FORMULATRIX®

CELLMATIC™

Automated Cell Culture

Feed - Split - Expand - Plate - Differentiate

REFRIGERATOR | LABWARE STORAGE | INSTRUMENT SHELF | INCUBATOR

Built for Next-Gen Cell Culture

Cellmatic is a fully automated cell culture system that will perform your cell experiments and culture work from start to finish. Media changes are completed with the Formulatrix Reagent Exchanger that quickly aspirates spent media to waste and gently dispenses warmed media on a user defined schedule.

Cells are imaged every day and are passaged once they reach a specific confluency or on a set schedule. After incubation with a dissociation reagent, the Formulatrix general purpose, tip based liquid handler, FLO i8® PD, mixes the cells up into suspension and performs a cell count. Cells can then be centrifuged and washed, prior to seeding into daughter plates.

The system features extensive reagent storage and is particularly adept at complex, long-term differentiation protocols tailored for iPSC culture. It supports various passaging techniques with precise liquid h andling. The core includes a dynamic scheduler and intuitive software, making it easy to integrate and enhance research capabilities in laboratory settings, ensuring both efficiency and reliability.

 www.formulatrix.com +1 781 788 0228 Rev: 23Jan26-0157

Key Features

- **Fully Automated Cell Culture Workflow:** Automates the entire cell culture process, including feeding, splitting, expansion, plating, and differentiation, allowing researchers to focus on science instead of manual labor
- **Integrated Smart Hardware:** Dual liquid handlers, imager, storage, refrigerator, and incubator—seamlessly unified for automated cell culture using Formulatrix's scheduling software and device drivers
- **High-Capacity Plate Handling:** Supports up to 320 SBS-sized plates (1- to 384-well formats), enabling parallel processing of multiple cell lines and high-throughput experiments
- **Intelligent Scheduling and Parallel Processing:** Advanced scheduler allows multiple users and protocols to run simultaneously, automatically interweaving tasks without scripting or programming
- **Versatile Application Support:** Handles a broad range of workflows including stem cell differentiation, cell line development, high-throughput plating, permeability assays, and more — all on a single platform

A plate storage rack in the incubator

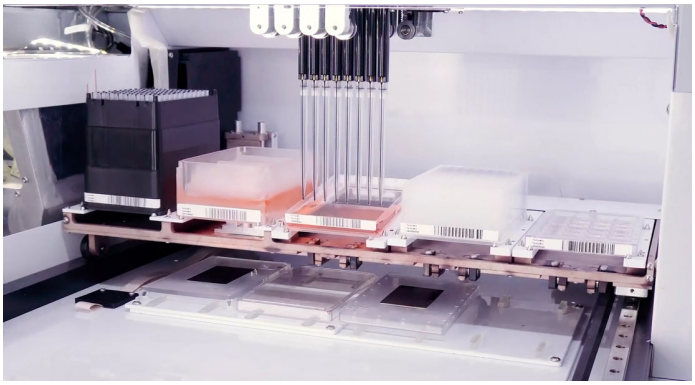
Rover supports automated reservoir filling

- **Smart Liquid Handling with Minimal Waste:** Accommodates over 50 media and reagent solutions, stored in a sterile, refrigerated environment with low dead volumes (500 µL) and reusable tips, reducing cost and waste
- **Rover® Autonomous Plate Handling Fleet:** Fleet of wireless, robotic plate handlers ensures gentle, spill-free transport of cell plates, reagents, and labware between subsystems, with precision and care
- **Advanced Environmental and Contamination Control:** Includes HEPA filtration, VHP sterilization, and fully enclosed, CO_2, temperature, and humidity-controlled incubators, ensuring optimal and sterile growth conditions
- **Intuitive, Web-Based Software with Remote Access:** User-friendly, no-code interface with real-time monitoring, scheduling, and data export. Access the system and receive alerts from anywhere via web-based software

Focus on Your Research as the Cell Automation Suite Grows Your Cells

The system handles the manual labor of feeding, splitting, and handling your cells

