



LIQUITRONICS® LDR-100 Reader

User Manual – July 2009

LDR-100 Reader PC program version: 1.2.0 and later.

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WARNING - IMPORTANT

- A. Electrostatic discharge can damage sensitive components on electronic circuit boards. Always use proper grounding and antistatic precautions when handling a board. When handling a board, hold it by the sides, and avoid touching any of the components on the board. If an electronic circuit board is to be transported, then antistatic packaging **MUST** be used.
- B. The plug-in logger board must **not** be removed from (or fitted to) an LPH-100 while mains power is on. Turn mains power off before inserting or removing the logger board.
- C. Only use the power adapter supplied with the LDR-100 for recharging the LDR-100. You must **NOT** connect a different plug-pack power adapter to the LDR-100.

Failure to comply with any of these warnings may cause permanent damage to the equipment. The manufacturer takes no responsibility for damage caused as a result of failure to comply with these warnings.

I. Getting the software

The *LDR-100 Reader PC program* and drivers are provided on a CD. The program may also be downloaded from our web site. Contact Liquitronics to obtain the link to the latest version of the *LDR-100 Reader PC program* and drivers.

Important: Do not connect an LDR-100 to the computer until the software installation is completed.

II. Installing the software

1. Make sure the LDR-100 is not connected to the computer, and ensure that any virus protection software is disabled before beginning the installation.
2. If the software is on a CD, then insert the CD into the computer. If the software was downloaded from the web, then run the downloaded setup program.
3. Follow all of the on-screen instructions in the setup program.
4. After installation, and while the LDR-100 still unplugged, launch the *LDR-100 Reader PC program*.

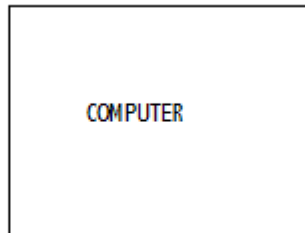
III. Setting up an LDR-100 Series Data Reader

Follow this procedure the first time you use the LDR-100 on a computer. It checks that

- the USB port is working
- the clocks in the computer and LDR-100 are set correctly
- the LDR-100 battery is adequately charged

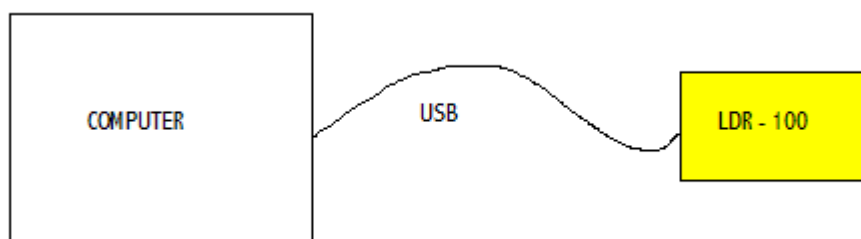
Routine use of the LDR 100 is described in Sections V and VI.

A. Get the *LDR-100 Reader PC program* ready



1. Make sure that the LDR-100 USB cable is unplugged from the computer.
2. Check that the *LDR-100 Reader* software (including the USB driver) has been properly installed, as per the instructions in section II.
3. Run the *LDR-100 Reader PC program*. To start the program, double-click the *LDR-100 Reader* shortcut on the desktop, or click on *Start Menu* → *All Programs* → *Liquitronics* → *LDR-100 Reader*.
4. Check that the computer's time and date are set correctly. The computer's time and date MUST be set correctly before continuing with step B.

B. Check that the computer recognizes the LDR-100

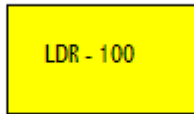


1. Connect the USB cable between the LDR-100 to the computer. Turn on the LDR-100 by pressing the ON / MODE button.
2. Click the “Search for LDR-100” button in the *LDR-100 Reader* window on the computer.
3. You should see “The LDR-100 is connected to the PC.” in green. If you do not see this message, then repeat steps 4 and 5.

If after repeated attempts, this does not work, then make sure that the drivers for the LDR-100 have been installed as per section II, and check the LDR-100’s battery level and USB cable connection.

If the computer has not been restarted since installing the drivers, then try restarting the computer and repeating section III.

C. Check the LDR-100 battery level



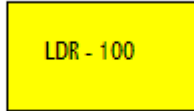
1. If the *LDR-100 Reader PC program* is running, then close it and disconnect the LDR-100 from the computer. If the LDR-100 is connected to mains, disconnect mains.
2. Turn the LDR-100 on.
3. Press the MODE button until you see “Info” flashing.
4. Press SELECT to enter the “Info” menu.
5. Press NEXT until you see “Battery level:”. You will see a voltage, and either “OK”, “low” or “flat”.
6. If you see either “low” or “flat”, then it is recommended that you plug in mains power to the LDR-100 and leave it for several hours in order for the battery to recharge.

The red LED next to the power socket remains on while the battery is being charged and the mains power should be left on until the light switches off. If the LDR-100 is required for use before being fully charged, a brief interim recharge is permissible. Check the battery level by accessing the “Info” menu. It is recommended that the battery level should reach at least 3.8V before mains power is disconnected. Connect the mains power again immediately after using the LDR-100 and leave until the red LED turns off.

If the LDR-100 is not used for a long period (typically two months or more), it will switch into a low power state to prevent flattening the battery. When switched on, the display will show “Connect to PC to set clock”. Follow the instructions in Section III to reset the clock. Recharge the battery as above.

If the LDR-100 battery is not recharged for an extended period, it will eventually discharge to a point where it cannot operate at all. In this case, the red LED might not come on when the charger is connected. To correct this, connect the mains powered charger and press the reset switch inside the small hole in the back of the case. The led should now light. Release the switch after ten seconds. If the led stays on, leave the LDR-100 to charge as above. If the light turns off when the reset switch is released, repeat the procedure for a longer period until the led stays on.

