

CYTOCYPHER

Multicell

User Manual

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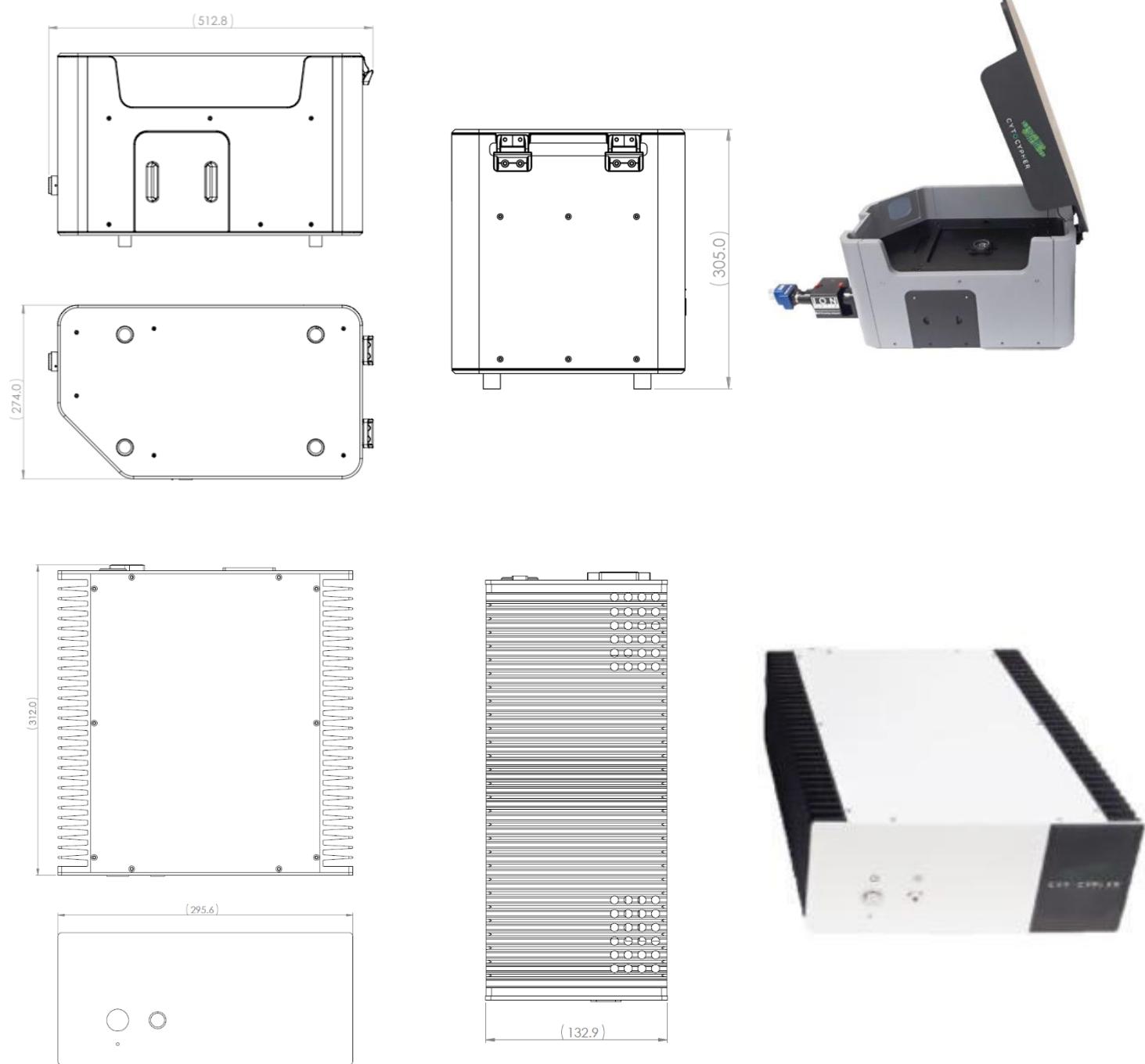
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Technical specifications

Dimensions			
microscope	W x D x H	512 x 274 x 305	mm
controller box	W x D x H	296 x 312 x 133	mm
Weight			
microscope		21	kg
controller box		12	kg
Power			
Voltage		110 – 250 V /	Volt
Frequency		50-60	Hz
Power consumption	Max.	500	VA
Environment			
Operating temperature	Min - Max	15 - 25	°C
Operating Humidity	Min - Max	20 - 80	% RH
Stages			
xy stage	X - Y	18 x 18	mm
z stage	Z	2.5	mm
Resolution xy stage	X - Y	50	nm
Resolution z stage	Z	5	nm
Temperature control			
Setpoint range	Min - Max	25 - 40	°C

Dimensions and connections

The dimensions of the microscope body (top figures) and controller box (bottom figures). Dimensions are in mm.