- 24/7 operation maintaining and handling adherent cell culture plates, allowing scientists to spend their valuable time on research
- Replace flasks with plates for easy expansion and handling of multiple cell lines
- Store and handle up to 320 SBS-sized plates; your choice of plate density from single-well up to 384-well plates
- Easily define cell maintenance and assay plate orders with our cell-application-specific scheduling software
- Web-based software allows access anywhere, to check on the progress of your cells; email and text notifications are available if any problems are found

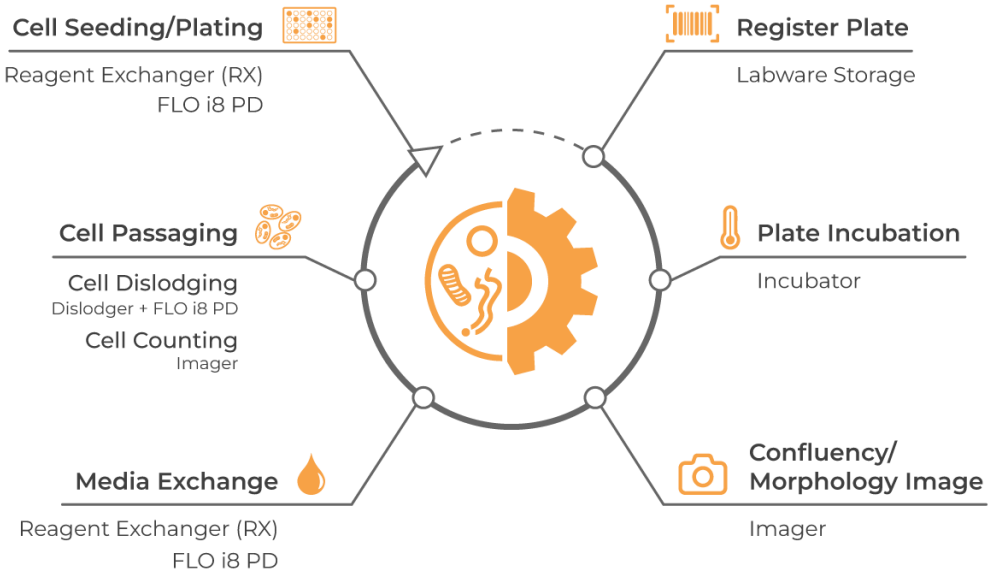


Cell counting preparation for accurate analysis

Maintain Several Cell Lines with Intelligent Scheduling

Simplified protocol programming and resource management

The system's scheduler allows multiple groups and users to run protocols for different cell lines simultaneously. Protocols are executed in parallel, maximizing instrument usage. The scheduling automatically interweaves methods and requires no scripting from end users.



Versatile for a Broad Range of Scientific Workflows

Stem Cell Differentiation

Automate week and month long protocols with thoughtful management of expensive reagents

Cell Line Development

Pick colonies and propagate forward from 384- and 96-well plates

Routine Maintenance and Expansion

Continuously feed, image, and passage cell lines with extensive data record keeping

Multi-well Plating for HT Screens

Dispense cells into 384- and 96-well plates at user defined cell number

Permeability Assays with Transwell Plates

Feed and culture cells in transwell plates for your permeability assays

Immunology Studies with PBMCs

Differentiate and mature blood cells for immunological assays

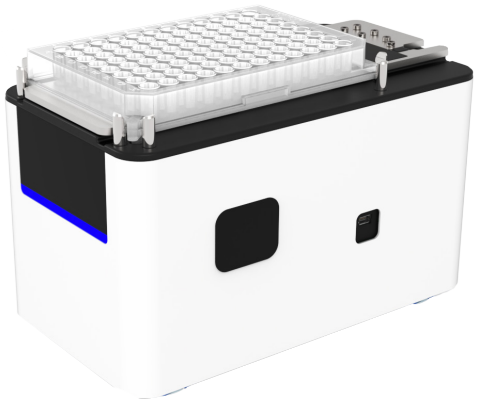
Save Time and Reagents with Smart Liquid Handling

Have users with different media and reagent needs?

