



The EL-21CFR-2-LCD data logger measures and stores up to 16,379 relative humidity and 16,379 temperature readings over 0 to 100%RH and -35 to +80°C (-31 to +176°F) measurement ranges at a resolution of 0.5°C (1°F) and 0.5%RH. The user can easily set up the logger and view downloaded data by plugging the data logger into a PC's USB port and using the supplied software. Relative humidity, temperature and dew point (the temperature at which water vapour present in the air begins to condense) data can then be graphed, printed and exported to other applications. The encrypted data has full audit tracking to comply with the requirements of 21CFR Part 11. The high contrast LCD can show a variety of temperature and humidity information. Cycle between the current temperature and humidity, along with the maximum and minimum stored values for temperature and humidity using the push-button. The data logger is supplied complete with a long-life lithium battery, which can typically allow logging for up to 1 year. The logger is protected against ingress from water and dust to IP67 standard when the plastic cap and seal are fitted.

Features

- 0 to +100%RH Measurement Range
- -35 to +80°C (-31 to +176°F) Measurement Range
- Dew point indication via Windows control software
- Operation is 21CFR Part 11 compliant
- USB Interface for Set-up and Data Download
- User-Programmable Alarm Thresholds for %RH & T
- High contrast LCD, with two and a half digit temperature and humidity display function
- Immediate, delayed and push-to-start logging
- Status Indication via Red and Green LEDs
- Supplied with Replaceable Internal Lithium Battery

Programmable Elements

- Logger Name
- °C, °F
- Logging Rate (10s, 1m, 5m, 30m, 1hr, 6hr, 12hr)
- High and Low Alarms
- Immediate, delayed and push-to-start logging
- Display off, on for 30 seconds after button press, or permanently on
- Data rollover (Allows unlimited logging periods by overwriting the oldest data when the memory is full)

Record Times

Sampling Interval	Record Times
1 sample every 10 seconds	45 hours
1 sample every minute	11 days
1 sample every 5 minutes	56 days
1 sample every 30 minutes	11 months
1 sample every hour	1.8 years
1 sample every 6 hours	> 2 years
1 sample every 12 hours	> 2 years

21 CFR Part 11 Compliance



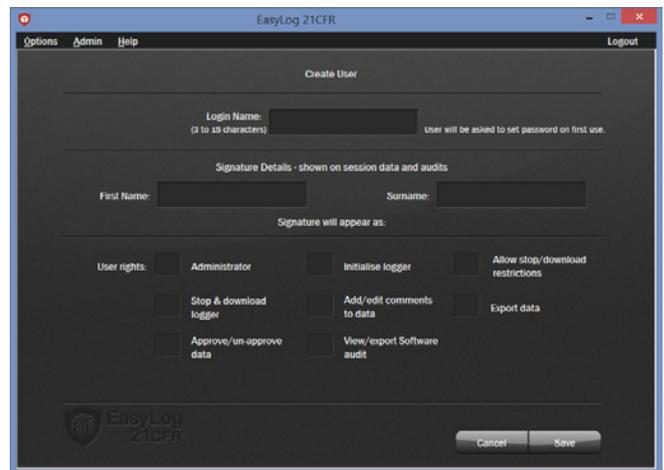
21 Code of Federal Regulations Part 11 (21CFR Part 11) has been established by the Food and Drug Administration (FDA) to govern the veracity of electronic records and signatures. Through a defined system of checks and balances 21CFR Part 11 ensures that information applied to the standard is both traceable and unalterable. In the case of model EL-21CFR-2-LCD data logger, that information is temperature, humidity, and time and date. Through a unique combination of data logger firmware and PC-side software this instrument ensures 21CFR conformance, which allows it to be deployed in applications that demand it: Medical device manufacturing, pharmaceuticals, contact research organizations, and others where hardcopy paper records have been displaced by computer files.

