INDEX

MICROMANIPULATION

MICROMANIPULATION con't.

MICROMANIPULATION

Sutter began making micromanipulators in 1985 with the MP-85, a refined version of the venerable Huxley-style manipulator. Seeing the potential of stepper motors, Sutter went on to develop the MP-285, our first stepper-driven micromanipulator. Both the MP-285 and MP-225 use stepper motors with a cable drive design. These have been proven over the last 25 years to be very reliable in the field. Both are available with the MPC-200 controller or their original standalone controllers.

More recently, we have developed a new series of manipulators using a lead-screw drive. The 3-axis MP-845 and narrow format MP-865 represent a new family of compact and reliable manipulators that interface with our proven controllers. These new designs offer a more compact footprint which creates additional space for setup and access around your microscope.

These are available with the TRIO™ MPC-100 controller. The narrow format MP-865 is alternatively available with the MPC-200 controller when four or more manipulators are required.

Multiple motorized manipulators can be controlled with the MPC-100 and MPC-200 controllers. The MPC-100 controller is an inexpensive, all-in-one controller capable of operating two of our MP-845 or MP-865 series manipulators. The MPC-200 controller will control two of our MP-285 or MP-225 motorized manipulators and can be ***expanded*** to run four manipulators off a single ROE-200 input device. These highly flexible solutions allow the user to add components to their system in the future as needed.

The QUAD® adds a motorized 4th axis to the MP-845 to move the pipette coaxially at the desired angle. This choice is perfect for users that need a true diagonal. The compact ROE and controller-in-one is easy to use, has built-in robotic capabilities and a USB port to program more complicated moves.

The TRIO™-235 eliminates the Z-axis in favor of an adjustable diagonal. This X-Y-D design is preferred by some as it makes for a very compact setup. Our TRIO-235 controller is capable of synthesizing an artificial Z-axis, in much the same way our 3-axis manipulators synthesize a diagonal.

Stages, Stands & Translators

Mounting options include manipulator platforms that bolt directly to the frames of the most popular microscopes, and rock-steady, free-standing platforms that support the manipulators by clamping to the table beside the microscope. Our MT-70 stand, originally designed for stable support of the fifteen-pound Huxley manipulator, and the MT-75 gantry-style stand, are perfect free-standing columns for our manipulators. We have also designed the MD series microscope-specific platforms that bolt directly to the bodies of the most popular Olympus, Leica, Nikon, and Zeiss inverted microscopes. These platforms lend themselves to the low-drift recording configuration required when using Sutter manipulators for positioning patch-electrodes onto attached cells in culture.

The 3DMS, 3-Dimensional Motorized Stage, was designed for experiments that require rapid movement of a chamber or culture dish to multiple locations in a compact space. Two axes provide X-Y translation and the third axis provides built-in focusing with sub-micron accuracy. The 3DMS offers robotic programmability of complex motion sequences when used with the MP-285 controller.

A task specific platform for manipulators is the MT-1000 translation system. When coupled with Sutter manipulators, the system forms a slice-patch workstation. The MT-1000 was born out of a technique now common in slice recording that moves the optical pathway while keeping the slice chamber and recording electrodes fixed. The translation system allows the user to move to multiple locations on the tissue at high resolution without disturbing recording electrodes. The MT-1000 workstation encompasses: an X-Y translator designed to move a microscope smoothly and accurately; two MT-75 gantry-type stands for positioning manipulators on one or both sides of the microscope; and a third gantry stand that becomes the fixed support for the chamber. The MT-2000 uses a motorized X-Y translator. In this design, stepper-motor driven lead-screws provide smooth movement of the microscope.

Sutter's large motorized platform stages, the MP-78 and MPC-78, are perfect for multi-site experiments where the microscope cannot be translated, and a wide field of view is necessary. The MT-78-FS large fixed-stage platform provides the same generous mounting surface for experiments dependent on X-Y translation.

Rounding out our company's line of manipulators is the MM-33 manual micromanipulator, an economical micromanipulator of sufficient resolution and control for impaling xenopus oocytes and other medium-fine manipulation tasks.

MPC-165/MPC-365
NARROW FORMAT MANIPULATOR SYSTEM

(Shown: MPC-165-2 with optional IPA headstage)

FEATURES MPC-165/MPC-365

- Single controller and ROE will run two to four stepper motor drive manipulators
- Control of four manipulators from one ROE-200 and two MPC-200 controllers
- Control of two MP-865 manipulators with the MPC-100 controller
- User-friendly interface: single button access to all major functions
- New Accelerated Mode for fast, manual manipulator movement
- Easy toggle selection of Mode (speed/resolution, pulsed diagonal, Accelerated Mode)
- Display indicates X, Y, Z coordinates, Mode, and active manipulator
- Robotic HOME and WORK position moves for easy automated pipette exchange
- Fast robotic moves
- Definable 4th axis for coaxial pipette movement, angle selected by DIP switches
- Simple USB interface
- Toggle switch selects which manipulator is connected to input device
- LED and display indicate active manipulator
- Low-drift mechanical stability
- Narrow MT-73 stand with 150 mm linear slide, and built-in rotating base mounting options

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

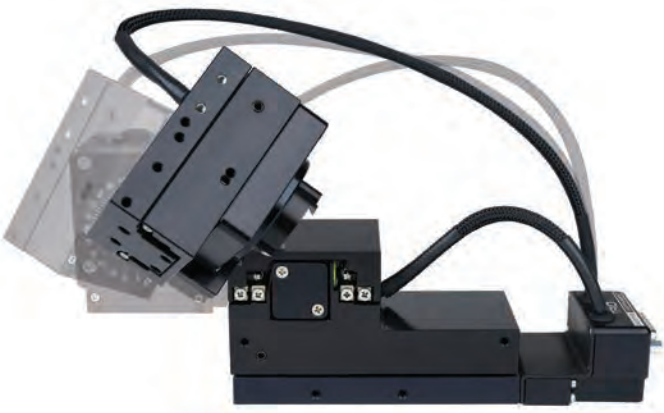
Our new MP-865 "narrow format" mechanical is designed especially for patch-slice manipulator systems that require more than 2 or 3 pipettes as well as for other setups where space is limited. The MP-865 was designed to minimize the width, allowing as many manipulators to be grouped together as possible. Travel in the Y-axis is shortened (12.5 mm) both to economize on width and because radially oriented manipulators do not require long travel in the traverse axis. Additional travel has been added in the X-axis giving the manipulator 50mm of travel in X, to facilitate fast and easy pipette exchange.

The MP-865 manipulator is designed specifically for systems requiring 4 or more manipulators. To this end, we have put together systems with special pricing for 4, 5 and 6 manipulators, and 2 or 3 dual manipulator controllers. The ***optional*** narrow-format stand and linear slide or rotating base is available for mounting the MP-865 mechanical. With the 150 mm throw of the linear slide, the manipulator can be quickly and smoothly retracted out to a location where there is easy access to the pipette for replacement. A rotating base can be used for mounting to large platform stages like the Sutter MT-78, or smaller Sutter MD Series platforms.

MPC-365 systems are formed by using the popular Sutter MPC-200 dual manipulator controller and ROE-200, with one or more MP-865 mechanicals. A single MPC-200 controller and ROE-200 can run one or two MP-865 manipulators. A single ROE-200, when paired with two MPC-200 controllers can control up to four MP-865 manipulators. If you require more manipulators in a single setup, you simply duplicate the smaller systems. A new firmware version of the MPC-200/ROE-200 automatically recognizes the MP-865 mechanical and adjusts accordingly.

As a more economical alternative, the MP-865 also pairs with our MPC-100 controller. The MPC-100 integrates the entire controller into the ROE input device in a quiet compact design. Each MPC-100 can control up to two MP-865 manipulators.

.

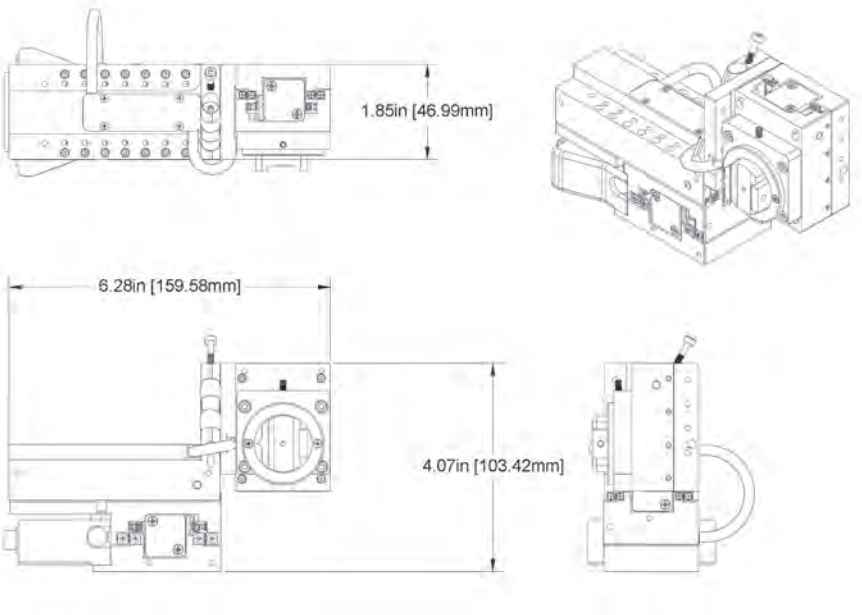


SPECIFICATIONS MPC-165/MPC-365

Resolution	Minimal microstep size is 93.75 nanometers per microstep with TRIO MPC-100 (46.88 with MPC-200) Display has single micron resolution.
Maximum Speed	*MP-865 mechanical:* Approx. 3 mm/sec
Drift	*Drive Mechanism:* <.05 micron/24 hr
Dimensions	*Controller (MPC-200):* 15.75 in x 10.75 in x 3.5 in / 40 cm x 27.3 cm x 8.9 cm ROE: 10 in x 6 in x 4 in / 25.4 cm x 15.2 cm x 10.2 cm
Weight	*Controller:* 6.5 lbs / 3 kg *ROE:* 3.5 lbs / 1.6 kg
Electrical	115/230 Volts 50/60 Hertz power line

CE

MECHANICAL DRAWINGS OF THE MP-865/M



PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MPC-165 SYSTEMS

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

- **MPC-165**[1,*] One TRIO™ MPC-100 controller, one MP-865 manipulator mechanical, mounting adapter plate, rod holder, 4 inch dovetail extension, cables, power cord and manual.
- **MPC-165-2**[1,*] MPC-165 with two MP-865 mechanicals.

[1] *Indicate right- or left-handed setup when ordering.*
** Order with a translator or moving stage and receive a discount.*

MPC-365 SYSTEMS

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

- **MPC-365**[1,*] One MPC-200 controller, one MP-865 manipulator mechanical, and one ROE-200, mounting adapter plate, rod holder, 4 inch dovetail extension, cables, power cord and manual.
- **MPC-365-2**[1,*] Same as the MPC-365, but with two MP-865 mechanicals
- **MPC-365-3**[1,*] Same as the MPC-365, but with three MP-865 mechanicals, and two MPC-200 controllers.
- **MPC-365-4**[1,*] Same as the MPC-365, but with four MP-865 mechanicals, and two MPC-200 controllers.
- **MPC-365-5**[1,*] Same as the MPC-365, but with five MP-865 mechanicals, three MPC-200 controllers, and two ROE-200 user interfaces.
- **MPC-365-6**[1,*] Same as the MPC-365, but with six MP-865 mechanicals, three MPC-200 controllers, and two ROE-200 user interfaces.

[1] *Indicate right- or left-handed setup when ordering.*
** Order with a translator or moving stage and receive a discount.*

COMPONENTS MPC-165/MPC-365

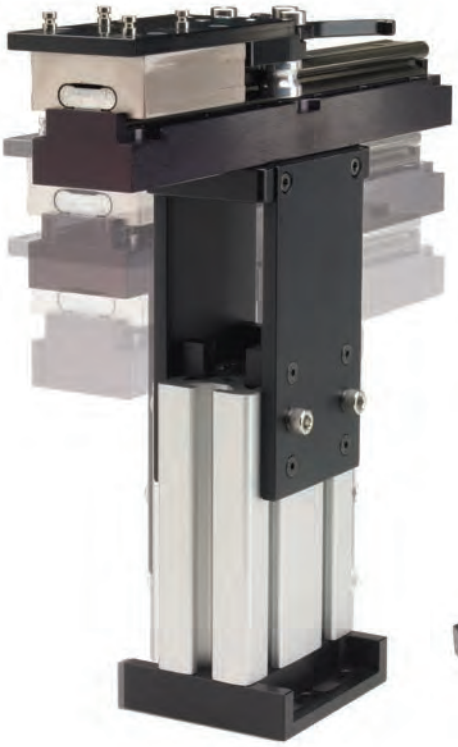
- **MP-865/M*** The MP-865 manipulator mechanical alone. Includes mounting adapter plate, rod holder, 4 inch dovetail extension, and cable to connect manipulator to controller.

** Indicate right- or left-handed setup when ordering*

ACCESSORIES MPC-165/MPC-365

- **MT-73**[1] Narrow format stand with linear slide
- **MT-74** Narrow format stand (no linear slide)
- **MAG-74** Magnetic feet for MT-74 (set of two)
- **265RBI**[2] Rotating base for MP-865
- **M100106** Flat side panel for MPC-200 controller (each)
- **MP-RISER-0.5**[3] 1/2 inch riser
- **MP-RISER-1.0**[3] 1 inch riser
- **EHOLDER** Micropipette holder – 1.0-1.5 mm glass

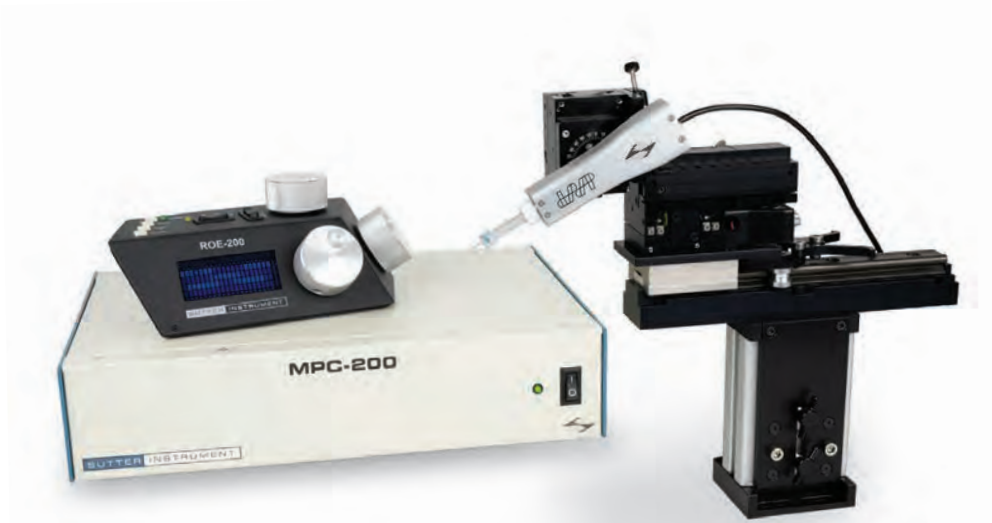
[1] *Suitable for upright scopes*
[2] *Useful with Sutter MD stand and large platform stages such as the MT-87-FS, MP-78 and MPC-78*
[3] *Risers can be combined to achieve desired height*



(Shown: Height-adjustable MT-73 stand)

(Shown: 265RBI rotating base)

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM



(Shown: MPC-365 with optional MT-73 stand and dPatch® headstage)

TRIO™ MPC-100 / MPC-145

THREE-AXIS MICROMANIPULATOR SYSTEM

(Shown: TRIO MPC-145-2 with optional dPatch® headstage)

FEATURES TRIO™ MPC-100 / MPC-145

- Controls one or two manipulators
- Sub-micron (less than 100 nm) resolution
- User selectable angle from 0 - 90 degrees via ROE input
- Fast movement with a top speed of 3 mm/sec (while homing)
- Compact, fanless, user-friendly, ROE controller preserves bench and rack space
- Push button control of multiple functions – WORK, HOME, LOCK, PULSE, RELATIVE, SPEED & ANGLE
- DIP switches on ROE select direction of movement produced by turn of ROE knob
- USB interface for computer control

FEATURES TRIO™ MP-845 MECHANICAL

- Now also available in thermally stable stainless steel
- Mechanically robust construction for high stability
- Precision cross-roller bearings
- Three independent axes – 25 mm orthogonal travel in X, Y and Z
- Carries up to a kilogram
- Suited for *in vivo* and *in vitro* electrophysiological recording
- Universal mounting system for headstage or pipette holder

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

Based on the original TRIO™ manipulator, the latest TRIO MPC-100 system expands the TRIO's capabilities, and now supports up to TWO manipulators from a single controller.

The compact design of the integrated Rotary Optical Encoder (ROE) controller requires minimal bench space; provides quiet, fan-free operation; and is easy to use. No rack mounted controller is required. Position coordinates, in relative or absolute values, are displayed directly on the ROE. The TRIO MPC-100 uses a logarithmic acceleration algorithm that eliminates the need for speed selection. As the knobs on the ROE are turned faster, acceleration ramps up. This allows for smooth and intuitive motion control of electrode position without the need to stop and change speeds or lift your hand from the controller. When not moving, the motors are powered down, reducing electrical noise in the system to unmeasurable levels which keeps the motors cool to eliminate thermal drift.

Five conveniently located buttons control all the functions you will need in normal operation. Press and hold the WORK button to quickly store a work position; pressing WORK after this will return the manipulator to the same location. HOME sends the manipulator to a second position, often set for a point furthest from the microscope, which is useful for rapid pipette exchange. Pressing SPEED allows the selection of one of 4 speed ranges. With practice, there is no need to ever change speeds, however, we have included three low speed ranges for those who work at very high magnification. Holding SPEED for three seconds will lock the knobs out, to prevent accidental movement. Display coordinates can toggle between relative and absolute by pressing the RELATIVE button; holding the button down will zero the relative coordinates. Finally, PULSE activates a pulse movement mode that produces small, rapid bursts of motion that can be advantageous for cell penetration with sharp electrodes. Hold PULSE for three seconds to set or modify the 4th axis angle between 0 and 90 degrees.

Designed with maximum flexibility in mind, a DIP switch on the controller changes the directional movement of the ROE knobs to accommodate the preference of the user. A Y-axis lockout function (accessible by DIP switch) is also available, allowing X/Z-only axial movement during HOME and WORK repositioning. The TRIO comes standard with a universal mounting system suitable for the most popular headstages or pipette holders.

