Image Engineering LG3 Transmissive Light Box User Manual

Contents

Image Engineering

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INTRODUCTION

Important information: Read the manual carefully before using the device. Inappropriate utilization may cause damage to the device, to the DUT (device under test), and/or other components of your setup.
Keep these instructions in a safe place and pass them on to any future user.

Conformity

We, Image Engineering GmbH & Co. KG, hereby declare that the LG3 corresponds to the essential requirements of the following EC directive:

- Electromagnetic Compatibility – 2014/30/EU
- Photobiological safety of lamps and lamp systems – IEC 62471:2009

Intended use

The LG3 is a high-intensity illuminator based on LED technology for transparent charts. It is capable of flicker generation with variable frequency and variable duty cycle. The external controller unit and the LG3 Software can control the device.

- Only suitable for indoor use.
- Place your system in a dry, constant tempered environment without light interference.
- The optimal ambient temperature range is 22 to 26 degrees Celsius. The maximum ambient temperature range is 18 to 28 degree Celsius.
- The system has an internal temperature management system, if there is any error regarding the internal temperature, you will get a warning message, and the system automatically turns off to avoid any damage.

General safety information

Do not open the device without instructions from the Image Engineering support team and when connected to the

power supply.

Photosensitive epilepsy
A few users with pre-existing conditions may experience seizures while using the flicker mode of the LG3. Certain frequencies and intensity combinations may trigger seizures with no prior medical history. Reframe using the device and consult a doctor immediately if you experience sickness while using the LG3.

Eye safety
The LEDs used in the LG3 can be classified as belonging to the Exempt Group or Risk Group 1, according to IEC 62471:2009.

GETTING STARTED

Scope of Delivery

LG3 Control Holder and Tripod

- LG3 control unit
- LG3 illumination unit
- Tripod handle
- Power supply cable
- USB cable
- 2x spare fuses (2A)
- Flight case
- Control software

- User manual
- Calibration protocol

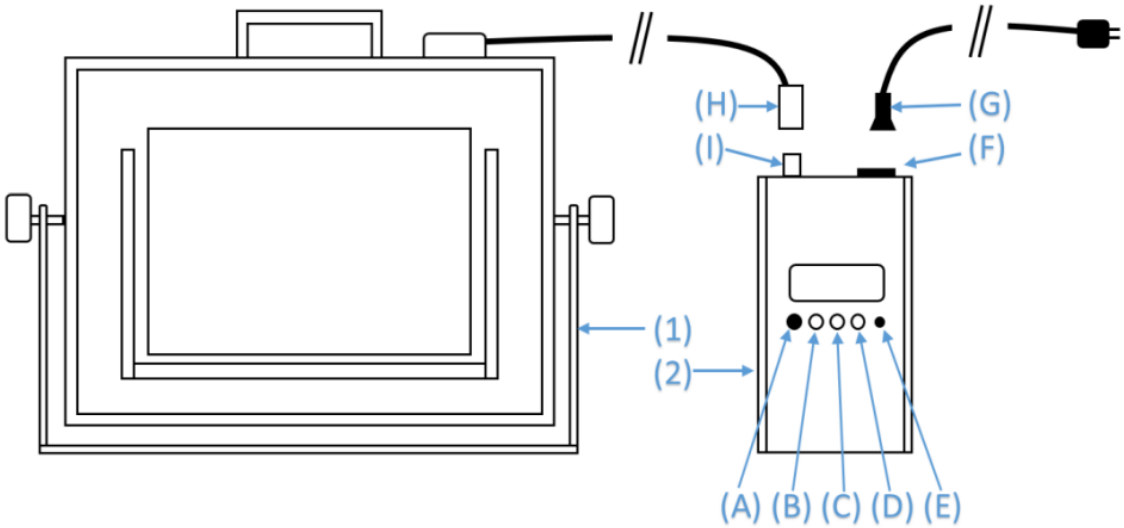
Optional equipment:

- LG3 Control Holder and Tripod
- LG C++ API.

Commissioning
Keep all ventilation slits of the LG3 illumination unit free of foreign objects. The minimum clearance is 15 cm.