The system can support over 50 different media solutions and reagents simultaneously. Dispensing is performed within a sterile refrigeration unit to eliminate long tubing and priming of expensive reagents. Dispensed media is then warmed prior to use with your cell culture plates. User intervention is minimized by having the capacity to store up to 3 weeks' worth of media with premixing on demand for those reagents with short expiration dates.

Gentle Plate Handling with Rover Autonomous Plate Handlers

The Rover Autonomous Plate Handlers are wireless, independently driven plate-handling vehicles that move labware throughout the Cellmatic system. The system's scheduler and Rover Fleet Manager automatically task individual Rover to execute transfers. The fleet of ~6 Rovers in the Cellmatic system drive in and out of the incubator, refrigerator, and processing areas delivering tips, reagents, and cell plates to liquid handlers and imagers. The unique motion profile of the Rovers allows large volume troughs of liquid and precious cell plates to be transferred with no spilling or disturbance to the cells.



Rover autonomous plate handler

FLO i8 PD: 8-channel, positive displacement liquid handling

Advanced Technology Integrated into Every Subsystem

- 320 plate capacity incubator with CO2, temperature, and humidity controls
- 4 °C refrigerator stores up to 12 base media and 50 specialized reagents for up to 2-3 weeks of run time
- 8 channel, independent z-axis liquid handler (FLO i8 PD) with liquid level detection and choice to reuse or dispose of tips; includes tilting deck
- Ultra-fast Reagent Exchanger for feeding plates and plating cells into high-throughput multi-well plates
- The confluency reader captures images of the entire 96-well plate in <3 mins
- Rover Autonomous Plate Handlers carry plates to and from subsystems
- Tightly controlled environment to reduce contamination. HEPA filters throughout with access points under positive air pressure
- The entire system can be sterilized with Vaporized Hydrogen Peroxide (VHP)

Efficient Cell Plating and Feeding - Reduce Cost, Waste, and Time

The Reagent Exchanger is a cell plating and feeding liquid handler built into the Cellmatic system. Its reusable tips quickly aspirate spent media and gently dispense new media. Optimized for delicate cells, it also plates cells into 96- and 384-well plates for assay generation.

Reagent Exchanger (RX): automated plate washer

The system offers various benefits, including:

- Excellent cell plating CVs by continually stirring the cell suspension during dispensing
- Increased cell viability with gentle handling of your cells via non-contact, sidewall dispensing
- Quickly feed your plates - aspirate and dispense a 96-well plate within one minute
- Compatible with 384-, 96-, 8-, 4-, and 1-well plates
- Save on reagents as the system boasts a low dead volume of 500 µL
- Reduce the risk of contamination with automated lidding and delidding

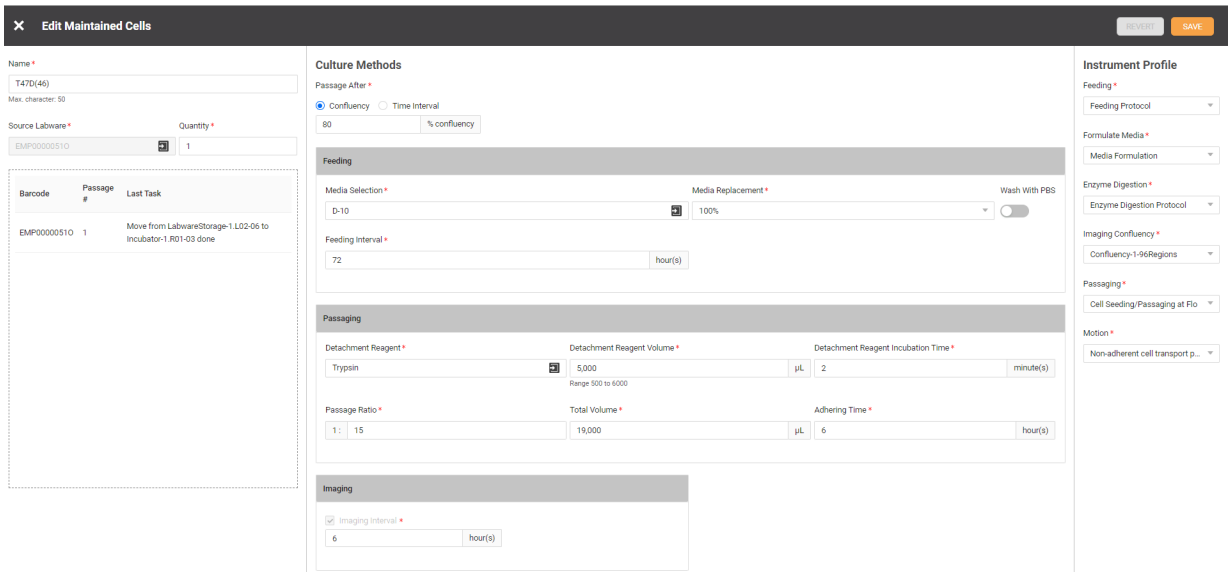
Need to Expand Cell Lines?

