

HEDECO

*Lime I*



# USER MANUAL

MANUAL V1.1 - 25.03.2022  
PRODUCT NAME: LIME ONE  
MODEL NUMBER: H-LM010  
HEDECO GMBH NÜRNBERG

# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Basics . . . . .	1
1.2	First steps . . . . .	4
1.3	Menu . . . . .	5
1.4	ISO selection . . . . .	6
1.5	Battery . . . . .	7
1.6	Mounting/adapters . . . . .	8
<b>2</b>	<b>Exposure modes</b>	<b>10</b>
2.1	<b>A:</b> aperture priority (default) . . . . .	10
2.2	<b>S:</b> shutter priority . . . . .	11
2.3	<b>M:</b> manual mode . . . . .	11
2.4	<b>EV:</b> exposure value . . . . .	12
2.5	Exposure Compensation . . . . .	13
<b>3</b>	<b>Operating modes</b>	<b>14</b>
3.1	Inverted mode . . . . .	14
3.2	Low resolution mode . . . . .	15
3.3	Adaptive behaviour . . . . .	15
<b>4</b>	<b>Measurement and calibration</b>	<b>16</b>
4.1	Introduction . . . . .	16
4.2	Calibration . . . . .	16

4.3	User calibration . . . . .	17
<b>5</b>	<b>General exposure advice</b>	<b>19</b>
5.1	Exposure compensation . . . . .	20
<b>6</b>	<b>Technical data</b>	<b>23</b>
<b>7</b>	<b>Service/Cleaning</b>	<b>24</b>
7.1	Cleaning . . . . .	24
7.2	Drill markings . . . . .	24
7.3	Dismantling . . . . .	24
7.4	Problems . . . . .	25



# 1 Introduction

## 1.1 Basics

The Lime One is designed in a way that most experienced photographers probably only need to check out the quick guide. Additionally, this manual contains a detailed description of all the functionality and operation of the Lime One light meter.

A German language variant of the quick guide is available on [hedeco.de](http://hedeco.de)

① rotary wheel

② push-button

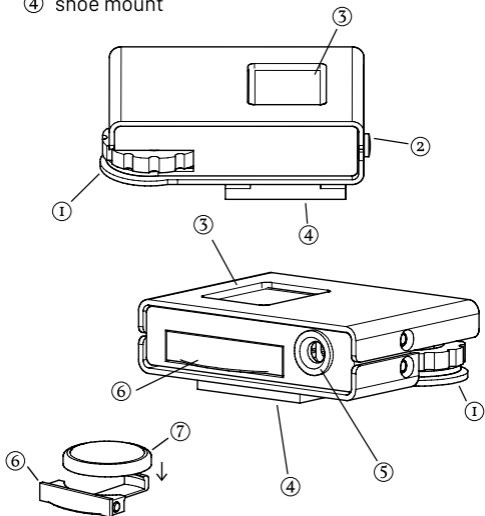
③ OLED display

④ shoe mount

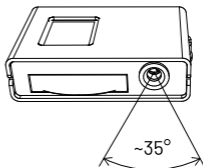
⑤ sensor window

⑥ battery drawer

⑦ CR2032 battery



**Field of view:**



**rotate wheel ①:**

change primary parameter

**rotate wheel ① while button pressed ②:**

change secondary parameter

**single press ②:**

ON / enter value

**double press 2x ②:**

enter / exit menu

**hold ②:**

lock light measurement

turning it **OFF:**

after 40 seconds the lightmeter  
turns off automatically

## 1.2 First steps

### Step by step first use:

The basic operation of the light meter with the default settings (aperture priority mode) is as follows: Attach the light meter to your camera via the accessory shoe. Power the meter on by pressing the push button ②. Double press the button ② and use the wheel ① to go to the ISO screen. Press the button to select the film ISO using the control wheel. Double press ② again, to go back to the main info screen.

Being on the main info screen, rotate the control wheel to change the aperture to the desired value you also have set on your lens. The light meter continuously updates its reading depending on where you point the meter at, while calculating and updating the corresponding shutter speed.

When you are comfortable with a reading, transfer the shutter speed to your camera shutter dial and take the picture.

If desired, the exposure compensation can be changed



by simultaneously holding the button ② while rotating the control wheel ① (see section 5.1 for more on exposure compensation).

To lock the reading after framing using the eye piece, hold down the button ②. This locks the reading until the button is released.

The meter shuts off automatically after 40 seconds of not having an input.

