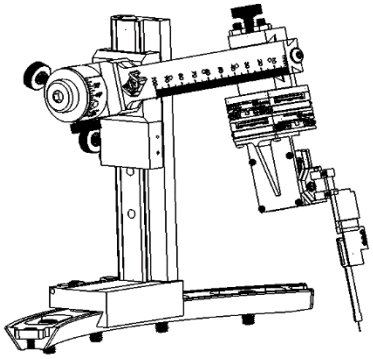
06590-M-0002 MPM Hardware Guide

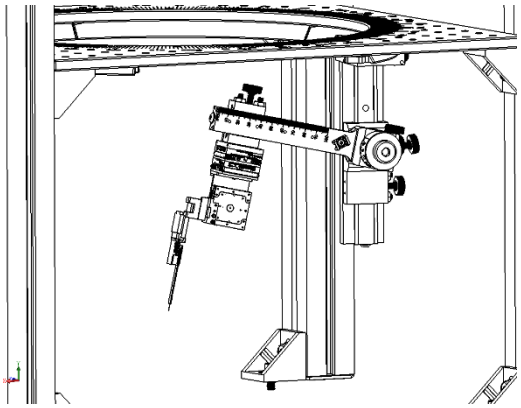
This document describes assembly, installation and manual adjustments of Multi-Probe Micromanipulator (MPM) hardware. The products covered by this manual include:

Product Model	Description
MPM-System Kit	Includes mechanical hardware, instructions, USB Hub and Pathfinder Software
MPM-Ring-72-DEG	Mounting Ring for 72-Degree Section *Quantity Required:* *One for 1-2 probes (72˚), Two for 3-4 probes (144˚), Three for 5 probes (216˚), Four for 6 probes (288˚), Five for 7+ probes (Full 360˚)*
MPM-Platform (optional)	Mounting plate, (4) legs, (4) hard stops, (8) angle supports
MPM-Platform-180 (optional)	180° Mounting plate, (4) legs, (4) hard stops, (8) angle supports
MPM-Platform-Extended (optional)	Mounting plate, (4) leg extensions, (4) legs, (4) hard stops, (16) angle supports
MPM-4 DOF Arm-Upright	MPM Four Degree of Freedom manual positioner for upright operation.
MPM-4 DOF Arm-Inverted	MPM Four Degree of Freedom manual positioner for inverted operation.
MPM-4 DOF Arm-Upright-Extended	MPM Four Degree of Freedom manual positioner for upright operation, with extended horizontal travel on the arm slider.
MPM-4 DOF Arm-Inverted-Extended	MPM Four Degree of Freedom manual positioner for inverted operation, with extended horizontal travel on the arm slider.
MPM-4 DOF Arm-Upright-Magnetic	MPM Four Degree of Freedom manual position for upright operation, with Magnetic Base.
M3-LS-3.4-15-XYZ-MPM- Upright	Three-axis motorized micromanipulator assembly for MPM system for upright operation. Includes: (3) M3-LS-3.4-15 Linear Smart Stages, and adapter hardware (1) M3-USB-3:1-6V Interface Electronics
M3-LS-3.4-15-XYZ-MPM- Inverted	Three-axis motorized micromanipulator assembly for MPM system for inverted operation. Includes: (3) M3-LS-3.4-15 Linear Smart Stages, and adapter hardware (1) M3-USB-3:1-6V Interface Electronics

Please visit us online for instructional videos, technical drawings, CAD models and more!

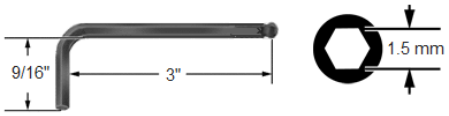
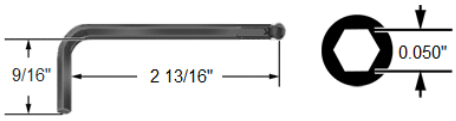
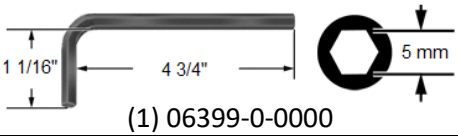


MPM-4 DOF Arm-Upright on a **MPM-Ring-72 DEG** section

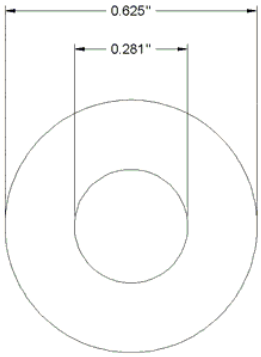
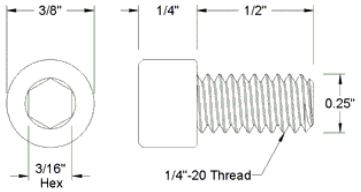
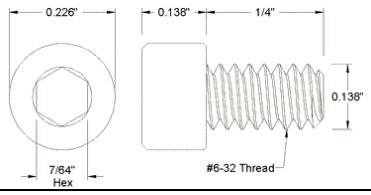


MPM-4 DOF Arm-Inverted on **MPM-Ring-72 DEG** sections mounted to **MPM-Platform**

Multi-Probe Micromanipulator: MPM-System Kit

06267-3-0000 MPM-System Kit			
 (1) 06455-3-0000	MPM Pathfinder Software USB	 (1) 05288-0-0000	Screwdriver, slotted, .07" wide
 (1) 07982-0-0000	Inclinometer	 (1) 06204-0-0000	#000 Screwdriver, Phillips
 (1) 06395-0-0000	Hex L-key set, 7 pieces, ball end, 5/64" - 3/16"	 (1) 06587-0-0000	Hex L-key, ball end, 1.5 mm
 (5) 06396-0-0000	Cable ties	 (1) 06588-0-0000	Hex L-key, ball end, 0.05"
 (1) 07332-0-0000	Angle Square	 (1) 06399-0-0000	Hex L-key, ball end, 5 mm
 (1) 07981-0-0000	Static Dissipating Tweezers	 (1) 06394-0-0000, (1) 06209-0-0000	10 port powered USB hub with international power supply

Multi-Probe Micromanipulator: MPM-Ring-72 DEG

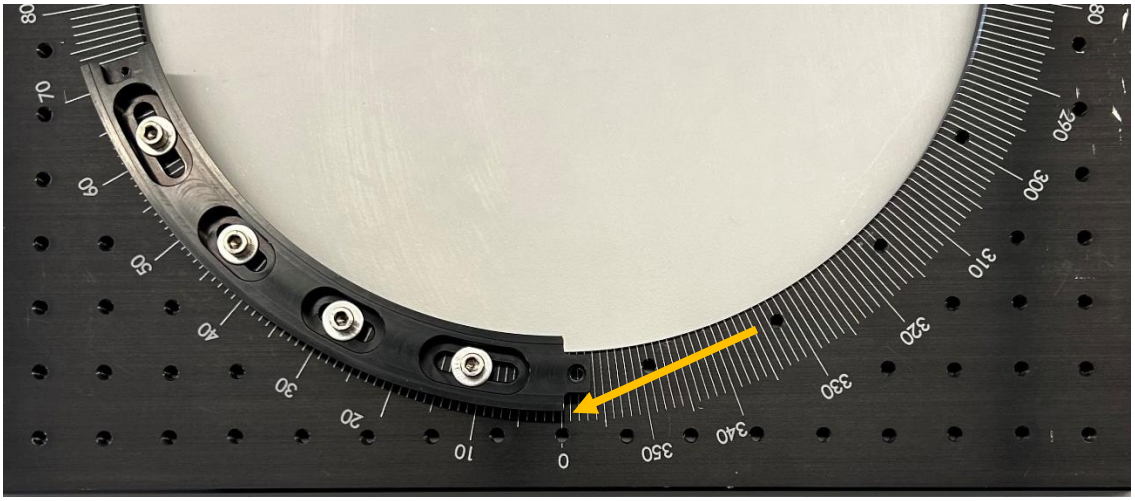
06262-3-0000 **MPM-Ring-72 DEG** 		
	(1) 06173-3-0000	MPM Dovetail ring 72° section
	(4) 06384-0-0000	Washer, 1/4 screw, 0.281"ID x 0.625"OD
	(4) 01945-0-0111	Screw, socket head, 1/4-20 x 1/2"
	(2) 01945-0-0132	Screw, socket head, 6-32 x 1/4”

Multi-Probe Micromanipulator: MPM-Ring-72 DEG

The **MPM-Ring-72 Deg** can be installed on any flat surface with tapped holes that correspond to the slots. The dimensions of the slots are compatible with standard optical breadboard tables with ¼-20 tapped holes with 1 inch spacing or M-6 tapped holes on 25 mm spacing. Screws (01945-0-0111) and washers (06384-0-0000) are provided with the **MPM-Ring-72 Deg**, and a 5/32 hex wrench (part of 06395-0-0000) is provided with the **MPM-System Kit**. During assembly, line up the edges ensuring a smooth transition between each section. This can be easily felt by running your finger along the edges. If sections are not flush with one another the sliding action of the dovetail in the **MPM-4 DOF Arm** will be difficult to manipulate.

Directions for MPM Mounting plate – 360 (06309)

1. Sections can be assembled to create longer arcs in increments of 72 degrees. Use the slots in the ring sections with screws (01945-0-0111), washer (06384-0-0000) and wrench (part of 06395-0-0000) to align sequential arcs. If a full ring is needed leave one section off until the end so **MPM-4 DOF Arm** can be slid on. **Do not fully tighten the screws until each section is placed together onto the plate.**

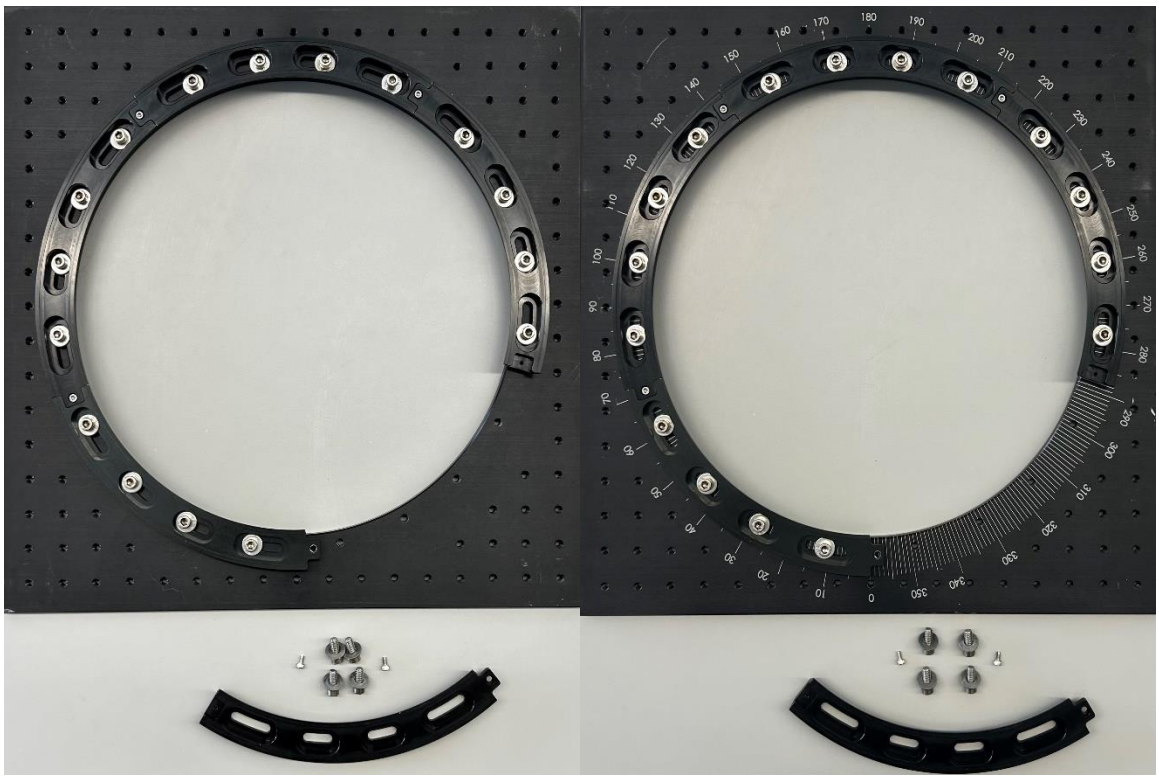


When placing the first section it helps to line up the edge of the part with the 0 Deg mark. This will ensure that every screw will have a slot to fit into. Do the same for the inverted set up.

