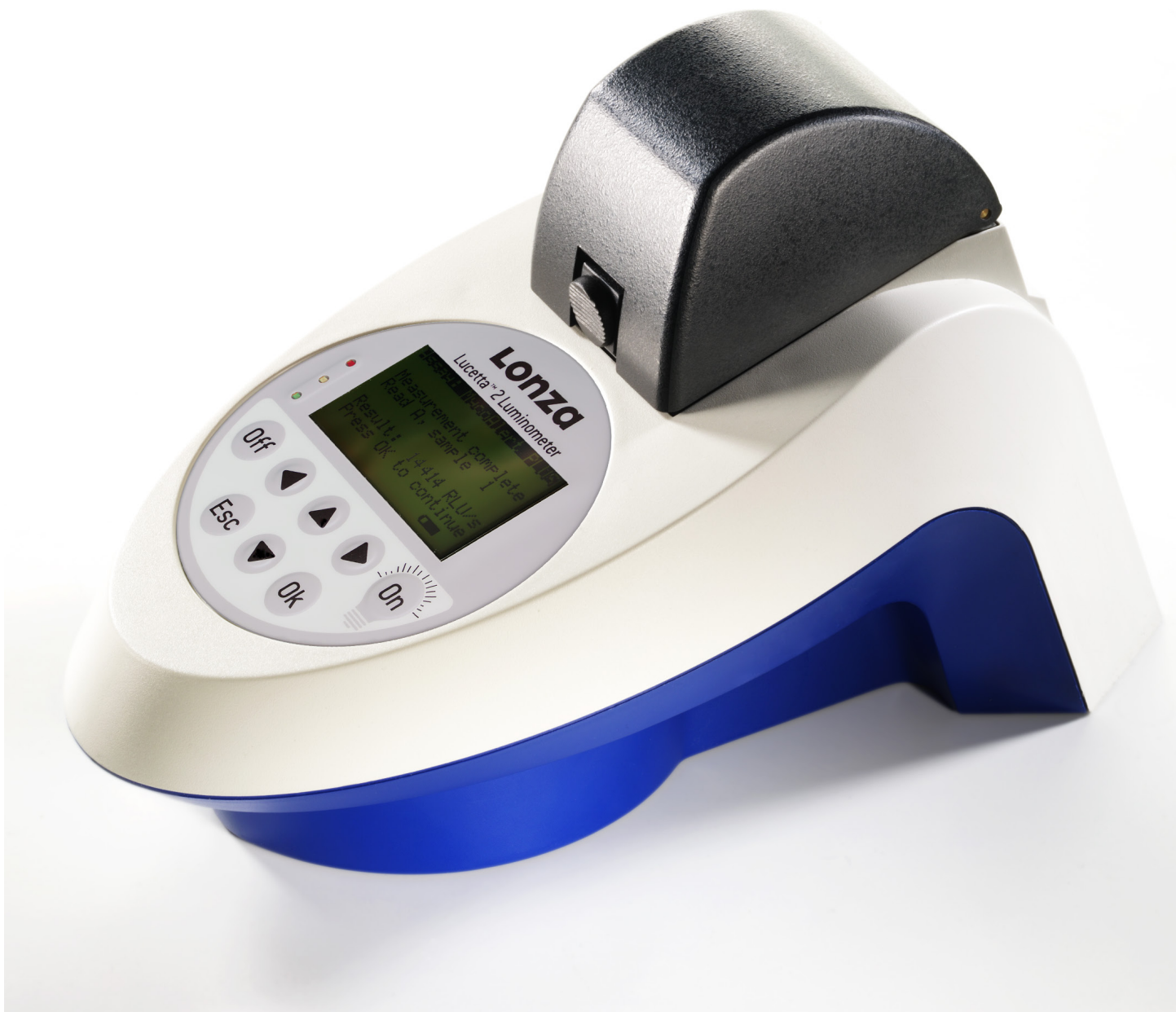




Lucetta™ 2 Luminometer Manual



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1.0 Introduction

1.1 Lucetta™ 2 Luminometer Overview

The Lucetta™ 2 Luminometer is a single tube luminometer developed for the detection of bioluminescence and chemiluminescence. It can be used as a portable battery-operated instrument as well as with an external power supply and is suitable for detecting all luminescence.

Highly sensitive luminescence detection

The Lucetta™ 2 Luminometer is able to detect less than 3 fmols ATP. The sample container is positioned beside the photon counting photomultiplier and the read chamber is sealed to avoid light leakage. Close proximity of the sample container to the highly sensitive photon-counting photomultiplier maximizes light collection efficiency and allows the detection of minimal light intensities.

Robust and reliable construction

The Lucetta™ 2 Luminometer is a lightweight and compact instrument with a measuring chamber for sample intake. After loading a sample, the measuring chamber lid is closed and the measurement automatically begins.

