NARISHIGE

NMN-21
Micromanipulator

High performance free from vibrations in manual operation.

Drift and electromagnetic disturbance are critical problems in patch clamping work. This mechanical micromanipulator was developed specifically for patch clamping: it does not employ a liquid hydraulic system (which is prone to drift caused by temperature changes), has no spring (a common cause of mechanical drifting), nor a motor (which is a source of noise). Its body is designed to absorb vibrations, so that even at high magnifications, problems of vibrations are virtually non-existent. Based on a drum type design, which is highly reputed as a liquid hydraulic method, and with a very stable center of gravity, this model provides exceptionally steady and stable performance. The overall design is compact, so installation requires a minimum of space. With coarse and fine manipulators integrated in the compact body, this model handles a full range of required movements, from moving a microelectrode into the microscope view field to making contact with the cell.

* To install the manipulator on the microscope, a mounting adapter suitable for the microscope is required separately.
* Alternatively, the manipulator can be mounted directly on the isolation table.
* The patch clamp headstage holder AP-13-3 can be attached to the solid universal joint UST-2 included in the manipulator.
* The One-Axis Water Hydraulic Micromanipulator MHW-4 / MHW-4-1 (sold separately) can be attached with the manipulator attachment P-11 (sold separately), allowing for the addition of a diagonal axis to the XYZ axes.

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Joint

An accessory for the NMN-21, also available separately. Loosening the knob allows the electrode to rotate freely in two dimensions, and tightening it fixes the angle, making adjustments intuitive and easy.

UST-2 Solid Universal Joint

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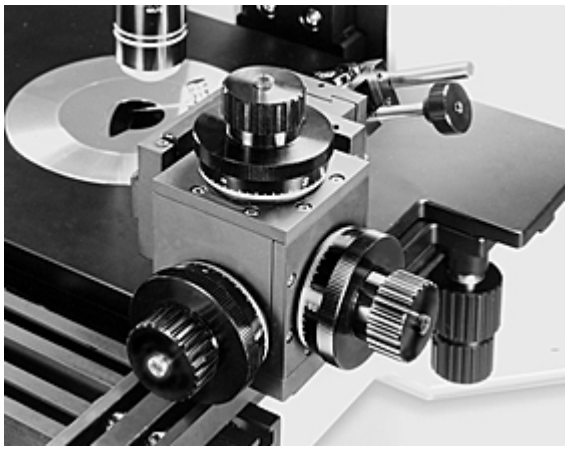
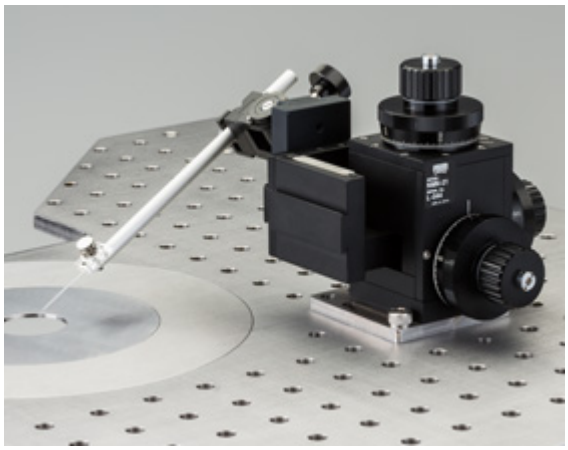
Setting example