2. Use screws (01945-0-0132) and wrench (part of 06395-0-0000) to secure sections to each other to maintain a smooth and consistent arc.

3. Go back and fully tighten all screws (01945-0-0111) fully securing rings to the table.

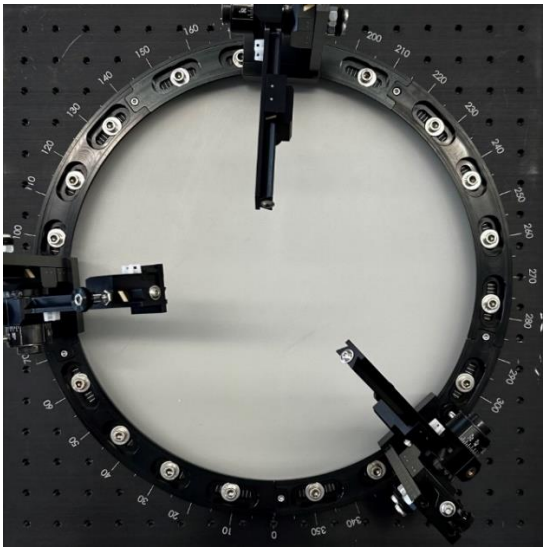
Below shows what a full ring should look like for both upright and inverted assembly. Make sure to leave one section off.



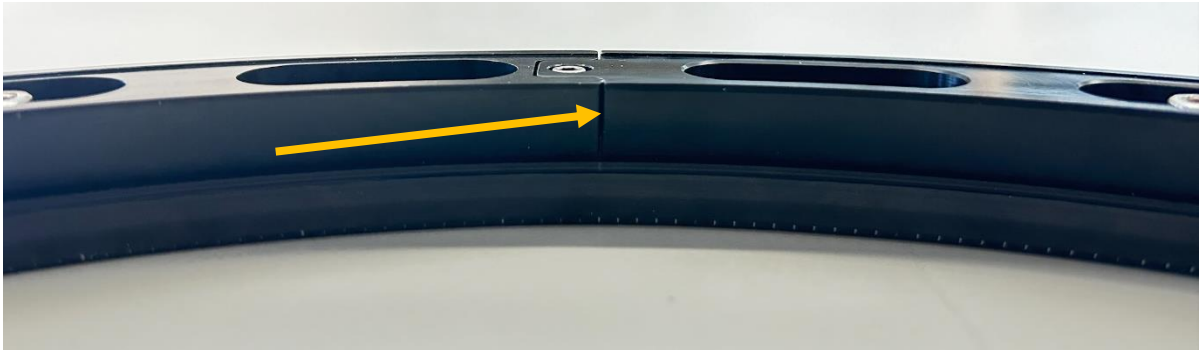
Inverted Assembly

Upright Assembly

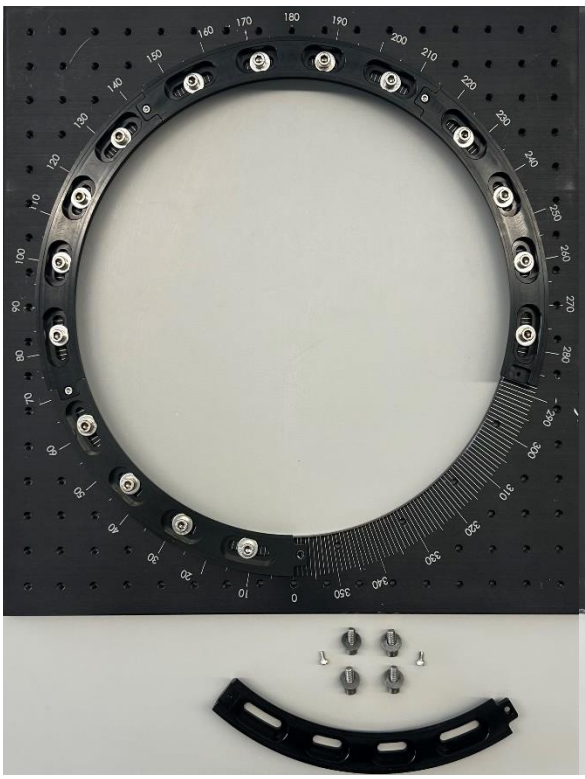
4. At this point slide on the arm uprights and put on the last section to test how **MPM-4 DOF Arm** slide from section to section.



5. If needed, loosen/tighten screws to obtain smooth transition between each section.



6. Once satisfied with how the sections fit together remove one section and all **MPM-4 DOF Arms**.



Upright Assembly

Inverted Assembly

Directions for MPM Mounting plate - 180 (07016)

1. Sections can be assembled to create longer arcs in increments of 72 degrees. Assembly varies depending on number of rings for practical purposes. Use the slots in the ring sections with screws (01945-0-0111), washer (06384-0-0000) and wrench (part of 06395-0-0000) to align sequential arcs. **Do not fully tighten the screws until each section is placed together onto the plate.**

2 ring assembly

When placing the first section it helps to line up the edge of the part with the 0 Deg mark. This will ensure that every screw will have a slot to fit into. Do the same for the inverted set up.

3 ring assembly

In the 3 ring assembly not all slots will have a hole for a screw.

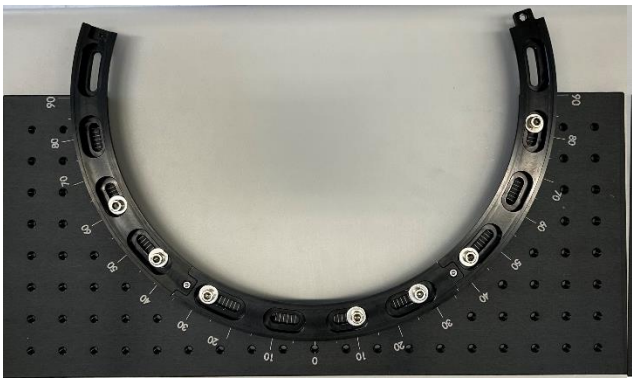
2. Use screws (01945-0-0132) and wrench (part of 06395-0-0000) to secure sections to each other to maintain a smooth and consistent arc.

3. Go back and fully tighten all screws (01945-0-0111) fully securing rings to the table.

Below shows what a 180 ring should look like for both upright and inverted assembly.

2 Ring Upright Assembly

2 Ring Inverted Assembly

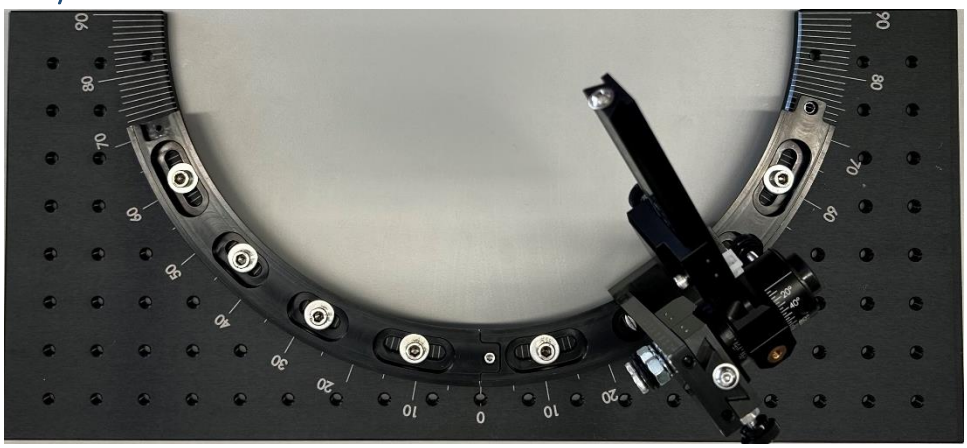


3 Ring Upright Assembly

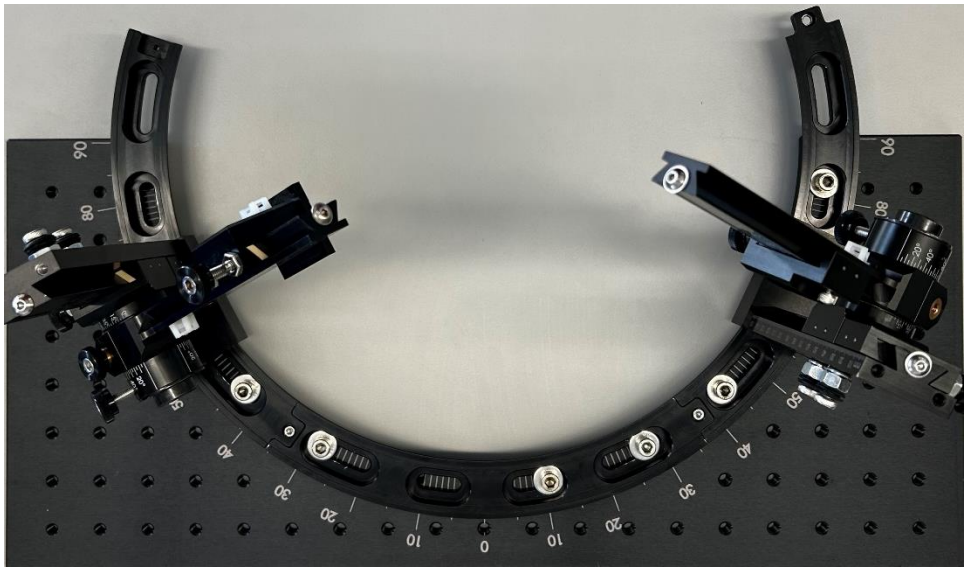
3 Ring Inverted Assembly

4. At this point slide on the arm uprights and put on the last section to test how **MPM-4 DOF Arm** slide from section to section.

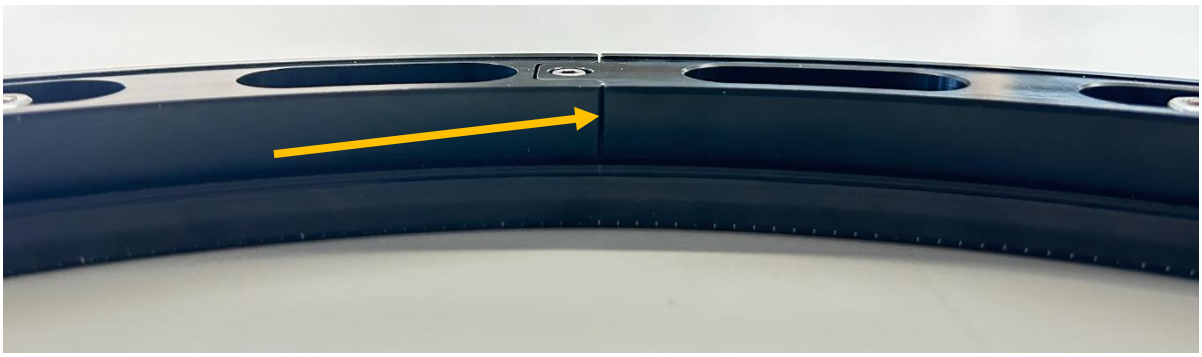
2 Ring Assembly



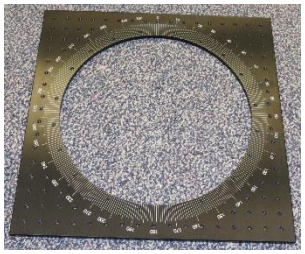
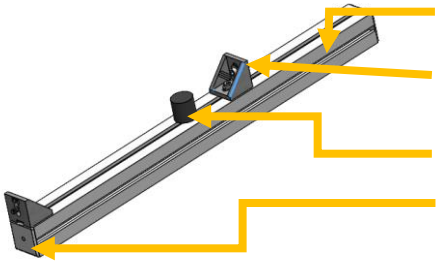
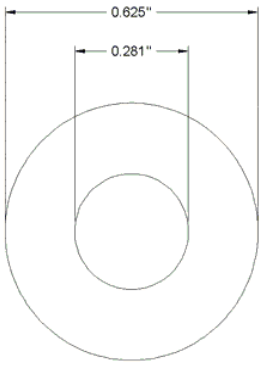
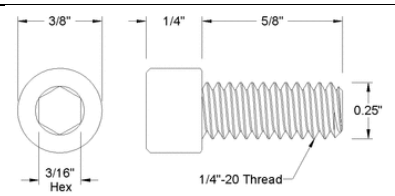
3 Ring Assembly



