

# EASYSense Vu+ Reference Manual



## CONTENTS

What's supplied? .....	3
Getting to know your Vu+ data logger .....	3
Charging .....	3
The EASYSense Vu+ data logger.....	4
Vu+ buttons.....	4
Sensors .....	5
The built-in sensors .....	5
The plug-in sensors .....	6
Changing a sensor's range or turning a sensor on or off.....	6
Ways to capture data with Vu+ .....	6
Using Vu+ standalone (without a computer).....	7
Meter.....	7
Pictogram.....	8
EasyLog.....	9
Snapshot.....	10
Timing .....	11
Stopwatch .....	14
Counting.....	14
Review .....	15
Bluetooth.....	15
System .....	16
Switch Off.....	16
Sensor (changing range or turning on or off).....	16
Delete Data .....	17
Full Reset.....	17
Language .....	17
Date Style.....	17
Decimals .....	18
Logger Name .....	18
About.....	18
Using Vu+ connected via USB to a computer.....	18
Using Vu+ after the initial setup.....	19
Using Vu+ connected via Bluetooth to a computer.....	19
When connecting to a Windows computer .....	19
When connecting to a iPad or Android device.....	20
The EasySense software overview.....	20
Retrieve Remote .....	23
Technical information .....	23
Selecting the sensor range .....	23
Powering Vu+ .....	23
Batteries .....	24
Auto switch off.....	24
Internal Clock and Calendar .....	24
Vu+'s memory.....	24
Fitting the lanyard.....	25
Hard and Full Reset .....	25
Specifications .....	26
Care & Maintenance .....	26
Updating EASYSense Vu+'s Firmware.....	26
Practical information for Vu+'s plug-in Temperature sensor.....	27
Limited warranty.....	28

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## What's supplied?



## Getting to know your Vu+ data logger

### Charging

#### ***Charge EASYSense Vu+ fully before first use***

Connect Vu+ directly to a USB port on your computer\* (or a powered USB hub) using the USB cable supplied with it.

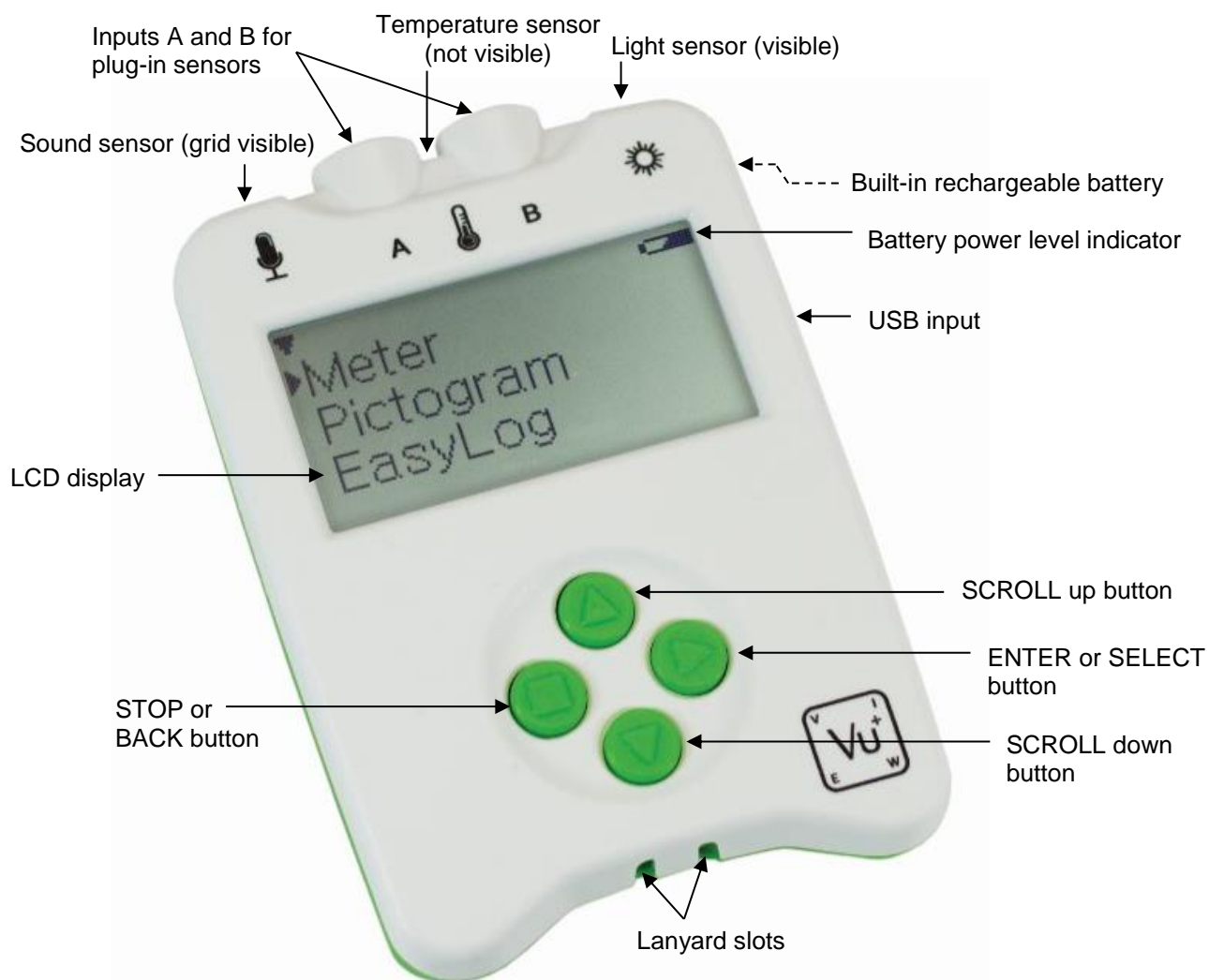
**Note:** Vu+ can also charge from a USB mains charger that outputs 5 V at 500 mA or more.

A full charge can take up to 8 hours.




A battery charging symbol will be displayed on Vu+'s screen while the logger is charging.

\*Your computer must be turned on and not in sleep or standby mode; otherwise, the battery may drain instead of charge.

## The EASYSense Vu+ data logger



### Vu+ buttons




-  The ENTER button is used to start data collection, progress to the next screen, confirm a choice or take a sample.
-  The square STOP button is used to stop data being recorded or return to the previous screen
-  The SCROLL buttons are used to scroll through menus on the LCD screen or to browse measurements during data logging.

To operate **EASYSense Vu+**, press any of these buttons.

## Sensors

### The built-in sensors

Vu+ is a fully self-contained portable data logger with 3 built-in sensors – Sound, Light and Temperature. It is supplied with the default range for its sensors selected (shown in the following table in bold).

	Built-in Sensors	Ranges
	Sound	<b>40 to 110 dBA</b>
	Light level	<b>Indoor 1 k lx</b> (0 to 1,000 lx) In/Out 10 k lx (0 to 10,000 lx) Outdoor 100 k lx (0 to 100,000 lx)
	Temperature	<b>Celsius 0 to 50°C</b> Celsius 0 to 110°C Celsius -30 to 110°C  Fahrenheit 0 to 120°F Fahrenheit 0 to 232°F Fahrenheit -22 to 230°F

Vu+ will automatically display values using the range selected. The built-in sensors can be hidden from the display – see [page 16](#).

### Sound sensor

This sensor has one range, **40 to 110 dBA** (decibels), which is used to measure sound pressure level (loudness). It is responsive to both single sounds (such as a whistle or handclap) and continuous background noise (such as passing traffic, classroom noise).

### Light level sensor

This sensor has 3 ranges to choose from.

- **Indoor 1 k lx.** This lower range is suitable for recording at indoor light levels and so is normally selected for use in the classroom.
- **In/Out 10 k lx.** This medium range is suitable for recording bright light levels indoors or low light levels outdoors.
- **Outdoor 100 k lx.** This larger range is suitable for recording light level outdoors in sunlight, which makes it ideal for environmental monitoring.

### Temperature sensor

This sensor has six ranges to choose from, three Celsius and three Fahrenheit. The range selected will also be applied to plug-in temperature sensors.

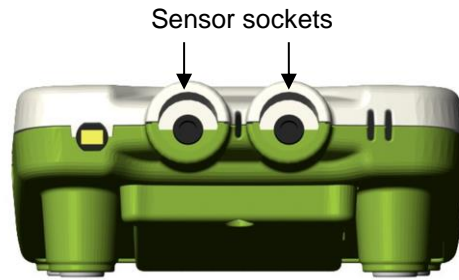
#### Notes:

- All Temperature sensors, built-in or plug-in will use the same range.
- The Vu+ logger can only be used in an environment of 0 to 40°C, 0 to 95%RH (non-condensing).
- The speed of reaction of the built-in temperature sensor to any change in external temperature will be delayed by Vu+'s plastic case.

### The plug-in sensors

Sensors plug into the sockets labelled **A** and **B** at the top of the Vu+ logger

When a sensor is connected it will automatically be detected and displayed on the LCD display.



Sensors can be divided into two main types:

1. Analogue – used to measure physical quantities such as temperature, sound, light, pH, etc.
2. Digital - switch-type sensors (e.g. Light gates and Timing mats) that are either ON or OFF and are used to calculate time, speed and acceleration.

Please contact your supplier for an up-to-date list of Vu+ sensors.

### Changing a sensor's range or turning a sensor on or off

- Use the up or down buttons (▲▼) to scroll the list until the cursor is pointing at Meter and press the enter button ►.
- Press the enter button ► again.
- Use the up or down buttons (▲▼) to move the cursor until it is pointing at the appropriate sensor and press enter ►.
- Use the ▲▼ buttons to move the cursor until it points at the appropriate option (either Set range or Turn On or Off) and press enter ►.