The new MP-845 micromanipulator features construction based on the TRIO-245, but with the addition of precision cross-roller bearings for even tighter tolerances, and a 25-pin connector for future compatibility with our other controllers. The MP-845 is a highly stable 3-axis manipulator with 25 mm of travel on each axis. The TRIO MPC-100 controller gives the MP-845 a synthetic 4th axis that can be set in software to any angle between 0 and 90 degrees for diagonal movement. Based on a lead-screw design with a smaller overall size and footprint than most manipulators, the MP-845 is ideal for applications that require 2 pipettes in one setup or for setups where space is limited.

The MP-845 manipulator is now also available in stainless steel! The standard version of the MP-845 has virtually no drift in its motor and bearing assemblies. The last remaining hurdle is that of thermal drift caused by the expansion and contraction of the aluminum body of the manipulator. By utilizing a stainless steel with very low coefficient of expansion, the MP-845S is simply the lowest drift manipulator available on the market. The added mass of the stainless steel body has the additional benefit of dampening out vibration, giving the stainless steel MP-845S the silkiest movement of any manipulator.

Because low expansion stainless steels do have some ferric content, the stainless MP-845S is PVD coated in titanium nitride, giving it its distinctive gold color. This coating will ensure that the stainless TRIO will resist corrosion caused by exposure to salt solutions in a lab environment.

(TRIO MP-845S)

SPECIFICATIONS TRIO™ MPC-100 / MPC-145

- **Travel** — *TRIO MP-845 and TRIO MP-845S:* 25 mm on X, Y and Z axes
- **Long Term Stability** — <1 micron in 24 hours
- **Control Box Dimensions** — *TRIO MPC-100:* 6.25 in x 8 in x 5.9 in (15.9 cm x 20.3 cm x 10.2 cm)
- **Manipulator Weight** — *TRIO MP-845 (aluminum):* 3.5 lbs (1.6 kg)
  TRIO MP-845S (stainless steel): 7.7 lbs (3.5 kg)
  TRIO MPC-100 Controller: 2.3 lbs (1.04 kg)
- **Electrical** — 115/230 Volts 50/60 Hertz power line

CE

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

TRIO™ MPC-100 / MPC-145

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

ALUMINUM

- **MPC-145** — One TRIO MPC-100 controller, one MP-845 manipulator mechanical, mounting adapter plate, rod holder, hinged headstage mount, 4 inch dovetail extension, manipulator connecting cables, power cord and manual (please specify right- or left-handed)
- **MPC-145-2** — TRIO MPC-145 with two MP-845 manipulator mechanicals (please specify right- or left-handed)

STAINLESS STEEL

- **MPC-145S** — One MP-845S manipulator mechanical in stainless steel, one TRIO MPC-100 controller, mounting adapter plate, rod holder, hinged headstage mount, 4 inch dovetail extension, manipulator connecting cables, power cord and manual (please specify right- or left-handed)
- **MPC-145S-2** — TRIO MPC-145 with two stainless steel MP-845S mechanicals (please specify right- or left-handed)

FIXED STAGE PLATFORM

- **MT-78-FS** — Fixed platform stage with imperial/standard holes, chamber insert and gantry supports
- **MT-78-FS/M6** — Same as above with M6 tapped holes

MANIPULATOR COLUMNS

- **MT-75** — Standard gantry stand 8.7 to 13.4in (22.1 to 33.9 cm)
- **MT-75S** — Short gantry stand 6.7 to 9.6 in (16.9 to 24.4 cm)
- **MT-75T** — Tall gantry stand 10.7 to 15.4 in (27.1 to 39.1 cm)
- **MT-75XT** — Extra tall gantry stand 14.7 to 18.5 in (37.4 to 47 cm)

For detailed information on mounting our micromanipulators, refer to the Mounting Systems section or phone for assistance.

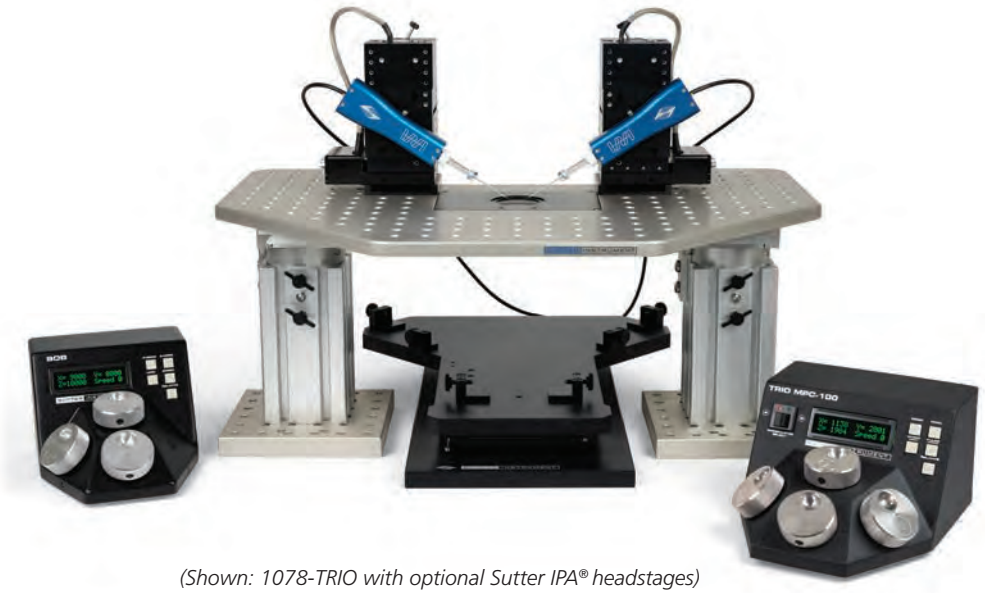
COMPONENTS TRIO™ MPC-100 / MPC-145

For those customers wishing to add a second manipulator

- **MP-845-M** — MP-845 manipulator mechanical alone - Includes mounting adapter plate, rod holder, 4" dovetail extension, hinged headstage mount and cable to connect manipulator to controller.
- **MP-845-S-M** — MP-845 stainless steel manipulator mechanical alone - Includes mounting adapter plate, rod holder, 4" dovetail extension, hinged headstage mount and cable to connect manipulator to controller.

285204	4 inch dovetail extension
265210	Mounting adapter plate
225RBI	Rotating base for TRIO
221165	Z-axis vertical extension
BR-AW	Rod clamp for XenoWorks® injectors (for rod OD 2 to 4 mm)
BR-AW-L	Long rod clamp for XenoWorks injectors (for rod OD 2 to 4 mm)
MP-CLIP[1]	Rod holder (for rod OD 1 to 4 mm)
MP-ROD	Rod holder (for rod OD 6.25 mm or larger)
MP-RISER-0.5[2]	1/2 inch riser
MP-RISER-1.0[2]	1 inch riser
EHOLDER	Micropipette holder – 1.0-1.5 mm glass

[1] *Suitable for multi-electrode probes.*
[2] *Risers can be combined to achieve desired height.*



(Shown: 1078-TRIO with optional Sutter IPA® headstages)

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MICROSCOPE MODELS - Use this scope suffix when ordering

Z25	Zeiss Axioskop 2 FS	**L30**	Leica DM LFS
Z45	Zeiss Axio Examiner	**L35**	Leica DM6000 FS, DM6 FS
Y51	Olympus BX51WI	**N65**	Nikon FN1

Y51-FD Olympus BX51WI (includes focus drive)
Y53 Olympus BX53/63

BUNDLED SYSTEMS

SAN FRANCISCO

MANUAL – MT-1000 with manual X-Y translator, micromanipulators
Includes 2 motorized TRIO micromanipulators, one MPC-100 controller, one MT-500 manual X-Y translator, one MT-150 chamber column, two micromanipulator stands (without linear slide)

- **1000-TRIO-(scope suffix)** With TRIO MPC-145-2
- **1000-TRIOS-(scope suffix)** With TRIO MPC-145S-2 stainless steel

MOTORIZED - MT-2800 with motorized X-Y translator, micromanipulators
Includes TRIO MPC-145-2 system with 2 motorized micromanipulators, the MT-800 motorized X-Y translator, BOB controller, one MT-150 chamber column, two micromanipulator stands (without linear slide)

- **2800-TRIO-(scope suffix)** With TRIO MPC-145-2
- **2800-TRIOS-(scope suffix)** With TRIO MPC-145S-2 stainless steel

ALCATRAZ

MANUAL – MT-1078 with manual X-Y translator, micromanipulators
Includes motorized TRIO micromanipulators, one MPC-100 controller, the MT-500 manual X-Y translator, one MT-78-FS fixed stage platform and insert

- **1078-TRIO-(scope suffix)[1]** With TRIO MPC-145-2
- **1078-TRIOS-(scope suffix)[1]** With TRIO MPC-145S-2 stainless steel

MOTORIZED - MT-2878 with motorized X-Y translator, micromanipulators
Includes TRIO MPC-145-2 system with 2 motorized micromanipulators, the MT-800 motorized X-Y translator, BOB controller, one MT-78-FS fixed stage platform and insert

- **2878-TRIO-(scope suffix)[1]** With TRIO MPC-145-2
- **2878-TRIOS-(scope suffix)[1]** With TRIO MPC-145S-2 stainless steel

[1] *Specify insert type when ordering*

TRIO™-245
THREE-AXIS MICROMANIPULATOR SYSTEM

(TRIO-245 shown with Sutter IPA® headstage (not included))

FEATURES TRIO™-245

- Three independent axes – 25 mm orthogonal travel in X, Y and Z
- Software-based Diagonal axis in any user selectable angle (0 - 90 degrees)
- Sub-micron (less than 100 nm) resolution
- Fast movement with a top speed of 3 mm/sec (while homing)
- Mechanically robust construction for high stability
- Compact, fanless, user-friendly, ROE controller preserves bench and rack space
- Carries up to a kilogram
- Push button control of multiple functions – WORK, HOME, LOCK, PULSE, RELATIVE, SPEED & ANGLE
- Suited for *in vivo* and *in vitro* electrophysiological recording
- Universal mounting system for headstage or pipette holder
- DIP switches on ROE select direction of movement produced by turn of ROE knob
- USB interface for computer control

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

The TRIO™-245 from Sutter Instrument is a highly stable 3-axis manipulator with 25 mm of travel on each axis. The TRIO's synthetic 4th axis can be set in software as any angle between 0 and 90 degrees for diagonal movement. Based on a lead-screw design with a smaller overall size and footprint than most manipulators, the TRIO-245 is ideal for setups where space is limited.

The TRIO-245 controller employs a combination of state-of-the-art software and mechanical design that eliminates the need for the motor to remain powered on during recording, thus eliminating the heating effects of the motors and giving us the electrically quietest manipulators in the industry. This stability ensures that Sutter manipulators will not drift in the middle of experiements.

The compact design of the integrated Rotary Optical Encoder (ROE) controller requires minimal bench space; provides quiet, fan-free operation; and is easy to use. No rack mounted controller is required. Position coordinates, in relative or absolute values, are displayed directly on the ROE. The TRIO manipulators use a logarithmic acceleration algorithm that eliminates the need for speed selection. As the knobs on the ROE are turned faster, acceleration ramps up. This allows for smooth and intuitive motion control of electrode position without the need to stop and change speeds or lift your hand from the knobs. A Y-axis lockout function (accessible by DIP switch) is also available, allowing X/Z-only axial movement during HOME and WORK repositioning.

Five conveniently located buttons control all the functions you will need in normal operation. Press and hold the WORK button to quickly store a work position; pressing WORK after this will return the manipulator to the same location. HOME sends the manipulator to a second position, often set for a point furthest from the microscope, which is useful for rapid pipette exchange. Pressing SPEED allows the selection of one of 4 speed ranges. With practice, there is no need to ever change speeds, however, we have included three low speed ranges for those who work at very high magnification. Holding SPEED for three seconds will lock the knobs out, to prevent accidental movement. Display coordinates can toggle between relative and absolute by pressing the RELATIVE button; holding the button down will zero the relative coordinates. Finally, PULSE activates a pulse movement mode that produces small, rapid bursts of motion that can be advantageous for cell penetration with sharp electrodes. Hold PULSE for three seconds to set or modify the 4th axis angle between 0 and 90 degrees.

Designed with maximum flexibility in mind, a DIP switch on the controller changes the directional movement of the ROE knobs to accommodate the preference of the user. The TRIO comes standard with a universal mounting system suitable for the most popular headstages or pipette holders.

SPECIFICATIONS TRIO™-245

Travel	25 mm on X, Y and Z axes
Long Term Stability	<1 micron in 24 hours
Control Box Dimensions	5.5 in x 7.5 in x 4 in (14 cm x 19 cm x 10.2 cm)
Weight	3.5 lbs (1.6 kg)
Electrical	115/230 Volts 50/60 Hertz power line

CE

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

TRIO™-245

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

TRIO™-245

BASIC SYSTEM

Includes the MP-245 manipulator, TRIO-245 controller, rod holder, 4 inch dovetail extension, mounting adapter plate, Z-axis vertical extension, cables, and power supply

- **TRIO-245-L** 3-axis manipulator (X,Y and Z) – left-handed setup
- **TRIO-245-R** 3-axis manipulator (X,Y and Z) – right-handed setup

FIXED STAGE PLATFORM

- **MT-78-FS** Fixed platform stage with imperial/standard holes, chamber insert and gantry supports
- **MT-78-FS/M6** Same as above with M6 tapped holes

MANIPULATOR COLUMNS

- **MT-75** Standard gantry stand 8.7 to 13.4in (22.1 to 33.9 cm)
- **MT-75S** Short gantry stand 6.7 to 9.6 in (16.9 to 24.4 cm)
- **MT-75T** Tall gantry stand 10.7 to 15.4 in (27.1 to 39.1 cm)
- **MT-75XT** Extra tall gantry stand 14.7 to 18.5 in (37.4 to 47 cm)

For detailed information on mounting our micromanipulators, refer to the Mounting Systems section or phone for assistance.

ACCESSORIES TRIO™-245

- **285204** 4 inch dovetail extension
- **265210** Mounting adapter plate
- **225RBI** Rotating base for TRIO
- **221165** Z-axis vertical extension
- **BR-AW** Rod clamp for XenoWorks® injectors (for rod OD 2 to 4 mm)
- **BR-AW-L** Long rod clamp for XenoWorks injectors (for rod OD 2 to 4 mm)
- **MP-CLIP**[1] Rod holder (for rod OD 1 to 4 mm)
- **MP-ROD** Rod holder (for rod OD 6.25 mm or larger)
- **MP-RISER-0.5**[2] 1/2 inch riser
- **MP-RISER-1.0**[2] 1 inch riser
- **EHOLDER** Micropipette holder – 1.0-1.5 mm glass

[1] *Suitable for multi-electrode probes.*
[2] *Risers can be combined to achieve desired height.*

MPC-200/MPC-385/MPC-325
MULTI-MICROMANIPULATOR SYSTEMS

(Shown: MPC-385-2)

FEATURES MPC-200

- Quietest electronics in the industry. Optimized for single channel recording.
- Single controller and ROE will run two stepper motor drive manipulators
- Self-detecting, daisy-chain capability allows control of four manipulators from one ROE-200
- User-friendly interface: single button access to all major functions
- Easily configurable virtual 4th axis set without external computer
- Accelerated Mode for fast, manual manipulator movement
- Easy toggle selection of Mode (speed/ resolution, pulsed diagonal, Accelerated Mode)
- Display indicates X, Y, Z coordinates, Mode, active manipulator
- Robotic HOME and WORK Position moves for easy automated pipette exchange
- Faster robotic moves than previous versions
- Definable 4th axis for coaxial pipette movement, angle selected by DIP switches
- Simple USB interface, open source command set available
- Toggle switch selects which manipulator is connected to input device
- LED and display indicate active manipulator
- Ultra-low drift, ultra-smooth movement

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

Neurobiological experiments are becoming more complex. Many require multiple manipulators with control units that quickly become space and/or cost prohibitive. The MPC-200 is the solution you have been asking for. A single controller capable of running 2 manipulators! Sutter Instrument has taken the simplicity of the MP-225 controller and expanded it to run two manipulators from a single controller/ROE. The MPC-200 works with our world-renowned mechanicals, the MP-285 (MPC-385), MP-225 (MPC-325) or narrow format MP-865 (MPC-365).

If two manipulators aren't enough, a second controller can be daisy-chained to allow the single ROE-200 to move up to four manipulators. Thus the system can be easily expanded to control highly sophisticated experiments.

The Sutter MPC-200 is electrically quiet. Unique to the MPC-200 is our multi-unit controller which employs linear output circuitry to minimize electrical noise. Sutter adds additional manipulators to the same controller without requiring potentially noisy chopper drives.

In all of our manipulators, the 4th axis can be set up and changed without the need to connect an external computer and download and configure software. A separate configuration is allowed for each output on this manipulator controller. If desired, each manipulator can approach the preparation at a different angle from the horizontal. The 4th axis can be configured between the X and Z axes or the Y and Z axes (useful when manipulator is rotated 90 degrees relative to the preparation).

Faster automated pipette exchange
The MPC-200 has faster "Home" and "Work Position" moves for quicker pipette exchange. Automation is set up and run via the same interface used in the MP-225 controller; however, the speeds of the automated movement are much faster.

Accelerated manual mode
For users who prefer manual pipette exchange we have added "Accelerated Mode" to the ROE. Using Accelerated Mode, the user can make quick manual moves in and out of a setup. Accelerated Mode amplifies the speed attainable in a manual move by smoothly accelerating to the maximum speed during sustained, fast turns of the ROE. Accelerated movement ends as soon as the user stops turning the knob. This mode can be fully disabled for those who feel the need for direct control of the pipette.

To provide the ultimate in flexibility, the MPC-200 can be purchased separately or as part of a basic system such as the MPC-385, MPC-365 and MPC-325. Additional component pieces can be added at any time, allowing the user to develop a system tailored to his or her particular needs. The controller is self-detecting, so there is no need for manual configuration of the components.