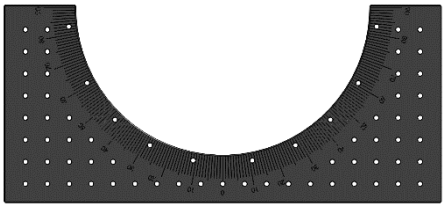
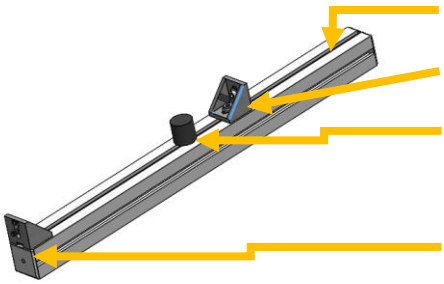
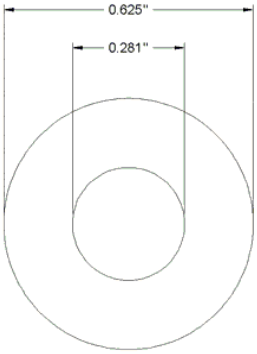
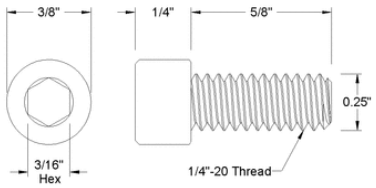
5. If needed, loosen/tighten screws to obtain smooth transition between each section. Once satisfied with fit remove **MPM-4 DOF Arm.**



Multi-Probe Micromanipulator: MPM-Platform & MPM-Platform-180

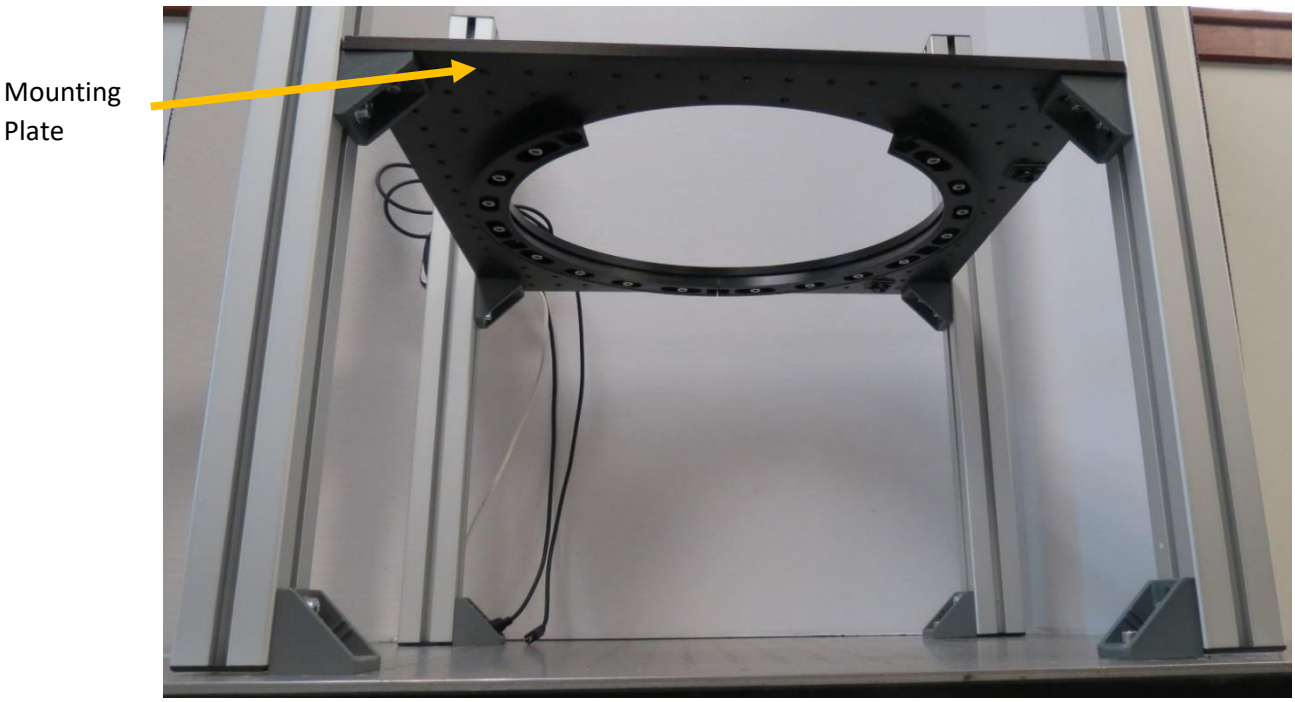
06308-3-0000 MPM-Platform		
	(1) 06309-0-0000	MPM Mounting plate, 450 x 450, etched
	(4) 06311-0-0000	Platform leg
	(8) 06312-0-0000	Angle bracket with hardware (pre-installed on Platform legs)
	(4) 07984-0-0000	Hard Stop (pre-installed on Platform legs)
	(8) 04831-0-0000	Endcap (pre-installed on Platform legs)
	(10) 06384-0-0000	Washer, 1/4 “ screw
	(10) 06392-0-0000	Screw, socket head, 1/4-20 x 5/8"

Multi-Probe Micromanipulator: MPM-Platform & MPM-Platform-180

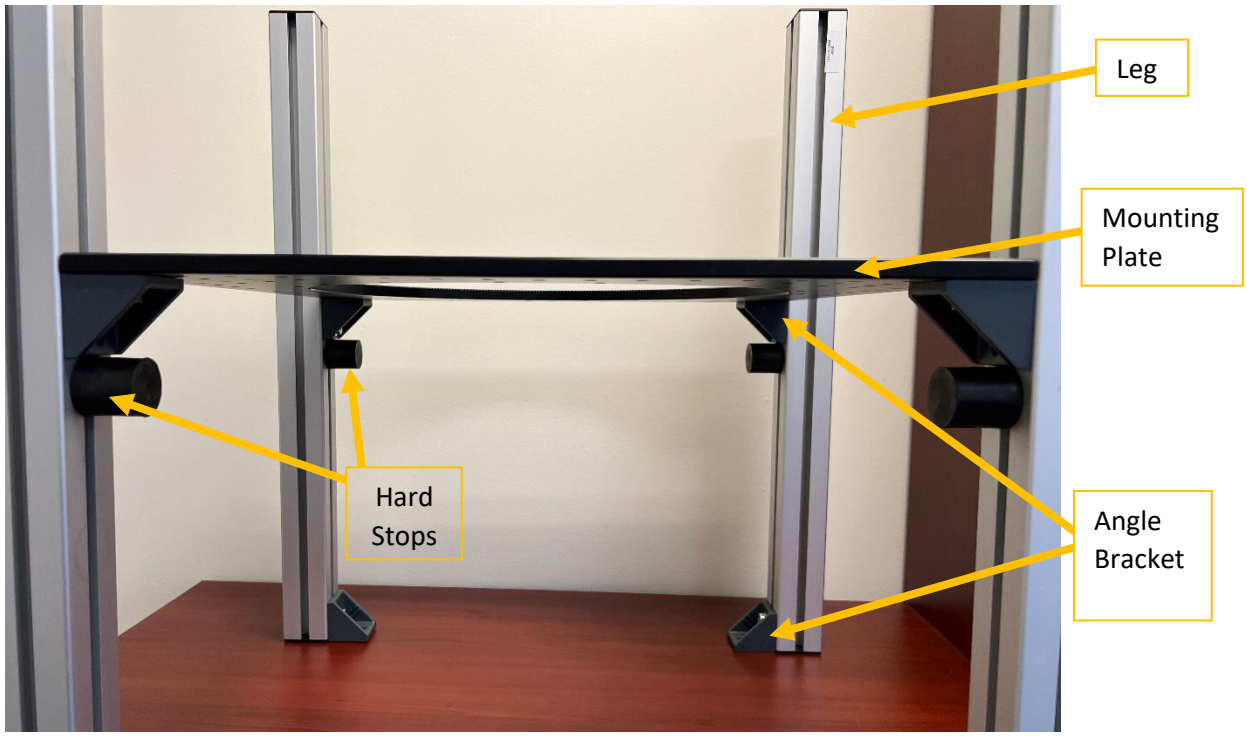
07024-3-0000 MPM-Platform-180		
	(1) 07016-0-0000	MPM Mounting plate, 507 x 228, etched
	(4) 06311-0-0000	Platform leg
	(8) 06312-0-0000	Angle bracket with hardware (pre-installed on Platform legs)
	(4) 07984-0-0000	Hard Stop (pre-installed on Platform legs)
	(8) 04831-0-0000	Endcap (pre-installed on Platform legs)
	(10) 06384-0-0000	Washer, 1/4 “ screw
	(10) 06392-0-0000	Screw, socket head, 1/4-20 x 5/8"

Multi-Probe Micromanipulator: MPM-Platform & MPM-Platform-180

The **MPM-Platform** is designed to be compatible with **MPM-Ring-72 Deg** sections.

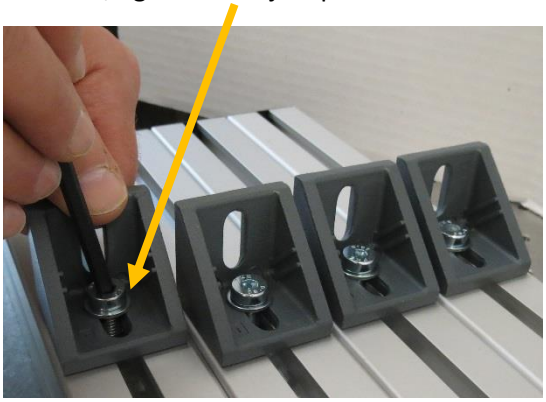


MPM-Platform assembled with (4) **MPM-Ring-72 Deg** sections installed



1. Adjust the position of the angle brackets so (4) are the desired height and (4) are at the end, using the provided wrench. You may also use the hard stops to adjust to the height of the system by unscrewing the hard stop with your hand, moving the hard stop to a desired height, and tightening the hard stop.

Loosen/tighten to adjust position

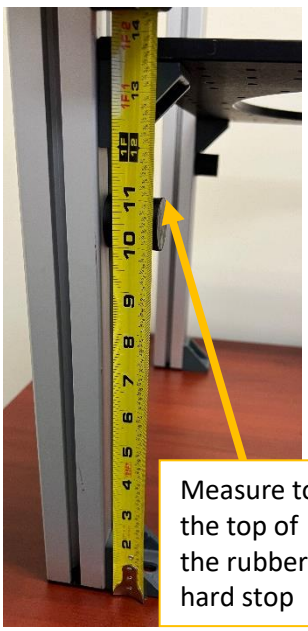


(4) angle brackets at desired height

(4) angle brackets at end

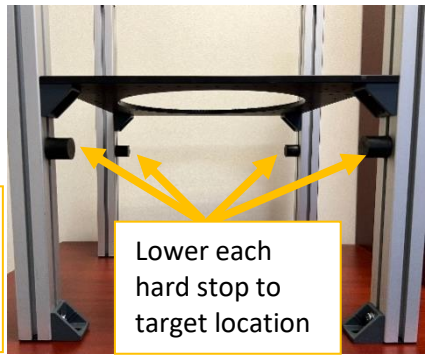
The provided round rubber hard stops are particularly useful when making an adjustment after the entire platform is already installed and assembled. It is recommended that you remove manipulators, probes and other valuable hardware before making this adjustment.

Measure to the top of the rubber hard stop once it is at your target location. Then adjust each hard stop of the same height. Loosen the angle brackets, allowing the platform to slide up or down in each leg. Lower the platform so each angle bracket is touching the hard stop, then tighten the screws back into place.