About this manual

This manual describes how to use the CytoCypher Multicell microscope system.
It is intended as a guide for daily operation and cleaning procedures.

This manual is not intended as a Setup Manual. Installation and setup is included in the delivery of all systems, and will be done by IonOptix / CytoCypher engineers.

Glossary

The following terms are used in this manual:

Controller box:

The unit the holds all control electronics for the Microscope. It has the Power button and LED light button on the front panel.

Dichroic cube:

Black Fluorescence Filter Cube designed to hold a fluorescence filter set depending on the dyes used.

Dish holder:

Small plastic circular piece that can be fitted onto the top plate and holds a 35mm dish for measurements.

Drip tray:

Horizontal plate inside the Microscope that collects any spilled liquids and leads them out to the back of the Microscope.

Microscope:

The unit that holds the X-Y-Z stages, light and objective.

Protective hat:

Horizontal plate that mounts on top of the objective inside the Microscope. The Protective hat prevents any spilled liquid from entering the Microscope unit.

Top plate:

Removeable horizontal plate inside the Microscope. This has the mounting position for the dish holder.

General safety precautions

The following warnings and procedures should be adhered to at any time:

- The microscope must be placed on a horizontal surface.
- Use in dry and clean environments only.
- Use only the supplied cables, or cables approved by the manufacturer.

Lid:

The microscope has a lid on which the light is mounted.

Before opening the lid, turn off the light with the switch on the front panel of the controller box.

Always open the lid fully so it will stand upright by itself.

Warnings:

Always close the lid gently.

Make sure there are no objects or body parts that can get pinched between the lid and the casing.

Product description

The MultiCell HTS system offers high-speed, high-content mechanical myocyte data acquisition from hundreds of myocytes per hour by using our automated cell finding image analysis method.

The system includes a fast x-y-z position programmable scanning microscope which can mark and find position, size, focus and orientation of myocytes enabling repeated measures of contraction-relaxation function.

Additionally, the enclosed microscope maintains stable temperature while allowing full access for introduction of perfusion systems as well as electrical stimulation leads.

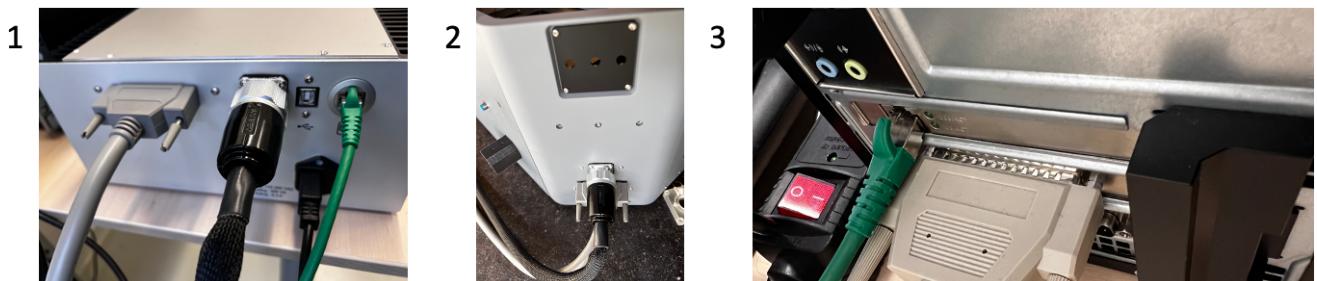
Installation

The manufacturer will install and setup the device on location.

If the device must be moved to a different location, disconnect all cabling first. Transport the microscope part and the controller box separately.

Disconnecting cabling:

- Make sure the power to the device is off, and remove the power plug from the wall-socket
- Disconnect cables between the microscope and its controller box (1 and 2)
- Disconnect the ethernet cable (green) cable to the computer, in the extra card with ethernet slot (1 and 3)
- Make sure the power on the controller box is switched off (switch at front panel).
- Connect the power supply cable.