Model EL-21CFR-2-LCD provides compliance with 21CFR through use of data files that are encrypted and therefore unalterable, with an audit trail complement. This logger offers identical measurement performance to its older cousin model EL-USB-2-LCD with these added 21CFR-centric features:

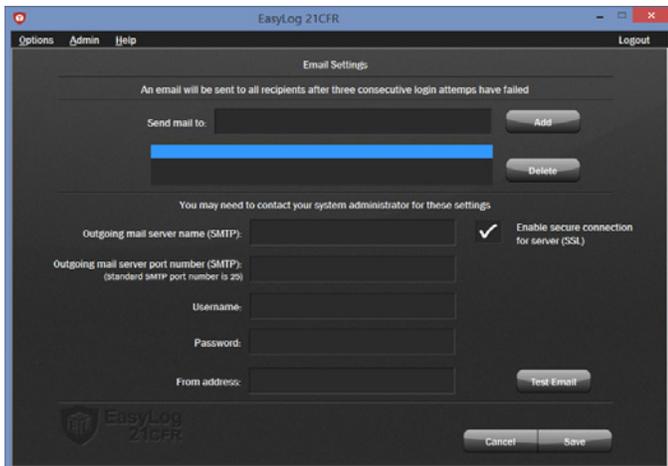
- Multiple user accounts with definable permissions
- Audit trails for session logins and data
- Email alerts when a login attempt fails
- Reported data protection with digital signatures
- Commented events that become part of the permanent record



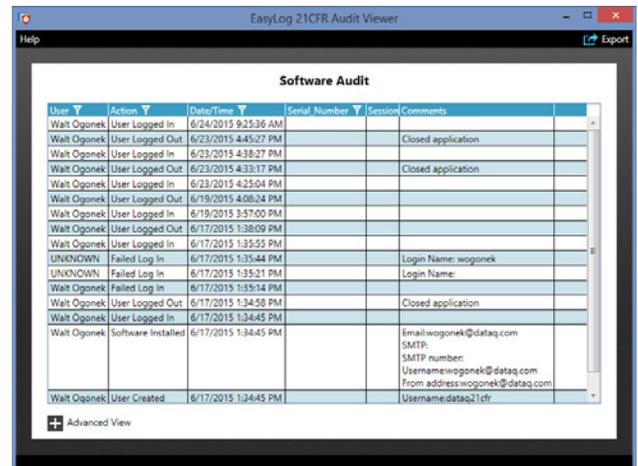
Login is required to view data and audit reports.



Manage multiple user accounts and layers of permissions including logger functions and export.



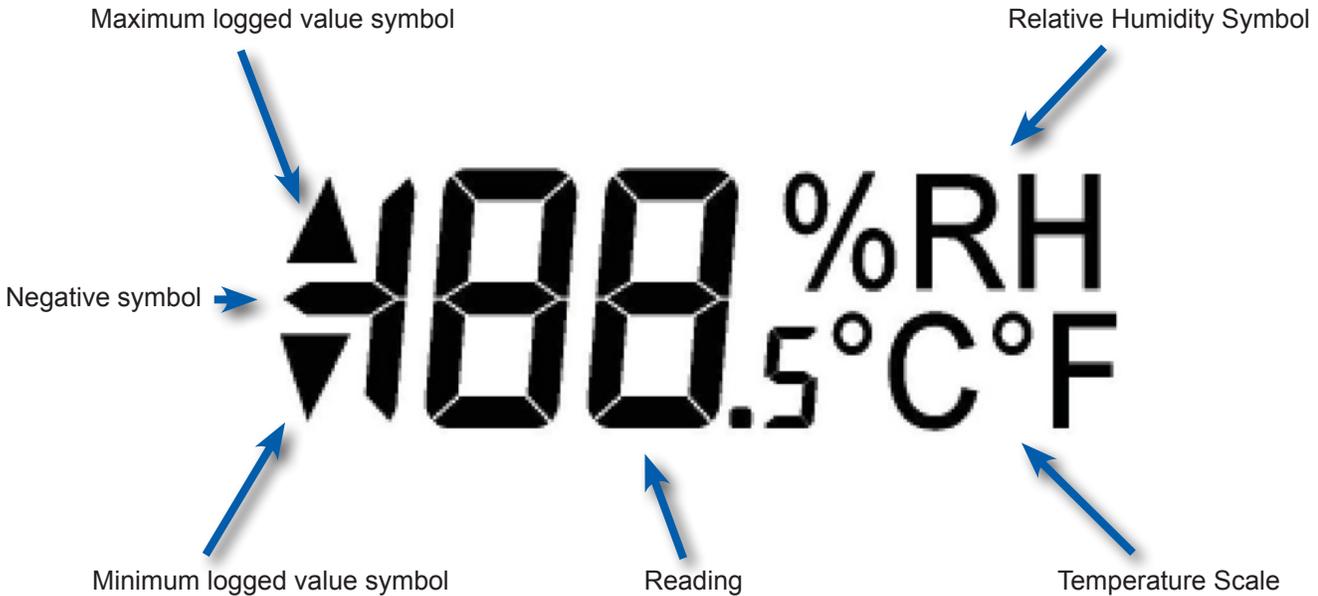
Setup email notification on failed login attempts.