Measure to the top of the rubber hard stop

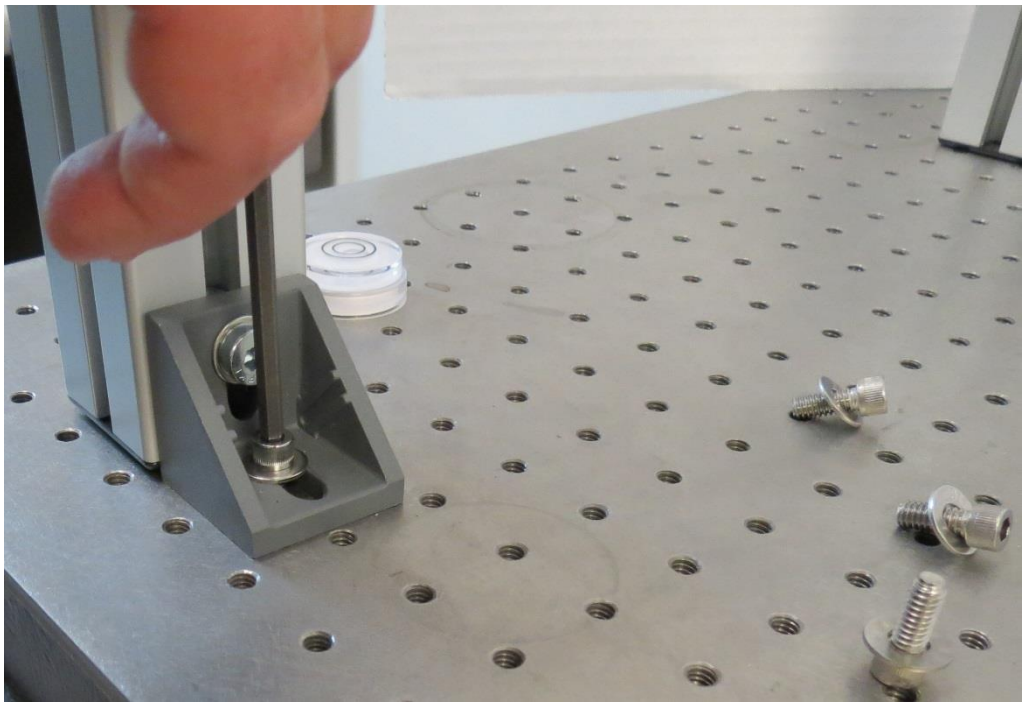
Loosen upper angle bracket screws



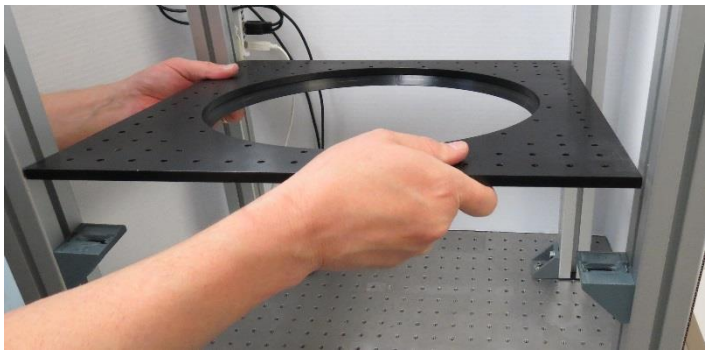
Lower each hard stop to target location

Lower platform, then retighten screws

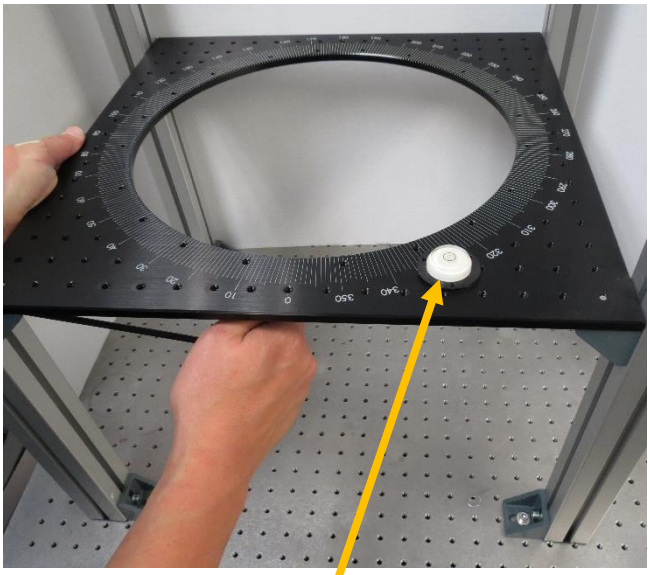
2. Use the screws (06392-0-0000), washers (06384-0-0000) and wrench (part of 06395-0-0000) provided to secure the (4) legs.



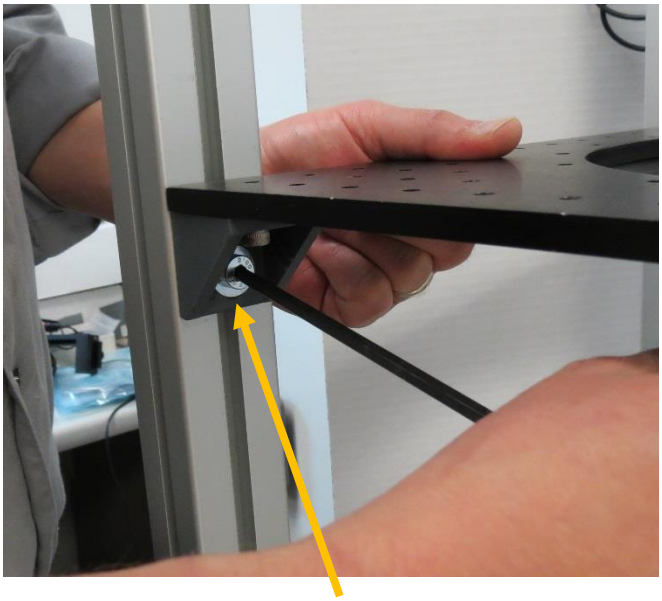
3. Place the mounting plate on the angles and secure in place using the screws (06392-0-0000), washers (06384-0-0000) and wrench (part of 06395-0-0000) provided.



4. Use a bubble level and adjust the height of the corners to level the platform.

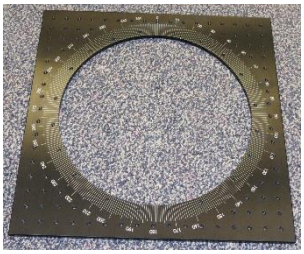
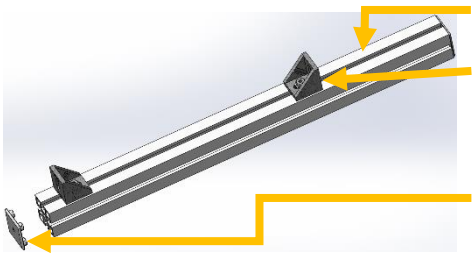
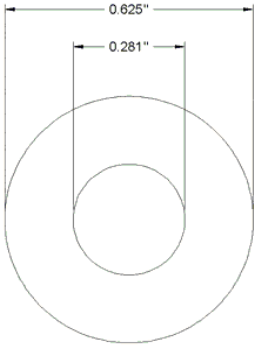
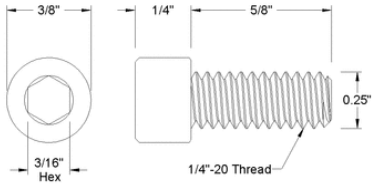


Bubble level

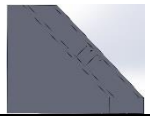


Loosen/tighten to adjust height

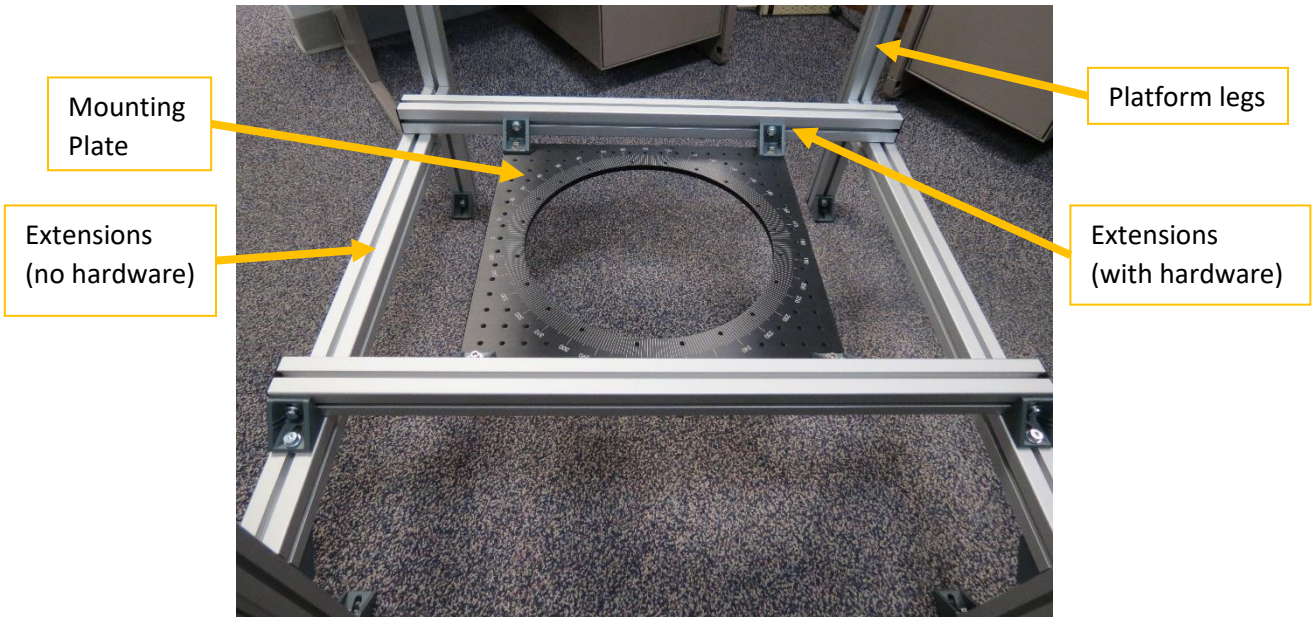
Multi-Probe Micromanipulator: MPM-Platform-Extended

07134-3-0000 MPM-Platform-Extended		
	(1) 06309-0-0000	MPM Mounting plate, 450 x 450, etched
	(4) 06311-0-0000	Platform leg
	(8) 06312-0-0000	Angle bracket with hardware (pre-installed on Platform legs)
	(8) 04831-0-0000	Endcap (pre-installed on Platform legs)
	(10) 06384-0-0000	Washer, 1/4 “ screw
	(10) 06392-0-0000	Screw, socket head, 1/4-20 x 5/8"

Multi-Probe Micromanipulator: MPM-Platform-Extended (continued)

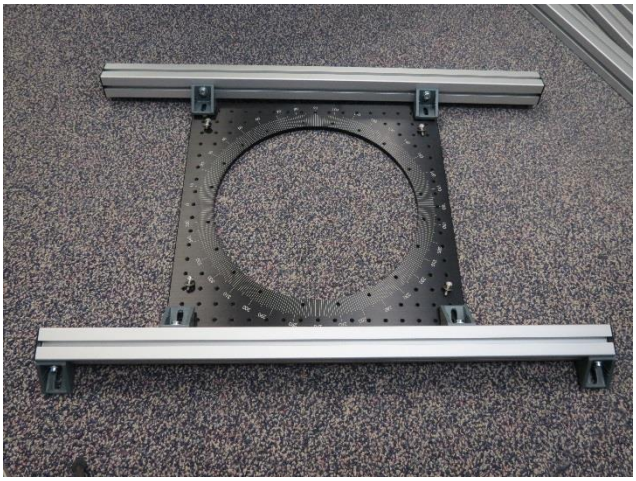
<table>
<tr><td>  </td><td>(2) 07135-0-0000</td><td>Extensions, 800 mm long, no endcaps or other hardware</td></tr>
<tr><td rowspan="4">  </td><td rowspan="4">(2) 07135-0-0000 with hardware</td><td>Each Extension (with hardware) includes the following:</td></tr>
<tr><td>(1) 07135-0-0000 (see above)</td></tr>
<tr><td>(2) 04831-0-0000 endcaps (pre-installed)</td></tr>
<tr><td>(2) 06312-0-0000 angles with alignment tabs (pre-installed)
  </td></tr>
<tr><td colspan="2"></td><td>(2) 06312-0-0000 angles with no alignment tabs (pre-installed)
  </td></tr>
</table>

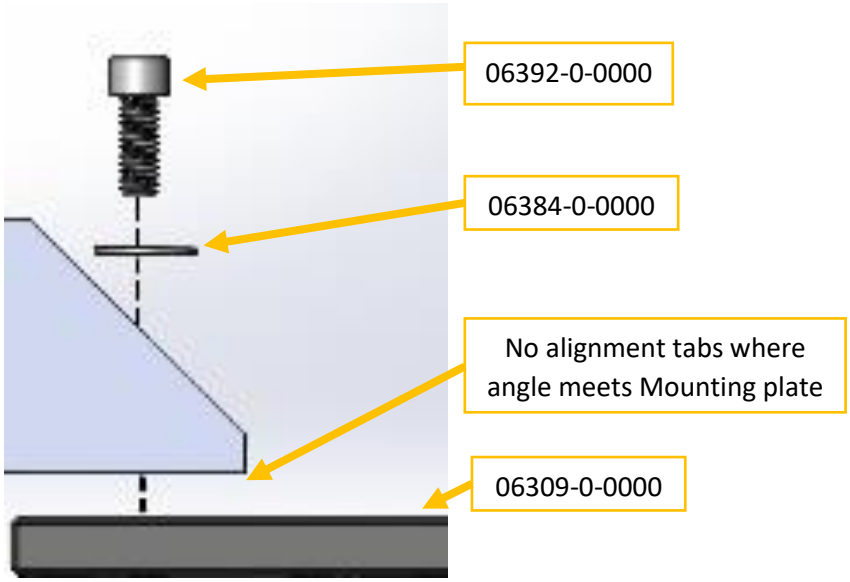
The **MPM-Platform-Extended** is designed to be compatible with **MPM-Ring-72 Deg** sections.