D. Check that the LDR-100 clock is correct



1. Access the “Info” menu as per steps 1 to 4 in part C (above).
2. Press NEXT until you see “Time” and “Date”. It should show the current date and time.
3. If the clock is not correct, then connect the LDR-100 to the computer and click the “Search for LDR-100” button (see part B of section III above).
4. The *LDR-100 Reader PC program* checks the LDR-100’s clock whenever it is connected. If the time on the LDR-100 is more than 5 minutes out, it is set to match the computer’s time.

IV. Setting up an LPH-100 Logger

IT IS ESSENTIAL THAT THE LPH-100 LOGGER IS SET UP WITH:

- (a) the correct time
- (b) a unique name identifying the site where it is installed
- (c) the types of probes connected.

The LPH-100 Logger MUST be set up by a computer via an LDR-100 Data Reader before it will begin logging data.

The characteristics (eg sensor types) must be entered in the *LDR-100 Reader PC program* so that the data can be interpreted correctly. This information is stored in “flash” memory in the logger so it is maintained even if power is lost. The site details are also be recorded by the computer so that data from the logger can be processed by the *LDR-100 Reader PC program*.

Normally the initial setup is performed on site using a portable computer so that data collected from the logger can be examined immediately after installation.

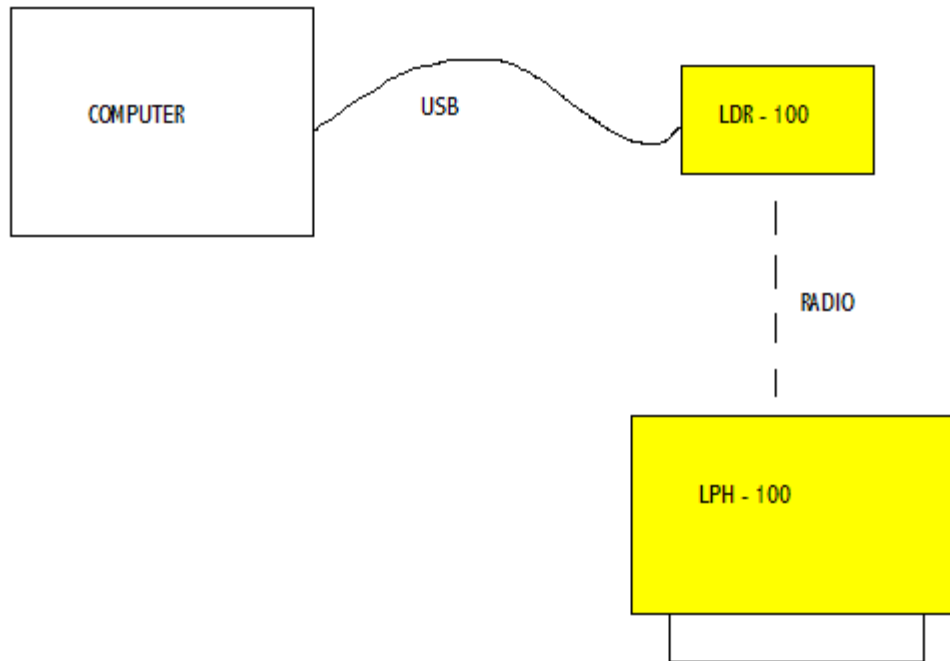
If a computer is not available at the installation site, the site name and probe types can be programmed into the LPH-100 logger before installation. In this case, it is still essential to have an LDR-100 Reader at the site to set the clock in the logger so that it will begin data recording with the correct time.

Note that whenever the LDR-100 Reader communicates with a computer, the reader clock will be synchronised with the computer time, so it is essential that the computer’s time and date are correct.

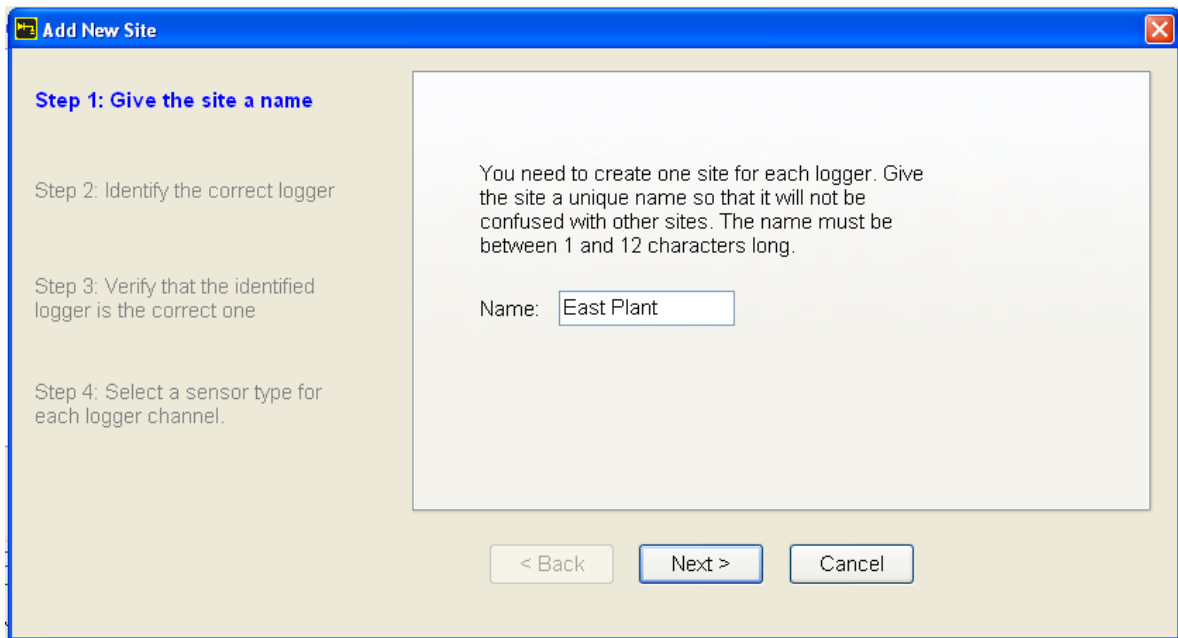
It is also possible to collect readings from the LDR-100 Reader on different computers other than the one used to originally set up the LPH-100 logger. This is described in Section VI (“Storing data on the computer”) and Section VII (“Manually adding a site”).