**Note:** If a sensor only has one range then only Turn Off will be available.

#### Set range

The cursor will indicate the current range selected.

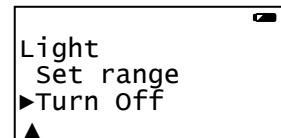
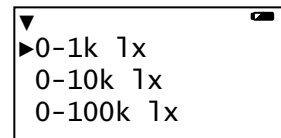
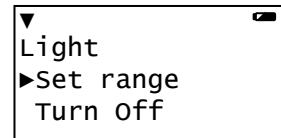
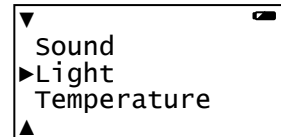
Use the up or down buttons (▲▼) to scroll the list until the cursor is pointing at the required range. Press enter ► to select the range.


Press the stop button ■ to return to the sensor window.

#### Turning a built-in sensor ON or OFF the display

With the cursor pointing at Turn Off or On press enter ► to return to the sensor window.

- Press the stop button ■ to return to Meters.



**Note:** If you change a sensor's range or turn it on/off via the logger while connected to a computer, it may be necessary to select New  in the software for these changes to be detected.

### Ways to capture data with Vu+

There are different ways that Vu+ can be used to collect data.

1. As a standalone instrument:
  - Vu+ is used to display, collect and store data while disconnected from the computer. I.e.
    - a. Display readings on its LCD screen (but not stored) using **Meter** or **Stopwatch** mode.
    - b. Displayed, collected and stored using Vu+'s logging menu options e.g. **Pictogram**, **EasyLog**, **Snapshot**, **Timing** and **Counting**.



- c. Setup via **Setup Remote** in the **EASYSense** software to log data for a set time period. See [page 23](#).

The data collected is stored in Vu+'s memory to either be reviewed on Vu+'s screen or retrieved to the **EASYSense** software on a computer.

Multiple sets of data can be stored in Vu+'s memory. The actual number will depend on the size of the data sets and that is dependent on how many sensors are connected and how many readings are taken.

- 2. As a logger connected to a computer:  
Vu+ is entirely driven by the software on the host computer. The data from the sensors is transmitted immediately to the computer and displayed on the computers screen using the options in the **EASYSense** software. This method of collection is useful for many classroom-based experiments. See [page 18](#).

## Using Vu+ standalone (without a computer)

**EASYSense** Vu+ has no ON switch. To 'switch' on press any button on the panel.

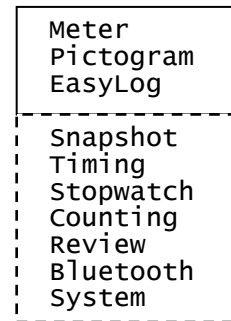
### Notes:

- If Vu+ is operating on battery power and is idle, it will automatically switch itself **off** after 2 minutes. Press any button to resume operation.
- Vu+ does not auto switch off while powered from a USB port.

Vu+ has a menu of different options available, which are displayed on the built-in LCD screen.

There are seven working modes, which can be used to collect data without being connected to the computer. These are **Meter**, **Pictogram**, **EasyLog**, **Snapshot**, **Stopwatch**, **Timing** and **Counting** modes.

A menu option is selected by using the scroll buttons to move the cursor up ▲ or down ▼ until it is pointing at the required option then press the enter ► button to select.

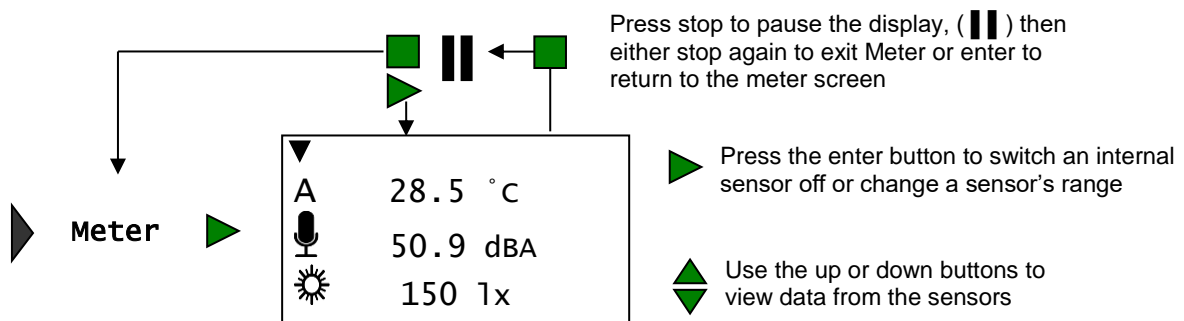


If using plug-in sensors they should be connected before entering a logging mode (except for Meters when they will automatically ID and then display readings).

**Note:** Some of the following examples show the effect seen on the LCD display when there is no sensor plugged into Input A or B (so A and B are omitted from the list).

### Meter

In Meter mode Vu+ will display measurements from the sensors (built-in and any plug-in sensors) on the LCD screen but will not store any data.

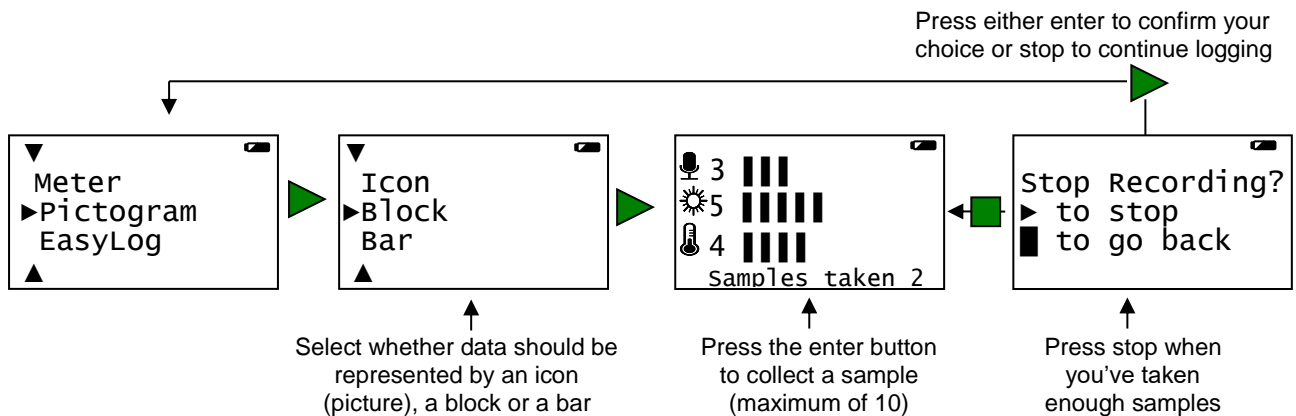


- Connect any plug-in sensors if required. If the display is turned off, press any button to wake up Vu+.
- While in the main menu use the up or down buttons ▲ ▼ to scroll until the cursor is pointing at **Meter**. Press the enter button ► to select.

- Use the up and down buttons ▲ ▼ to view data from the sensors.
- Use the enter button ► to check or change the sensors range or to switch a sensor off (see [page 6](#)).
- The stop button ■ will temporarily halt the updates to the sensors readings. Two lines █ █ (top left) indicate that the display is paused.
- Press enter ► to cancel pause and continue in Meters.
- Press stop ■ again to exit Meters and return to the main menu.

### Pictogram

Pictogram uses an image, block or bar to represent the data. Each represents a 10<sup>th</sup> of a total range (or span) of the sensor and displays a number from zero to ten (proportional to the reading). Sensor readings are captured every time the enter button ► is pressed, rather than at regular time intervals. The samples are stored to Vu+'s memory - a maximum of ten samples per data set.



- Connect any plug-in sensors. If the display is turned off, press any button to wake up Vu+.
- While in the main menu use the up or down buttons ▲ ▼ to scroll until the cursor is pointing at **Pictogram**. Press the enter button ► to select.
- Use the ▲ ▼ buttons to move the cursor until it points at how you want the data to be represented. Press enter ► to select.
- Each time you press the enter button ► Vu+ will take a reading from the sensors (built-in and any plug-in) and will show the number of samples taken so far.  
Use the up or down buttons ▲ ▼ to scroll and view data from the sensors.  
**Note:** If Vu+ goes into 'sleep' mode during logging, press any button to wake up the logger and then ► to take a reading.
- When you have finished sampling press the stop button ■ to close the data set, then ► to confirm your choice.

The readings will be stored as a data set with a maximum of ten samples per set. A data set is identifiable by the method and time and date the recording was started i.e. Pictogram 09/05/16 16:12:43.

The contents of the data set can be:

- Reviewed on Vu+ - select **Review** from the main menu, use the ▲ ▼ buttons to locate the data set and press enter ► to select. Use the ▲ ▼ buttons to scroll through individual readings.
- Downloaded to a computer by selecting **Retrieve Remote** from the Home screen in the EasySense software (see [page 23](#)).



