnAlarm`
Sound options (see `Sounds` dialog)
- `Fahrenheit`
See `Temperatures` dialog (`Yes` = Fahrenheit, `No` = Celsius)
- `QuickSampleMs`
Minimum sample interval for which AC/frequency measurement is possible (default is 1000 ms). Warning: reducing this will significantly slow down the sampling speed of some converters by preventing the Quick sample mode from being active at sampling intervals up to 1000 ms.
- `AllowStandby`
By default, the Logging Software prevents a PC from automatically going to the power-saving Standby mode. If `AllowStandby=Yes` then the software will not interfere with power-saving operations.

- DemoMode
Use to override the installation setting for whether or not the Logging Software is in Demo mode. However, the product drivers will need to be reinstalled if the software was installed in Demo mode (Yes = Demo, No = Normal).

7.2 .plw data file

The `.plw` file has a fixed-length header, followed by a data record for each sample. It is terminated by a copy of the `.pls` file that was used to record it.

The first two-byte field of the header contains the length, in bytes, of the header. The remaining fields are as follows:

```

UNS16      header_bytes; - the length, in bytes, of this header
char       signature [40]; "Logging Software"
UNS32      version;
UNS32      no_of_parameters; no of parameters recorded
UNS16      parameters [250];
UNS32      sample_no; same as no_of_samples, unless wraparound
            occurred
UNS32      no_of_samples; number of samples recorded so far
UNS32      max_samples;
UNS32      interval; sample interval
UNS16      interval_units; 0=femtoseconds, 4=milliseconds,
            5=seconds, 6=minutes, 7=hours
UNS32      trigger_sample;
UNS16      triggered;
UNS32      first_sample;
UNS32      sample_bytes; length of each sample record
UNS32      settings_bytes; length of settings text after samples (copy
            of .pls file)
PICODATE   start_date;
FULLTIME   start_time;
long       minimum_time;
long       maximum_time;
char       notes [1000];
long       current_time;
unsigned short stopAfter;
unsigned short maxTimeUnit;
unsigned long maxSampleTime;
unsigned long startTimeMsAccuracy;
unsigned long previousTimeMsAccuracy;
unsigned long noOfDays;
UNS8      spare [58];

```

Note: Do not attempt to save your data directly to a floppy disk.

Definition correct as of R5.20.1.

7.3 .pls settings file

The Logging Software uses `recorder.pls` to hold information about the current recording session. A separate file, `player.pls`, holds information about the current player session.

The user can use the Save as... option in the [File](#) ^[20] menu to save the current settings in a named `.pls` file. These details can later be loaded to carry out a new test with the same settings.

The `recorder.pls` file is also written to the end of each `.plw` ^[52] data file and is automatically reloaded when an old `.plw` file is loaded.

All settings files are in Windows `.ini` format and could be edited using a text editor, although this is not recommended. The file contains the following sections:

<code>[Sampling]</code>	This section contains details of recording and sampling.
<code>[General]</code>	Numbers of parameters, converters, etc
<code>[Converter 1]</code>	Generic converter details - type and port ^[53]
<code>[Unit 1]</code>	Type-specific converter details
<code>[Unit 1 Measure 1]</code>	Details about a measurement from converter 1
<code>[Parameter 1]</code>	Information on the monitor window
<code>[Recorder]</code>	Information on the recorder window
<code>[Graph1]</code>	Information on the graph window
<code>[XYGraph1]</code>	Information on the XY graph window
<code>[Spread1]</code>	Information on the spreadsheet window
<code>[File]</code>	Current filename

Note: Do not attempt to save your data directly to a floppy disk.

7.4 Scaling file

This file is a text file containing information in the following format.

The first few lines define a number of keyword parameters. These lines are in the same format as a Windows `.ini` file, with a keyword, an equals sign and then a value, for example:

```
Units=°C
```

One of the keyword parameters is the scaling method and must always be included. The remaining parameters are optional. The keywords for the optional parameters are listed below.

