User Guide

Milliflex® Quantum Rapid Detection System

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada.

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1. Introduction

Milliflex® Quantum System is a rapid fluorescence-based technology for fast quantitative detection of contaminants over a broad range of filterable matrices. This easy to use and simple system can detect viable microorganisms filtered on a membrane down to one CFU per sample. The non-destructive method allows the identification, by any method, of any microorganisms detected during the initial fluorescence reading. Sample preparation is performed by means of membrane filtration using the Milliflex® system that ensures consistent and reliable results.

1.1 Chemistry of the reaction

The Milliflex® Quantum system uses proven technology based on a universal enzymatic fluorescent staining of viable microorganisms.

After a filtration step with Milliflex Oasis® sample preparation devices, all microorganisms retained on the membrane are stained by a fluorescence viability marker. The reaction consists of an enzymatic cleavage by active microbial metabolism of a non-fluorescent substrate. Once cleaved by the cell's metabolism, the substrate liberates free fluorochrome into the microorganism cytoplasm that cannot leave the cell due to its hydrophilic nature.

The signal is thereby naturally amplified by accumulation of the fluorochrome inside the cells and can be easily detected by exposure to the excitation wavelength of the fluorescence dye in the Milliflex® Quantum reader and visually counted (or via usage of Milliflex® Quantum Camera and the dedicated software).

1.2 Principles of the procedure

The procedure is easy and requires limited training & skills: sample contaminants are collected by membrane filtration using the Milliflex Oasis® system. After a short incubation time, media cassettes are removed. Each Milliflex Oasis® membrane is then transferred onto a cellulose pad pre-soaked with 2 mL of staining solution and incubated for 30 minutes at 32.5 °C ±2.5 °C. Fluorescent micro-colonies are counted using the Milliflex® Quantum reader or on a PC screen using a dedicated camera and software. After reading, membranes can be re-incubated on media for later micro-organism collection and identification if contamination of the sample was detected.

2. Operator and Equipment safety

All employees who will operate and/or be near the Milliflex® Quantum must comply with the following:

- Read and understand the user guide of the Milliflex® Quantum before using this Milliflex® Quantum. Failure to follow operating instructions could result in user injury or damage to the instrument.
- Do not attempt to open and repair the Milliflex® Quantum. Service should be performed by trained and authorized personnel only.
- Read and understand all maintenance instructions in this user guide before performing maintenance on the pump. Failure to follow instructions could result in user injury or damage to the instrument.
- Any alteration of the pump from factory specification may cause unsafe conditions, and will void the product warranty.
- Any attempt to use the Milliflex® Quantum in a manner not specified in this user guide may result in damage to the instrument, operator injury, and will void the product warranty.
- Place the Milliflex® Quantum on a clean, flat, stable, horizontal surface, away from any source of excessive heat and close to an easily accessible, properly grounded power supply outlet.
- Do not locate the Milliflex® Quantum under direct lab light, as this could interfere with the reading of the membrane.
- The Milliflex® Quantum must be installed and used in a clean and dry area.
- The product is not intended to be used in an explosive atmosphere.
- Do not expose the Reader, Camera, or power supply to liquid. If this happens, immediately switch off and disconnect the pump from the power outlet, and wipe up the liquid.
- Use only accessories and replacement parts designed for the pump. Using accessories not designed for the pump could result in user injury or damage to the instrument.
- When filtrating hazardous liquids, wear and use proper protective clothing and equipment in accordance with the MSDS for the handling and the disposal of the liquid to be filtrated.
- The system power cord is the main system disconnecting device, and must be easily accessible at all times.
- To avoid damaging the power cord or the outlet, it is recommended that you pull on the plug and not on the cord to unplug the system from a wall outlet or an electrical connector.
- Make sure the power cord is not a tripping hazard. Make sure that it is not gripped too tightly at the plug, the outlet or the point where it is connected to the system.
- Before use, check that the hoses are not unplugged, folded, or damaged.
- In case of skin contact with the filtrated liquid, refer to the safety datasheet of the filtrated liquid for first aid measures.
- Dispose of the filtrated liquids according to local regulations.
- Before cleaning, shut down the Milliflex® Quantum and switch off and disconnect the power supply from the power source. The power supply must be connected to the earthing system.
- The electrical installation must comply with local standards, power supply voltage: 100–240 Volt AC, 50–60 Hz.
- Use an electrical surge protector to prevent damage to the system.
- Milliflex® Quantum is designed for indoor use only.

Operating and storage temperatures

The Milliflex® Quantum and/or its accessories must be kept away from any heat source. Do not expose the system to direct sunlight or to temperatures outside the ranges of values given below.

Operating and storage temperatures given below:

System operation	System storage	Altitude
10 to 40 °C	10 to 40 °C	< 2000 m

Maximum relative humidity (storage and operation) 80% at temperatures up to 31 °C, then linear decrease to 50% RH at 40 °C.

3. Specifications and Operating requirements

Dimensions (nominal)

Component	Length cm (in.)	Width cm (in.)	Height cm (in.)
Reader	24.9 (9.8)	14.2 (5.6)	12.5 (4.9)
Reader Stand	30.7 (12.1)	18.0 (7.1)	13.5 (5.3)
Camera	9.7 (3.8)	6.6 (2.6)	11.4 (4.5)
Membrane Transfer Tool	5.7 (2)	5.7 (2)	3.2 (1.2)
Membrane Removal Tool	16.2 (6.3)	10.4 (4.1)	4.4 (1.7)

Weight (nominal)

Component	Weight kg (lb)
Reader	4.4 (9.7)
Reader Stand	1.5 (3.3)
Camera	0.5 (1.1)
Membrane Transfer Tool	0.4 (0.9)
Membrane Removal Tool	0.8 (1.8)

Voltage

Catalogue No.	Supply Voltage Input	Supply Voltage Output
MXQREAD01	100 V–240 V 50 Hz–60 Hz	24 V Direct current
MXQCAM001	Powered by the computer	

Power

Catalogue No.	Consumption (mA)		Power (Watts)	
	Nominal	Maximal	Nominal	Maximal
MXQREAD01	670	2080	16	50
MXQCAM001	200	430	1	2.15

Power cord adapter plugs for Europe, North America.

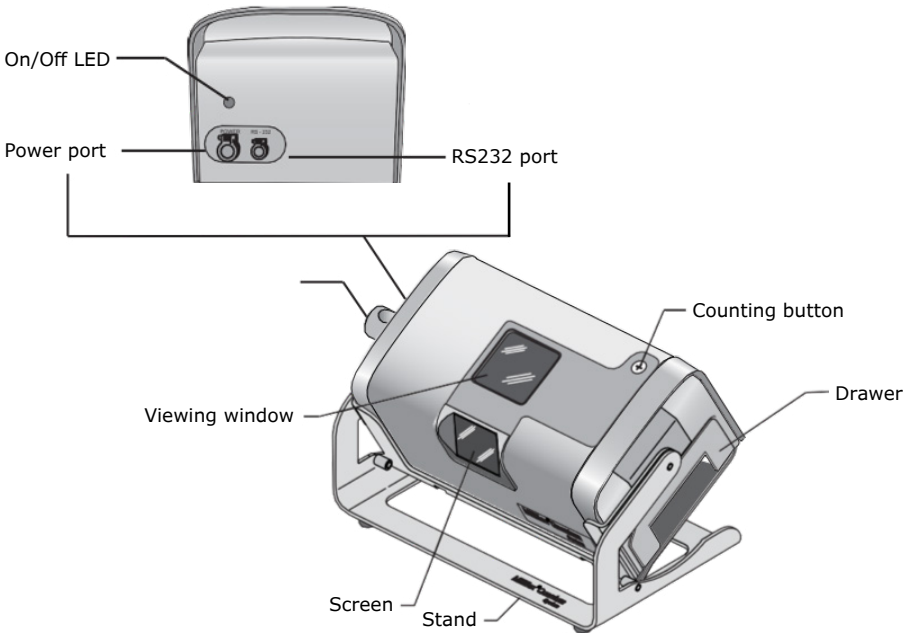
Environmental operating temperature	10 °C to 40 °C (50 °F to 104 °F)
Humidity	<80%
Altitude	<2,000 m (6,562 ft)
Regulatory information	We certify that the Milliflex® Quantum Reader and the Milliflex® Quantum Camera were designed and manufactured in application of the following European Council directives: - Electromagnetic compatibility 2004/108/EEC - ROHS 2002/95/CE

Materials of construction

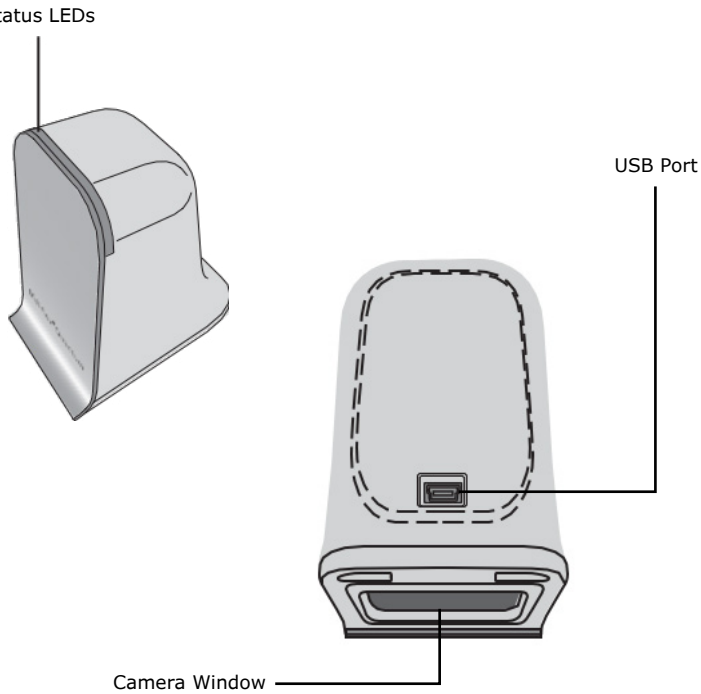
Component	Materials of Construction
Reader	
Housing	Aluminum sheet 1050 with epoxy coating
Optical chamber	304L stainless steel
Handle	304L stainless steel
Optical filter	Glass
LED protector	Transparent polycarbonate
Foot	Polyvinyl Chloride (PVC)
Labels	Polyester
Screen Protector	Polyester
Reader Stand	
Stand	304L stainless steel
Foot	Styrene butadiene rubber (SBR)
End stops	Silicone
Camera	
Front plate	304L stainless steel
Housing	Aluminum alloy with epoxy coating
Window	Glass
Light guide	Clear Polymethyl Methacrylate (PMMA)
Membrane Transfer Tool	
Body	Stainless ASI 316L, ASI 630
Seal	Silicone
Membrane Removal Tool	
Body and adapter	Polyphenylsulfone (PPSU)
Lever	316L stainless steel

