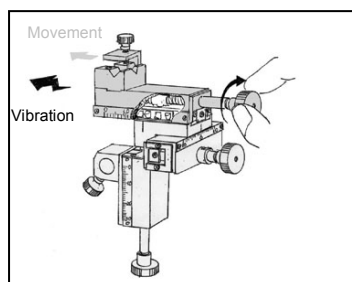


## Advantages of NMN-21/NMN-25 to Other Manipulators

You can find a lot of manually operated manipulators available on the market today. The NMN-21 and NMN-25 are distinctive micromanipulators that have a revolutionary mechanism differentiating it from other conventional manually operated manipulators. In this news, we will discuss the mechanism of the NMN-21/NMN-25 and its advantages.

### ◆◆ Manually Operated Manipulators ◆◆

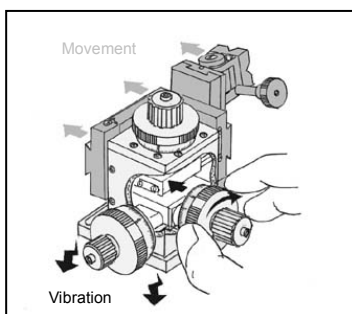
In the field of micromanipulation, a total magnification of 100 times or less is considered a low magnification range, while 200 times or higher is considered a high magnification range. Generally speaking, manually operated manipulators are designed to provide comfortable pipette movement in the low magnification of a microscope, such as the total magnification of 100 times. Some of them are equipped with fine movement which only plays a supporting role. When you operate a manual manipulator, you will experience vibration of the pipette every time you touch or rotate the operation knobs. When magnification is low, you may not feel the vibration. However, as the magnification is turned higher, the vibration becomes prominent. You may also experience the pipette being moved out of focus. The vibration incurred from fine knobs is not as prominent as the vibration from the coarse knobs.



However, still it is extremely difficult to control a pipette in a precise way only with a manually operated manipulator in high magnification. Therefore, when an experiment requires higher total magnification of more than 100 times, remotely controlled micromanipulators are commonly used.

With conventional sliders, the operation knobs are directly attached to the responsible sliders. Therefore, the vibration or any stress that occurs by contact to the knobs or rotation of the knobs is transmitted directly to the driving part. This results in vibration of the pipette at the time of knob operation.

### ◆◆ The NMN-21 Mechanism ◆◆



The NMN-21 has a special slider mechanism. The operation knobs are not connected directly to the responsible sliders. Thus, the vibration incurred by knob operation is not transmitted directly to the pipette tip. This concept was initially used in the MX-2, then through to the MX-4 and then on to the NMN-21. The NMN-25 was brought in as a new design so that adjacent placement could be achieved. Junction parts are connected plane to plane to secure excellent stability. The close distance of the operation knobs suppresses vibration of the pipette tip under magnification. A large amount of the vibration occurs during knob operation and is diminished with the help of the special slider mechanism. The slider allows not only use in experiments with low magnifications but also experiments with high magnifications, such as patch clamp experiments.

### ◆◆ Point ◆◆

There are a lot of experiments in the field of microinjection for which methods are already established. For these experiments, it is common to choose a manipulator model along with the established methods or procedures. However, when a method has not yet been established or when it is a unique experiment, you should choose a suitable model anticipating the range of capability while at the same time considering your budget. The NMN-21 or NMN-25 can be an optimal option when a manually operated manipulator seems to be unsuitable but a remotely controlled one seems to be too much.

### ◆◆ For Your Information ◆◆

If manipulators were ranked by taking price into consideration, they may be classified as follows. By knowing the total magnification required for an experiment, you can minimize the models to be considered to some extent.

#### **【Auxiliary Role】**

Miniature manual manipulators (YOU-2 or YOU Little Giant Series)

#### **【Low Magnifications in General (~ x100 in Total Magnification)】**

Manual Manipulators in general (M-152, MM-3, MP-1, YOU Standard Series)

#### **【From Low Magnifications to High Magnifications】**

Special-mechanical micromanipulators (MX-2, MX-4, NMN-21, NMN-25)

#### **【High Magnifications in General】**

Remotely controlled micromanipulators (Water-hydraulic, Oil-Hydraulic, DC-motor driven, Step-motor driven type)

If you have any questions or need further information, please contact us.