Stand-alone instrumentation

The Lucetta™ 2 Luminometer can be utilized as a stand-alone instrument without a PC. It features on-board software with menu options to optimize sample measurements (MycoAlert™ PLUS and MycoAlert™ Mode or Single Read mode), upload data to a PC and configure system parameters.

Two basic measurement modes

The easy to operate instrument-embedded software is tailored around two basic measurement modes:

- MycoAlert™ PLUS and MycoAlert™ Mode: straight-forward implementation of the procedure for running Lonza's MycoAlert™ PLUS and MycoAlert™ Mycoplasma Detection Assays.
- Single Read mode: allows the user to obtain unprocessed luminescence readings. This mode can be used for Lonza's ViaLight™ or ToxiLight™ Assay or other luminescent assays.

Data storage capacity and transfer

- Each completed measurement is stored in the instrument's internal circular memory with a storage capacity of up to 2,000 single sample readings.
- Furthermore, sample results may be uploaded to a PC to view and analyze results with Microsoft® Excel®. The data transfer to PC is enabled by the Lucetta™ Connect software.

Broad range of applications

Lucetta™ 2 Luminometer applications include:

- MycoAlert™ PLUS and MycoAlert™ Mycoplasma Detection Assays
- ATP assays, e.g. ViaLight™ Cell Proliferation and Cytotoxicity Assay
- Adenylate Kinase assays, e.g. ToxiLight™ Non-destructive Cytotoxicity Assay
- Luciferase reporter gene analysis

1.2 Light Detection

The photomultiplier (detector) is a single photon counter, which measures light ranging from 380 to 630 nm. The photons emitted by the sample are converted into electrons and amplified by the photomultiplier. The individual impulses are counted digitally and are directly proportional in their linear range to the emitted amount of light.

Luminescence is noted in Relative Light Units (RLU). For MycoAlert™ and MycoAlert™ PLUS measurements, the Lucetta™ 2 Luminometer reports RLU/s values. For Single Read measurements, the Lucetta™ 2 Luminometer reports in RLU values. The readout is integrated over the measurement period where RLU values in time intervals of 5 ms are gathered.

2.0 General Use Instructions

2.1 Use Restrictions

The Lucetta™ 2 Luminometer is intended for research and investigational use by professionals only. Please note that it is not intended to be used for diagnostic purposes or for testing or treatment of humans.

The Lucetta™ 2 Luminometer may only be used for measurement of glow type bio- and chemiluminescence of samples in tubes. The instrument may not be used for purposes other than those described above.

2.2 Maintenance

The Lucetta™ 2 Luminometer is low maintenance. It should be protected from dust and debris.

The surface of the instrument is protected by a robust and washable finish. Should it become dirty or dusty, we recommend wiping it with a damp cloth or optical grade tissue. If necessary, a mild, non-abrasive detergent can be used. The instrument can be cleaned by wiping with 70% (v/v) ethanol if required. Acetone damages the instrument coating and should NOT be used for cleaning!

The sample holder must be kept clean and wiped with a damp cloth if dirty.

No free fluid should ever enter the instrument! If this occurs, disconnect the instrument immediately, remove the test tube and turn the instrument upside down to remove the fluid before it enters the measuring chamber. Contact the Lonza Scientific Support Team immediately!

Rechargeable batteries

Nickel metal hydride (NiMH) batteries are used to wirelessly operate the Lucetta™ 2 Luminometer.

Batteries should be allowed to fully deplete, then fully recharged every couple of months.

Discharging duration: approx. 6 h

Recharging duration: approx. 4–5 h

2.3 Safety Instructions and Use Precautions

Lucetta™ 2 Luminometer instruments have been tested by the manufacturer, certified by international safety standards and are safe to use when operated in accordance with this manual.

Please adhere to the following safety instructions and use precautions before and during operation of the system or taking the instrument into service:

- Read and understand the the Lucetta™ 2 Luminometer Manual prior to using the instrument. All potential users should have access to the manual and should read and understand it prior to using the instrument.
- The Lucetta™ 2 Luminometer can be operated using an electrical outlet or as a portable, battery-operated instrument. Ideally, battery charging occurs while the instrument is not in use, e.g overnight. To charge the battery, the instrument should be attached to the provided AC power supply/charger and turned on.
- The power supply must be connected to a wall outlet complying with local regulations of the country of its installation and providing voltage and current according to the specification of the power supply.
- Do not connect the power cord near fluids to avoid electric shock and burning. The power cord must never become wet!
- **When charging the instrument or operating with an external power supply, make sure to use ONLY the originally provided power supply. Substitution may create a hazard and harm the instrument.**
- Unauthorized opening, modification, repair, or improper usage of the instrument may result in damage and will void all warranties.
- The instrument may only be used for its intended purpose (see section 2.1).