OPERATING INSTRUCTIONS HARDWARE

Overview



Hardware Overview

1. Illumination unit
2. Control unit
    - A. Multifunctional rotary/push knob
    - B. Multifunctional button (function is stated on the display)
    - C. Multifunctional button (function is stated on the display)
    - D. Multifunctional button (function is stated on the display)
    - E. Display brightness adjustment
    - F. Powerswitch, powersocket and fuses combination
    - G. Power cable
    - H. Ilumination unit connection cable
    - I. Illumination unit connection socket

Connecting the hardware

Connect the illumination unit (1) to the control unit (2):

- Plug the cable (H) into the socket (I)
- All “open” marks must face to the front side of the device
- Turn the lock ring clockwise for a secure connection

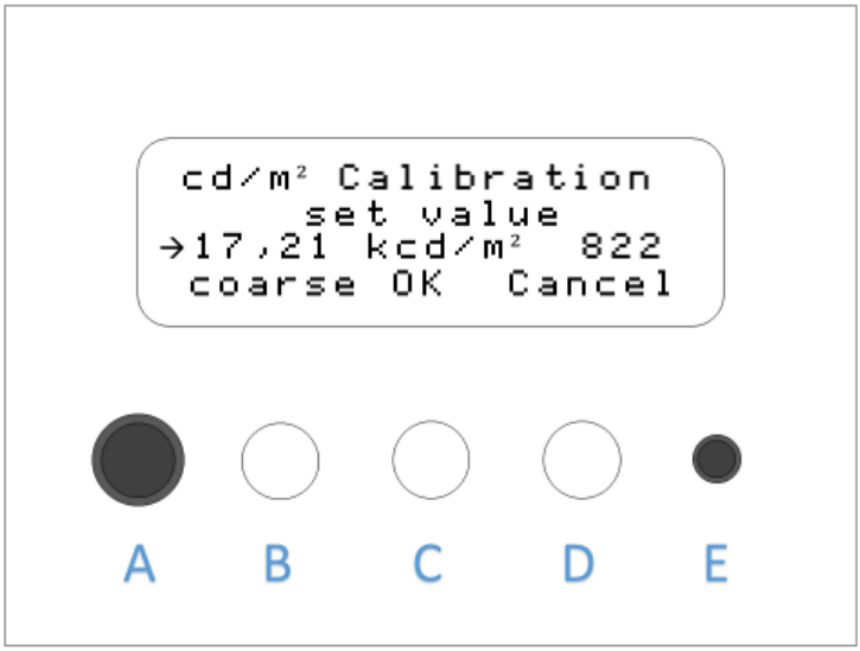
Starting the system

The power switch (F) is located on the upper side of the control unit.

Calibration

The LG3 has a stabilized intensity output, and the system needs to be calibrated to use the output feedback in cd/m² or lux. The LG3 provides two calibration modes.

- Luminance calibration: Luminance is a measure of the emission or reflection from a flat surface in cd/m². For the LG3, the chart surface is measured, but the diffuser plate is measured for shading measurements. Therefore, it measures the emission towards the device under test (e.g., a camera system). Choose a reference point on the chart for the calibration. When using an OECF chart, we recommend the field with the lowest density.
- Illuminance calibration: Illuminance measures how much light illuminates a surface in lux. It, therefore, measures the illumination directed at the light source and is not suitable for a measurement on the chart.



Calibration menu

- Press buttons (B) and (C) simultaneously to enter the calibration menu
- Wait until the calibration reference value is measured; this will take a few seconds
- Switch between luminance and illuminance calibration mode by pressing the rotary knob (A)
- Measure the calibration values with a suitable measurement device (e.g., luminance meter) on the preferred region of the chart
- With the measured value from the external measurement device, rotate the rotary knob (A) to assign the calibration
- Switch between “fine” and “coarse” to set the sensitivity of the rotary knob (A) by pressing the button (B)
- Press the “OK” button (C) to save the calibration and exit the calibration menu
- Press the “Cancel” button (D) to exit the calibration without saving

- The last performed calibration will be activated

The LG3 is factory calibrated. Perform an individual calibration to use it with your charts.

Continuous illumination

Use continuous illumination when illuminating test charts. The continuous illumination is preset as a default on the LG3 start-up. Read chapter 3.5 on how to enter and exit the flicker mode.