After the optional parameters, the actual scaling information appears in the same format as it is entered in the scaling dialog.

The scaling method can be specified either in English or in the currently selected language. If the scaling method is specified in English, it will be understood regardless of what language is selected.

For a lookup table with just two pairs, the file would look like this:

```
Notes=LM35CZ Temperature sensor
Type=Table
Units=°C
-0.02    -20
 0.1     100
```

For an [equation](#)^[52], the file would look like this:

```
Notes=Temperature in Fahrenheit from LM35CZ
Type=Equation
32 + x *0.005555
```

The optional parameters are:

- **Notes.** You can include one or more lines of notes to explain what this scaling file is to be used for. The first few lines of the scaling file are displayed when the file is loaded, so the notes give the user an indication that they have loaded the correct scaling file.
- **Units.** The unit text to be shown on graphs, spreadsheets etc
- **Width.** The field width when the parameter appears in spreadsheets
- **Places.** The number of decimal places to display
- **MinValue.** The minimum value for graphs
- **MaxValue.** The maximum value for graphs

Some of the optional parameters will automatically set the fields on the Parameter options dialog, for example the units, range etc. See the [Parameter options](#)^[31] dialog for more information on these parameters

7.5 Command line options


You can specify the following options when starting the Logging Software:

<code>-p</code>	start the software in Player mode
<code>-r</code>	restart recording
<code>xxxx.pls</code>	load the settings from <code>xxxx.pls</code>

7.6 Multiple program instances

You can have more than one copy of the Logging Software running at once. This means that you can use one copy to examine old data files whilst another copy is collecting a new data file. You can have more than one 'player' open to examine old files, but only one recorder is allowed.

To start the software as a recorder, click the Logging Recorder icon in the Omega program group.

To start the software as a player, you can either click the Logging Player icon in the Omega program group or, if you already have a recorder running, select the Player window from the [View](#)  menu.

See also the `-p` option for the startup command.

7.7 DDE

DDE stands for Dynamic Data Exchange. This is a convenient method of transferring the current set of readings to other applications. Data is updated continuously, about once per second.

Data items are identified by three keywords: Application, Topic and Item. The keywords accepted by the Logging Software are:

Application	PLW
Topic	Current
Item	Name - parameter name
	Value - the current value
	Units - the units
	Alarm - the alarm status

Each DDE request returns a list of values for each parameter.

To read the current values into Excel, type the following command into a spreadsheet cell:

```
=PLW|Current!Value
```

To read the current values into Quattro Pro, type in the following command into a cell:

```
@DDELINK([PLW|Current]Value)
```

Most application programming languages (C, Delphi, Visual Basic) provide tools to make DDE requests from other applications.

7.8 Equation notation

An equation can contain the following items:

- Input parameters. These are represented by X for a measured parameter and A, B C D E for a calculated parameter.
- Numbers. These should be in fixed point decimal notation, such as 12.34. Exponential notation, such as 1.234E1, is *not* supported.
- Mathematical operators. See below.
- Mathematical functions. See below
- Spaces.
- Operators. The operators follow the normal rules of operator precedence (BODMAS, for "Brackets, Of, Division, Multiplication, Addition, Subtraction"). If you wish to force a particular order of evaluation, use brackets.

Notation	Description	Usage
()	brackets	$(x - 5) * 6$
-	unary minus	-x
-	binary minus	x - 5
+	plus	x + 5
*	times	x * 5
/	divide	x / 5

• Functions

Name	Description	Usage	Example
exp	e^x	exp (x)	exp (3) = 20.085
log10	log10	log10 (x)	log10(100) = 2
ln	loge	ln (x)	ln(20.085) = 3
power	power	x power 5	2 power 3 = 8
mod	modulo (remainder)	x mod 5	10 mod 2 = 1
sqrt	square root	sqrt (x)	sqrt(2) = 1.414

7.9 Glossary

.bmp. Bitmap file format, used for uncompressed images. The bitmap format is a very widely supported generic image format. The files are not usually compressed, and are therefore very large, but the image quality is very high.