Then let the automation suite handle it for you.

Load the system with a plate of your starting cells, tell it the desired cell number you want, and a few days or weeks later your cells are ready to go. In order to be automation-friendly, the system utilizes one-well, SBS-format plates for cell expansion work instead of flasks. The system can output one well plate of cells, pool multiple plates into a trough, or plate them into high-density plates, depending on your needs. Expand multiple different cell lines in parallel, all while focusing on your research and allowing the system to do the cell expansion work for you.

Intuitive, Web-based Software Designed Specifically for Cell Culture

Users do not script or create protocols as is traditionally done with automation robotics. Instead, users tell the system what end result they are looking for. Culture methods are defined in terms of the trigger for splitting, imaging interval, and passage ratio. There is no need for a step-wise definition of aspirate and dispense sequences. The intuitive scheduler will then interweave all user requests automatically. Results and analysis tools are displayed in an easy-to-follow layout with export tools that link with your own lab notebook systems. Diagnostic routines are performed daily to ensure proper system operation.

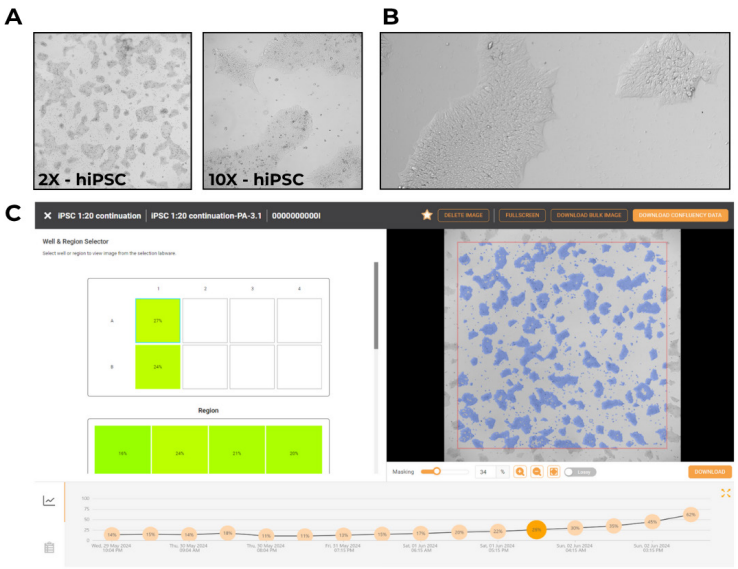


Stem Cell Differentiation

Have a 30 to 60-day stem cell differentiation protocol to run?

Trying to design the best protocol to differentiate your stem cells?

Utilize the automated cell culture system to handle your stem cells with the utmost care. The precise 8-channel liquid handler can be used for growth factor additions at user-specified schedules. Phenotypic feedback, such as dendrite length, from the high-resolution imager, can be used to direct protocols automatically. Cells are gently handled with minimal vibrations throughout the entire system and side wall dispensing is utilized for any reagent addition. Protocols can be modified at any time giving you full control of how your stems cells are handled. Protocol progress and results are viewed via the web-based software from anywhere. Increase throughput and reduce variability by having the cell automation suite run your protocols.