## 1.3 Menu

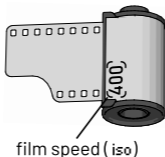
The menu allows the setting of the exposure modes (MODE), the ISO (ISO), the operational modes (SETUP), the calibration offset (CALIB) as well as the display of the version screen (VERS.).

The menu is entered and exited by pressing button ② two times in short succession (like a double click on a computer). Rotate the wheel ① to the desired setting to change and enter the selection by pressing the button.

The contents of the menu and each setting are described in the upcoming sections.

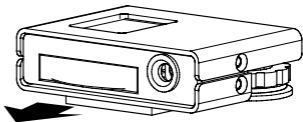
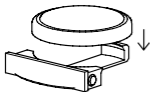
## 1.4 ISO selection

The ISO, also called "film speed", describes the sensitivity to light of the used film or emulsion. It is the second parameter selectable in the menu.



For long exposures of more than a couple of seconds, please look up and account for the reciprocity failure of the specific film/emulsion.

remove the battery drawer with care!



battery orientation: upside down  
text and markings on bottom!

## 1.5 Battery

The Lime One is designed to work with a **CR 2032** coin cell. Similar coin cells like the CR2025 could also work, as long as they output 3V and have the 20mm diameter, though because of their thinner size, they have a shorter battery life.

The battery indication is displayed as a percentage on the menu screen (BAT:). **This is only an estimate:** It uses the cell voltage as a way to gauge the battery level, which is affected by a lot of different factors, so the following behaviour is expected:

- Depending on the individual coin cell, it can go

pretty fast from 100% to 90%

- Using it very heavily during a single day, it may show a lower estimate at the end of the day and recovers the next day
- After not using the meter for a couple weeks, it may even show a higher estimate directly after powering on, going down to a more realistic level after a moderate amount of use

## 1.6 Mounting/adapters

The light meter can be mounted on any accessory shoe mount, be it a cold or a hot shoe. The sprung ball on the bottom of the shoe mount isn't electrically connected, so it should not interfere with any camera.

Cameras where the accessory shoe mount only grips the sides (some Leica cameras for example) can result in a loose grip, since the sprung ball can't work in that configuration. Strips of adhesive tape (e.g. electrical tape) on the bottom of the meter-mount can then improve the friction fit.

**Please note when using the optional adapters:** When storing the adapters for more than a couple of days: remove any devices attached to the adapter and remove it from the camera if there is a tight fit. Since plastic can creep, leaving it stressed may decrease the clamping force of the integrated spring elements!

Use the optional adapters as necessary, note that using the dual-slot adapter backwards (rotated 180°) results in an "offset" adapter that may be useful for some obstructions on some cameras.

## 2 Exposure modes

For displaying and calculating the exposure parameters, there are four modes available:

### 2.1 A: aperture priority (default)

You choose the aperture f-number, the light meter then calculates the appropriate shutter speed.

Aperture priority is probably the most popular mode. By choosing a small aperture (big f-number e.g. f11) the depth of field is increased, having sharpness spanning near and far elements of the frame.

Choosing a big aperture (low f number e.g. f2.0) you can shorten the needed shutter time in low light or use the shallow depth of field to isolate subjects. Objects in focus appear sharp while the background is blurred.

## 2.2 S: shutter priority

With shutter priority, you set the desired shutter speed and let the light meter calculate the corresponding f-number to set on the aperture.

This is helpful for example when shooting sports or fast moving subjects, when a manually selected fast shutter speed results in reduced motion blur in the picture.

Also when shooting in low light while wanting the biggest depth of field possible, setting the shutter speed to the slowest comfortably hand held speed possible (e.g. 1/30 or 1/15) results in the calculation of the smallest useful aperture to gain the highest depth of field.

## 2.3 M: manual mode

With manual mode, you set both the aperture (control wheel) as well as the shutter speed (holding button + control wheel).

In this mode, the resulting over or underexposure of

the current settings is displayed on the scale usually used for displaying the exposure compensation. Displaying the current over- or underexposure in real time makes it easy to “scope out” a scene. This way it is easier to judge which areas will be over or underexposed.

## **2.4 EV: exposure value**

The exposure value (german “Lichtwert”) can be interpreted as a combination of a camera’s shutter speed and f-number, such that all combinations that yield the same exposure have the same EV. Some cameras allowing the shutter and aperture controls to be locked together such that, when one is changed, the other is automatically adjusted to maintain the same exposure.