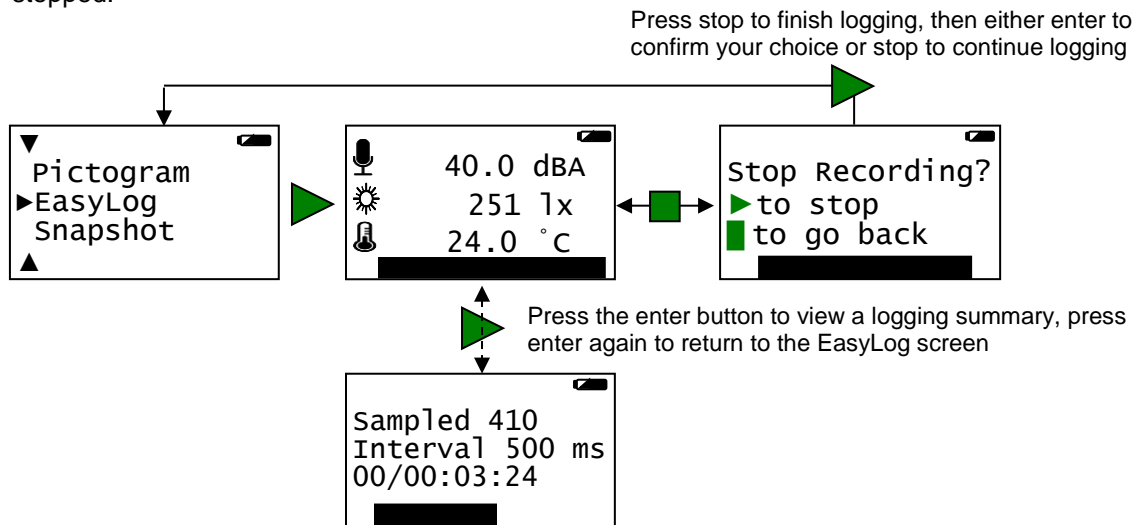


Key for built-in sensors

<b>Sound</b>	40 to 110 dBA		
Scale (10 <sup>th</sup> of range)	7 dBA		
<b>Light</b>	0 to 1 k lx	0 to 10 k lx	0 to 100 k lx
Scale (10 <sup>th</sup> of range)	100 lx	1,000 lx	10,000 lx
<b>Temperature °C</b>	0 to 50°C	0 to 110°C	-30 to 110°C
Scale (10 <sup>th</sup> of range)	5°C	11°C	14°C
<b>Temperature °F</b>	0 to 120°F	0 to 232°F	-22 to 230°F
Scale (10 <sup>th</sup> of range)	12°F	23.2°F	25.2°F

EasyLog

With EasyLog it is not necessary to set the duration of the recording – Vu+ will capture data until stopped.



- Connect any plug-in sensors. If the display is turned off, press any button to wake up Vu+.
- While in the main menu use the up or down buttons ▲ ▼ to scroll until the cursor is pointing at **EasyLog**. Press the enter button ► to automatically begin logging.  
 If using more than 3 sensors use the ▲ ▼ buttons to view the current value while still logging.  
 The bottom line of the LCD display is a visual indicator of logging as it takes place, each time the line completes logged samples are compressed and the sample rate alters.  
 Press the enter ► button to see a logging summary i.e. samples taken, current logging interval and the elapsed time (days / hours: minutes: seconds). Press enter ► again to return to the normal screen.  
**Note:** If Vu+ goes into 'sleep' mode during logging, any button press will wake up the logger.
- When the investigation is complete press the stop button ■. Vu+ will continue to log data until you press the enter ► button to confirm your choice

The data will be stored as a data set identifiable by the method and time and date the recording was started i.e. EasyLog 09/05/12 16:12:43.

The contents of the data set can be

- Reviewed on Vu+ - select **Review** from the main menu, use the ▲ ▼ buttons to locate the data set, press enter ► to select. Use the ▲ ▼ buttons to scroll through individual readings.
- Downloaded to a computer by selecting **Retrieve Remote** from the Home screen in the EasySense software (see [page 23](#)).



Vu+ records data at a rate of 40 samples per second until it has captured 1,000 samples. At this point the sample rate halves (i.e. 20 samples per second) and alternate samples are discarded (leaving 500 samples). It will continue at this speed until it has captured another 500 samples (1,000 in total) then the sample rate halves (i.e. 10 samples per second) and discards half the stored data, and so on.

Sample Rate	Interval (seconds)	Samples	Days	Hours	Min.	Sec.
40 per sec	0.025 (25 ms)	0 - 1000				25
20 per sec	0.05 (50 ms)	Compress to ½ 500 - 1000				50
10 per sec	0.1 (100 ms)	Compress to ½ 500 - 1000			1	40
2 per sec	0.5 (500 ms)	Compress to a fifth 200 - 1000			8	20
1 per sec	1	Compress to ½ 500 - 1000			16	40
Every 5 sec	5	Compress to a fifth 200 - 1000		1	23	20
Every 15 sec	15	Compress to ⅓ 330 - 1000		4	10	0
Every 30 sec	30	Compress to ½ 500 - 1000		8	20	0
Every 1 minute	60	Compress to ½ 500 - 1000		16	40	0
Every 5 minutes	300	Compress to a fifth 200 - 1000	3	11	20	0
Every 15 minutes	900	Compress to ⅓ 300 - 1000	10	10	0	0
Every 30 minutes	1800	Compress to ½ 500 - 1000	20	20	0	0
Every 1 hour	3600	Compress to ½ 500 - 1000	41	16	0	0

While battery powered Vu+ will stay awake until the interval between readings reaches 5 seconds or greater – at this point it will begin to sleep (auto switch off) between samples to conserve battery power. When Vu+ is asleep, sensor readings can be viewed by pressing any button to ‘wake’ it up.

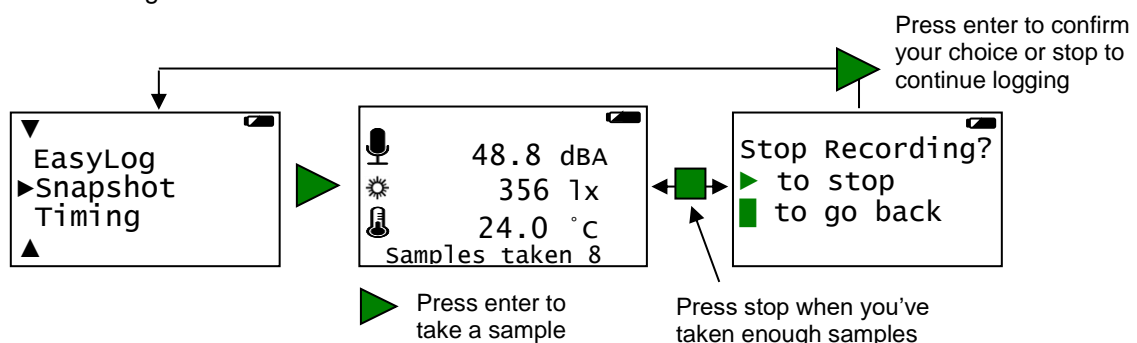
**Note:** Vu+ does not auto switch off when accepting power.

When the sample interval is greater than or equal to one second (after logging for 8 minutes and 20 seconds), it is possible to download data from Vu+ to a computer to check its validity (without interrupting the recording) using **Remote ► Retrieve Remote** from Home in the EasySense software.

**Note:** If you would prefer to record remotely for a specified time span use **Remote ► Setup Remote** from the Home screen in the EasySense software.

### Snapshot

Snapshot mode enables you to capture sensor readings every time the enter button ► is pressed, rather than at regular time intervals.



- Connect any plug-in sensors. If the display is turned off, press any button to wake up Vu+.
- While in the main menu use the up or down buttons ▲ ▼ to scroll until the cursor is pointing at **Snapshot**. Press the enter button ► to select.
- Each time you press the enter button ► a reading will be taken from the sensors. The bottom line of the LCD will display the number of samples taken so far.

If using more than 3 sensors use the ▲ ▼ buttons to view the current value from the sensors while still logging.

**Note:** If Vu+ goes into 'sleep' mode during logging, press any button to wake up the logger then press ► to take a reading.

- When you have finished sampling press the stop button ■ to close the data set, then enter ► to confirm your choice.

The readings will be stored as a data set identifiable by the method and time and date the recording was started i.e. Snapshot 09/05/16 16:12:43. At least 650 samples can be stored in one data set (the limit is dependent on the number of sensors).

The contents of the data set can be

- Reviewed on Vu+ - select **Review** from the main menu, use the ▲ ▼ buttons to locate the data set, press enter ► to select. Use the ▲ ▼ buttons to scroll through individual readings.
- Downloaded to a computer by selecting **Retrieve Remote** from Home in the EasySense software (see [page 23](#)).



## Timing

Timing is used to set up and store simple time and speed measurements. Connect the digital switch type sensors before selecting Timing either to Input A or both Input A and Input B.

The possible options are Time at A, Time from A to B, Time A to A (stopwatch), Speed at A and Speed from A to B.

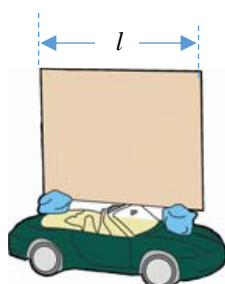
For Vu+ to perform direct calculations of speed, you will need to select the parameter used in the experiment i.e.