Reconnecting cabling:

- Connect cables between the microscope and its controller box (1 and 2)
- Connect the ethernet cable (green) cable to the computer, in the extra card with ethernet slot (1 and 3)
- Make sure the power on the controller box is switched off (switch at front panel).
- Connect the power supply cable to the controller box and the wall outlet.
- Turn on the system with power switch on the front of the controller box.

How to use the product

Powering-up

To start the system:

- Check that the microscope is empty by opening the lid.
 - Loose items can interfere with the movement of the microscope and may damage the system.
- Turn the system on by pressing the power  button .
 - The indicator light below will be red/orange to indicate the system is initializing. During initialization the objective will move quickly to maximum positions. When the indicator light turns green, the microscope has initialized successfully and can be used.

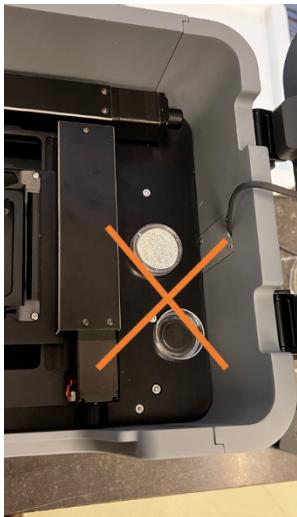


System OFF



System ON and initialized

Figure 1 Left: system turned off. Right: system turned on and the green light indicates that the system has initialized successfully. The red button on the right is to operate the microscope lamp.



Temperature control

The microscope is temperature controlled and by default set to 37°C.

- It takes ~30 minutes for the microscope to warm up.
 - It is advised to power on the microscope at least an hour ahead of the intended start of the experiment.
- A small (1-2°C) offset between the temperature of the microscope and the temperature in the dish is expected.
 - It is advised to occasionally measure the actual temperature in the dish.
- The temperature can be controlled in the software (see manual), and at room temperature (20°C) the microscope can be controlled between 25°C and 40°C.

Microscope lamp

The microscope lamp/condenser consists of 2 LED rings, that allows to set up phase contrast (figure 4 and 5).

Switching the Condenser on:

- Switch on the LED ring with the power switch (Figure 3-A) located on the front of the controller box. The switch will light



Switching the Condenser off:

- Switch off the power by pushing the button again (Figure 3-A)

Change between LED rings

- Turn the LED ring off
- Open lid and remove the magnetic filter assembly from LED ring condenser (Fig 4)
- Flip switch to the desired position (Figure 5)
 - Choose position A / Inner ring when imaging with a 10x Ph1 objective or when imaging with standard objectives.
 - Choose position B / Outer ring when imaging with a 20x or 40x Ph2 objective
- Place the filter back onto the condenser, close lid and turn lamp on.

AB



Switching dichroic cubes inside the microscope

The dichroic cube inside the microscope can be switched to enable fluorescence measurements at different wavelengths.

- Open the port on the side panel of the microscope (Figure 6, left).
 - For all the systems delivered after 2020 the port is held shut with magnets, so it can be pulled off, no screws must be removed.
- Reach into it and grab the dichroic cube and pull it out (Figure 6, right),
 - For all the systems delivered after 2020 the cube is also held with magnets.
 - Cubes can be put in only one way, as the magnets will reject every other position. Put the cube back so that it clicks in place.
- Place port cover back on side panel.



Figure 6 Pull of the cover (left) and remove the dichroic (right). Both are held in place with magnets.

Swapping objectives

The microscope can accommodate objectives with an RMS thread and Nikon objectives with a M25 thread.

Nikon objectives can be screwed directly into the xyz stage (fig 7). RMS threads need an adapter.

To change an objective, go through the following steps, as depicted in figure 7:

- 1) Turn off the microscope with the switch on the controller box
- 2) Remove the top plate from the microscope by loosening the 4 screws on the corners
- 3) Loosen the screw under the sticker of the objective hat
- 4) Remove the objective hat
- 5) You should now see the objective
- 6) Unscrew the objective
- 7) Depending on the objective type, you need to use the brass adapter (RMS thread, Olympus in this picture) or, when it has a M25 thread (the Nikon here) without an adapter.
- 8) After screwing the objective back in, put back the objective hat.
- 9) Put a new sticker on