The value is identical to the “light value” LV when the light meter is set to ISO 100 with no exposure compensation applied.

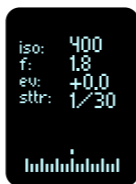
Changing the ISO/exposure compensation adjusts the exposure value reading accordingly.



## 2.5 Exposure Compensation



-2/3 stops



neutral



+1 stop

All modes (except manual) allow the setting of the exposure compensation. This means that you can set over or under exposure in  $\frac{1}{3}$  stop increments up to 3 stops over/under exposed. See "Basic exposure advice" in section 5.1 on page 20 for more information on when and how to use this feature.

For a neutral exposure, make sure to set it to +0.0

On the main display it is displayed as `ev:` and as a bar graph on the bottom.

## 3 Operating modes

In the Setup screen there are multiple combinations for operating the light meter. In addition to normal mode there are two additional settings: inverted and low resolution mode.

In normal mode the light meter is continuously reading and calculating the exposure values. Changing the exposure settings with the control wheel happens in  $\frac{1}{3}$  stop increments. Locking a measurement happens by continuously pushing down on the button, starting new measurements as soon as the button is released.

### 3.1 Inverted mode

Inverted mode changes the behaviour of the button: it continuously updates the measurement/display of the exposure values when continuously pushing down on the button, while locking in the latest measurement when releasing the button.

## 3.2 Low resolution mode

Low resolution mode allows faster operation, when  $\frac{1}{3}$  stop accuracy is not needed. Most cameras only allow the changing of the exposure settings in one stop increments, so it can be useful to have settings change and displayed in one stop increments. Instead of 3 clicks of movement on the control wheel to change one stop, you now only need one.

## 3.3 Adaptive behaviour

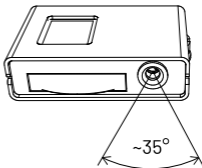
- the meter is dimming down the brightness of the display once a threshold is reached (below EV 6.7, for example below ISO 100 f2.0 1/25s)
- If either the range of the sensor or the calculable parameters is reached or exceeded, "range" will blink on the main display. Examples: sensor reading below -3.0 EV or the calculated aperture f-number lies below 0.7
- To increase accuracy in low light the update rate of the meter is reduced from roughly 10 updates every second to just one every second (Below EV 6.0).

## 4 Measurement and calibration

### 4.1 Introduction

The light meter uses photo diodes to measure the incoming light. The direction dependency of the photo sensor follows a Gaussian bell curve. Combined with the cone shaped aperture, it results in a field of view of roughly  $35^\circ$ . It's similar to that of a 50mm lens on a 35mm film camera, measuring center weighted.

**Field of view:**



### 4.2 Calibration

The light meter is calibrated to  $\pm 1/3$  of a stop when manufactured. When going to the menu in the cali-

bration screen "CALIB", the current calibration offset (most likely 0.0) is displayed.

## 4.3 User calibration

User Calibration using a reference camera:

Any camera that has working metering, be it digital or analog, can be used as a reference for the light meter. Using a 'standard' lens is preferred, so on 35mm film a lens in the 35mm to 50mm range of focal length. If the metering can be changed, it should be set to average or center weighted average.

It is important, to set the camera ISO setting the same as the light meter ISO setting. When using a digital camera, make sure not to use auto-ISO. When using a 'newer' 35mm film camera, a film canister with DX code (black/silver checker board pattern on the film canister) may be needed to be loaded in the camera.

Use the light meter in the mode most closely resembling the mode on the reference camera (most likely aperture or shutter priority). Compare the reading of the light meter and the camera and if needed, adjust

the value in the CALIB menu

Be careful when trying to use incident/spot meters for calibration. The Lime One uses reflective metering like most cameras do, so the opportunity of error increases using a dissimilar metering method.

## 5 General exposure advice

While the light meter will measure and calculate the most “neutral” parameters to set, the photographer still has to interpret these measurements and calculations. There is probably an infinite amount of information and advice on that topic, but as a start the following topics should at least cover the basics.

### **Different film types**

Negative color and black and white films generally handle overexposure better than under exposure, so overexposing by one or two stops will be OK in most cases. Underexposing even one stop meanwhile will probably result in losing detail in the shadows.

Note that overexposing can change the color/contrast response of that film. In some cases, this may even be desired as an artistic choice.

Slide/reversal film on the other hand needs to be fairly accurately/ neutrally metered, since the dynamic range in both the highlights as well as the shadows is limited.