.jpg. JPEG file format, used for compressed images such as photographs. The image format most widely supported across all platforms.

.pls. Data logger settings file. This holds data about the setup of the current recording session, but does not hold data collected from the converter.

.plw. Data logger data file. This file holds the data collected from the converter, and ends with a copy of the .pls Logging Software settings file.

.prn. The print file exported from the spreadsheet window is formatted with 'tab-separated values'. The data fields are separated by tabs and each record is separated with a carriage return, as in the following example:

Time (s)	Sound Level (dBA)
0	55.5
1	55.4
2	56.2

.scl. Data logger scaling file. It contains data about a specific type of sensor. Some files such as `PT100.scl`, are installed with the application and can be loaded from the [Parameter scaling](#) dialog while the Use scaling from file option is selected. The data can be used to calibrate the sensor, or to scale it to a particular measurement unit.

.wmf. Windows Metafile. The Logging Software uses this vector-based format because it produces scalable images and has a small file size.

ADC. Analog to Digital Converter. An ADC samples analog signals and convert them to digital data for storage and processing. It is an essential component of a data logging [converter](#).

Client. The client computer requests and receives information from a server. Therefore when setting up an IP Network arrangement, the server is attached to the converter and passes data to the client, which then receives and records it.

COLORREF. C language `typedef` of `unsigned long` used by Windows. For more information, search <http://msdn.microsoft.com/library/>.

Converter. A device that converts analog signals, such as temperature readings, to digital form. Available converters include the TC-08 8-channel thermocouple logger and the PT-104 platinum [RTD](#) temperature logger.

IP socket. Internet Protocol socket. An IP socket simply defines the data transfer protocol and the socket via which the server and client communicate. The default socket number is 1050. An IP socket is not a physical port.

Port. A physical connector, usually on the back of the computer, to which data logging converters are attached.

- USB - Units that natively support USB do not have port numbers
- Parallel - LPT1, LPT2, etc. (sometimes known as a printer port)
- Serial - COM1, COM2, etc.
- Parallel Port USB adapter - USB-PP1, USB-PP2, etc.

RTD. Resistance Temperature Detector. A type of resistor having a predictable change in electrical resistance with temperature. By measuring the resistance of the device, it is therefore possible to estimate its temperature accurately. The PT-104 RTD data logger can do this to an accuracy of 0.01 degrees Celsius.

Server. Receives data requests from the client and returns data as a response. When you set up an IP Network, therefore, the server is attached to the converter and passes data to the client, which then receives and records it.

USB 1.1. Universal Serial Bus (Full Speed). It can support data transfer rates up to 12 megabits per second. USB 1.1 was superseded by USB 2.0.

USB 2.0. Universal Serial Bus (High Speed). It can support data transfer rates up to 480 megabits per second and is the successor to USB 1.1.

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Index

.

- .ini files 47, 48
- .pls files 48
- .plw files 48
- .prn files 11
- .txt files 11
- .wmf files 16

A

- ADC 3
- Adding a calculated parameter 34
- Adding a converter 26
- Adding new measurements 14
- Alarm 33
- Assigning a channel name 29

B

- Buttons
 - Back a file 6
 - Copy to clipboard 16
 - Forwards a file 6
 - Help 5
 - New file 5, 14, 16
 - Open file 6
 - Pause/resume 5
 - Print view 16
 - Re-record 5, 14
 - Select channels 14
 - Start recording 5, 14
 - Stop recording 5
 - View Graph 15
 - View Notes 15
 - View options 17
 - View spreadsheet 15

C

- Client 18, 46
- Clipboard 7, 9, 11
- Command line 51
- Connecting to a server 29
- Converters 1
 - PT-104 46
 - USB TC-08 46