It is the operator's responsibility to adhere to local regulations when installing and operating the system.

- The user must ensure the instrument is configured and installed such that functionality is not impaired. Please refer to the setup instructions (section 3.2).
- The instrument should be utilized only when located on a stable table or bench.
- Do not expose the instrument to a humid environment (>70%).
- The instrument should not be exposed to direct sunlight nor be located in a hot environment (above 30°C).
- The instrument is not approved for use in fire or explosion potential areas, nor for use with flammable or explosive media.
- The sample holder must remain free of dust and contamination. The holder should only be open during sample loading/unloading and cleaning.
- Use only specified sample tubes.

- Assays must be validated with the instrument prior to routine use.
- Certain biological and chemical components and samples may pose a hazard or infection risk. Always refer to the description of the sample to ensure adequate safety precautions are in place. Utilize appropriate protective equipment to avoid exposure.
- Servicing and repair may only be performed by Lonza authorized personnel.
- The user may perform only those maintenance steps specifically described in this manual (section 2.2).
- The instrument must be decontaminated before repair work or service.
- Do not enter or place foreign objects in the sample area.
- Avoid liquid spills on the instrument housing and in the sample area. Wipe up all spills immediately and decontaminate the instrument surfaces appropriately.

Note

If liquid gets inside the instrument, switch off the instrument immediately. Do not operate the instrument if internal components have been exposed to fluids. The instrument must be cleaned by Lonza authorized personnel.

- Handling of instrument components with potential sample contamination shall always be performed with protective gloves. Disposal of parts must be according to federal, state or local procedures for biohazardous waste handling and disposal. Use secure leak proof containers and avoid unprotected handling of parts.

Lonza Cologne GmbH and its distributors disclaim all warranties, either expressed or implied, and shall in no event be liable for damages, including those to third parties, caused by or arising from improper installation or any operation or use in violation of the above safety and handling instructions.

2.4 Storage Conditions

For shipping and long-term storage, the instrument should remain in the original cardboard box in a dry, dust-free environment and protected from direct sunlight and significant temperature fluctuations. Storage conditions should remain at 5–40°C and up to 80% humidity at 30°C, non-condensing.

2.5 Batteries

To charge the battery, the instrument is attached to the provided AC power supply/charger and switched on. Battery charging should be done when instrument is not in use, e.g overnight. The instrument holds three NiMH batteries each 1.2V/4000 mAh.

In case of battery defect, please contact Lonza Scientific Support Team. Lonza Cologne GmbH accepts no liability for damage caused by use of other batteries than recommended by Lonza Scientific Support Team.

2.6 Return Shipment

If the instrument has to be returned to Lonza for servicing or inspection, please follow the instructions below:

- Contact the Lonza Scientific Support team to obtain the required decontamination and repair form. Complete both forms before return shipment.

Note

Lonza Cologne GmbH will not accept instruments without completed decontamination and repair order forms.

- Turn luminometer off and disconnect power supply.
- Clean the instrument according to the instructions for cleaning and decontamination listed in the decontamination form.
- Remove any foreign objects that have entered the instrument.
- Contact your local distributor or Lonza representative for specific shipping instructions.
- Contact Lonza Scientific Support for assistance if required.

2.7 Instrument Disposal

Decontaminate the instrument before disposal. This luminometer contains electronic parts. To prevent environmental pollution please dispose of the instrument and the corresponding accessories according to local legislation. Within the European Union dispose the instrument and accessories according to the directive 2012/19/EU (Waste of Electrical and Electronic Equipment) or contact your local Lonza representative.

3.0 Setup Instructions

3.1 Lucetta™ 2 Luminometer Components

The Lucetta™ 2 Luminometer is delivered with the following components:

- 1 Lucetta™ 2 Luminometer Instrument
- 1 Power supply and country specific mains adaptor to load internal rechargeable battery
- User Manual



A



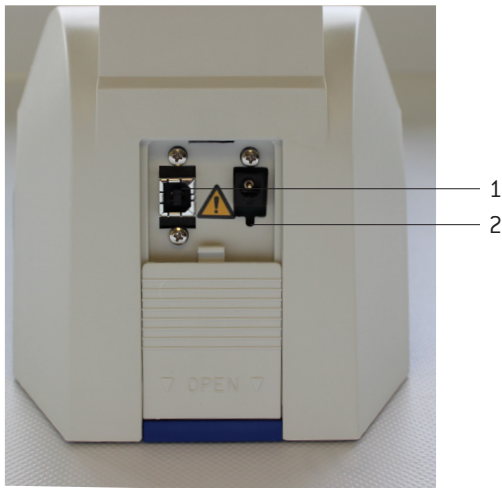
- 1 Graphic display
- 2 Lid

B



- 3 Measuring chamber with tube receptacle
- 4 ON button/ display light
- 5 OFF button
- 6 OK button
- 7 ESC button
- 8/9 Arrow button ▲▼
- 10/11 Arrow button ►◄