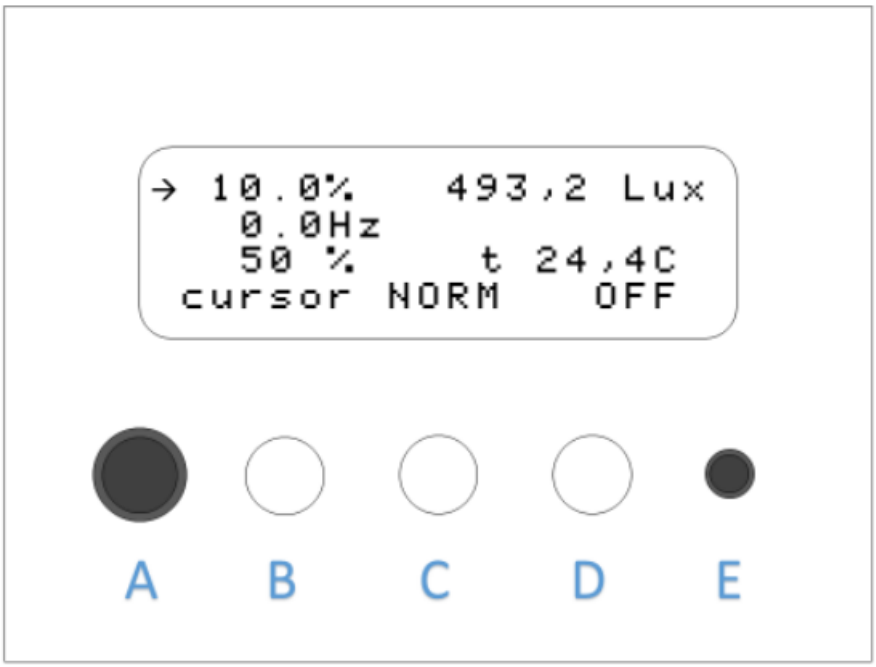
Power modes
Three power modes are available

- LOW: 32 kHz PWM, variable duty cycle, stabilized illumination level
- NORM: 32 kHz PWM, variable duty cycle, stabilized illumination level with higher intensities
- HIGH: direct current, not stabilized, high illumination level (over 150,000 lux)
    - The illumination in the high-power mode is not variable by the user and is preset at the maximum possible intensity
    - Due to the high thermal stress, the high-power mode is available for 60 seconds at a time
    - The device will not start the high-power mode if the LED temperature is too high

PWM (Pulse Width Modulation)
The LG3 uses pulse width modulation (PWM) to control illumination levels. The high frequency of 32 kHz allows a flicker-free image acquisition for most cameras. The constant voltage has the benefit of a constant correlated color temperature.

LED intensity over time at 32 kHz pulse width modulation with 50% duty cycle

Setting the Illumination Level
The illumination level is adjustable. Set the illumination level by performing the following steps:

