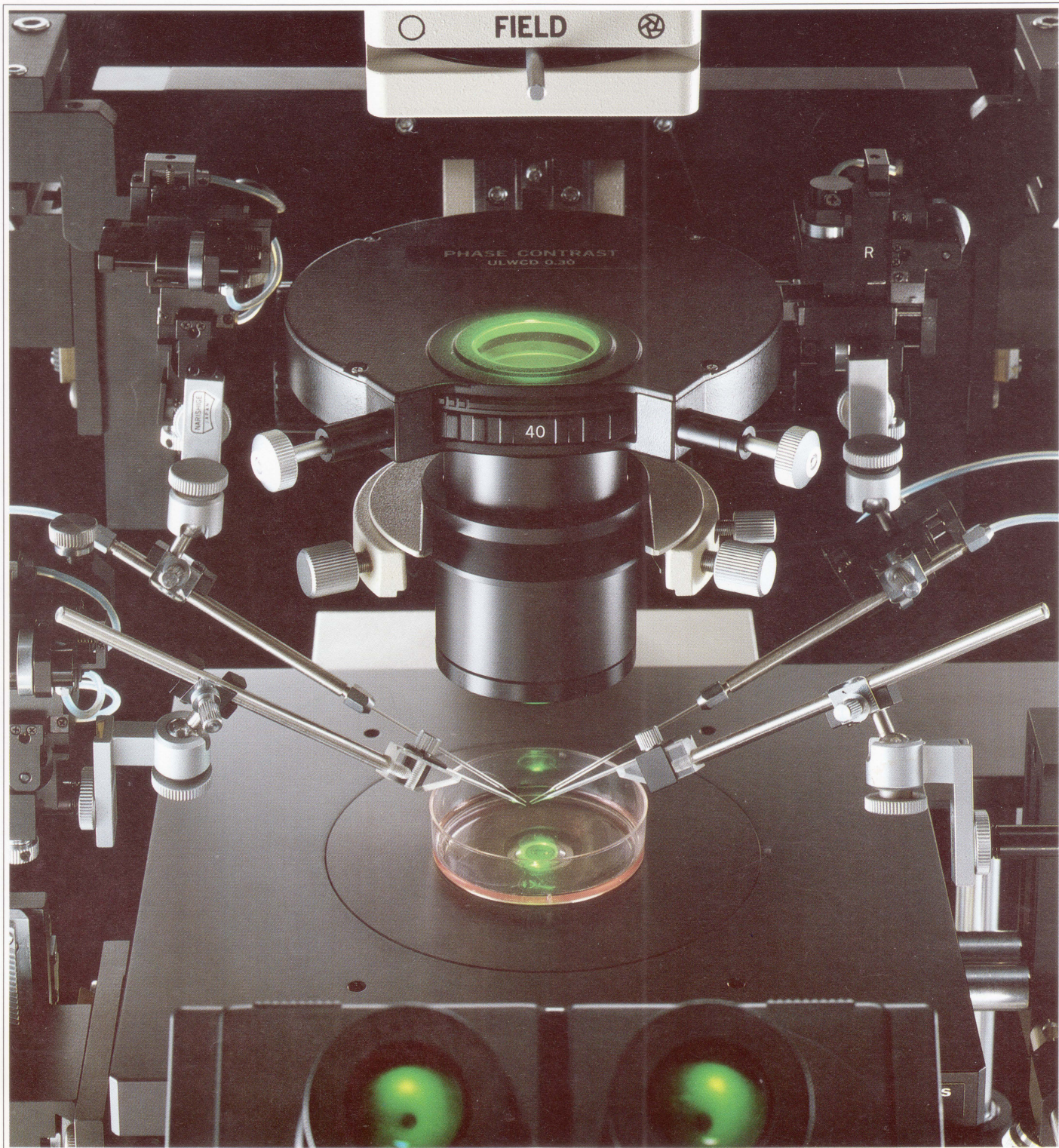


# NARISHIGE

## MICROMANIPULATORS

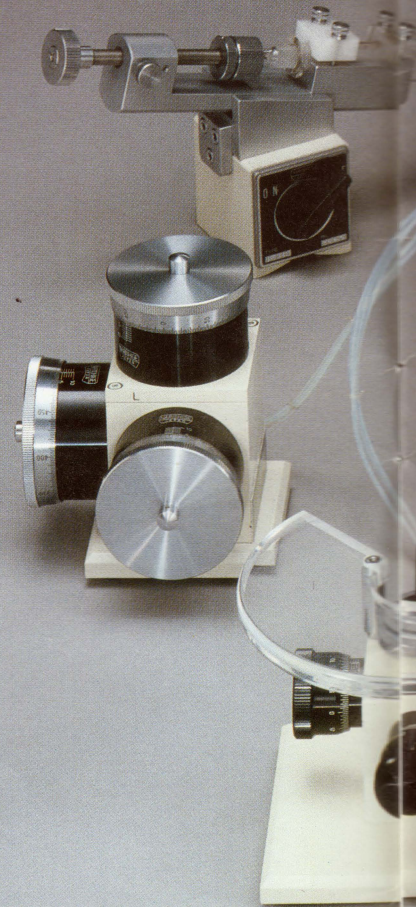
For Olympus Microscopes

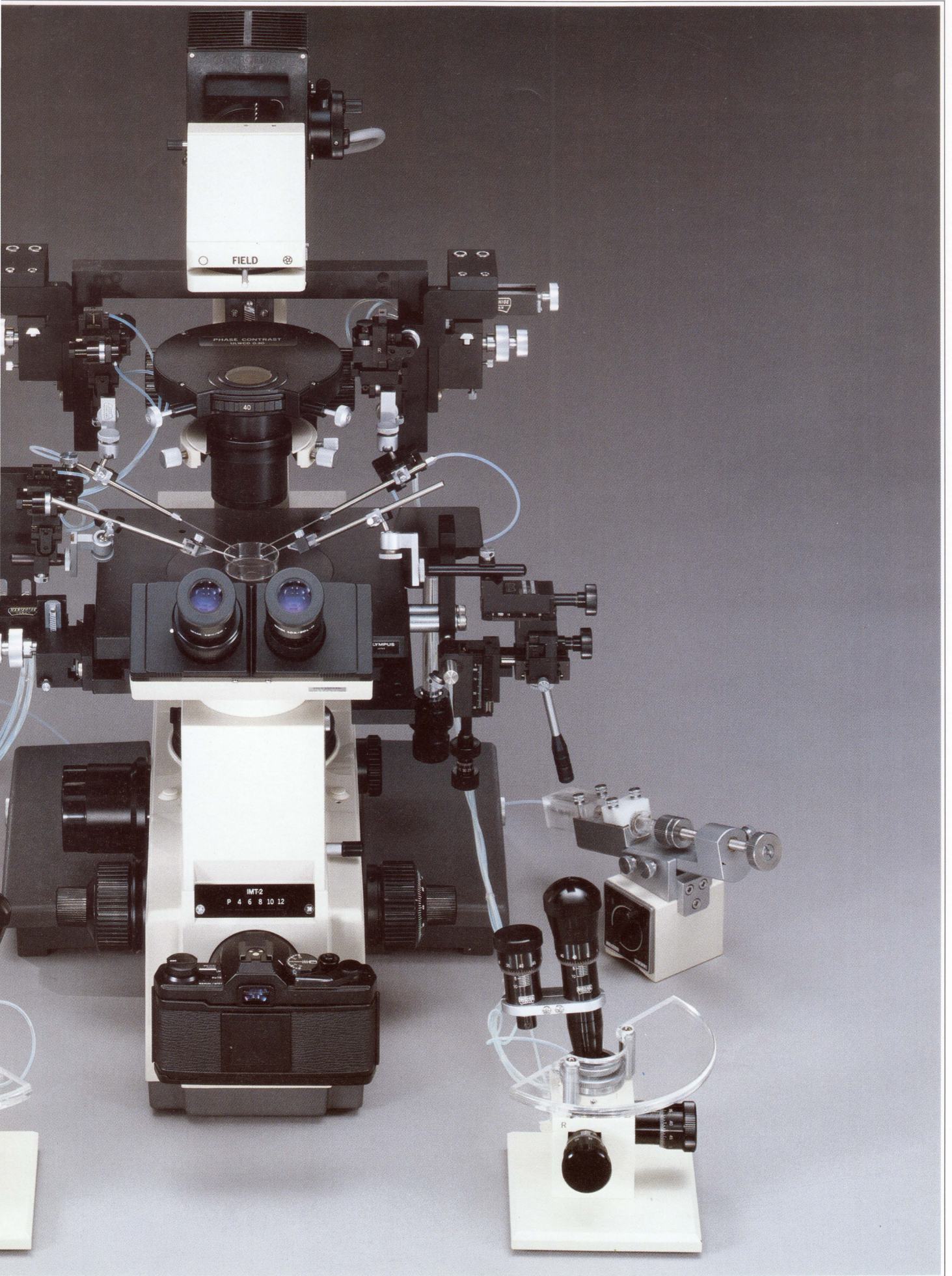


# *Narishige Micromanipulators Combine High Precision and Operating Ease Ideal for Biotechnology Applications.*

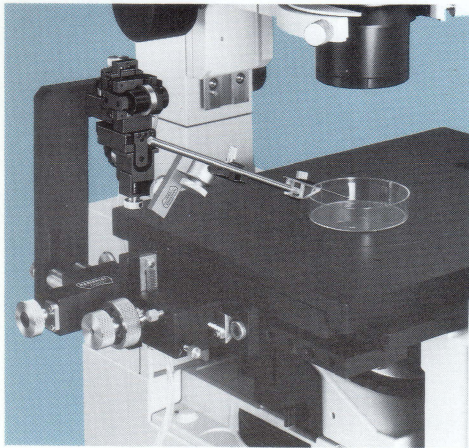
Modern techniques such as gene recombination, cell fusion and protein rebuilding continue to advance and diversify biotechnology. Today, biotechnology spans many fields—from agriculture, foodstuffs, chemicals, pharmaceuticals and medicine to energy. To meet these growing micro world requirements, Narishige pursues micromanipulation product development based on high precision and operating ease.

When combined with the high-quality Olympus IMT-2 Inverted System Microscope for example, Narishige micromanipulators provide superior performance. Sharp, clear images necessary for cell injection, suction and sectioning in every field from cell, embryo and genetic engineering to bioelectronics, pharmacology to neurology are assured.

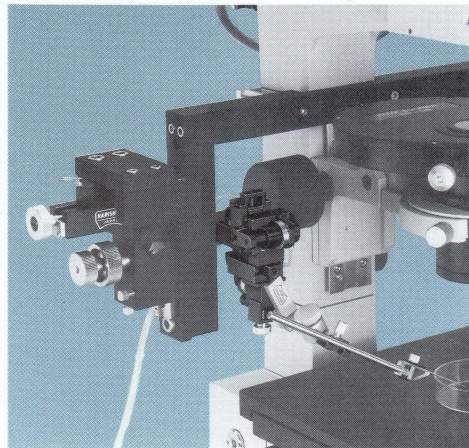




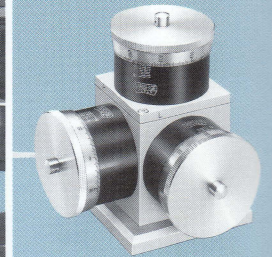
# Superior Micro Performance and Ease of Operation Four Independently Controllable Micromanipulators



Working Distance  
X•Y•Z — 10mm



Working Distance  
X•Y•Z — 10mm