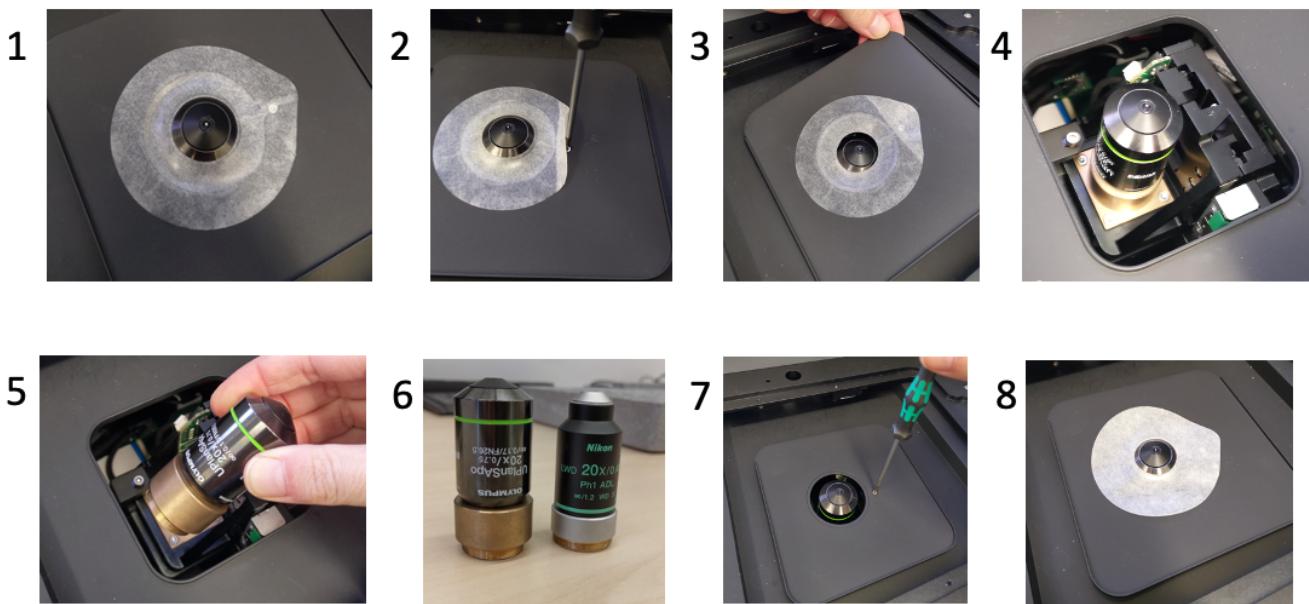


Figure 7 Changing the objective

35mm dish holder and perfusion

The system is equipped with a 35mm dish holder with integrated pacing electrodes and the ability to connect perfusion lines. Figure 8 shows how the dish holder is used.

- A1) The dish holder is placed on the base plate. The holder is dish specific. Please check with

the manufacturer for which brands your holder is suitable.

2) The dish holder is placed

3) Fixate the dish holder with the screws provided.

4) place the 35mm dish in the holder. Press down gently so the dish is flush with the bottom

B1) Place the electrode set on the dish holder. The electrode set is universal for all 35mm dish types.

2) The electrode set clicks in place with magnets. It can be placed in 4 different orientations, which one to choose depends on the user. To disconnect, gently pivot electrode set to release the magnets.

3) Guide the wires that connect the pacer with the electrodes set through the ports in the microscope body

4) Connect the wires to the electrode set.

C1) The electrode set has two holes that fit luer connectors.

2) Tubing can be guided through the ports in the microscope body and connected to the electrode set. To perfuse the system, balanced flow is required, i.e. the inflow and outflow should be the same, balanced, in order to prevent flooding the 35mm dish. The CytoCypher MultiPump system can be used for this.

