



Description

The LD-2M is a high quality Inclinator & display system which features a built in rechargeable battery allowing measurements to be taken with no cables for up to 13 hours between charges. The LD-2M measures both pitch and roll axes simultaneously & it's intelligent software detects when transferring from dual to single axis applications, changing the display mode and orientation automatically. It's self contained and compact design make it ideal for use in nearly all industrial and personal applications. It has a robust precision ground stainless steel base & sleek ABS top cover, the graphical LED display makes operation simple and the selectable backlight enables use in all lighting conditions. The LD-2M can be used whilst charging & the USB type power cable allows it to be charged almost anywhere. RS232 communication makes logging data to a computer possible (LD-2M-RS232 cable required), with an easy to use command-set which can be implemented into a custom solution or by using our free Windows application if preferred.



Dual Axis Mode - X & Y

Features

- Dual or single axis measurement
- Wide range of operation:  $\pm 30^\circ$
- High accuracy; with a maximum error of  $\pm 0.05^\circ$  or 1% of the measured angle (whichever is greater)
- High resolution:  $0.01^\circ$  ( $0.17 \text{ mm/m}$ )
- Graphical LCD display with selectable backlight
- Adjustable filter response for versatile operation.
- Built in rechargeable battery
- Measurement scale selectable between degrees or mm/m
- RS232 digital interface when used with cable: LD-2M-RS232 (optional purchase)
- Supplied in a protective case with USB & Wall charging accessories
- M6 threaded holes on base make mounting fast and simple
- V section on precision ground base for measuring cylinders:



Horizontal single axis mode - X



Vertical single axis mode - Y

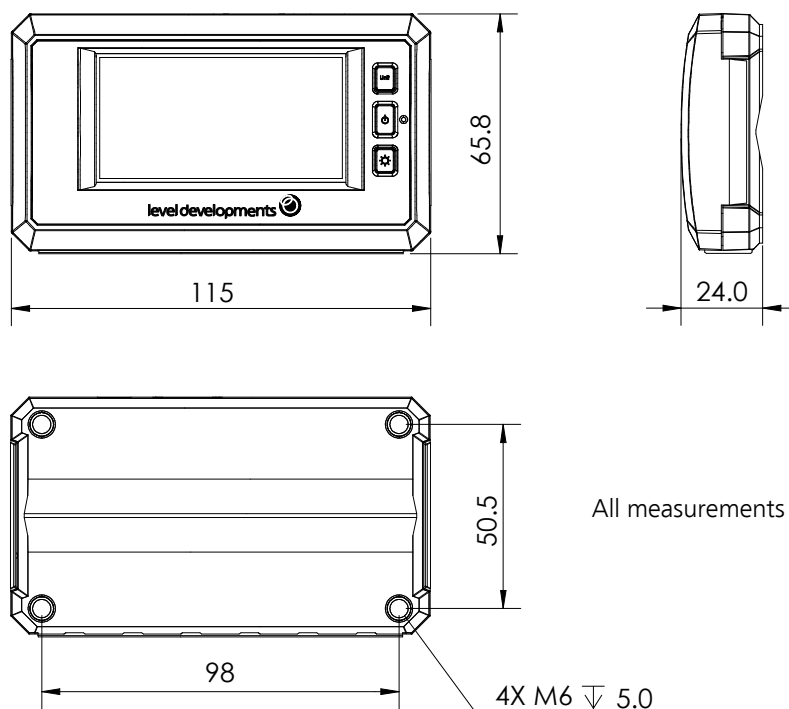




## Specifications

General	
Measurement Range	±30°
Resolution	0.01° (0.17mm/m)
Accuracy	±0.05° or 1% of measured angle (whichever is greater).
Non Linearity	<1% FS
Response Time	< 1 second
Physical Characteristics	
Size	115 x 65.8 x 24 mm
Weight	180g
Screen Type	128 x 64 pixel black & white LCD (with selectable backlight)
Operational Temperature	0°C to 45°C, < 80%RH
Power Supply	Rechargeable Internal Li-ion battery, 3.7V
Battery Life	Up to 13 hours
Charger Type	USB A to Mini B. Charge using PC or wall plug adapter (supplied)
Communications Interface	
LD-2M Socket Type	USB Mini B (part no: LD-2M-RS232 is required for PC comms)
Communications type	RS232 Full Duplex
Output Format	ASCII
Baud Rate	9600
Parity	None
Baud Rate	8
Stop Bits	1