SPECIFICATIONS MPC-200

- **Resolution and Full Travel** — Minimal microstep size is 62.5 nanometers per microstep. Display has single micron resolution. Full travel is 25 mm in each axis.
- **Maximum Speed** — MP-225 mechanical 3 mm/sec. MP-285 mechanical 5 mm/sec.
- **Long Term Stability** — <0.5 micron in 20 hours Drive Mechanism

DIMENSIONS

- **Controller** — 15.75 in x 10.75 in x 3.5 in 40 cm x 27.3 cm x 9 cm
- **ROE** — 10 in x 6 in x 4 in 25.4 cm x 15.2 cm x 10.2 cm

WEIGHT

- **Controller** — 6.5 lbs 3 kg
- **ROE** — 3.5 lbs 1.6 kg
- **Electrical** — 115/230 Volts 50/60 Hertz power line

CE

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MPC-385 SYSTEMS

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MPC-385	One MP-285 manipulator mechanical, one MPC-200 controller and one ROE-200. Also includes mounting adapter plate, rod holder, hinged headstage mount, 4 inch dovetail extension, manipulator and ROE connecting cables, power cord and manual.*
MPC-385-2	MPC-385 with two MP-285 mechanicals.*
MPC-385-3	MPC-385 with three MP-285 mechanicals, and two MPC-200 controllers.*
MPC-385-4	MPC-385 with four MP-285 mechanicals, and two MPC-200 controllers.*

MPC-325 SYSTEMS

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MPC-325	One MP-225 manipulator mechanical, one MPC-200 controller and one ROE-200. Also includes mounting adapter plate, rod holder, hinged headstage mount, 4 inch dovetail extension, manipulator and ROE connecting cables, power cord and manual.*
MPC-325-2	MPC-325 with two MP-225 mechanicals.*
MPC-325-3	MPC-325 with three MP-225 mechanicals, and two MPC-200 controllers.*
MPC-325-4	MPC-325 with four MP-225 mechanicals, and two MPC-200 controllers.*

** Indicate right- or left-handed set-up when ordering*

MPC-200 COMPONENTS

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

- **MPC-200-ROE** Consists of the MPC-200 controller and ROE-200. This "system" is made available at a special price for those who wish to use previously purchased Sutter manipulators with the newer controller system or to use the MPC-200-ROE to control other devices. Includes cable to connect ROE to controller, power cord and manual.
- **MPC-200** Controller box alone. Purchase this if you intend to daisy-chain two controllers to one ROE-200. In this configuration, up to 4 manipulators can be controlled by a single ROE-200.
  NOTE:
  This is not a standalone device. In order to function, the MPC-200 must be connected to a second MPC-200 with ROE-200 attached or be connected to its own ROE-200. Includes daisy-chain cable, power cord and manual.
- **ROE-200** This is the ROE alone. Provides user input to one or more MPC-200 controllers. This component is intended for users who have an existing four-manipulator MPC-200 system with a single ROE-200 and wish to split it into two independent two-manipulator systems. Includes cable to connect ROE to controller.
- **MP-285/M** The MP-285 manipulator mechanical alone. This is the mechanical from the MP-285, the manipulator system that made Sutter the world leader in motorized manipulators for electrophysiology. Over 2000 units, many of which have been in use over 5 years, allow us to stand behind the reliability of this design. It is widely known for its smooth movement and low drift. Includes mounting adapter plate, rod holder, 4 inch dovetail extension, hinged headstage mount and cable to connect manipulator to controller.*
- **MP-225/M** The MP-225 manipulator mechanical alone. This is the mechanical unit from the Sutter MP-225. It features modular construction, lower cost, smooth movement and low drift. Includes mounting adapter plate, rod holder, 4 inch dovetail extension, hinged headstage mount and cable to connect manipulator to controller.*

** Indicate right- or left-handed set up when ordering*

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MPC-200 ACCESSORIES

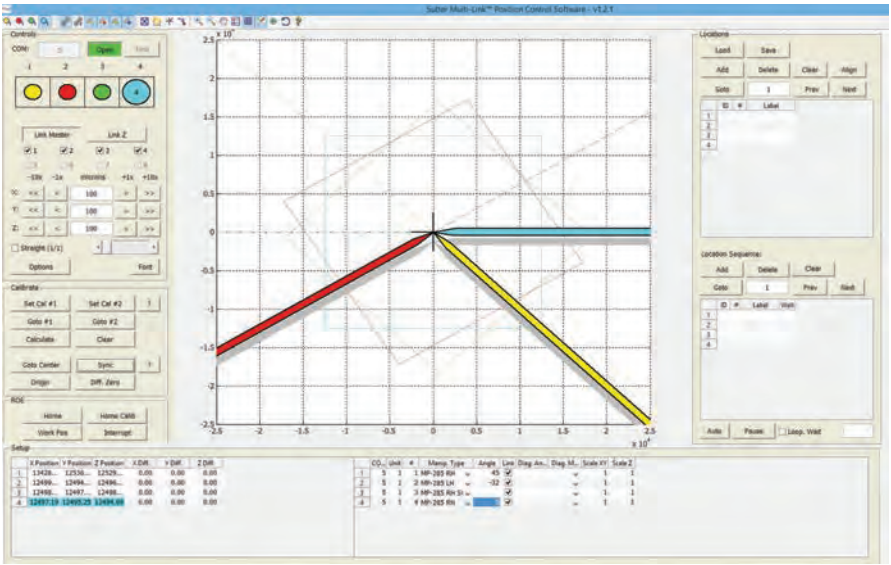
*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

285204	4 inch dovetail extension
285210[1]	Mounting adapter plate
285RBI	Rotating base for MP-285
225RBI	Rotating base for MP-225
285300	Right angle adapter
285305	Z-axis vertical extension
285310	Z-axis horizontal extension
BR-AW	Rod clamp for XenoWorks® injectors (for rod OD 2 mm to 4 mm)
BR-AW-L	Long rod clamp for XenoWorks injectors (for rod OD 2 to 4 mm)
MP-CLIP[2]	Rod holder (for rod OD 1 to 4.5 mm)
MP-ROD	Rod holder (for rod OD 6.25 mm or larger)
285HEA	Hinged headstage mount
M100106	Flat side for controller (each)
MP-RISER-0.5[3]	1/2 inch riser
MP-RISER-1.0[3]	1 inch riser
EHOLDER	Micropipette holder – 1.0-1.5 mm glass

For detailed information on mounting our micromanipulators, refer to the Mounting Systems section or phone Sutter for assistance.

[1] *For use with MT and MD series stands and platforms, or any surface with 1 inch centered holes.*
[2] *Suitable for multi-electrode probes.*
[3] *For MP-225 mechanical only. Risers can be combined to achieve desired height.*

MULTI-LINK™
POSITION CONTROL SOFTWARE



FEATURES MULTILINK™

- Selectable linking of one, two or more manipulators and translator
- Unlimited memorized positions
- Simultaneous control via ROE and computer GUI
- Positional information mirrored between GUI and ROE
- Pipettes are color coordinated to selected manipulator LED on ROE
- Supports mounting of manipulators at ANY mounting angle in the X-Y plane
- Extended version controls up to 8 manipulators
- Backwards compatible with all existing MPC-200 controllers
- Price: FREE! Available on our Technical Support/Software page at www.sutter.com

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

The Multi-Link™ Position Control Software is a standalone program that interfaces with our MPC-200 manipulator controllers. Multi-Link™ is an intuitive GUI that uses the MPC-200 driver Sutter developed for the NIH freeware µManager. It operates any Sutter Instrument device that can be connected to the MPC-200, including: manipulators, motorized microscopes (MOM and SOM), the MT-800 translator (with or without focus drive), and the MPC-78 platform stage (with or without focus drive) and the 3DMS stage.

The most powerful aspect of the Multi-Link software is the ability to link the movement of multiple devices together. The lead pipette can be used to direct the movement of a microscope translator (objective/camera), or the translator can function as the leader and thereby keep the pipettes in the field of view. The leading device can be controlled through the manual input knobs of the ROE-200 or the computer GUI via a mouse or other PC interface.

Multi-Link easily memorizes multiple working locations and can rapidly switch between them. The user simply moves the microscope to a region of interest and clicks to save the location. Turning on "Link" will then coordinate all linked devices (usually manipulators) with moves made by the microscope via a motorized translator. Switching between memorized positions will bring all linked devices to that location. Link, intuitive and easy to use, will allow users to bring all their pipettes to a working location in seconds! The memory positions available in the Multi-Link software allow for most of the same robotic functionality found in our MP-285. Memorized locations can be repeated in looped operation.

While all features found in the ROE-200 have been replicated in Multi-Link, full functionality of the ROE is retained, allowing movement of any connected device by turning the knobs on the ROE or by clicking and dragging the pipettes in software. Moves made in the GUI update the positional information displayed on the ROE, and moves made with the ROE-200 are updated in Multi-Link.

ADDITIONAL FEATURES
Accurately linked moves require "Calibration". A calibration protocol within the software automatically determines the mounting angle of each manipulator in the X-Y plane, so that Linked movement of the pipette will always be accurate. With two simple moves, the software automatically determines the mounting angle of each pipette with respect to the objective/camera.

The ROE-200 always displays the coordinates in an absolute scale, from 0 µm to 25000 µm. Multi-Link displays coordinates in either absolute or relative scale. Press one button to set the relative origin in all three axes and move in a positive or negative direction with respect to the relative origin. Multi-Link can also multiply the coordinates by a user-defined Scaling factor. The Scaling factor allows the user to match the position information displayed in Multi-Link to that of third-party and/or home-made stages, translators, focusing knobs, or other stepper motor devices.

One of the most innovative features of Multi-Link is the GUI representation of all manipulated pipettes. In addition to being a great teaching tool, the GUI allows a user to visualize the relative position of all pipettes in an experiment. Zoom out to see the location of each pipette at each memorized location, even when these positions are outside the microscope's field of view. Drag the virtual pipettes from one memorized position to another and the manipulators will move the real pipettes in real-time.

All the features of the Multi-Link software, from Link to the virtual pipette GUI, will increase the success rate of your experiments and save time. Another outstanding feature of this software is the price. Sutter is including this software at no charge with all MPC-200 systems. The software is also available as a FREE download for those with existing MPC-200 systems!

MP-285
ROBOTIC MICROMANIPULATOR

(Shown with optional dPatch® headstage)

FEATURES MP-285

- Quietest electronics in the industry. Optimized for single channel recording.
- Highly stable for experiments intolerant of pipette drift
- Sub-micron resolution and integrated coarse positioning
- 1 inch of motorized travel on all three axes
- Virtual 4th axis can be set without need of external computer or software
- Adjustable speed and resolution allows optimization for your experimental setup
- Programmable robotics for complex motion sequences
- Continuous display (in microns) of axes positions
- Switch between continuous or single step movement
- Absolute and relative origins
- Convenient HOME function allows pipettes to be quickly repositioned
- Assignable axes permit any orientation of the manipulator
- Easy-to-read vacuum fluorescent display
- Remote computer control via serial interface
- Compact design easily adaptable to your setup
- Universal mounting system for headstage or pipette holder
- Optional mounting adapters (see price list)

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

One of the first in our line of precision motorized micromanipulators, the MP-285 is affordable yet offers advanced features found in manipulators costing thousands more. Custom engineered stepping motors, precision cross-roller bearing slides and proprietary worm gear capstan drives form the basis of the watch-like mechanical system. The controller provides power to the stage motors with a quiet linear power supply to minimize electrical noise radiation in your setup. Pipette holders and headstages are securely mounted to the MP-285 with one of our several unique and rigid mounting systems.

The MP-285 was designed to meet a wide variety of positioning needs for the scientific community and is suitable for patch clamp experiments, extracellular recording, microinjection, intra-cellular recording and precision robotic positioning applications. An outstanding feature of this system is the unique definable 4th axis for diagonal advancement of the pipette. You select the angle, then activate the 4th axis. As with the other three axes, you may move with adjustable coarse or ultrafine resolution, select the movement speed, and move continuously or in single step increments. To quickly reposition the pipette, simply select the HOME function. Axes positions are continuously shown in relative and absolute scales, and are easily readable on the vacuum fluorescent display.

The extremely low backlash of the MP-285 removes traditional drawbacks of "open loop" technology and eliminates drift. This allows submicron resolution down to 0.2 microns in the coarse range and down to 40 nanometers in the fine range. With over 1 inch of motorized travel on all three axes, and a user designated 4th axis, the MP-285 allows tremendous range of motion while maximizing resolution.

In all our manipulators, the 4th axis can be set up and changed without the need to connect an external computer and download and configure software. Unlike other designs, the virtual 4th axis in the MP-285 can comprise any two axes — conventional X-Z to approach along the pipette axis, Y-Z used when the manipulator is rotated 90 degrees, and you can even set up a virtual diagonal in the X-Y plane: useful when the manipulator is set up as a 3DMS (3D movable stage) and one wants to quickly move along the diagonal between two points on a horizontal specimen.

Available with a table-top or rack-mounted controller, our manipulator fits in seamlessly with your other components while the compact design and assignable axes of the MP-285 allow you to easily integrate it into your setup at any orientation. To add to its practicality, the rotary optical encoder (ROE), assures a comfortable experimentation environment, customized to the scientist. Turning one of three 2-inch knobs produces a movement along one axis proportional to the amount and speed of the turn. Buttons allow the activation of "4th axis", change of movement resolution, "Home" return function, and toggle between continuous pulse movements.

For users who require repeatable motion sequences, the MP-285 features easily programmed robotic control from the keypad, or via a remote computer. The system can store up to 500 position instructions, including pauses, and will execute the instruction set once, continuously, or in reverse.

As always, our technical support team is available to address your concerns and answer all questions before, and after your purchase.

SPECIFICATIONS MP-285

Travel	1 inch 25 mm on all three axes
Resolution	Low: 0.2 µm/step High: 0.04 µm/step
Maximum Speed	2.9 mm/sec
Long Term Stability	<10 nm/hour at 24 deg C
Drive Mechanism	Precision worm gear capstan drive
Serial Interface	RS-232, 9600 baud (1 start bit, 8 data bits, 1 stop bit)
Dimensions	*Manipulator:* 4.5 in x 6 in x 6.25 in 11.4 cm x 15.2 cm x 15.9 cm Controller: 16 in x 10.75 in x 3.75 in 40.6 cm x 27.3 cm x 9.6 cm
Weight	*Manipulator:* 3.85 lbs / 1.7 kg *Controller:* 10 lb 11 oz / 4.5 kg
Electrical	115/230 Volts 50/60 Hertz power line

CE

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MP-285

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MP-285/R	Includes manipulator, rack mount controller unit, rotary optical encoder, cables, rod holder, hinged headstage mount, 4 inch dovetail extension, mounting adapter plate, choice of input device, power cord, and manual
MP-285/T	Includes manipulator, table top controller unit, rotary optical encoder, cables, rod holder, hinged headstage mount, 4 inch dovetail extension, mounting adapter plate, choice of input device, power cord, and manual

When ordering the MP-285, the handedness must be specified. Please list as separate item with no cost.

Select the manipulator handedness

Right-handed setup	**RIGHT**
Left-handed setup	**LEFT**

If you have any questions regarding the part numbering system, please contact Sutter Instrument Company directly.

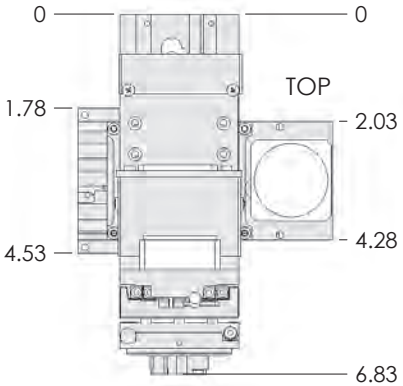
ACCESSORIES MP-285

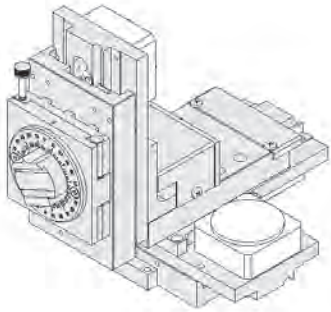
285204	4 inch dovetail extension
285210[1]	Mounting adapter plate
285RBI	Rotating base for MP-285
285300	Right angle adapter
285305	Z-axis vertical extension
285310	Z-axis horizontal extension
BR-AW	Rod clamp for XenoWorks® injectors (for rod OD 2 mm to 4 mm)
BR-AW-L	Long rod clamp for XenoWorks injectors (for rod OD 2 mm to 4 mm)
MP-CLIP[2]	Rod holder (for rod OD 1 to 4.5 mm)
MP-ROD	Rod holder (for rod OD 6.25 mm or larger)
285HEA	Hinged headstage mount
M100106	Flat side panel for controller (each)
EHOLDER	Micropipette holder – 1.0-1.5 mm glass

For detailed information on mounting our micromanipulators, refer to the Mounting Systems section or phone Sutter for assistance.

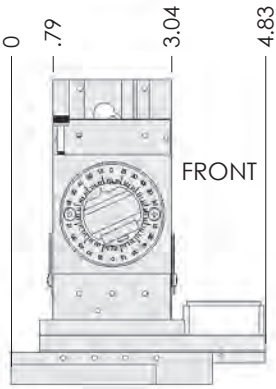
[1] For use with MT and MD series stands and platforms, or any surface with 1 inch centered holes.
[2] Suitable for multi-electrode probes.

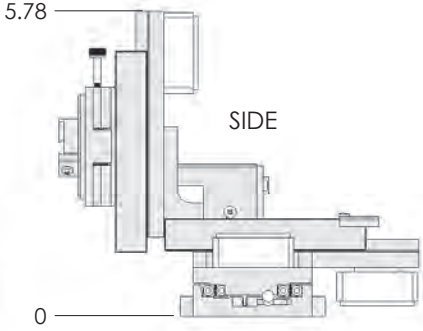
MANIPULATOR DRAWINGS MP-285





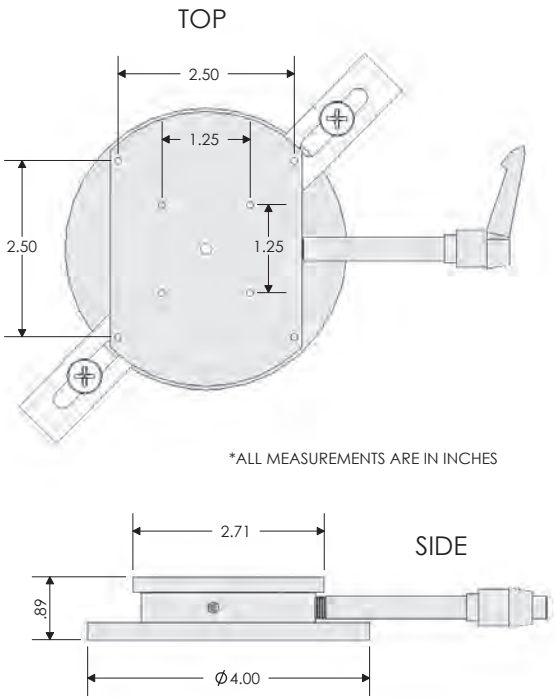
*ALL MEASUREMENTS ARE IN INCHES





PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MECHANICAL DRAWINGS OF OPTIONAL ROTATING BASE (285RBI OR 225RBI)



MP-225
MOTORIZED MICROMANIPULATOR

FEATURES MP-225

- Highly stable for experiments intolerant of pipette drift
- Submicron (62.5nm) minimal resolution for fine movement
- Convenient toggle wheel selects resolution/speed of movement
- 25mm of motorized travel on all three axes
- 4th axis for coaxial movement of pipette, angle selected by DIP switches on ROE
- ROE button press actuates move to HOME position for pipette exchange
- ROE button press actuates move to Work position near recording location
- Continuous display (in microns) of axes positions located on ROE
- DIP switches on ROE select direction of movement produced by turn of ROE knob
- Modularized, compact design easily adaptable to your setup
- Universal mounting system for headstage or pipette holder
- Mounting adapters included with manipulator

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

The MP-225 represents an economical alternative to the MP-285 and other 3-axis manipulators. In 2002, production and design changes allowed us to produce this motorized manipulator as a more affordable alternative to the industry standard MP-285. While the MP-225 feature set is less comprehensive than the MP-285, it includes the most popular features with an efficient user interface. The mechanical design utilizes a miniature stepper motor and integral anti-backlash gear head. Pre-loaded ball bearing slides provide smooth movement throughout the 25mm of travel. The controller uses low-noise, linear-drive output circuitry identical to that found in the MP-285. The methodology for mounting pipette holders and headstages used with the MP-285 has been maintained in the MP-225 to allow for cross compatibility.