4. System components

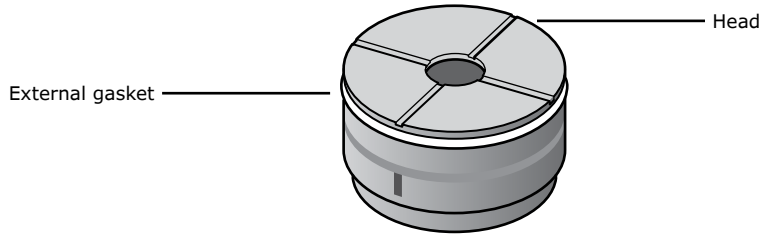
4.1 The Milliflex® Quantum reader and stand



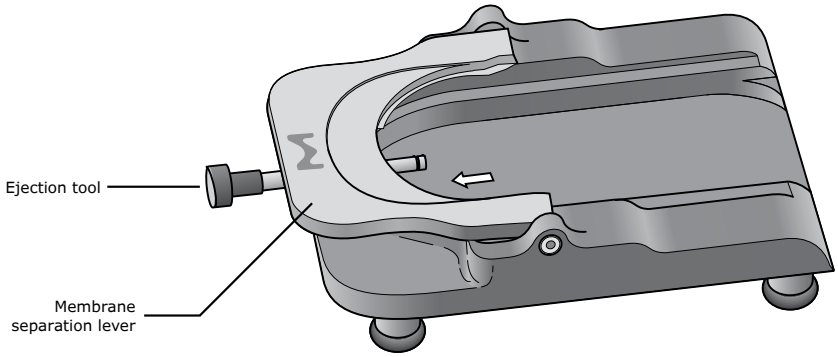
4.2 The Milliflex® Quantum camera

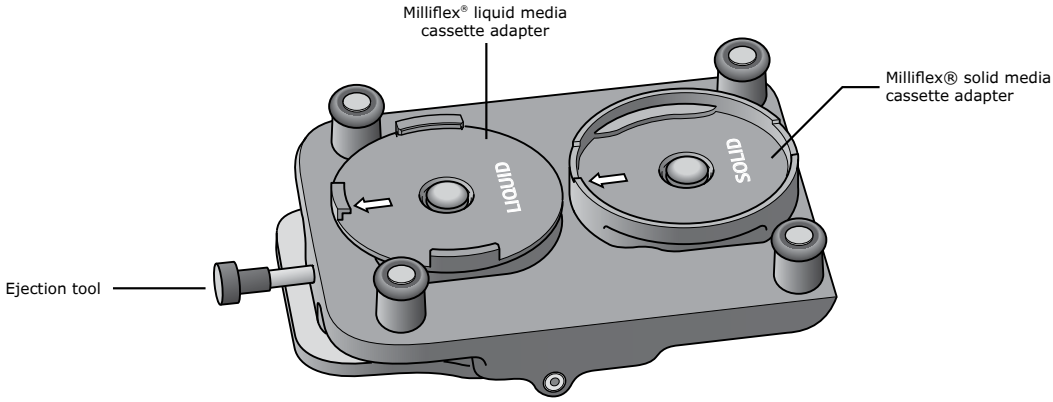


4.3 The Milliflex® Quantum membrane transfer tool for Milliflex Oasis® system

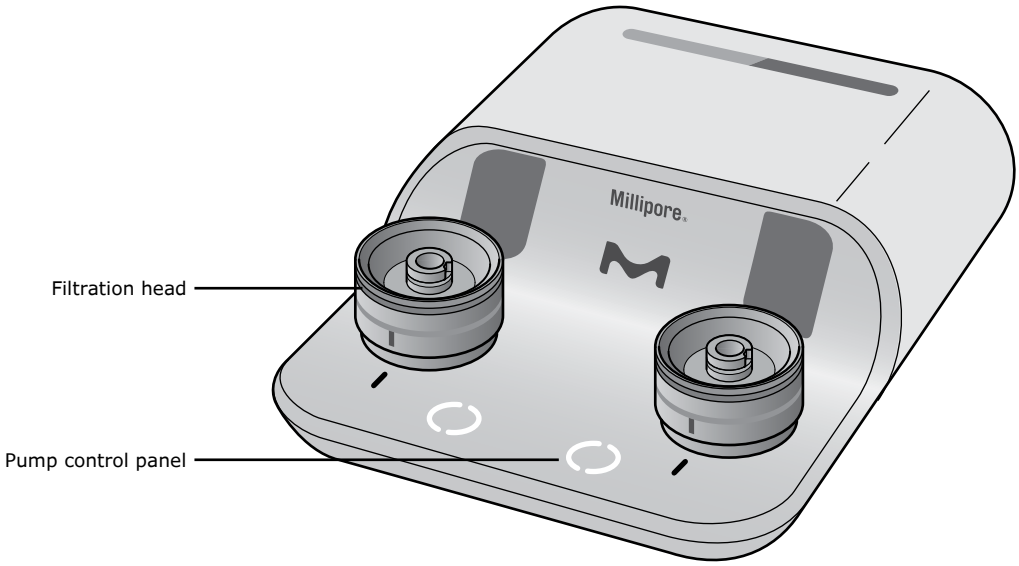


4.4 The Milliflex® Quantum membrane removal tool for all Milliflex® and Milliflex Oasis® devices and media types



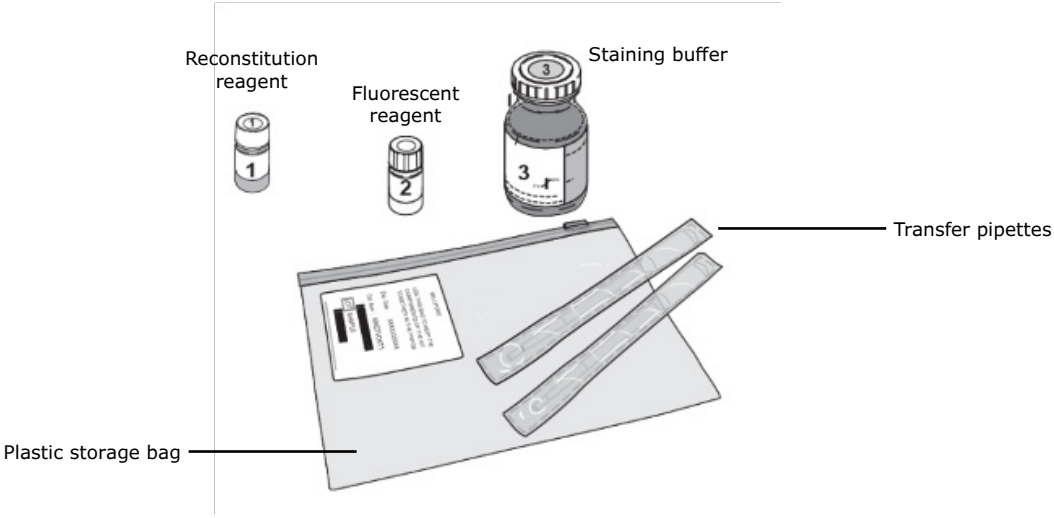


4.5 The Milliflex Oasis® pump



See the Milliflex Oasis® Pump User Guide for details and instructions.

4.6 The Milliflex® Quantum consumable kit



The kit components must be stored at 2 to 8 °C. 48 tests can be performed with one Milliflex® Quantum Consumable Kit.

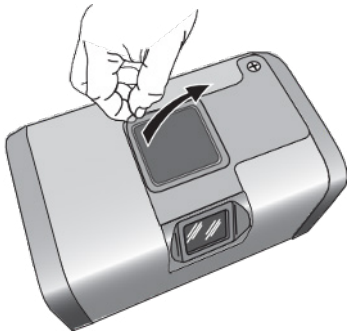
5. Installing the Milliflex® Quantum reader

The Milliflex® Quantum reader weighs 4.4 kg (9.7 lb) and is designed for use on a laboratory workbench.

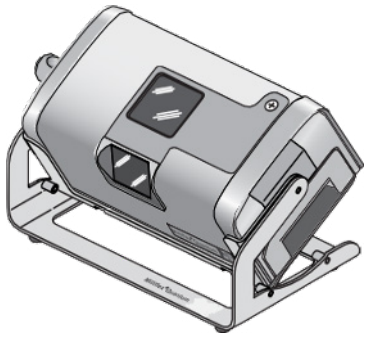
1. Remove all components and their accessories from the boxes. Remove the reader from the protective bag and place it on a flat, stable, horizontal surface.

NOTE: Retain all packing materials. If the unit needs to be shipped, it should be packed in the original materials.

2. Remove the protective film on the window.

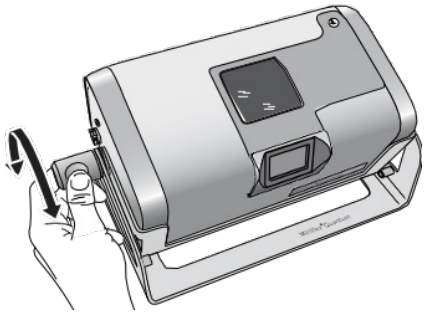


3. Place the reader in the stand.

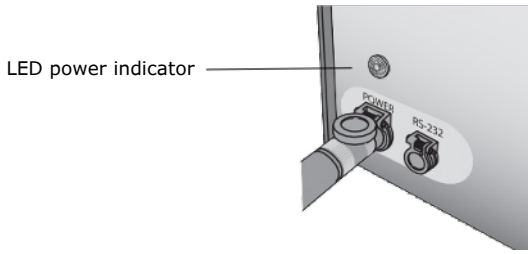


NOTE: The reader stand is not autoclavable.

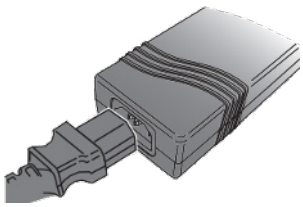
4. Unscrew the adjustment knob on the stand. Adjust the position of the reader and tighten the adjustment knob to lock the position.



5. Connect the end of the power cord to the power outlet on the reader.



6. Connect the power cord to the external power supply. Connect the external power supply to a power source. The system will start up.