## **MO-202** Three-Dimensional Joystick Hydraulic Micromanipulator

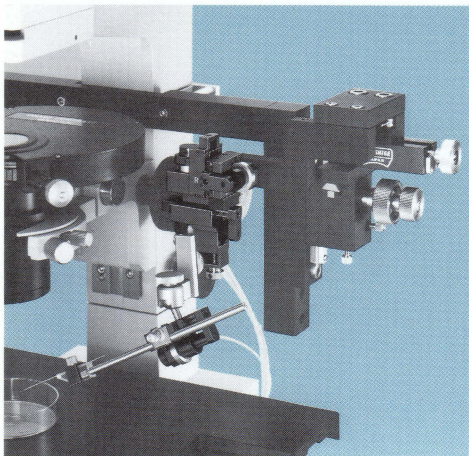
### Hydraulic Remote Control Type

The hydraulic drive system ensures smooth, vibration-free operation. Three-axis motion control using a single joystick means outstanding operating ease. The MO-202 can be used on either the right or left side of the microscope for maximum versatility.

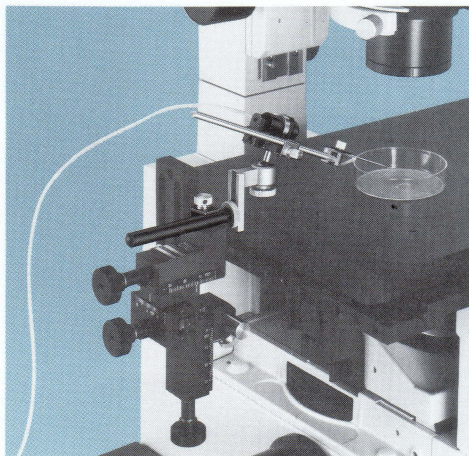
## **MO-203** Three-Dimensional Hydraulic Micromanipulator

### Hydraulic Remote Control Type

The hydraulic drive system means smooth, vibration-free operation. Motion can be freely controlled on three axes. The MO-203 can be set on either the right or left side of the microscope.



Working Distance  
X•Y•Z — 10mm  
T — 10mm



Working Distance  
Z — 10mm



## **MO-204** Joystick Micromanipulator System with Four Degrees of Movement

### Hydraulic Remote Control Type

In addition to X, Y and Z axes movements, single-direction angular movement is also possible. This simplifies such operations as insertion of pipettes into cells. Full hydraulic remote control assures no vibration is transmitted to the needle tips. Single joystick control of all movements in four directions provides outstanding operating ease. The MO-204 can be used on either the right or left side of the microscope.