Figure 1. Front view of the Lucetta™ 2 Luminometer (A) and display view (B)



- 1 Power cord receptacle
- 2 USB port Type B

Figure 2. Back view of the Lucetta™ 2 Luminometer

3.2 Setup Instructions

- Carefully unpack the instrument and place it on the bench in a dry, dust-free environment, protected from direct sunlight and significant temperature fluctuations.
- To connect the instrument to an electrical outlet, slide the protective panel on the rear of the instrument to the open position to access the power socket. Plug in the power supply delivered with the instrument and connect to a suitable outlet. Refer to the power and safety information in sections 9.2 (Technical Data) and 2.3 (Safety Instructions and Use Precautions).
- Turn the instrument on by pressing the ON button. The display will illuminate when ON button is pressed a second time.
- Check the status of the rechargeable battery via the charging indicator on the lower right corner of the display (Figure 3). If the battery is low, please fully recharge it before using the instrument or attach the instrument to an electrical outlet.



- 1 Charging indicator

Figure 3. Display view with charging indicator

3.3 Optimal Operation Temperature

It is strongly recommended to operate luminescence measurements at room temperature (20°C) to achieve the performance characteristics listed in the technical data. The general operating range is 15–30°C and below 70% humidity.

3.4 Battery Operation

The Lucetta™ 2 Luminometer is equipped with a rechargeable battery.

- The battery status can be checked via the charging indicator on the lower right corner of the display.
- A full battery charge requires 4 to 5 hours. Prior to the first use, or after a long period of unuse charge the battery for at least 5 hours.
- Ensure the instrument is switched on during the charge time.
- The battery lifespan depends on the power-on time of the instrument, the use of display light and the age of the battery. The battery may auto-discharge when the instrument is not used for an extended period.
- To optimize the battery lifespan, the display light switches off after 15 sec if the instrument is not in use.
- A warning message is displayed 10 minutes before the battery becomes fully discharged. This is indicated by the message “Battery low”. Connect the instrument to the charger and charge the battery for at least 5 hours. If the battery is not charged, a second warning message “Battery empty” is displayed. The instrument shuts down automatically after another 10 minutes to avoid deep discharge and needs to be connected to the charger if switched on again.

3.5 Electrical Outlet Operation



When performing measurements while connected to an outlet, the battery should be fully charged. If possible, avoid charging of the battery during measurement, as charging elevates the instrument internal temperature. During very sensitive measurements or weak luminescence signals, this slight temperature increase may lead to a high dark count signal and influence measurement results.

3.6 Consumables

75 mm length and up to 12 mm diameter, 5 ml polystyrene tubes are recommended (e.g. Sarstedt [Cat. No. 55.476] or BD Falcon Round-Bottom Tubes [Cat. No. 352054]). Alternatively, 1.5 or 2 ml microcentrifuge tubes may be used.

3.7 Quality Control

It is considered good laboratory practice to evaluate samples according to instructions and specific recommendations included in the package insert of the reagent kit or the standard laboratory protocol. Performance failures of Quality Control checks could result in erroneous test data. Samples should be obtained, treated and stored following the instructions and recommendations of the kit insert. Known internal quality standards or samples should be run.

4.0 Lucetta™ 2 Luminometer Operation

4.1 Menu

On the front face of the Lucetta™ 2 Luminometer is an LCD display showing the menus, the measurement parameters, and the measurement results. To open a submenu from the main menu (Figure 4) move the gray select bar up and down by using the two arrow buttons ▲▼. Once at the desired position, press OK to activate that choice.



Figure 4. Main menu of the Lucetta™ 2 Luminometer.

“Run MycoAlert PLUS” or “Run MycoAlert” will take you to the programs for the MycoAlert™ PLUS or MycoAlert™ Mycoplasma Detection Assay, respectively. From here, the MycoAlert™ PLUS/ MycoAlert™ Assay can be performed and the contamination status of cells be determined.

“Run Single Read” will take you to the single read programs. These 6 customizable programs can be used to perform the ViaLight™ Cell Proliferation and Cytotoxicity Assay or the ToxiLight™ Cytotoxicity Assay.

“Results” will allow you to view stored data and upload the data from selected runs to your PC via the integral USB port on the rear side.

“Settings” opens a submenu that allows you to change date/time, review the instrument information and adapt Single Read parameters. End user settings can be protected with a password here. The submenu “MycoAlert Settings” is only accessible by Lonza personnel.

4.2 MycoAlert™ PLUS/ MycoAlert™ Run

Select the correct program for the assay you want to run as interpretation of the results is slightly different. For a detailed description of the assay steps, please refer to the MycoAlert™ PLUS/ MycoAlert™ Assay Instructions.