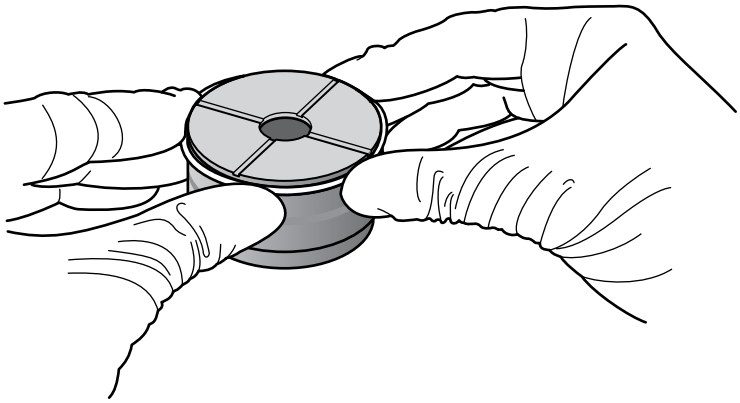


7. The auto test sequence will run and verify that the Milliflex® Quantum Reader is ready to use.

6. Installing the Milliflex® Quantum membrane transfer tool for Milliflex Oasis® system

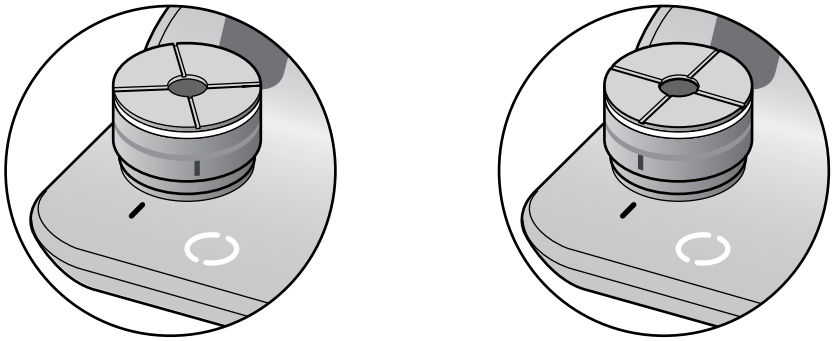
NOTE: The Milliflex® Quantum membrane transfer tool should be used in a microbiological safety cabinet or laminar flow hood.

1. Perform the daily maintenance on the Milliflex® Quantum membrane transfer tool prior to use. Refer to the maintenance section for instructions.
2. Ensure that the external gasket does not twist and is fully seated in the groove.



3. Remove the Milliflex Oasis® filtration head from the pump.

Place the Milliflex® Quantum membrane transfer tool onto the pump and lock it by turning clockwise until the mark on the head is aligned with the one on the pump body.



4. The Milliflex® Quantum membrane transfer tool is ready to use.

7. Preparing the Milliflex® Quantum membrane removal tool for all Milliflex® and Milliflex Oasis® devices and media types

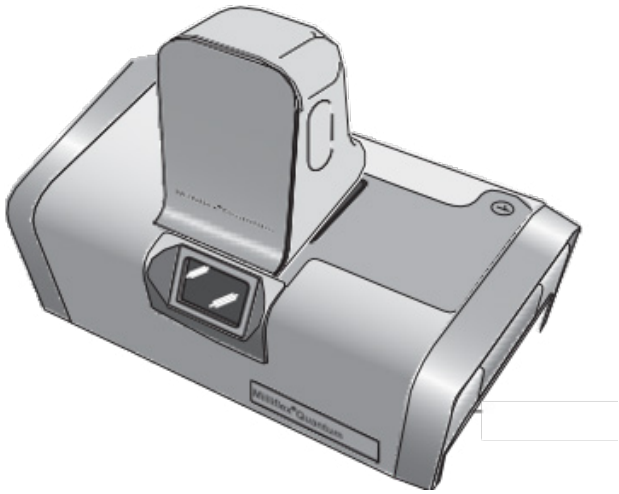
NOTE: The Milliflex® Quantum membrane removal tool should be used in a microbiological safety cabinet or laminar flow hood.

Perform the daily maintenance on the Milliflex® Quantum membrane removal tool prior to use. Refer to maintenance section for instructions. The Milliflex® Quantum membrane removal tool is ready to use and requires no preparation.

8. Installing the camera

NOTE: Do not place the reader in the stand if the camera will be installed. Place the reader on a flat, stable surface before installing the camera.

1. Place the camera on the top of the Milliflex® Quantum Reader as shown here. The camera will magnetically lock onto the reader.



9. Installing the software

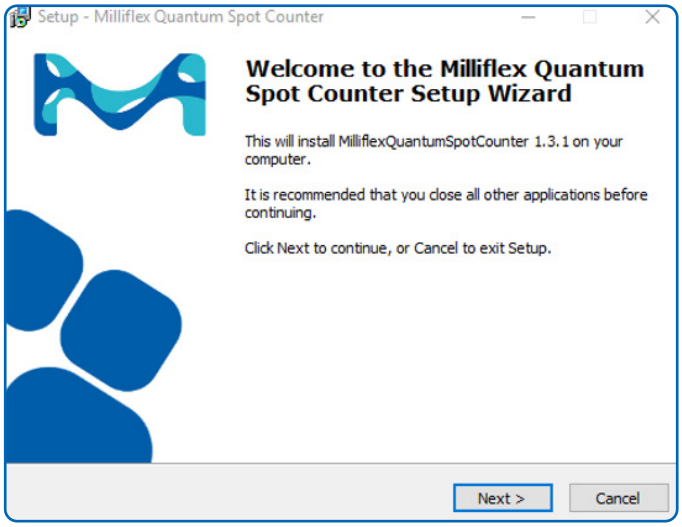
System requirements

- Two USB ports
- Minimum 512 MB of RAM memory, 1 GB recommended
- Minimum disk space: 500 MB
- Processor recommended: Intel® Core™2 Duo
- Minimum screen resolution 1024 x 768—recommended: 1280 x 1024
- Operating system:
  – Windows 7® 32 bits and 64 bits
  – Windows 10® 32 bits and 64 bits
  – Windows 11®
- Microsoft.NET Framework 2.0 SP2 is also recommended. It's installed automatically during the installation.

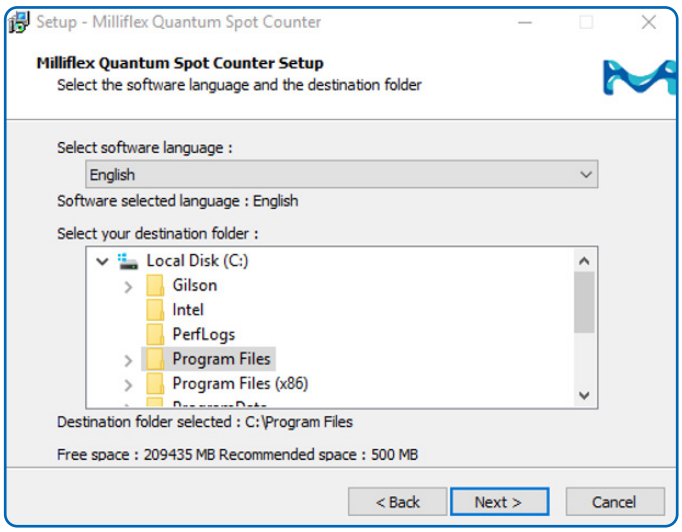
Administrator access to the computer is required to install the Milliflex® Quantum Spot Counter software.

All screenshots shown are examples and may vary from one computer to another.

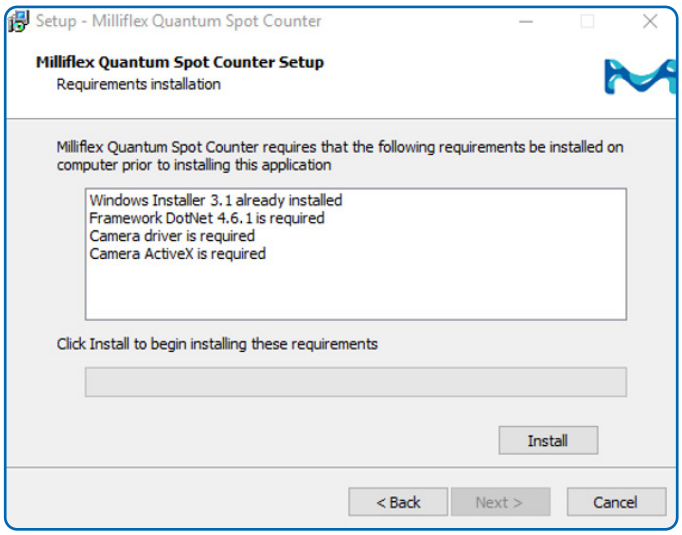
1. Switch on the computer.
2. Log on with an administrator account.
3. The software package can be downloaded on www.sigmaaldrich.com
4. Once downloaded, double-click the "Setup.exe" file to start the installation
5. The installation wizard for the Quantum Spot Counter is displayed. Click Next



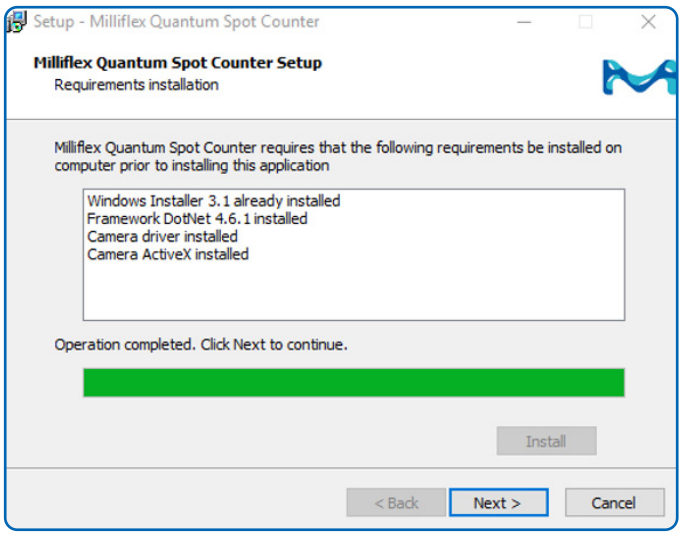
6. Select the language and the destination folder for the software. Click Next



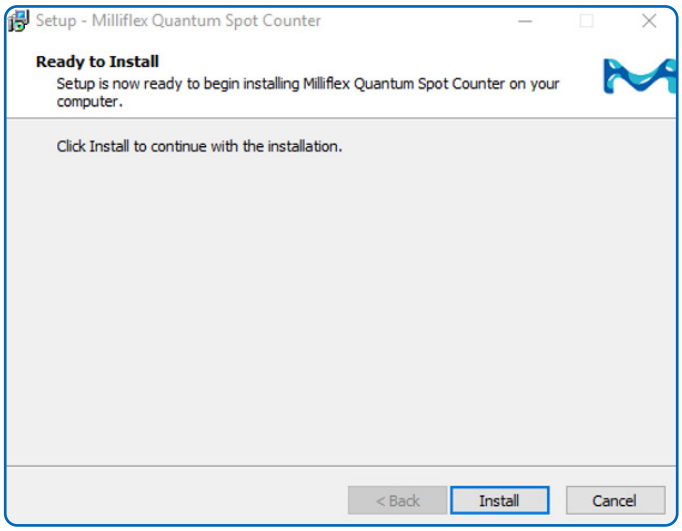
7. A new window is displayed, listing the components required to complete the Milliflex® Quantum software installation. Click Install.



8. When the operation is completed, click Next.

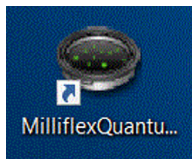


9. A message indicating that the software is now ready to be installed is displayed. Click Install.



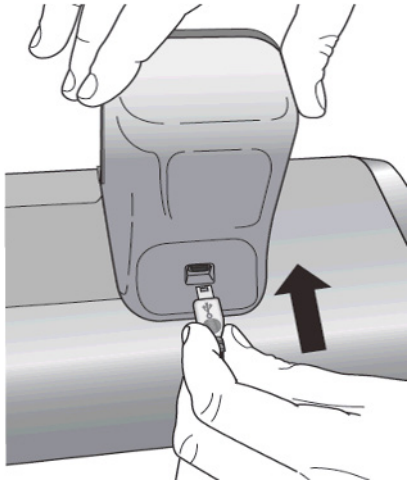
10. A message indicating that the computer must be restarted in order to complete the installation of the software is displayed. Save and close all the other applications. Then, select Yes, restart the computer now and click Finish.