## Dimensions





Axis Directions - Dual Axis Mode

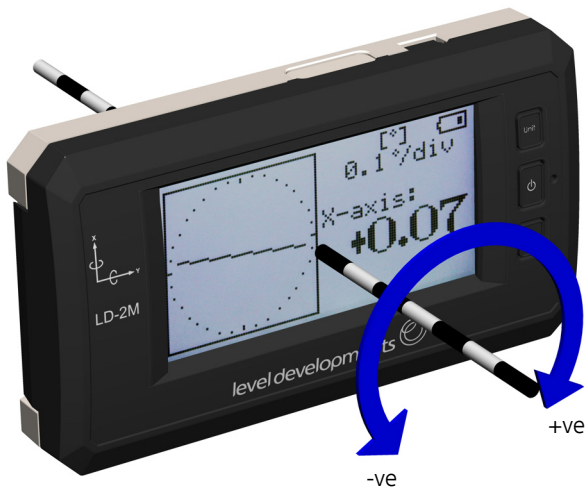
Mounted on a Horizontal Surface. Dual Axis Mode



Axis Directions - Single Axis Modes

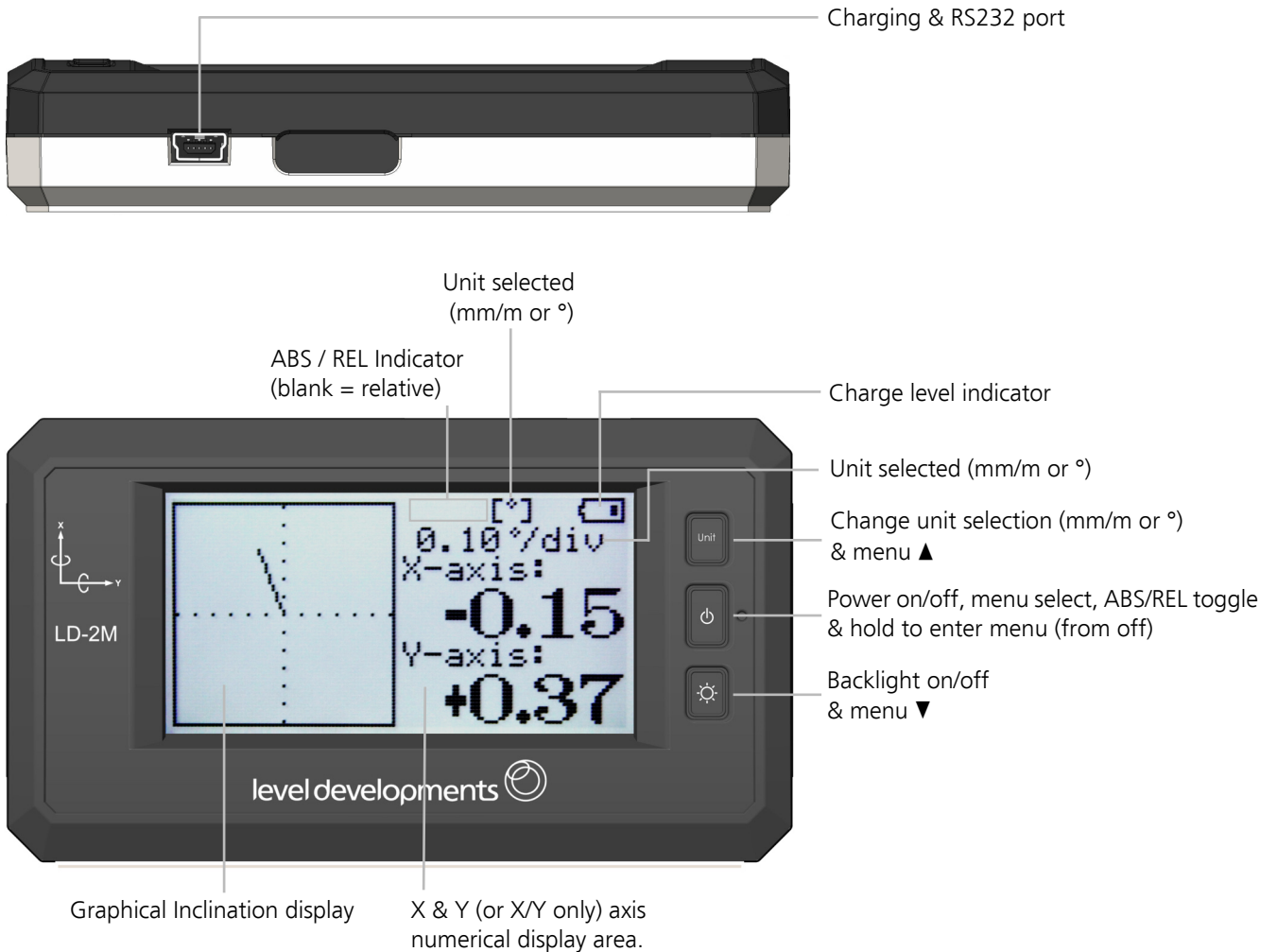
Mounted on a Horizontal Surface. Single X Axis Mode

Mounted on a Vertical Surface. Single Y Axis Mode





Product Features



Secondary Button functions.