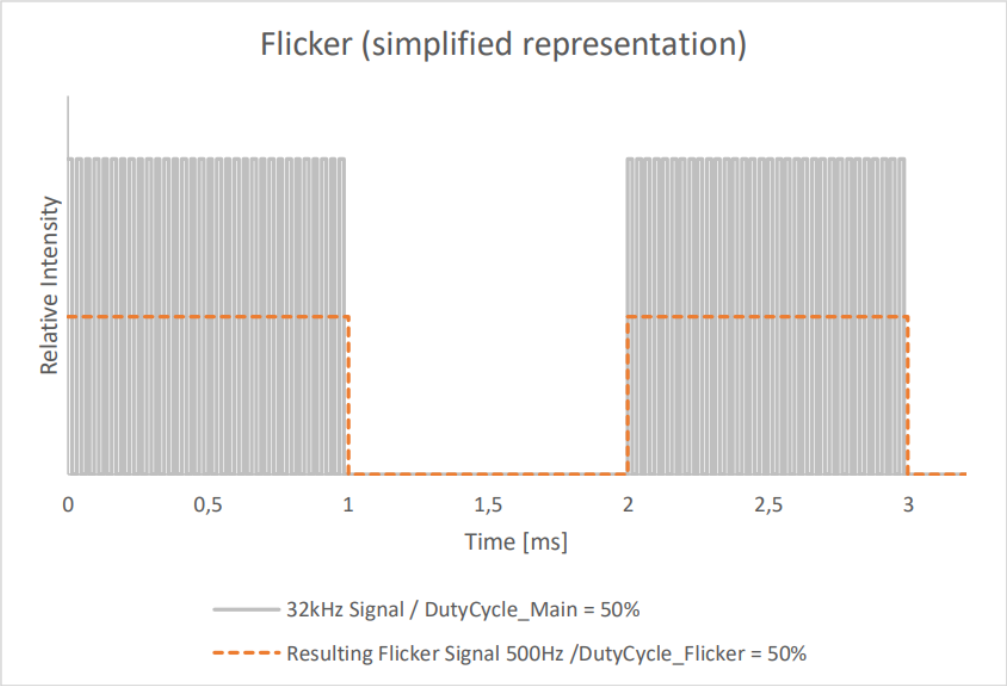


Default settings

- Ensure the selected chart is placed in the chart holder if it is required for your measurement.
- Calibrate the illumination feedback (Chapter 3.3.1)
- Select the power mode by pressing the button (C)
- To enter HIGH power mode, hold button (C) for 2 seconds
- Select the illumination feedback unit by pressing the rotary knob (A). Lux and cd/m² are available. Ensure the selected unit is calibrated with the actual setup
- Toggle the cursor with the button (B) through the settings and change the setting by turning the rotary knob (A)
  - First line: set the actual illumination level in percent and Lux or cd/m²
  - Second line: set the flicker frequency (0 Hz = continuous illumination as described in chapters 0– 0)
  - Third line: set the flicker duty cycle. (Chapter 3.5)
- The stabilization of the set intensity may take up to 10 seconds
- Press button (D) to turn the illumination on and off.

Intensity stabilization
The intensity of continuous illumination in the LOW and NORM modes is stabilized. The LG3 performs independently of the LED temperature, but the stabilization can take from 2 up to 10 seconds. Do not change the chart position in this period.
Light emitted by external light sources or reflected by objects in front of the LG3 can enter the illumination unit and affect stabilization. Place the illumination unit in a dark room and avoid reflective and moving objects in this room.

Flicker
Camera systems are often part of safety systems, such as in the automotive or security industries. Often, they must handle different illumination scenarios, such as traffic lights, LED street illumination, LED stop lights, etc. Different light sources use different frequencies and duty cycles, which can affect the image quality and cause the loss of image information.
The LG3 simulates different light sources with its capability to vary the duty cycle and frequency of the illumination. The adjustable duty cycle settings of the 32 kHz frequency can change the illumination, and the flicker frequency is modulated on the 32 kHz frequency.



Modulated flicker frequencies

Perform the following steps to use the flicker mode for your measurement.

- Ensure the selected chart is placed in the chart holder if your measurement requires it.
- Select the power mode by pressing the button (C)
- To enter HIGH power mode, hold the button (C) for 2 seconds
- Illumination feedback in lux and cd/m² is not available in flicker mode
- Toggle the cursor with the button (B) through the settings and change the setting by turning the rotary knob (A)
    - First line: set the actual illumination level in percentage
    - Second line: set the flicker frequency (0 Hz = continuous illumination as described in chapters 0– 0)
    - Third line: set the flicker duty cycle.
- Press button (D) to turn the illumination on and off.
- For a quick switch between continuous and flicker mode, press the rotary knob (A)

ADDITIONAL INFORMATION

Maintenance

- Do not touch, scratch, or pollute the diffuser.
- If there is any dust on the diffuser, clean it with compressed air or an air blower.

Fuse replacement
In the event of an overcurrent, the fuses will break to protect the device. Broken fuses need to be replaced. Only use T2/250E fuses.

- TURN THE DEVICE OFF
- DISCONNECT FROM THE POWER SUPPLY
- ENSURE ALL CABLES ARE DISCONNECTED

Fuse replacement

Lift the fuse cover located over the power switch using a small flathead screwdriver

- Lift the red fuse holder using a small flathead screwdriver
- Replace the defected fuse
- Place the fuse holder back into the fuse holder socket
- Close the fuse cover

Storage and transport
Store and transport the LG3 only in the delivered hard case.

Disposal instructions
The LG3 must be disposed of properly after the service life is over. Electrical and electromechanical components are included in LG3. Observe your national regulations and ensure that third parties cannot use LG3 after disposing of it.
Contact Image Engineering if assistance for disposal is required.

TECHNICAL DATA SHEET

See annex for the technical data sheet. It can also be downloaded from the website of Image Engineering: **https://image-engineering.de/support/downloads**.

Documents / Resources

	**Image Engineering LG3 Transmissive Light Box** [pdf] User Manual LG3 Transmissive Light Box, LG3, Transmissive Light Box, Light Box, Box

References

- **Image Engineering - Solutions to test image Quality**
- **Downloads**