11. After the computer has restarted the QuantumSpotCounter icon is displayed on the desktop.

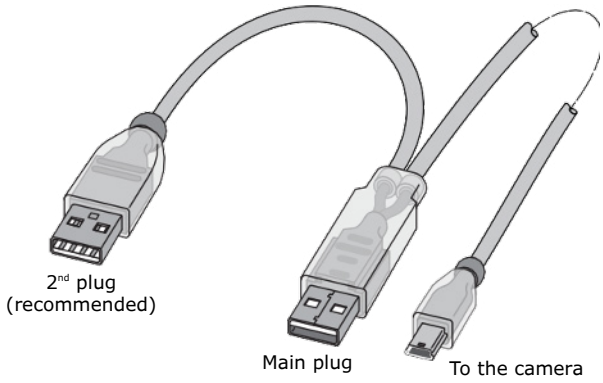


NOTE: Do not open the Quantum Spot Counter software before installing the Milliflex® Quantum Camera.

12. Connect the small end of the USB cable to the camera.



13. The other end of the USB cable is equipped with two plugs. Connect the main plug to a USB port of the PC. Connect the second plug to another USB port of the PC, if available.



NOTE: The main plug of the camera USB cable must be connected to the same USB port during installation and use or the camera will not be recognized by the PC.

14. The PC detects the Milliflex® Quantum Camera. Wait until each component is installed.

15. The installation is completed. The software can now be started.

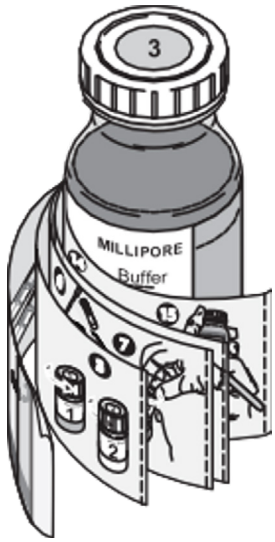
10. Preparing the Reagent Kit

10.1 Precautions

- Do not use any expired kit component.
- Remove the kit from the refrigerator one hour before starting the reconstitution.
- Reconstitute under a laminar flow hood or a microbiological safety cabinet.
- During the seven-day shelf life, do not let the staining solution remain at room temperature for more than four hours per day.
- When removing the staining solution from the refrigerator, wait one hour before performing a staining.
- Use appropriate personal protective equipment when using the staining solution.
- Mix the staining solution before performing the first test of the day.

10.2 Reconstitution

Reconstitute the staining solution following the procedure on the Staining Buffer Vial (vial 3) before the first use of the reagent kit. The reconstitution date may be noted on the Staining Buffer (vial 3) label.



Store the reconstituted Staining Solution at 2 to 8 °C. 48 tests can be performed with the reconstituted Staining Solution. The approximate number of remaining tests is indicated on the Staining Buffer (vial 3) label.

The shelf life of the reconstituted Staining Solution is 7 days.

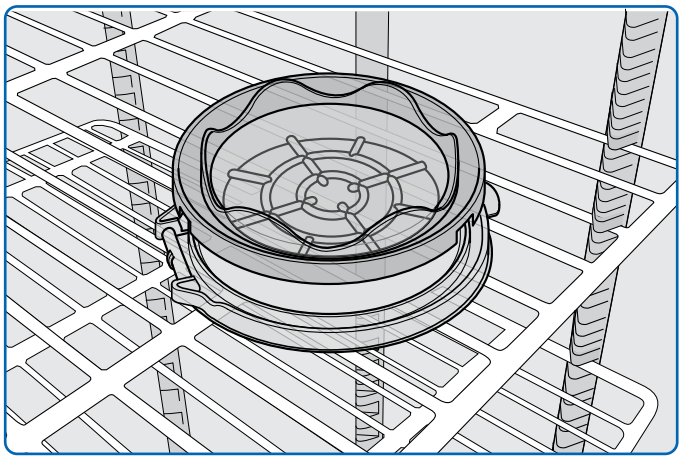
NOTE: To extend the shelf life, the reconstituted Staining Solution can be distributed in up to four aliquots. These aliquots can be stored up to four weeks in the freezer. Once thawed, the aliquot must be stored at 2 to 8 °C, protected from light. The shelf-life of the thawed aliquot is seven days.

11. Filtering

Perform the sample filtration as described in the Milliflex Oasis® system User Guide.

12. Incubating

Place the media plate/membrane assemblies in the incubator, with the funnel cover facing down.

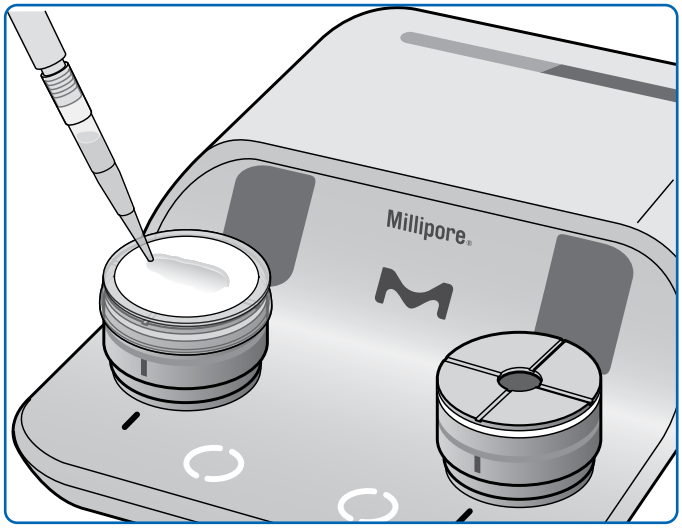


13. Staining

1. Once the incubation is complete, remove the media plate/membrane assembly from the incubator and bring it under the laminar flow hood or the microbiological safety cabinet.
2. Clean the surface of the Milliflex® Quantum membrane transfer tool with a non-woven wipe soaked in one of the products listed in the Cleaning recommendations section before the first transfer of the day, and with a dry wipe between transfers if necessary.
3. Place a Milliflex® liquid cassette on the Milliflex® Quantum membrane transfer tool.

4. Secure the Milliflex® liquid cassette onto the Milliflex® Quantum membrane transfer tool and remove the protective film from the Milliflex® liquid cassette.

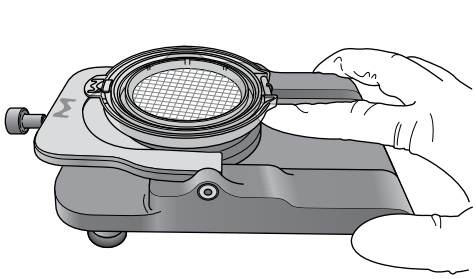
5. With a pipette, add 2 mL of staining solution on the center of the pad of the Milliflex® liquid cassette.

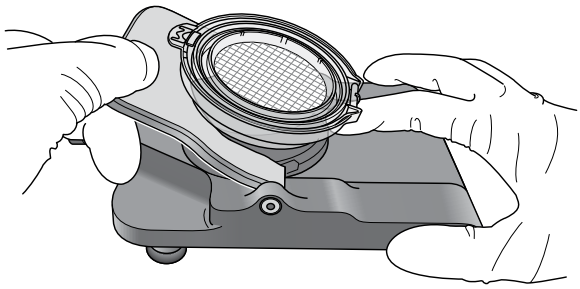


NOTE: Gently shake the staining solution before the first staining of the day. Do not touch the pad when adding the staining solution.

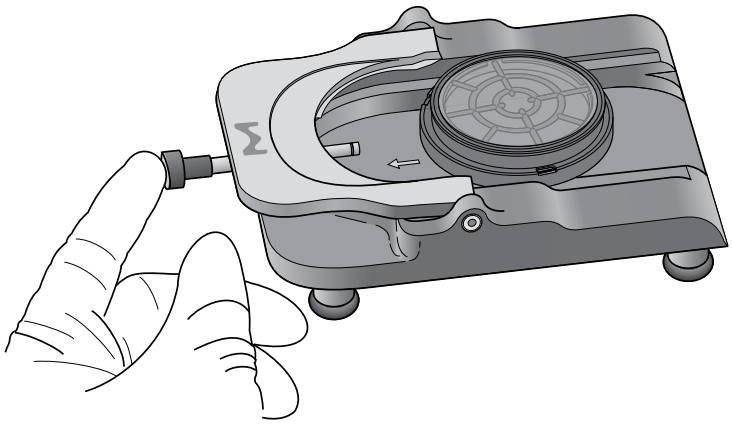
6. Using the Milliflex® Quantum membrane transfer tool, separate the membrane from the media plate as shown.

- Slide the media plates/membrane assembly in the Milliflex® Quantum membrane transfer tool following the arrow engraved on the tool until it blocks.
- Hold the media plate/membrane assembly while lifting the lever.





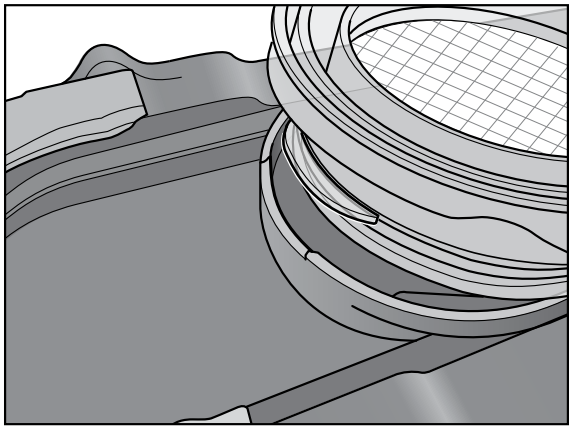
- Press the ejection tool to remove the media plate.

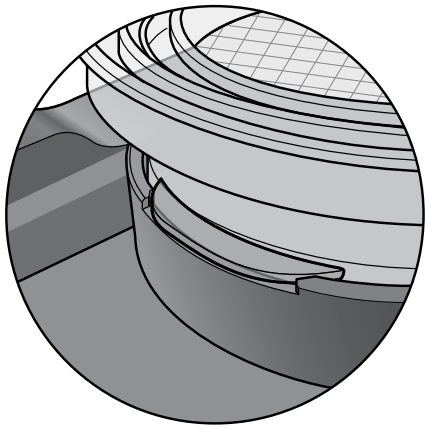


IMPORTANT NOTE

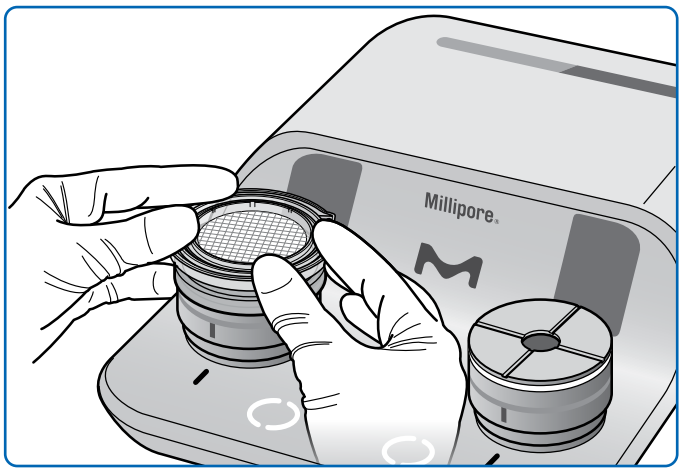
If using Milliflex® agar cassettes, use the appropriate adapter—labeled SOLID—located underneath the Milliflex® Quantum membrane transfer tool.