Sometimes slightly underexposing a frame can be advised, if blown out highlights would be problematic.

## 5.1 Exposure compensation

The Lime One offers exposure compensation settings (see section 2.5). While most of the time a neutral exposure is sufficient, here are some situations in which it is advised:

### Using filters

Using filters always reduces the total amount of light coming into the camera, so adjusting the over exposure accordingly takes that effect into account.

If you are unsure how much your filter needs to be compensated, the following should be a good approximation: Go into "EV" mode and find a neutral wall with consistent brightness to direct the light meter at. Take a reading with and without holding the filter directly in front of the sensor. The difference between these two values amounts to the over exposure needed.



## Challenging lighting

Since the light meter takes an average across the frame, having bright elements in the background results in an underexposed foreground.

Examples indoors: unshaded light bulbs, a bright window, uneven lighting. Examples outdoors: Snow, a bright sky, the sun.

In these scenarios overexpose by one or two stops (ev: +1.0...+2.0).

Similarly, if the scene is mostly dark in colour it makes sense to under expose by one stop (ev: -1.0). Examples: photographing a black car or a black steam locomotive.

There also are situations where multiple exposures can make sense. Example: a portrait shot with the sun at sunset in the frame:

If you want to capture the deep colors of the sunset while having only the silhouette of the person visible, underexpose by one stop. If instead the skin tones

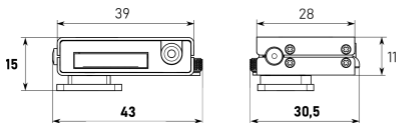
should still be visible, overexpose by two stops.

### **Parallax error**

Similar to framing using a viewfinder or TLR camera, the parallax error must be accounted for. The offset of the meter in relation to the lens of the camera distorts the desired measurement area.

When doing close-up or macro photography, aiming the meter towards the subject when metering is advised.

## 6 Technical data



size	43x30,5x15 mm
weight	16 g
battery	3V CR2032
aperture	f0.7 ... f1024
shutter speed	1/8000s ... 8 hours 20 minutes
ISO	0.5 ... 12800
stepsize	1/3 stop (optionally 1 stop)
dynamic range *	-3 ... 20 EV

\*: Below 0 EV: lower resolution, more noisy signal

This device conforms to European (CE), US (FCC) and Canadian (IC) EMC directives. See [hedeco.de](http://hedeco.de) for conformity delcarations.

# 7 Service/Cleaning

## 7.1 Cleaning

With normal use the light meter should not need any servicing. If parts require cleaning, use solvent free cleaning solutions. If this is not sufficient, using small amounts of isopropanol alcohol is also fine.

## 7.2 Drill markings

In case one wants to modify the placement of the shoe mount to a center or left-aligned position there are four laser engraved markings for potential drill holes on the bottom of the meter. Please read the section below before disassembling the meter.

## 7.3 Dismantling

If there is any reason to dismantle the light meter, use a Phillips PH00 screwdriver if possible. **Don't overtighten the screws when reassembling!** As long as they

don't have any play they should be secure enough. Because of the small thread size it is very easy to strip the threads.

While the 6 screws on the outside can be removed without problems, note that the 2 screws holding the shoe mount also clamp the ball detent spring! Always keep the parts under pressure when screwing/unscrewing that part, otherwise the spring/ball has a high chance of escaping in an uncontrolled manner.

## 7.4 Problems

Please check the website [hedeco.de](http://hedeco.de) for the latest updated version of this manual.

If there are exposure issues, take note of section 4.3 to undertake user calibration. Please first check if the camera you are using is working correctly (slow clockwork? sticky aperture? etc.). Also check if your film is expired and adjust your settings accordingly.

Static shock: While the light meter is designed to handle normal electrostatic discharges, there may be rare

cases with a high enough charge that require a restart of the light meter by reinserting the battery.

Other electric errors: Remove the battery for more than 60 seconds for a true restart. In some rare error states the internal capacitors can remain charged for at least 30 seconds, keeping the controller in a faulty state. A true "reset" then will only occur when removing the battery for a longer period of time.

If there still are problems, errors or faulty calibration, please contact

hello@hedeco.de

HEDECO GmbH  
Josephspl. 8  
90403 Nürnberg  
Represented by: Johannes Heberlein

Register entry  
Entry in: Handelsregister  
Register Number: HRB 37837  
Register Court: Nürnberg

Twitter/Instagram: @hede\_co\_

Youtube: HEDECO

email: hello@hedeco.de

hedeco.de