The MP-225 is designed primarily for positioning patch and intracellular recording pipettes. We have retained and refined the features most desired for this type of work. An extended version of the popular rotary optical encoder (ROE) is the sole input device available with the MP-225. Like the MP-285, the manipulator has a synthetic 4th axis for diagonal advancement of the pipette; 16 different angles are selectable via DIP switches. Speed and resolution of movement are easily selected with a multiple position switch, allowing fast/coarse movement and slow/ultra-fine movement in 10 increments. Two commonly used robotic movements have been incorporated for user convenience. A single button press can initiate a move to a Home position for pipette exchange, or to a user defined Work position for quick location of the pipette near the recording location. A display on the ROE gives position location. As all controls are located on the ROE, the controller can be moved to a less accessible area of your setup and does not need to occupy prime space in an equipment rack.

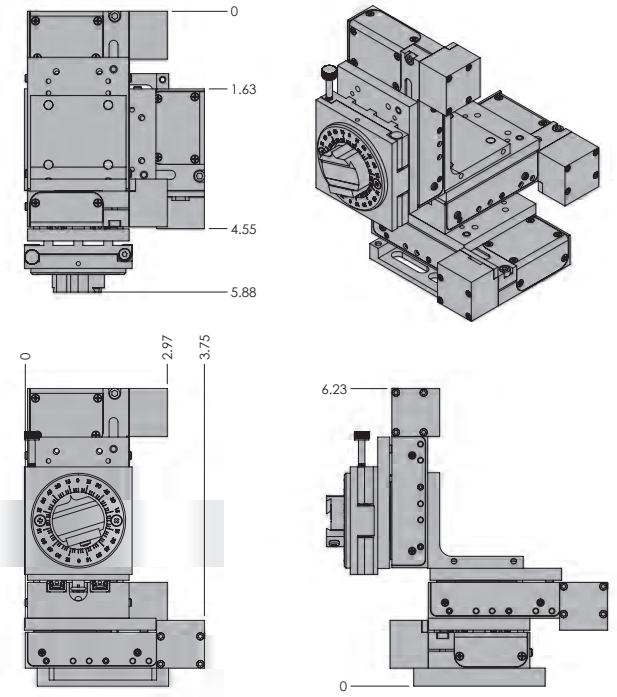
As always, our technical support team is available to address your particular needs and answer all questions before and after your purchase.

SPECIFICATIONS MP-225

Travel	1 in – 25 mm on all three axes	
Resolution	Six microstep sizes selectable (µm/ustep): 0.0625, 0.125, 0.25, 0.5, 1.0 and 2.0. Finer movement settings use the 62.5 nm microstep size but fewer microsteps are commanded per encoder knob turn	
Maximum Speed	2.0 mm/sec	
Long Term Stability	1-2 µm/hour maximum	
Drive Mechanism	Integral miniature stepper motor anti-backlash gearhead	
Drift	< 0.5 microns in 20 hours	
Dimensions	*Manipulator:* 4 in x 5.5 in x 6 in 10 cm x 15 cm x 15.5 cm	*Controller:* 16 in x 11 in x 3.75 in 40.6 cm x 28 cm x 9.6 cm
Weight	*Manipulator:* 2.95 lbs /1.3 kg	*Controller:* 10 lb 11 oz / 4.5 kg
Electrical	115/230 Volts 50/60 Hertz power line	

CE

MECHANICAL DRAWINGS MP-225



PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MP-225

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MOTORIZED MICROMANIPULATOR

MP-225*	Includes manipulator, table top controller unit, extended ROE, hinged headstage mount, cables, rod holder, 4in dovetail extension, mounting adapter plate, screws, hex wrench, power cord and manual*

** Indicate right- or left-handed set-up when ordering.*

ACCESSORIES MP-225

285204	4 inch dovetail extension
285210[1]	Mounting adapter plate
225RBI	Rotating base for MP-225
285300	Right angle adapter
285305	Z-axis vertical extension
285310	Z-axis horizontal extension
BR-AW	Rod holding clamp for XenoWorks® injectors (rod OD 2-4 mm)
BR-AW-L	Long rod clamp for XenoWorks injectors (for rod OD 2 to 4 mm)
MP-CLIP[3]	Rod holder (for rod OD 1 to 4.5 mm)
MP-ROD	Rod holder (rod OD 6.25 mm or larger)
285HEA	Hinged headstage mount
M100106	Flat side panel for controller (each)
EHOLDER	Micropipette holder – 1.0-1.5 mm glass

For detailed information on mounting our micromanipulators, refer to the Mounting Systems section or phone for assistance.

[1] For use with MT and MD series stands and platforms, or any surface with 1 inch centered holes.

QUAD®
FOUR-AXIS MICROMANIPULATOR SYSTEM

FEATURES QUAD®

- Four independent axes — 30 mm travel in diagonal for coaxial pipette movement, 25 mm travel in X, Y and Z
- User-friendly, fanless compact controller with ROE preserves bench space
- True diagonal assures coaxial movement
- Suited for *in vivo* electrophysiological recording
- Quiet mode eliminates electrical noise
- Push button control of multiple functions — WORK, HOME, LOCK, PULSE, and RELATIVE
- Robotic Home and Work position moves for easy automated pipette exchange
- Sub-micron 100 nm resolution
- USB interface for computer control

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

The QUAD® motorized micromanipulator is easy to use and features four independent axes. Each axis has a 25 mm range of motion, a digital display of position and an ROE control. The compact, intuitive controller takes up minimal bench space, is fan free and is easy to use. Three axes provide the X, Y, Z-orthogonal motion typical of most motorized micromanipulators. In the QUAD, Sutter introduces a true fourth axis to move the electrode coaxially at exactly the desired angle of approach. The fourth axis has 30 mm of travel that significantly extends the range of travel for the system.

The QUAD has an intuitive ROE interface. The ROE inputs for each axis allow facile manual control of electrode position. Five conveniently located buttons control all of the basic functions that you will need in normal operation. Press and hold the WORK button to quickly store a work position; press WORK again and the manipulator will return to the same location. HOME sends the manipulator to an initial location that is useful for changing electrodes. When you are ready to begin collecting data, the motor drive, electronics can be suppressed by pressing LOCK. Display coordinates can be zeroed at any location by pressing RELATIVE; go back to absolute coordinates by pressing RELATIVE again. Finally, PULSE activates a pulse movement mode that produces small, rapid bursts of motion that can be advantageous for sharp electrode cell penetration.

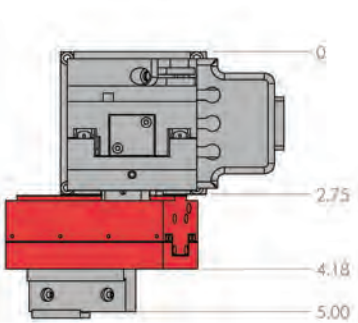
PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

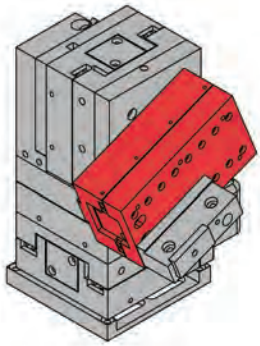
SPECIFICATIONS QUAD®

Travel	30 mm on diagonal 4th axis 25 mm on X, Y and Z axes
Long Term Stability	<1 micron in 4 hours
Control Box Dimensions	5.5 in x 7.5 in x 4 in 14 cm x 19 cm x 10.2 cm
Weight	2.2 lbs 1.0 kg
Electrical	115/230 Volts 50/60 Hertz power line

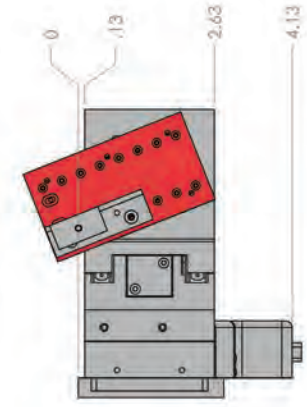
CE

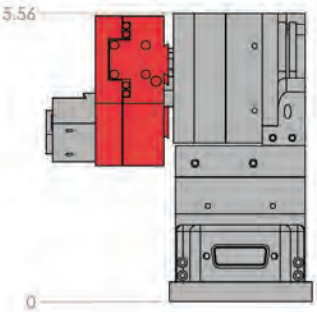
MECHANICAL DRAWINGS QUAD®





*** All measurements are in inches*





PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

QUAD® SYSTEMS

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

QUAD

BASIC SYSTEM

Includes the manipulator, controller, rod holder, 4 inch dovetail extension, mounting adapter plate, Z-axis vertical extension, cables, and power supply

- **QUAD-L**[1] QUAD 4-axis manipulator – left-handed setup
- **QUAD-R**[1] QUAD 4-axis manipulator – right-handed setup

FIXED STAGE PLATFORM

- **MT-78-FS** Fixed platform stage with imperial/standard holes, chamber insert and gantry supports
- **MT-78-FS/M6** Same as above with M6 tapped holes

MANIPULATOR COLUMNS

- **MT-75** Standard gantry stand 8.7 to 13.4 in (22.1 to 33.9 cm)
- **MT-75S** Short gantry stand 6.7 to 9.6 in (16.9 to 24.4 cm)
- **MT-75T** Tall gantry stand 10.7 to 15.4 in (27.1 to 39.1 cm)
- **MT-75XT** Extra tall gantry stand 14.7 to 18.5 in (37.4 to 47 cm)

MICROINJECTION COLUMNS

- **MT-81-DOV8**[2] MT-81 stand with 8 inch dovetail
- **MT-81-DOV12**[2] MT-81 stand with 12 inch dovetail

For detailed information on mounting our micromanipulators, refer to the Mounting Systems section or phone for assistance.

ACCESSORIES QUAD®

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

- **285204** 4 inch dovetail extension
- **225RBI** Rotating base for TRIO
- **221165** Z-axis vertical extension
- **BR-AW** Rod clamp for XenoWorks® injectors (for rod OD 2 to 4 mm)
- **BR-AW-L** Long rod clamp for XenoWorks injectors (for rod OD 2 to 4 mm)
- **MP-CLIP**[3] Rod holder (for rod OD 1 to 4.5 mm)
- **MP-ROD** Rod holder (for rod OD 6.25 mm or larger)
- **MP-RISER-0.5**[4] 1/2 inch riser
- **MP-RISER-1.0**[4] 1 inch riser
- **EHOLDER** Micropipette holder – 1.0 to 1.5 mm glass

[1] *Handedness is a convenience. Customer can change orientation as needed.*
[2] *Useful for low profile stereoscopes and microinjection.*
[3] *Suitable for multi-electrode probes*
[4] *Risers can be combined to achieve desired height.*

TRIO™-235
THREE-AXIS MICROMANIPULATOR SYSTEM

(TRIO-235 shown with Sutter IPA® headstage (not included))

FEATURES TRIO™-235

- Three independent axes – 25 mm orthogonal travel in X, Y and Z
- Software-based Diagonal axis in any user selectable angle (0 - 90 degrees)
- Sub-micron (less than 100 nm) resolution
- Fast movement with a top speed of 3 mm/sec (while homing)
- Mechanically robust construction for high stability
- Compact, fanless, user-friendly, ROE controller preserves bench and rack space
- Carries up to a kilogram
- Push button control of multiple functions – WORK, HOME, LOCK, PULSE, RELATIVE, SPEED & ANGLE
- Suited for *in vivo* and *in vitro* electrophysiological recording
- Universal mounting system for headstage or pipette holder
- DIP switches on ROE select direction of movement produced by turn of ROE knob
- USB interface for computer control

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

Ideal for *in vivo* work, the TRIO™-235, replaces the Z-axis with an adjustable diagonal axis. This configuration pairs a traditional X and Y-axis with a diagonal axis that can be adjusted in angle with a set screw. The diagonal features 50 mm of travel, with 25 mm of travel in the X and Y-axes. We have added software to create a synthetic "Z-axis" by combining the diagonal and X-axes which is the reverse of how we create a synthetic diagonal axis on our other manipulators. The TRIO-235 features a precision bearing and lead-screw design.

The TRIO-235 controller employs a combination of state-of-the-art software and mechanical design that eliminates the need for the motor to remain powered on during recording, thus eliminating the heating effects of the motors and giving us the electrically quietest manipulators in the industry. This stability ensures that Sutter manipulators will not drift in the middle of experiments.

The compact design of the integrated Rotary Optical Encoder (ROE) controller uses minimal bench space; provides quiet, fan-free operation; and is easy to use. No rack mounted controller is required. Position coordinates, in relative or absolute values, are displayed directly on the ROE. The TRIO manipulators use a logarithmic acceleration algorithm that eliminates the need for speed selection. As the knobs on the ROE are turned faster, acceleration ramps up. This allows for smooth and intuitive motion control of electrode position without the need to stop and change speeds or lift your hand from the knobs. A Y-axis lockout function (accessible by DIP switch) is also available, allowing X/Diagonal-only axial movement during HOME and WORK repositioning.

Five conveniently located buttons control all the functions you will need in normal operation. Press and hold the WORK button to quickly store a work position; pressing WORK after this will return the manipulator to the same location. HOME sends the manipulator to a second position, often set for a point furthest from the microscope, which is useful for rapid pipette exchange. Pressing SPEED allows the selection of one of 4 speed ranges. With practice, there is no need to ever change speeds; however, we have included three low speed ranges for those who work at very high magnification. Holding SPEED for three-seconds will lock the knobs out, to prevent accidental movement. Display coordinates can toggle between relative and absolute by pressing the RELATIVE button; holding the button down will zero the relative coordinates. Finally, PULSE activates a pulse movement mode that produces small, rapid bursts of motion that can be advantageous for cell penetration with sharp electrodes. Hold PULSE for three-seconds to set or modify the angle the diagonal axis is positioned at. This allows the controller to calculate the synthetic “Z-Axis”.

Designed with maximum flexibility in mind, a DIP switch on the controller changes the directional movement of the ROE knobs to accommodate the preference of the user. The TRIO-235 comes standard with a universal mounting system suitable for the most popular headstages or pipette holders.

SPECIFICATIONS TRIO™-235

Travel	25 mm on X and Y / 50 mm on diagonal
Long Term Stability	<1 micron in 4 hours
Control Box Dimensions	5.5 in x 8 in x 4 in (14 cm x 20.4 cm x 10.2 cm)
Weight Mechanical	2.8 lbs (1.3 kg)
Weight Controller	2.2 lbs (1.0 kg)
Electrical	115/230 Volts 50/60 Hertz power line

CE

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

TRIO™-235

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

TRIO™-235	BASIC SYSTEM Includes the manipulator, controller, rod holder, 4 inch dovetail extension, mounting adapter plate, Z-axis vertical extension, cables, and power supply
■ **TRIO-235**	3-axis manipulator (X,Y and diagonal)
	FIXED STAGE PLATFORM
■ **MT-78-FS**	Fixed platform stage with imperial/standard holes, chamber insert and gantry supports
■ **MT-78-FS/M6**	Same as above with M6 tapped holes
	MANIPULATOR COLUMNS
■ **MT-75**	Standard gantry stand 8.7 to 13.4in (22.1 to 33.9 cm)
■ **MT-75S**	Short gantry stand 6.7 to 9.6 in (16.9 to 24.4 cm)
■ **MT-75T**	Tall gantry stand 10.7 to 15.4 in (27.1 to 39.1 cm)
■ **MT-75XT**	Extra tall gantry stand 14.7 to 18.5 in (37.4 to 47 cm)
	MICROINJECTION COLUMNS
■ **MT-81-DOV8**[1]	MT-81 stand with 8 inch dovetail
■ **MT-81-DOV12**[1]	MT-81 stand with 12 inch dovetail

For detailed information on mounting our micromanipulators, refer to the Mounting Systems section or phone for assistance.

ACCESSORIES TRIO™-235

■ **285204**	4 inch dovetail extension
■ **265210**	Mounting adapter plate
■ **225RBI**	Rotating base for TRIO
■ **221165**	Z-axis vertical extension
■ **BR-AW**	Rod clamp for XenoWorks® injectors (for rod OD 2 to 4 mm)
■ **BR-AW-L**	Long rod clamp for XenoWorks injectors (for rod OD 2 to 4 mm)
■ **MP-CLIP**[2]	Rod holder (for rod OD 1 to 4.5 mm)
■ **MP-ROD**	Rod holder (for rod OD 6.25 mm or larger)
■ **MP-RISER-0.5**[3]	1/2 inch riser
■ **MP-RISER-1.0**[3]	1 inch riser
■ **EHOLDER**	Micropipette holder – 1.0 to 1.5 mm glass

[1] *Useful for low profile stereoscopes and microinjection.*
[2] *Suitable for multi-electrode probes.*
[3] *Risers can be combined to achieve desired height.*

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

SOLO
SINGLE AXIS MANIPULATOR CONTROLLER

(Shown with SOLO-50)

FEATURES SOLO

- Control any single axis from Sutter stepper motor manipulator collection
- 25 mm or 50 mm length of travel
- Absolute and Relative modes
- User defined WORK and HOME positions in Absolute mode
- Pulse mode
- USB connectivity

APPLICATIONS SOLO

- Can be used with a single axis micromanipulator to design a focus drive for your researcher-made microscope
- Can be used to add a 4th axis to a 3-axis Sutter manipulator
- Ideal for *in vivo* experiments

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

The SOLO is an extremely easy to operate single axis controller capable of running any single axis from Sutter's line of stepper motor manipulators. The compact design of the SOLO controller requires minimal bench space and provides quiet, fan-free operation.

The SOLO controller features user defined HOME and WORK positions. Press and hold the WORK button to quickly store a Work position; press WORK again and the manipulator will return to the same location. HOME sends the manipulator to an initial location or any user defined position. Position coordinates, in relative or absolute values, are displayed directly on the ROE. A PULSE button activates a discrete 3 micron movement of the axis.