Multi-Probe Micromanipulator: MPM-Platform-Extended Assembly

1. Attach Mounting Plate to Extensions (with hardware): Place Mounting Plate on a flat surface. Place the Extensions (with hardware) next to the Mounting Plate on either side; be sure the angles with *alignment tabs removed* are facing the Mounting Plate. Align the angles to the corner holes of the Mounting Plate. Use the screws and washers to attach the Extensions (with hardware) to the Mounting plate.

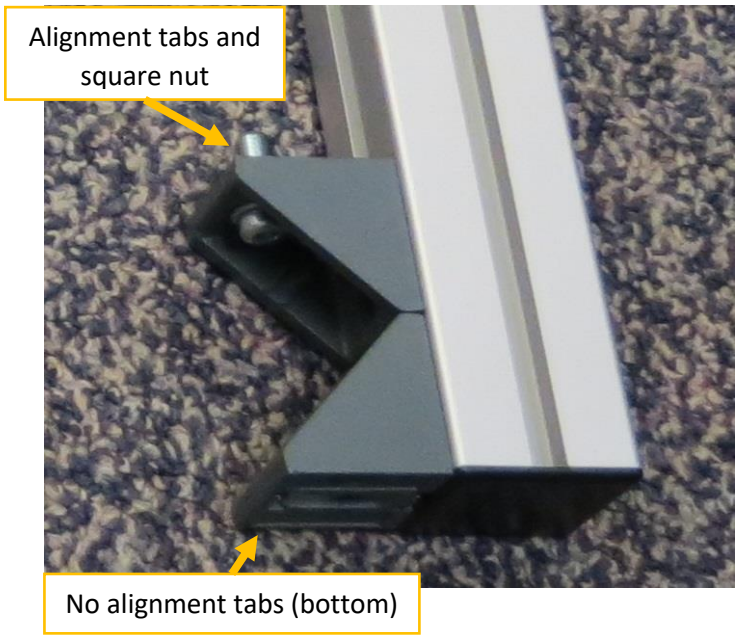


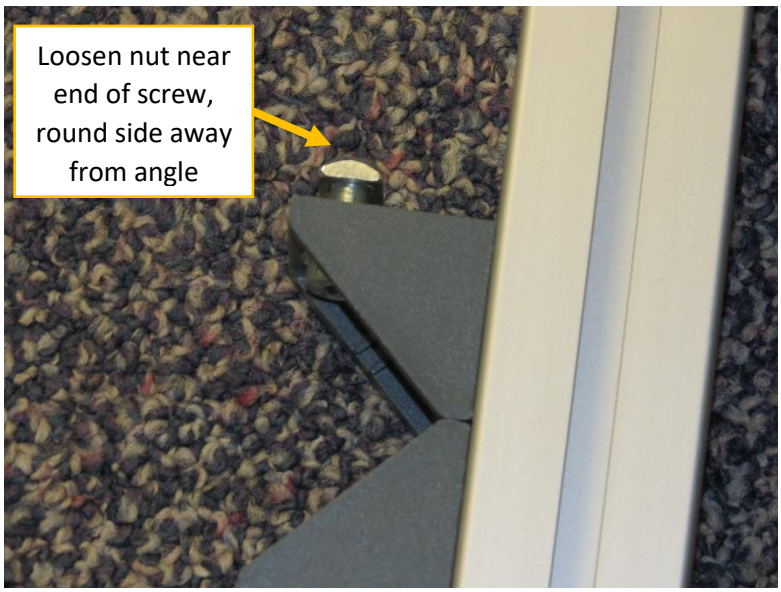


2. Attach Extensions to Platform legs (x2): Attach (2) x 06311-0-0000 Platform legs and (1) x 07135-0-0000 Extension, and repeat the assembly with the other Legs and Extension.

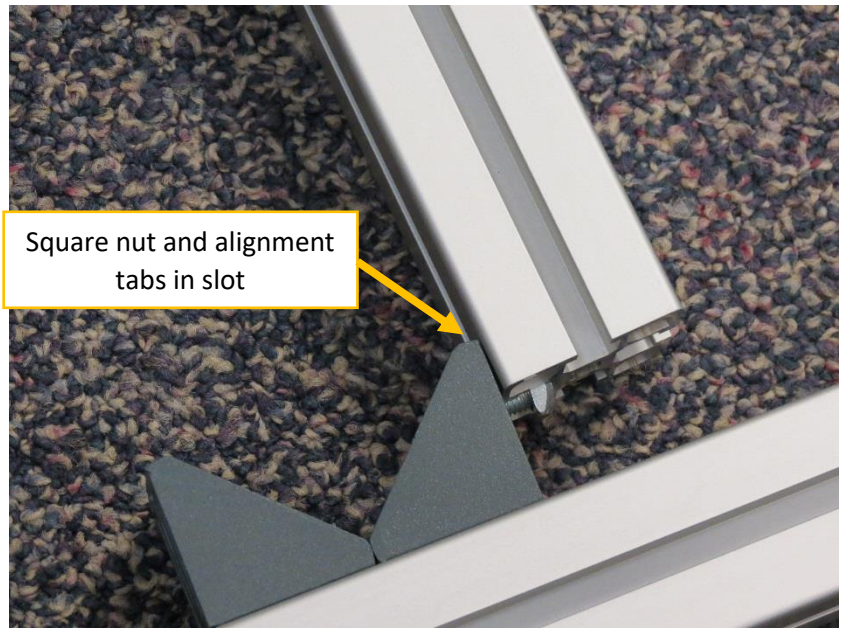
Multi-Probe Micromanipulator: MPM-Platform-Extended Assembly (step 2 continued)

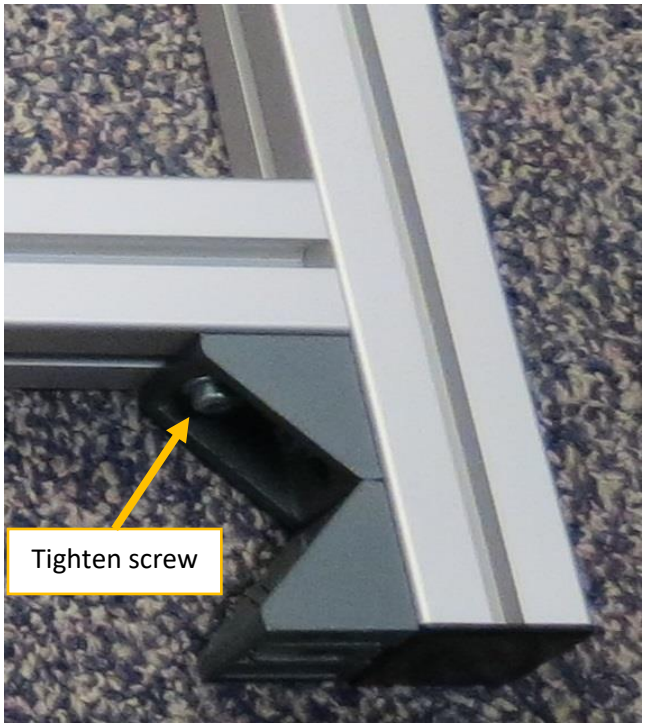
On a 06311-0-0000 Leg with hardware, loosen the square nut on the angle with alignment tabs until it is near the end of the screw, as shown.





Slide Extension onto angle, with square nut and alignment tabs in the slot as shown, then tighten the screw. Repeat on opposite end of Extension.

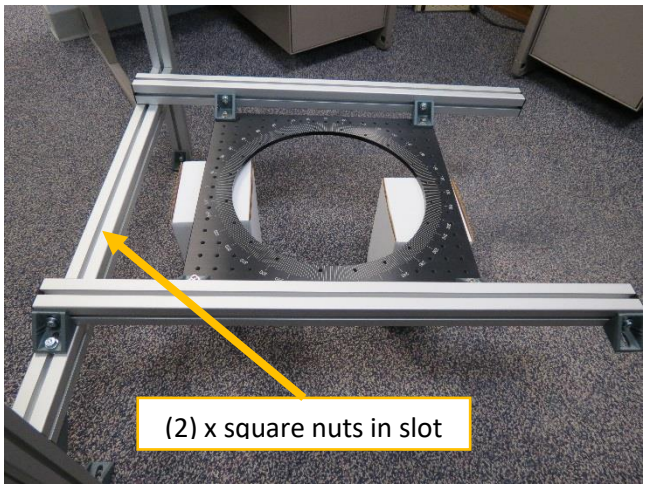


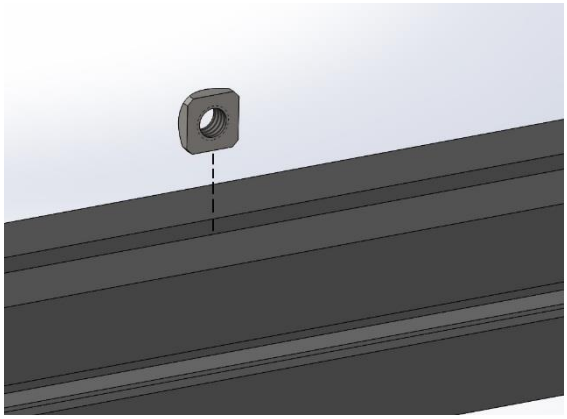


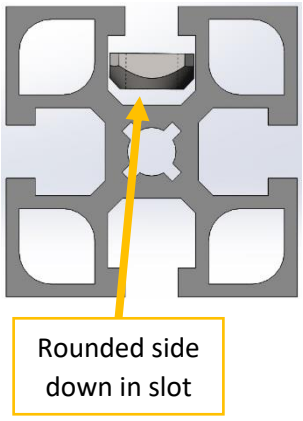
Multi-Probe Micromanipulator: MPM-Platform-Extended Assembly (continued)

3. Complete the assembly: Use blocks or boxes to elevate the Mounting plate with Extensions (from Step 1) close to the desired height as shown. Place Legs with Extensions (from Step 2) to one side as shown.

Adjust height of Legs with Extensions to about the same height as the Mounting plate with Extensions, as shown. Place (2) x M8 square nuts, one side rounded, into the slot of the Legs with Extension; turn the nut sideways and drop into place, be sure rounded side of nut is down in slot.