Align the Milliflex® agar cassette/membrane assembly with the SOLID adapter's notches as shown on the pictures below. Then separate the Milliflex® agar cassette/membrane assembly as described at the beginning of this section.

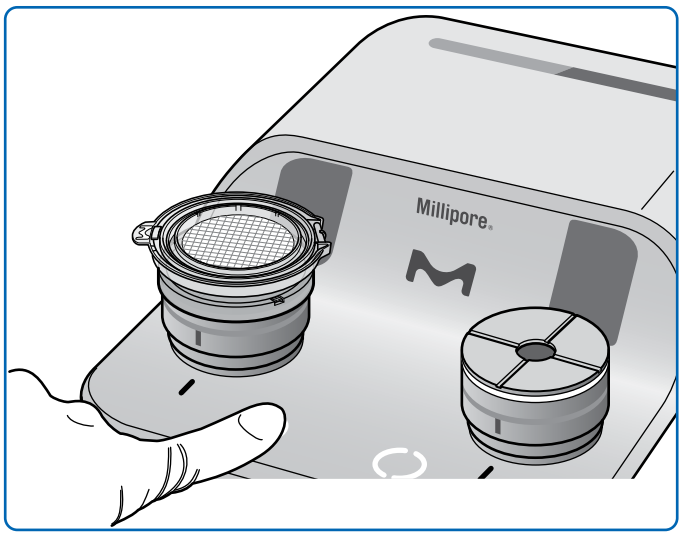




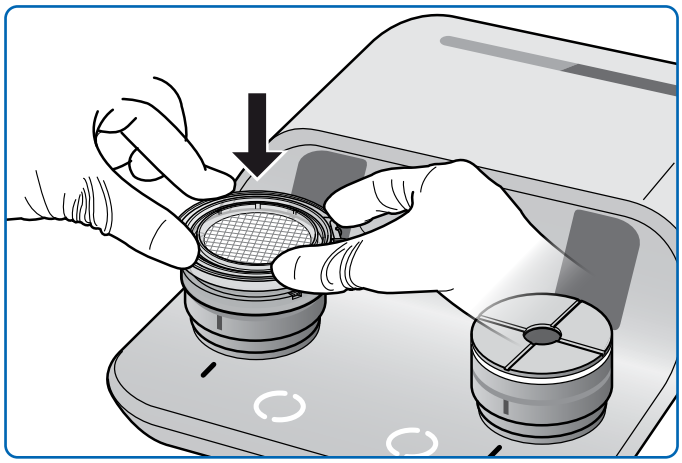
7. Place the membrane assembly with its cover onto the Milliflex® liquid cassette.



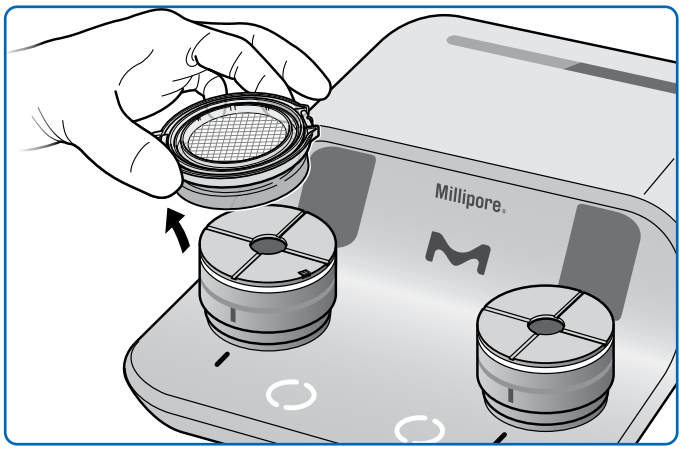
8. Press the button to start the pump.



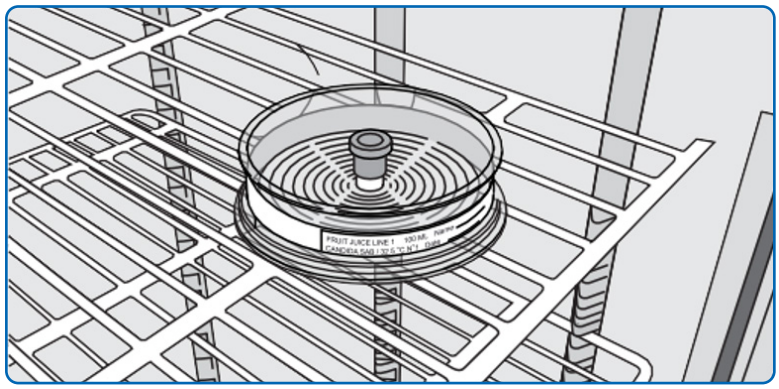
9. Press firmly on both sides of the membrane assembly cover to lock it onto the Milliflex® liquid cassette. This step allows even staining.



10. Press the button to stop the pump and remove the membrane on the Milliflex® liquid cassette from the tool.



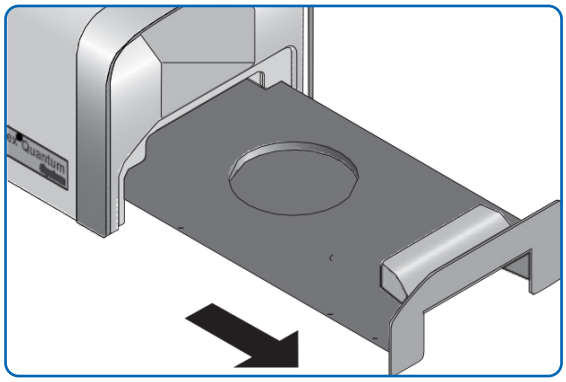
11. Incubate the membrane on the Milliflex® liquid cassette for 30 minutes at 32.5 °C + 2.5 °C with the funnel cover facing down.

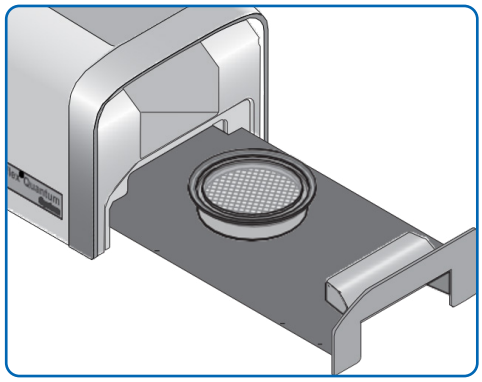


NOTE: The membranes on the Milliflex® liquid cassettes should not be stacked in the incubator to ensure that all membranes are incubated at homogeneous temperature.

14. Installing the Milliflex® Membrane in the Reader

1. After the staining step, remove the membrane on the Milliflex® liquid cassette from the incubator.
2. Verify that the reader is on and ready to use.
3. Open the reader drawer and place the membrane on the Milliflex® liquid cassette in the drawer.





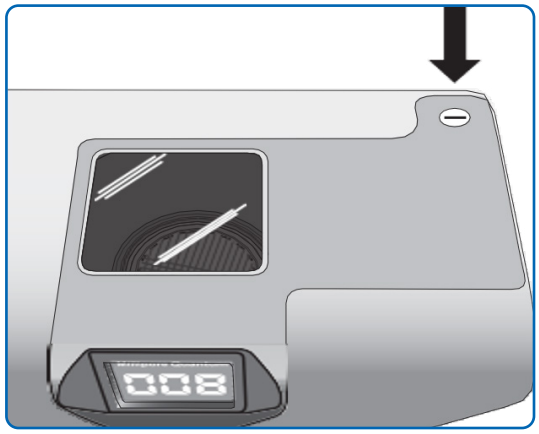
4. Close the drawer.

15. Reading the membrane

15.1 Reading the Membrane Manually

NOTE: Aligning the membrane grid with the drawer will make counting easier.

1. Once the reader drawer is closed, the reader lights the membrane. The screen displays the counter.
2. Push the counting button to increase the count.



NOTE: After 10 minutes without opening the drawer, the LEDs inside the reader switch off and the system enters standby mode.

To relight the membrane, open and close the drawer. This resets the counter.

3. After the counting is complete, record the count and open the drawer to remove the Milliflex® membrane from the reader.

NOTE: Five seconds after opening the drawer, the counter disappears and the message Waiting for Milliflex® is displayed on the screen.

If the Milliflex® Quantum reader is not used for more than 30 minutes with no Milliflex® membrane inside, the reader goes into sleep mode.

To reactivate it, push the counting button or open the drawer and insert a Milliflex® membrane on a Milliflex® liquid cassette. Close the drawer. When the reader is reactivated, the auto test sequence will run.

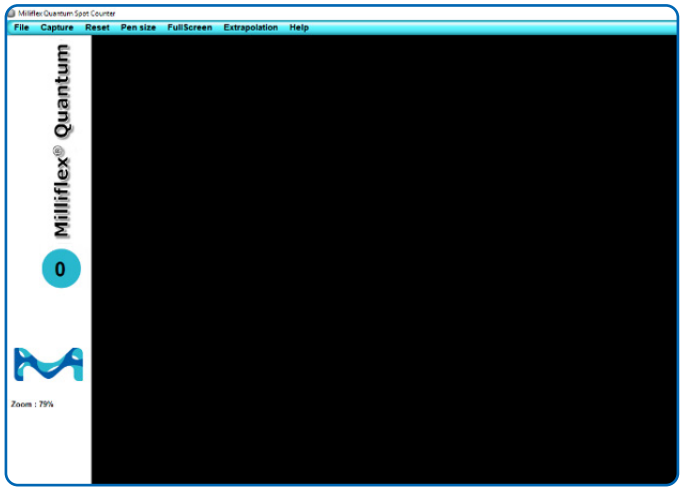
4. Close the drawer.

15.2 Reading the Membrane with the Milliflex® Quantum Camera

15.2.1 Starting the Milliflex® Quantum Spot Counter Software

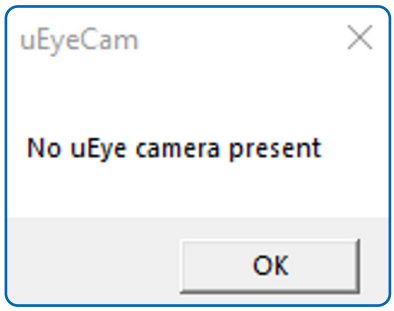
Double-click the 

icon on the desktop. The software opens.