1. Turn on the instrument by pressing the ON button.
2. Use arrow buttons ▲▼ to select RUN MYCOALERT PLUS when running a MycoAlert™ PLUS Mycoplasma Detection Assay or RUN MYCOALERT when running a MycoAlert™ PLUS Mycoplasma Detection Assay, respectively. Press OK.

Note

Pressing ESC in any of the process related screens will exit the measurement process and bring you back to the start screen. Do not press ESC unless you really want to exit the measurement cycle.

3. Enter the number of samples (1–99) by using arrow buttons ►◀ to select the digit you want to change. Use arrow buttons ▲▼ to select a number from 0 to 9. Press OK. The instrument will first perform reading A for all samples and then continue with reading B for all samples. For convenient handling of incubation times we recommend a maximum number of five samples in one run.
4. Follow instructions to add MycoAlert™ PLUS or MycoAlert™ Reagent to the samples. Press OK when completed. This will start the automatic countdown for the required incubation time of 5 minutes.
5. Wait for the instrument to beep and then press OK to continue.

Note

You can abort the automatic countdown by pressing arrow button ►. You are prompted to confirm your decision by pressing the arrow button ◀ and OK. This will access the next screen and allow you to time the incubation manually.

6. Open the black lid of the Lucetta™ 2 Luminometer and insert the first sample vial. Upon closing the lid the measurement automatically starts with reading A. The measured value in RLU will appear on the display.
7. Press OK to continue with the next sample.
8. After reading A is finished for all samples press OK to continue. Add the MycoAlert™ Substrate to all samples and press OK when completed. Again, this will start the automatic countdown for the required incubation time of 10 minutes.
9. Wait for the instrument to beep and then press OK to continue.

Note

You can abort the automatic countdown by pressing arrow button ►. You are prompted to confirm your decision by pressing the arrow button ◀ and OK. This will access the next screen and allow you to time the incubation manually.

10. Open the lid of the Lucetta™ 2 Luminometer and insert the first sample vial. Upon closing the lid, the measurement automatically begins with reading B. The measured value in RLU will appear on the display.
11. Press OK to continue with the next sample.
12. After reading B is finished for all samples, press OK. The complete results for all samples will be displayed (starting with sample no.1) including the individual RLU readings A and B, the calculated B/A ratio and the contamination status (Figure 5).
13. Pressing the arrow buttons ►◀ allows you to switch back and forth between the sample results.
14. Results are classified as CLEAN, BORDERLINE or CONTAMINATED according to the values shown below. Classification is indicated by 3 LEDs: green = clean, yellow = borderline, red = contaminated.

Interpretation of Results

1. MycoAlert™ PLUS Assay

Ratio B/A	Indicated as
> 1.2	CONTAMINATED
1.0–1.2	BORDERLINE
< 1.0	CLEAN

2. MycoAlert™ Assay

Ratio B/A	Indicated as
> 1.2	CONTAMINATED
0.9–1.2	BORDERLINE
< 0.9	CLEAN

Please note that borderline ratios are different between the MycoAlert™ PLUS Assay and MycoAlert™ Assays.

- Press ESC to go back to the main screen. The Lucetta™ 2 Luminometer has now stored a MycoAlert™ Data Record with measurement results of all samples in its memory (see section 5).



Figure 5. Example of a MycoAlert™ PLUS Measurement screen. In this case, CONTAMINATED is displayed as the B/A ratio is 3.6.

4.3 Single Read Run

The Single Read Run feature can be used with the ViaLight™ or ToxiLight™ Assays. For a more detailed description of the assay steps please refer to the Instructions for ViaLight™ or ToxiLight™ Assay.

- Turn on the instrument by pressing the ON button.
- Use the arrow button ▼ to select RUN SINGLE READ and press OK. Navigate up to ASSAY PROTOCOL NAME and press OK. Use arrow buttons ▲▼ to select a protocol from the protocol list and confirm with OK.
- If a protocol with a new measurement time or threshold values is needed, refer to chapter 6.0 (paragraph: Customer Settings) to define a new protocol.
- Each measurement is given an identifier number displayed under TEST. By default the number begins with 1 counting upwards. The number can be customized by using the arrow buttons ▲▼ to select the TEST parameter and press OK. With arrow buttons ►◀ select the digit you want to change. Use arrow buttons ▲▼ to select a number from 0 to 9. When numbers are selected, confirm with OK.
- Follow your assay protocol (add reagents, vortex, etc.).

Note

Pressing ESC in any of the process related screens will exit the measurement process and bring you back to the start screen. Do NOT press ESC unless you really want to exit the measurement cycle.