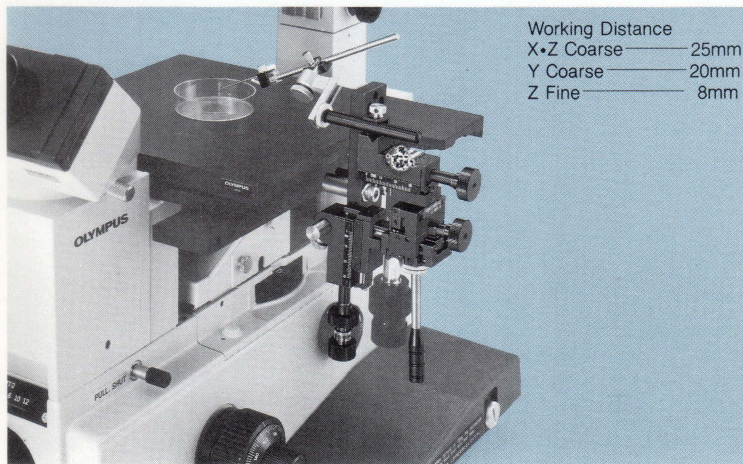
## **MO-22** One Dimensional Hydraulic Micromanipulator

### Hydraulic Remote Control Type

The hydraulic drive system is mounted on the tips of ball joints to achieve extremely high precision and compactness. Hydraulic remote control is used to drive micropipettes smoothly without vibration.

# eration. Up to pulator Set-Ups Available.

*Narishige micromanipulator systems can be configured to meet any application. Multiple set-up options are possible by combining microscope lighting support column mounts and stage mounts.*

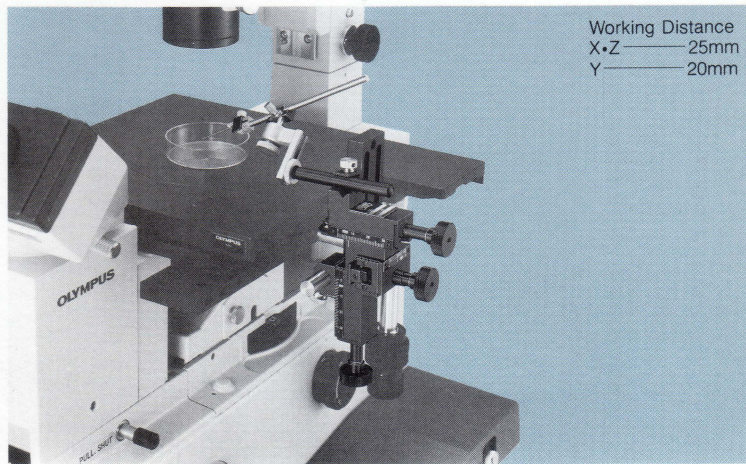


Working Distance  
X•Z Coarse — 25mm  
Y Coarse — 20mm  
Z Fine — 8mm

## MN-151 Joystick Manipulator

### Manual Operation Type

This manipulator uses joystick drive for fine-tuned control of X, Y plane and fine Z axis movement is also possible. Adjustment of movement speed and lever tension assures excellent operating ease. It is ideal for all types of microscope research and experiments.

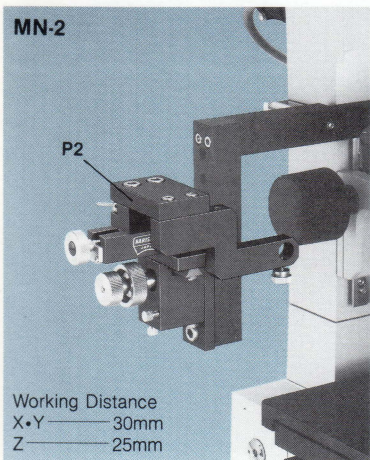


Working Distance  
X•Z — 25mm  
Y — 20mm

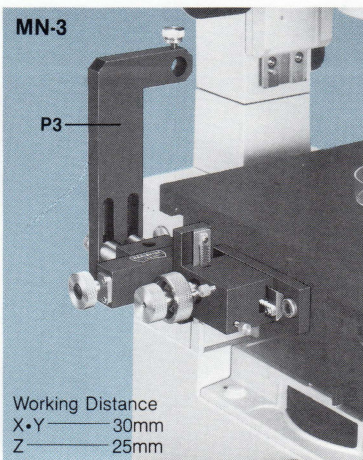
## M-152 Lightweight Three-Dimensional Manipulator

### Manual Operation Type

Maximum use of Duralumin keeps weight to a minimum. Mainly used with single-direction manipulators such as the MO-22, it provides three-dimensional control for rapid movement to the desired position and can be used independently for manipulation requiring accuracies of 20—30 microns.