NOTE: If the Milliflex® Quantum camera is not connected, the message below is displayed before the opening of the software.

The camera must be connected to the same USB port during installation and use. Otherwise the camera will not be recognized by the PC.

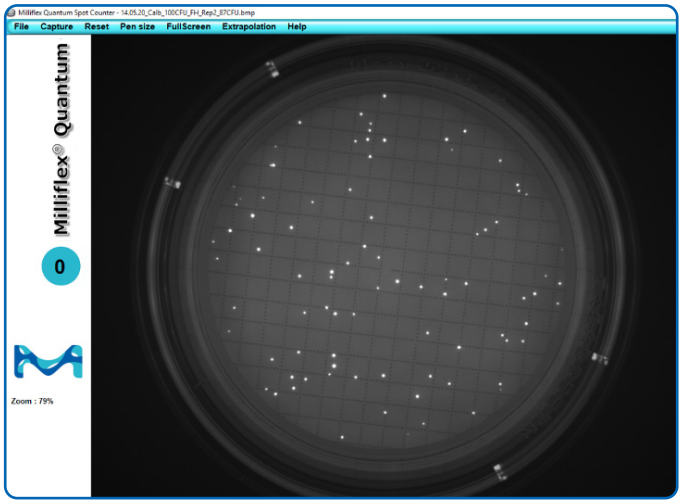


15.2.2 Capturing an image

1. Click Capture (or Ctrl + space) after placing a membrane on the Milliflex® liquid cassettes into the reader drawer.

NOTE: During the image capture, the camera LED light is orange. A blinking orange LED indicates an error.

2. The Milliflex® membrane image is displayed.

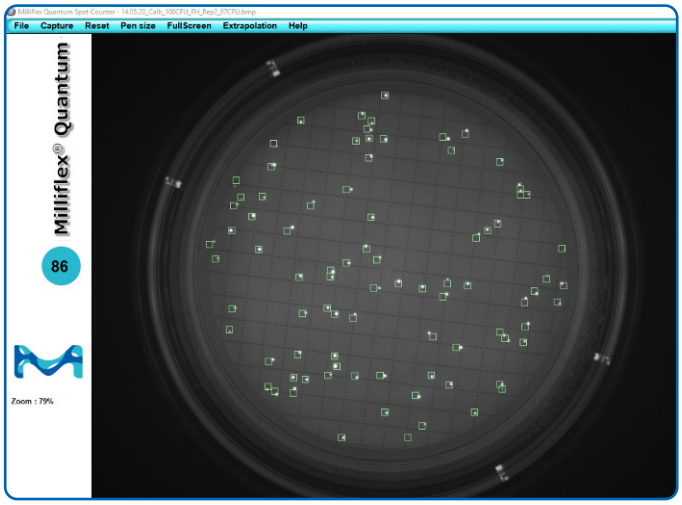


15.2.3 Counting

1. Place the mouse on the Milliflex® membrane image. A cross appears on the screen.
2. Place the cross on a spot by moving the mouse.
3. Using the left button of the mouse, click the spots to mark them. The counter increases by one with each click.

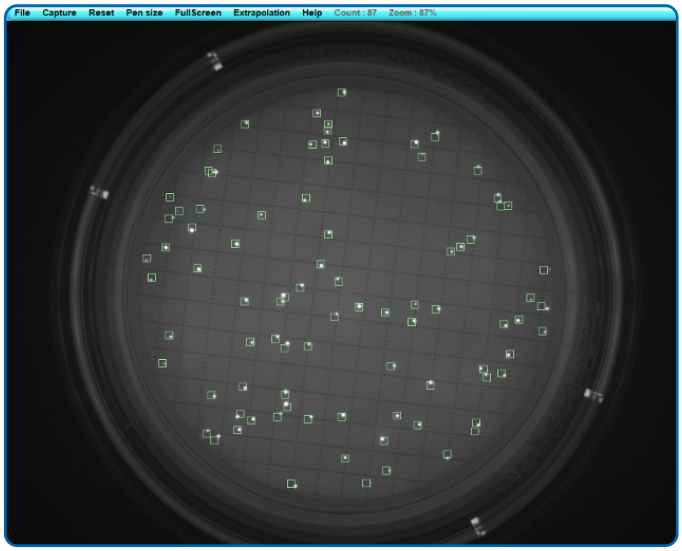
NOTE: To erase a marking, place the cursor of the mouse on the wrong marking and perform a right-click with the mouse.

The size of the image can be increased or decreased using the scroll wheel of the mouse or the size of the image can be increased using the FullScreen menu.



15.2.4 FullScreen Menu

1. Click the FullScreen menu to switch to the full screen mode.

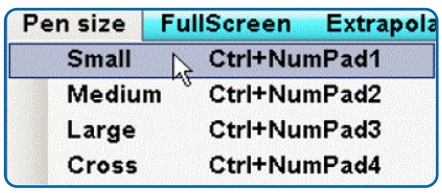


NOTE: When the FullScreen mode is activated, the counter value and the zoom factor are displayed in the toolbar menu, at the top of the screen.

2. Click the FullScreen menu to switch back to the normal mode.

15.2.5 Pen size Menu

The pen size can be changed by clicking the Pen size menu. Four types of pens are available. The standard pen size is Medium. Several pen sizes can be used to mark the spots of one Milliflex® membrane.

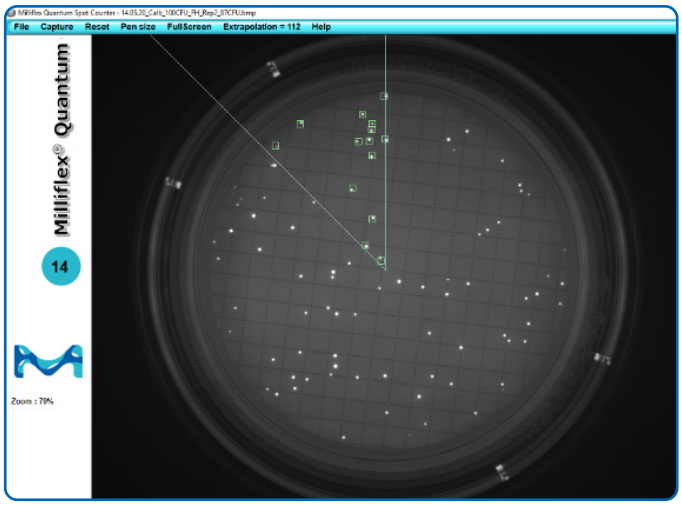


15.2.6 Extrapolation Menu

In applications with too many spots to count on the Milliflex® membrane, the Extrapolation function can be used to estimate the number of colonies contained on the entire membrane.

NOTE: Activating the Extrapolation function resets the counter. When using the Extrapolation menu, mark only the spots within the outlined segment.

1. Click the Extrapolation menu. A one-eighth segment of the Milliflex® membrane is outlined.



2. Count the spots in the outlined segment.
3. The extrapolated number of spots for the entire Milliflex® membrane is indicated at the top of the screen.

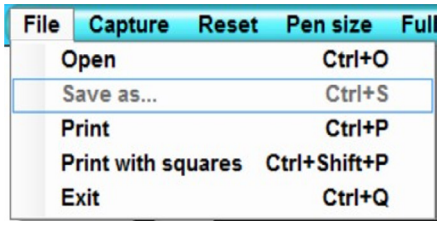
4. Click Extrapolation to quit this function.

15.2.7 Reset Menu

Click the Reset menu to erase all the spot markings and reset the counter.

15.2.8 Saving an Image

1. Click the File menu. Select Save as menu



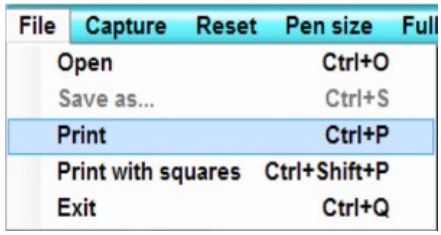
2. Select the folder to save the image in.
3. Select the format of the saved image (.bmp or .jpg).

NOTE: .bmp format provides the best image quality. Images are saved without the counting marks.

4. Enter the image name in the File name field.
5. Click Save.

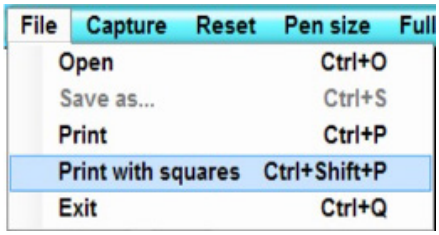
15.2.9 Printing an Image

1. Click the File menu. Two types of printing are available, with or without counting marks.
2. To print the image without counting marks, select Print.
3. To print the image with counting marks, select Print with squares.

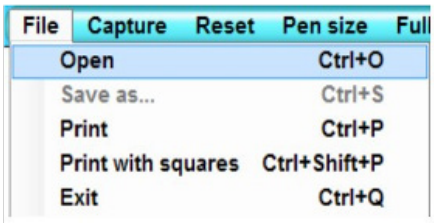


15.2.10 Opening a Saved Image

1. Click the File menu and select Open.



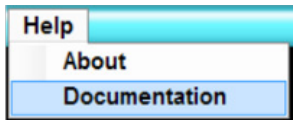
2. Browse the image to be opened and click Open.
3. Once the image opens, the image functions are available.



NOTE: The Milliflex® Quantum Camera does not need to be connected to open and work on a saved image.

15.2.11 Help Menu

Click the Help menu and select Documentation menu.

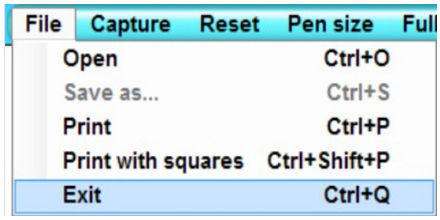


On the following window click the link to our website in order to download the Milliflex® Quantum Rapid Detection System User Guide.

Go to the section Reading the membrane with the Milliflex® Quantum Camera of this user guide.

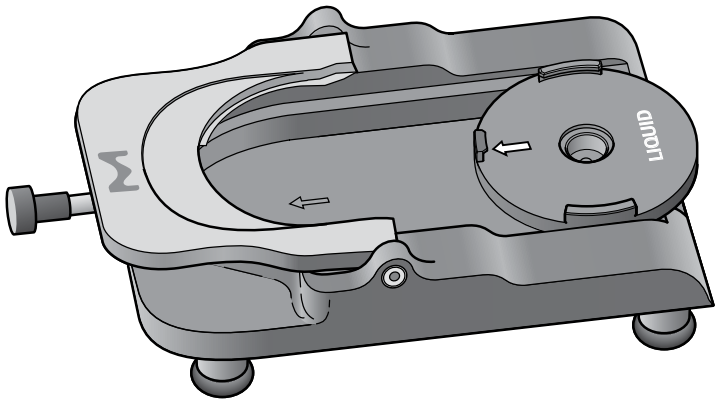
15.2.12 Closing the Milliflex® Quantum Spot Counter Software

Click File and select Exit.

