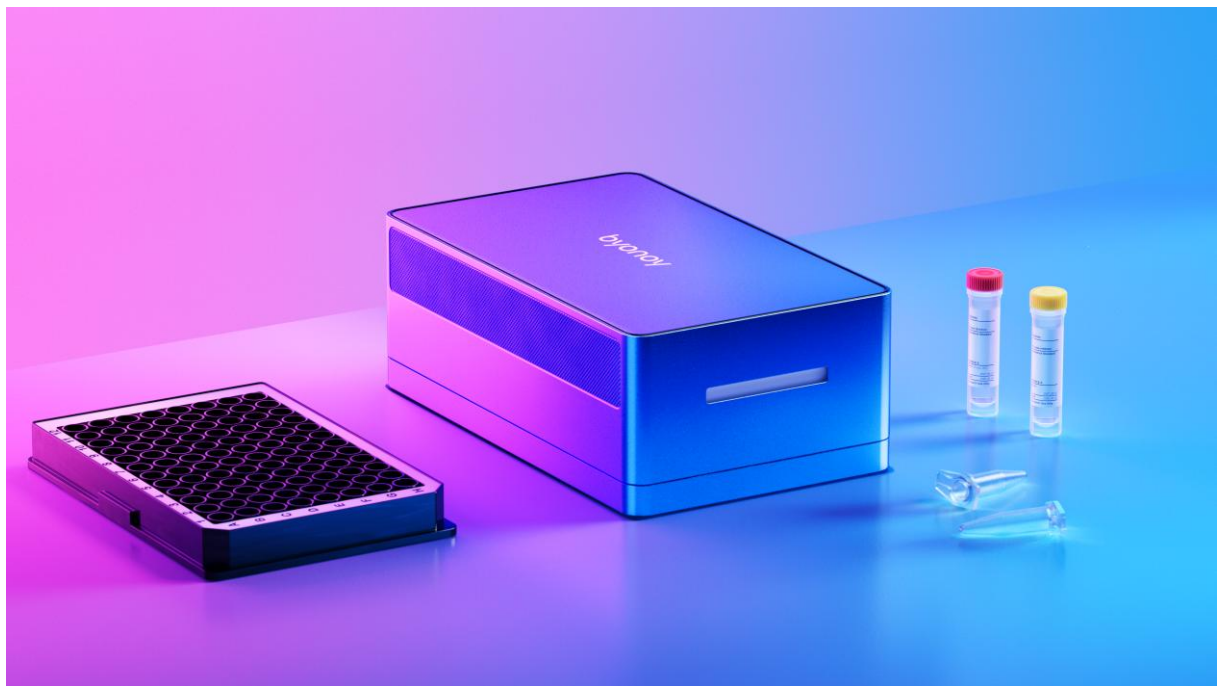


Instructions for Use

Fluorescence 96

Valid for Model Number DE MMF



Instructions for Use

Fluorescence 96

Version 1.0 (23/09/2026)

©Copyright 2026 by Byonoy GmbH. All rights reserved.

Manufacturer: Byonoy GmbH
Schützenstraße 21
22761 Hamburg, Germany

00 49 40 5379 866 00
service@byonoy.com
www.byonoy.com

Dear customer,

We are delighted that you have chosen Fluorescence 96. To take full advantage of the instrument's performance and to enjoy your instrument for many years, please read these instructions for use carefully before installing and commissioning the instrument. Operate the instrument in accordance with these instructions. The safe operation and proper functioning of the instrument can only be guaranteed if both the general safety regulations and accident prevention regulations of the legislator, as well as the safety instructions in this manual, are observed. We accept no liability for any damage resulting from improper use or incorrect operation.



Ensure that the manual is always accessible and is read and understood by all persons operating the instrument.

This user manual may only be used according to its intended purpose. It may not be reproduced, changed, or translated in another language without the prior written consent of Byonoy GmbH.

This document is subject to technical changes and updates.