Working Distance  
X•Y — 30mm  
Z — 25mm

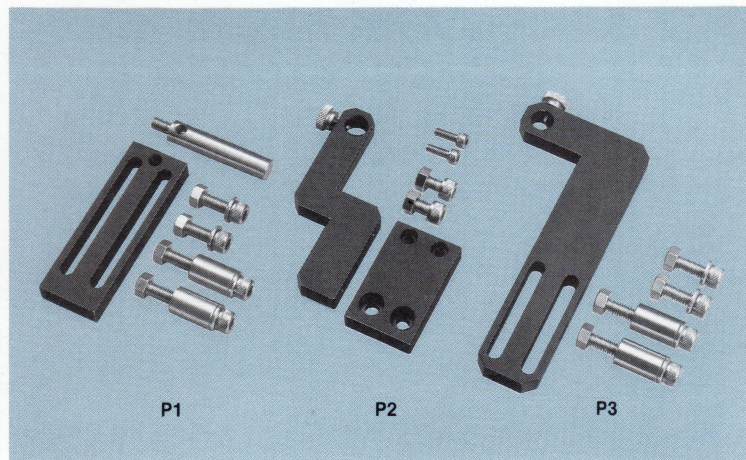


Working Distance  
X•Y — 30mm  
Z — 25mm

## MN-2/MN-3 Three-Dimensional Manipulators

### Manual Operation Type

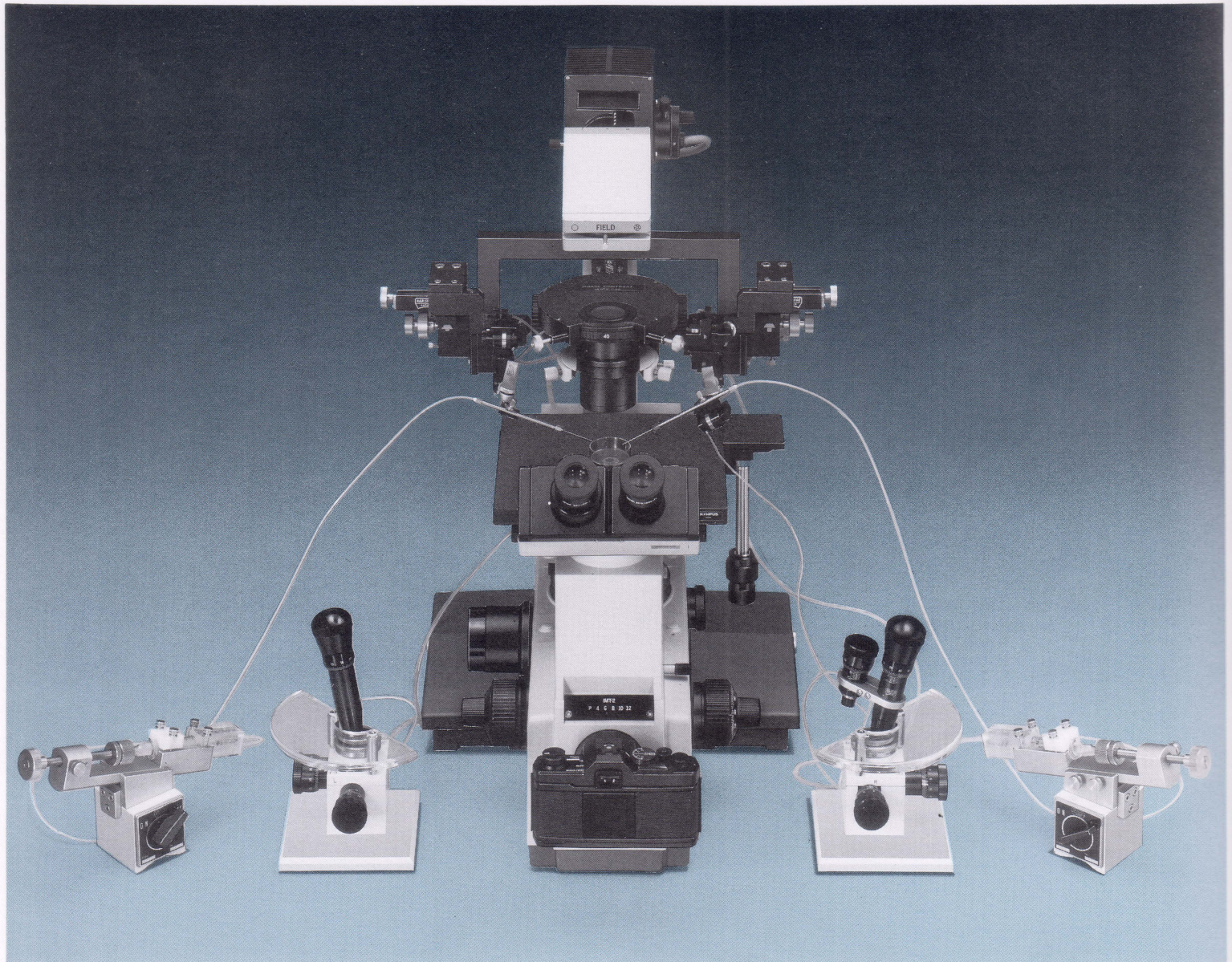
These provide three-dimensional macro movements so that desired positions with hydraulic manipulators, such as the MO-202, MO-203 and MO-204, can be reached quickly. The MN-2 is mainly mounted on adaptors designed for mounting on lighting support columns, while the MN-3 is mainly mounted on stage mounting adaptors. Both take up very little space and keep vibration to a minimum. The MN-1 manipulator can be converted to the MN-2 or MN-3 by merely changing a plate. For details, refer to P-1/P-2/P-3 Manipulator Mounting Plates.



## P-1/P-2/P-3 Manipulator Mounting Plates

Plate P-1 is used to attach the MN-151, MN-153, etc., to various microscope adaptors. Plate P-2 is used mainly to connect hydraulic micromanipulators when the MN-2 is attached to the microscope lighting support column via the MO-ADM. Plate P-3 is necessary for height adjustment to connect a hydraulic micromanipulator when the MN-3 is mounted below the microscope stage. Select the plate which matches your application.

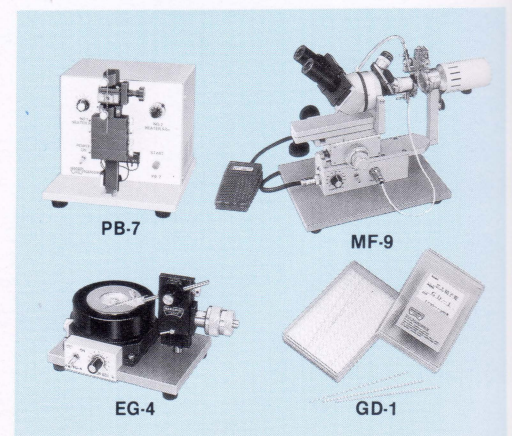
# Remote Control Provides Smooth Vibration-Support Column Mounting Adaptor Gives M



## MO-IM2-1set

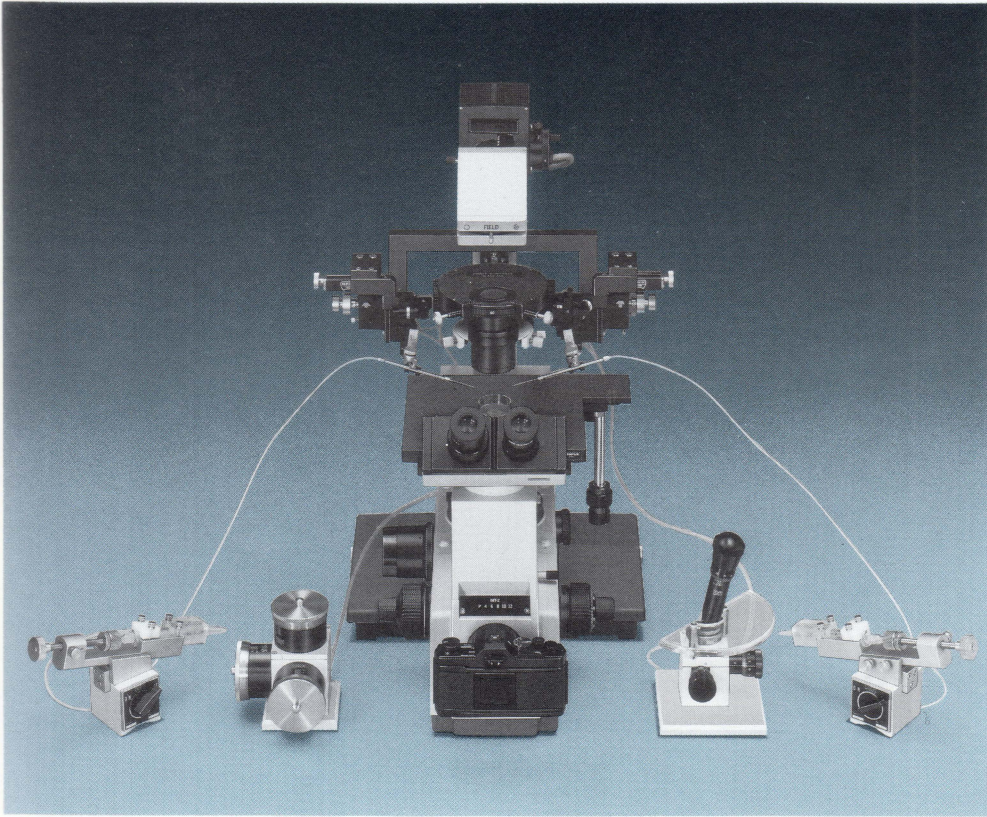
### Two-Hand Combined Operation and Hydraulic Remote Control

This system combines the Four Direction Hydraulic Micromanipulator (MO-204) plus Three-Dimensional Joystick Hydraulic Micromanipulator (MO-202). In addition to X, Y and Z axes movements, single-direction angular movement is also possible to simplify such operations as insertion of pipettes into cells. Complex three-dimensional movements can be easily controlled with a single joystick.