- To turn on the LD-2M: hold the power button for 1 second.
- To turn off the LD-2M: hold the power button for 1 second.
- To enter the settings menu: ensure LD-2M is switched off then hold the power button for 3 seconds.
- The Unit button becomes ▲ inside the settings menu for navigating sub menus and increasing values.
- The Backlight button becomes ▼ inside the settings menu for navigating sub menus and decreasing values.

Absolute / Relative mode function.

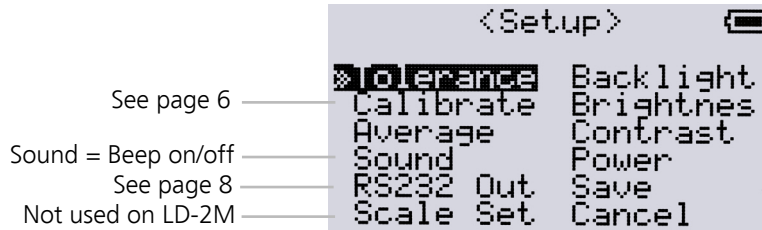
To swap between absolute & relative mode: press & immediately release the power button while the unit is on.

- When changing from relative to absolute mode the unit will immediately discard the last relative 0° setting & replace it with the calibrated 0° position.
- When changing from absolute to relative mode the LD-2M will beep once, from this point please allow the unit to remain still for 3 seconds while it generates a stable 0° reading which it will save as the new reference. There will be a 2nd beep once this is complete and the X & Y readings should drop to 0°.



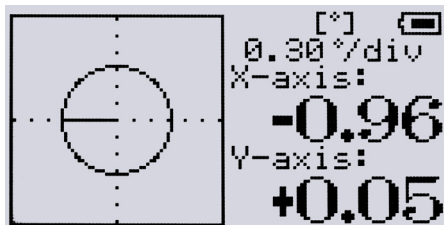
Setup Menu Functions

To enter the settings menu switch off the LD-2M then hold the power button for 3 seconds. Note that after modifying any settings; selecting "Save" will apply the changes whereas selecting "Cancel" will discard them.



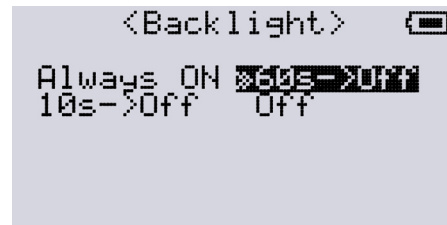
Tolerance

When enabled, the tolerance value controls the circular region's threshold in the graphical X&Y display: The range of this setting is 0.1° to 10°. (1° example):



Backlight

The Backlight can be configured to remain on at all times, or to turn off after a 10 / 60 second period of inactivity. Activity is related to movement.



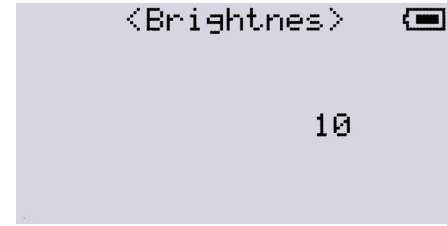
Average

This setting varies the number of samples used internally to smooth the readings, a lower value will result in a faster response whereas a higher value will give a smoother output. The default is 15 and range is 6-25.



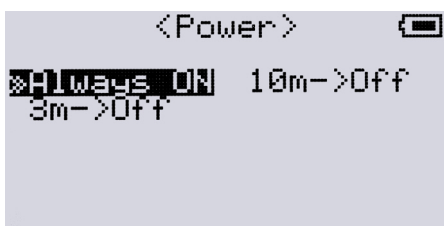
Brightness

The brightness value controls the intensity of the backlight. The setting range is from 0 to 10 & default setting is 10.