TABLE OF CONTENTS

1	GENERAL INFORMATION.....	1
2	OVERVIEW OF FLUORESCENCE 96	4
2.1	SCOPE OF APPLICATION	4
2.2	MEASUREMENT METHOD	4
2.3	FLUORESCENCE 96 SYSTEM.....	4
2.4	CONSUMABLES	8
3	PREPARING THE PRODUCT FOR USE	9
3.1	UNPACKING, STORAGE, AND TRANSPORT	9
3.2	SUPPLIED MATERIALS	9
3.3	WORKING ENVIRONMENT	10
4	OPERATION	11
4.1	COMPUTER CONNECTION	11
4.2	ASSAY.....	11
5	SIGNALS AND TROUBLESHOOTING.....	14
5.1	E-PAPER DISPLAY	14
6	MAINTENANCE AND CLEANING.....	15
6.1	MAINTENANCE	15
6.2	CLEANING.....	15
6.3	TECHNICAL SUPPORT.....	17
6.4	REPAIRS	17
7	TECHNICAL SPECIFICATIONS.....	18
8	GUARANTEE	20
9	COMPLIANCE	21
9.1	EUROPEAN UNION (CE).....	21
9.2	UNITED STATES (FCC)	21
9.3	CANADA (ISED)	22
9.4	AUSTRALIA (RCM).....	22

1 General information

Important: Follow the instructions for use

Any commissioning or handling of the instrument requires a thorough understanding of these instructions. The device is intended for the described use only.

In this manual and on the label of the reader, particularly important remarks are labeled as followed:

Symbol	Description
	Caution: Caution indicates a potentially hazardous situation, which, if not avoided, could result in minor or moderate injury.
	Information: This is a piece of information indicating certain properties that must be observed.
	Marking that indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area.
	Certification mark employed on electronic products manufactured or sold in the United States. FCC ID: 2AC7Z-ESPS3WROOM1U
	to show that electronic products meet specific regulatory standards for safety, electromagnetic compatibility, and telecommunications.
	Disposal of used electrical and electronic equipment
	Device Manufacturer
	Serial number
	Catalogue number
	Indicates a potential hazard. Failure to follow the instructions may result in injury or damage to the device.
	Indicates that the user must read and understand the instructions for use before operating the device. Where this symbol is present on the equipment, the user shall consult the accompanying documents.

Liability for function and damage

Liability for the function of the device shall, in any case, pass to the owner or operator if the device is improperly maintained, repaired, or modified by persons who do not belong to the authorized service personnel, or if it is handled in a way that does not comply with its intended use. The service and operation of the product must be in accordance with this manual. Byonoy shall not be liable for damages resulting from non-observance of the information above. Warranty and liability conditions of the terms of sale and delivery of Byonoy are not extended by the information above.

Information

-  **An incorrect operating environment can lead to a reduction in service life, damage to the device, or measurement errors.**
-  **To avoid measurement errors, it is essential to ensure that the instrument is connected properly and that the experiments are carried out correctly. Please note the explanations and warnings in chapter 3.**
-  **Incorrect cleaning of the instrument can reduce its service life and can cause damage to the instrument. Please note the explanations and warnings in chapter 6.2.**

Disposal of used electrical and electronic equipment.



This product is subject to Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE).

The crossed-out wheeled bin symbol indicates that the product must not be disposed of with household waste. The product must be collected separately in accordance with local regulations.

Byonoy offers a return option for this product, possibly with a fee. For information regarding the return and disposal process, please contact the service.

Email: service@byonoy.com

Phone: [+49 40 5379 866 00](tel:+4940537986600)

Working with biological and harmful material

Fluorescence 96 is not to be used for the measurement of biohazardous substances.

Always observe the manufacturer's hazard information pertaining to the substances to be measured.

The instrument does not produce any toxic or harmful gases or substances. During the measurement, make sure that there are no toxic or harmful substances in the microtiter plate.