Speed of movement is determined by how fast the ROE knob is turned. We have added three distinct speeds to give the user extreme control over movement. The combination of three speeds and the knob speed control makes the SOLO an ideal, ultra-reliable controller for sub-micron movement.

Single axes are available in lengths of 25 mm or 50 mm. The SOLO is suitable for *in vivo* experiments that require only one motorized axis. Additionally, this single axis controller can be used as a sub-micron focusing system as seen in the Sutter SOM and BOB microscopes. Or add a fourth axis to your existing Sutter manipulator to create a true four-axis motorized *in vivo* and *in vitro* manipulator (such as the QUAD).

USB connectivity and open source commands, along with built-in features such as WORK & HOME positions, and Pulse mode, make this single axis controller the ideal device for the do-it-yourself scientist.

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

SPECIFICATIONS SOLO

Control Box Dimensions	5.5 in x 5.1 in x 3.2 in 14 cm x 13 cm x 8.1 cm
Weight	*Controller:* 1.2 lbs 0.53 kg
Electrical	115/230 Volts 50/60 Hertz power line

CE

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

SOLO

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

SINGLE AXIS MANIPULATOR CONTROLLER

- **SOLO-25MM** SOLO controller and single axis with 25 mm travel
- **SOLO-50MM** SOLO controller and single axis with 50 mm travel
- **SOLO-70MM** SOLO controller and single axis with 70 mm travel

Adapters are available to connect your Sutter single axis manipulator to many instruments. Phone Sutter for details.

ACCESSORIES SOLO

For 25 mm axis

- **SO-NG25** Stereotaxic adapter for Narishige
- **SO-ST25** Stereotaxic adapter for Kopf/Stoelting

For 50 mm and 70 mm axis

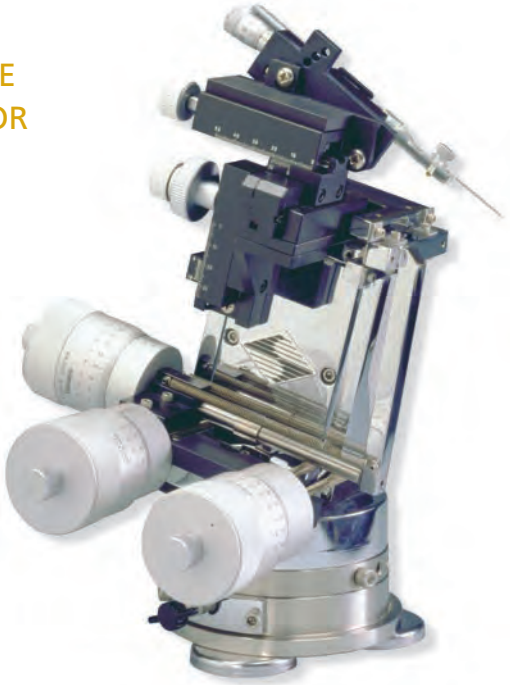
- **SO-NG** Stereotaxic adapter for Narishige
- **SO-ST** Stereotaxic adapter for Kopf/Stoelting

For ALL

- **285204** 4 inch dovetail extension
- **MP-CLIP**[1] Rod holder (for rod OD 1 to 4.5 mm)
- **MP-ROD** Rod holder (for rod OD 6.25 mm or larger)
- **EHOLDER** Micropipette holder – 1.0 to 1.5 mm glass

[1] *Suitable for multi-electrode probes.*

MP-85
HUXLEY-WALL STYLE MICROMANIPULATOR



(Shown with optional spacer, wedge and magnetic feet)

FEATURES MP-85

- Dual springing of the moment arms to insure zero backlash and zero torsion
- The micromanipulator is mounted on a precision rotating base featuring a positive stop and lock
- The coarse movement is an all cross-roller bearing design consisting of coarse X, Y, and Z with an additional fine X motion
- The micromanipulator can be ordered in either a right- or left-handed version

OPTIONS MP-85

- Fifteen degree stackable wedges for tilting the manipulator
- A set of three magnetic feet for increased stability
- One inch thick, chrome plated, solid brass spacer

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

The classic micromanipulator, developed by Sir Andrew Huxley many years ago, is still considered by many investigators to be the finest manual micromanipulator available. The MP-85 offers the advantage of a very large range of movement with its built-in coarse manipulator and precise submicron movement with the fine controls. Coarse positioning is achieved with a three axis manipulator mounted on top. The ultrafine positioning is accomplished with the large micrometers mounted on the base. These micrometers provide smooth, precise movement through a 10:1 reduction mechanism.

The brass and stainless steel construction of the MP-85 makes for a very heavy and solid micromanipulator with excellent damping properties. This exceptionally stable design is ideal for patch clamp recording, intracellular recording, or any other application that is intolerant of drift.

The MP-85 is chrome-plated and anodized to prevent corrosion. The J.R. Wall designed rotating base is machined from solid, stainless steel with a brass spindle; a thin Teflon washer provides for the bearing surface.

Please contact Sutter Instrument for any additional information on the suitability and use of the MP-85 micromanipulator for your specific application.

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

SPECIFICATIONS MP-85

Coarse X-axis Tilt	0 to 45 degrees in 15 degree increments
Coarse Resolution	0.1 mm on all axes
Fine X resolution	0.01 mm
Ultrafine (Huxley) Resolution	0.2 µm
Huxley Excursion	~2 mm maximum in each axis
Dimensions	10 in x 10 in x 12 in 25.4 cm x 25.4 cm x 30.5 cm
Weight	*Manipulator:* 15 lbs 7 kg

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MP-85

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MICROMANIPULATOR

- **MP-85/R** — Right-handed — Includes manipulator, coarse movement MM-33 micromanipulator, and rotating base
- **MP-85/L** — Left-handed — Includes manipulator, coarse movement MM-33 micromanipulator, and rotating base

ACCESSORIES MP-85

- **Holder/MP85** — Headstage adapter
- **RBI** — Rotating base for MP-85
- **MAG-85** — Magnetic feet (set of 3)
- **85AX200**[1] — Headstage adapter for MP-85
- **X850600** — 15 degree wedges (each)
- **X850700** — 1 inch increment spacer *(No more than three recommended)*
- **X700115** — MP-85 to MT stand adapter plate

[1] *Suitable for Sutter IPA®, dPatch®, Axopatch 200 and Heka EPC-10.*

MM-33
MICROMANIPULATOR

(Shown: MM-33 – open profile)

FEATURES MM-33

- Compact design allows use in tight environments
- Cross-loaded roller bearings for smooth, low friction movement
- Rack and pinion drive gives stable movement with minimal backlash
- Vertical axis lock

OPTIONS MM-33

- Rotating base allows horizontal rotation and vertical tilting
- Tilting mount for fine X-axis
- Magnetic feet

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

Successfully used in conjunction with our other micromanipulators, the MM-33 is available separately for those in need of a small, practical instrument in applications not requiring submicron accuracy.

The MM-33 is the right choice for tight environments which require maximum versatility within a small space. A vertical lock is added to secure the vertical axis in position. The optional rotating base and tiltable X-axis provide even further flexibility.

Stainless steel cross-loaded roller bearings are designed to offer low friction and smooth linear motion with a minimum of side play. The pre-loaded rollers are set at 90 degrees to the hardened steel guides insuring constant contact and accuracy. This precise rack and pinion drive gives stable, drift-free movement with minimal backlash. The controls are placed one above the other which makes for less hand movement and easier positioning. The scales for all axes are calibrated in 0.10 mm increments and the fine micrometer adjustment for the X-axis thrust is calibrated at 0.01 mm with estimates to 5µm.

The optional rotating base extends the utility of the MM-33 by providing two additional rotating planes. The rotation in the horizontal plane (approximately 120 degrees) has a positive stop, quick release mechanism for fast insertion and removal of pipettes. The second rotating axis allows the MM-33 to be tilted in a vertical plane from 0 to 70 degrees. The optional tiltable X-axis allows the fine axis to be tilted up to 45 degrees. This option should be ordered at the time of purchase since the modifications require factory installation.

(Shown: MM-33A/L)

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

INDIVIDUAL EXCURSIONS ARE AS FOLLOWS:

X-axis coarse movement: 37 mm

X-axis fine movement: 10 mm

Y-axis horizontal movement: 20 mm

Z-axis vertical movement: 20 mm

(Shown: MM-33/R)

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MM-33

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MICROMANIPULATOR

- **MM-33/R** Right-handed micromanipulator with vertical lock (with 1/2 inch rod clamps*)
- **MM-33/L** Left-handed micromanipulator with vertical lock (with 1/2 inch rod clamps*)
- **MM-33A/R** Right-handed micromanipulator with tilting mount for fine X-axis, vertical lock, rotating base, and two base clamps
- **MM-33A/L** Left-handed micromanipulator with tilting mount for fine X-axis, vertical lock, rotating base, and two base clamps

**12mm rod clamps available upon request*

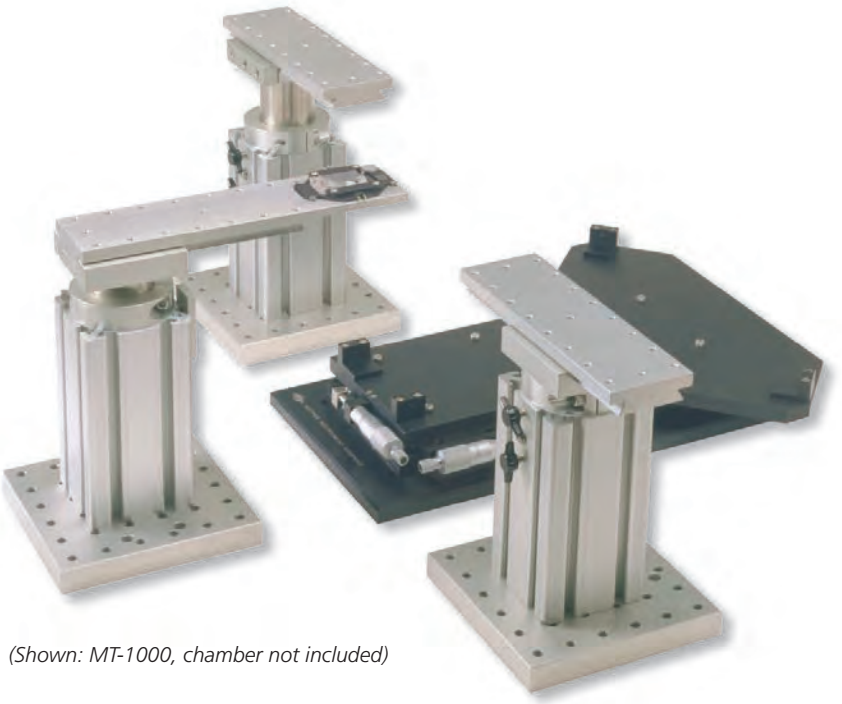
ACCESSORIES MM-33

- **MM-33000**[1] Right-handed tilting mount for fine X-axis
- **MM-33001**[1] Left-handed tilting mount for fine X-axis
- **MM-33002** Rotating base with two base clamps
- **MM-33005**[1] Stationary mounting base
- **MM-33006** Rod mounting bracket for use with stands
- **H102905** 12 mm rod clamp
- **H102910** 1/2 inch rod clamp
- **H102925** Electrode holder
- **MAG-33**[1] Magnetic feet for rotating base (set of 3)
- **X850447**[1] Vertical lock
- **X330105** Base clamps (2) for clamping rotating base

[1] *Must be ordered with the MM-33 since this option is factory installed only.*

MT-1000 / MT-2000 / MT-2200

MOTORIZED AND MANUAL TRANSLATION SYSTEM FOR FIXED-STAGE MICROSCOPES



(Shown: MT-1000, chamber not included)

FEATURES MT-1000 / MT-2000 / MT-2200

- 22 mm of travel in X & Y
- 40 nm resolution displayed in submicrons (MP-285)
- 62.5 nm resolution displayed in microns (MPC-200)
- Highly stable for experiments intolerant of drift
- Easy to read vacuum fluorescent display
- Adjustable speed and resolution allows optimization for your experimental setup
- Programmable robotics for complex motion sequences (MP-285)
- Continuous display of axes positions
- Convenient HOME function allows microscope to be quickly repositioned

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

The MT-1000 / MT-2000 / MT-2200 systems consist of a microscope translator and three independent stands. Two MT-75 stands used for each manipulator and a similar stand, the MT-150 holds the tissue chamber. The classic design features freestanding columns that provide rock solid mounting for the tissue recording chamber and multiple micromanipulators. Many prefer this methodology as it maximizes working room for adjusting the microscope and changing pipettes. Furthermore, the independent stand design minimizes movement-related cross talk between manipulators.

The MT-1000 uses a manual translator. At the core of the MT-1000 translator systems is the MT-500 X-Y manual translation table. It is designed to allow movement of a microscope's optics with respect to the fixed stage(s). This methodology was developed by electrophysiologists recording from tissue slice preparations. The translator allows visualization and/or imaging of multiple tissue locations while maintaining multiple stable recordings from the preparation. Such a system is also useful for experiments on cells in culture where one wishes to monitor several cells not in the same field of view, e.g., recording from pre and post synaptic neurons in culture and/or imaging one cell while recording from or stimulating another.

The MT-2000 / MT-2200 systems use a motorized translator. At the core of the MT-2000 / MT-2200 system is the MT-800 stepper-motor driven X-Y translation table. The motors can be operated either by the popular MP-285 manipulator controller (MT-2000) or the dual manipulator controller MPC-200 (MT-2200). A two-axis rotary optical encoder (ROE) accepts user input to the motorized translator and can be placed in any convenient location in your setup. Either controller gives the user smooth, high-resolution control of motion. The MP-285 controller offers extensive on-board robotic functionality and a serial computer interface for PC control. The MPC-200 controller offers a USB computer interface for PC control. Systems using the MP-285 controller are called MT-2000 while systems using the MPC-200 controller are designated MT-2200.

Our controller design has allowed Sutter to easily add a focus drive to the MT-2000 / MT-2200. The Sutter focus drive employs a direct-coupled stepper motor for lock-step focus movement and adjustable end of travel sensors to limit the travel of the microscope objective to a safe range for the setup. In the focus drive version, MT-2000/FD and MT-2200/FD, the ROE input device has inputs for X, Y and Z focus.

MT-500 manual translators and MT-800 motorized translators are currently available for the Olympus BX-51WI, Nikon FN1, Zeiss Examiner, Zeiss Axioskop 2 FS and the Leica DM6000FS. Focus drives are available for the Olympus BX51WI. Other microscopes can be supported.

SPECIFICATIONS
MT-1000 / MT-2000 / MT-2200 SYSTEMS

Baseplate Dimensions	8 in x 15.25 in x 2.25 in 203 mm x 387.4 mm x 57.2 mm
Maximum Travel	22 mm
Minimal Microstep Size	50 nm (MP-285 controller) 78 nm to 125 nm (MPC-200 controller)
Minimal Display Resolution	50 nm (MP-285 controller) 1 micron (MPC-200 controller)
Maximum Load	110 lbs 50 kg
Weight	35 lbs 16 kg
Mechanical Controller	11 lbs 4.5 Kg

CE

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

COMPLETE SYSTEMS

MT-1000	Includes the MT-500 manual X-Y translator, MT-150 chamber column, two MT-75 micromanipulator columns (without linear slide)
■ **MT-1000/Y51**[1]	MT-1000 for the Olympus BX51WI
■ **MT-1000/Y53**[1]	MT-1000 for the Olympus BX53/63
■ **MT-1000/Y71**[1]	MT-1000 for the Olympus IX71
■ **MT-1000/Z25**[1]	MT-1000 for the Zeiss Axioskop 2 FS
■ **MT-1000/Z45**[1]	MT-1000 for the Zeiss Axio Examiner
■ **MT-1000/N65**[1]	MT-1000 for the Nikon FN1
■ **MT-1000/L30**[1]	MT-1000 for the Leica DMLFS
■ **MT-1000/L35**[1]	MT-1000 for the Leica DM6000 FS
MT-2200	Includes the MT-800 motorized X-Y translator, MPC-200 controller and ROE, MT-150 chamber column, two MT-75 micromanipulator columns (without linear slide), cables and manual
■ **MT-2200/Y51**[1]	MT-2200 for the Olympus BX51WI
■ **MT-2200/Y51/FD**[1]	MT-2200 with focus drive for the Olympus BX51WI
■ **MT-2200/Y53**[1,2]	MT-2200 for the Olympus BX53/63
■ **MT-2200/Z25**[1]	MT-2200 for the Zeiss Axioskop 2 FS
■ **MT-2200/Z45**[1]	MT-2200 for the Zeiss Axio Examiner
■ **MT-2200/N65**[1]	MT-2200 for the Nikon FN1
■ **MT-2200/L30**[1]	MT-2200 for the Leica DMLFS
■ **MT-2200/L35**[1]	MT-2200 for the Leica DM 6000 FS
MT-2000	Includes the MT-800 motorized X-Y translator, MP-285 controller and ROE, MT-150 chamber column, two MT-75 micromanipulator columns (without linear slide), cables and manual
■ **MT-2000/Y51**[1]	MT-2000 for the Olympus BX51WI
■ **MT-2000/Y51/FD**[1,2]	MT-2000 with focus drive for the Olympus BX51WI
■ **MT-2000/Y53**[1]	MT-2000 for the Olympus BX53/63
■ **MT-2000/Z25**[1]	MT-2000 for the Zeiss Axioskop 2 FS
■ **MT-2000/Z45**[1]	MT-2000 for the Zeiss Axio Examiner
■ **MT-2000/N65**[1]	MT-2000 for the Nikon FN1
■ **MT-2000/L30**[1]	MT-2000 for the Leica DMLFS
■ **MT-2000/L35**[1]	MT-2000 for the Leica DM 6000 FS

[1] *Please specify chamber type when ordering.*

[2] *Please contact Sutter for availability of focus drive on other microscope makes & models.*

MT-1000 / MT-2000 / MT-2200

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

COMPONENTS

MANUAL X-Y TRANSLATOR

- **MT-500/Y50** Manual Translator for Olympus BX50WI
- **MT-500/Y51** Manual Translator for Olympus BX51WI
- **MT-500/Y53** Manual Translator for Olympus BX53/63
- **MT-500/Y71** Manual Translator for Olympus IX71
- **MT-500/N65** Manual Translator for Nikon FN1
- **MT-500/L30** Manual Translator for Leica DMLFS
- **MT-500/L35** Manual Translator for Leica DM6000 FS
- **MT-500/Z20** Manual Translator for Zeiss Axioskop FS
- **MT-500/Z25** Manual Translator for Zeiss Axioskop 2 FS
- **MT-500/Z45** Manual Translator for Zeiss Axio Examiner