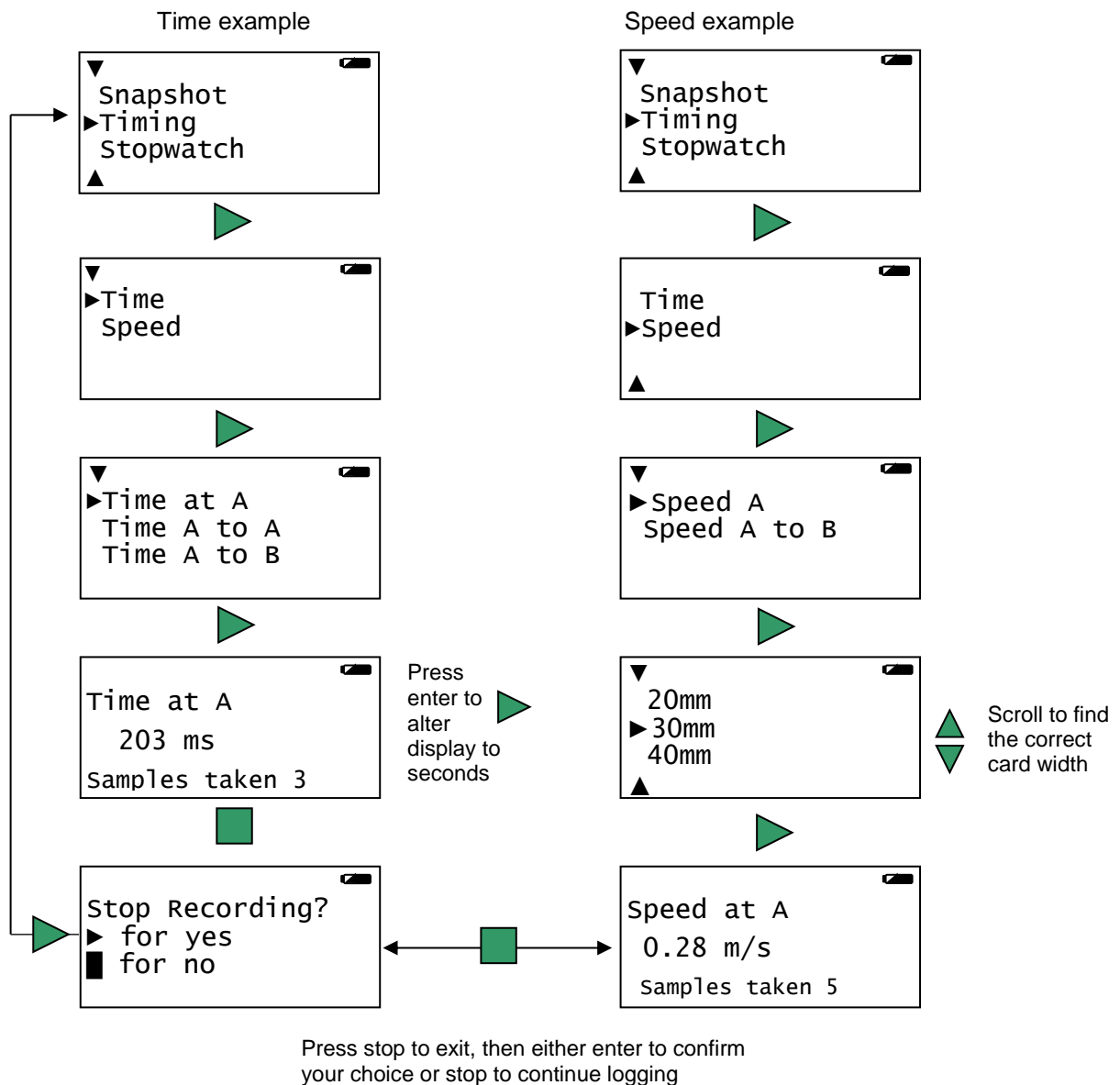
- For **Speed A to B** select the distance between the sensor connected to input A and the sensor connected to input B.

$$\text{Speed from A to B} = \frac{\text{Distance from A to B}}{\text{Time}}$$

- For **Speed at A** select the width of the single interrupt card that will pass through the Light gate connected to input A.

$$\text{Speed at A} = \frac{\text{Length of single interrupt card}}{\text{Time}}$$





- If recording Time or Speed at A connect a digital sensor to input A. For Time or Speed from A to B connect digital sensors to both Input A and B.
- If the display is turned off, press any button to wake up Vu+. While in the main menu use the up or down buttons ▲ ▼ to scroll until the cursor is pointing at **Timing**. Press the enter button ► to select.
- Use the ▲ ▼ buttons to scroll until the cursor is pointing at either Time or Speed. Press the enter button ► to select.
- Use the ▲ ▼ buttons to scroll until the cursor is pointing at either Time or Speed at A, Time or Speed from A to B or Time A to A (stopwatch). Press the enter button ► to select.
- If Speed is selected ▲ ▼ scroll to choose the parameter that matches your setup. Press the enter button ► to select.
  - For Speed at A select the width of the single interrupt card (from 10 to 120 mm).
  - For Speed from A to B select the distance from the sensor connected to A to the sensor connected at B (from 0.10 to 6.0 metres).

- When a signal change from the digital sensor/sensors is received, the timing measurement will be displayed on the LCD screen. Time data will be measured in milliseconds, press enter ► to alter the display to show seconds. Speed data is in metres per second (m/s).

The bottom line of the LCD will display the number of samples taken so far.

- Press the stop ■ button to finish or cancel any pending timing event and then enter ► to confirm your choice.

The readings will be stored as a data set identifiable by the method and time and date the recording was started i.e. Timing 09/05/12 16:12:43. Up to 850 samples can be stored in one data set.

The contents of the data set can be

- Reviewed on Vu+ - select **Review** from the main menu, use the ▲ ▼ buttons to locate the data set, press enter ► to select. Use the ▲ ▼ buttons to scroll through individual readings.
- Downloaded to a computer by selecting **Retrieve Remote** from the Home screen in the EasySense software (see [page 23](#)).

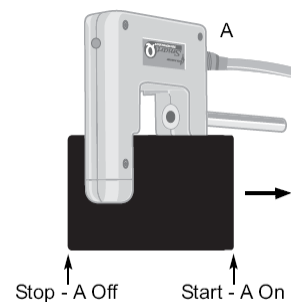


Other calculations can be performed on the timing data by downloading to the EasySense software, then using the **Show Data as** function from the Settings menu in Timing. It will be necessary to enter the parameter used in the investigation e.g. the length of a segment of a double interrupt card to calculate acceleration from a single Light gate at A.

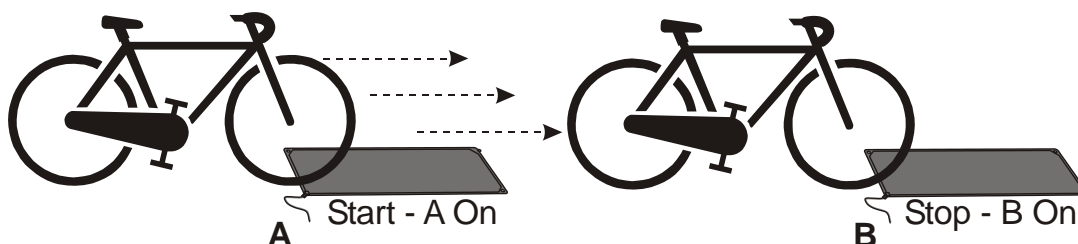
### Timing options

**Time or Speed at A:** Timing starts when the signal at input A changes and stops when the signal reverts back.

- With Light gates it will be the time it takes for an object to pass through the light beam.
- For a Push Switch it will be the length of time that the switch is kept depressed.
- For Timing mats it will be the length of time someone stands on the mat.



### Time or Speed from A to B



Timing will start when a signal change is detected at sensor A and stops when the signal at B changes (so it measures the time taken by an object to travel from sensor A to sensor B).

### Time A to A (stopwatch)

The time will start to be measured when the signal at input A changes (ON) and will continue until the signal at A changes again (ON) i.e. like a stopwatch.

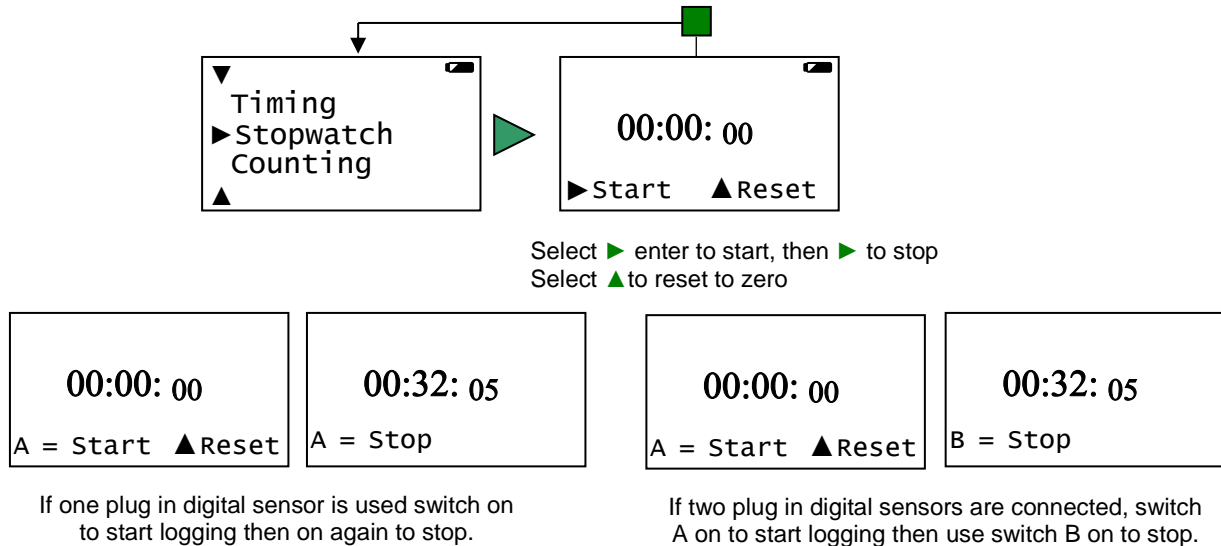


### Stopwatch

Stopwatch is used to time events by using either:

- The enter ► button on Vu+ to start and stop the timer.
- One digital switch type sensor connected to input A or B to start and stop the timer.
- Two digital switch type sensors connected to input A and B, use A to start and B to stop the timer.