2 Overview of Fluorescence 96

2.1 Scope of application

Fluorescence 96 is a single-mode fluorescence microplate reader for measuring the fluorescence of biological or non-biological samples in ANSI/SBS-standard 96-well microtiter plates in accordance with the specifications described in the user manual. Fluorescence 96 is intended for research and other non-in-vitro-diagnostic analyses only. It is to be operated by trained laboratory personnel and is intended for professional use.

2.2 Measurement method

Fluorescence 96 is designed to carry out sensitive fluorescence measurements. The measurement results are expressed in relative fluorescence units (RFU).

Fluorescence

Fluorescence generally describes the emission of light from a molecule after excitation by an external light source. This emission typically occurs immediately after excitation and at a longer wavelength than the excitation light. In fluorescence measurements, the emitted signal is detected separately from the excitation light using an optical system that spectrally separates excitation and emission.

Relative Fluorescence Units

The absolute fluorescence signal detected by a fluorescence reader can vary between different device models and manufacturers and depends on the optical design, excitation source, filters, and detector type. Therefore, the intensity of the emitted fluorescence light is reported in instrument-specific relative fluorescence units, rather than in absolute physical units.

2.3 Fluorescence 96 System

2.3.1. Technology description

Fluorescence 96 operates in single-mode fluorescence configuration using eight parallel light-emitting diodes (LEDs) and eight corresponding detection channels. Fluorescence signals are detected by silicon photomultipliers (SiPMs), providing a compact, robust, and highly sensitive detection solution.

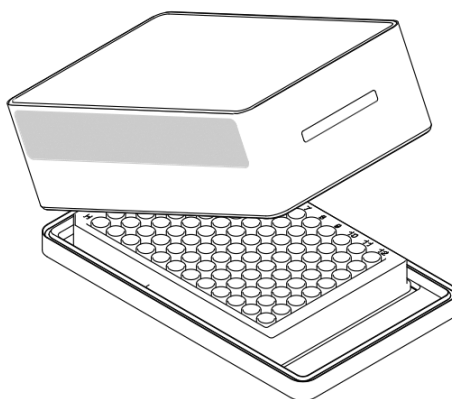


Figure 1. Visual representation of the product from the front, top readout, upper part opened.

Measurement Principle

Fluorescence 96 measures eight wells simultaneously. The optical excitation and detection unit is mounted on a motorized positioning system that moves across the microplate column by column until all 96 wells have been measured.

In each measurement position, the system performs a dark reference measurement, which is used for signal correction.

The translation mechanism operates with high precision and low vibration to ensure stable optical alignment throughout the scanning process.

Fluorescence 96 uses electronic signal processing to convert the detector output into fluorescence intensity values. No manual gain adjustment is required during operation.

Mechanical and optical design

The upper part of the instrument (see Figure 2) contains the electronic assembly, including the signal processing electronics and the optical excitation and detection unit.

Well-to-well crosstalk is reduced by the optical design, including channel separation and light shielding.

The lower part (see Figure 2) of the instrument functions as a sealing unit. It encloses the measurement chamber to reduce the influence of ambient light during operation.

The instrument is powered via USB-C.

Integration time

The integration time defines the signal acquisition period for each column of eight wells. All eight wells within one column are measured simultaneously. The columns are measured sequentially until all 96 wells have been measured.

The software provides predefined integration time settings as well as the option to select a custom integration time.

Longer integration times allow increased signal accumulation and may improve the signal-to-noise ratio and thus the detection of low-intensity fluorescence signals.

Dynamic range

The dynamic range describes the range between the lowest detectable fluorescence signal and detector saturation.

The dynamic range of the instrument is defined by its optical and electronic design and is independent of the selected integration time.

To achieve an extended dynamic range, the light-emitting diodes are operated in varying powerlevels, thereby avoiding detector saturation.

