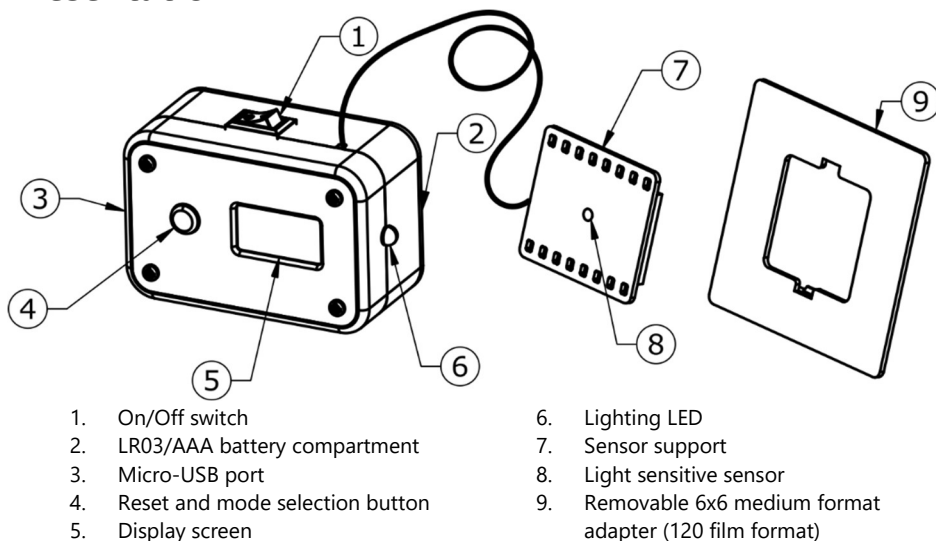


Baby Shutter Tester – User Manual

The Baby Shutter Tester is a device designed to check the accuracy of the shutter speed of film cameras.

Presentation



Setup

The device can be powered either by a micro USB cable or by two LR03 (AAA) batteries. When the device is powered through the USB port, the On/Off switch is not functional.

It is necessary to **remove the batteries**

- When not using the device for a long time
- **When you power the device using the USB port**

The Baby Shutter Tester should be kept away from moisture and heat sources.

It is designed to operate over a temperature range from 5 to 40°C.

Measurement operation

- Open the back of your camera.
- Place the sensor on the back of the camera, in place of the film. With medium format cameras, use the supplied adapter. Be sure to center the sensor, and hold it with a rubber band or other device.
- Place the main box in front of your camera, raising it if necessary, so that the illumination LED of the device is in front of the sensor. The Baby Shutter Tester LED has an illumination cone of 20°. It is necessary that the sensor is located in this lighting cone. Avoid projecting the light beam towards the eyes
- Turn on the baby Shutter Tester. The box displays "Ready" and the lighting LED is on

- To be sure that the Baby Shutter Tester box and its sensor are correctly positioned, use the Test mode (see next chapter)
- Select the speed you want to measure on your camera. **To perform precise measurements at high speeds** (1/500th of a second and faster), place your assembly on a fixed frame and **first calibrate the tester** (see chapter "Autocalibration Mode")
- Trigger your camera's shutter. During the shutter opening phase, the Baby Shutter Tester displays a sun picture in order to indicate that it detects light. This phase can be very brief, depending on the speed chosen on the camera.
- Once the shutter is closed, the measured speed value is displayed on the screen
- Compare the measured value with the value chosen on the speed selector of your camera
- To perform a new measurement, press the reset button.

When The Baby Shutter Tester is used rigorously, it can perform measurements ranging from several seconds to 1/4000th of a second with an accuracy better than 1/10th stop.

The different operating modes

The initial operating mode of the Baby Shutter Tester is the "Measurement" mode, with which speed measurements are carried out.

But the device also has other operating modes, that can be used to facilitate positioning, to display information or to carry out the self-calibration of the device. A long or short press on the device button allows you to navigate from one mode to another.

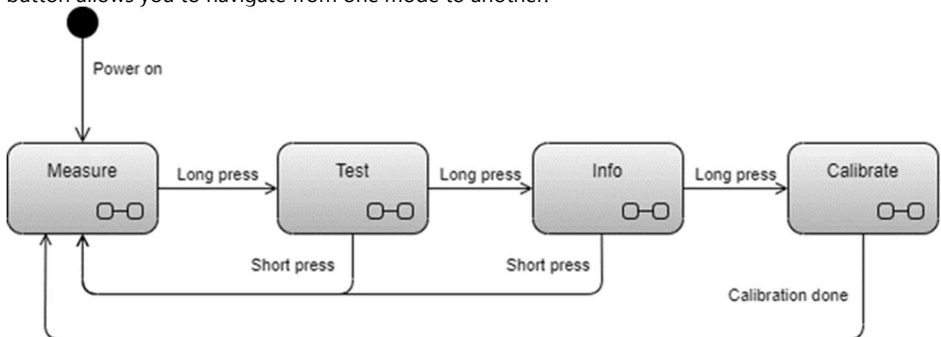


Figure 1: Operating modes and transitions from one mode to another

Measurement mode

This mode allows you to measure the speed of your camera.