# Free Control. The Lighting ore Working Space.

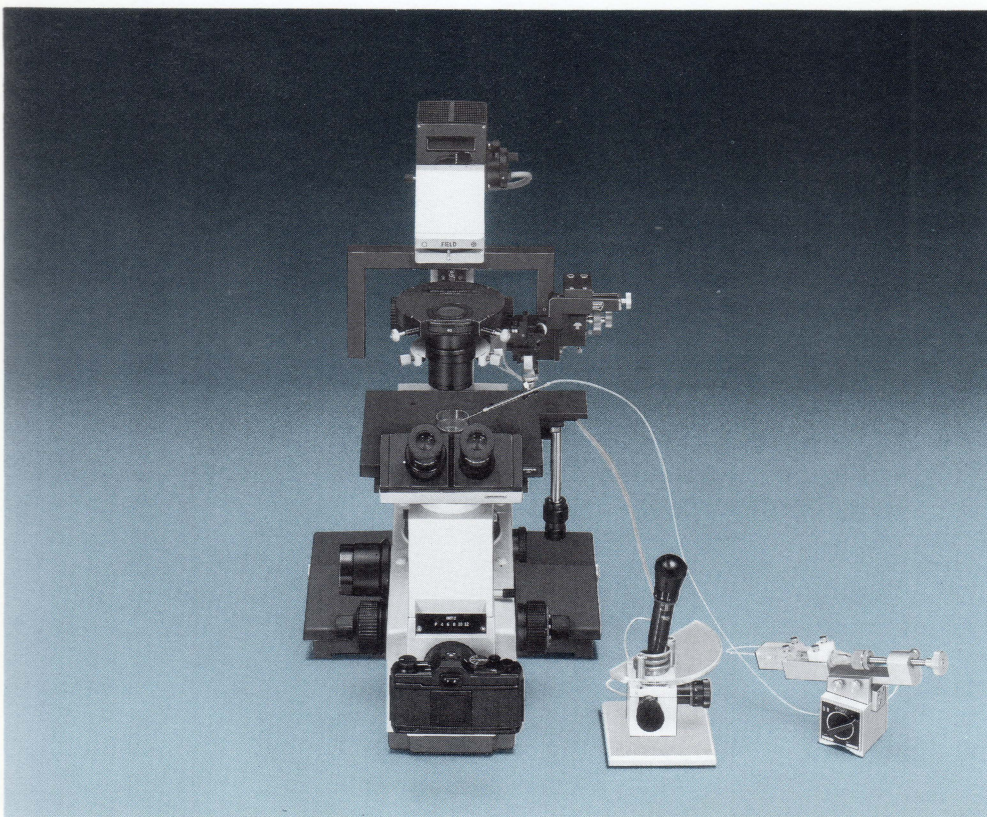
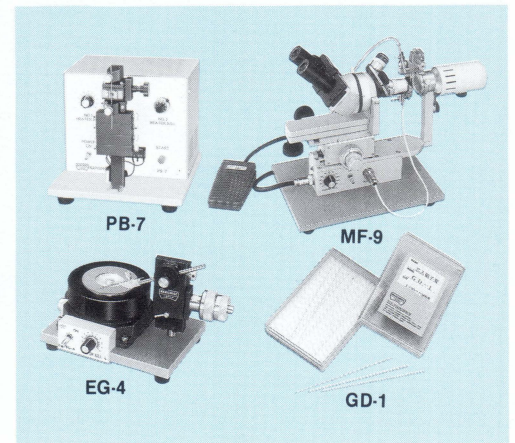
Mounting the manipulator at the rear of the lighting support column allows full use of the space in front of the stage. Hydraulic remote control provides smooth vibration-free operation. This system gives you superior precision and operating ease.



## MO-IM2-2set

### Two-Hand Combined Operation and Hydraulic Remote Control

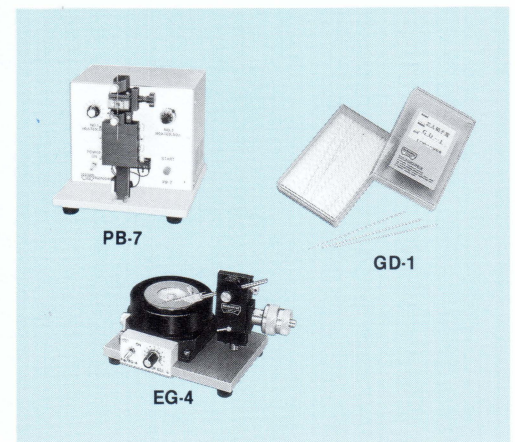
This system combines Three-Dimensional Hydraulic Micromanipulator (MO-203) plus Three-Dimensional Joystick Hydraulic Micromanipulator (MO-202). Complex three-dimensional movements can be easily controlled with a single joystick. It's highly convenient for those who frequently find themselves in need of precise control.



## MO-IM2-3set

### One-Hand Combined Operation and Hydraulic Remote Control

This system includes the Three-Dimensional-Joystick Hydraulic Micromanipulator. A single joystick controls the three-dimensional movements of the manipulator. Operation is simple and the hydraulic drive eliminates vibration. Two sets can be combined for experiments which require operation from both sides.