2.3.2. Physical characteristics and interface

Fluorescence 96 is designed for manual handling. The device is split into two parts: the Detection Unit and the Sealing Unit. The Detection Unit contains all the electronic and optical components, including the detectors. The Sealing Unit serves to close and darken the chamber, preventing stray light from entering the system.

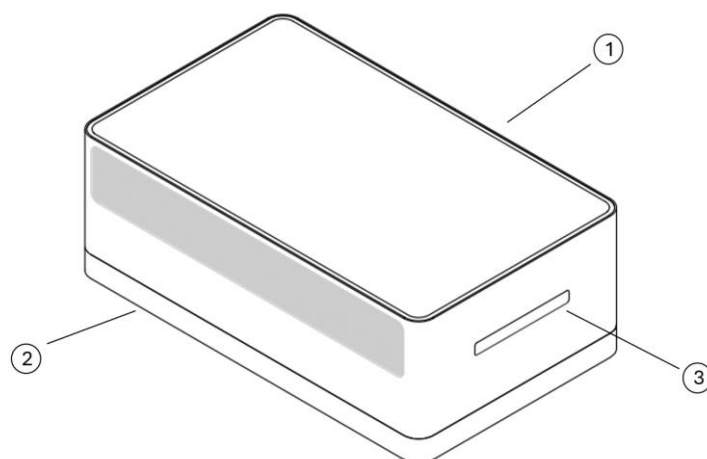


Figure 2. Visual representation of the product from the front. 1. Detection Unit, 2. Sealing Unit, 3. E-paper status display.

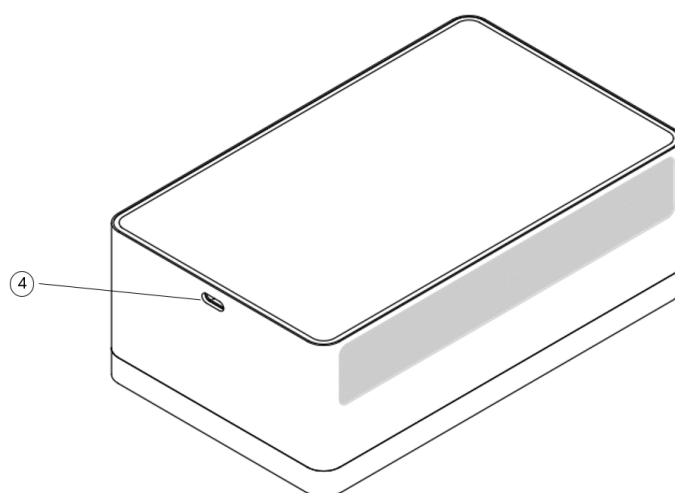


Figure 3. Visual representation of the product from behind. 4. USB-C port.

To perform a measurement, the microplate must be placed inside the measurement chamber. This is achieved by separating the Detection Unit from the Sealing Unit, placing the microplate into the device, and recombining the Detection Unit with the Sealing Unit.

Power consumption

Fluorescence 96 is an analytical instrument with very low power consumption. It is operated by a USB-C cable and the total power consumption is typically less than 2.5 watts.

Software

The Fluorescence 96 reader is operated using Lyte. For instructions on the software operation and installation, refer to the corresponding Lyte User manual.

2.4 Consumables

With the Fluorescence 96, ANSI/SBS Standard 96-well microtiter plates can be used. Only certain microplate types can be used with the Fluorescence 96 (see chapter 7).

When using microtiter plates, always check the specifications of the microtiter plate manufacturer. Not all microtiter plates of a particular manufacturer are the same in design, materials, or configuration.

3 Preparing the product for use

3.1 Unpacking, storage, and transport

Unpacking

Remove the packaging material and carefully place the device on a firm and level surface. Check the device for external damage and check the materials supplied (see chapter 3.2).

The device is packed in a specially designed cardboard box. Keep the packaging material. If the device must be returned for repair, the original packaging material must be used.