As well as the site name that MUST be entered during setup to identify the source of data, each logger has a unique serial number. The serial number should be recorded along with other site information as it may be required when setting up additional computers (Section VII).

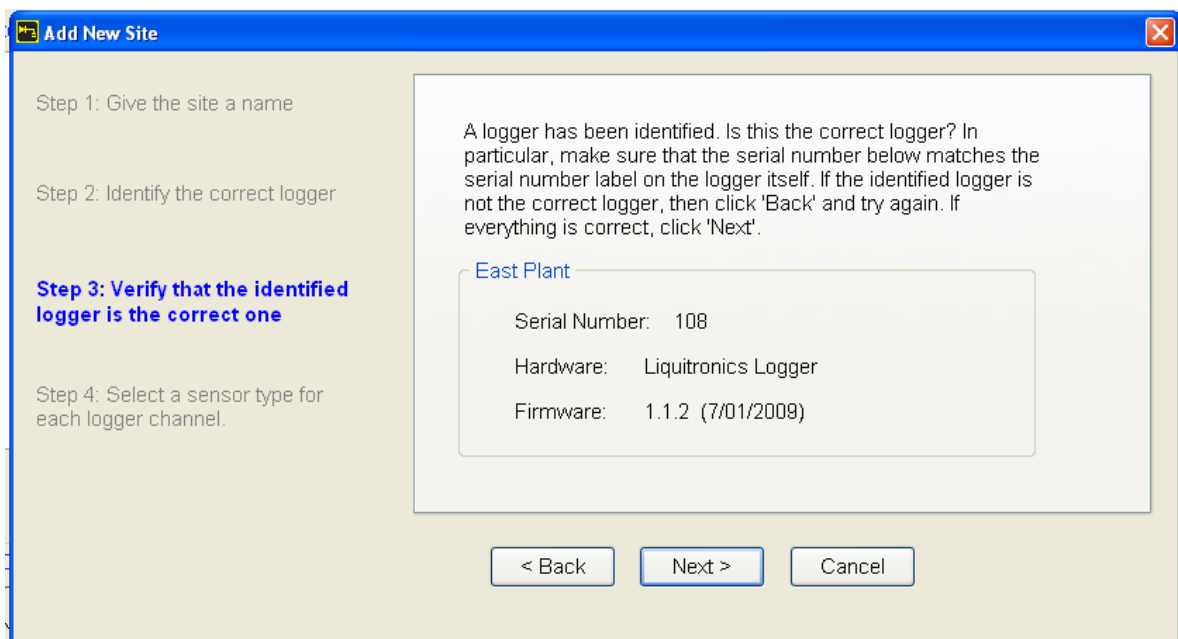
In the *LDR-100 Reader PC program*, you will use the “Add Site” procedure to set up the information for each logger. Each site corresponds to one LPH-100 logger. Once entered, the name for each logger will appear in the sites list box in the *LDR-100 Reader PC program* window.



1. Make sure that sections I to III have been done.
2. Run the *LDR-100 Reader PC program*.
3. Connect the USB cable from the LDR-100 to the computer and make sure that the intended LPH-100 is close by (within several metres).
4. Click “Search for LDR-100” if the LDR-100 has not already been found by the computer.
5. Click the “Add Site...” button in the *LDR-100 Reader PC program* window. The Add New Site screen will be displayed. Enter a name to describe this site (up to 12 characters) and click “Next”.



6. The LDR-100 Reader will now search for the LPH-100 logger.

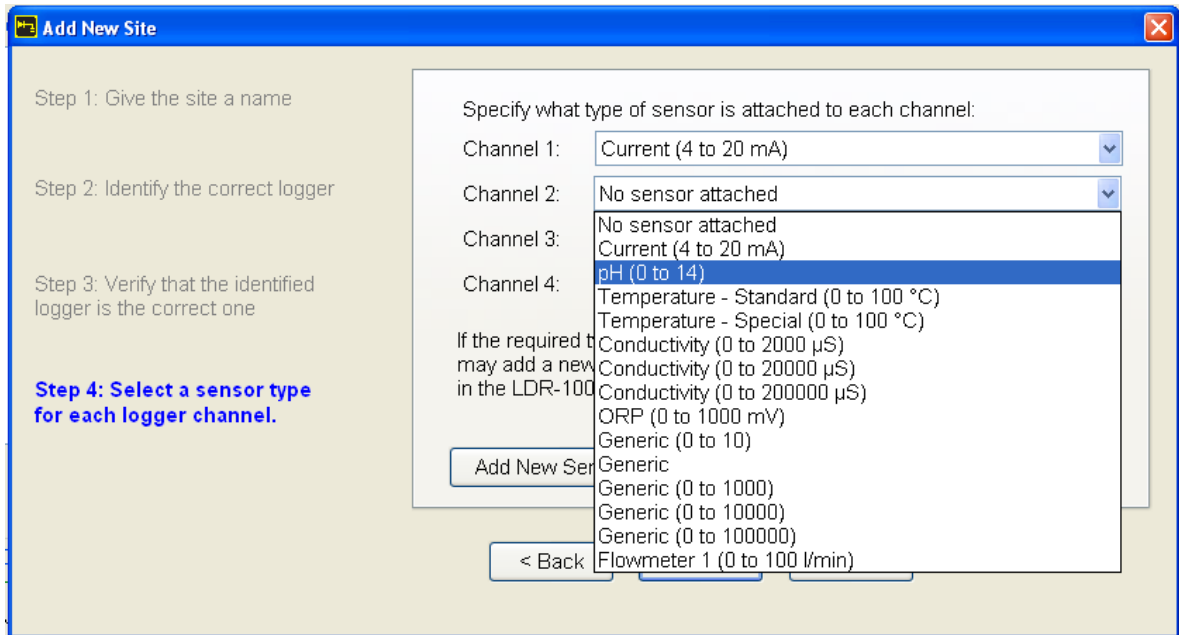


If this is the correct logger, click “Next”.