If a plug-in sensors are connected, Vu+ will automatically use the input from this sensor.

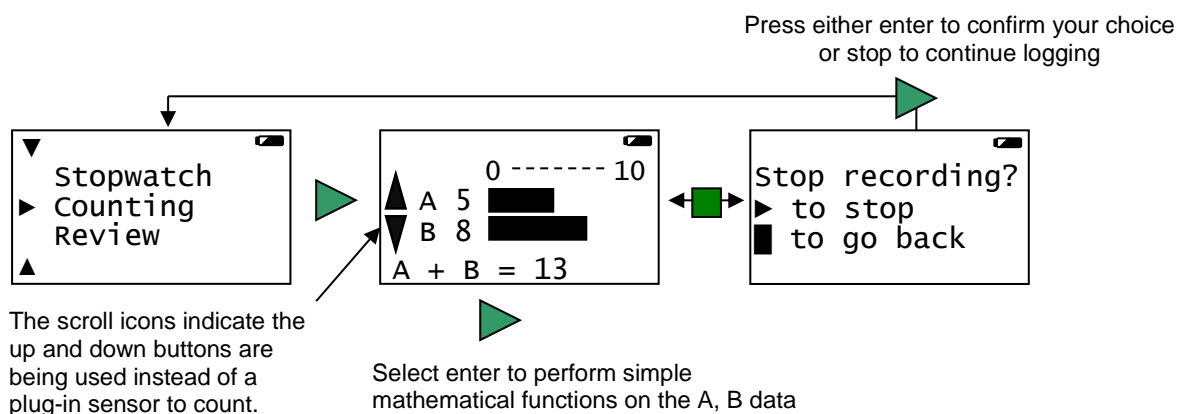


### Counting

Counting is used to count events by using:

- One digital switch type sensor connected to either input A or input B
- Two digital switch type sensors connected to both input A and input B
- The up ▲ (A) or down ▼ (B) buttons on Vu+.

If plug-in sensors are connected, Vu+ will automatically count using input from those sensors.



- If you are using plug-in digital sensors connect them to input A and/or B. If the display is turned off, press any button to wake up Vu+.
- While in the main menu use the up or down buttons ▲ ▼ to scroll until the cursor is pointing at **Counting**. Press the enter button ► to select.



- If you are using plug-in digital sensors each time the state of the sensor is changed to On e.g. by pressing a push switch, the number of counts will advanced by one.

If the scroll buttons on Vu+ ▲▼ are used then the count will increase by one each time you press a button. You can use either one or both buttons.

Vu+ will display both the numeric value and show it as a bar graph. The bar maximum starts as 10, if the count goes above 10 it will increase to 20, then 50, 100, 250, 500, up to a maximum of 1,000.

**Note:** If Vu+ goes into 'sleep' mode during logging, press any button to wake it up.

If counts are from both A and B pressing the enter button ► will cycle through simple calculations based on the counting data (e.g.  $A + B = 13$ ,  $A - B = -3$ ,  $B - A = 3$ , Difference = 3).

- Press the stop ■ button to finish and then enter ► to confirm your choice.

The count will be stored as a data set identifiable by the method and time and date the recording was started e.g. Counting 09/05/16 16:12:43.

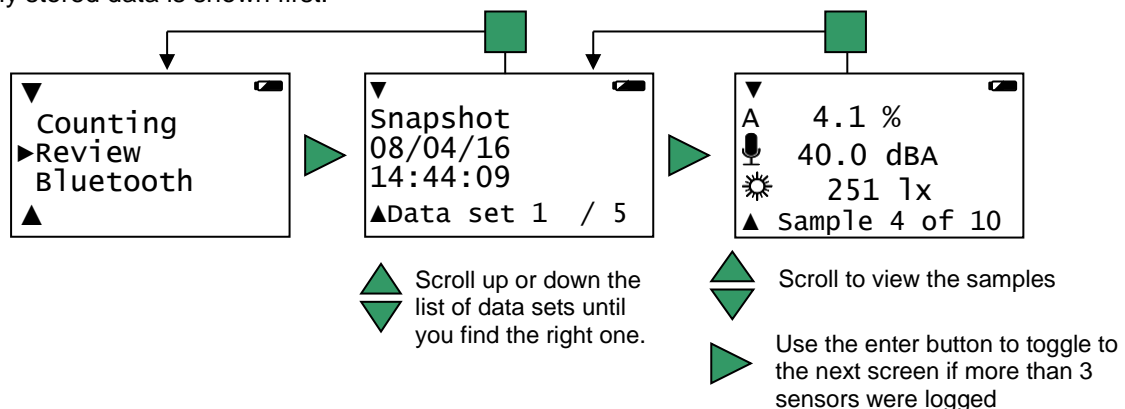
The contents of the data set can be

- Reviewed on Vu+ - select **Review** from the main menu, use the ▲▼ buttons to locate the data set, press enter ► to select.
- Downloaded to a computer by selecting **Retrieve Remote** from the Home screen in the EasySense software (see [page 23](#)).



## Review

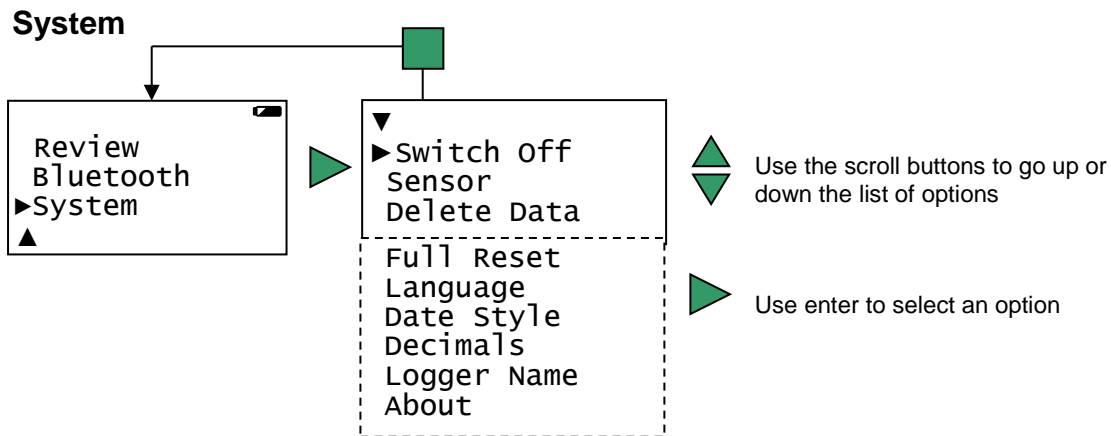
You can use Retrieve to view the readings previously stored in a data set on Vu+'s screen. The most recently stored data is shown first.



1. While in the main menu use the up or down buttons ▲▼ to scroll until the cursor is pointing at **Review**. Press the enter button ► to select.
2. Use the up and down buttons ▲▼ to scroll through the data sets, press enter ► when you locate the correct data set. The most recently stored data is shown first.
3. Use the up and down buttons ▲▼ to scroll through stored data points. If more than 3 sensors were logged, use the enter button ► to toggle to the second screen.
4. Press the stop ■ button to return to the list of data sets then ■ again to return to the main menu.

## Bluetooth

Use to turn Bluetooth On. See [page 19](#) for connecting via Bluetooth to a computer.



1. While in the main menu use the up or down buttons ▲ ▼ to scroll until the cursor is pointing at **System**. Press the enter button ► to select.
2. Use the up and down buttons ▲ ▼ to scroll the menu until the cursor is pointing to the appropriate system menu option. Press the enter ► button to select.

### Switch Off

Used to send Vu+ directly into low power (sleep mode), even when it's connected to a USB port.

Press any button to 'wake up' the logger.

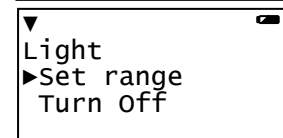
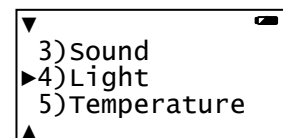
**Note:** While operating on battery power Vu+ automatically goes to low power (sleep) after a period of inactivity.

### Sensor (changing range or turning on or off)

**Note:** These options are also available by pressing enter ► whilst in Meter mode.

Some built-in and plug in sensors have multiple ranges and the built-in sensors can be switched On or Off the display e.g. Sound and Temperature switched off so only Light measurements are displayed.

- Use the up or down buttons (▲ ▼) to move the cursor until it is pointing at the appropriate sensor and press enter ►.
  - Use the ▲ ▼ buttons to move the cursor until it points at the appropriate option (either Set range or Turn On or Off) and press enter ►.
- Note:** If a sensor only has one range then only Turn Off will be available.

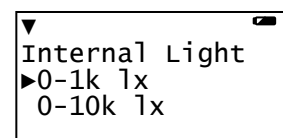


#### Set range

The cursor will indicate the current range selected.

Use the up or down buttons (▲ ▼) to scroll the list until the cursor is pointing at the required range. Press enter ► to select the range.

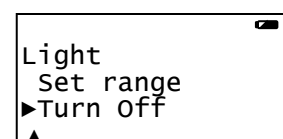
Press the stop button ■ to return to the sensor window.




#### Turning a built-in sensor ON or OFF the display

With the cursor pointing at Turn Off or On press enter ►.

- Press the stop button ■ to return to Meters.