View and export audit reports showing user activity and failed login attempts.

LCD Display

The EL-21CFR-2-LCD features a high contrast LCD that shows logged temperature and humidity values using seven segment numbers, along with annunciators. The LCD can also show information regarding the logging status.



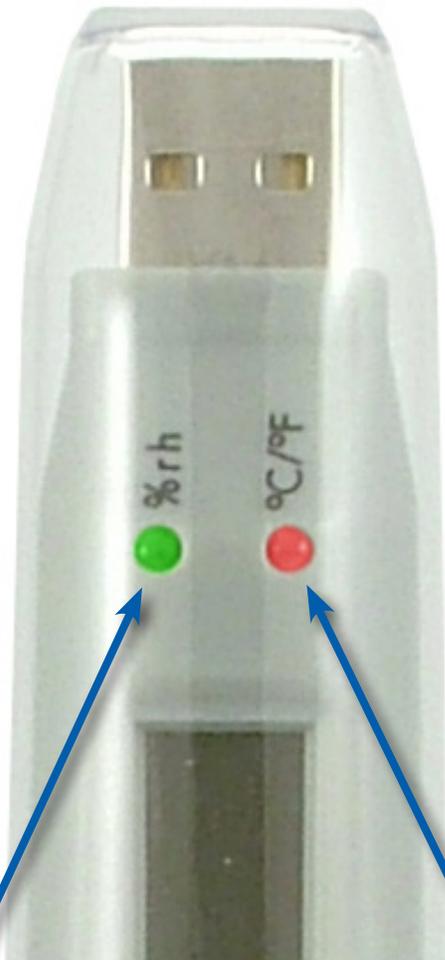
The LCD shows six different recorded readings, which can be cycled through using the built-in push button. The most recent logged value, maximum logged value and minimum logged value can be displayed separately for humidity and temperature. In addition, logging and alarm status is shown using two high intensity LEDs (next page).

Display	Logger Status	Explanation
ds	Delayed Start	This is shown when the logger is set to start at a specific data and time. If the logger is set to "LCD off" or "LCD on for 30 seconds" mode, then this will only be shown after the button is pressed. Otherwise the display will remain blank.
ps	Push to Start	This is shown when the logger is setup for "Push to start" logging.
109	Logging	This is shown when the logger is running in "LCD off" mode, and the button is pressed. The display clears again after three seconds.
---	Stopped	If the logger has not been set to log and the button is pressed, three dashes are displayed for three seconds.

LED Flashing Modes

The EL-21CFR-2-LCD features 2 bi-color LEDs; one LED represents temperature measurement, the other represents RH. Each is clearly marked on the logger. To save power, the status indication alternates between the two channels every 10 seconds. First you will see the status of the temperature logging, and 10 seconds later you will see the status of the RH logging, and so on.

RH%	°C (°F)		10 seconds later				
			<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 25%;">RH%</th> <th style="width: 25%;">°C (°F)</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	RH%	°C (°F)		
RH%	°C (°F)						
							