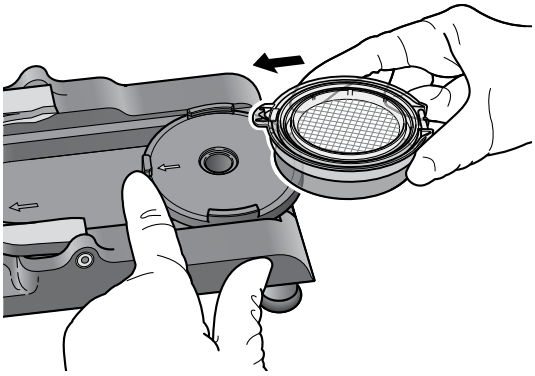


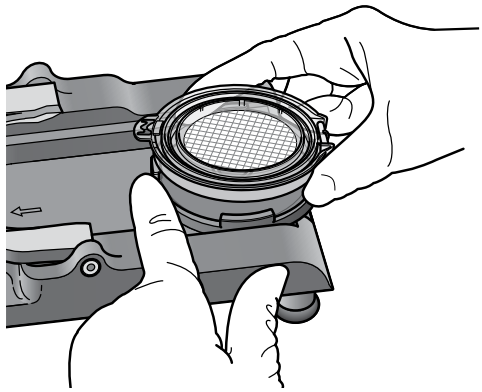
15.3 Reincubation—optional

1. After reading the sample, separate the membrane from the Milliflex® liquid cassette using the Milliflex® Quantum membrane removal tool. Keep the cover on the membrane.
2. Place the adapter for Milliflex® cassette for liquid media—labeled LIQUID—located underneath the Milliflex® Quantum membrane removal tool as follows:

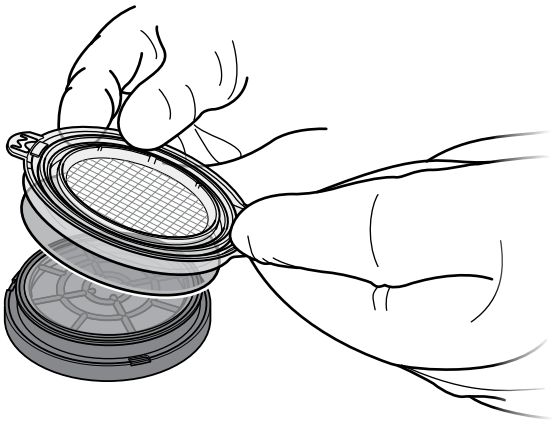


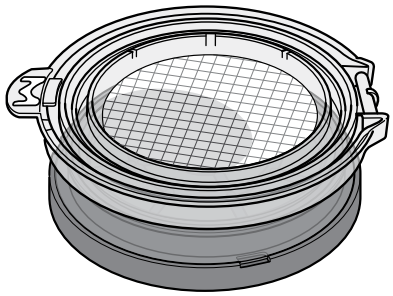
3. Slide the membrane on the Milliflex® liquid cassette in the adapter while blocking the adapter to prevent it from shifting.



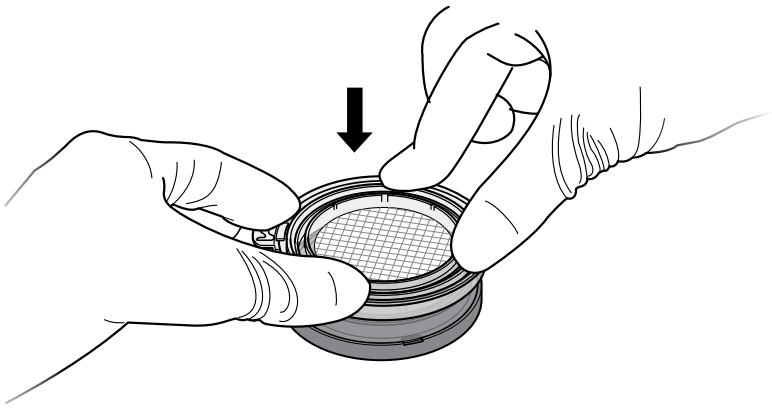


4. Separate the membrane from the liquid media cassette as described in the staining section.
5. Remove the cover from a new media plate.
6. Place the membrane onto the new media plate. Gently press on the edge of the membrane assembly to initiate the contact between the membrane and the surface of the media plate on one edge of the membrane. Let the membrane roll out.

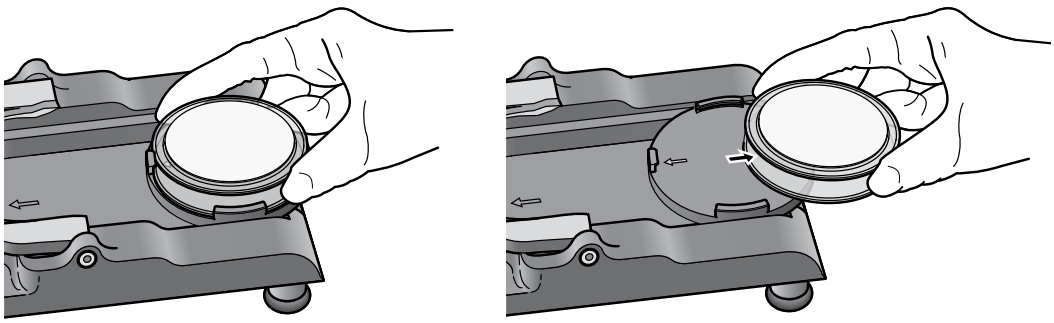




7. When the membrane is evenly spread, assure full membrane contact with the media plate by pressing slowly and firmly on both sides of the membrane. The membrane should be fully in contact with the medium.



8. Take the Milliflex® liquid cassette out of the adapter using the Milliflex® Quantum membrane removal tool as a guide.



9. Place the media plate/membrane assembly in the incubator, with the funnel cover facing down.
10. Take the media plate/membrane assembly out of the incubator, count the colony forming units, and identify if relevant.

16. Storing the reader

If the reader will not be used for an extended period of time, close the drawer and unplug the power cord from the power source.

17. Maintenance

17.1 Cleaning recommendations

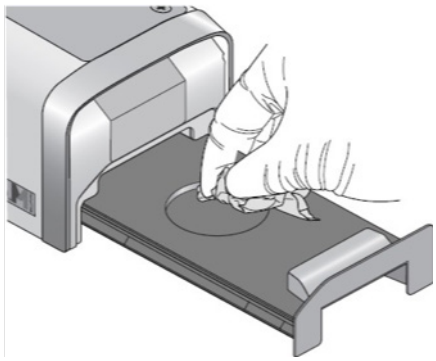
1. Disconnect the reader from the power supply before cleaning or servicing.
2. Do not spray any cleaning products, solvents or abrasives on or in the Milliflex® Quantum Reader and Camera, as these could damage the instrument. Use only non-woven wipes soaked in one of the products listed below.

Cleaning Product	Dilution
Quaternary ammonium (NH4) Biguanide Propanolol (10 to 40%)	Ready to use
IPA 70% (aerosol) Isopropyl alcohol 70%	Ready to use
Ethanol 70%	Ready to use
Sodium Hypochlorite	250 ppm
Peracetic acid at 5% Acetic acid at 7% Hydrogen peroxide at 27%	2.5%
Ethanol 41% Polyhexamethylene biguanide hydrochloride N-(3-aminopropyl)-N-dodecylpropane-1,3-diamine Didecyldimethylammonium chloride	Ready to use

17.2 Daily cleaning

17.2.1 Milliflex® Quantum reader

1. Gently clean the reading window and the screen using a non-woven wipe soaked in one of the products listed above.
2. Gently clean the Milliflex® membrane site on the drawer using a non-woven wipe soaked in one of the products listed above

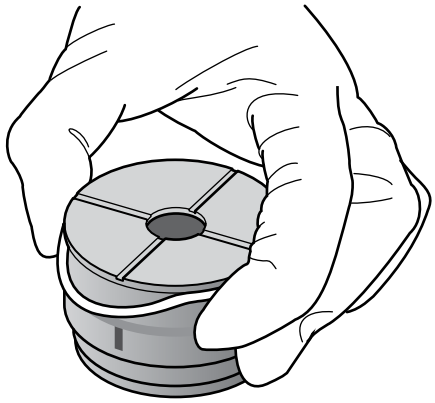


17.2.2 Milliflex® Quantum camera

Clean the window of the Milliflex® Quantum Camera using a non-woven wipe soaked in one of the products listed in the Cleaning recommendations section.

17.2.3 Milliflex® Quantum Membrane Transfer Tool

1. Before the first transfer of the day, gently clean the surface of the Milliflex® Quantum membrane transfer tool with a non-woven wipe soaked in one of the products listed in the Cleaning recommendations section.
2. Before each transfer, wipe the surface with a dry wipe.
3. After the last transfer of the day, clean the seal with a non-woven wipe soaked in one of the products listed in the Cleaning recommendations section.
4. Wait a few seconds to allow the cleaning agent to evaporate and push the external gasket from center outwards, so that the external gasket can be pulled off.



5. Clean the groove with one of the products listed in the Cleaning recommendations section.

NOTE: The cleaning product can be sprayed directly on the membrane transfer tool.

6. Rinse the tool with water, especially the groove.
7. Let the tool dry on an absorbent cloth.

NOTE: Although not mandatory, the tool can be autoclaved. Remove the external gasket from the tool and autoclave the tool and the external gasket at 121°C for 15 minutes or at 134°C for 5 minutes.

8. Reinstall the external gasket on the Milliflex® Quantum membrane transfer tool's groove.

17.2.4 Milliflex® Quantum Membrane Removal Tool

Clean the Milliflex® Quantum membrane removal tool using a non-woven wipe soaked in one of the products listed in the Cleaning recommendations section.

NOTE: The Milliflex® Quantum membrane removal rack can be autoclaved at 121°C for 15 minutes or at 134 °C for 5 minutes.

17.3 Weekly Servicing

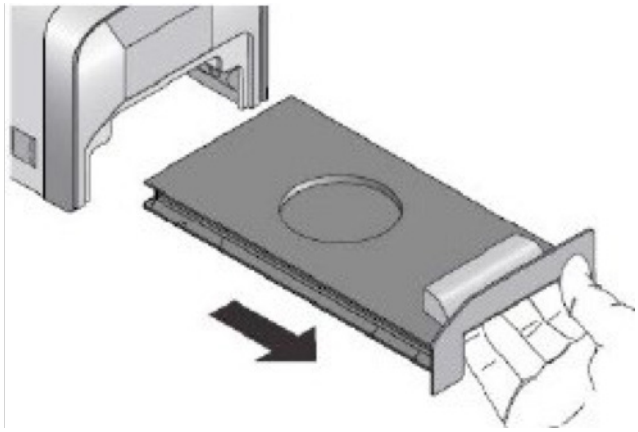
17.3.1 Milliflex® Quantum Reader

Disinfect all the exterior surfaces of the reader, the stand and the camera using a non-woven wipe soaked in one of the products listed in the Cleaning recommendations section.