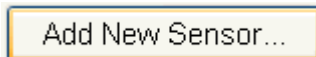
If it is not the correct logger, move the LDR-100 Reader closer to the LPH-100 logger and then click “Back” to repeat the search.

7. Enter the Sensor Type for each Channel. By default all channels are set to No Sensor.
To select a sensor, move the mouse cursor to the right hand arrow over the drop down sensor selection box for each channel. Click the left mouse button to expand

the list of sensors. Move the mouse over the sensor you require. To select the sensor, click the left mouse button.



8. If the list does not contain the required sensor you can easily set up your own sensor. Click the “Add New Sensor” button.



For instructions on adding a new sensor, see Section VIII (“Adding a new sensor”).

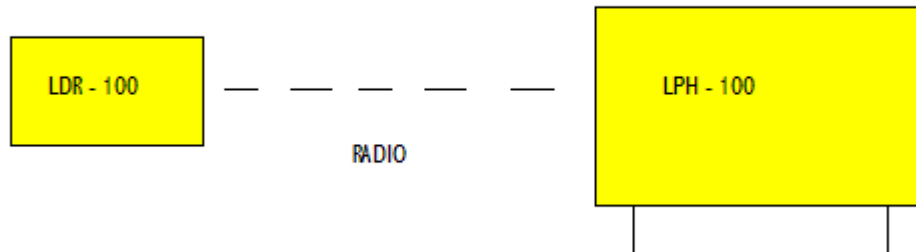
9. Once you have selected the sensor types for each channel, click “Finished”. The site setup will be sent to the LPH-100 logger. This process will take about 5 seconds.

The Site details will be also saved by the *LDR-100 Reader PC program* and the site will appear in the Sites list. The site information will be shown on the right hand side of the screen.

10. The default data directory for storing data files is the “Liquitronics” folder below the “My Documents” folder. To change the data directory for this site, click the “Change Data Directory...” button. The browse folder screen will be shown. Select a different folder (or create a new folder using the “Make New Folder” button) and click OK.
11. It is recommended that you now do a test collection using the instructions in section V (“Collecting data from a logger”) and section VI (“Storing data on the computer”) to ensure that the system functions as expected and that the readings exhibit the correct times, dates and signal levels.

V. Collecting data from a logger

Note – The LPH-100 loggers take a reading once per 10 minutes. Therefore, after the initial setting up, you may need to wait up to 10 minutes before an LPH-100 logger has any data available for collection.



1. Make sure that section III (“Setting up an LDR-100 series data reader”) has been done for each LDR-100, and that section IV (“Setting up an LPH-100 logger”) has been done for each LPH-100 logger.
2. Take the LDR-100 reader close to the LPH-100 logger (within several metres).
3. Press the ON / MODE button until “Collect” is flashing.
4. Press SELECT. You should see “Hold LDR-100 close to logger” on the display.
5. Wait for about 20 seconds, or until the LCD display changes.
6. When normal data collection starts, the LCD display on the LDR-100 will show the Site Name and the bottom line of the display will show a series of “>” characters as data is received.

eg. #1 Logger 108
>>>>>>>>

When all of the data has received, the LDR-100 display will show the site name and the date range for the collected readings.

eg. #1 Logger 108
28-May to 15-Jun

Record the collection date and time for this site so that if the LPH-100 logger clock has been reset (due to a power failure) you will be able to enter an approximate date and time of the last reading when the data is transferred to the computer.

If you wish to View the site information again, press MODE until “View” is flashing, then press “Select”. Press the “Select” button to toggle the bottom line between the date range for the collected readings and the serial number for the logger at this site.

To return to the main menu, press MODE again.

If you see the message “Serial Number X has not been set up”, then this LPH-100 logger will have to be set up as per section IV before any data may be collected.

If you see the message “Error – try again” then the data transfer failed. In this case, move the LDR-100 closer to the LPH-100 and repeat steps 3 to 5.

If you see the message “Collected before” then the LDR-100 already has data from that site and the data must be stored on the computer (as per the instructions in section VI, Storing data on the computer) before being collected again.

VI. Storing data on the computer

1. Run the *LDR-100 Reader PC program*.
2. Connect the LDR-100 and turn it on by pressing the ON / MODE button. If it is not already recognized by the *LDR-100 Reader PC program*, then click the “Search for LDR-100” button in the *LDR-100 Reader* window.
3. If the LDR-100 has contains data then the “Collect All Readings” button will be enabled. If so, click the button. The data collection summary table will be displayed.
4. The data for each site in the Sites list will now be collected. As readings are received, the data collection summary table will be updated to show the site information including site name, number of readings and the time of the oldest and latest readings.

Data Collection Summary						
Site Name	Serial	No. of	Time of	Time of	Name of CSV File	LDR-100
	No.	Readings	Oldest Reading	Latest Reading		Result
Logger 108	108	2534	Collecting...	15 Jun 2009 9:00 am		Date Ok

When all of the data for this site has been collected from the LDR-100 Reader, the program will store the data in CSV (comma separated variable) format to the nominated data directory.