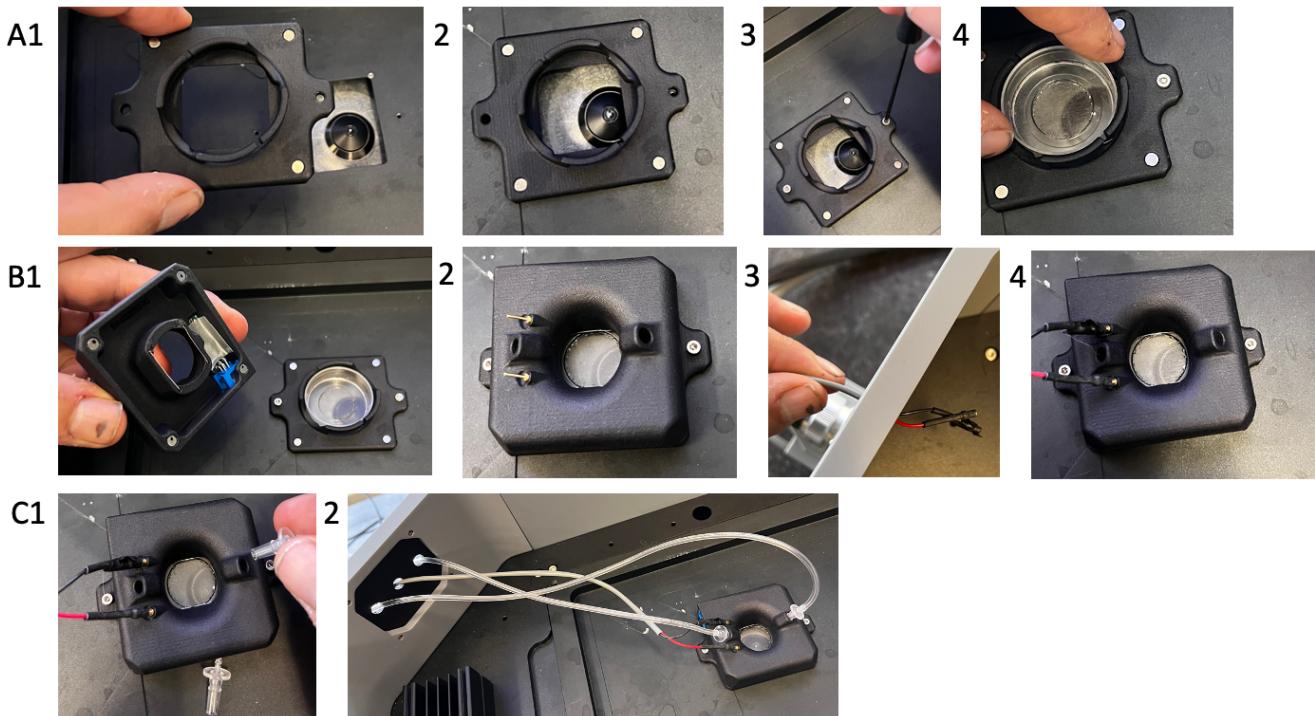


Figure 8 A: placing of 35mm dish holder. B: Placing of electrode set. C: Adding perfusion tubes.

Cleaning and maintenance

Cleaning:

- Before cleaning, always turn off the device with the switch on the front panel of the controller box.
- Use a soft damp cloth to clean the outside of the microscope and the controller box.
- For cleaning the working area in the microscope, 70% alcohol is allowed.
- Do not use solvents like acetone or thinner
- Make sure the objective protector hat is always present when cleaning, no solution is allowed to drip into the microscope, as it will irreversibly damage the instrument

Maintenance:

- No maintenance other than cleaning is necessary.
- In case of malfunctions contact the manufacturer

Storage and transport

Storage:

- When not in use, to protect it from dust, make sure the lid of the microscope is closed.
- Store in a dry and clean environment.

Transport:

- For transport, the original box is preferred.
- The xy stage has to be locked.

Faults and troubleshooting

Troubleshooting

1. System does not turn on:

Check if power cord is connected properly to both the controller box and the wall-socket.

Check if power switch on front panel of controller box is in the ON position.

2. No image / light:

Check that both the power button and light button on the front panel of the controller box is in the ON position.

If the switch is lit, but the light inside the microscope is still not working: check that the switch inside the light-holder is not in the “OFF” position. (The switch has positions for “Inner ring” / “Outer ring” / “OFF”)

If the light still doesn’t work: check if the cabling between the controller box and the microscope is connected properly and the locking screws are tight.

3. System is unable to initialize properly (light on the controller box remains red).

Turn power switch on the front panel of the controller box OFF.

Open lid of the microscope and check that nothing is interfering with the movement of the objective.

Turn power switch ON and watch the movement of the objective. It should move swiftly and without noise.

Repairing:

If the device is damaged, stop using it, disconnect all cabling and contact the manufacturer.

The system cannot be repaired by the user, and there are no user-serviceable parts inside.

For repair or inspection, contact the manufacturer.

Dismantling and disposing

The Multicell microscope is an electronic device and should be disposed of according to local regulations.

Declaration of Conformity

[Insert CE Declaration of Conformity here]