Storage and protection during the intervals of normal use



Protect the device from moisture and dust during prolonged storage.



Do not store the device next to heat sources and protect it from direct sunlight.

The temperature for storage should be within the recommended temperature range (see chapter 7).

Transportation

Before transportation, unplug the instrument and ensure there is no microtiter plate inside the device. Depending on the transport distance, use the original packaging material. Make sure that the new location meets the requirements described in chapter 3.3.



To avoid spillage and contamination, make sure that there is no microtiter plate inside the instrument before transport.



Always transport the product well-packaged to avoid damage in transit.

3.2 Supplied materials

When unpacking the device, please check that the following components are present:

- Fluorescence 96
- USB-C cable
- Quick-start guide with download link
- Calibration certificate

3.3 Working environment

Due to its small size, Fluorescence 96 can be operated very well in various working environments. Allow the instrument and the microplate to equilibrate to the operating temperature before starting measurements. Sudden temperature changes may lead to condensation and measurement errors.

However, the following warnings must be observed. Ignoring them may lead to measurement errors and a reduction in the expected lifetime or damage to the device:

-  **The device should stand on a level surface, free from dust and vibrations.**
-  **Do not operate the device near heat sources or under direct sunlight.**
-  **The ambient temperature and the humidity should be within the recommended range (see chapter 7).**

4 Operation

4.1 Computer connection

Fluorescence 96 requires a connection to the computer for power supply, starting the measurement, and data transfer. Insert the USB-C cable into the Fluorescence 96 and the USB port of the computer. The Fluorescence 96 powers up automatically when connected to a computer via the USB-C cable and the software automatically establishes a connection.



Always use the included USB-C cable for the connection to your computer.



Connect the instrument directly to your computer and do not use an external USB hub.



The device is powered via the USB-C connection and is rated for 5 V DC with a maximum input current of 2 A (10 W maximum). The USB connection is also used for data communication with the computer.



Do not apply excessive force to the optical glass surface when inserting or removing microplates. Do not use the device if the glass is cracked, chipped, or otherwise damaged.

Each time the instrument is switched on, an internal self-test is performed. If an error is detected, it is indicated by the device.

4.2 Assay

Placing the microtiter plate into the instrument



Place the plate into the instrument cautiously and slowly to avoid spills.



For top-read measurements, ensure that the microplate and the instrument are at the same temperature before starting the measurement. Temperature differences may cause condensation on the optical surfaces, resulting in invalid measurement results.



Pay attention to the correct plate orientation.



Before each measurement, ensure that the optical glass surface is clean and free of dust or other contamination. Carefully remove dust or contamination using a clean, dry microfiber cloth and/or a manual air blower.

Important

Before every measurement, clean the entire interior of the instrument, including the optical glass surface and the inner surfaces of both the Detection Unit and the Sealing Unit, using a clean, dry microfiber cloth and/or a manual air blower. This cleaning must be performed even if no dust or contamination is visible. Very small dust particles may not be visible to the naked eye but can interfere with the fluorescence measurement and affect the measurement results.

The entire interior of the instrument must be clean and free of dust and other particles during every measurement.

Plate orientation and positioning

Fluorescence 96 can perform both top and bottom readouts. While most fluorescence assays are read from above using black microplates, it is possible to use black plates with a clear bottom to read the signal at the bottom of the well instead of from above. To enable bottom readout, take out the microplate and simply invert the reader, placing the Detection Unit on the bottom and the Sealing Unit on the top, as shown in Figure 4. Never invert the reader while a microplate is inside the device.

When placing the microplate into the device, ensure that the A1 well is in the correct position, as shown in Figure 4.

Once all settings have been completed, the measurement can be started. The app will automatically guide the user through the readout process.

