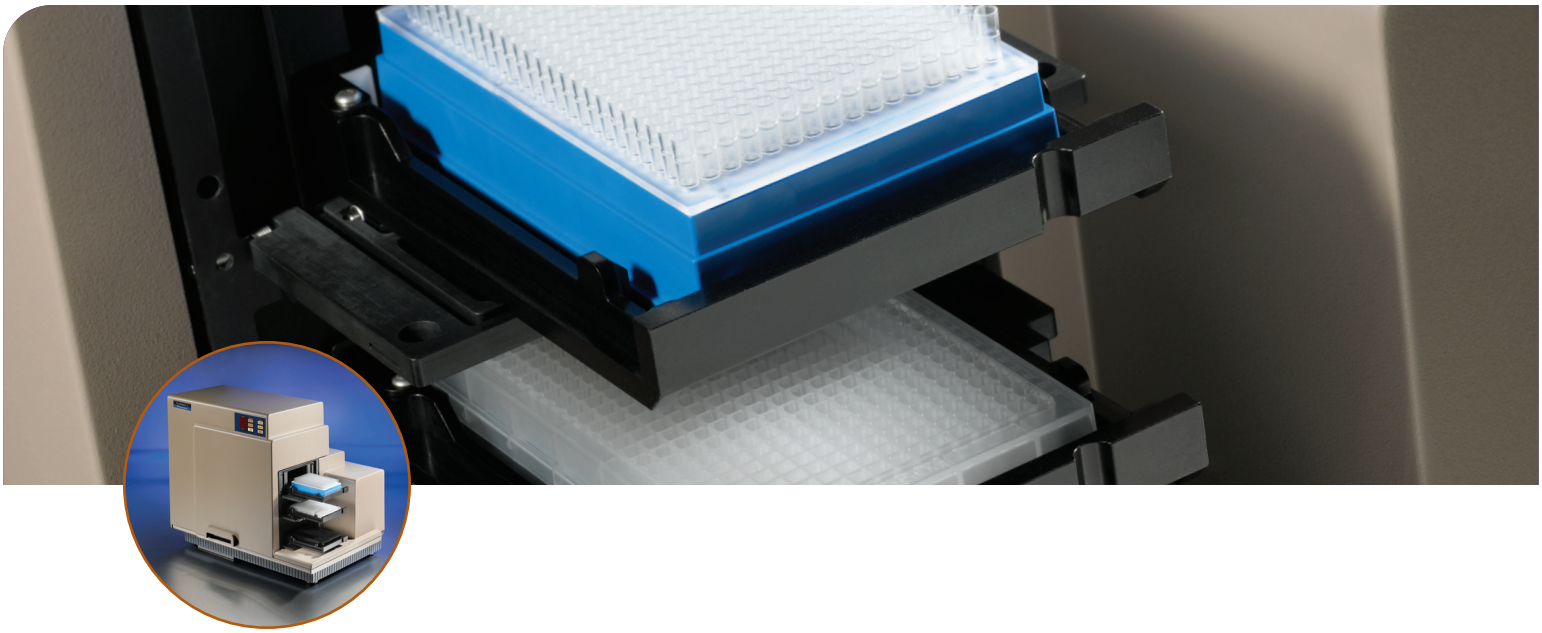
Molecular Devices

FlexStation 3 Microplate Reader

A FIVE-MODE MICROPLATE READER WITH INTEGRATED FLUID TRANSFER



- → FIVE-MODE READER WITH WIDE RANGE OF APPLICATIONS
- → FLEXIBLE LIQUID TRANSFER ENABLES MORE ASSAY CONDITIONS
- → USER-DEFINED PIPETTING SIMPLIFIES ASSAY OPTIMIZATION
- → INSTRUMENT AND SOFTWARE VALIDATION

Adapting to biochemical- and cell-based application requirements while streamlining assay throughput is a challenge faced by many drug discovery and research laboratories. Multi-detection platforms often provide assay flexibility, however, throughput is often compromised—especially for applications that require integrated fluid transfer, such as calcium mobilization or other fast applications. To address this concern, Molecular Devices offers the FlexStation® 3 Multi-Mode Benchtop Reader. The FlexStation 3 Reader combines Molecular Devices' SpectraMax® M5^e Microplate Reader performance with an integrated 8- or 16-channel pipettor into one compact benchtop reader. This integrated system provides users with a multi-detection platform capable of increasing the liquid handling throughput and flexibility for biochemical- and cell-based kinetic assays.