D

- Data file 48
- Data logging software components 4
 - Graph window 4, 7
 - Monitor window 5
 - Notes window 4, 13
 - Player window 4, 6
 - Recorder window 4, 5
 - Spreadsheet window 4, 11
 - XY Graph window 4, 9
- DDE 51
- Deleting a converter 26
- Dialog boxes
 - Alarm settings 33
 - Calculated parameters 34
 - Colours 40
 - Confirm File delete 25
 - Converter details 25
 - Converter preferences 27
 - Converters 26
 - Device status 30
 - Edit calculated parameters 35
 - Edit socket channel 29
 - Graph options 37
 - IP Socket options 28
 - Parameter options 31
 - Parameter scaling 32
 - Print 24
 - Recording 23
 - Sampling Rate 24
 - Select parameters 33
 - Socket channels 29
 - Sounds 40, 41
 - Spreadsheet options 39
 - Temperatures 41
 - XY options 38
- Displaying data 15

E

- Editing a calculated parameter 35
- Editing a converter 26
- Editing socket channels 29
- Enabling a client 28
- Enabling a server 28
- Enabling an alarm 33
- Enabling data and time scaling on a graph 17
- Entering scaling details 14
- Equation notation 52
- Equipment 46

Excel 51
Exporting a graph to a word processor 16
Exporting data to a spreadsheet 16

F

Facilities 1
File menu
 Delete File 20
 Exit 20
 New data 20
 New settings 20
 Open 20
 Preferences 20
 Save as... 20
File types
 .ini 47, 48
 .pls 48
 .plw 48
 .prn 11
 .txt 11
 .wmf 16

G

Graph controls 7
Graph window 4
 Buttons 7
 Horizontal controls 7
 Vertical controls 7

H

Help menu
 About... 22
 Contents 22
 Guided tour 22
 Index 22
 This view 22
 Using help 22

I

Introduction 1
IP network 18, 46
IP socket connection 30
IP sockets 18, 46
IP/UDP protocol 46

K

Keyboard shortcuts 22

M

Mathematical notation 52
Menu bar 20
Menus
 File 20
 Help 22
 Settings 21
 View 21
Monitor window 5
Multiple programs 51
Multiple recorders 19

N

Networking 18
Notes window 4, 13

O

Omega PT-104
 Editing channels 42
 Selecting channels 42
 Status check 43
Omega USB TC-08
 Editing channels 44
 Selecting channels 44
 Status check 45
Overview 1

P

Player controls 6
Player window 4
 Buttons 6
 Controls 6
Preferences file 47
Preferences menu
 Colours 20, 40
 Converter 20
 IP Sockets 20
 Language 20
 Recorder 20
 Sound 20, 40, 41
 Temperature 20, 41
Printing 16, 24
PT-104 46

Q

Quattro Pro 51

R

- Recorder controls 5
- Recorder window 4
 - Buttons 5
 - Controls 5
 - Range indicators 5
- Recording
 - Fast block mode 2, 14, 23
 - Real time continuous mode 2, 14, 23
- Repeating a run 14
- Running multiple recorders 19
- Runs 13, 14

S

- Safety 3
- Sampling interval 24
- Sampling rate 24
- Scaling 14, 31, 32, 50
- Selecting measurements 33
- Selecting measurements to display 14
- Selecting the converter type 25
- Server 18, 46
- Settings
 - Converter details 14
 - Recording method 14
- Settings file 48
- Settings menu
 - Calculated parameters 21
 - Input channels... 21
 - Monitor 21
 - Recording 21
 - Sampling... 21
- Settings
 - Sampling rate 14
- Simultaneous recording 19
- Spreadsheet window 4, 11
- Starting a new run 14
- Starting a recording 15

T

- Technical information 47
- Transferring data over an IP network 18
- Types of window 15

U

- UDP/IP protocol 46
- USB TC-08 46

V

- View menu
 - Graph 21
 - Notes 21
 - Player 21
 - Spreadsheet 21
 - XY Graph 21

X

- XY Graph controls 9
- XY Graph window 4
 - Buttons 9
 - Horizontal controls 9
 - Vertical controls 9

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WARRANTY/DISCLAIMER

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

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

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

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

RETURN REQUESTS/INQUIRIES

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

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

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

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

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

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

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

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