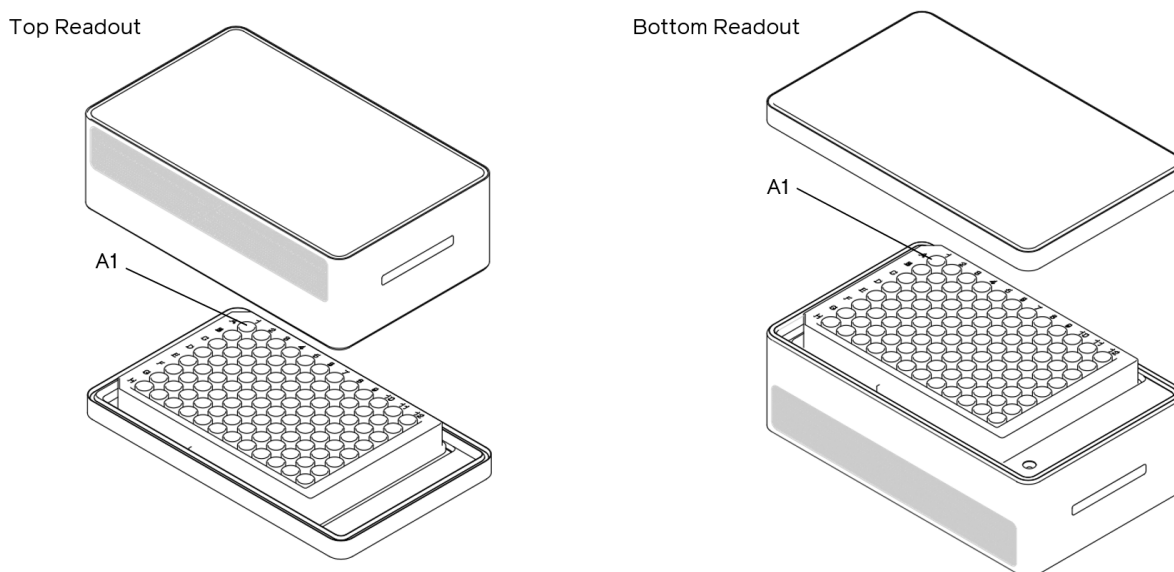


Figure 4. Visual representation of the two readout orientations.

To guarantee a correct measurement result, please pay attention to the indications in the App and heed the following warnings:



Shocks to Fluorescence 96 can cause an unwanted signal. Therefore, Fluorescence 96 should not be touched during measurement.



Note that the system depends on a clean and dust-free environment. Therefore, do not wear powdered safety gloves.

Removing microtiter plate

The microtiter plate must be removed from the Fluorescence 96 after the readout. To do this, separate the two parts of the instrument and remove the plate.



Do not leave a microtiter plate filled with reagents in the device for prolonged periods of time, as evaporating gases can damage the device.

5 Signals and troubleshooting

5.1 E-paper Display

Fluorescence 96 provides a visual status indication to inform the user about the operational state of the device. This is implemented on a black-and-white display. The status indication is visible through a narrow window in the housing.

The following illustrations in Table 1 show the status indications at a greatly enlarged scale. Each display pixel has a size of 0.2 mm.

Animated indications shown during device startup and during a measurement are presented as a sequence of images.

When no status indication is required, the display remains blank. This also applies when the device is switched on.

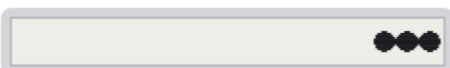
Status	Display
Device starts: Pulsing dots are displayed until the device is ready for use.	
Welcome: "Hello" and a waving-hand symbol are displayed.	
Plate inserted: Indicates that a microtiter plate is inserted in the device.	
Measuring: The black area increases as the measurement progresses.	
Error: Indicates that the device has detected an error.	

Table 1 Overview of various states indicated by the display.

6 Maintenance and cleaning

6.1 Maintenance

Fluorescence 96 is maintenance-free. Each time the instrument is switched on, an internal self-test is carried out to ensure there are no malfunctions.

There are no parts within the Fluorescence 96 that can be serviced by the customer. It is only necessary to ensure that the device is kept clean.

