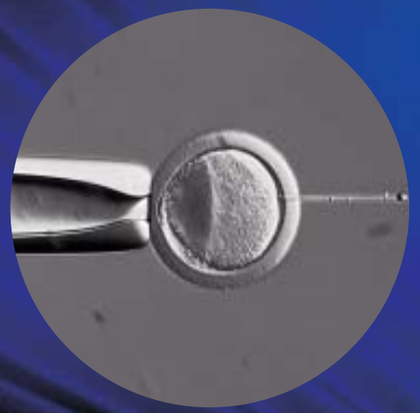
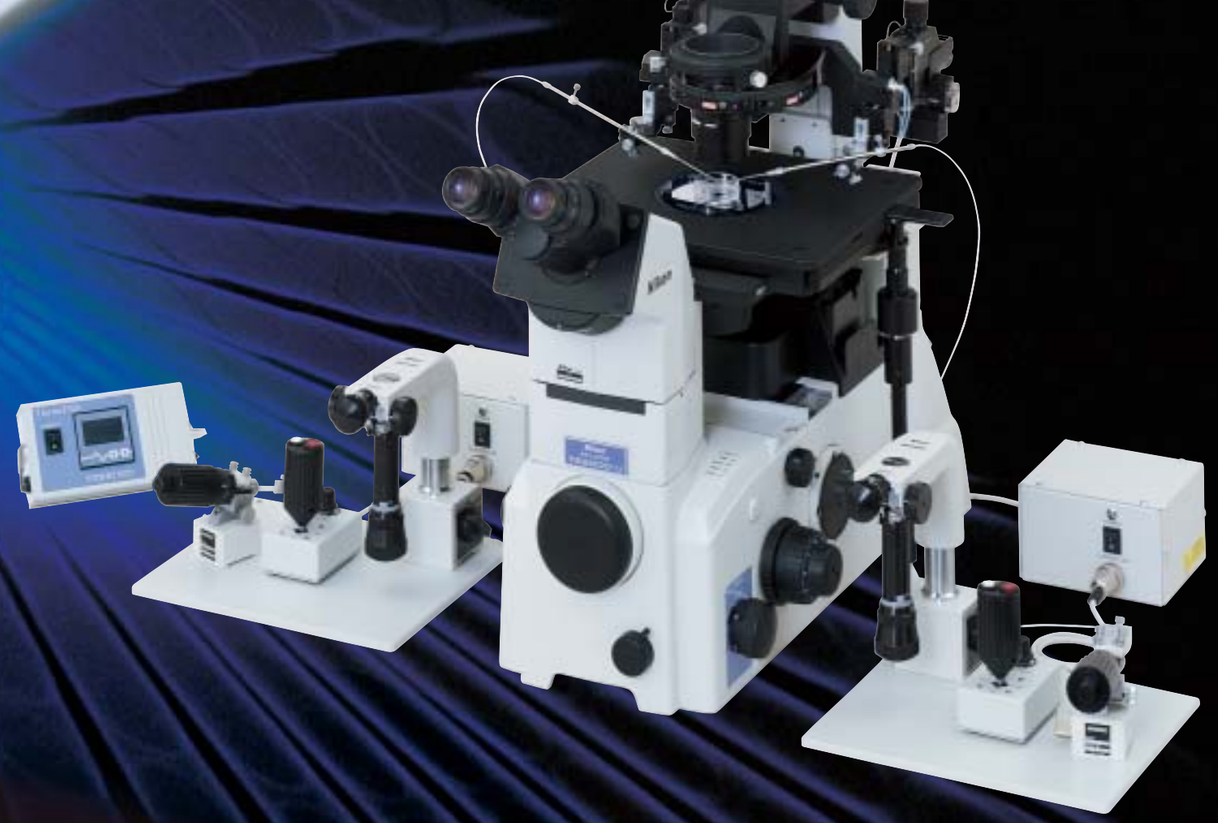
Nikon

Micromanipulator System
NT-88NE

Water-Hydraulic Micromanipulators
MWO-3/MHW-3



Developed Using the Latest Micromanipulation Technology, the NT-88NE and Related Equipment Combine Outstanding Precision with Easy Operation