Monitoring hiPSC cultures through the Cellmatic Imager

Why Consider Formulatrix's Automated Cell Culture System?

Integrated Refrigerator and Labware Storage Allows for Long Run Times with Reduced Footprint

The Cellmatic system is designed with space in mind. We know how expensive laboratory space is, so we have optimized every square inch of the system while also including an automated labware storage cabinet and integrated refrigerator, separate from the cell incubator. This allows the system to run continuously for days to weeks unattended so that you can take a vacation and know your cells are well cared for.

Commitment for Continued Development and Support that Grows with Your Science

With the Formulatrix Cellmatic system, you are purchasing a product that will be supported for years to come. It is not a custom integration solution that is being created for one specific use case. Rather, it is a system that will evolve and grow with your science. A team of software and hardware engineers is continuously developing and improving the system, pushing out updates based on your feedback throughout the years, ensuring that your investment meets your future needs.

Off-the-Shelf Design Reduces the Burden on Automation Engineers

Formulatrix engineers and scientists have been working with pharmaceutical and academic sites around the world in designing the Cellmatic system. The system has been developed as an all-in-one solution with built-in flexibility to meet your scientific needs without custom engineering. We have spent over 5 years thinking through all the details required to automate sensitive cell work so your team does not have to.

All Hardware and Software Developed and Supported by Formulatrix

The Cellmatic system is the only automated cell culture solution on the market that is integrated with a scheduling and controlling software developed by the same manufacturer as the hardware. This allows for complete control of the full system with no limitations due to driver incompatibilities. If you want the system controlled in a specific way, we can make it happen.

Technical Specifications

FLO i8 PD

Channel Configuration	8 fully-independent liquid handling channels
Tip Variety	Formulatrix® brand disposable F20, F200 and F1000 Next-Level Tips®
Volume Range	0.5 µL to 20 µL (F20), 5 µL to 200 µL (F200), 10 µL to 1000 µL (F1000)
Liquid Viscosity Range	Any type of liquid
Dispense Mode	Air displacement via in-line pressure regulation
Liquid Level Detection	Yes, pressure-based and resistance-based detection
Transfer Precision	13% CV at 0.5 µL and 5% CV at 1 µL
Microplate Compatibility	Standard SBS Plate format (Contact us for custom options)
Contamination Mitigation	VHP compatible
Time to Passage Cell Plate	6 minutes

Imager

Plate Compatibility	Standard SBS Plate format
Smart Imaging Features	Autofocus and auto exposure
Objectives and Field of View	6.8 mm width FoV; 1.3x magnification 1.36 mm width FoV; 6.45x magnification
Imaging Time	7.5 minutes for 96 well plate, full well coverage with auto focus and auto exposure
Contamination Mitigation	VHP compatible

Reagent Exchanger

Plate Compatibility	One well, square well plates with 4, 8, and 24 wells, 96- and 384- well plates
Time for Media Exchange	1 minute full aspiration and dispense
Dispense Mode	Pressurized continuous flow through chip
Dispense Reagents	Two reagents can be used in parallel for dispensing, with 30 seconds changing to alternative reagent
Cleaning Reagents	Three plumbed in liquid lines for cleaning aspirate and dispense heads
Tip Type	Reusable silicon nozzles
Contamination Mitigation	VHP compatible

Rovers

Size	186 mm x 105 mm x 116 mm
Weight	2 kg
Battery Life	~3 hr
Charging Time	~1 hr
Top Speed	600 mm/s
Maximum Load	0.650 kg
Software Control	Formulatrix proprietary Fleet Manager software
Quantity Operating in System	4-6 Rovers
Charging Stations	6 self docking charging stations

Incubator

Capacity	320 SBS footprint plates
Environmental Control	Ambient to 39 °C temp; ambient to 5% CO^2; ambient to 90% humidity
Contamination Mitigation	HEPA filtered, VHP compatible
CO^2 Flow Rate	10 standard cubic feet per hour (peak), 1.3 standard cubic feet per hour (average)