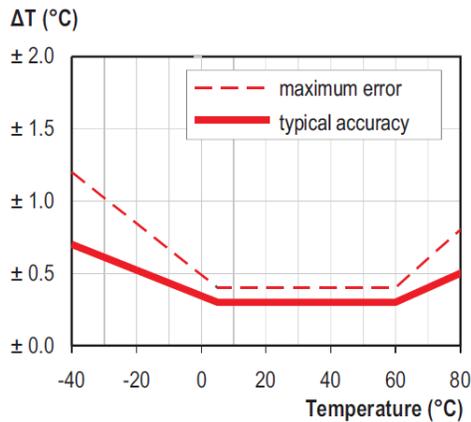
%RH
Red/Green LED

°C/°F
Red/Green LED

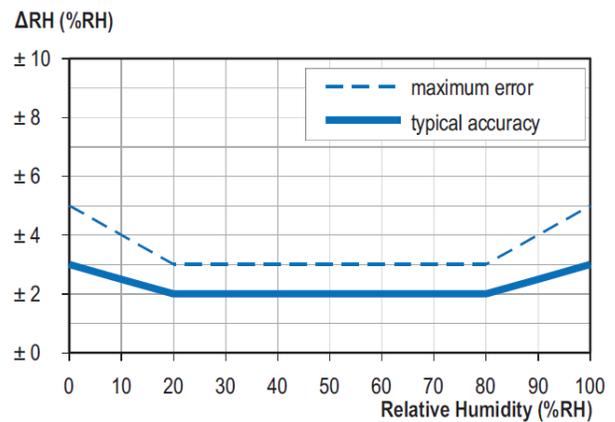
	<p>Green Double Flash The data logger is not currently logging, but is primed to start at a later date and time (delayed start).</p>		
	<p>Green Single Flash The data logger is currently logging. No alarm on the channel.</p>		
	<p>Red Single Flash The data logger is currently logging. Low alarm on the channel.</p>		
	<p>Red Double Flash The data logger is currently logging. High alarm on the channel.</p>		
	<p>Green Triple Flash The data logger is full and has stopped logging. No alarm on the channel.</p>		
	<p>Red Triple Flash The data logger is full and has stopped logging. Alarm (high, low or both).</p>		
	<p>No LEDs Flash The data logger is stopped, the battery is dead, or there is no battery.</p>		
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="text-align: center;"></td> <td> <p>Dual Red Flash The data logger battery is running low as its voltage has dropped below 2.9V</p> </td> </tr> </tbody> </table>		<p>Dual Red Flash The data logger battery is running low as its voltage has dropped below 2.9V</p>
	<p>Dual Red Flash The data logger battery is running low as its voltage has dropped below 2.9V</p>		

Sensor Accuracy and Information

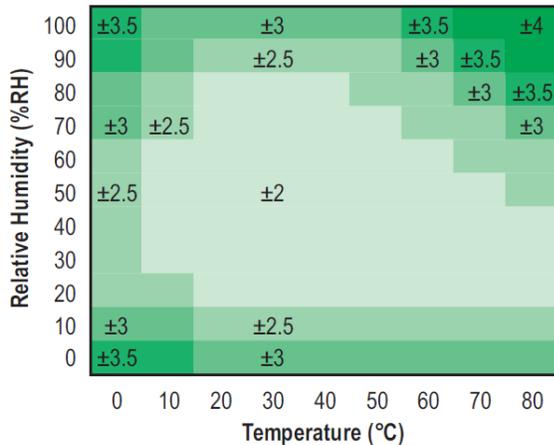
Typical and maximal tolerance for temperature sensor in °C.



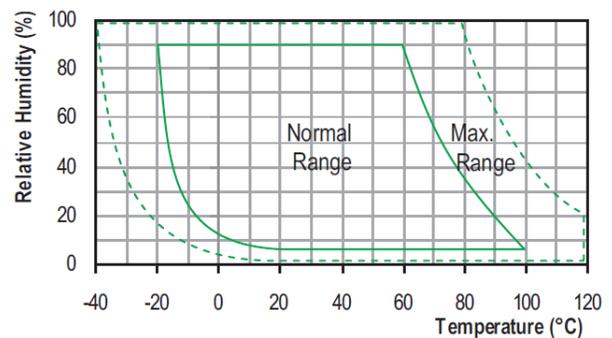
Typical and maximal tolerance at 25°C for relative humidity.



Typical accuracy of relative humidity measurements given in %RH for temperatures 0 to 80°C.



Operating conditions.



When tracking changes in ambient conditions, the response time of the humidity sensor in your data logger is approximately 20 minutes to reach 90% of the reading. However, if you are measuring step changes in humidity (for example if calibrating the product) it is advised that you leave the unit for up to four hours to ensure that it has enough time to settle at the new level.

It is worth remembering that the value of relative humidity is of course sensitive to temperature variation. As an example, at a relative humidity of ~90%RH at ambient temperature, a variation in temperature of 1°C will result in a change of up to -5%RH. Therefore when comparing multiple devices or calibrating them, any temperature variations must be considered.

The humidity measuring element in the humidity data loggers can be contaminated through exposure to a variety of compounds. These products should not be kept in proximity to volatile chemicals such as solvents and other organic compounds. Generally speaking, if a material or compound emits a strong odour you should not keep your humidity data logger in close proximity to it. If you would like more information, please contact your local Lascar Electronics office.