- To start measurement, select START MEASUREMENT with the arrow buttons ▲▼.
- Open the black lid of the Lucetta™ 2 Luminometer and insert the sample vial.
- Upon closing the lid, the measurement automatically begins. The measured value in RLU will appear on the display (Figure 6).



Figure 6. Example of a Single Read measurement screen. The result of the measurement is 1250 RLU.

- Press OK to continue with the next sample.

Repeat Steps #7 through #8 for multiple samples.

- Press ESC to go back to the main screen. The Lucetta™ 2 Luminometer has now stored a Single Read data record with measurement results of all samples in its memory (section 5).

5.0 Data Storage and PC Upload

The Lucetta™ 2 Luminometer has excellent data storage and transfer capabilities. Each completed measurement is logged in the instrument's internal memory. When the maximum storage capacity is reached, the oldest data are automatically overwritten. For long-term data storage or data analysis, measurements can be uploaded to a PC via USB connection. Data upload to a PC requires the Lucetta™ Connect software.

5.1 Maximum Storage Capacity

Readings with 1 sample: The memory holds up to 2000 single sample readings, i.e. 2000 reading of a Single Run or 2000 readings of a MycoAlert Run (including both readings A and B, as well as the B/A ratio and the contamination status message) or any combination of both run modes.

5.2 Viewing Logged Measurements

The user can either select a date range for displaying logged measurements or view all measurements stored in the instrument.

Select RESULTS in the main menu followed by DISPLAY RESULTS.

Viewing all results

The instrument shows the current date and time by default. If no changes are made to the date or time, the instrument will display all logged measurements.

Selecting a date range

Select a date and time in the past to display all logged measurements from that date until the present.

Note

If no measurements were taken in the date range selected, the instrument will display all logged measurements stored in the instrument.

To change the date displayed, use arrow button ▲ to select DATE and press OK. Use arrow buttons ►◀ to select day, month or year. Depending on the selected country for the date format (for more details see section 6.0), the format is MM/DD/YYYY (USA) or DD.MM.YYYY (Europe). The flashing cursor indicates the number to be adjusted (Figure 7). To change the time displayed, select TIME to change hours and minutes as described for changing the date.



Figure 7: Example of time and date selection to view measurements

Select START SEARCH with arrow buttons ▲▼ and press OK to get to the measurements (Figure 8).

Use arrow button down ▼ to view all measurements.



Figure 8: Example of a logged measurement

5.3 Upload to a PC

For long-term storage measurement results may be uploaded to a Windows Operating System and both viewed and analyzed with Microsoft® Excel®. Data upload to a PC requires installation of the Lucetta™ Connect software on the PC. This software is a separate product and is not included in the Lucetta™ 2 Luminometer shipment. It needs to be ordered individually (Catalog number SAAF-1003).

Before you begin, please install the Lucetta™ Connect software on your PC. For a detailed description of the data upload to PC process, see the instructions included with the Lucetta™ Connect software.

Note

The Lucetta™ Connect software is only compatible with a Windows Operating System and cannot be used on a MacOS or Linux based computer.

1. Close all other measurement programs running on your PC before starting data transfer from the Lucetta™ 2 Luminometer.
2. Connect the Lucetta™ 2 Luminometer to the PC via the USB port of your PC using the provided USB cable. Switch on your Lucetta™ 2 Luminometer and PC.

- Open the Lucetta™ Connect software on your PC.
- From the main menu of the Lucetta™ 2 Luminometer select RESULTS and press OK.
- Navigate to PC UPLOAD and press OK.
- Choose the time frame for which you want to transfer data to the PC (Figure 9; for details see section 5.2). If no time frame is selected, all data are transferred. Select START TRANSFER with arrow buttons ▲▼ and press OK to start data transfer.
- In the Lucetta™ Connect software, select the results to be saved in result files from the choices: last experiment, selected experiments filtered by date, start time of experiment, protocol and number of samples, or raw data. For more details please refer to the information included with the Lucetta™ Connect software.
- Press CREATE FILE to obtain result files.
- Select the location on your PC where the Excel® result file(s) should be saved. Excel® files are generated for each individual experiment.



Figure 9: Example of transfer result screen

6.0 Setting Instrument Parameters

Via the submenu SETTINGS (Figure 10) the Lucetta™ 2 Luminometer allows the setting of a user password, creation of customized protocols in Single Read mode and date and time setting options. Display settings such as brightness and contrast can also be optimized here. Instrument settings for MycoAlert measurements are password-protected and can only be accessed by Lonza service personnel. Software version and serial number of the luminometer can also be reviewed in the submenu.



Figure 10: Submenu SETTINGS

6.1 Password

If you want only authorized persons to change parameter settings and/or delete results, it is possible to define a password. The default password for a new instrument is 0000. Maximum number of digits for a password is four.