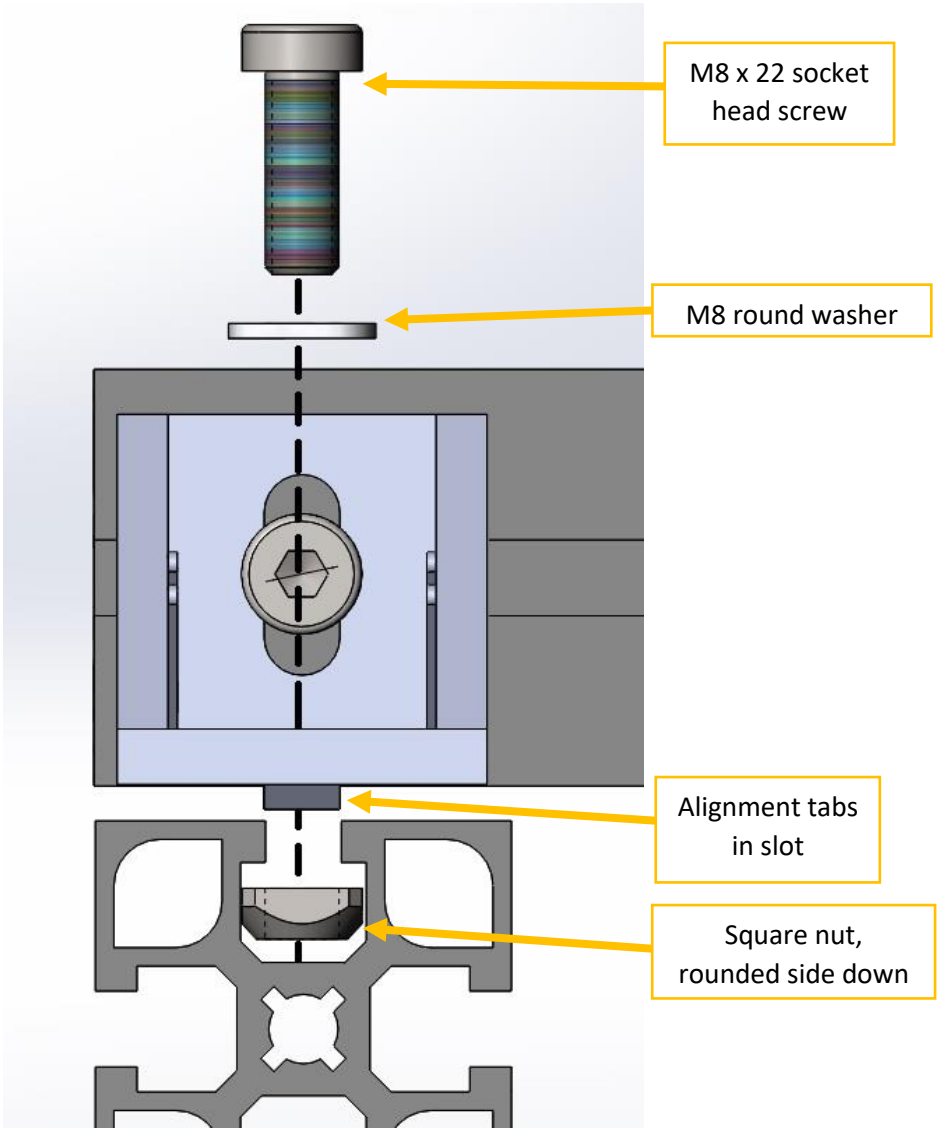


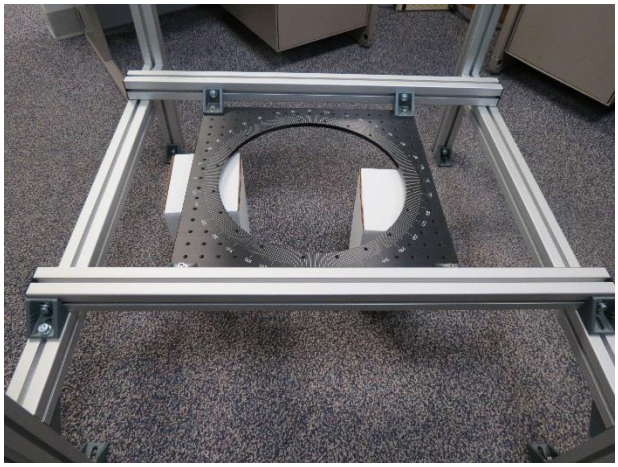




Multi-Probe Micromanipulator: MPM-Platform-Extended Assembly (step 3 continued)

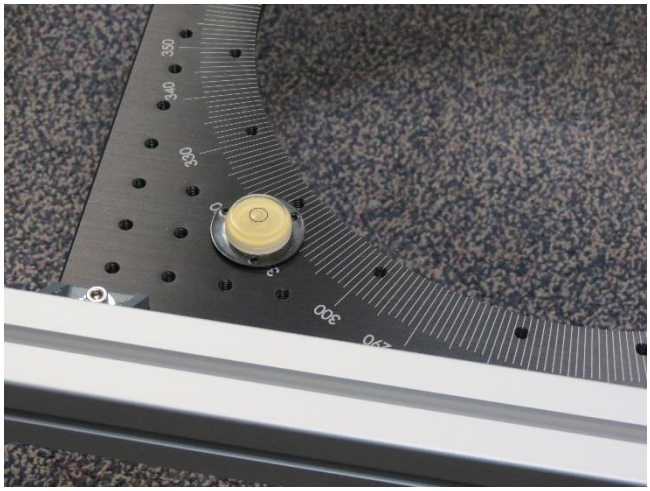
Use (2) x M8 x 22 socket head screws and (2) x M8 round washers to secure the Mounting plate with Extensions to Leg with Extensions; place alignment tabs in the slot where the (2) x M8 square nuts are found, and tighten the screws into the nuts. Repeat for opposite side of Mounting plate with Extensions.

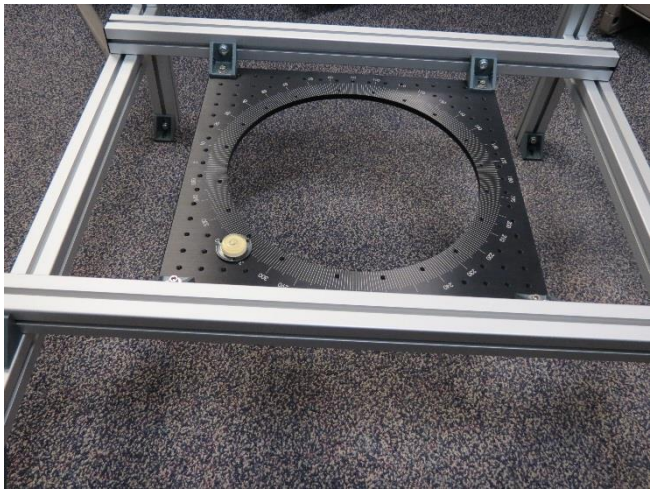




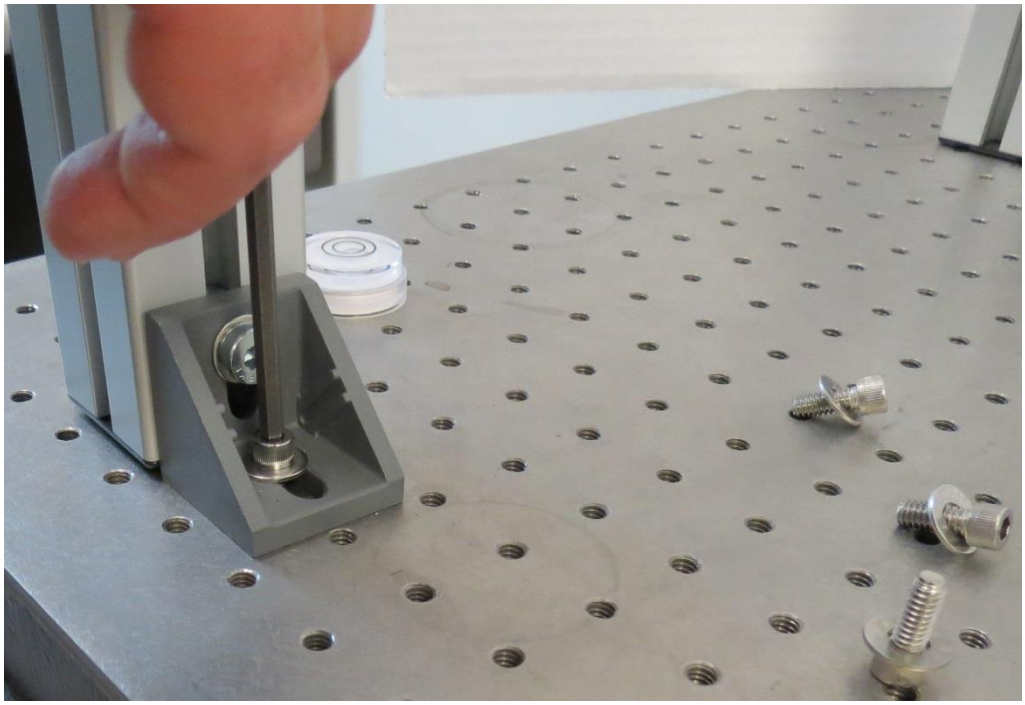
Multi-Probe Micromanipulator: MPM-Platform-Extended Assembly (step 3 continued)

Use a bubble level to ensure the Mounting plate is level. Many adjustments are available to suit specific applications, adjust position of Mounting plate as needed.





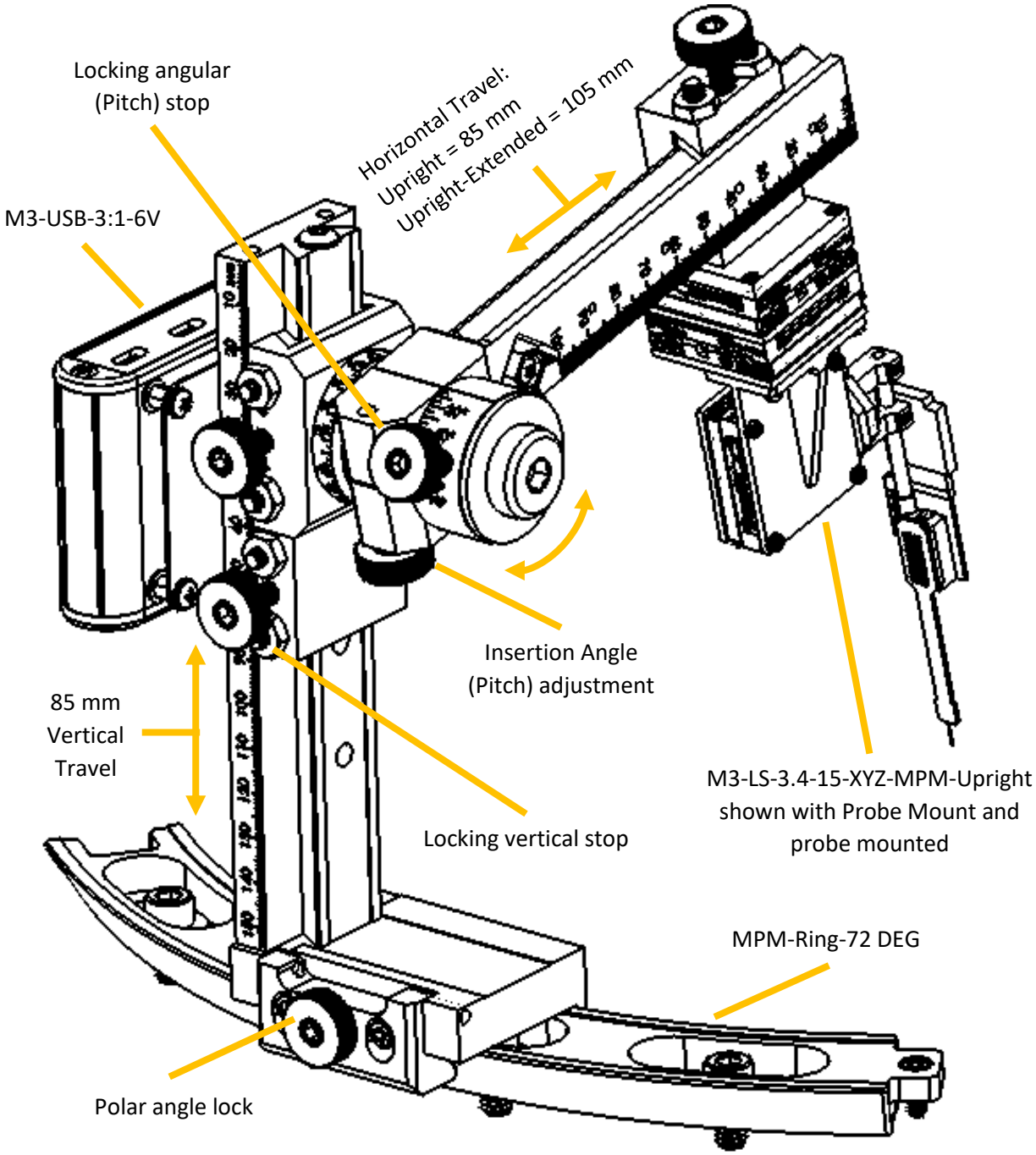
Use (4) x 06392-0-0000, 1/4-20 x 5/8" socket head screws and (4) x 06384-0-0000, 0.281" ID x 0.625" OD washers to secure the Extended Platform assembly to a surface with 1/4-20 threaded holes (like a standard optical table).