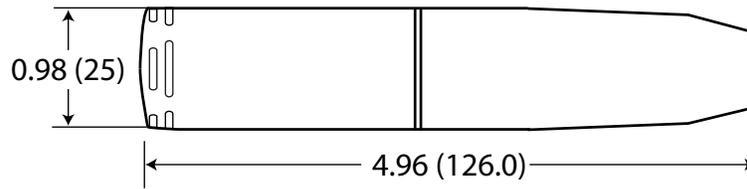
Exposure to extreme conditions or chemical vapours will require the following reconditioning procedure to bring the internal sensor back to calibration state:

Baking 80°C (176°F) at < 5%RH for 36 hours.

Re-hydration 20 to 30°C (70 to 90°F) at > 74%RH for 48 hours.

High levels of pollutants may cause permanent damage to the internal sensor.

Dimensions



Dimensions shown are inches (mm)

Specifications

	Specification	Minimum	Typical	Maximum	Unit
Relative Humidity (see page 5)	Measurement Range	0		100	%RH
	Humidity Repeatability (short term)		±0.1		%RH
	Accuracy (overall error, 20-80% RH)		±2.0		%RH
	Internal Resolution		0.5		%RH
	Long-term Stability		<0.25		%RH/Yr
Temperature (see page 5)	Measurement Range	-35 (-31)		+80 (+176)	°C (°F)
	Repeatability		±0.1 (0.2)		°C (°F)
	Accuracy (overall error)		±0.75 (1.4)	±1.4 (±2.5)	°C (°F)
	Internal Resolution		0.5 (1)		°C (°F)
Dew Point	Accuracy (overall error) (25°C, 40-100%RH)		±1.1 (±2)		°C (°F)
Logging Rate		every 10s		every 12hr	-
Memory Capacity (each, temp and rh)			16,382		samples
Operating Temperature Range *		-35 (-31)		+80 (176)	°C (°F)
Battery Life			2**		Year

* At temperatures below -20°C (-4°F) the LCD will exhibit slower response times of approximately 10 seconds.

** at 25°C, 1 minute logging rate, and LCD on

EL-21CFR-2-LCD Ordering Information

Description	Order Number
RH, Temp, and Dew Point Data Logger Includes EL-21CFR-2-LCD data logger, software on CD, and battery.	EL-21CFR-2-LCD
Battery Replacement battery.	BAT 3V6

EasyLog 21CFR Software

21CFR Compliance

The EL-21CFR-2-LCD adheres to FDA regulation 21CFR Part 11 for electronic records, audit trails, and signatures:

- Assign individual users with specific permissions
- Full software & session data audit trails
- Receive email alerts for failed log in attempts
- Digital signatures added to all reports
- Add comments to specific readings

Easy to Program and Deploy

Getting an EasyLogger product ready to acquire data is easy:

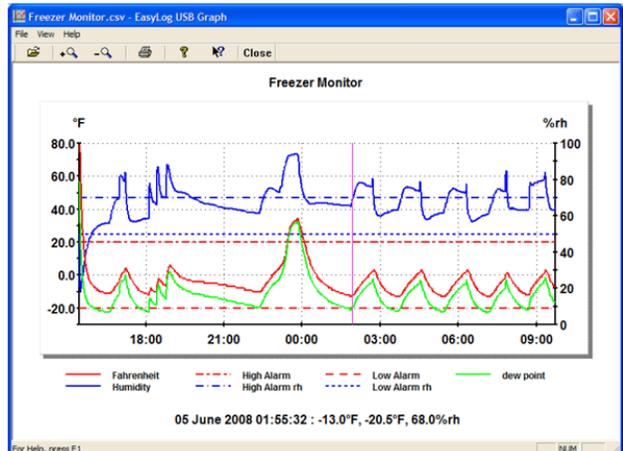
1. Remove the protective USB cover.
2. Plug the instrument into any convenient USB port (image 1).
3. Program the data logger with the provided EasyLog software (image 2):
 - Give the logger a unique name (convenient when deploying multiple units).
 - Select the required sample rate.
 - Select high and/or low alarm thresholds.
 - Select the specific date and time to begin logging.

Now remove the data logger from the USB port, replace the USB cover, and deploy the instrument wherever you need it.