If required, a yearly verification procedure can be implemented to ensure that the device is measuring within the specifications.

6.2 Cleaning

Remove the USB-C cable from the instrument before cleaning.



Make sure before cleaning, that there is no microtiter plate in the instrument.



Before each measurement, ensure that the optical glass surface is clean and free of dust or other contamination. Carefully remove dust or contamination using a clean, dry microfiber cloth and/or a bellows.

Cleaning the housing

The surfaces of the housing should be cleaned regularly. For this purpose, you can use e. g. a cloth, or a sponge lightly wetted in water. For heavier soiling, clean the surface of the housing with a mild soap solution diluted with water or glass cleaner and then wipe with a lightly moistened cloth or sponge to remove any residue. Do not use scouring agents.

Cleaning the interior

To clean the interior of the Fluorescence 96 reader, simply separate the two parts of the instrument to access the interior chamber. The interior surface may be cleaned with a damp cloth with, for example, 70% ethanol. Ensure that the glass surface located above or below the microtiter plate (depending on the readout orientation) is clean and free of dust.

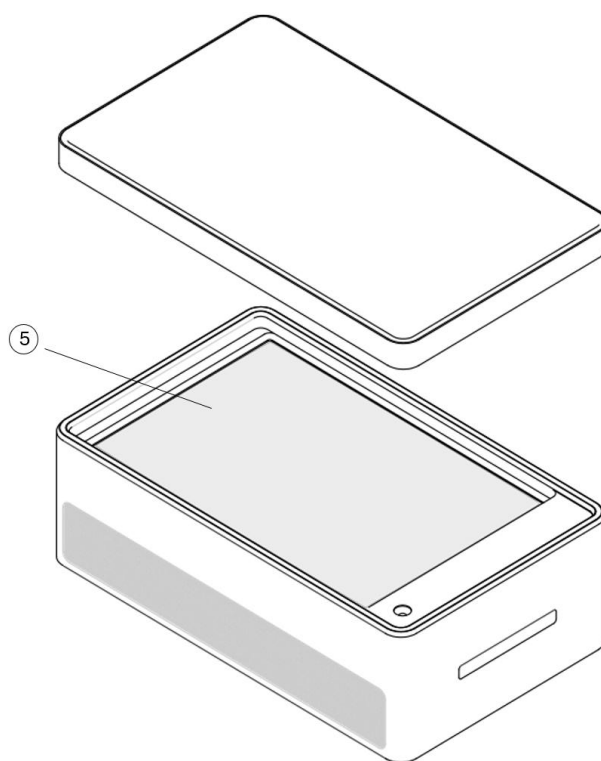


Figure 5. Detection Unit with optical glass surface (5).

-  **Do not loosen any screws, as this can lead to a malfunction and may void the instrument's warranty.**

Do not allow water or other liquids to get inside the instrument. If this happens, return the device to the manufacturer for inspection.

Warnings for cleaning

When cleaning, pay attention to the following warnings. Failure to observe these warnings may result in damage to the instrument. This can lead to a reduction of the service life or in measurement errors:

-  **Always avoid spraying liquid directly onto the surfaces of Fluorescence 96. This is especially important for the inside of the device, where there are optical elements that are very sensitive and essential for the functioning of the instrument.**
-  **Never clean the interior of the device with sharp or abrasive scourges, and do not use aggressive solvents or corrosive agents.**
-  **Biological hazard: Always wear gloves during cleaning operations that may involve contact with biological or generally hazardous materials or liquids.**

6.3 Technical support

In case of problems with the instrument, please contact the manufacturer's service department at service@byonoy.com or your local representative.



Biological hazard: It is your responsibility to decontaminate the instrument and all accessories before servicing and before returning the instrument or accessories to the manufacturer.

For decontamination of Fluorescence 96, follow the government guidelines for inactivation of organisms used in biological laboratories.