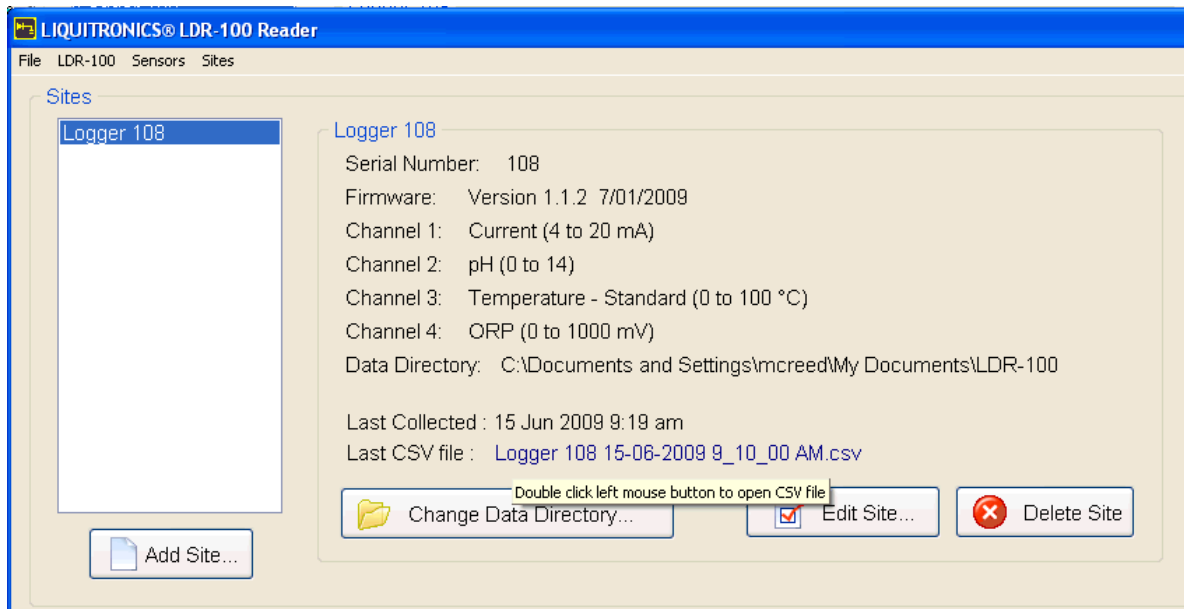
The file name for the exported data is shown in the Data Collection Summary table.

Data Collection Summary						
Site Name	Serial	No. of	Time of	Time of	Name of CSV File	LDR-100
	No.	Readings	Oldest Reading	Latest Reading		Result
Logger 108	108	2534	28 May 2009 6:50 pm	15 Jun 2009 9:00 am	Logger 108 15-06-2009 9_00_20 AM.csv	Cleared

If the data is successfully exported to the CSV file then the data for this site is cleared from the LDR-100's memory.

Once all of the data has been collected, the CSV files may be opened from the Data Collection Summary table. To open a CSV file, move the mouse cursor over the CSV file name. When the cursor is over the file name, the cursor will change to a hand pointer. Double-click the left mouse button – the file will be opened automatically in Microsoft Excel (or whatever program is registered for files with extension .CSV).

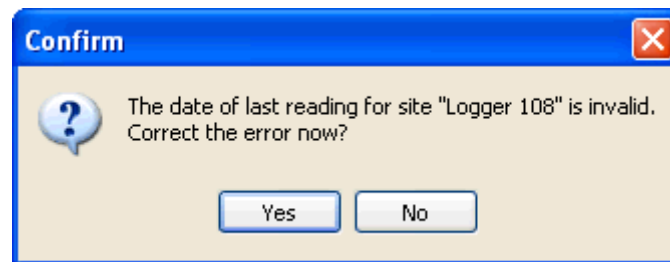
The *LDR-100 Reader PC program* displays the date of the last collection for each site and the name of the last CSV file that was written below the site information.



To open the CSV file in Microsoft Excel, move the mouse cursor over the file name and then double-click the left mouse button.

Correction of an invalid date of last reading

If the LPH-100 logger has lost power then the date of the latest reading stored in the LDR-100 reader may be invalid. If the *LDR-100 Reader PC program* detects an invalid date for a site, the following message will be displayed:



To correct the date of the last reading, click “Yes”.

If you select “No”, the data will be written to the CSV file with the invalid date.

Select the Collection Date and Time for Logger 108

Select the collection date...

June 2009						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
25	26	27	28	29	30	31
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5

Select the collection time

10:00 AM

Continue Cancel

Enter the approximate date and time when you collected the data from the LPH-100 logger.

Click “Continue”. You will be asked to confirm the date and time. The data will then be collected from the LDR-100 reader using the corrected date and time.

Recovery of data from unknown sites

An LPH-100 logger that has been set up on a different computer is regarded as an unknown site on this computer.

The *LDR-100 Reader PC program* checks the LDR-100 reader to see if it contains any data from unknown sites. If data from unknown sites is found you will see the following message:

Information

The LDR-100 contains 2534 readings from one or more unknown sites. Do you wish to recover these readings?

Yes No Cancel

You may recover the data to this computer, or if you select “No” or “Cancel”, the data will be retained on the LDR-100 reader to be collected by a different computer.

To recover readings from unknown sites, click the “Yes” button.

The *LDR-100 Reader PC program* will now commence searching for the data from the unknown sites.

If the LPH-100 logger has been set up to use standard sensors, then the *LDR-100 reader PC program* will automatically read the site information from the LDR-100 reader and add the site to the Sites list.

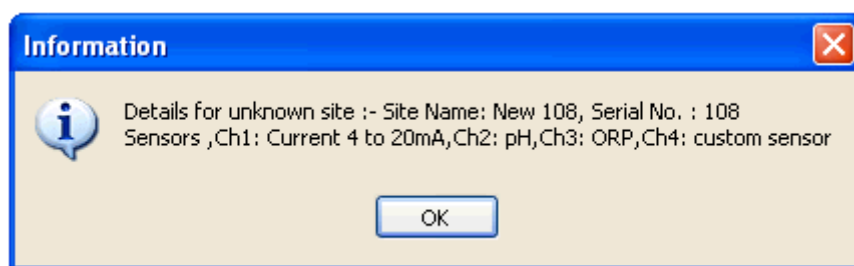
The following sensors are standard sensors:

Current (4 to 20 mA)
pH (0 to 14)
Temperature - Standard (0 to 100 °C)
Temperature - Special (0 to 100 °C)
Conductivity (0 to 2000 µS)
Conductivity (0 to 20000 µS)
Conductivity (0 to 200000 µS)
ORP (0 to 1000 mV)
Generic (0 to 10)
Generic
Generic (0 to 1000)
Generic (0 to 10000)
Generic (0 to 100000)

The data for this site will then be collected automatically and then cleared from the LDR-100's memory.