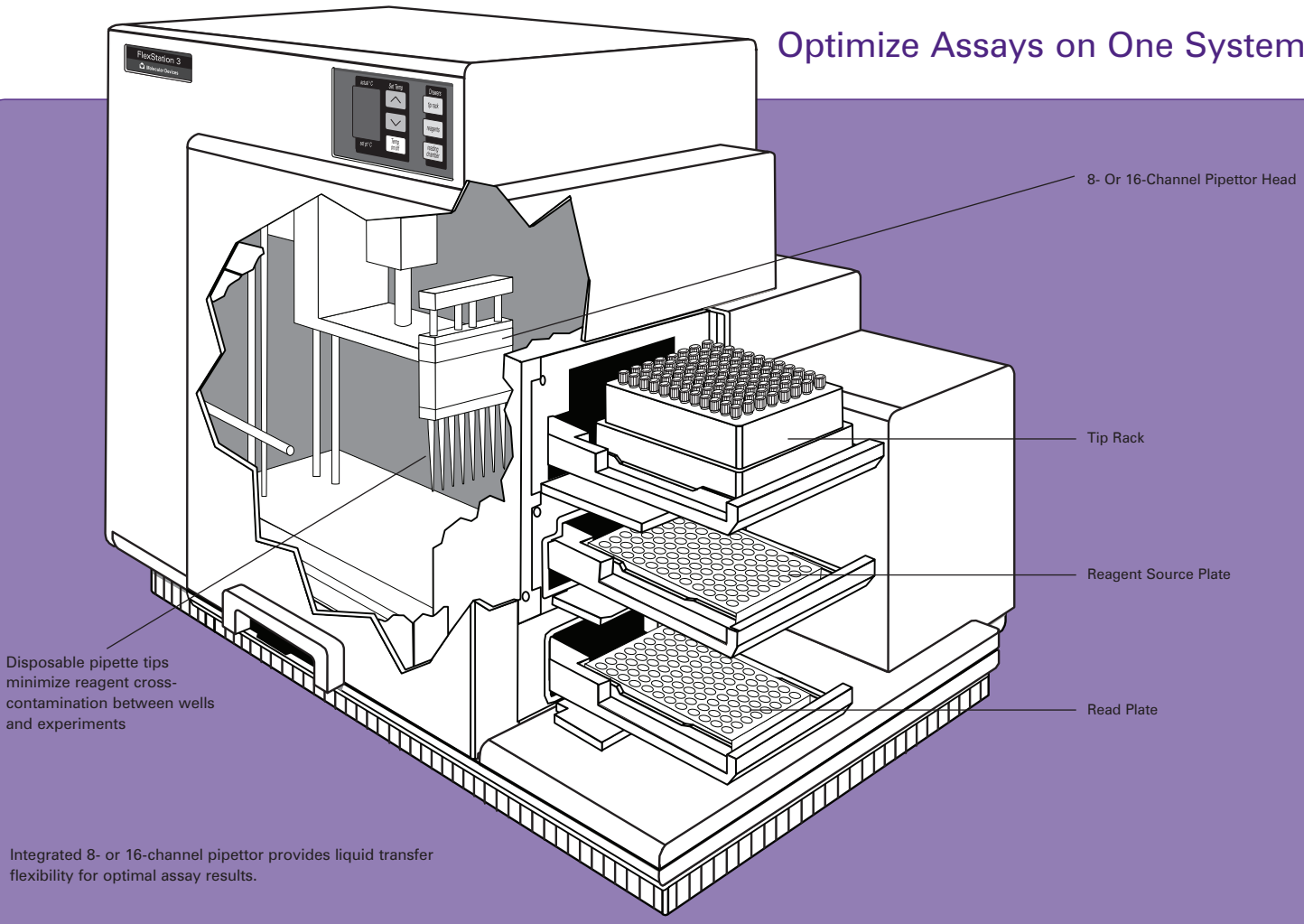
FLEXIBLE LIQUID TRANSFER

Using an 8- or 16-channel pipettor, the FlexStation 3 Reader offers added assay flexibility over dispenser-based systems by transferring reagents from 96 or 384 distinct wells in a source plate to a read plate, simultaneously. In addition, users can define individual reagents and concentrations to be delivered to each well. The direct transfer capability reduces reagent consumption and allows more assay conditions to be explored in a single microplate, making the system more amenable to agonist and antagonist assay formats.