MPM-4 DOF Arm-Upright & MPM-4 DOF Arm-Upright-Extended

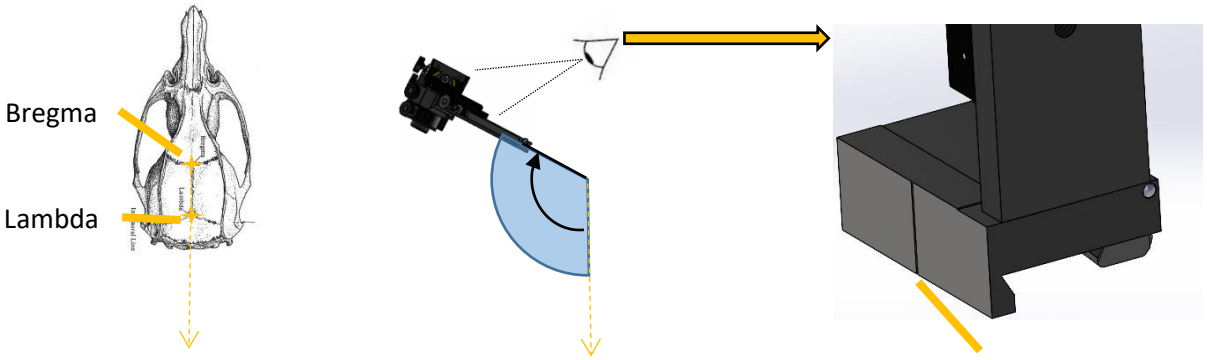
Item #	Description
06463-3-0001	MPM-4 DOF Arm-Upright
06463-3-0011	MPM-4 DOF Arm-Upright-Extended

MPM-4 DOF Arm-Upright shown installed on MPM-Ring-72 DEG, with M3-USB-3:1-6V and M3-LS-3.4-15-XYZ-MPM-Upright mounted on the Arm.

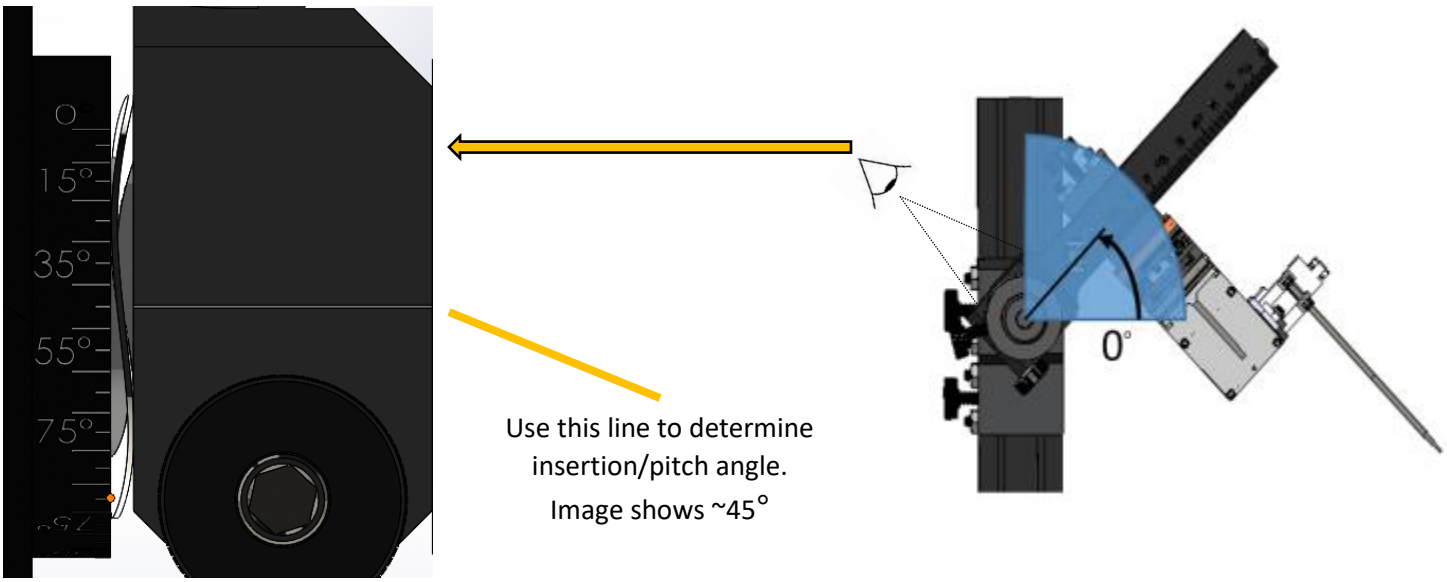


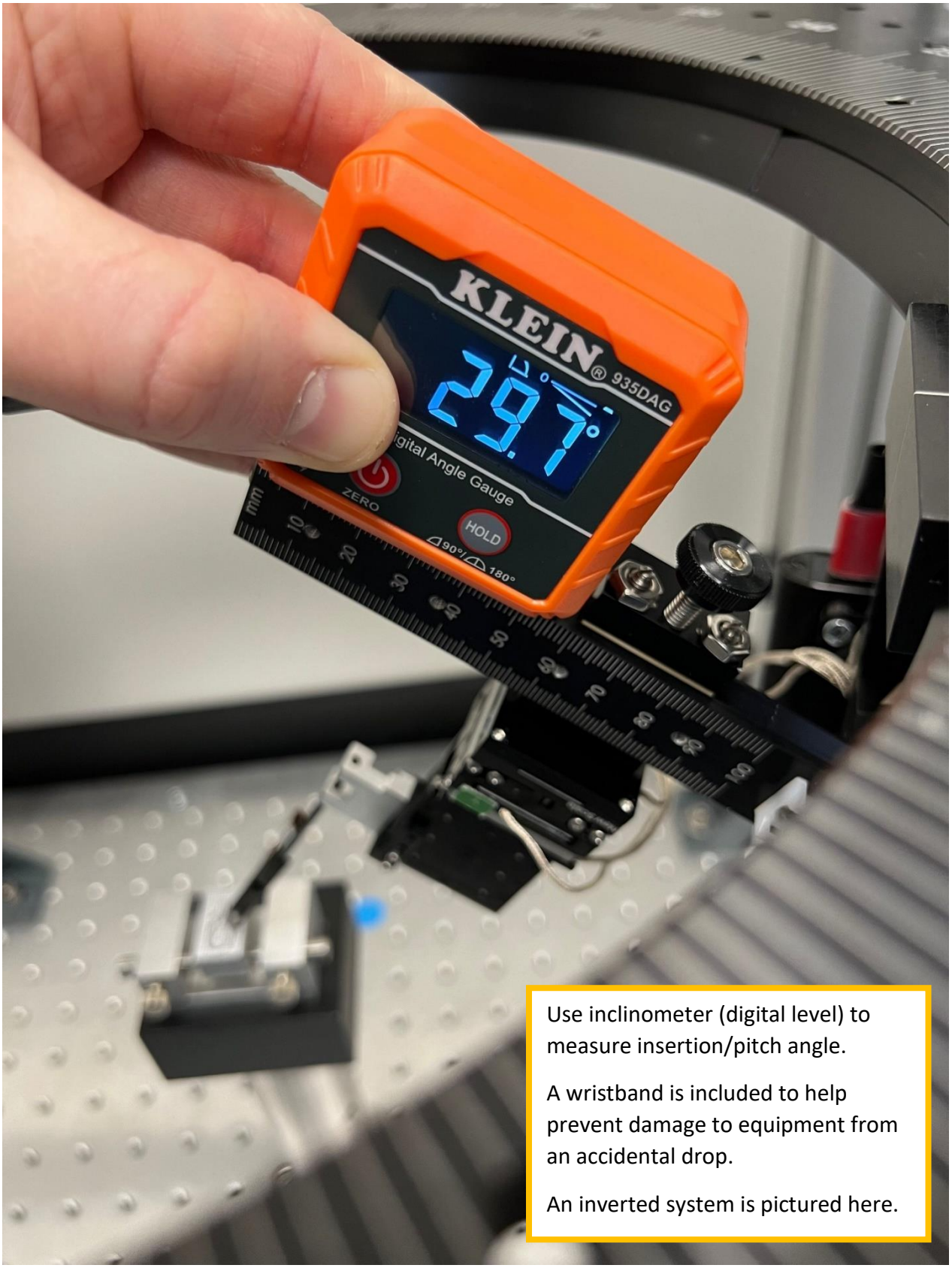
MPM-4 DOF Arm-Upright & MPM-4 DOF Arm-Upright-Extended: How to use position marks

Polar Angle: The polar angle measurement is based on the orientation of the Arm relative to the subject, as shown. Assume a "front facing angle" lined up with the bregma/lambda axis, facing the tail of the subject, as shown. Polar angle is measured as positive offset to the front facing angle. For precise polar angle measurement, a digital protractor is recommended (for example iGaging Digital Protractor with 7 inch rule, digital protractor not included).



Insertion Angle/Pitch Angle: 0° is parallel to the base/table, angle is measured in the direction shown. For more precise angle measurement, a digital angle sensor is recommended (for example the Klein Tools Digital Angle-Gauge included in the MPM System Kit). Available range is 0° - 90°.





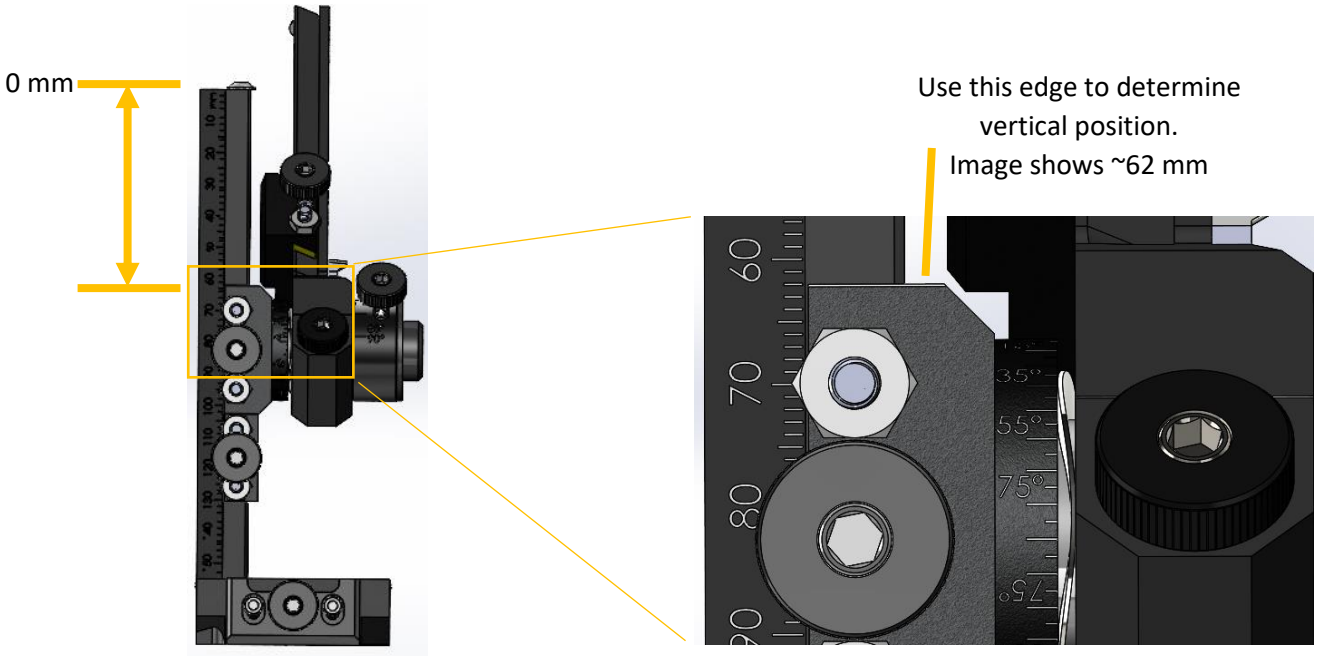
Use inclinometer (digital level) to measure insertion/pitch angle.