MOTORIZED X-Y TRANSLATOR WITH MPC-200 CONTROLLER AND ROE

- **MT-820/Y51** Translator for Olympus BX51WI
- **MT-820/Y51/FD** Translator for BX51WI with focus drive
- **MT-820/Y53** Translator for Olympus BXBX53/63
- **MT-820/Z25** Translator for Zeiss Axioskop 2 FS
- **MT-820/Z45** Translator for Zeiss Axio Examiner
- **MT-820/N65** Translator for Nikon FN1
- **MT-820/L30** Translator for Leica DMLFS
- **MT-820/L35** Translator for Leica DM6000 FS

MOTORIZED X-Y TRANSLATOR WITH MP-285 CONTROLLER AND ROE

- **MT-800/Y51** Translator for Olympus BX51WI
- **MT-800/Y51/FD** Translator for BX51WI with focus drive
- **MT-800/Y53** Translator for Olympus BX53/63
- **MT-800/Z25** Translator for Zeiss Axioskop 2 FS
- **MT-800/Z45** Translator for Zeiss Axio Examiner
- **MT-800/N65** Translator for Nikon FN1
- **MT-800/L30** Translator for Leica DMLFS
- **MT-800/L35** Translator for Leica DM6000 FS

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

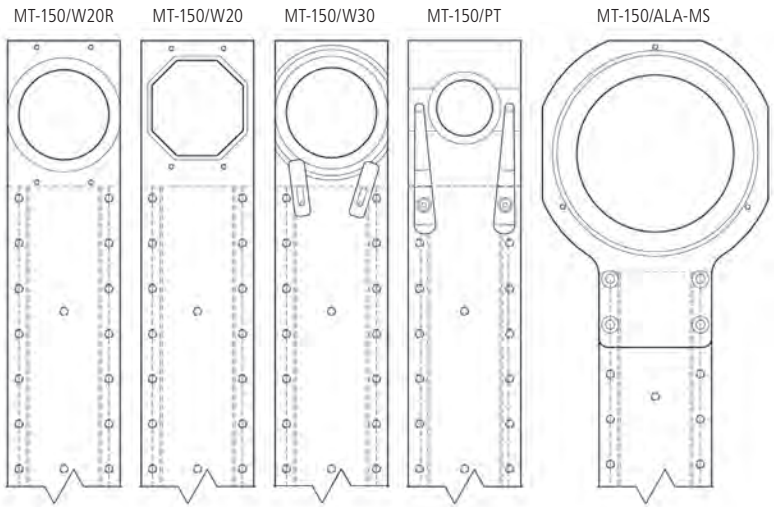
CHAMBER COLUMN

- **MT-150/W20** Chamber column for Warner Series 20 (octagon)
- **MT-150/W20R** Chamber column for Warner Series 20 (round)
- **MT-150/ALA35** Chamber column for ALA 35 mm chamber
- **MT-150/ALA-MS** Chamber column for ALA MS
- **MT-150/CUST** Chamber column for non-standard recording chamber
- **MT-150/PT** Chamber column for petri dish or lid
- **MT-150/AUTO** Chamber column for Automate round stage adapter

MANIPULATOR COLUMNS

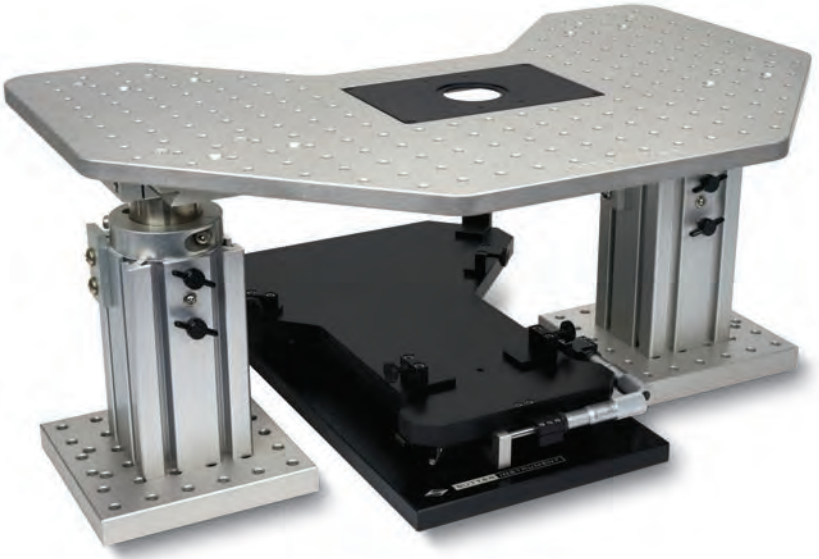
- **MT-75** Standard gantry stand 8.7 to 13.4 in (22.1 to 33.9 cm)
- **MT-75S**[1] Short gantry stand 6.7 to 9.6 in (16.9 to 24.4 cm)
- **MT-75T** Tall gantry stand 10.7 to 15.4 in (27.1 to 39.1 cm)
- **MT-75XT** Extra tall gantry stand 14.7 to 18.5 in (37.4 to 47 cm)
- **MT-75/LS**[1] Standard gantry stand with linear slide
- **MT-75S/LS**[1] Short gantry stand with linear slide
- **MT-75T/LS** Tall gantry stand with linear slide
- **MT-75XT/LS** Extra tall gantry stand with linear slide

[1] *Useful for most upright scopes & Axiovert 25 inverted scope with low stage plate.*



MT-1078 / MT-2078 / MT-2278

X-Y TRANSLATION SYSTEM FOR FIXED-STAGE MICROSCOPES



(Shown: MT-1078/Y51)

FEATURES MT-1078 / MT-2078 / MT-2278

- Motorized or manual X-Y translation
- Stable support and solid design
- Open design allows easy access to specimen and microscope
- Highly stable for experiments intolerant of drift
- Accommodates a variety of stage inserts
- Compatible with Nikon, Olympus, Zeiss and Leica upright and inverted microscopes
- Suitable for:
  Multi-site electrophysiology where there is a need for a single large stage

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

The MT-1078 / MT-2078 / MT-2278 systems consist of a X-Y translator and a large fixed stage. The MT-78-FS is designed for users who prefer a large platform stage for their experiments. The stage provides solid, stable support and ample space to attach manipulators and other instruments as needed. The rigid aluminum top plate sits firmly on two MT-75 gantry style stands. These stands provide height adjustment and sturdy attachment to the user's vibration tables.

At the core of the MT-1078 is a manual X-Y translation table, the MT-500. The translator is designed to allow movement of a microscope's optics with respect to the fixed stage. The translator allows visualization and/or imaging of multiple tissue locations while maintaining multiple stable recordings from the preparation.

The MT-2078 / MT-2278 systems use a motorized translator. At the core of the MT-2000/MT-2200 system is the MT-800 stepper-motor driven X-Y translation table. The motors can be operated either by the popular MP-285 manipulator controller (MT-2078) or the dual manipulator controller MPC-200 (MT-2278). A rotary optical encoder (ROE) accepts user input to the motorized translator and can be placed in any convenient location in your setup. Either controller gives the user smooth, high-resolution control of motion. The MP-285 controller offers extensive on-board robotic functionality and a serial computer interface for PC control.

The MPC-200 controller offers a USB computer interface for PC control. Systems using the MP-285 controller are called MT-2078 while systems using the MPC-200-ROE controller are designated MT-2278. In the center of the MT-78-FS top plate is a 4x6 inch milled pocket that will accommodate a variety of aluminum or stainless steel (ferromagnetic) stage inserts, designed to secure various commercial tissue chambers, Petri dishes or slide holders. Custom can also be provided. The ferromagnetic insert allows small magnetic devices such as perfusion lines, ground electrodes and small manipulators to be mounted near the dish.

The MT-500 manual translator and the MT-800 motorized translator are currently available for the Olympus BX-51WI, Nikon FN1, Zeiss Examiner, Zeiss Axioskop 2 FS and the Leica DM6000FS. Focus drives are available for the Olympus BX51WI. Other microscopes can be supported.

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

SPECIFICATIONS
MT-500 X-Y TRANSLATOR

Baseplate Dimensions	8 in x 15.25 in x 2.25 in 203 mm x 387.4 mm x 57.2 mm
Maximum Travel	1 in 25 mm
Resolution	0.0002 in 5 µm
Maximum Load	70 lbs 32 kg
Weight	35 lbs 16 kg

CE

(MT-1078 shown with MPC-385-2. Headstages and microscope not included)

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

COMPLETE SYSTEMS

MT-1078 Includes the MT-500 manual X-Y translator, and MT-78-FS fixed stage platform

- **MT-1078/Y51[1]** MT-1078 for the Olympus BX51WI
- **MT-1078/Y53[1]** MT-1078 for the Olympus BX53/63
- **MT-1078/Y71[1]** MT-1078 for the Olympus IX71
- **MT-1078/Z25[1]** MT-1078 for the Zeiss Axioskop 2 FS
- **MT-1078/Z45[1]** MT-1078 for the Zeiss Axio Examiner
- **MT-1078/N65[1]** MT-1078 for the Nikon FN1
- **MT-1078/L30[1]** MT-1078 for the Leica DMLFS
- **MT-1078/L35[1]** MT-1078 for the Leica DM6000 FS

MT-2278 Includes the MT-800 motorized X-Y translator, MPC-200 controller and ROE, MT-78-FS fixed stage platform, cables and manual

- **MT-2278/Y51[1]** MT-2278 for the Olympus BX51WI
- **MT-2278/Y51/FD[1]** MT-2278 with focus drive for the Olympus BX51WI
- **MT-2278/Y53[1]** MT-2278 for the Olympus BX53/63
- **MT-2278/Z25[1]** MT-2278 for the Zeiss Axioskop 2 FS
- **MT-2278/Z45[1]** MT-2278 for the Zeiss Axio Examiner
- **MT-2278/N65[1]** MT-2278 for the Nikon FN1
- **MT-2278/L30[1]** MT-2278 for the Leica DMLFS
- **MT-2278/L35[1]** MT-2278 for the Leica DM6000 FS

MT-2078 Includes the MT-800 motorized X-Y translator, MP-285 controller and ROE, MT-78-FS fixed stage platform, cables and manual

- **MT-2078/Y51[1]** MT-2078 for the Olympus BX51WI
- **MT-2078/Y51/FD[1]** MT-2078 with focus drive for the Olympus BX51WI
- **MT-2078/Y53[1]** MT-2078 for the Olympus BX53/63
- **MT-2078/Z25[1]** MT-2078 for the Zeiss Axioskop 2 FS
- **MT-2078/Z45[1]** MT-2078 for the Zeiss Axio Examiner
- **MT-2078/N65[1]** MT-2078 for the Nikon FN1
- **MT-2078/L30[1]** MT-2078 for the Leica DMLFS
- **MT-2078/L35[1]** MT-2078 for the Leica DM6000 FS

[1]Please specify chamber type and standard or M6 tapped holes when ordering.

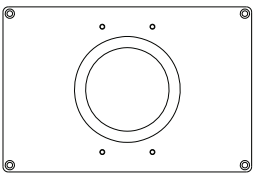
*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

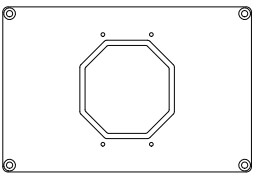
PLATFORM CHAMBER INSERTS

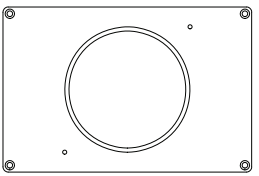
- **X040500**[1] Warner Series 20 (round) for PM platform — aluminum
- **X040503**[1] Warner Series 20 (round) for PM platform — stainless
- **X040505**[1] Warner Series 20 (octagonal) for P & PH — aluminum
- **X040507**[1] Warner Series 20 (octagonal) for P & PH — stainless
- **X040510**[1] 50 mm round — aluminum
- **X040512**[1] 50 mm round — stainless steel
- **X040497**[1] Blank insert — aluminum
- **X040498**[1] Blank insert — stainless steel
- **SI-SLIDE**[1] Insert with slide holders
- **SI-PETRI** Insert for petri dish and slides
- **SI-W30**[1] Warner Series 30 platform insert — aluminum
- **SI-W30ST**[1] Warner Series 30 platform insert — stainless steel
- **SI-ALA-MS**[1] ALA MS series insert — aluminum
- **SI-CUSTOM**[1] Custom stage insert

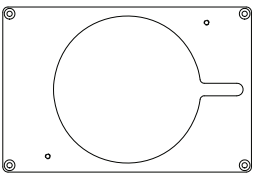
[1] *No charge when ordered with MPC-78 or MP-78 (metric or standard)*

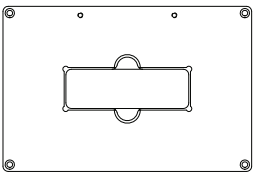
INSERT DRAWINGS

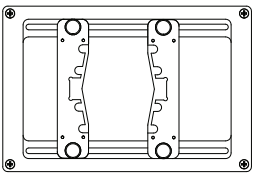

X040500, X040503


X040505, X040507


SI-W30, SI-W30-ST


SI-ALA-MS


SI-SLIDE


SI-PETRI

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

INDIVIDUAL COMPONENTS

- **MT-78-FS**[1] Fixed platform stage with imperial/standard holes, chamber insert and gantry supports
- **MT-78-FS/M6**[1] Same as above with M6 tapped holes
- **MT-78-CS**[1] Platform stage with 12.5 mm manual micrometer movement, chamber insert, and gantry supports
- **MT-78-CS/M6**[1] Same as above with M6 tapped holes

MANUAL X-Y TRANSLATOR

- **MT-500/Y50** Manual Translator for Olympus BX50WI
- **MT-500/Y51** Manual Translator for Olympus BX51WI
- **MT-500/Y53** Manual Translator for Olympus BX53/63
- **MT-500/Y71** Manual Translator for Olympus IX71
- **MT-500/N65** Manual Translator for Nikon FN1
- **MT-500/L30** Manual Translator for Leica DMLFS
- **MT-500/L35** Manual Translator for Leica DM6000 FS
- **MT-500/Z20** Manual Translator for Zeiss Axioskop FS
- **MT-500/Z25** Manual Translator for Zeiss Axioskop 2 FS
- **MT-500/Z45** Manual Translator for Zeiss Axio Examiner

MOTORIZED X-Y TRANSLATOR WITH MPC-200 CONTROLLER AND ROE

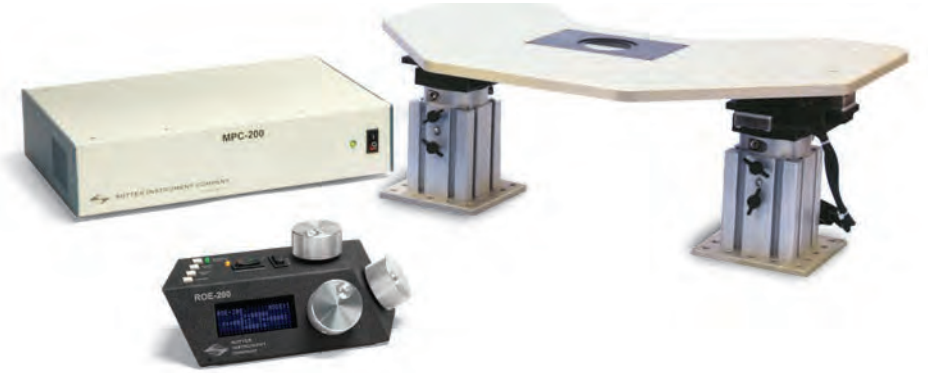
- **MT-820/Y51** Translator for Olympus BX51WI
- **MT-820/Y51/FD** Translator for BX51WI with focus drive
- **MT-820/Y53** Translator for Olympus BXBX53/63
- **MT-820/Z25** Translator for Zeiss Axioskop 2 FS
- **MT-820/Z45** Translator for Zeiss Axio Examiner
- **MT-820/N65** Translator for Nikon FN1
- **MT-820/L30** Translator for Leica DMLFS
- **MT-820/L35** Translator for Leica DM6000 FS

MOTORIZED X-Y TRANSLATOR WITH MP-285 CONTROLLER AND ROE

- **MT-800/Y51** Translator for Olympus BX51WI
- **MT-800/Y51/FD** Translator for BX51WI with focus drive
- **MT-800/Y53** Translator for Olympus BX53/63
- **MT-800/Z25** Translator for Zeiss Axioskop 2 FS
- **MT-800/Z45** Translator for Zeiss Axio Examiner
- **MT-800/N65** Translator for Nikon FN1
- **MT-800/L30** Translator for Leica DMLFS
- **MT-800/L35** Translator for Leica DM6000 FS

[1] *Useful for most upright scopes and the Axiovert 25 inverted scope with low stage plate. Please specify chamber type when ordering (Page 100).*

MPC-78 / MP-78
LARGE MOVING PLATFORM STAGE



FEATURES MPC-78 / MP-78

- Stable support and solid design
- 25 mm motorized travel in X & Y
- 40 nm or 62.5 nm resolution (depending on controller)
- Convenient HOME function allows stage to be quickly repositioned
- Can be operated with MPC-200 or MP-285 controllers
- Easy to read vacuum fluorescent display
- Accomodates a variety of stage inserts
- Compatible with Nikon, Olympus, Zeiss and Leica upright and inverted microscopes
- Suitable for:
  Multi-site, two-photon, electrophysiology
  Multi-site, inverted (or other large microscope) electrophysiology

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

The MPC-78 / MP-78 Large Moving Stage is available for patch slice or *in vivo* experiments where the microscope body cannot be moved to view different fields of view. This is most common in two-photon experiments where the excitation beam path must enter a fixed microscope. In order to visit wide-spaced fields of view, and potentially position pipettes at wide-spaced locations, the preparation and any associated manipulators must move together on a large stage.

The MPC-78 / MP-78 was introduced at the 2007 Imaging Structure and Function in the Nervous System course at Cold Spring Harbor labs. The stage was very well received. The MPC-78 / MP-78 is also appropriate for use with inverted microscopes or other scopes that are larger and not easily translated.

The MPC-78 version uses our MPC-200 multi-manipulator controller. Connecting the stage to one port leaves the second port open for a Sutter MP-285, MP-865, or MP-225 manipulator. A simple switch on the ROE-200 allows you to easily control the stage or manipulator. A second MPC-200 controller can be daisy-chained to allow operation of a more complex system from one ROE-200.

The MP-78 version is operated by the MP-285 controller, providing onboard programming capability along with control via a serial interface.