- Navigate down to SETTINGS and press OK.
- Select PASSWORD and press OK
- Enter OLD PASSWORD: To change the given number, use arrow buttons ►◀ to select the digit you want to change. Use arrow buttons ▲▼ to select a number from 0 to 9. When numbers are selected, confirm with OK.
- Enter NEW PASSWORD: Change the 4 digits as described for OLD PASSWORD and confirm with OK.



Figure 11: Display for setting a password

6.2 Customer Settings

Six unique Single Read protocols can be configured. Definable protocol parameters include LIMIT FAIL, LIMIT PASS and MEASUREMENT TIME. Customer settings are password protected.

- Navigate down to SETTINGS and press OK.
- Select CUSTOMER SETTINGS and press OK.
- Enter PASSWORD and press OK
- Select protocol to be defined and press enter.
- Create Protocol name. Name is limited to 10 characters.
- Use arrow button ▼ and select LIMIT FAIL number.
- Press OK and enter the RLU value for the limit fail which will serve as the upper/lower threshold value to classify results as fail.
- Select LIMIT PASS parameter with arrow button ▼ and select limit pass number.
- Press OK and enter the RLU value for the LIMIT PASS which will serve as the lower/upper threshold of the range that will be used to classify results as pass (Acceptance range). See Figure 11

Note

Results falling between the two thresholds will be classified as warn (= Warning range).

- Use arrow button ▼ and select MEASURING TIME parameter and press OK.
- Enter the desired measuring time in seconds and confirm with OK. When all individual parameters have been defined exit by pressing ESC and return to the SETTINGS submenu.



Figure 12: Display for setting Single Read parameters

6.3 Date & Time

Upon receipt of the instrument, date and time are set in European format [dd-mm-yy and hh-mm with hours ranging from 0–24]. Date format can be changed to US [mm/dd/yyyy]. See Figure 12.

1. Navigate down to SETTINGS and press OK
2. Select DATE/TIME and press OK.
3. Change date: To change the given date, press OK and use arrow buttons ►◄ to move to the year, month or day you want to change. Use arrow buttons ▲▼ to select a number from 0 to 9. When numbers are selected, confirm with OK.
4. Change date format: Use arrow button ►◄ to select FORMAT and press OK. Use arrow buttons ▲▼ to switch from Europe to USA.
5. Change time: Use arrow button ▼ to move to TIME and press OK. With arrow buttons ►◄, select the hour and minute position to change. Use arrow buttons ▲▼ until the correct value is reached. Confirm with OK.
6. Press ESC to return to the SETTINGS sub-menu.



Figure 13: Display for setting date and time

6.4 System

Display brightness and contrast are adaptable to the lighting conditions.

1. Navigate down to SETTINGS and press OK.
2. Select SYSTEM and press OK.
3. To adjust brightness, press OK. Use arrow buttons ▲▼ to set levels between 1–4. The display illumination is changed simultaneously to this entry. Confirm with OK.
4. To modify contrast, navigate down ▼ and select the CONTRAST parameter and press OK. Using the ▲▼ arrow buttons, the contrast level can be adjusted between levels 1–10. Press OK to confirm and return to the SETTINGS sub-menu by pressing ESC.



Figure 14: Display for adjusting display brightness and contrast

6.5 Information

Software version and serial number of the luminometer can be reviewed in the submenu.

1. Navigate down to SETTINGS and press OK.
2. Select INFORMATION and press OK
3. Software version and serial number are displayed.



Figure 15: Display for software version and serial number information

7.0 Troubleshooting

If unexpected results or instrument malfunction occur refer to the troubleshooting list below and/or contact Lonza's Scientific Support Team.

Europe

Scientific Support: +32 87 321 611

scientific.support@lonza.com

USA

Scientific Support: +1 800 521 0390 (toll free)

scientific.support@lonza.com

Detected Failure	Potential Error	Action
Background value without sample tube >20 RLU/s	Contamination of sample holder and/or measurement chamber with luminescent material	Clean sample holder and measurement chamber (refer to section 2.2. "Maintenance")
	Luminescent material contamination inside instrument	Service required; please contact Lonza.
	Instrument environment suboptimal, e.g. temperature/humidity excursions	Check installation procedure for compliance with operating conditions
Background or measurement value too low (0 RLU/s)	Detector or electronics damaged, or incorrect instrument settings.	Service required; please contact Lonza.
Unexpected or wrong measurement value	Sample position suboptimal	Check the fit of the sample in the sample holder
Measurement value too high	Contamination of sample holder and/or measurement chamber with luminescent material	Clean sample holder and measurement chamber (refer to section 2.2 "Maintenance")
	Luminescent material contamination inside instrument	Service required; please contact Lonza.