AUTOMATED PIPETTING

The FlexStation 3 Reader offers automated pipetting using the 8- or 16-channel pipettor to improve assay quality and increase throughput. For instance, liquid transfer for endpoint and slow kinetic assays can be automated to initiate a response at user-defined points of time. Automated pipetting ensures consistent addition times and minimizes pipetting errors, thus providing tighter assay CVs within and between experiments. For fast, kinetic cell-based assays, throughput is increased when a column of wells are pipetted, read, and analyzed simultaneously rather than one well at a time.

Optimize Assays on One System

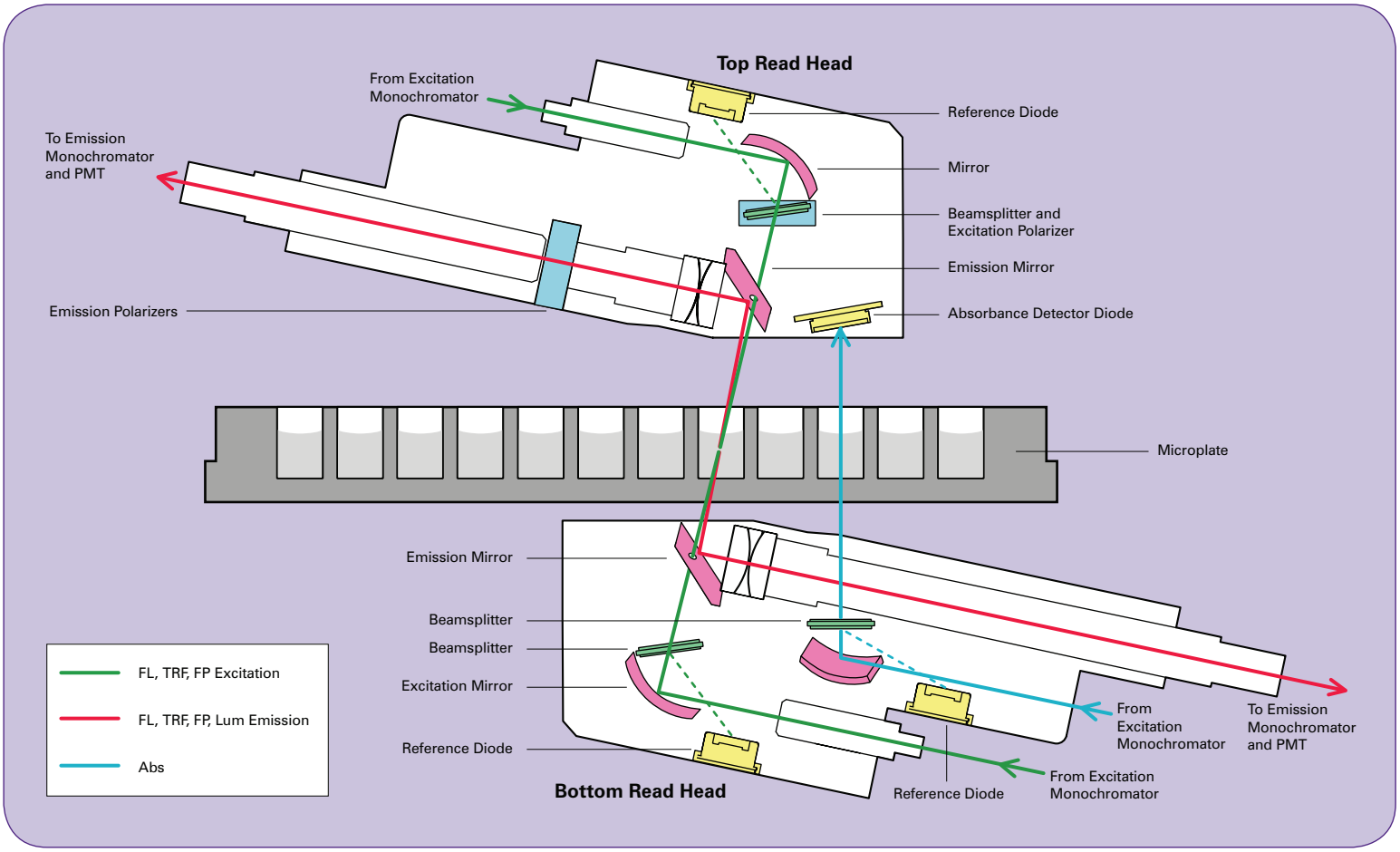


Integrated 8- or 16-channel pipettor provides liquid transfer flexibility for optimal assay results.