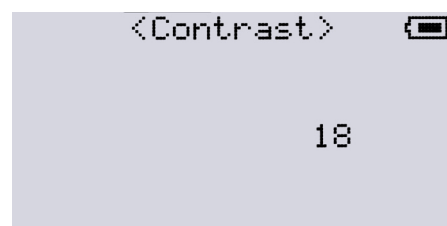
Power

The LD-2M can be configured to remain on at all times, or to turn off after a 10 / 60 second period of inactivity. Activity is related to movement.



Contrast

The contrast value controls the ratio of black to white pixels. The setting range is 10 to 40 & the default setting is 18.



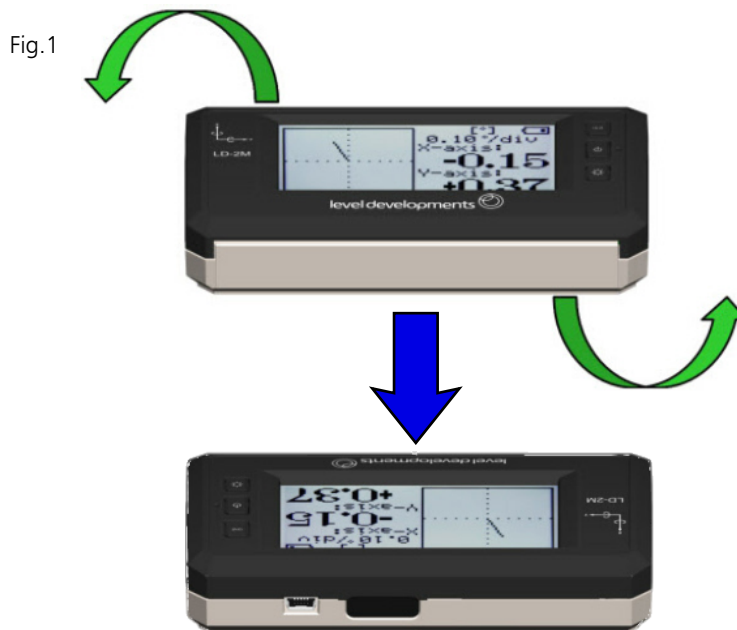


Calibration

Testing the Accuracy

Please use the following simple procedure to check the accuracy of the LD-2M before using. This should also be carried out if the unit is dropped, or is being used in an environment that varies more than 5°C from the environment in which it was last calibrated.

- 1) Place the LD-2M down on a clean, flat horizontal surface. The surface does not have to be exactly level. Wait 10 seconds so the display is completely stabilised and note the X and Y angle readings from the display.
- 2) Turn the instrument through 180° as shown below, placing it back down in the same spot on the surface.

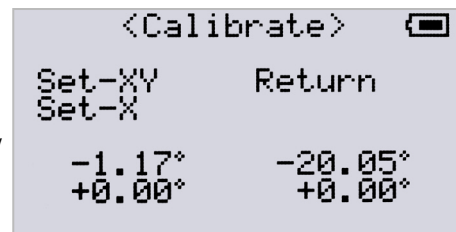


- 3) Compare the two X-axis readings. One reading should be the negative of the other. For example if X1 = +0.35° then X2 should read -0.35°. If there is more than 0.05° variation then unit will need to be recalibrated. Check the same for the Y-axis readings.

Setting the XY Axis 0° Position

Place the instrument on a flat stable surface and enter the "Calibrate" sub menu from the Setup menu. The surface does not need to be perfectly level.

- 1) Use the ▼ ▲ keys to select **Set-XY** then press the ⏻ key. Wait for a few seconds until the display reads: *Please rotate 180° and push button again.*



- 2) Rotate around on the base plate, placing the unit back in the same spot as shown in fig.1 above then press the ⏻ key. Wait for a few seconds for a stable reading to be saved, the LD-2M will beep when this is complete.