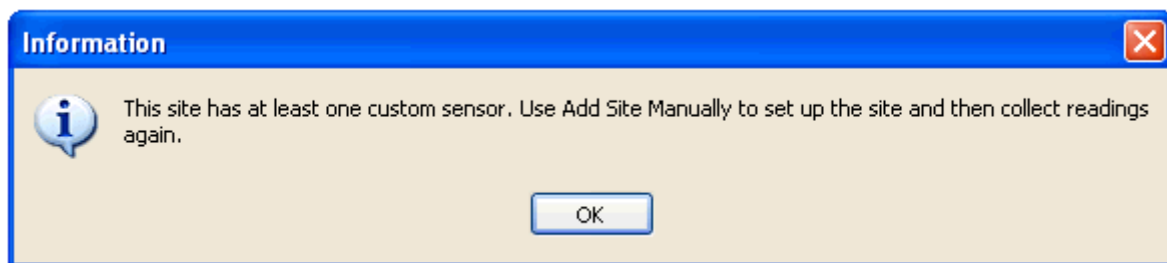
Data Collection Summary						
Site Name	Serial	No. of	Time of	Time of	Name of CSV File	LDR-100
	No.	Readings	Oldest Reading	Latest Reading		Result
Logger 108	108	2535	Collecting...	15 Jun 2009 9:10 am		Date Ok

If the LPH-100 logger is using one or more custom sensors, then the *LDR-100 Reader PC program* will display the site information on the screen.



To collect data for an unknown site that uses custom sensors, you will need to follow the “Manually Add Site” procedure (see section VII. Manually Adding a Site).

Make a note of the above site details - you will need to enter the information during the “Manually Add Site” procedure. Click OK.



If you do not have the details for the custom sensor(s), contact Liquitronics.

Note: The data for this site is retained on the LDR-100 until the site is added to the Sites list on this computer and collected, or alternatively collected on a different computer.

Go to Sites, “Manually Add Site”, enter the site setup and then select “Collect All Readings” again to recover the data for this site.

VII. Manually adding a site

Use this procedure to add a site when the LPH-100 logger has been set up on a different computer.

An LPH-100 logger that has been set up on a different computer is regarded as an unknown site on this computer.

Use this procedure when you have data on the LDR-100 Reader for an unknown site and wish to collect the data to this computer.

Note: If you are installing a new LPH-100 logger that has never been set up on any computer, then you must use the “Add Site” procedure. See section IV (Setting up an LPH-100 Logger).

If the LDR-100 contains data for this LPH-100 logger and you know that the LPH-100 logger is using standard sensors (see the previous page for a list of standard sensors), then the *LDR-100 Reader PC program* can automatically recover the site information from the LDR-100 reader, add the site to the sites list and collect the data.

To proceed, simply click the “Collect All Readings” button. (see Section VI Storing data on the computer under Recovery of data from unknown sites).

If the LPH-100 logger is using one or more custom sensors, then you must use the following “Manually Add Site” procedure.

The “Manually Add Site” operation may be performed without the LDR-100 connected.

1. Determine the serial number of the LPH-100 logger. See section X (How to determine the LPH-100 logger serial number).
2. Run the *LDR-100 Reader PC program*.
3. From the of the *LDR-100 Reader PC program* main menu, click “Sites” → “Manually Add Site...”.
4. Enter a name for the site. Click “Next”
5. Type in the LPH-100 serial number. Click “Next”.
6. Select the sensor type for each logger channel.
7. If the sensor is not available in the list, then add a new sensor. (See section VIII Adding a new sensor).
8. Click “Finish”.
9. The logger’s name will be added to the Sites list and the site information will be displayed on the screen.
10. The default directory for storing data files is the “Liquitronics” folder below the “My Documents” folder. To change the data directory for this site, click the “Change Data Directory...” button. The browse folder screen will be shown. Select a different folder (or create a new folder using the “Make New Folder” button) and click OK.
11. You may now collect the site data from the LDR-100 Reader.

VIII. Adding a new sensor

The *LDR-100 Reader PC program* (version 1.02 and later) now has the ability to set up custom sensors.

To add a new sensor, go to the *LDR-100 Reader PC program* main menu and click “Sensors” → “Add New Sensor” or alternatively, click the “Add New Sensor” button at the bottom of the “Add Site” or “Manually Add Site” screens.

Add New Sensor...

The Add New Sensor screen will be shown.

