

## Key Points for Installation:2 - Screws

The previous issue of the web news discussed wrenches which are an essential tool for installation. This issue focuses on screws also essential for installation.

### Types of Screws



#### ■ Knurled-head Thumb Screw (with clamping hole)

This type of screw has a knurled or fluted head that provides a finger grip for manual tightening. You may also find a through-hole in the side of the screw head. The through-hole is for a hexagonal wrench to be inserted whereby the screw is fastened tightly due to the principle of leverage.\*1

This type of screw is used for frequent tightening and loosening. This screw can be tightened by the fingers. Tools are not necessary for tightening or loosening.

#### ■ Socket Cap Screw

This type of screw requires a hexagonal wrench to fasten. This screw fastens tightly. You often find this screw called a "fixing screw" in the instruction manuals.

This screw is fastened tightly with an appropriate hexagonal wrench and allows for proper installation.

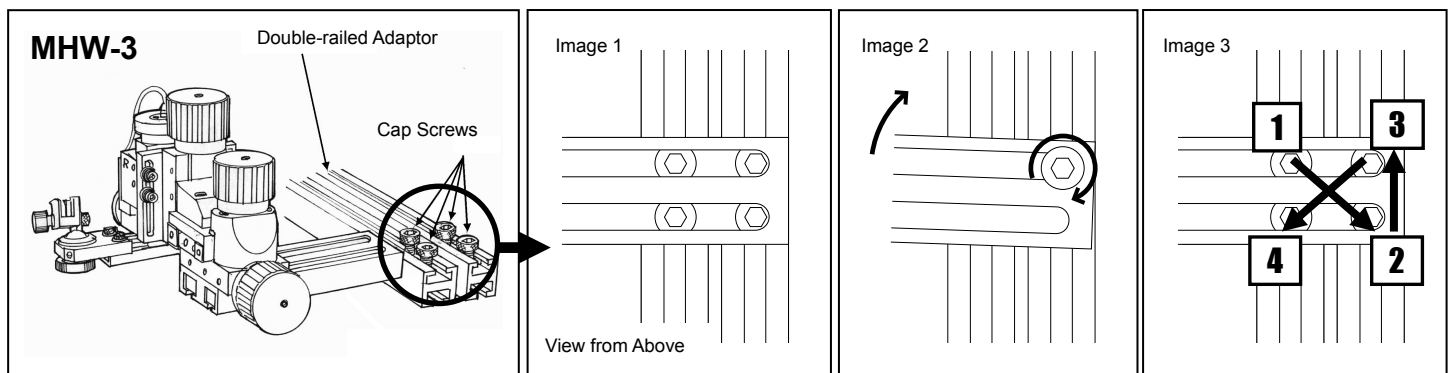
#### ■ Set Screw (a.k.a. grub screw)

This type of screw has a hexagonal recess in one end and is fastened with a hexagonal wrench. This screw is small and hidden in a screw hole in order to play the role of stopper or to fix a rotation part.

This screw is often adjusted after fixation, or used for stopper adjustment at the time of installation.

\*1 Extreme force can break the screw or twist the hexagonal wrench.

### How to Fasten Screws



The above drawings are the MHW-3 Three-Axis Water-Hydraulic Micromanipulator. This micromanipulator was developed for electrophysiology applications. It is designed to be installed with four cap screws (fixing screws) to the double-railed adaptor to offer solid stability (see image 1). The fixing plate of the MHW-3 should be fixed to the double-railed adaptor at a right angle, otherwise when the MHW-3 is driven to X-axis direction, Y-axis movement is also found.

What is the best way for fastening the four screws? Starting with one screw, as you tighten the screw, the fastening force gives pressure to the fixing plate through the screw threads whereby the plate can move (see image 2). Taking this fact into consideration, when you fasten the four screws, fasten lightly at first in the following order: start with screw #1 in the upper left corner, then screw #2 diagonally opposite screw #1, proceed to screw #3 opposite of screw #2, and finally screw #4 diagonally opposite of screw #3 (see image 3). By fastening the screws in this order, the plate is held in place without slippage. Finally, finish tightening the screws in the same order, by using the short side of a hexagonal wrench as described in the previous web news. Now the screws are fastened properly. When a plate is fixed with two screws, instead of four screws, fasten the two screws lightly in turn to hold the plate. Then tighten the screws to fix the plate without slippage.

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