The NT-88NE standard package consists of:

3D Motor-Driven Coarse Manipulator MM-188NE: 2 pcs

3D Hydraulic Fine Micromanipulator MO-188NE: 2 pcs

Universal Joint U-NE: 2 pcs

Pipette Holder HI-7 with Rotating Mechanism HIR: 2pcs

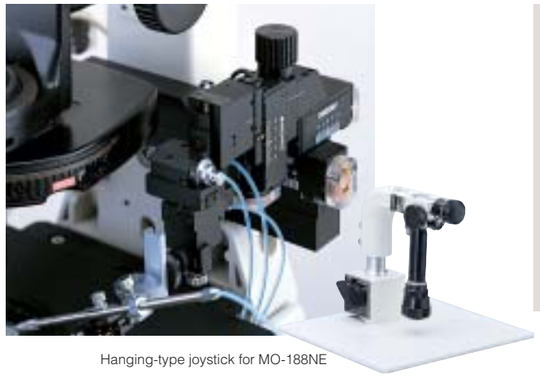
Holder Keeper HIK-3: 2 pcs

Adapter for TE2000 NS-888NE: 1pc

To this equipment, add your desired injectors to build your system.

Whatever the application—IVF (in-vitro fertilization), ICSI (intracytoplasmic sperm injection), electrophysiology, or biotechnology—the NT-88NE and other top-notch micromanipulation equipment from Nikon will meet the task.

3D Hydraulic Fine Micromanipulator MO-188NE



Hanging-type joystick for MO-188NE

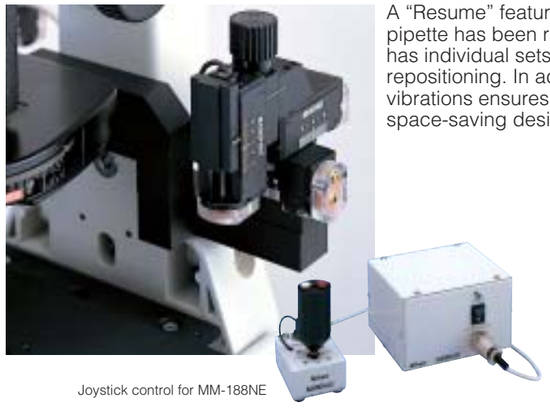
X-axis control knobs are located symmetrically on both sides of the joystick to eliminate left side/right side positioning problems. This design allows faster assembly and saves on bench space. Furthermore, a 10mm X-Y operating range provides more versatility at lower magnifications.

Universal Joint "U-NE"

This convenient mechanism simplifies operation by allowing the pipette holder to be moved in a single direction. Angle adjustment for both vertical and horizontal directions is possible via two separate control knobs.
This product can be purchased individually.

Drive unit	
X-, Y-, Z-axes movement	10 mm (max.)
Control knob	
X-, Y-, Z-axes control knob movement	10 mm (max.)
Joystick movement (X- and Y-axes)	2 mm (max.)
Control knob movement (one rotation)	250 µm (with 2.5 µm min. scale)
Configurations	Drive unit, control unit (with magnetic base), pipette holder, universal joint, metal plate for magnetic base

3D Motor-Driven Coarse Manipulator MM-188NE



Joystick control for MM-188NE

A "Resume" feature returns the pipette to the original position after the pipette has been raised for quicker, easier petri dish changes. The drive unit has individual sets of index calibrations for the X, Y, Z axes for fast repositioning. In addition, a microscope adapter with enhanced resistance to vibrations ensures more stable manipulation, while the joystick's compact, space-saving design and height adjustment provide comfortable operation.

Drive unit	
X-, Y-, Z-axes movement	22 mm (max.)
Control unit	
Minimum speed	Approx. 50 µm/sec.
Maximum speed	Approx. 250 µm/sec.
High-speed mode speed	1.6 mm/sec.
Joystick movement	X- , Y-axes
Up-down button movement	Z-axis
High/low speed adjustment	Provided
Configurations	Drive unit, control unit, power transformer

3D Manual Coarse Manipulator MN-188NE

A manual 3D coarse positioning manipulator allows you to quickly move the micro-pipette to the ideal position. The MN-188-NE's compact size saves installation space, while a stopper on the Z-axis further improves ease of operation.