17.4 Monthly Servicing

17.4.1 Milliflex® Quantum Reader

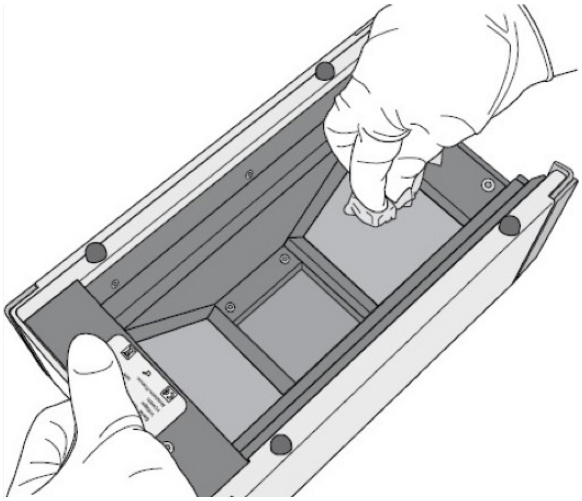
1. Remove the drawer from the reader by pulling it firmly.



2. Gently clean the drawer using a non-woven wipe soaked in one of the products listed in the Cleaning recommendations section.

NOTE: The drawer is not autoclavable

3. Invert the Reader. Gently clean the interior of the reader using a non-woven wipe soaked in one of the products listed in the Cleaning recommendations section.



4. Replace the drawer inside the Milliflex® Quantum Reader.

17.5 Semi-annual servicing

17.5.1 Milliflex® Quantum Membrane Transfer Tool

Replace the external gasket on the Milliflex® Quantum membrane transfer tool using the Milliflex® Quantum membrane transfer tool for Milliflex Oasis® gaskets replacement kit – Catalogue No. MMGASKTQU.

17.6 Annual servicing

A complete check of the Milliflex® Quantum System should be performed by our authorized technicians.

17.7 Cleaning and maintenance table

	Installation	Before use	After use	Weekly	Monthly	Yearly
Milliflex® Quantum membrane transfer tool						
Surface	X	X	X	N/A	X	N/A
External Seal	X	X	X	N/A	X	N/A
Internal Seal	X	N/A	N/A	N/A	X	N/A
Maintenance	N/A	N/A	N/A	N/A	N/A	Spare parts replacement
Milliflex® Quantum membrane removal tool						
External surface	N/A	X	X	N/A	N/A	N/A
Milliflex® Quantum reader						
External surface	N/A	X	N/A	X	N/A	N/A
Internal surface	N/A	X	N/A	N/A	X	N/A
Camera window	N/A	X	N/A	N/A	N/A	N/A
Camera housing	N/A	N/A	N/A	X	N/A	N/A
Maintenance	N/A	N/A	N/A	N/A	N/A	Calibration

Optional: Although not mandatory, the Milliflex® Quantum membrane transfer tool including its components can be autoclaved at 121 °C for 15 minutes or at 134 °C for 5 minutes.

18. Troubleshooting

Error Message or Symptom	Possible Cause	Remedy
Milliflex® Quantum Reader		
The light (LED) and the screen on the reader are off.	The reader is not connected to power source.	Connect to power source.
		If the reader is connected to a power source and the light is off, contact our Technical Service.
The light on the reader is on but the screen is off.	The reader is in sleep mode.	Push the counting button or open the drawer and place a membrane on a Milliflex® liquid cassette inside to reactivate the reader.
The membrane is not lit when the reader drawer is closed.	The reader is not connected to power source.	Connect to power source.
	The drawer is not properly closed.	Close the drawer properly.
	The membrane is not inserted in the reader with a Milliflex® liquid cassette below and the funnel cover above.	Insert the membrane in the reader with a membrane on a Milliflex® liquid cassette below and the funnel cover above.
	The membrane has shifted from the drawer membrane site when the drawer was closed.	Open the drawer and verify that the membrane is properly located in the drawer membrane site. Then close the drawer again.
The counting function does not work.	The counting button does not work properly.	Contact our Technical Service.
The VERIFICATION NEEDED message is displayed at the top of each screen.	Some of the LEDs inside the reader are not functioning properly.	Contact our Technical Service.
The CALIBRATION NEEDED message is displayed at the top of each screen.	30 days before the calibration due date, the message will be displayed at the top of each screen.	Contact our Technical Service to calibrate the reader. If the calibration due date has passed, the reader can be used, however the performance is not guaranteed.
	The LEDs on-time limit has been reached.	
System out-of- order—Please contact our Technical Service.	The reader is out of order.	Contact our Technical Service.

Error Message or Symptom	Possible Cause	Remedy
Milliflex® Quantum Camera and Spot Counter		
No uEye camera present.	The camera is not properly connected.	Verify that the main plug of the camera USB cable is connected to the USB port used during the installation.
Could not open camera! Check your connection.		
The camera is not connected.		
Transfer error.	The camera is not properly connected.	Verify that the main plug of the camera USB cable is connected to the USB port used during the installation.
		Close and restart the software.
		Verify that the second plug of the camera USB cable is connected to a USB port of the PC. If the problem persists, disconnect other peripheral devices connected to USB ports of the PC. Then close and restart the software.
An unspecified error has occurred.	The camera is not properly connected.	Verify that the main plug of the camera USB cable is connected to the USB port used during the installation.
		Close and restart the software.
		Verify that the second plug of the camera USB cable is connected to a USB port of the PC. If the problem persists, disconnect other peripheral devices connected to USB ports of the PC. Then close and restart the software.
Too bright! Check your reader.	The membrane is not correctly lit.	Verify that the camera is correctly placed on the reader.
		Open and close the drawer to reactivate the membrane lighting.
		Verify that the second plug of the camera USB cable is connected to a USB port of the PC. If the problem persists, disconnect other peripheral devices connected to USB ports of the PC. Then close and restart the software.

Error Message or Symptom	Possible Cause	Remedy
Nothing to capture! Check your reader.	The membrane is not or not correctly lit.	Verify that the camera is correctly placed on the reader.
		Verify that the reader is connected to power source.
		Verify that the membrane is inserted in the reader with a Milliflex® liquid cassette or a solid media adapter below and the funnel cover above.
		Open and close the drawer to reactivate the membrane lighting.
		Verify that the second plug of the camera USB cable is connected to a USB port of the PC. If the problem persists, disconnect other peripheral devices connected to USB ports of the PC. Then close and restart the software.
No image is displayed and the progress bar is blocked during an image capture.	Incorrect exposure time.	Verify that the camera is correctly placed on the reader.
		Connect the reader to power source.
	The membrane is not correctly lit.	Verify that the camera is correctly placed on the reader.
		Connect the reader to power source.
Milliflex® Quantum Membrane Transfer Tool for Milliflex Oasis®		
The membrane is not transferred to the Milliflex® liquid media cassette.	The tool is not properly installed on the Milliflex Oasis® Pump.	Install the tool correctly.
	The Milliflex Oasis® Pump does not work properly.	Verify that the Milliflex Oasis® Pump is working properly.
Milliflex® Quantum Reader Stand		
The reader does not stay in the desired position.	Adjustment knob on the stand is not tightened.	Tighten the adjustment knob.

If any of the problems above persist, contact our Technical Service.

19. Spare parts, accessories and services

Description	Qty/Pk	Catalogue No.
Milliflex® Quantum System Kits		
Milliflex® Quantum standard kit which includes 1 reader, 1 reader stand, 1 membrane transfer tool, 1 membrane removal tool, and 1 camera	1	MMQUANK01
Milliflex® Quantum standard kit with validation protocol European format which includes: 1 reader, 1 reader stand, 1 membrane transfer tool, 1 membrane removal tool, 1 camera and 1 IQ-OQ Validation Protocol (A4)	1	MMQUA4K01
Milliflex® Quantum standard kit with validation protocol US format which includes: 1 reader, 1 reader stand, 1 membrane transfer tool, 1 membrane removal tool, 1 camera and 1 IQ-OQ Validation Protocol (US Letter)	1	MMQULTK01
Milliflex® Quantum Hardware and Accessories		
Milliflex® Quantum reader	1	MXQREAD01
Milliflex® Quantum reader stand	1	MXQSUP001
Milliflex® Quantum membrane transfer tool for Milliflex Oasis®	1	MMHEADQU1
Milliflex® Quantum camera	1	MXQCAM001
Milliflex® Quantum membrane removal tool for all Milliflex® and Milliflex Oasis® devices and media types	1	REMRACKMM
Filter Forceps	1	XX6200006
Milliflex® Quantum Consumables Kits		
Universal kits:		
Milliflex® Quantum kit for 48 tests: Milliflex Oasis® 100ml funnels—0.45 µm MCE white membrane + reagents	48 tests	MMQTV0KT1
Milliflex® Quantum kit for 48 tests: Milliflex Oasis® 250ml funnels—0.45 µm MCE white membrane + reagents	48 tests	MMQTV0KT2
Milliflex® Quantum kit for 48 tests: Milliflex Oasis® 100ml funnels—0.22 µm MCE white membrane + reagents	48 tests	MMQTV0KT3
Milliflex® Quantum kit for 48 tests: Milliflex Oasis® 100ml funnels—0.45 µm MCE black membrane + reagents	48 tests	MMQTV0KT4
Milliflex® Liquid cassettes	120	MXLMC0120
Milliflex® Quantum Services		
Milliflex® Quantum IQ-OQ Validation Protocol, A4 format	1	MXQUA4P2
Milliflex® Quantum IQ-OQ Validation Protocol, US letter format	1	MXQULTVP2
Milliflex® Quantum Performance Qualification Protocol, A4 format	1	RPBTA4VP1
Milliflex® Quantum Performance Qualification Protocol, US letter format	1	RPBTLTVP1
Milliflex® Quantum Feasibility Study, 1 matrix	1	QSMEDEV01
Milliflex® Quantum Installation and Training	1	QSINSTL11
Milliflex® Quantum Initial Maintenance Contract at our Repair Center	1	QSPMQUA00
Milliflex® Quantum Standard Maintenance Contract	1	QSPMQUA01
Milliflex® Quantum Premium Maintenance Contract	1	QSPMQUA02
Milliflex® Quantum System Rental (per month)	1	RENTALQUA
Spare Parts		
Adapter for Milliflex® cassette for liquid media	1	REMRACKSP
Adapter for Milliflex® agar cassette	1	REMRACKSP
Milliflex® Quantum membrane transfer tool for Milliflex Oasis® gaskets replacement kit	5	MMGASKTQU

20. Standard Warranty

We make no warranties of any kind or nature, express or implied, including any implied warranty of merchantability or fitness for any particular purpose, with respect to any technical assistance or information that we provide. Any suggestions regarding use, selection, application or suitability of the products shall not be construed as an express or implied warranty unless specifically designated as such in a writing signed by an officer or other authorized representative of our company.

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Lit. No. MS_PG5589EN Ver. 4.0
PF11940
07/2025