Add New Sensor

Sensor Name

Unit

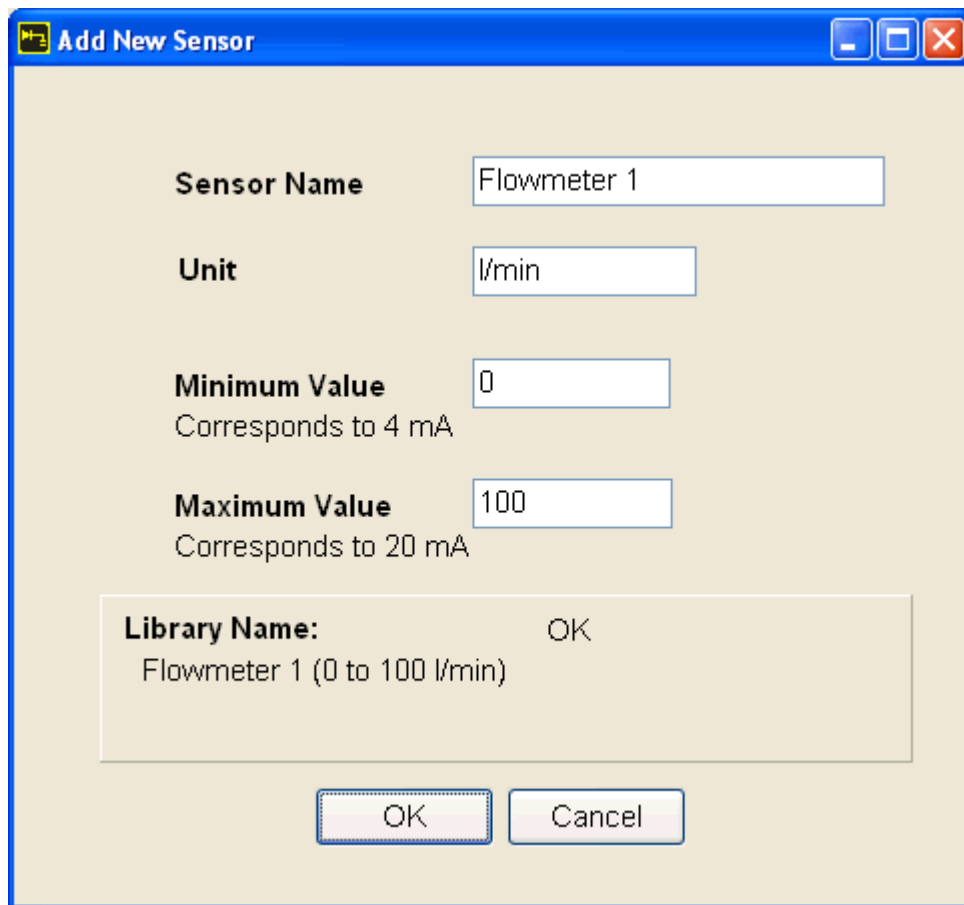
Minimum Value
Corresponds to 4 mA

Maximum Value
Corresponds to 20 mA

Library Name: Blank (0 to 100) Name is not valid

OK Cancel

- Type in the Sensor Name, Unit, Minimum value (at 4mA) and Maximum value (at 20mA).



The "Add New Sensor" dialog box is shown with a blue title bar and standard window controls. It contains four input fields: "Sensor Name" with the text "Flowmeter 1", "Unit" with "l/min", "Minimum Value" with "0", and "Maximum Value" with "100". Below the "Minimum Value" field is the text "Corresponds to 4 mA", and below the "Maximum Value" field is "Corresponds to 20 mA". A summary box at the bottom left shows "Library Name:" followed by "Flowmeter 1 (0 to 100 l/min)" and an "OK" button. At the very bottom are two buttons: "OK" and "Cancel".

Sensor Name	Flowmeter 1
Unit	l/min
Minimum Value	0
Corresponds to 4 mA	
Maximum Value	100
Corresponds to 20 mA	
Library Name:	Flowmeter 1 (0 to 100 l/min)
OK	

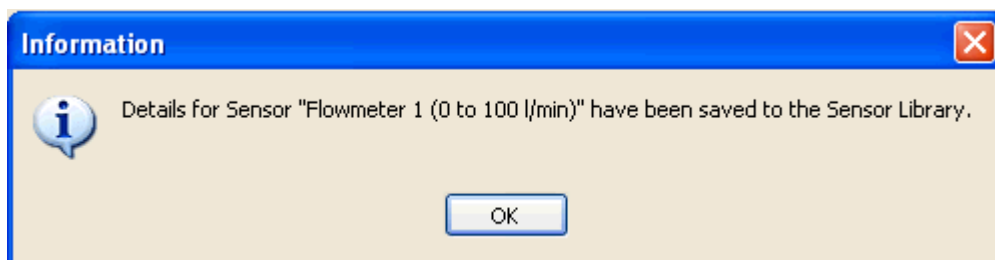
OK Cancel

The sensor library on the computer uses a combination of the sensor name, unit and minimum and maximum values to generate a library name. In this example, the library name is “Flowmeter 1 (0 to 100 l/min)”.

This library name must be unique, so if you set up a sensor and see the words “Name already taken” next to Library Name, you will need to modify either the sensor name, units or range.

The standard sensors are also included in the library. For example, the name “pH (0 to 14)” is already taken by a standard sensor.

- Click OK. A message will be displayed to indicate that the sensor has been saved to the sensor library for this computer.



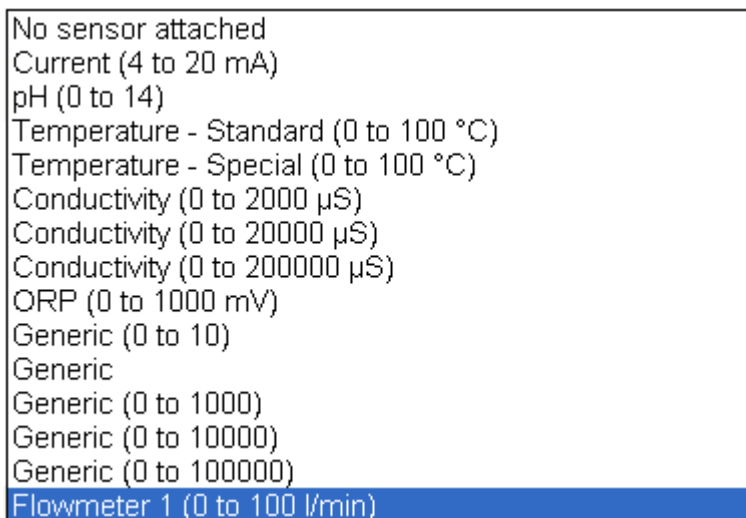
The "Information" dialog box has a blue title bar with a close button. It features an information icon (a lowercase 'i' in a circle) on the left. The text in the center reads: "Details for Sensor 'Flowmeter 1 (0 to 100 l/min)' have been saved to the Sensor Library." At the bottom center is an "OK" button.