Drive unit	
X-, Y-, Z-axes movement	30 mm (X and Y), 30 mm (Z) with stopper)
Configurations	Main unit

Oil-type Microinjector IM-9B / Pneumatic Injector IM-9C

IM-9B IM-9C

These injectors provide smoother and more stable maneuverability by applying a new mecha-nism to minimize backlashes. Also, its 53mm working distance, large-volume syringe and just-the-right-size control knob with graduated scales all contribute to easy control of the injection. The IM-9B has a finely-ground metal syringe for smoother movement, while its new tube connector with a multi-purpose valve makes for easier filling of oil without generating air bubbles.

	IM-9B	IM-9C
Movement distance		
Movement range	53mm	53mm
Full rotation of knob	500µm	6mm
Minimum graduation	10µm	120µm
Control value		
Full rotation of knob	10µl	480µl
Minimum graduation	0.2µl	9.6µl
Syringe	1.1cc metal type	4.2cc glass type

Pipette Holder HI-7 with Rotating Mechanism HIR

This is a standard accessory included with these microinjectors. Featuring a rotating mechanism, the HIR, this accessory enhances the easy alignment of the pipette tip in the microscope field, while reducing oil leaks.

1D Hydraulic Micromanipulator MO-109NE

The 1D micromanipulator is attached to a ball-joint, enabling versatile angle adjustment.
It can also be used in combination with other systems for very effective injection.
Attaching this equipment to the MO-188NE creates the 4D Hydraulic Micro-manipulator MO-189NE.

4D Hydraulic Micromanipulator MO-189NE

Drive unit	
Movement in one direction (T-unit)	10 mm (max.)
Control unit (T unit)	
T-unit movement	10 mm (max.)
Control knob movement (one rotation)	250 µm (with 2.5 µm min. scale)
Configurations	Drive unit (with T-unit ball joint), control unit (with mechanical T- handle)

Two-Electrode Holder HD-21

The HD-21 allows you to install two pipette holders close to each other on a 3D hydraulic micromanipulator.
It's ideally suited for embryo-biopsy applications with controls to adjust angles smoothly, thanks to the ball-joint pivot construction.