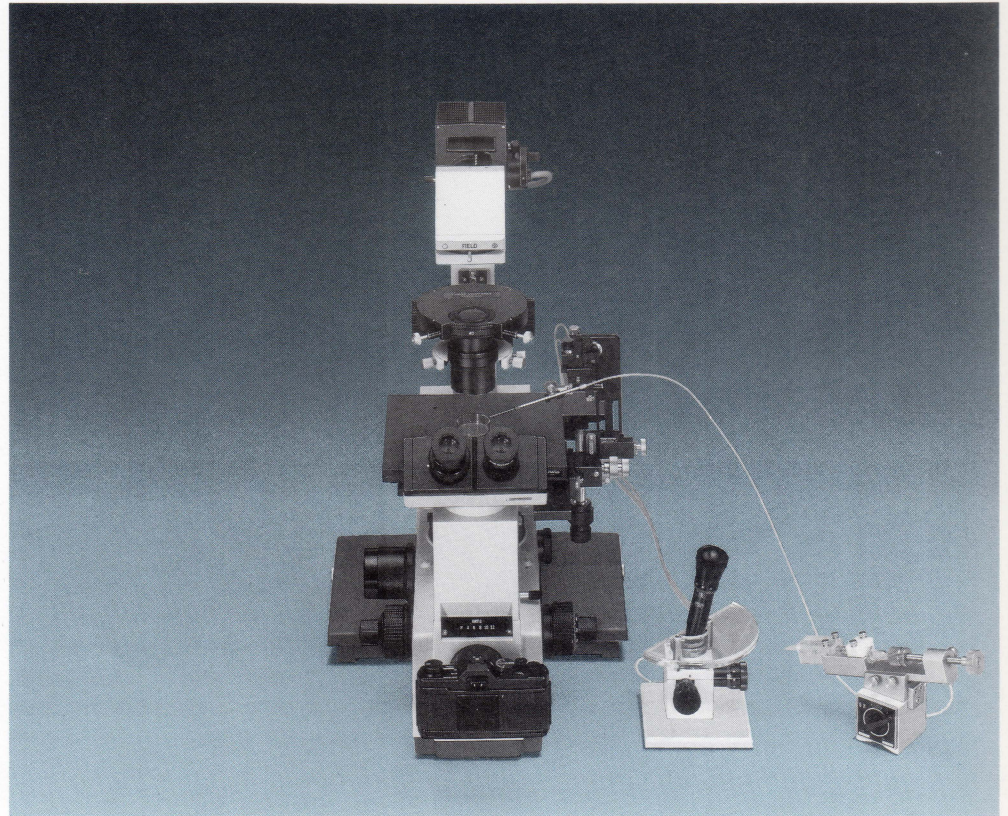


# Mounting Below the Stage Saves Space. Hi That Keep Vibration to an Absolute Minimum

## MO-5set

### One-Hand Combined Operation and Hydraulic Remote Control

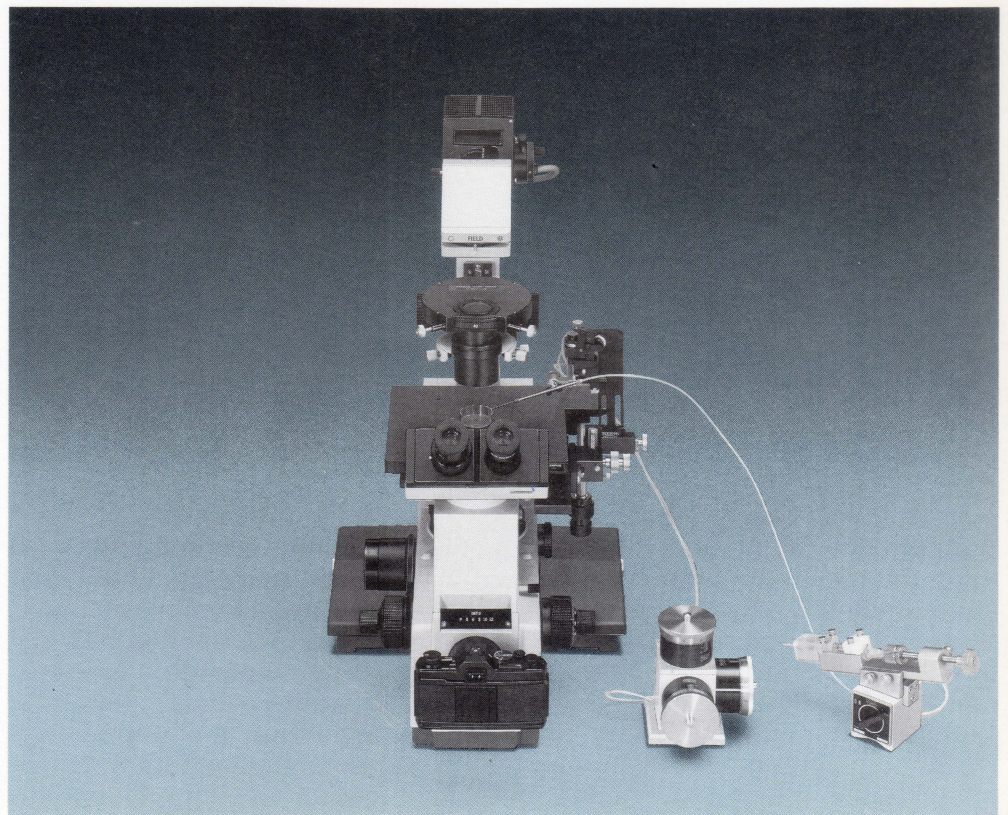
This model was developed specifically for cell, embryo and genetic engineering. It includes a Three-Dimensional Joystick Hydraulic Micromanipulator.



## MO-6set

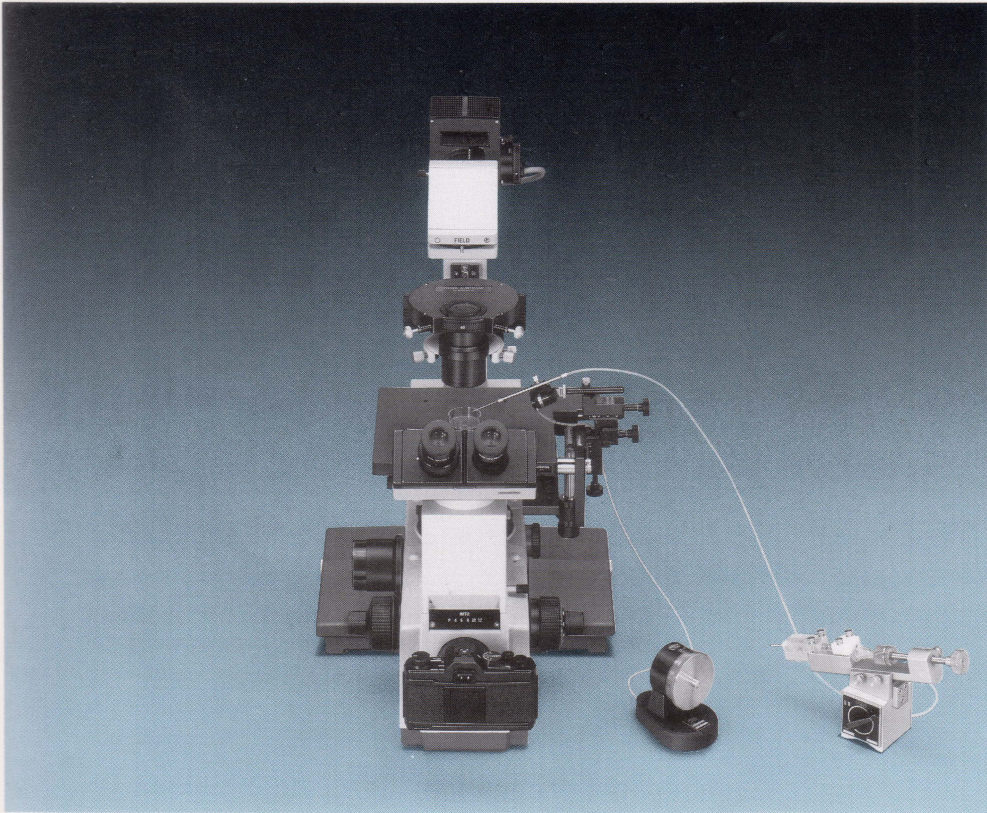
### One-Hand Combined Operation and Hydraulic Remote Control

A system with exceptional capabilities in the fields of electrophysiology, pharmacology and neurology. It includes a Three-Dimensional Hydraulic Micromanipulator.