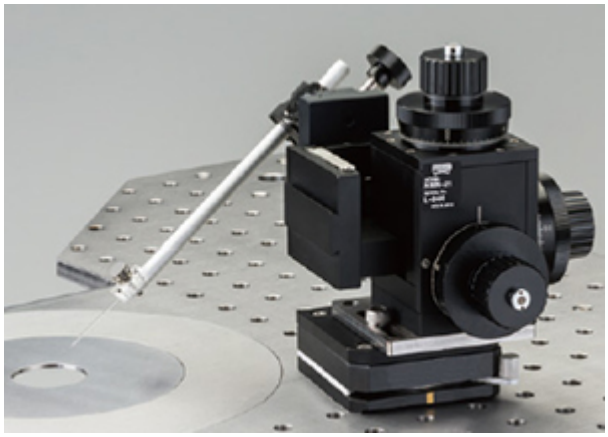


Mounting adaptor setting example

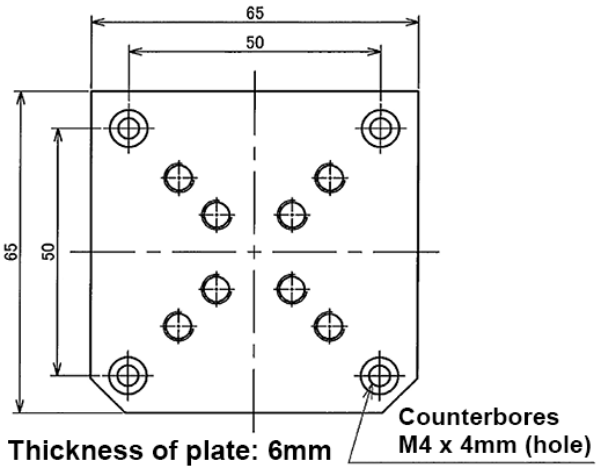


ITS + NR-12 + NMN-21 setting example

*** The manipulator can be installed on the isolation table with a third-party magnetic base using mounting plate GJ-12A (sold separately).**



Please use a magnetic base that meets the following specifications: **the mounting plate GJ-12A (sold separately)**



Set-up of the NMN-21, GJ-12A, magnetic base, and ITS2.

Accessories included in GJ-12A

1. Mounting screw (M4×8): 4 pieces (for the magnet installation)
2. Mounting screw (Low head M6×8): 2 pieces.
3. Hex wrench (width across flats: 3 mm): 1 piece

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By connecting the separately sold P-11 to the included UST-2 unit, the one-axis water hydraulic micromanipulator MHW-4-1 (precision: 1μm, 250μm per rotation) can be attached. This allows vibration-free fine-drive control at the same angle as the electrode, and by rotating the control knob located away from the drive unit, it can be easily operated with fingertips.

Set-up image of MHW-4-1, P-11, and NMN-21.

Achieving low vibration operation

The slider, which is one of the main mechanisms of a micromanipulator, actually consists of two independent sliders - one used inside, the other outside. When the operator touches the control knob, which is connected to one slider, vibrations are caused. To overcome this problem, the control knob is fixed independently, separate from the slider.

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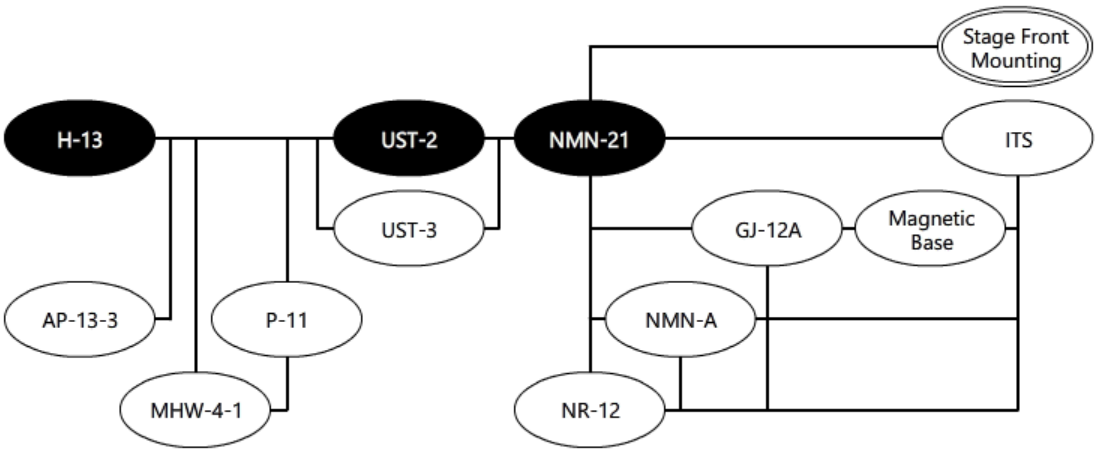
Specification

Accessories included		UST-2 Solid Universal Joint Fixing Plate H-13 Electrode Holder Hex Wrench
Movement range	**Coarse**	X15mm, Y15mm, Z15mm Full rotation of knob approx. 4mm
	Fine	X6mm, Y6mm, Z6mm Full rotation of knob: 250µm Minimum graduation: 1µm
Dimensions/Weight		W110 × D170 × H105mm, 930g

System Diagram



refers to the model itself with standard attachments
refers to attachable main accessories
refers to types of mounting adaptors

Specifications are subject to change without notice.