Information

Details for Sensor "Flowmeter 1 (0 to 100 l/min)" have been saved to the Sensor Library.

OK

The custom sensor will now be available in the “Add Sites” screen and the “Manually Add Site” screen, at the bottom of the sensor selection list for each channel.

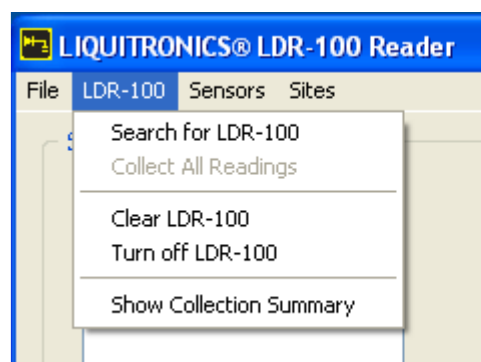


Custom sensors may be deleted at any time.

If a custom sensor has selected for a site setup, the details for the custom sensor are stored in the site setup file. So even if you have deleted the custom sensor from the computer’s sensor library, it will still be shown in when you edit the site setup.

To delete a custom sensor, see section IX (Other functions) under Sensors – Delete Custom Sensor.

IX. Other functions



The LDR-100 menu

Clear LDR-100

Use this menu item if you wish to clear the entire memory of the LDR-100 Reader.

To clear the memory the LDR-100 Reader must be connected and turned on.

A confirmation message will be shown. Click “Yes”. A message will be shown on the screen if the memory clear operation was successful.

Turn Off LDR-100

This option allows you to turn off the LDR-100 without unplugging the USB cable and without having to close the *LDR-100 Reader PC program*.

Use this option if you wish to use the LDR-100 Reader to collect data from a logger or use the LDR-100 Reader “View” or “Info” menus.

On the main menu, click “LDR-100” → “Turn Off LDR-100”.

The LDR-100 will turn off immediately. You may now turn on the LDR-100 and the menu buttons will be available. Note: you do NOT need to unplug the USB cable.

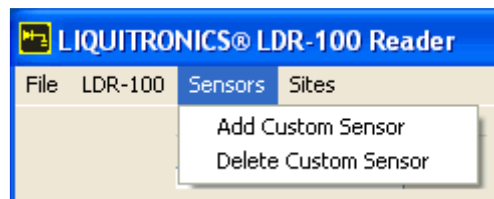
When you wish to use the LDR-100 with the computer again, turn on the LDR-100 reader and click “Search for LDR-100”.

Show Collection Summary

Use “Show Collection Summary” to display the collection summary table.

This option is only available after you have collected readings from the LDR-100.

The Sensors menu



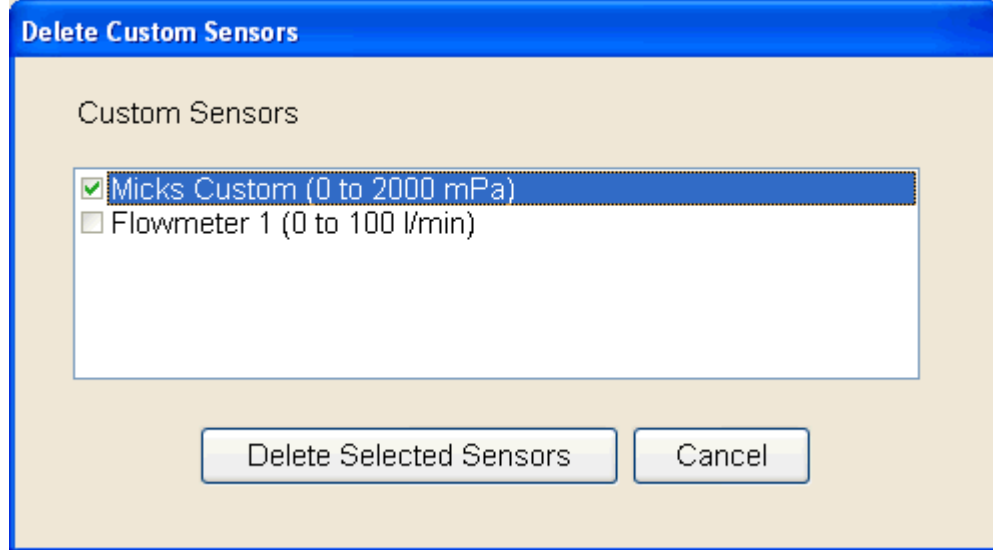
Add Custom Sensor

Use this option to add a custom sensor to the *LDR-100 Reader PC program* sensor library. Sensors added via this menu item will be available in the sensor types drop-down lists in the “Add Site” and “Add Site Manually” screen. See Section VIII (Adding a new sensor).

Delete Custom Sensor

Use this menu item if you wish to remove one or more custom sensors from the *LDR-100 Reader PC program* sensor library.

Click “Sensors” → “Delete Custom Sensor”. A list of the custom sensors used on this computer will be displayed.



Place a tick next to each custom sensor to be deleted. Click “Delete Selected Sensors”.

The deleted sensors will be removed from the sensor library.

Existing site setups that use these custom sensors will not be affected because the sensor information for each channel is stored with the site information. If you edit the setup for a site containing custom sensors, then the custom sensor will appear in the sensor list.

X. Finding the LPH-100 logger serial number

There are a number of ways to determine the LPH-100 logger serial number:

- Run the *LDR-100 Reader PC program* on the original computer where the LPH-100 logger was first set up. Select the site from the Sites list and record the site information.
- Collect data from the logger to the LDR-100 reader. Go to the “View” menu. Press the “NEXT” or “PREV” buttons until you see the name of the site of interest. Press the “SELECT” button. This logger serial number will be shown on the bottom line of the display. Press the “MODE” button to return to the main menu.
- Open the case of the LPH-100 logger and read the sticker found on top of the radio module on the logger’s board (inside the LPH-100’s case).