ASSAY OPTIMIZATION

With the FlexStation 3 Reader's pipettors, users can adjust parameters to optimize the assay's robustness. The dispense parameters can be optimized for each reagent addition to accommodate cells with different adherence characteristics, such as adjusting dispense velocity to prevent cell dislodging. The ability for the system to allow multiple additions enables secondary controls to be added to each well. In addition, trituration (*i.e.*, the mixing of well contents through repeated aspiration and dispensing using the pipettor) can improve the assay two ways: resuspending compounds that have settled at the bottom of the wells in the source plate, or quickly mixing reagents to promote an even, rapid response with minimal assay variability.

Five-Mode Microplate Reading With Superior Optics



SUPERIOR OPTICS

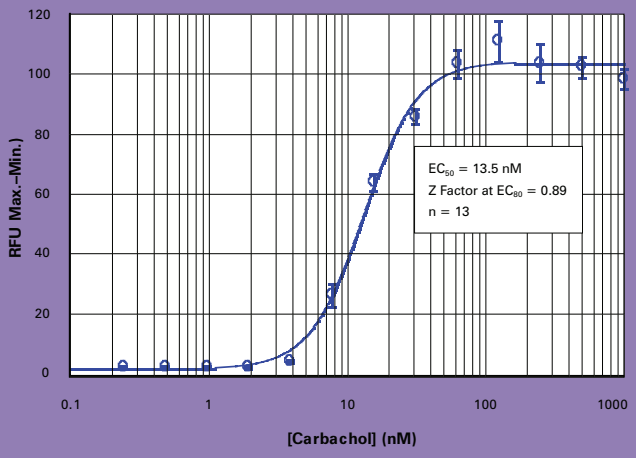
The FlexStation 3 Reader's optics are designed to easily adapt to changes in assay requirements while maintaining the optimal performance of a single-mode reader. Based on the SpectraMax M5^e platform, this five-mode reader addresses multiple application technologies including: absorbance, fluorescence intensity, fluorescence polarization, luminescence and time-resolved fluorescence. Dual monochromators allow users to target the optimal assay excitation and emission wavelengths and eliminate the need to change expensive band pass filters between experiments. Dual PMTs provide flexibility to detect multiple detection modes, while a separate PMT provides additional sensitivity for luminescence applications. Reference diodes automatically adjust to slight fluctuations in excitation intensity to reduce measurement noise. Absorbance applications are enhanced using top-quality UV-grade fibers to provide high light transmission in the lowest wavelengths.

INSTRUMENT AND SOFTWARE VALIDATION

SpectraTest® Absorbance and Fluorescence Validation Packages are available to determine the optical characteristics of the system. The FlexStation 3 Reader exclusively offers fluid transfer validation using Molecular Devices' patented† PathCheck® Sensor to quantify the integrated 8- and 16-channel pipettor head performance. These tools can be used in conjunction with SoftMax® Pro Software validation package and IQ/OQ/PQ validation protocols for FDA 21 CFR Part 11 compliance.

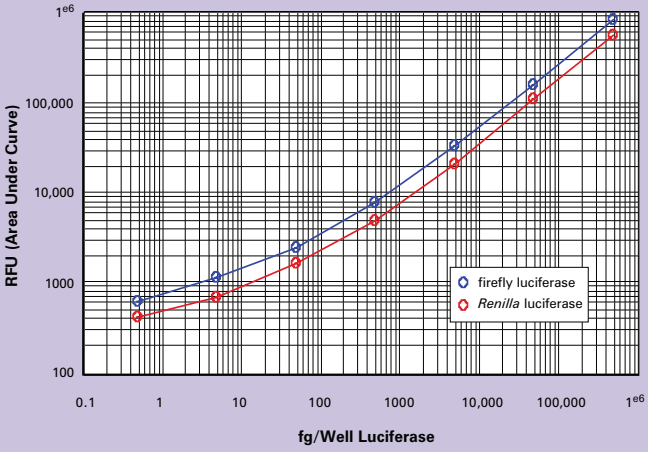
Wide Range of Applications

Calcium Mobilization in WT3M1 CHO Cells



Calcium mobilization in WT3M1 CHO cells by carbachol, run on the FlexStation 3 Reader in 384-well microplate with the FLIPR® Calcium 4 Assay Kit.