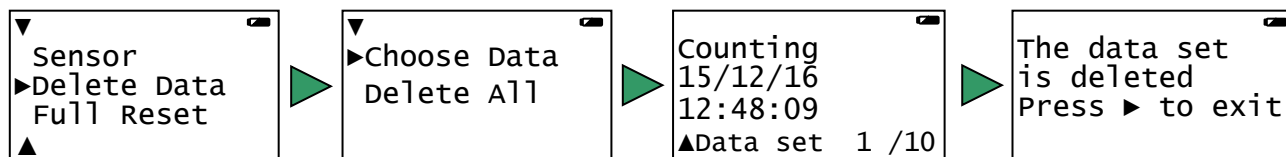


**Note:** If you change a sensor's range or turn it on/off via the logger while connected to a computer, it may be necessary to select New  in the software for these changes to be detected.

## Delete Data

Select whether to delete all or just individual data sets.

- Delete all – press ► to confirm your decision or stop ■ to cancel.
- Choose data - use the up or down buttons ▲ ▼ to scroll through the data sets and when you find the data press enter ► to delete).



## Full Reset

A full reset **erases** all data sets and returns the logger back to the factory default settings.

**Note:** A hard reset (see [page 25](#)) can be tried first if Vu+ simply stops responding, a hard reset won't alter settings or erase data.

A full reset will:

- **Erase** all stored data sets.
  - Return the built-in sensors to their default range (Light - Indoor 1 k Lux, Temperature - Celsius 0 to 50°C).
  - Return the date format to DD-MM-YY.
  - Return decimals to On with a full stop format.
  - Return language to its default.
- With the cursor pointing at **Full Reset** press the enter ► button to select.
  - Select the enter button ► to confirm the reset or stop ■ to cancel and exit.
  - Once done press enter ► to return to the System menu.

## Language

Use to alter the selected language.

- With the cursor pointing at **Language** press the enter ► button to select.  
The screen will show the language options. The cursor will indicate the current language selected.
- If you wish to alter the choice use the scroll (▲ ▼) buttons to scroll the cursor until it is pointing at the preferred language and press the enter ► button to select.

**Note:** If a System Full Reset is performed language will automatically return to its default.

## Date Style

Use this option to alter the format of the date display (how you would like the date displayed) i.e. from a European to USA date format (DD-MM-YY to MM-DD-YY). The actual time and date is set automatically by the computers clock (see notes).

- With the cursor pointing at **Date Style** press the enter ► button to select.
- The cursor will indicate the current selection. If you wish to alter the choice use the ▲ ▼ buttons to scroll the cursor until it is pointing at the preferred style and press the enter ► button to select.

**Notes:**

- Vu+'s internal clock is set automatically by the computer's clock (date and time) each time it is connected to the computer and the EasySense software is run. If the date or time on a data set is not correct, check the date/time settings on your computer.
- If a System Full Reset is performed the date format will automatically return to its default (DD-MM-YY).

**Decimals**

Use to switch decimals off and on, or to change the decimal format from a full stop to a comma.

- With the cursor pointing at **Decimals** press the enter ► button to select.

**Turn On or Off**

With the cursor pointing at **Turn Off / On** press enter ► to alter the selection (from Off to On or visa versa).

**Format**

To change the format of the decimal separator from a full stop to a comma, scroll to **Format** and press enter ►. Scroll to the number displayed with a comma, press enter ► to select.

- Press the stop button ■ to return to System menu.

**Note:** If a System Full Reset is performed decimals will automatically return to its default - decimals On (displayed) and the format as a full stop.

**Logger Name**

To change the name the logger displays while Bluetooth connected, select Logger Name. Use ■ to delete characters from the existing name and then scroll and select characters for the new name (maximum of 11 characters). When you've finished scroll to ✓ (bottom row right) then enter ►.

<b>Name:</b> Da Vinci 32 abcdefghijklmnopqrstu vwxyzABCDEFGHIJKLMNPO QRSTUVWXYZ0123456789+ -*%\$@!_:\/?<=>.\ ✓×
--

- Use the scroll buttons (▲▼) to go forward or back through the alphabet / numbers / symbols on the keyboard.
- Use enter ► to select / accept the symbol under the dark cursor.
- Use ■ to delete a character.
- Move the cursor to the 'tick' ✓ symbol and press enter ► to accept the entered name.
- Move the cursor to the 'cross' × symbol and press enter ► to leave this screen with any characters entered to be rejected and ignored.

**About**

Shows the version number of the Vu+'s firmware, its serial number, its Bluetooth name, and the Bluetooth firmware version number.

**Using Vu+ connected via USB to a computer****Step 1:**

Install the EasySense software, if it is not already on your computer. For details of how to install and operate this program, please refer to the instructions provided for the EasySense software.

**EASYSSENSE Vu+** requires **version 3.8** or above of the EasySense Windows PC software or **version 1.03** of the Mac OSX software.


(The version number can be verified with Windows from About in the Help menu, or with Mac OSX from About EasySense in the EasySense menu).


**Step 2:**

Connect Vu+ to the computer's USB port using the USB cable supplied, it will automatically be detected as a new device and the drivers will install

**Step 3:**

Check that the LCD display on Vu+ is displaying the main menu (Meter, Pictogram, EasyLog, etc.).

**Note:** In most circumstances Vu+ will **not** communicate with the PC if it is taking samples. If the LCD screen shows samples being taken, press the stop  button to finish recording.

Open the EasySense software program. 

**Step 4:**

The first time the EasySense program is opened a 'Select Program Level' window will automatically open. Select a suitable user's level.

- Level 1 is aimed at 'start' level (e.g. up to 9 years old).
- Level 2 is aimed at 'mid' level (e.g. 9 – 15 years old)
- Level 3 is aimed at 'exam' level (e.g. 15 years plus).

**Step 5:**

An Interface option window will open. Leave the Interface selection as **EasySense Range** and the method of connection as **USB Port** and select OK. The program will save your selection so it will be automatically configured when next used.

**Step 6:**

The Home window will open. Select one of the experiment modes e.g. EasyLog, Pictogram, Meters, Snapshot, Counting or Timing.

**Using Vu+ after the initial setup**

- Use the USB cable to connect Vu+ to the computer.
- Open the EasySense software program.
- Select one of the experiment modes e.g. EasyLog from the Home screen.

**Using Vu+ connected via Bluetooth to a computer** 

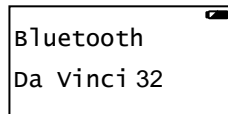
**When connecting to a Windows computer**


**V3.8** or later of the EasySense Windows software **must** be installed on the computer. An operating system of Windows 7 or above is required.

**Note:** No pairing is required.

- Connect a 2070 or 2071 Bluetooth Smart USB adaptor to the USB port on the Windows computer. The adaptor is a plug and play device whose drivers should install automatically 

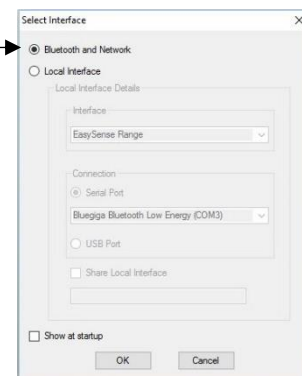
- On Vu+ scroll to Bluetooth and  to select.

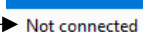
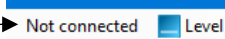



- Open the EasySense software on the PC. 

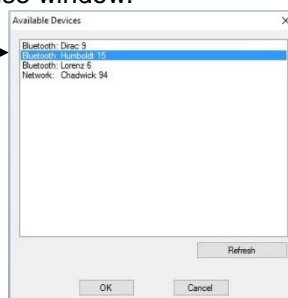
- From **File, Interface** select **Bluetooth and Network**. OK. 

**Note:** When first selected you may need to change Windows firewall settings to allow network access for this app.





- Select the connection status text top right of the EasySense window.  

- Select the Vu+'s name (as displayed on its screen) from the list. 



- The connection status will change to show that it is '**Controlling xx** or **Viewing xx** the logger.

A link symbol on Vu+'s screen will indicate connection to a computer. 

When you've finished select the connection status icon in the EasySense software to disconnect, then stop  and enter  to confirm on Vu+.


\* If auto install fails, download and unzip the drivers for the Bluetooth USB adaptor (Product 2070 or 2071) from the Data Harvest website. Open Device Manager, right click on the entry for the dongle (typically listed under Other devices) and select Update drivers. Select to 'Browse my computer' (install manually), locate and select the BLED112 directory. When installed the adaptor will be listed under the Ports (COM & LPT) section.



## When connecting to a iPad or Android device

An iPad will need to support Bluetooth Low Energy (BLE) also known as Smart or 4 (iPad 3 or later or any iPad Mini). **V1.10** or later of the EasySense iPad software **must** be installed.

An Android will need to support Bluetooth Low Energy (BLE) / Smart – OS 4.4 or later. **V1.05** or later of the EasySense Android software **must** be installed.

**Note:** No pairing is required.

- Check in **Settings** on the device that Bluetooth is On.
- Select Bluetooth on Vu+.
- Start the EasySense software.
- On an iPad tap on the 'Not Connected' text bottom right of the screen.  
On the Android select the connect icon , top right of the screen
- Select the Vu+'s name from the list.
- The status will change to show that it is '**Controlling xx** or **Viewing xx**'.

When you've finished select the connection status icon in the EasySense software to disconnect, then stop  and enter  to confirm on Vu+.

## The EasySense software overview



Home is the main navigation screen, which contains the icons for all of **EASYSSENSE Vu+**'s logging options. The experiment options and the complexity of toolbars and functions are altered by the user level selected.




### EasyLog

EasyLog will open pre-set to record sensor values **continuously** as a line graph until stopped.