The cast aluminum top plate has an attractive shape with an extensive 1/4-20 threaded hole pattern on 1-inch centers. This hole pattern is appropriate for mounting Sutter MP-285 or MP-225 manipulator mechanicals using the mounting adapter plates that come with these devices. Optional rotating bases (285RBI) are also compatible and add fiexibility. Finally, the MP-865 mechanical can be mounted on its narrow linear slide.

The large-stage platforms provide solid, stable support and ample space to attach manipulators and other instruments as needed. The rigid aluminum top plate sits firmly on two of our well-known MT-75 gantry-style stands. These stands provide height adjustment and sturdy attachment to the user's vibration table. Multiple degrees of freedom accommodate a variety of microscope and instrument arrangements.

In the center of the top plate is a 4 X 6 inch milled pocket that will accommodate a variety of aluminum stage inserts, designed to secure various commercial tissue chambers or slide holders. Custom aluminum inserts can also be provided. An available magnetic stainless steel insert carries commercial chambers or can be provided with a simple large, through hole for mounting a custom chamber. The magnetic insert allows small magnetic devices (perfusion lines, ground electrodes, small manipulators) to be mounted easily near the dish.

SPECIFICATIONS MPC-78
LARGE MOVING STAGE PLATFORM

Baseplate Dimensions	8 in x 15.25 in x 2.25 in 200 mm x 375 mm x 55 mm
Maximum Travel	1 in 25 mm
Resolution	0.625 µm/step Displayed in microns
Maximum Load	110 lbs 50 kg
Weight	35 lbs 16 kg
Interface	USB

CE

SPECIFICATIONS MP-78
LARGE MOVING STAGE PLATFORM

Baseplate Dimensions	8 in x 15.25 in x 2.25 in 200 mm x 375 mm x 55 mm
Maximum Travel	1 in 25 mm
Resolution	Low: 0.2 µm/step High: 0.04 µm/step Displayed in submicrons
Maximum Load	110 lbs 50 kg
Weight	35 lbs 16 kg
Interface	RS-232, 9600 baud

CE

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MPC-78 / MP-78

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

INDIVIDUAL COMPONENTS

- **MPC-78**[1] Moving platform stage plate with motorized gantry supports and imperial/standard holes, MP-200 controller (USB interface) and ROE, chamber insert, cables, manual
- **MPC-78/M6**[1] Same as MPC-78 except M6 tapped holes
- **MP-78**[1] Moving platform stage plate with motorized gantry supports and imperial/standard holes, MP-285 controller (serial interface) and ROE, chamber insert, cables, manual
- **MP-78/M6**[1] Same as MP-78 except with M6 tapped holes

INDIVIDUAL COMPONENTS

- **MPC-78/Y51/FD**[2] MPC-78 with focus drive for the Olympus BX51WI
- **MP-78/Y51/FD**[2] MP-78 with focus drive for the Olympus BX51WI

ACCESSORIES MPC-78 / MP-78

MP-78 and MPC-78 CHAMBER INSERTS (Diagrams on page 100)

- **X040500**[3] Warner Series 20 (round) for PM platform – aluminum
- **X040503**[3] Warner Series 20 (round) for PM platform – stainless
- **X040505**[3] Warner Series 20 (octagonal) for P & PH – aluminum
- **X040507**[3] Warner Series 20 (octagonal) for P & PH – stainless
- **X040510**[3] 50mm round – aluminum
- **X040512**[3] 50mm round – stainless steel
- **X040497**[3] Blank insert – aluminum
- **X040498**[3] Blank insert – stainless steel
- **SI-SLIDE**[3] Insert with slide holders
- **SI-PETRI** Insert for petri dish and slides
- **SI-W30**[3] Warner Series 30 platform insert – aluminum
- **SI-W30ST**[3] Warner Series 30 platform insert – stainless steel
- **SI-ALA-MS**[3] ALA MS series insert – aluminum
- **SI-CUSTOM**[3] Custom stage insert

[1] *Please specify chamber type when ordering.*

[2] *Other microscope makes and models may be available. Order with M6 or standard tapped holes.*

[3] *No charge when ordered with MPC-78 or MP-78 (metric or standard)*

3DMS
3-DIMENSIONAL MOTORIZED STAGE

(Shown: 3DMS-200, with 3DMS-W20 stage bracket)

FEATURES 3DMS

- Variety of stage bracket options provide increased flexibility
- Highly stable for experiments intolerant of pipette drift
- Sub-micron resolution and integrated coarse positioning
- 1 inch of motorized travel on all three axes
- Adjustable speed and resolution allows optimization for your experimental setup
- When used with the MP-285 controller, programmable robotics for complex motion sequences
- Continuous display (in microns) of axes positions
- Switch between continuous or single step movement
- Absolute and relative origins
- Remote computer control
- Compact design easily adaptable to your setup

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

Many imaging experiments require the ability to move to multiple locations in a chamber or in a tissue culture dish. Large motorized stages accomplish this, but generally make the microscope into a single-use, motorized imaging station. The form factor of motorized stages usually precludes positioning other equipment such as manipulators at the same microscope.

Now, a simple attachment converts a standard Sutter MP-285 manipulator into the 3-Dimensional Motorized Stage. The 3DMS manipulator and stage attachment can be either mounted on an MT-75 gantry stand next to an upright microscope, or on an MD series stand attached to the body of an inverted microscope. The compact size allows manipulators and other equipment to be used simultaneously.

Refocusing is often required at the different X-Y locations when images are automatically acquired. Normally this requires a motorized focus drive to be added to the microscope. Because the 3DMS is a three-axis manipulator, focusing (vertical movement of the stage) is already built in. Surprisingly, this relatively small package still allows for 25 mm of movement in X, Y and Z axes with sub-micron precision.

A variety of stage brackets are available to fit the needs of your experiment. Please consult our technical staff for further information.

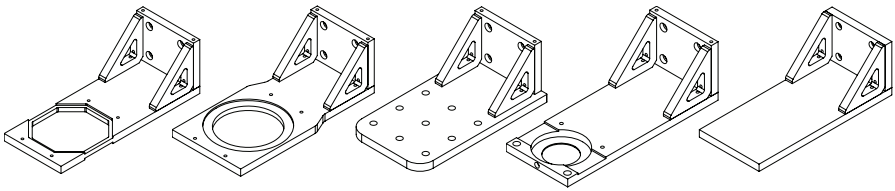
3DMS-W20 3DMS-W20R 3DMS-3X3 3DMS-PETRI 3DMS-BLANK

SPECIFICATIONS 3DMS

Travel	1 inch 25 mm on all three axes
Resolution (with MP-285 Controller)	Low: 0.2 µm/step High: 0.04 µm/step
Maximum Speed	2.9 mm/sec
Long Term Stability	<10 nm/hour at 24 deg C
Drive Mechanism	Precision worm gear capstan drive
Serial Interface	RS-232, 9600 baud (1 start bit, 8 data bits, 1 stop bit)
Dimensions	*Manipulator:* 4.5 in x 6 in x 6.25 in 11 cm x 15 cm x 16 cm *Controller:* 4 in x 16 in x 12.25 in 10 cm x 40.5 cm x 31 cm
Weight	*Manipulator:* 3.85 lb 1.7 kg *Controller:* 10 lb 11 oz 4.5 kg
Electrical	115/230 Volts 50/60 Hertz power line

CE

MECHANICAL DRAWINGS
STAGE BRACKETS



3DMS-W20 3DMS-W20R 3DMS-3X3 3DMS-PETRI 3DMS-BLANK

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

3DMS SYSTEMS

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

- **3DMS-100** Includes TRIO™ MPC-100 controller, 3-axis motorized stage for microscope, stage bracket, and ROE user interface
- **3DMS-285*** Includes rack mount MP-285 controller, 3-axis motorized stage for microscope, stage bracket, and ROE user interface
- **3DMS-200*** Includes rack mount MPC-200 controller, 3-axis motorized stage for microscope, stage bracket, and ROE user interface

** Please specify stage bracket when ordering.*

ACCESSORIES 3DMS

STAGE BRACKETS

When ordering the 3DMS, the stage bracket must be specified. Please list as a separate item at no cost. Additional stage brackets can be purchased as needed.

- **3DMS-W20**[1] Stage bracket for Warner Series 20 octagonnal (P & PH)
- **3DMS-W20R**[1] Stage bracket for Warner Series 20 round (PM)
- **3DMS-3X3**[1] Stage bracket with 3X3 M6 tapped holes
- **3DMS-PETRI**[1] Stage bracket for Petri dish and slides
- **3DMS-BLANK**[1] Stage bracket – blank
- **3DMS-CUSTOM** Stage bracket – custom design
- **3DMS/M** 3-axis motorized stage mechanical only
- **M100106** Flat side panel for controller (each)

[1] No charge when ordering with the 3DMS-200 or 3DMS-285.

MOTORIZED MICROSCOPE STAGE AND TRANSLATOR COMPARISON CHART



	MT-2000 / 2078 MT-2200 / 2278	MP-78 MPC-78	3DMS
DESCRIPTION	*Microscope translator and table mounted stands and/or fixed stage for multi-patch*	*Large moving platform stage*	*3-dimensional motorized stage*
USES	Multi-electrode recording and imaging in slices or other preparations	Simultaneous 2-Photon Imaging and electrophysiology	Multi-site imaging of samples smaller than 25 mm x 25 mm
FEATURES	25 mm X and Y optical train movement via manual or motorized microscope translators. Accomplishes high magnification microscopy/ electrophysiology at multiple sites in a sample. Manipulatators and tissue sample can be on separate stands or on a single large fixed stage.	Tissue sample or whole animal and multiple manipulators are supported on a large, moving stage. 25 mm travel in X and Y allow the user to move to multiple sites in brain or other tissue for electrode placement and simultaneous 2-photon imaging. The large moving stage is also useful for inverted microscope or other applications where moving the microscope is not convenient or easily accomplished.	Built-in Z focus drive, compact form factor, compatible with upright or inverted microscopes, 25 mm travel in X, Y, and Z. Adjustable speed and resolution allows optimization for your experimental setup. Absolute and relative origins.Programmable robotics for complex motion sequences when used with MP-285 controller.

Features

Travel			
25 mm in X, Y, and Z		■	■
22 mm in X and Y	■		
Focus			
Built-in			■
Option for Olympus BX51WI[1]	■	■	
Control	ROE or PC	ROE or PC	ROE or PC
Interface			
With MPC-200	USB	USB	USB
With MP-285A	Serial & USB	Serial & USB	Serial & USB
With TRIO™ MPC-100[2]			USB

[1] Please contact Sutter for availability on other microscope makes and models
[2] Only available with 3DMS

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MT-75 SERIES
GANTRY STYLE MICROMANIPULATOR STAND

FEATURES MT-75 SERIES

- Adjustable vertical and horizontal axes
- Up to 360 degrees of rotation
- Suitable for upright and inverted microscopes
- Quick lock mechanism allows for easy positioning
- Solid construction provides stable mounting
- Optional linear slide provides smooth and easy movement for pipette replacement

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

For the ultimate flexibility in positioning micromanipulators or other devices adjacent to your microscope, look to the MT-75 series stands. These unique gantry systems offer adjustable vertical and horizontal axes and up to 360 degrees of rotation. Your manipulator or other device will mount to the 3/4 inch thick aluminum cantilever which is dovetailed for secure positioning. The cantilever assembly is mounted on a heavy 2 inch diameter stainless steel post. The post is supported within the same extruded aluminum tower used in our MT-70 stands. The tower can be center mounted or edge mounted to the baseplate for an additional degree of positioning freedom.

Vertical positioning is achieved with an aluminum collar which securely locks onto the steel post to fix the height of the system. The MT-75 is suitable for use with most inverted microscopes, and can be adjusted from a minimum height of 8.71 inches to a maximum height of 12.25 inches. The MT-75S is suitable for most upright scopes, and can be adjusted from 6.71 inches to 7.25 inches. These systems are very stiff, deflecting approximately 2 µm per 25 mm rise with a 1.5 kg load at the end of the cantilever.

A quick lock mechanism allows easy unlocking and rotation of the post/cantilever assembly up to 320 degrees, then rotation back to the same positive stop position and locking in place (e.g. insertion and removal of microelectrodes from headstages). Remove the positive stop and you have a full 360 degree rotation. A Teflon washer contributes to the smooth rotation of the system.

The solid aluminum baseplate has through-holes on 1 inch (25 mm) centers for mounting onto tables. The cantilever has eighteen 1 inch spaced 10-32 holes along the edges. The MT-75/LS manipulator mount provides additional flexibility of movement. In multiple manipulator setups, rotational movement for pipette replacement is often not possible. Using a long linear rail, the manipulator can be quickly and smoothly moved to a location where there is easy access to the pipette for replacement. After replacement, the manipulator can be slid back into a fixed stop that defines the working position.

The linear slide system can also be added to existing MT-75 stands by ordering the MT-7004 linear slide cantilever alone.

SPECIFICATIONS
MT-75 SERIES

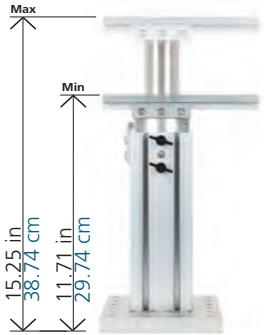
Baseplate Dimensions	6 in x 6 in x .75 in 153 mm x 153 mm x 19 mm
Cantilever Dimensions	2.5 in x 8 in x .75 in 64 mm x 204 mm x 19 mm
Weight	*MT-75:* 11 lbs 7 oz 5.2 kg *MT-75S:* 9 lbs 14 oz 4.5 kg *MT-75T:* 13 lbs 5.9 kg

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MT-75 GANTRY STYLE STAND SELECTION GUIDE

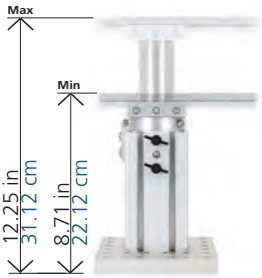
For use with an inverted microscope. Independent tower solution when not using our MD manipulator or stage platforms.

MT-75T



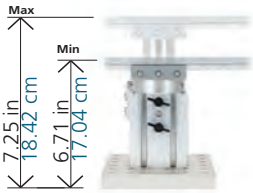
For use with an upright microscope mounted on a translator.

MT-75

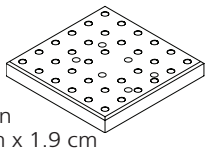


For use with an upright microscope without a translator.

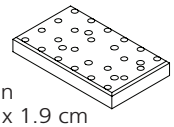
MT-75S



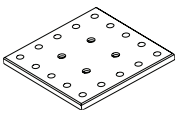
BASEPLATE OPTIONS



SQUARE
6 in x 6 in x 0.75 in
15.2 cm x 15.2 cm x 1.9 cm



NARROW
3 in x 5 in x 0.75 in
7.6 cm x 12.7 cm x 1.9 cm



THIN
5 in x 5 in x 0.3 in
12.7 cm x 12.7 cm x 0.76 cm

The MT-75 stands come standard with the square baseplate. The narrow or thin baseplate can be substituted at the time of ordering at no additional charge.

	MT-75T		MT-75		MT-75S	
BASEPLATE	VERTICAL DIMENSIONS					
	Min	Max	Min	Max	Min	Max
SQUARE OR NARROW	11.71 in 29.74 cm	15.25 in 38.74 cm	8.71 in 22.12 cm	12.25 in 31.12 cm	6.71 in 17.04 cm	7.25 in 18.42 cm
THIN	11.26 in 28.60 cm	14.80 in 37.59 cm	8.26 in 20.98 cm	11.80 in 29.97 cm	6.26 in 15.90 cm	6.80 in 17.27 cm

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MT-75 SERIES

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MT-75 SERIES

- **MT-75** Standard gantry stand 8.7 to 13.4in (22.1 to 33.9 cm)
- **MT-75S**[1] Short gantry stand 6.7 to 9.6 in (16.9 to 24.4 cm)
- **MT-75T** Tall gantry stand 10.7 to 15.4 in (27.1 to 39.1 cm)
- **MT-75XT** Extra tall gantry stand 14.7 to 18.5 in (37.4 to 47 cm)
- **MT-75/LS**[1] Standard gantry stand with linear slide
- **MT-75S/LS**[1] Short gantry stand with linear slide
- **MT-75T/LS** Tall gantry stand with linear slide
- **MT-75XT/LS** Extra tall gantry stand with linear slide

MT-81 MICROINJECTION SERIES

- **MT-81-DOV8**[2] MT-81 stand with 8 inch dovetail
- **MT-81-DOV12**[2] MT-81 stand with 12 inch dovetail

[1] *Useful for most upright scopes and the Axiovert 25 inverted scope with low stage plate.*
[2] *Useful for low profile stereoscopes and microinjection.*

ACCESSORIES MT-75 SERIES

- **MT-7004** Linear slide cantilever (no stand)
- **MAG-MT** Magnetic feet (set of 4)
- **X700080**[3] Thin baseplate – 5 in x 5 in x 0.3 in thick
- **X700095**[3] Narrow baseplate – 3 in x 5 in x 0.75 in thick
- **X700100**[3] Square baseplate – 6 in x 6 in x 0.75 in thick
- **X750090**[3] 12 inch dovetail

[3] *Can be substituted at time of ordering with MT-75 stands at no additional charge.*

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

(Shown: MT-81-DOV8. Suitable for microinjection)

MT-70 / MT-71
STANDS

FEATURES MT-70 / MT-71

- Solid extrusion provides sturdy, stable mounting
- Individual components provide a variety of mounting options
- Adjustable height cantilever available
- Accomodates a variety of special layouts
- Suitable for upright and inverted microscopes

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

The MT-70 series of stands are sturdy, stable, and extremely versatile for mounting components for a variety of research applications. They were designed for placing our heavy Huxley-style micromanipulators adjacent to any microscope. We found them to be so useful and adaptable that we also use them for mounting other items such as optical components.

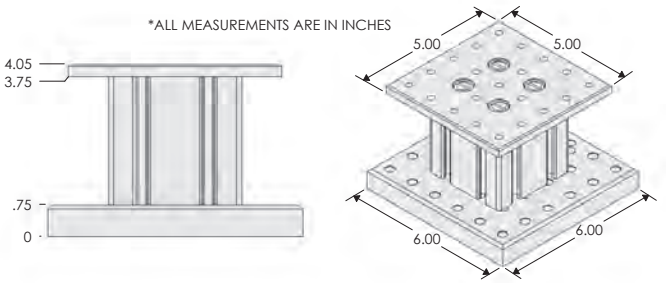
The stands are based on a rigid extruded aluminum tower which is available in 3 inch increments up to 12 inches. The tower is mounted on a sturdy 3/4 in thick aluminum baseplate and then fitted with a 5/16 in thick aluminum mounting platform. These systems are configurable as fixed height stands or, in the MT-71 series, have an adjustable height cantilevered side platform for added versatility. The tower can be center or edge mounted to the baseplate for accommodating various spatial layouts. Rows of 1 inch and 25 mm centered clearance holes are provided in the baseplate for attachment to tables. The mounting platforms have tapped ¼-20 mounting holes on 1 inch centers.