Refrigerator

Dispenser Capacity	10 hanging dispensers for Gibco bottles (500 ml, 1 L) or media bags (1 L or 5 L)
Trough Capacity	20 trough slots for low volume troughs and 96 deep well blocks
Environmental Control	4 °C to 8 °C
Contamination Mitigation	UV cleaning in dispensing station; HEPA filtered, VHP compatible

Labware Storage

Load Ports	Dual load ports to separate cell plates from clean labware
Capacity	30 larger labwares (tip caddies, troughs, etc.), 190 microplates (although the columns are configurable, each taller labware slot takes up to 4 microplate slots)
Environemental Control	Positive pressure; passive temperature control at ambient
Contamination Mitigation	HEPA filtered, VHP compatible

Control Computer Specification

Cell Suite PC	DELL Optiplex 3080 SFF Intel Core i7-10700/16GB/Debian Linux
Rover Fleet Manager	DELL Precision 3240 Intel Core i5-10500/8GB/Ubuntu Linux
User Interface Browser	Google Chrome

Electrical Specifications (6 total power plugs with 8 kW maximum power)

Refrigerator	220V, 6A. 50/60Hz
Refrigerator Robotics	110V, 3.2A; or 220V, 1.6A; 50/60Hz
Labware Storage	110V, 3.2A; or 220V, 1.6A; 50/60Hz
Instrument Cabinet 1	110V, 12.9A; or 220V, 6.5A; 50/60Hz
Instrument Cabinet 2	110V, 13.6A; or 220V, 6.8A; 50/60Hz
Incubator	110V, 17.6A; or 220V, 8.8A; 50/60Hz

Instrument Cabinets

Capacity	3 levels each for instrumentation; access from Rovers via elevator on front door of cabinet
Environmental Control	Positive pressure; passive temperature control at ambient
Contamination Mitigation	HEPA filtered, VHP compatible

Media Warmers

Heat Type	IR lamp
Time for Warming	11 minutes for 200 mL to go from 4 °C to 25 °C
Capacity	250 mL trough

Facilities Requirements

Water for Incubator	Sterile distilled water source
CO^2 for Incubator	10 psi
Solid Waste	Solid waste bin for collecting deposited cell culture plates outside of the system
Liquid Waste	Minimum of 20 L jerry can for collecting liquid waste outside of system
Environment	Temperature (22+/- 3 °C) and humidity regulated BSL 1 laboratory with filtered air in room; Solid concrete floor away from heavy machinery
Clearance Around System	300 mm left, right, rear, and top; 1200 mm clearance in front. Additional space for computer stand with monitors

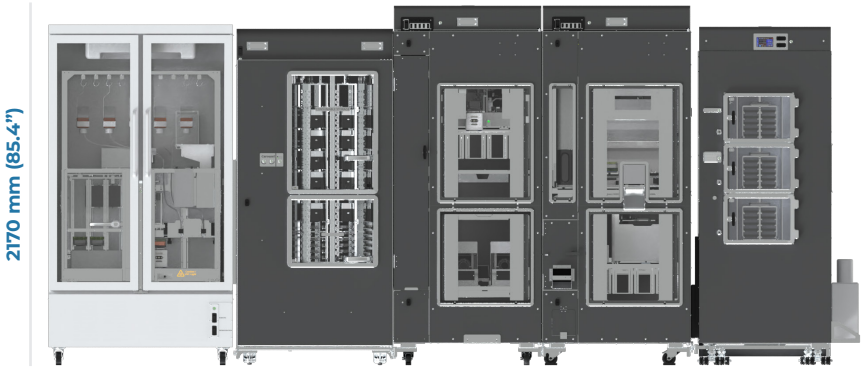
Cellmatic Physical Dimensions

- **Width:** 4717 mm (185.7”)
- **Height:** 2170 mm (85.4”)
- **Height:** 2684 mm (105.6”) (Plenum Open)
- **Depth:** 1224 mm (48.1”)
- **Depth:** 2007 mm (79”) (Door Open)
- **Weight:** 1456 kg (3209 lbs)

Top

Side

Front



For more information about the **Cellmatic**, visit **www.formulatrix.com** or email us at **info@formulatrix.com**.