A logging wizard will open, deselect the tick next to any sensors from which readings are not required and click on Finish.

Click on the **Start/Stop** icon  to begin recording.

Logging will start with a time span of 30 seconds and when this has elapsed the time will double automatically. This will continue until the recording is stopped by clicking on the **Start/Stop** icon. 



### Meters

The Meters window gives an introduction to sensors and how they respond to change. Up to four section displays can be open at any one time and they can be any combination of sensors and displays.



The program will open with live data from one sensor in a Numeric window. Click on the appropriate picture icon on the tool bar to open other section displays i.e. Numeric, Gauge, Colour Change or Bar. To alter the sensor displayed in a section, **right** click in the individual section window and select the sensor from the list.

Click on the Start/Stop icon  to stop recording.




### Pictogram

(Level 1 USB connection only)

The value from the sensors can be displayed as pictures or an abstract colour block or bar chart. Each picture represents a 10<sup>th</sup> of the range (or span) of the sensor and is also displayed as a number from zero to ten.

The program will open with live data from the sensors displayed as pictures on a horizontal chart. The graph type can be changed to an abstract colour blocks, a bar chart or oriented vertically.



The sensor readings are captured every time the Store icon is selected. Click on the Start/Stop icon to stop recording. .



### Snapshot

Snapshot will open pre-set to record sensor values on demand (**manual sampling**) with a bar graph display.

A logging wizard will open, deselect the tick next to any sensors from which readings are not required and click on Finish.

Click on the Start/Stop icon  to begin recording. Click in the graph area to collect a sample for each active sensor. Click on the Start/Stop icon  to stop data being recorded.





### Graph

(Level 2 and 3 only)

Graph is pre-set to record sensor values against a **chosen time span** as a line graph display.

The window will open with the Real time logging wizard: -

1. Deselect the tick next to any sensors from which readings are not required. Next.
2. Select the total recording time and the interval between the samples being taken (the shortest interval for Vu+ logger is **20 ms**). Next.
3. Select the condition required for the recording to start i.e.
  - **None** - the recording will start as soon as you click on the Start/Stop  icon.
  - **Trigger on Level** - the recording will start when the sensor selected is above, below, rises above or falls below a set level e.g. when the value from a Temperature sensor rises above 15°C.
4. When the selection has been made, click on Finish. The recording will start when the start condition you have selected is met. The recording will stop when the selected time span has passed.

**Note:** If you want to stop a recording before it has run the full term, click on the Start/Stop icon. .





### Scope

(Level 3 only)

Scope has a simple oscilloscope type display.

1. A logging wizard will open, deselect the tick next to any sensors from which readings are not required and click on Finish.
2. Select the Timebase (from panel on the right). The fastest interval between readings for Vu+ is **20 ms** (roll mode).


- Click on the **Start/Stop** icon  to begin recording. The graph trace will be redrawn continuously on the screen until you click on the **Start/Stop** icon  when the trace will 'freeze'.



### Timing

Timing is used to allow students to study Time, Velocity, Acceleration, Momentum and Kinetic Energy relationships using switch-type (digital) sensors such as Light gates connected to input A or A and B.

A wizard will open with the recording options available (these will depend on the user level selected). When the selection has been made, click on Finish.

Click on the **Start/Stop** icon  and a reading will be displayed when a change is detected in signal from the digital sensors.


Click on the **Start/Stop** icon  to stop data being recorded.



### Counting

(Level 1 and 2 USB connection only)

Use to count events by using switch-type (digital) sensors. The program will open pre-set to display a count as a number and horizontal bar graph.

Click on the **Start/Stop** icon  each time the state of a sensor is changed to On e.g. by pressing a push switch, the number of counts will advanced by one.

Click on the **Start/Stop** icon  to stop data being recorded.





### Setup Remote

Use to program Vu+ to capture data for a set time span while disconnected from the computer (remote). The collect data is stored in Vu+'s memory to be retrieved by the computer at a later stage. The window will open a logging wizard.


If EasySense is set to **Level 1**: -

- Deselect the tick next to any sensors from which readings are not required. Next.
- Select the total recording time, Finish.
- The settings will be downloaded to Vu+ and a message on the computer will inform 'The logger is now set up for remote logging'. Click on OK.

Vu+ can now be disconnected from the computer and placed in its recording position. Recording will start when the enter button  on Vu+ is pressed and stop when the selected time span has passed.

**Note:** If you want to stop a recording before it has finished, press the stop  button and follow the instructions on the display.

If EasySense is set to **Level 2 or 3**:

- Deselect the tick next to any sensors from which readings are not required. Next.
- Select the total recording time and the interval between the samples being taken, Next.
- Select the condition required for the recording to start i.e.
  - **When Enter pressed** - the recording will start as soon as you press the  button on Vu+.
  - **Trigger on Level** – the recording will start when the sensor selected is above, below, rises above or falls below a set level e.g. when the value from a Temperature sensor rises above 25°C.
  - **Trigger on Digital Condition** – the recording will start when a digital sensor connected to A or B is On, Off, rising to On or falling to Off.
  - **Trigger on Time** – the recording will start at the time and date specified. This trigger is useful for recording at a time when a logger is unattended or to start multiple loggers at the same time.
- When the selection has been made, click on Finish. The settings will be downloaded to Vu+ and a message on the computer will inform 'The logger is now set up for remote logging'. Click on OK.

Vu+ can now be disconnected from the computer and placed in its recording position. The recording will start when the start condition you have selected is met and stop when the selected time span has passed.

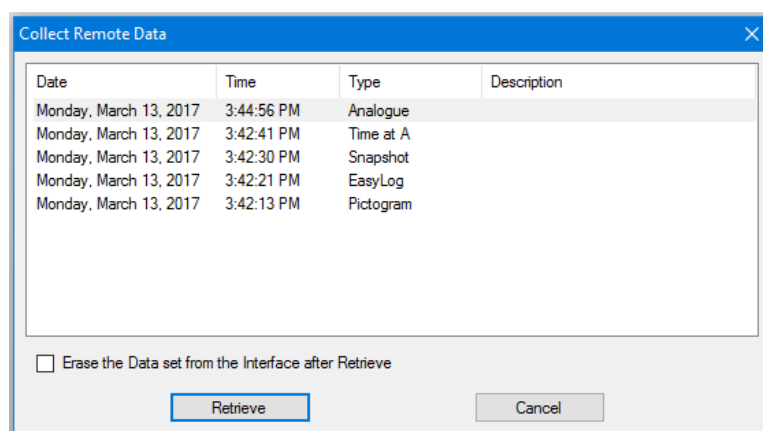


### Retrieve Remote

Use this option to retrieve a data set stored in Vu+'s memory.

A dialogue box will open showing the list of data currently stored in Vu+. The most recent data set is first in the list. Select the required set of data and click on **Retrieve**.

**Note:** If the Erase data box is ticked, the set of data selected will be erased from the logger after retrieval.



## Technical information

### Selecting the sensor range

Some of the internal sensors in Vu+ and some plug-in Vu+ sensors have more than one range. Once a range has been selected it will be used until reselected.

The range of a sensor can be altered:

- In Vu+ Meters (see [page 6](#)).
- In Vu+ System (see [page 16](#)).
- Using Sensor Config in the EasySense software (Settings menu).
- Using New in the EasySense software (EasyLog, Graph, Pictogram, Snapshot, Counting mode).

### Powering Vu+

EASYSense Vu+ can be powered by:

1. By the USB port (whilst connected to the computer).
2. By its internal batteries (when charged).

Connect Vu+ directly to a USB port on your computer\* (or a powered USB hub) using the USB cable supplied with it. A full charge can take up to 8 hours. A battery charging symbol will be displayed on Vu+'s screen while the logger is charging.

\*Your computer must be turned on and not in sleep or standby mode; otherwise, the battery may drain instead of charge.

#### Notes:

- Vu+ can also charge from a USB mains charger that outputs 5 V at 500 mA or more.
- EASYSense Vu+ will not work with an unpowered hub (EASYSense Vu+ requires an output current of 500 mA).
- An extension cable must be of a single direct port extension type.

While Vu+ is accepting power from the USB port it will not operate auto switch off.

## Batteries

Vu+ is fitted with a rechargeable lithium-ion battery pack. Whenever Vu+ is connected to the USB port on the computer, it will automatically re-charge the battery.

Lithium-ion batteries are 'memory-free' and prefer a partial rather than a full discharge. Constant partial discharges with frequent recharges will not cause any harm. Frequent full discharges should be avoided whenever possible.

Ideally Vu+ should be stored at about 40% or more charge. Do not store Vu+ with its battery fully discharged or with sensors connected. Even when turned off (asleep), Vu+ will use a small amount of current, and the battery will slowly discharge (some reserve charge is required to retain data and settings in memory). If Vu+ is to be stored for lengthy periods without use then it's a good idea to recharge the battery every 6 – 8 weeks.

When its battery is in good condition and fully charged it will power Vu+ in EasyLog or remote mode for a minimum of 41 days.

The speed at which a lithium-ion battery will age is governed by both its storage temperature (preferably less than 40°C) and state-of-charge. Ideally batteries should be replaced every 4 years. Eventually the battery pack will no longer deliver the stored energy and will need to be replaced. A fully charged battery that loses its charge quickly or a battery with symptoms of swelling or physical damage will demonstrate the need for replacement. When this happens, contact Data Harvest and request a battery replacement pack for **EASYSense Vu+ – Product No. 5007**.

## Auto switch off

While battery powered Vu+ will normally auto switch off (go into low power sleep mode) to reduce power consumption if more than two minutes have passed since any measurements have been taken or a button was pressed.