Firefly and *Renilla* Luciferase Standard Curves



Standard curves obtained in a 384-well plate on the FlexStation 3 Reader in FLEX mode using Promega Dual-Luciferase Reporter Assay System. Firefly luciferase signal is an order of magnitude higher than that of *Renilla* luciferase. In this experiment, the estimated lower limits of detection (LLDs) were 0.5 and 5 fg/well for firefly and *Renilla* luciferase, respectively.

APPLICATIONS

Superior optics in the FlexStation 3 Reader allow homogenous and heterogeneous biochemical- or cell-based microplate assays to be detected through a variety of readouts. When utilizing 8- or 16-channel pipettors, assays are expanded to include fast absorbance, fluorescence, and luminescence applications. Alternatively, automated liquid transfer can be incorporated into numerous endpoint and kinetic applications in five detection modes. Applications include:

- Calcium mobilization assays
- Membrane potential assays
- Dual luciferase reporter (DLR) assay
- DNA/RNA/protein quantitation and purity
- PicoGreen/NanoOrange/Bradford assay
- ELISAs/enzyme kinetics (*e.g.* K_m, K_i, etc.)
- Drug dissolution profiles
- Live/Dead viability/cytotoxicity assays
- Caspace-3 and protease assays
- cAMP assays using CatchPoint® Assay Kits
- Kinase assays using IMAP® Assay Kits
- Intrinsic trytophan fluorescence
- Green fluorescent protein
- FRET and TR-FRET assays
- Reporter gene assays
- ADME-Tox assays
- Membrane permeability assays (PAMPA)
- FluoroBlok cell migration assays
- DELFIA assays

Technical Specifications

General Photometric Performance

Plate formats:	6, 12, 24, 48, 96, 384 wells
Light source:	Xenon Flash Lamp (1 joule/flash)
Detectors:	2 photomultiplier tubes
Shaker time:	0 to 999 seconds
Temp. control*:	2°C above ambient to 45°C
Temp. uniformity*:	< 1°C at 37°C set point
Temp. accuracy*:	±1°C at 37°C set point
Flex reading:	Abs + fluidics FI + fluidics Lum + fluidics
Endpoint reading :	All modes + fluidics
Kinetic reading :	All modes + fluidics
Spectral scanning:	All modes
Well scanning:	Abs, FI, TRF, Lum

*Temperature is regulated in the Read Chamber.

Fluidics (96- & 384-Well Plates Only)

8-channel

Max. volume:	200 µL
Precision @ 50 µL:	2% CV
Precision @ 5 µL:	8% CV
Dispense max. rate:	208 µL/sec.

16-channel

Max. volume:	30 µL
Precision @ 10 µL:	3% CV
Precision @ 1 µL:	5% CV
Dispense max. rate:	52 µL/sec.

Absorbance Photometric Performance

Wavelength range:	200–1000 nm
Wavelength selection:	Monochromator, tunable in 1.0 nm increments
Wavelength bandwidth:	≤ 4.0 nm
Wavelength accuracy:	±2.0 nm
Wavelength repeatability:	±0.2 nm
Photometric range:	0–4.0 OD
Photometric resolution:	0.001 OD
Photometric accuracy:	< ±0.006 OD ±1.0%, 0–2 OD
Photometric precision:	< ±0.003 OD ±1.0%, 0–2 OD
Stray light:	< 0.05% @ 230 nm

Fluorescence Intensity Performance

Reading capabilities:	Top- or bottom-read
Wavelength range:	250–850 nm
Wavelength selection:	Monochromators, tunable in 1.0 nm increments
Bandwidth (EX, EM):	9 nm, 15 nm
Sensitivity:	< 5 pM fluorescein in 96 wells, < 20 pM in 384 wells

Fluorescence Polarization Performance

Reading capabilities:	Top-read
Wavelength range:	400–750 nm
Wavelength selection:	Monochromators, tunable in 1.0 nm increments
Bandwidth (EX, EM):	9 nm, 15 nm
Precision:	< 5 mP standard deviation at 1 nM fluorescein in 96 and 384 wells