8.0 Error Codes

Error Message	Action
Display - 10	Turn off instrument and allow it to dry fully. Switch instrument on. If error message appears again, contact Lonza Scientific Support.
Other error messages	Contact Lonza Scientific Support

9.0 Appendix

9.1 Factory Settings for Single Read

Protocol	Limit Pass	Limit Fail	Measuring Time
1	5000	10000	5
2	7000	20000	5
3	20000	50000	10
4	50000	100000	10
5	100000	500000	10
6	10000	5000	10

9.2 Technical Data

Sample and Data Handling	
Sample Tube Format	Transparent polystyrol tubes and microcentrifuge tubes Diameter: maximum up to 15 mm; minimum approximately 12 mm Length: 47-75 mm
Detector	Ultra fast single photon counter with spectral sensitivity range of 380-630 nm
Sensitivity	1 fmol ATP using the ATP Bioluminescence Assay Kit CLSII (Boehringer Mannheim, FRG)
Background Value	Background average < 20 RLU/s
Dynamic Range	6 orders of magnitude
Measurement Time	1–999 sec, in increments of 1 sec
Data Format	Data output in RLU
Hardware	Microcontroller to control all instrument functions
Microprocessor Software	8 buttons: 1 <ON/LIGHT> button, 1 <OFF> button, 1 <OK> button, 1 <ESC> button, 4 navigation buttons ▲, ▼, ►, and ◀. Measurement of glow luminescence 2 operating modes (one pre-tailored for MycoAlert™ / MycoAlert™ PLUS Mycoplasma Detection Assay, one for single read measurement)
Display	Graphic display with backlit LED, 128 x 64 dots
Interfaces	USB 2.0 Type B USB interface for PC connection (data transfer)
Software	Built-in microprocessor, storage of 6 different customized measuring protocols
Data storage	Storage of the last 2000 results
Hardware and Software Requirements for Data Upload (Optional)	PC with industrial standard, Microsoft® Windows® 7 (32/64 bit) or higher Microsoft® EXCEL®
PC-software	Data capture software program Lucetta™ Connect for data transfer to Excel®

Instrument Specifications	
Dimensions (w x d x h)	150 mm x 280 mm x 170 mm (5.90 in x 11.02 in x 6.69 in)
Weight	Approx. 2 kg (4.4 lbs), incl. batteries
Power supply	Universal input: 100–240 V AC, 50–60 Hz
Output:	5.9–6 V DC, 2.1 A (Negative pole is on the inside of the plug!)
Protection class	II
Power consumption (instrument)	Max. 15 W
Batteries	3 rechargeable Ni/MH Akku Baby, 1.2 V / 4000 mAh
Temperature range and humidity	Storage: 5°–40° C, Operation: 15°–30° C 80% humidity at 31° C degreasing linearly to 50% at 40° C, no condensation
Electrical safety	IEC 61010-1:2010 (Third Edition) UL 61010-1 (Third Edition) (USA) CAN/CSA-C22.2 No. 61010-1-12 (Third Edition) (Canada)
Certification	This instrument bears the CE mark, based on conformity to EU legislation: Electromagnetic compatibility (EMC) 2014/35/EU, Low voltage (LVD) 2014/35/EU, Restriction of Hazardous Substances (RoHS) 2011/65/EG
Manufacturing date	The manufacturing year is encoded by the second and third digit of the serial number, e.g. an instrument with a serial number 719L2xxx was manufactured in 2019.

Contact Information

North America

Customer Service: +1 800 638 8174 (toll free)
Fax: +1 301 845 8338
order.us@lonza.com
Scientific Support: +1 800 521 0390 (toll free)
scientific.support@lonza.com

Europe

Customer Service: +32 87 321 611
order.europe@lonza.com
Scientific Support: +32 87 321 611
scientific.support.eu@lonza.com

International

Contact your local Lonza distributor
Customer Service: +1 301 898 7025
scientific.support@lonza.com

International Offices

Australia	+61 3 9550 0883
Belgium	+32 87 321 611
Brazil	+55 11 2069 8800
China	+86 6430 3488
France	0800 91 19 81 (toll free)
Germany	0800 182 52 87 (toll free)
India	+91 22 4342 4000
Japan	+81 3 6264 0660
Luxemburg	+32 87 321 611
Singapore	+65 6521 4379
The Netherlands	0800 022 4525 (toll free)
United Kingdom	0808 234 97 88 (toll free)

Lonza Cologne GmbH–50829 Cologne Germany

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Manufacturer and distributor information: The Lucetta™ 2 Luminometer is manufactured by Berthold Technologies GmbH & Co. KG (Calmbacher Str. 22, 75323 Bad Wildbach, Germany) and distributed by Lonza Cologne GmbH (Nattermannallee 1, 50829 Cologne, Germany) and Lonza Walkersville, Inc. (8830 Biggs Ford Road, Walkersville, MD 21793).

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