Combination Examples

Eclipse TE2000 with MM-188NE x 2, MO-188NE x 2, IM-9B, IM-9C

TS100 with MM-188NEx 2, MO-188NE x 2, IM-88, IM-88H

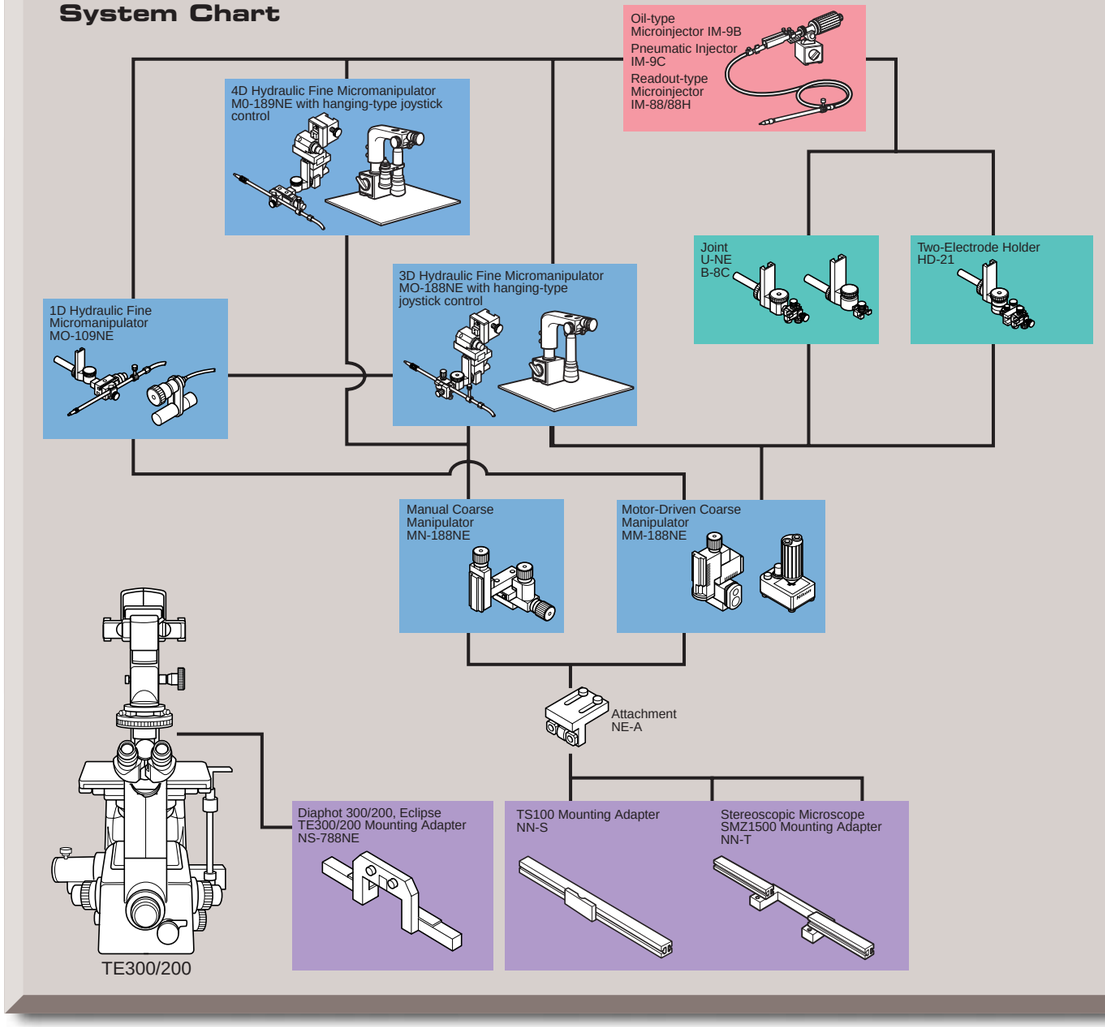
Stereoscopic Microscope SMZ1500 with MM-188NE,MO-188NE, IM-9B, IM-9C

NT-88NE Combination Chart

	Embryo-biopsy set	In-vitro fertilization set	Biotechnology set	Electrophysiology set*
4D Hydraulic Fine Micromanipulator MO-189NE with hanging-type joystick control	–	–	1 pc. (For injection side)	–
3D Hydraulic Fine Micromanipulator MO-188NE with hanging-type joystick control	2 pcs.	2 pcs	1 pc. (For holding side)	–
3D Water-Hydraulic Micromanipulators MHW-3/MWO-3	–	–	–	2 pcs. of MHW-3 or MWO-3
3D Motor-Driven Coarse Manipulator MM-188NE	2 pcs.	2 pcs.	2 pcs.	–
3D Manual Coarse Manipulator MN-188NE	2 pcs. (For economical set)	2 pcs. (For economical set)	2 pcs. (For economical set)	–
1D Hydraulic Fine Micromanipulator MO-109NE	–	–	–	–
Pneumatic Microinjector IM-9C	1 pc. (For holding side; economical set)	1 pc. (For holding side; economical set)	1 pc. (For holding side; economical set)	–
Oil-type Microinjector IM-9B	2 pcs.	2 pcs.	2 pcs.	–
Two-Electrode Holder HD-21	1 pc.			
Ball-Joint B-8C/Universal Joint "U-NE"	–	–	B-8C 2 pcs.	–
Pipette Holder HI-7	2 pcs.	2 pcs.	2 pcs.	–

*Other items for electrophysiology are available from other manufacturers.
Mounting adapters are available to fit to your microscope.

System Chart



Optional Equipment for Making Customized Pipettes

Pipette Grinder EG-400

The EG-400 virtually eliminates vibration and drift over the grinding surface due to a specially designed micro-motor on the variable-speed rotating wheel.