# gh-Performance Systems m.

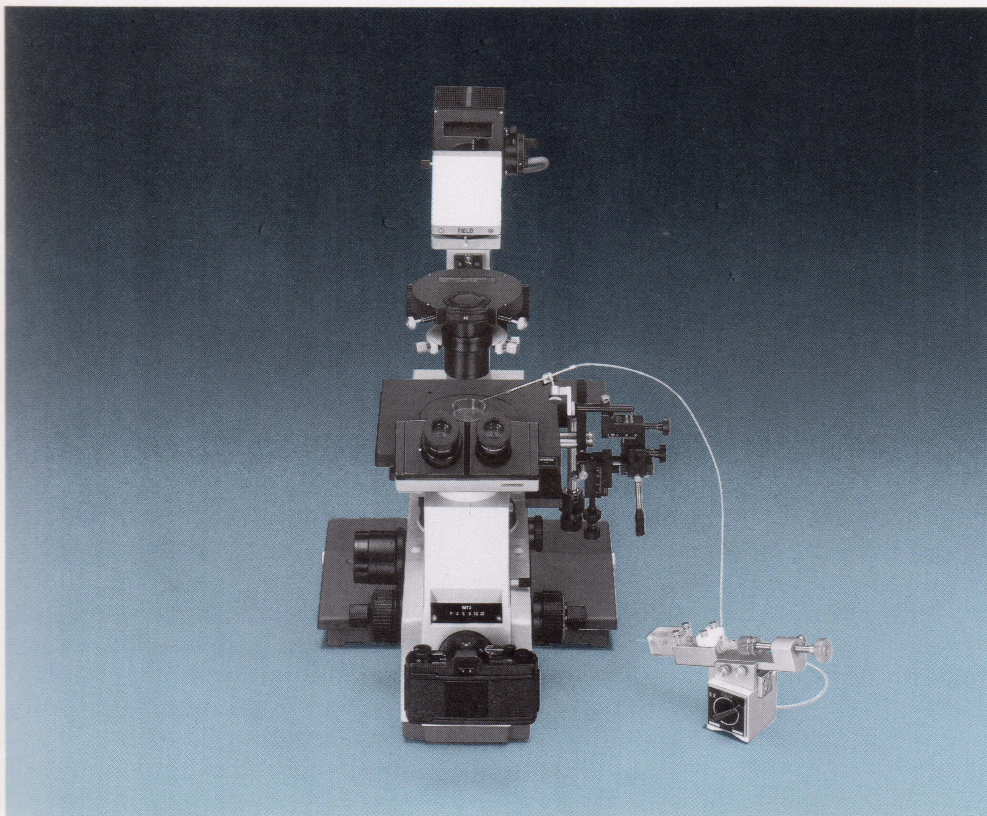
*These space-saving designs mount below the stage. Performance is extremely high and vibration is minimal. Four types are available to match any research application.*



## **MO-7set**

### **One-Hand Combined Operation and Hydraulic Remote Control**

This system combines the Three-Dimensional Coarse Adjustment Manipulator and Single-Direction Fine Adjustment Hydraulic Micromanipulator. Single-direction fine adjustment is performed by vibration-free hydraulic remote control. This is a popular combination featuring high value performance.



## **MO-8set**

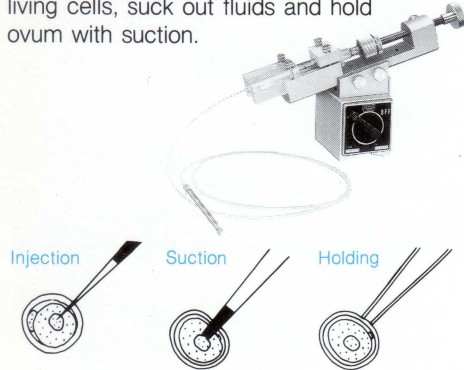
### **One-Hand Combined Operation and Manual Operation**

This system includes a single Joystick Manipulator. Two-dimensional fine adjustments can be made with the joystick. Fine Z-axis adjustment is also possible. This is an easy-to-operate system suitable for low magnification manipulation.

# A Full Lineup of Accessories for Total System Capabilities and Truly Fine Micromanipulation.

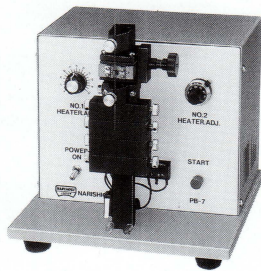
## Microinjector IM-5A/5B

A micropump used to inject solutions into living cells, suck out fluids and hold ovum with suction.



## Micropipette Puller PB-7

The PB-7 may be used for single-stage pulling for injection needles and fine electrode production as well as two-stage pulling for making holding needles and vacuum pump needles. Operation is easy. Glass tubing is electrically heated and tension is applied by a variable weight system on the main unit. A constant voltage power supply assures high accuracy and uniformity.



## Pipette Grinder EG-4

This device is used to process the tips of glass pipettes fabricated using the Micropipette Puller. Tips are ground at an angle for easier insertion into cells and easier sectioning. Vertical grinding is also possible for producing spuit (plunger) and holding-type pipettes.



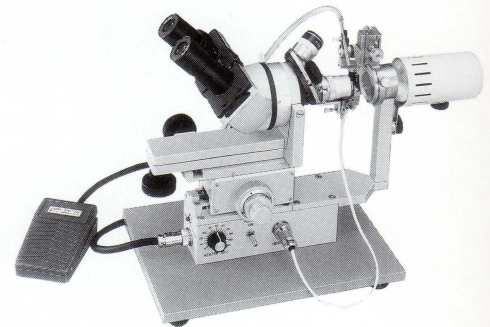
## Cored Glass Tubes GD-1 (1mm O.D.)

These hard glass tubes, containing 100-micron glass fibers, are popularly called double tubes. They can be easily filled with solutions because capillary action prevents formation of interfering air bubbles.



## Microforge MF-9 (For Making Fine Glass Tubes)

This is mainly used to fabricate round tip pipettes required for clamping culture cells and ovum. The tips of glass needles fabricated with the Micropipette Puller are heated and rounded. In addition various micro-tools can also be fabricated with this device.