Time-Resolved Fluorescence Performance

Reading capabilities:	Top- or bottom-read
Wavelength range:	250–850 nm
Wavelength selection:	Monochromators, tunable in 1.0 nm increments
Bandwidth (EX, EM):	9 nm, 15 nm
Precision data collection:	1–100 flashes, delay of 0–600 µsec. before read, integration time-selectable between 50–1500 µsec.
Sensitivity:	100 fM europium in 96 or 384 wells with top-read

Luminescence Performance

Reading capabilities:	Top- or bottom-read
Wavelength selection:	All wavelengths or with selected wavelengths
Wavelength range:	250–850 nm
Sensitivity:	< 2 fg/well lower detection limit for firefly luciferase in 96- and 384-well top read
Cross-talk:	< 0.3% in white 96- and 384-well microplates

Typical Read Times (minutes:seconds)*

	96 wells	384 wells
Absorbance	0:18	0:49
Fluorescence Intensity	0:17	0:48
Fluorescence Polarization	0:42	2:03
Time-Resolved Fluorescence	0:17	0:48
Luminescence	2:00	7:00

*With 3 flashes/well in absorbance and fluorescence modes, and 1 sec./well integration in luminescence.

General Specifications

Dimensions (in.):	23 (W) x 19 (H) x 16 (D)
Dimensions (cm):	58 (W) x 49 (H) x 40 (D)
Weight:	50 lbs. (22.7 kg)
Power consumption:	500 VA
Power source:	90–240 VAC, 50–60 Hz

ROBOT INTEGRATION

The FlexStation 3 Reader can be integrated with a variety of automation solutions. Our Automation Vendor Partners Program has streamlined the integration of our microplate reader systems with all leading partner robots. The "out-of-the-box" automation solution saves up-front integration time and resources.

ASSAYS POWERED BY SPECTRAMAX READERS

Molecular Devices has collaborated with various assay partners to optimize and validate assay performance on the SpectraMax platform.

ORDERING INFORMATION

FlexStation 3 Microplate Reader
Part Number: FLEX3
- FlexStation 3 Base System
- SoftMax Pro Software
- 1-year warranty

Pipettor head kit, 8-channel (96) for FlexStation 3 Reader
Part Number: 0200-6182
- 8-channel pipettor
- (10) racks of 96-well, FlexStation Pipet Tips (Black)
- 96-well yellow plate

Pipettor head kit, 16-channel (384) for FlexStation 3 Reader
Part Number: 0200-6183
- 16-channel pipettor
- (10) racks of 384-well, FLIPR$^{TETRA®}$ Pipet Tips (Clear)
- 384-well yellow plate

Consumables

96-Well, FlexStation Pipet Tips (Black)
Part Number: 9000-0911
- 200 µL capacity
- (10) racks/box

96-Well, FlexStation Pipet Tips (Clear)
Part Number: 9000-0912
- 200 µL capacity
- (10) racks/box

384-Well, FLIPR$^{TETRA®}$ Pipet Tips (Black)*
Part Number: 9000-0764
- 30 µL capacity
- (50) racks/case

384-Well, FLIPR^{TETRA} Pipet Tips (Clear)*
Part Number: 9000-0763
- 30 µL capacity
- (50) racks/case

* Inquire regarding partial case purchases.

Reagents

FLIPR® Calcium Assay Evaluation Kit
Part Number: R8172
- (3) vials* Component A of FLIPR Calcium Assay Kit
- (3) vials* Component A of FLIPR Calcium 3 Assay Kit
- (3) vials* Component A of FLIPR Calcium 4 Assay Kit
- (1) bottle Component B

* Each vial sufficient for 1 plate (96 or 384)

IMAP® Fluorescence Polarization Evaluation Kit
Part Number: R8155
- Beads and buffers for 800 data points in standard 384-well plate

IMAP TR-FRET Evaluation Kit
Part Number: R8161
- Beads and buffers for 800 data points in standard 384-well plate

QBT™ Fatty Acid Uptake Assay Explorer Kit
Part Number: R8132
- (10) one-plate reagent vials

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www.moleculardevices.com

† The PathCheck sensor is covered under U.S. Patents 5,959,738, 6,188,476, 6,320,662, 6,339,472, 6,404,501, 6,496,260, and 6,995,844.

The FlexStation 3 System is also covered under U.S. Patents 6,097,025, 6,232,608, 6,236,456, and 6,313,471.

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