Grinding wheel	Diamond
Adjustment	Coaxial coarse/fine manipulator
Accessories	Pipette holder, motor output adjustment dial, cleaner

Microforge MF-900

The MF-900 is designed to produce custom-made injection and holding pipettes.

Microscope	Eyepieces (10X), objectives (5X, 10X), trans-illumination
Accessories	Heater, heater output adjustment dial, heater foot switch, air hose

Glass Microelectrode Puller PN-30

The PN-30 is designed to produce microelectrodes from 1 mmø to 1.5 mmø glass capillaries.

Heater voltage	2V
Current	45A
Glass capillaries	1 – 1.5 mmø

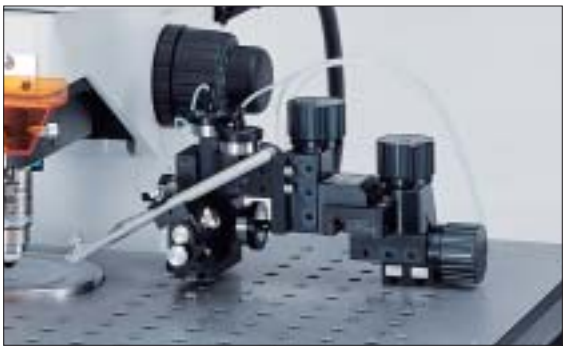
	Embryo-biopsy set	In-vitro fertilization set	Biotechnology set	Electro- physiology set
Micropipette GD-1/G-100	G-100 1 pc.	G-100 1 pc.	GD-1/G-100 1 pc. each	GD-1 1 pc.
Micropipette Puller PC-10/PN-30	PN-30 1 unit	PN-30 1 unit	PC-10 1 unit	PC-10 1 unit
Pipette Grinder EG-400/EG-6	EG-400 1 unit	EG-400 1 unit	EG-400 1 unit	EG-6 1 unit
Microforge MF-900	1 unit	1 unit	1 unit	1 unit

3D Water-Hydraulic Micromanipulator

MWO-3

The MWO-3 features a cutting-edge, hydraulic double-cartridge mechanism to minimize drifts caused by temperature changes. This design ensures injections with a constant pressure for stable operation that is free from drift, vibration, and electromagnetic disturbances.

Movement range	Fine 2mm (X, Y and Z axes), coarse 30mm (X, Y and Z axes)
Full rotation of knob	Fine 50µm, coarse approx. 4mm
Minimum graduation	Fine 0.2µm



MWO-3

3D Water-Hydraulic Micromanipulator

MHW-3

The MHW-3 features minimized drift due to temperature changes, a scale increment as small as 0.2µm, and a fine control manipulation with a one-to-five moving ratio. Also, because Teflon tubes are secured to the microscope main body, vibration of the tip of the micropipettes has been eliminated, resulting in stable micromanipulation.

Movement range	Fine 2mm (X, Y and Z axes), coarse 30mm (X, Y and Z axes)
Full rotation of knob	50µm
Minimum graduation	Fine 0.2µm

MHW-3 with NN-L adapter

Manual 3D Micromanipulators

NMN-21/25

The NMN-21 and -25 are designed for drift-free operation, making them ideal for delicate, patch-clamp research. The unit has no hydraulic system nor spring mechanism and its unique double-slider structure minimizes vibrations transmitted from the operator's hand to the tip of the pipette via the control knob. The unit's motor-less and actuator-less design also eliminates electromagnetic disturbances. The NMN-25 features a compact, space-saving design without a scale.

	NMN-21	NMN-25
Movement range	Fine 6mm (X, Y and Z axes), coarse 15mm (X, Y and Z axes)	Fine 6mm (X axis), 10mm (Y axis), 6mm (Z axis); coarse 15mm (X axis), 10mm (Y axis), 15mm (Z axis)
Full rotation of knob	Fine 250µm, coarse approx. 4mm	Fine 250µm (X and Z axes), 292µm (Y axis)
Minimum graduation	Fine 1µm	—

NMN-21

WARNING TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USING YOUR EQUIPMENT.

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. December 2004

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