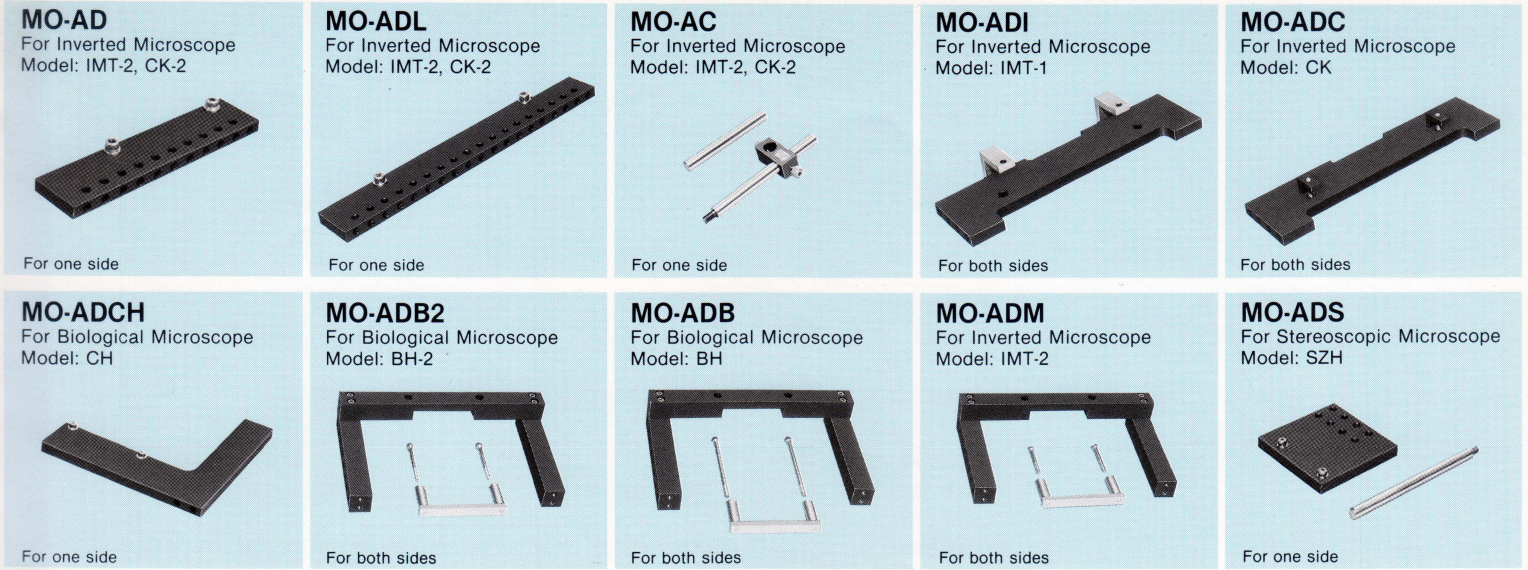


## Combination Chart

Product Name	Model	Lighting Support Column Mounting Type			Stage Mounting Type			
		Two-Hand Combined Operation		One-Hand Combined Operation	One-Hand Operation Combination			
		MO-IM2-1	MO-IM2-2	MO-IM2-3	MO-5	MO-6	MO-7	MO-8
Joystick Micromanipulator System with Four Degrees of Movement	MO-204	○						
Three-Dimensional Joystick Hydraulic Micromanipulator	MO-202	○	○	○	○			
Three-Dimensional Hydraulic Micromanipulator	MO-203		○			○		
One Dimensional Hydraulic Micromanipulator	MO-22						○	
Joystick Micromanipulator	MN-151							○
Lightweight Three-Dimensional Micromanipulator	M-152							○
Three-Dimensional Micromanipulator	MN-2	○×2	○×2	○				
Three-Dimensional Micromanipulator	MN-3				○	○		
Micropipette Puller	PB-7	○	○	○				
Pipette Grinder	EG-4	○	○	○				
Microforge (Fine Glass Tube)	MF-9	○	○					
Microinjector	IM-5B	○×2	○×2	○	○	○	○	○
Cored Glass Tube	GD-1	○	○	○	○	○	○	○
Manipulator Mounting Adaptor	MO-ADM	○	○	○				
Manipulator Mounting Adaptor	MO-AD				○	○	○	○

- The MO-IM2 Series includes the main high-quality combinations for cell, embryo and gene engineering applications.
- MO-5 is the main combination for cell, embryo and gene engineering.
- MO-6 is the main combination for the fields of electrobiology, pharmacology and neurology.
- MO-7 and MO-8 are used for low magnification manipulation and feature superior cost performance.
- When combining two sets, the MO-5 (fine adjustment) and MO-8 (coarse adjustment), or the MO-5 (fine adjustment) and MO-7 (coarse adjustment) are recommended.

## Mounting Adaptors for OLYMPUS Microscope



## Manipulator Microscope Mount Adaptor Chart

Mount Type	Adaptor Name	Applicable Microscope	Applicable Manipulator			Precautions			
			MO-202 MO-203 MO-204	MN-151, M-152 MO-150, MO-155 MN-153	MO-22				
Stage Mounting Type	MO-AD	Inverted Type	Inverted System Microscope IMT-2 Inverted Microscope CK-2	○ Used together with MN-3	○	○ Note 3. (Cannot be used independently.)	Mounting is possible only on one side when a mechanical stage (IMT-2 MVR) is mounted on the plain stage.		
	MO-ADL						Mounting is possible only on one side when a mechanical stage is mounted on the plain stage or with a cross stage (IMT2-SVR).		
	MO-AC						Cannot be used with a cross stage (IMT2-SVR).		
	MO-ADI						Inverted Microscope IMT	Note 2. △ Used together with X block (X-10).	The stage stroke is slightly reduced when a mechanical stage (IMT2-SVR) is used.
	MO-ADC						Compact Culture Microscope CK	Used together with MN-3.	The adaptor is mounted at the rear of the stage when a lighting support is installed.
	MO-ADCH	Erect Type	Research Training Microscopes CH, CH2	Note 1. △ Used together with X block (X-10).					
Stage Holder Mounting Type	MO-ADB2	Erect Type	High-Quality System Microscope BH-2	○ Used together with MN-2.	○	○	The stage is mounted with the handle in front.		
	MO-ADB		Research Biology Microscope BH				The stage stroke is slightly reduced.		
Lighting Support Mounting Type	MO-ADM	Inverted Type	Inverted System Microscope IMT-2				The MN-151, M-152, MO-150, MO-155 and MN-153 are mounted with the protruding arm level with the stage.		
Frame Mounting Type	Note 4 MO-ADS	Stereo	High-Quality System Stereo Microscope SZH	○ Used together with MN-3.					

Note 1: Note that the coarse manipulators (MN-2, MN-3) cannot be used. (Adaptors MO-AC, MO-ADCH)

Note 2: An intermediate adaptor is available on special order for combining the MO-ADI, MO-ADC and MN-3.

Note 3: Use the MO-22 together with the MN-151, M-152, MO-150, MO-155, MN-153 or MO-202.

Note 4: Stereo microscopes other than the SZH are available with steel plate base, magnetic stand, etc.

## Consider the Following Factors When Selecting a Manipulator:

① The microscope ② Mounting adaptor ③ Manipulator (coarse and fine) ④ Peripheral devices (Microinjector, Micropipette Puller, Microforge, Pipette Grinder, Glass Tube) ⑤ Other points (Anti-Seismic Stand, TV devices)

A Typical Micromanipulation Microscope System Configuration:

IMT-2-21 + MO-IM2-2set + Anti-Seismic Stand + Color TV

Photo by  
Fukushima  
Shuchiku Bokujo



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Specifications are subject to change without notice.

For further details and questions about the microscope,  
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