- If Vu+ is accepting power from the USB port or similar it will not operate auto switch off.
- Vu+ will wake up when any button is pressed.
- While remote recording on battery power in EasyLog mode or after using Setup Remote, Vu+ will stay awake until the interval between readings reaches 5 seconds or greater – at this point it will begin to use sleep mode between samples (waking up just in front of the sample time to allow the sensors to stabilise).
- While in Timing or Counting mode Vu+ does not operate auto switch off and will stay awake ready to take a measurement.

## Internal Clock and Calendar

Vu+'s internal clock will be updated automatically by the computer's clock (date and time) each time it is connected to the computer and the EasySense software is run.

**Note:** If the date or time on a data set is not correct, check the date/time settings on your computer.

## Vu+'s memory

Multiple sets of data can be stored in Vu+'s memory. The actual number will depend on the size of the data sets and that is dependent on how many sensors are connected and how many readings are taken.

### Notes:

- A System, Full Reset will **erase** all data sets and return the logger back to its factory default settings. See [page 25](#).
- Individual data sets or all can be deleted via System, Delete Data.

## Fitting the lanyard



Thread the thin cord loop through both slot holes in the base of the logger.




Thread the ribbon strap completely through the open loop of the thin cord. Pull the thin cord end tight to achieve a secure fitting.

## Hard Reset

If Vu+ fails to respond to the computer or a button press, carry out a Hard Reset.



1. If necessary attach Vu+ to USB power.
2. Press  +  +  at the same time.

If the hard reset has been done correctly, the LCD will display **Vu+** before returning to the main menu.

**Note:** A Hard Reset does **not** erase any stored data sets but if a recording is interrupted by a reset, then the data being captured will not be stored.

If Vu+ still fails to respond apply a Full Reset (see below) or contact Technical Support at Data Harvest.

Please provide details of:








- The computer platform it is being used with.
- The software version number
- A description of the problem being encountered

If possible, telephone from a location where you can operate Vu+ with the computer.

## Full Reset

A Full Reset will return Vu+ back to the factory default.

It will:

- **Erase** all stored data sets.
  - Automatically return the built-in sensors to their default range (Light - Indoor 1 k Lux, Temperature - 0 to 50°C).
  - Return the date format to DD-MM-YY.
  - Return decimals to On with a full stop format.
  - Return the language to its default.
- Scroll   the menu to **System**, press enter  to select. Scroll down  to **Full Reset**. Press the enter  button to select.
  - Select enter  to confirm this selection.
  - Select enter  to return to the System menu.

## Specifications

128 x 64 graphic display

Firmware upgradeable

USB compatible communication V1.1 & V2.0 compatible

Operating range: 0 - 40°C and 0 to 95%RH (non-condensing).

10 bit sampling resolution

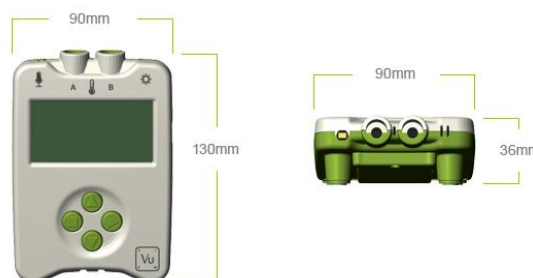
Graph and Scope maximum logging speed: 20 millisecond (ms) interval between samples

Digital timing: Resolution = 5.3 microseconds

Power specifications: 5 V at 500 mA or more

Weight of Vu+: approx. 167 g

Dimensions: H 36 mm max., W 90 mm, D 130 mm.



Bluetooth 4.2 low energy radio, single mode compliant

Transmit (TX) power: 0 dBm

Receiver (RX) sensitivity: - 90 dBm

Usable transmission range: up to 10 m in open air

Frequency Range: 2.402 to 2.480 GHz operation

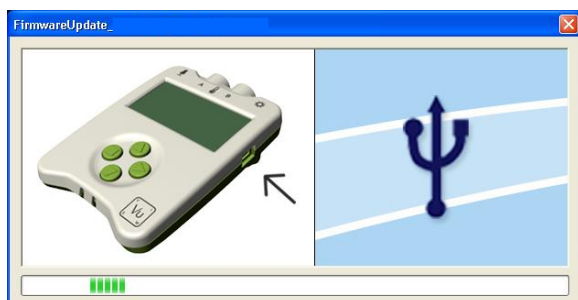
## Care & Maintenance

- Clean with a damp cloth, do not immerse in water or detergent. Vu+ is **not** waterproof.
- Vu+ is suitable for use in an operating range of 0 - 40°C and 0 to 95%RH (non-condensing).
- Do not subject to extreme heat or cold or leave in a location where it will get wet.
- If Vu+ has been left in the cold, let it warm to near room temperature before waking it from sleep.
- Do not expose to direct sunlight for extended periods of time.
- Do not expose to temperatures greater than 60° C, e.g. near a heater or inside a car in hot weather.
- Do not store Vu+ with its battery fully discharged. Ideally Vu+ should be stored at least **40% or more** state-of-charge. See [page 24](#).

## Updating EASYSense Vu+'s Firmware

Occasionally Data Harvest may release updated firmware which will contain improvements or new features. Updates will be made available from the [Data Harvest website](#). To update the firmware of your EASYSense Vu+ logger:

**Step 1.** Copy the English Firmware Update for Vu+ onto the hard disc of your computer and run the .exe.



**Step 2.** Connect Vu+ to the computer using the USB cable.





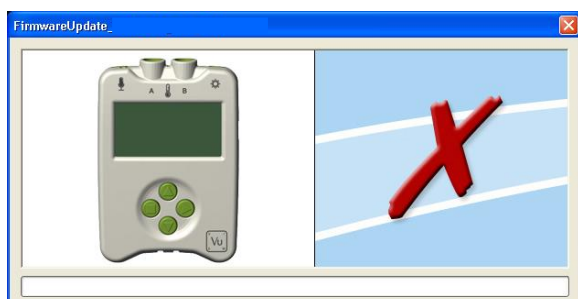
**Step 3.** Wait for a few seconds.

A progress bar will indicate Vu+ is being programmed.



A **tick** will indicate if the process was successful. Disconnect Vu+.

If you wish to repeat this process, connect another Vu+ and click on the update window.



A **cross** will indicate that an error occurred. Click on the update window to go back to the start screen and re-program.

**Step 4.** Exit the program.

### Practical information for Vu+'s plug-in Temperature sensor

- The sensor has a particularly low thermal inertia. The thermistor is housed at the end of the stainless steel tube, so it is the tip of the sensor that is most sensitive to temperature.
- Lay the sensor on its side, not its end, when measuring a surface temperature.
- Do NOT put any part of the sensor in a direct flame or on a hot plate.
- Temperatures higher than 150°C will damage the sensor.
- The PVC insulation on the connecting cable has a working range of -10 to 85°C, so keep this cable away from the source of heat.
- Avoid submerging the sensor beyond the stainless steel portion.
- Wash the sensor thoroughly after use.
- The boiling point of water will vary with changes in air pressure. At one atmosphere of pressure (101.3 kPa, 1013 mBar) pure water boils at 100°C. Water boils when the vapour pressure of water equals the pressure of the gases above water, so if the pressure changes, then the temperature that the water boils at will also change.

Boiling Point of Water vs. Pressure

Pressure in kPa	Pressure in mBar	Temperature in °C
101.3	1013	100.0
99.5	995	99.5
97.8	978	99.0
96.0	960	98.5
94.4	944	98.0
92.7	927	97.5

For Advanced Users:

Resolution 0.1°C (0.1°F)

Accuracy ± 0.5°C at 0 - 70°C, rising to ±1°C at extremes of range.

- The 3 mm by 200 mm AISI 316 stainless steel tube has a high resistance to corrosion from a wide variety of weak acids and alkalis. Some environments e.g. saltwater may cause some discolouration to the stainless steel tube but this will have no effect on the sensor's performance.
- The sensor can be left in an alkaline solution such as Sodium Hydroxide (NaOH) for up to 48 hours, with only minor discoloration. We do not recommend use in a solution whose concentration is greater than 3 mol dm<sup>-3</sup>.
- The maximum length of time recommended for exposure to an acid is dependent on the acid's concentration. In general, we do not recommend that temperature sensors be left to soak in acids of between 1 – 3 mol dm<sup>-3</sup> concentrations for longer than 48 hours.

The exceptions to this rule are Hydrochloric acid (HCl), and Sulphuric Acid (H<sub>2</sub>SO<sub>4</sub>). The maximum recommended times for exposure are:

Concentration of Hydrochloric acid	Maximum exposure
1 mol dm <sup>-3</sup>	20 minutes
2 mol dm <sup>-3</sup>	10 minutes
3 mol dm <sup>-3</sup>	5 minutes

Concentration of Sulphuric acid	Maximum exposure
1 mol dm <sup>-3</sup>	48 hours
2 mol dm <sup>-3</sup>	20 minutes
3 mol dm <sup>-3</sup>	10 minutes

## Limited warranty

For information about the terms of the product warranty, see the Data Harvest website at: <https://data-harvest.co.uk/warranty>.

**Note:** Data Harvest products are designed for **educational** use and are not intended for use in industrial, medical or commercial applications.



### WEEE (Waste Electrical and Electronic Equipment) Legislation

Data Harvest Group Ltd is fully compliant with WEEE legislation and is pleased to provide a disposal service for any of our products when their life expires. Simply return them to us clearly identified as 'life expired' and we will dispose of them for you.



This device complies with Part 15 (Radio Frequency Devices) of the Federal Communications Commission (FCC) rules.

Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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