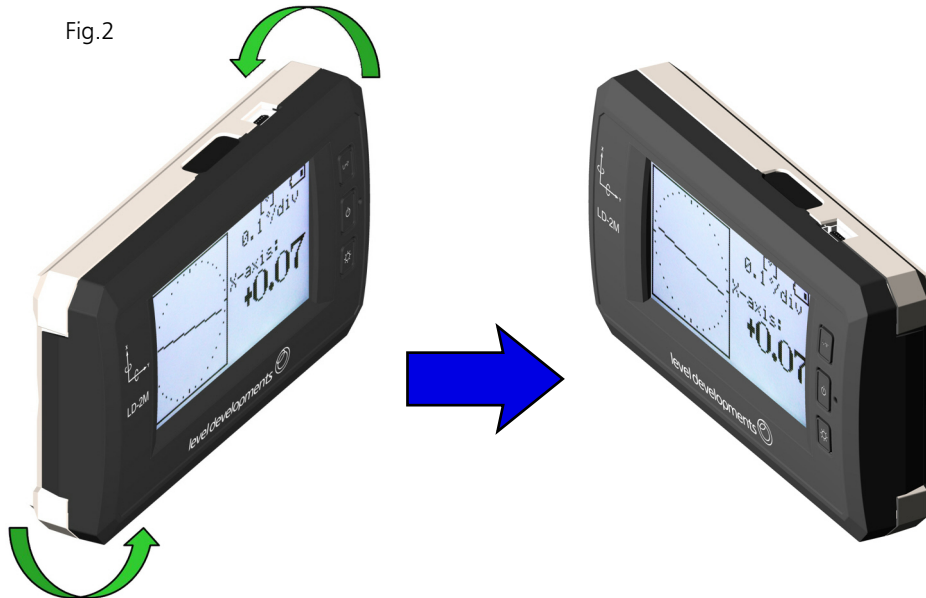
- 3) The XY measurement mode zero point is now re-set. Use the ▼ ▲ keys to select **Return** and press the the ⏻ key to return to the main menu. Select **Save** to exit the menu and return to the normal mode of operation.



### Calibration Continued

#### Setting the X Axis 0° Position

- 1) Place the instrument on its horizontal side on a flat stable surface as shown in the picture below. The surface does not need to be perfectly level but should be clean and flat.
- 2) Use the ▼ ▲ keys to select **Set-X**, and press the Ⓞ key. Wait for a few seconds until the display reads: *Please rotate 180° and push button again*. Turn the level through 180° as shown below placing back down in the same place on the surface as before.



- 3) The X measurement mode zero point is now re-set. Use the ▼ ▲ keys to select **Return** and press the the Ⓞ key to return to the main menu. Select **Save** to exit the menu and return to the normal mode of operation.

### Package Contents

Each purchase includes the following items supplied in a protective carry case:

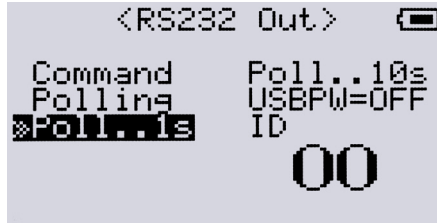
- LD-2M Inclinometer & display unit.
- USB A to Mini B cable for charging.
- Wall plug adapter to USB for mains charging (Including UK, US, EU & AUS plug attachments).





RS232 Communications

The RS232 setting screen enables you to alter the way in which the RS232 signal is transmitted. Use the ▼▲ keys to highlight the desired option and then the Ⓞ key to return to the main menu. Select save to exit the main menu and return to the normal mode of operation.



Command

When Command is selected, an RS232 output of the X and Y axis readings is sent only in response to a call command from the connected equipment (usually a PC or laptop). The call command needs to be in the format:

Bytes	4				2	
O/P	C	A	L	L	0	0

Polling

When Polling is selected, an RS232 output of the X and Y axis readings is sent continuously from the instrument.

Poll..1s

When Poll..1s is selected, an RS232 output of the X and Y axis readings is sent every 1 second from the instrument.

Poll...10s

When Poll..10s is selected, an RS232 output of the X and Y axis readings is sent every 10 seconds from the instrument.

USBPW

Turning USBPW to "OFF" prevents "unknown device" message in windows when the USB charging cable is connected to a PC.

ID

For use by Level Developments only. Please leave this setting at the default value of "00".

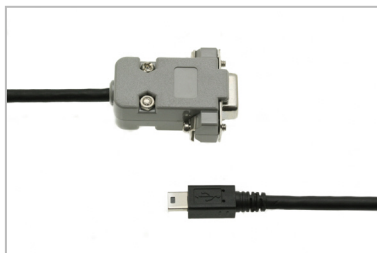
LD-2M's RS232 Output Format

- Baud Rate: 9600bps
- Parity: None
- Data Bits: 8
- Stop Bits: 1

Bytes	1	1	6				1	1	1	6				1	1			
O/P	x	=	+	3	.	0	2	,	y	=	-	1	7	.	4	5	CR	LF

Please Note:

An "LD-2M-RS232" cable is required to use the LD-2M with a PC.



These are sold separately on our web site.

The USB connection is used for RS232 serial communications and charging only.



This product does not feature a USB interface.