6.4 Repairs

Repairs on the device may only be carried out by the manufacturer. Please contact the service department at service@byonoy.com, or your local representative. The product warranty is voided if the device is modified by unauthorized persons, or different parts are installed.

7 Technical specifications

Table 2. Performance and technical data

Parameter	Value
Type of product	Fluorescence microplate reader
Product name	Fluorescence 96
Operating Software	Lyte
Service life	10 years at an average use of 4h/day
Housing material	Aluminium
Place for use	Laboratory
Degree of contamination	2
Temperature for storage/measurement	15–30 °C*
Temperature (Transport)	-10–50 °C
Relative tolerated humidity (storage/measurement)	Max. 70 %
Measurement mode	Fluorescence
Measuring method	Endpoint and Kinetic
Microplate types	96-well plates, flat bottom, transparent bottom for bottom read
Excitation filter wavelength range	430 - 495 nm
Light source	8 Light Emitting Diodes (CW at 490 nm)
Emission filter wavelength range	510 - 580 nm
Detection	8 Silicon Photomultipliers
Linear dynamic range	> 6 decades
Sensitivity	0.2 nM Alexa Fluor 488, 200µL /well (in black 96-well plate)
Cross-Talk	1×10^{-6}
Plate uniformity	> 95%
Connection to computer	USB 2.0 data communication via USB-C
Dimensions	97 x 160 x 58 mm
Power supply	USB 5 V DC / 500 mA or USB Power Delivery 5 V DC / 2 A
Nominal value/Characteristic of the fuse	5 A, very fast-acting, electronic fuse
Power input	10 W max. with USB-C
Weight	723 g

System requirements (App)	Windows 10 (1809 or later) or 11 Mac OS 13 or higher
Altitude	< 5100 m

* Reduced sensitivity at higher temperatures

8 Guarantee

The regular warranty period of Fluorescence 96 is 24 months. If a defect manifests itself in your device during the warranty period, please contact the service department directly at service@byonoy.com.

The instrument may only be operated in technically perfect condition. In the event of defects that could endanger employees or third parties, the device may only be used again after it has been repaired by the manufacturer.

This warranty does not cover damage caused by improper use or external mechanical influences, transport damage, or unauthorized intervention in the device by unauthorized persons.

9 Compliance

The Fluorescence 96 is designed to comply with the regulatory requirements of the target markets listed below. The device incorporates a certified ESP32-S3-WROOM-1U radio module. Wireless communication functionality is disabled in the currently released firmware configuration and cannot be enabled by the user.

9.1 European Union (CE)

The Fluorescence 96 complies with the applicable requirements of Directive 2014/53/EU (Radio Equipment Directive – RED) and Directive 2011/65/EU (RoHS).

The EU Declaration of Conformity is provided with the product documentation.

9.2 United States (FCC)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device contains a WiFi-Transmitter-Unit with the FCC-ID 2AC7Z-ESPS3WROOM1U.

Responsible Party – U.S. Contact Information:

Americas Compliance Consulting LLC, dba iCertifi

5809 US-2, Suite B, Albeni Plaza Priest River, Idaho 83856, United States

Email: fccagent@icertifi.com icertifi.com

9.3 Canada (ISED)

This device complies with the applicable requirements of Innovation, Science and Economic Development Canada (ISED).

CAN ICES-003(A) / NMB-003(A)

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- 1. This device may not cause interference.*
- 2. This device must accept any interference, including interference that can cause undesired operation of the device.*

L'émetteur ou le récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- 1. L'appareil ne doit pas produire de brouillage.*
- 2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

This equipment complies with the applicable ISED RF exposure requirements and shall be installed and operated with a minimum distance of 20 cm between the radiator and the user.

Contains IC: 21098-ESPS3WROOMU

9.4 Australia (RCM)

The Fluorescence 96 complies with the applicable Australian Communications and Media Authority (ACMA) requirements for electromagnetic compatibility and radiocommunications.