For slow and medium speeds (up to 1/250th of a second), the measurement can be performed without any particular precautions.

For higher speeds, it is necessary to place your camera and your tester on a fixed frame and to first carry out the calibration of the assembly (see chapter "Autocalibration mode").

Test mode

In this mode, the device does not perform measurements, but keeps the illumination LED on and displays a sun picture when the sensor detects light.

This mode allows you to correctly set the sensor at the back of the camera, and the LED at the opposite and at the right height.

When you consider you have positioned everything correctly, select a slow shutter speed or pause B on your camera and release shutter. If a sun picture appears on the tester, the device and sensor are correctly positioned.

Information mode

In this mode, the screen displays information about the device, including its firmware version number.

Autocalibration mode

Introduction

Measuring the opening time of a shutter looks like a simple exercise. It only needs to start and stop a timer when a photosensitive sensor detects the light during the open time of the shutter, and then display the result to the operator.

For slow to medium speeds (typically up to 1/250th of a second), we can make the approximation that the shutter has two states: open or closed. The measurement does not require any particular calibration.

For higher speeds, this approximation is no longer valid and it is necessary to also consider the intermediate phase where the shutter is neither completely open nor completely closed.

With a focal plane shutter for example (shutter made up of two curtains placed close to the plane of the film), the intermediate phase is when the opening or closing curtain moves in front of the tester sensor and partially masks it. For an accurate measurement, the sensor must trigger the timer at the moment when the shutter is exactly at the middle of the sensor. Too sensitive and time will be overestimated (and speed underestimated). Not enough sensitive and the time will be underestimated (and therefore the speed overestimated).

This is the role of calibration: adjust the sensitivity of the sensor so that it triggers exactly at half-illumination.

Procedure

- Proceed in dimmed light, so that the light which hits the sensor comes mainly from the LED of the tester
- Place the sensor firmly on the camera (use for example an elastic band)
- Place the tester case with its LED in front of the camera, fixed on a frame.
- Select a slow speed on your camera (1/30th or slower)
- Select the self-calibration mode, the tester displays "Calibrate" and its LED is lit
- Trigger the camera and note the value that briefly appears on the display screen of the tester. If this value is negative, it indicates that the LED is too close to the sensor. If it is positive, it indicates that the LED is too far from the sensor.
- Adjust the distance from the LED to the sensor and restart the calibration until the indicated value is close to 0 (plus or minus 10)

You can now perform speed measurements with the highest accuracy. Make sure neither the distance nor the angle of the LED to the sensor is changed.

Specificity of the measure according to the type of shutter.

There are mainly two types of shutters:

- Leaf shutters
- Focal plane shutters (curtain shutters)

The Baby Shutter Tester gives an indication of shutter speed as a single value.

However, there are some cases where this simple value is not sufficient to determine the exposure.

Leaf shutter

The central shutter has the characteristic of operating in three phases : opening, full opening, and closing.

When the full aperture lasts a long time compared to the opening and closing phases, everything is fine, the speed measured corresponds to the exposure that the film will have. When this is no longer

the case (for very high speeds, but also if the speed of the shutter leaves is too slow), you may have a discrepancy between the measured speed and the actual exposure you will get. The film, since the intermediate phase during which the shutter is neither completely open nor completely closed is important.

However, there is a way to estimate the phenomenon : If you place the sensor closest to the shutter (lens side, therefore), you can make measurements in the center and measurements on the periphery. The measured time difference will give you the time taken by the leaves to open and close.

Focal plane shutter

The focal plane shutter uses two curtains which move successively, in the same direction. The opening of the first is followed by the closing of the second. If the two curtains move at the same speed over the entire surface, the exposure is uniform and is given by the measurement of the Shutter Speed Tester.

If the two curtains move at different speeds, this gives exposure differences depending on the parts of the photo. To detect such a phenomenon, place the sensor at different positions on the back of the camera to make your measurements and check that the measurement values are identical regardless of the location of the sensor. This method is however only valid if the shutter speed is regular. Make several measurements to verify this point.

Note that the Baby Shutter Tester cannot measure the translation speed of the curtains.

Manufacture

This product has been designed and manufactured in France. Its assembly is made according to an artisanal process. The case is printed individually on a 3D printer with a bio sourced raw material produced in Europe.

Its design comes from the Shutter Speed Tester open-source project (github.com/sebastienroy/shutter_speed_tester).

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Document version : en_1.1.0_-C