Easy to Upload and Analyze Data

Whether you want to review stored data using the supplied application or using Microsoft Excel, getting meaningful results from recorded data is fast and easy:

1. Remove the protective USB cover.
2. Plug the instrument back into the PC's USB port.
3. Use EasyLog software to stop recording, access the instrument's stored data, and save it to a file that you name on the PC, all in one easy operation. The file format is Excel-compatible.
4. Immediately EasyLog's Graph utility is enabled to display all the stored data in one compressed view.
5. A cursor allows you to determine signal magnitude and time and date of acquisition for any value, and a magnifier utility allows you to zoom in for a closer look over any range – Easy and fast.
6. For more custom analysis and report generation, simply import the stored data file to Microsoft Excel for virtually unlimited flexibility in how you view and interpret your results.



Freezer Monitor	Time	Fahrenheit(°F)	High Alarm	Low Alarm	Humidity(%rh)	High Alarm rh	Low Alarm rh	dew point(°F)
1	4/6/2008 15:26	77	20	-20	50	70	50	56.9
2	4/6/2008 15:27	79	20	-20	25.5	70	50	40.7
3	4/6/2008 15:28	75	20	-20	20.5	70	50	31.9
4	4/6/2008 15:29	66	20	-20	19	70	50	22.6
5	4/6/2008 15:30	56	20	-20	20	70	50	15.6
6	4/6/2008 15:31	48	20	-20	22	70	50	11.1
7	4/6/2008 15:32	40	20	-20	24	70	50	6.2
8	4/6/2008 15:33	34	20	-20	25.5	70	50	2.4
9	4/6/2008 15:34	28	20	-20	27	70	50	-1.6
10	4/6/2008 15:35	24	20	-20	28.5	70	50	-3.9
11	4/6/2008 15:36	20	20	-20	30.5	70	50	-6
12	4/6/2008 15:37	16	20	-20	32.5	70	50	-8.2
13	4/6/2008 15:38	13	20	-20	34	70	50	-10
14	4/6/2008 15:39	11	20	-20	35	70	50	-11.2
15	4/6/2008 15:40	9	20	-20	37	70	50	-11.9
16	4/6/2008 15:41	7	20	-20	38.5	70	50	-12.9
17	4/6/2008 15:42	5	20	-20	39.5	70	50	-14.2
18	4/6/2008 15:43	4	20	-20	41	70	50	-14.4

EL-USB Data Logger Series Overview

EasyLog Products for Any Application

From temperature and humidity to carbon monoxide trending, there's an EasyLog data logger that's right for you. Click on "Go" to go to the product's web page.

Measurement		Model EL-USB (click on page number to jump to page)																		
Function	Range	-LITE	-1	-1-LCD	-1-RCG	-1-PRO	-2	-2+	-2-LCD	-2-LCD+	-3	-4	-5	-ACT	-CO	-TC	-TC-LCD	-TP-LCD	-TP-LCD+	
Temperature	-10 to +50°C (+14 to +122°F)	Go																		
Temperature	-35 to +80°C (-31 to +176°F)		Go	Go																
Temperature	-20 to +60°C (-4 to +140°F)				Go															
High Temperature	-40 to +125°C (-40 to +257°F)					Go												Go	Go	
Humidity, temperature, dew point	0 to 100% RH -35 to +80°C (-31 to +176°F)						Go	Go	Go	Go										
Voltage	0 to 30 VDC										Go									
Process current	4 to 20 mA											Go								
Event, State, Count	3-28 VDC												Go							
Current	-1000 to 1000 mV													Go						
Carbon monoxide	0 to 1000 ppm														Go					
Thermocouple	-130 to +900°C -200 to +1300°C -200 to +350°C															Go	Go			

Lascar Data Logger Product Lines

EL-USB Data Loggers



Lascar EasyLog model EL-USB series products are a line of low cost, compact, battery-operated data loggers with built-in memory and a USB interface for easy setup and data download. Each product in the line offers a specific measurement function (including temperature, voltage, process current, and more).

EL-GFX Data Loggers



The EL-GFX line of data loggers is the latest release from Lascar Electronics with similar functionality of the EL-USB series with an added graphic display for data.

EL-WiFi Data Loggers



Lascar's EL-Wifi Data Logger series products are low cost, compact, battery-operated data loggers with wireless connectivity to any PC over a WiFi router. Each product in the line features a large, easy-to-read display of current measurements, and is purchased for specific measurement functions.



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Data Acquisition Product Links

(click on text to jump to page)

[Data Acquisition](#) | [Data Logger](#)