The stands are available in sets, or you can order individual components separately to meet your specific requirements. Custom heights can be made to order for an additional fee. To securely fasten our MP-85 Huxley style manipulator to the mounting plates, please order the manipulator adapter plate at the time of purchase. Larger baseplates or mounting plates are available upon special order.

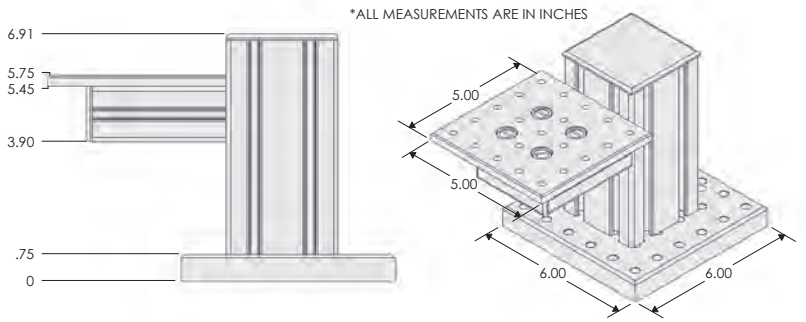
SPECIFICATIONS MT-70 / MT-71

Baseplate Dimensions	6 in x 6 in x .75 in 153 mm x 153 mm x 19 mm
Mounting Plate Dimensions	5 in x 5 in x 5/16 in 128 mm x 128 mm x 8 mm
Total Stand Height	depending on configuration 4 1/16 in to 13 1/16 in 104 mm to 333 mm
Weight	depending on configuration 3 lbs 11 oz to 8 lbs 5 oz 1.7 kg to 3.8 kg

MECHANICAL DRAWINGS MT-70-3



MECHANICAL DRAWINGS MT-71-6



PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MT-70 / MT-71 STANDS

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MT-70 SERIES

MT-70-3	3 inch tower, baseplate, mounting platform and fastening hardware
MT-70-6	Same as above with 6 inch tower
MT-70-9	Same as above with 9 inch tower
MT-70-12	Same as above with 12 inch tower

(Custom tower lengths available: Call for pricing)

MT-71 SERIES

MT-71-3	3 inch tower, baseplate, mounting platform and fastening hardware
MT-71-6	Same as above with 6 inch tower
MT-71-9	Same as above with 9 inch tower
MT-71-12	Same as above with 12 inch tower

(Custom tower lengths available: Call for pricing)

ACCESSORIES MT-70 / MT-71 STANDS

MT-7001	Cantilever mounting assembly
MAG-MT	Magnetic feet (set of 4)
X700080	Thin baseplate — 5 in x 5 in x 0.3 in thick
X700095	Narrow baseplate — 3 in x 5 in x 0.75 in thick
X700100	Square baseplate — 6 in x 6 in x 0.75 in thick
X700102	Mounting plate — 5 in x 5 in x 0.3 in thick
X700115	MP-85 adapter plate

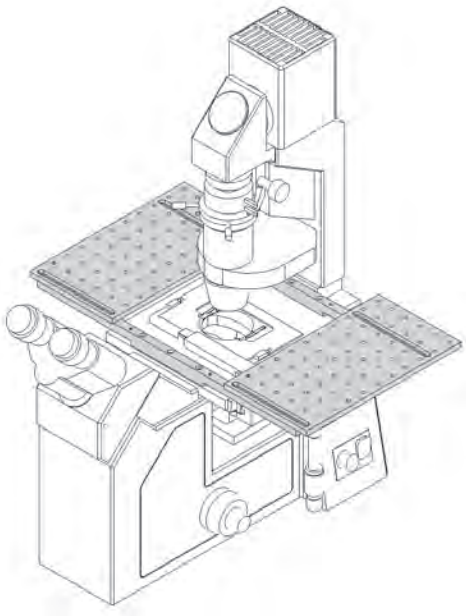
MD SERIES
MICROMANIPULATOR PLATFORMS FOR INVERTED MICROSCOPES

FEATURES MD SERIES

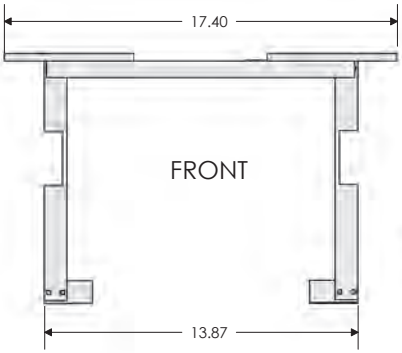
- Creates a stable matrix of ¼-20 or M6 holes on one or both sides of a mechanical stage
- Open design allows easy access to specimen and microscope
- Mounts directly on microscope, preserving valuable optical bench space
- Independent platform separate from specimen
- Allows for flexible mounting of all Sutter motorized manipulators

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

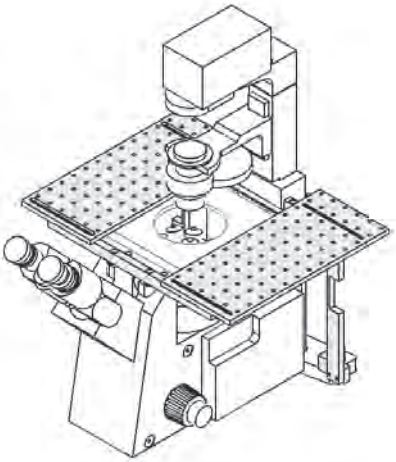
We've designed a series of Microscope Dependent (MD) stands for those who wish to use a Sutter Instrument manipulator in conjunction with an inverted microscope. The typical MD stand is a manipulator platform that bolts directly to the frame of an inverted microscope. Stands are available in either single-sided or double-sided versions for the most common inverted microscopes made by Nikon, Olympus, Leica, and Zeiss. These platforms lend themselves to the absolutely drift-free recording configuration required when using the manipulators to position patch-electrodes to record from attached cells in culture. To mount the MP-285 to an MD stand, you also need either the X285210 mounting adapter plate (for orthogonal mounting), or the 285RBI rotating base that allows for non-orthogonal mounting and rotation of the entire manipulator (note: the X285210 mounting plate is included with each MP-285 and MP-225). New mounting options and adapters for new microscopes are being added frequently. Please see our web site for new additions, current mechanical drawings, and dimensions.

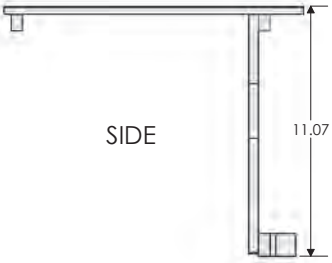


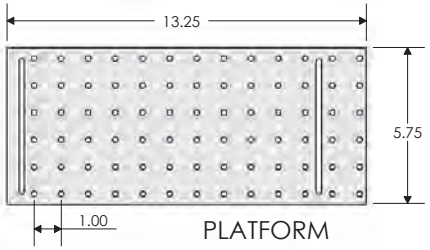
MECHANICAL DRAWINGS MD-SERIES



*ALL MEASUREMENTS ARE IN INCHES







(Dimensions vary by scope)

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MD-SERIES

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MD part numbers have top plates with an imperial hole pattern (¼-20 on 1 inch centers) and our MDM part numbers indicate a metric hole pattern (M6 tapped holes on 25 mm centers). The last digit of the MD and MDM part number identifies a single-sided universal platform (-1), single-sided positional (-1L, -1R), or a double-sided platform (-2). If you do not see a metric top plate for your microscope, please phone Sutter as it may be available.

Olympus — MD-80 SERIES

Olympus IX 50/70
MD-80-1 Single-sided
MD-80-2 Double-sided

Olympus IX 50/70 (metric tap)
MDM-80-1 Single-sided
MDM-80-2 Double-sided

Olympus IX 51/71/81
MD-81-1 Single-sided
MD-81-2 Double-sided

Olympus IX 51/71/81 (metric tap)
MDM-81-1 Single-sided
MDM-81-2 Double-sided

Olympus IX 51/71/81 with zero drift stage
MD-81-1ZDC Single-sided
MD-81-2ZDC Double-sided

Olympus IX 53/73
MD-73-1 Single-sided
MD-73-2 Double-sided

Olympus IX 53/73 (metric tap)
MDM-73-1 Single-sided
MDM-73-2 Double-sided

Olympus IX 83
MD-83-1 Single-sided
MD-83-2 Double-sided

Olympus IX 83 (metric tap)
MDM-83-1 Single-sided
MDM-83-2 Double-sided

Nikon — MD-50 SERIES

Nikon Diaphot 200/300 and Nikon TE 200/300
MD-50-1 Single-sided
MD-50-2 Double-sided

Nikon TMD
MD-51-1 Single-sided
MD-51-2 Double-sided

Nikon TE-2000
MD-52-1 Single-sided
MD-52-2 Double-sided
MD-52-1/UP Single-sided for scopes with Stage Up
MD-52-2/UP Double-sided for scopes with Stage Up

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

Nikon — MD-50 SERIES – continued

Nikon TE-2000 (metric tap)

MDM-52-1	Single-sided
MDM-52-2	Double-sided
MDM-52-1/UP	Single-sided for scopes with Stage Up
MDM-52-2/UP	Double-sided for copes with Stage Up

Nikon Ti

MD-54-1/L	Single-sided left
MD-54-1/R	Single-sided right
MD-54-2	Double-sided
MD-54-1/M	Single-sided for scopes with motorized stage
MD-54-2/M	Double-sided for scopes with motorized stage
MD-54-1/UP	Single-sided for scopes with Stage Up
MD-54-2/UP	Double-sided for scopes with Stage Up
MD-54-1/MUP	Single-sided for scopes with Stage Up — motorized
MD-54-2/MUP	Double-sided for scopes with Stage Up — motorized

Nikon Ti (metric tap)

MDM-54-1/L	Single-sided left
MDM-54-1/R	Single-sided right
MDM-54-2	Double-sided
MDM-54-1/M	Single-sided for scopes with motorized stage
MDM-54-2/M	Double-sided for scopes with motorized stage
MDM-54-1/UP	Single-sided for scopes with Stage Up
MDM-54-2/UP	Double-sided for scopes with Stage Up
MDM-54-1/MUP	Single-sided for scopes with Stage Up — motorized
MDM-54-2/MUP	Double-sided for scopes with Stage Up — motorized

Nikon Ti2

MD-55-1/L	Single-sided left
MD-55-1/R	Single-sided right
MD-55-2	Double-sided

Nikon Ti2 (metric tap)

MDM-55-1/L	Single-sided left
MDM-55-1/R	Single-sided right
MDM-55-2	Double-sided
MD-SPACER-15	15 mm spacer for Nikon Ti2 with motorized stage (set of 4)

Nikon TS-2

MD-56-1/L	Single-sided left
MD-56-1/R	Single-sided right
MD-56-2	Double-sided

Nikon TS-2 (metric tap)

MDM-56-1/L	Single-sided left
MDM-56-1/R	Single-sided right
MDM-56-2	Double-sided

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MD-SERIES

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

Leica	MD-60 SERIES
Leica DMIRB	
MD-60-1/L	Single-sided left
MD-60-1/R	Single-sided right
MD-60-2	Double-sided
Leica DMIL	
MD-61-1	Single-sided
MD-61-2	Double-sided
Leica DMI 4000/5000/6000	
MD-62-1/L	Single-sided left
MD-62-1/R	Single-sided right
MD-62-2	Double-sided
Leica DMi 8	
MD-63-1/L	Single-sided left
MD-63-1/R	Single-sided right
MD-63-2	Double-sided
MD-63-1L/M	Single-sided left for scopes with motorized stage
MD-63-1R/M	Single-sided right for scopes with motorized stage
MD-63-2/M	Double-sided for scopes with motorized stage
Leica DMi 8 (metric tap)	
MDM-63-1L	Single-sided left
MDM-63-1R	Single-sided right
MDM-63-2	Double-sided
MDM-63-1L/M	Single-sided left for scopes with motorized stage
MDM-63-1R/M	Single-sided right for scopes with motorized stage
MDM-63-2/M	Double-sided for scopes with motorized stage

Zeiss	MD-90 SERIES
Axiovert 100/135	
MD-90-1	Single-sided
MD-90-2	Double-sided
Axiovert 200 / Axio Observer	
MD-91-1	Single-sided
MD-91-2	Double-sided
Axiovert 200 / Axio Observer (metric tap)	
MDM-91-1	Single-sided
MDM-91-2	Double-sided
Axiovert 25	
MD-92-1	Single-sided
MD-92-2	Double-sided

ELECTROPHYSIOLOGY SYSTEMS
BUNDLED CONFIGURATIONS

(Shown: 1078-385-N65. Headstages and microscope not included)

FEATURES BUNDLED SYSTEMS

- Discounted pricing offers savings and value
- Classic electrophysiology designs available through a single system configuration
- Each bundled system comes with 2 manipulators
- Easy toggle selection of active component
- Single ROE input device controls manipulators and motorized components providing ease of operation
- All features of manipulators, stages and translators are retained
- Systems with platforms include rotating bases for mounting manipulators
- Simple USB interface

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

MANIPULATOR / STAGE / PLATFORM BUNDLED SYSTEMS

Over the last 20 years, electrophysiology rigs have developed around several platforms. In all, the central concept is that manipulators and the sample are fixed in one frame, and the microscope is fixed in a second frame. These two separate frames of reference are then moved with respect to each other in order to locate cells. Sutter Instrument is now offering several systems, or "Big Kits", that include dual manipulators with either manipulator stands and scope translator or large moving stage and a dual manipulator system. By specifying and offering the Big Kit systems, Sutter is able to extend significant price savings over the same components purchased separately.

Sutter San Francisco... the classic moving scope design with manual translator and three columns and two manipulators. Developed by labs at UCSF and later adopted throughout the Bay area, the U.S., and the world. This method allows for easy hand access to controls on the scope and manipulators, for pipette exchange and other adjustments.

Sutter Alcatraz... another well proven design, relies on a manual scope translator but uses a single large fixed plate stage rather than separate stands for manipulators. Many electrophysiologists want the ability to add additional manipulators or other devices that a single large platform allows.

Both the *San Francisco* and the *Alcatraz* are available with a motorized or manual translator.

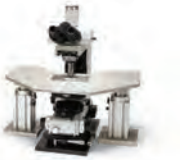
Sutter Long Island... intended specifically for multi-pipette electrophysiology on two-photon microscopes. Designed in conjunction with Northwestern University and first used for the CSHL Imaging course. The large moving stage can easily hold an *in vivo* or slice preparation and two or more manipulators. The scope is allowed to be fixed to the table top, which is required for scopes attached to two-photon sources. This same design is also good for systems where the scope has become too large to move easily, as in spinning disc confocals and large camera systems. The stage and manipulator systems have been used on many two-photon and other scopes including those from Intelligent Imaging Innovations, Zeiss, Olympus and Leica. This configuration is also used by many researchers in custom built two-photon microscopes.

Software compatibility: Motorized translation and motorized stage systems are compatible with a wide range of commercial and freeware imaging software platforms including Intelligent Imaging Innovations' Slidebook, Scan Image, MicroManager and Sutter's MCS - MOM Computer System. Please contact Sutter for current listing of software suites that are compatible with our products.

CHOOSING THE RIGHT BUNDLED SYSTEM

SAN FRANCISCO[1]

Three Towers	Translator	Manipulator	Part No.
MT-150 + (2) MT-75	MT-1000 Manual	MPC-325-2	1000-325-(scope suffix)
		MPC-385-2	1000-385-(scope suffix)
	MT-2200 Motorized	MPC-325-2	2200-325-(scope suffix)
		MPC-385-2	2200-385-(scope suffix)



ALCATRAZ[1]

Fixed Platform Stage	Translator	Manipulator	Part No.
MT-78-FS	MT-1078 Manual	MPC-325-2	1078-325-(scope suffix)
		MPC-385-2	1078-385-(scope suffix)
	MT-2278 Motorized	MPC-325-2	2278-325-(scope suffix)
		MPC-385-2	2278-385-(scope suffix)

LONG ISLAND[2]

Motorized Platform Stage	No Translator	Manipulator	Part No.
MPC-78		MPC-325-2	78-325
		MPC-385-2	78-385

[1] *Suported microscopes. Others may be available. Please call Sutter for details.*

Z25	*Zeiss Axioskop 2 FS*	*L30*	*Leica DM LFS*
Z45	*Zeiss Axio Examiner*	*L35*	*Leica DM6000 FS, DM6 FS*
Y51	*Olympus BX51WI*	*N65*	*Nikon FN1*
Y51-FD	*Olympus BX51WI (includes focus drive)*		
Y53	*Olympus BX53/63*		

[2] *The Long Island has no translator and is appropriate when the microscope must be stationary.*

PHONE: 1.888.883.0128 • FAX 1.888.883.0900
INTL PHONE: +1.415.883.0128 • INTL FAX: +1.415.883.0572
EMAIL: INFO@SUTTER.COM • WEB: WWW.SUTTER.COM

BUNDLED SYSTEMS

*U.S. prices available at **www.sutter.com**. International prices vary by country. Contact a distributor or Sutter Instrument for a quotation. Prices subject to change without notice.*

MICROSCOPE MODELS - Use this scope suffix when ordering

Z25 Zeiss Axioskop 2 FS
Z45 Zeiss Axio Examiner
Y51 Olympus BX51WI
Y51-FD Olympus BX51WI (includes focus drive)
Y53 Olympus BX53/63
L30 Leica DM LFS
L35 Leica DM6000 FS, DM6 FS
N65 Nikon FN1

SAN FRANCISCO

MT-1000 with manual X-Y translator, micromanipulators

- **1000-325-(scope suffix)** With two MP-225 manipulators
- **1000-385-(scope suffix)** With two MP-285 manipulators

MT-2200 with motorized X-Y translator, micromanipulators

- **2200-325-(scope suffix)** With two MP-225 manipulators
- **2200-385-(scope suffix)** With two MP-285 manipulators

ALCATRAZ

MT-1078 with manual X-Y translator, micromanipulators

- **1078-325-(scope suffix)[1]** With two MP-225 manipulators
- **1078-385-(scope suffix)[1]** With two MP-285 manipulators

MT-2278 with motorized X-Y translator, micromanipulators

- **2278-325-(scope suffix)[1]** With two MP-225 manipulators
- **2278-385-(scope suffix)[1]** With two MP-285 manipulators

LONG ISLAND

MT-78 with motorized platform stage, and micromanipulators

- **78-325[1]** With two MP-225 manipulators
- **78-385[1]** With two MP-285 manipulators

[1] *Specify stage insert type when ordering.*