A wristband is included to help prevent damage to equipment from an accidental drop.

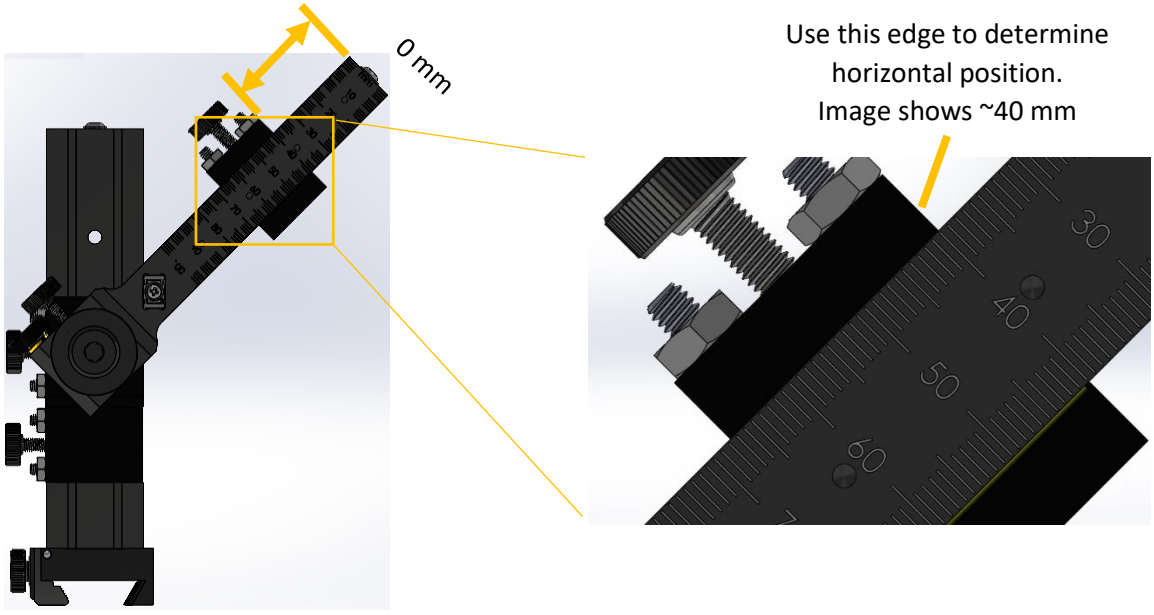
An inverted system is pictured here.

MPM-4 DOF Arm-Upright & MPM-4 DOF Arm-Upright-Extended: How to use position marks (continued)

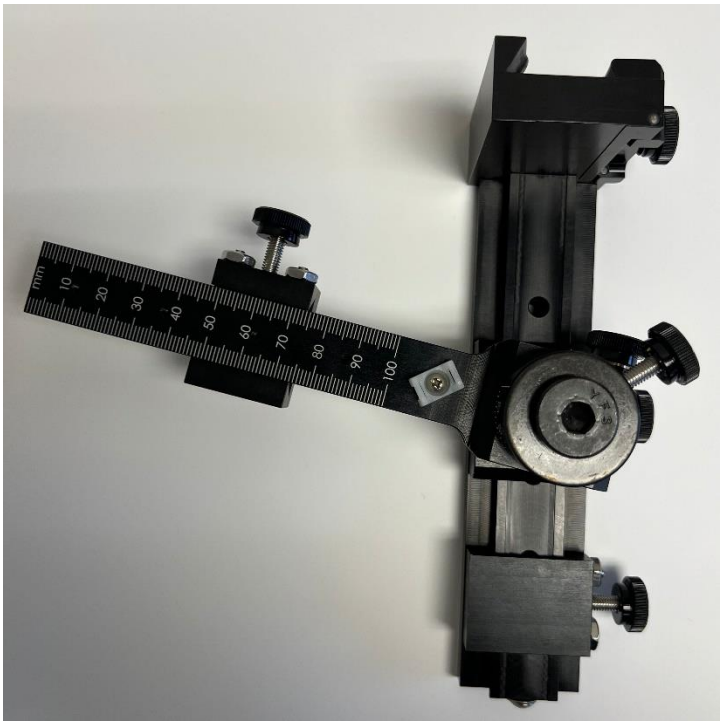
Vertical Position: Measured from the top of the vertical dovetail ("0 mm") to the top of the vertical slide, as shown. Available range is 0 mm – 86 mm.

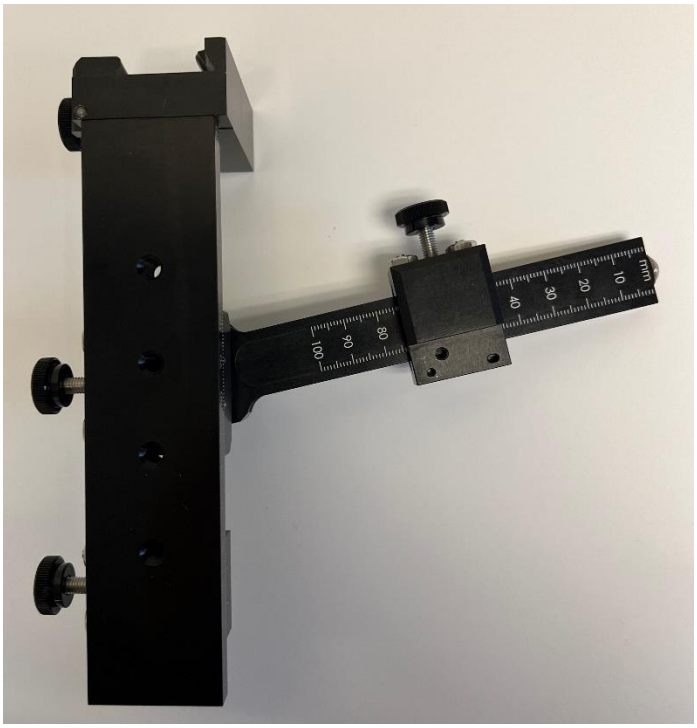


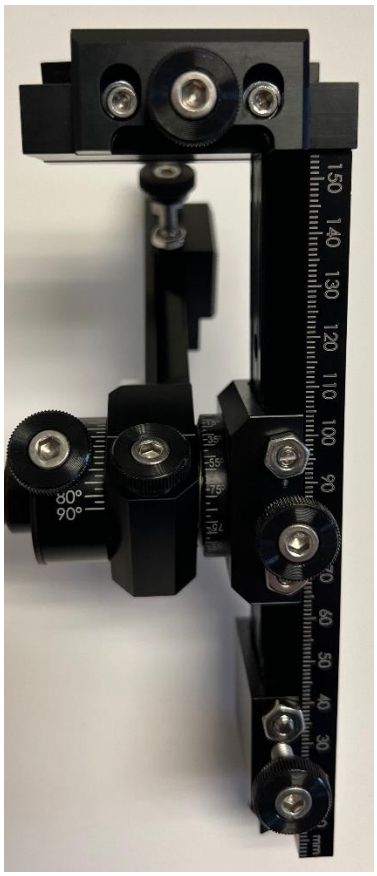
Horizontal Position/Arm Slider Position: Measured from the end of the horizontal dovetail facing the subject ("0 mm") to the edge of the horizontal slide, as shown. Available range is 0 mm – 93 mm.

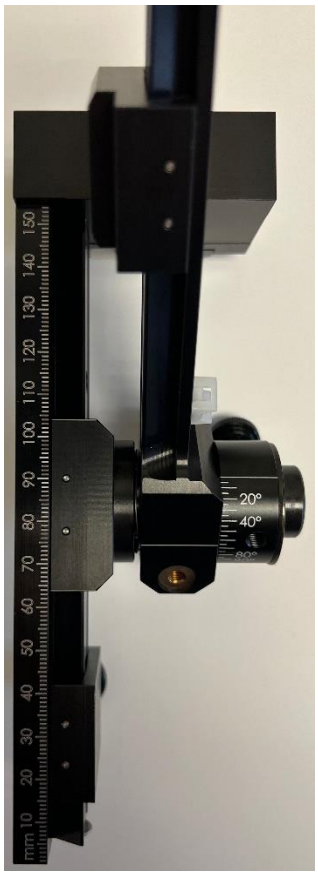


Etchings are included on both sides of the 4 DOF Arm, for easy readability, regardless of viewing angle.





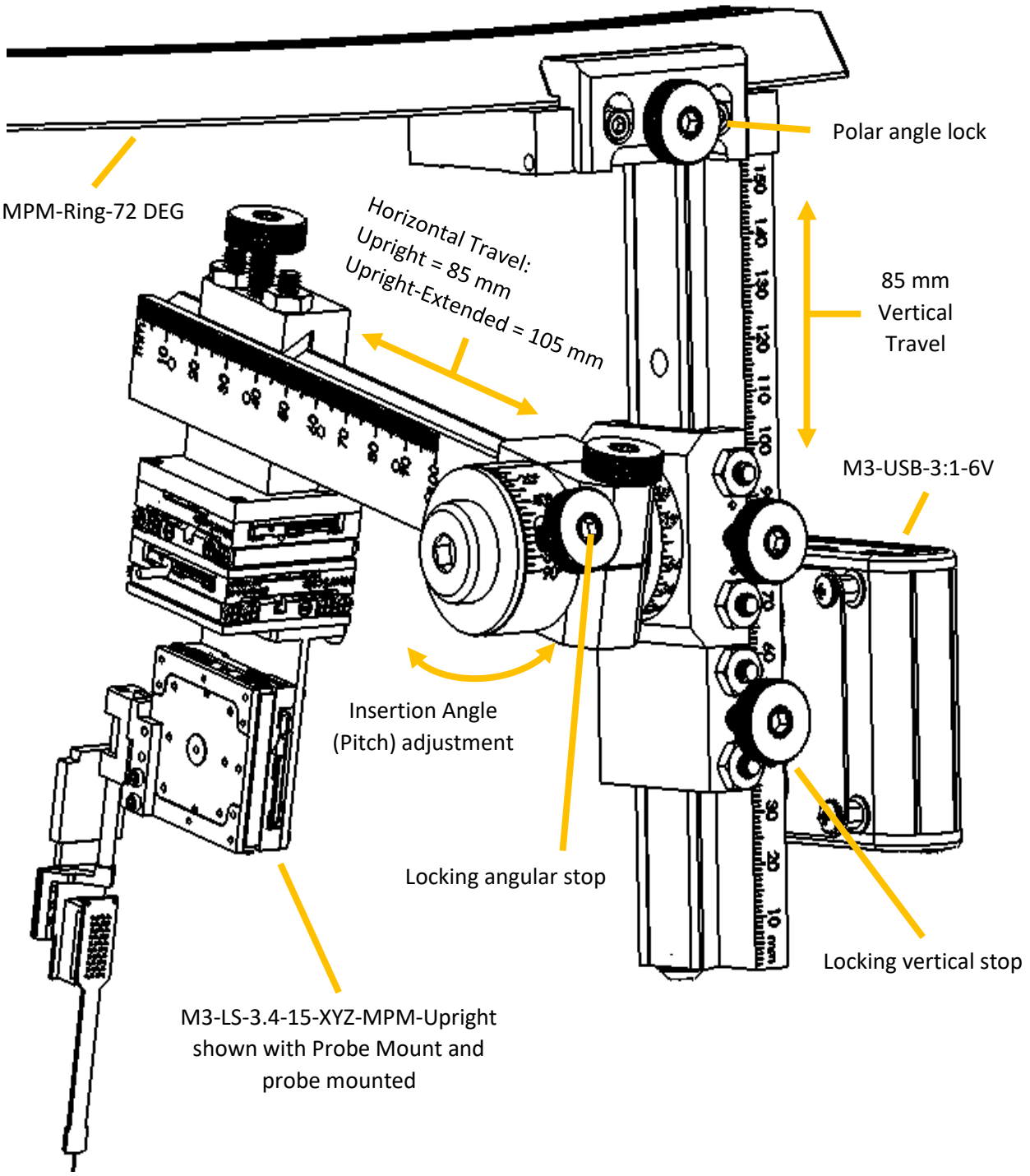




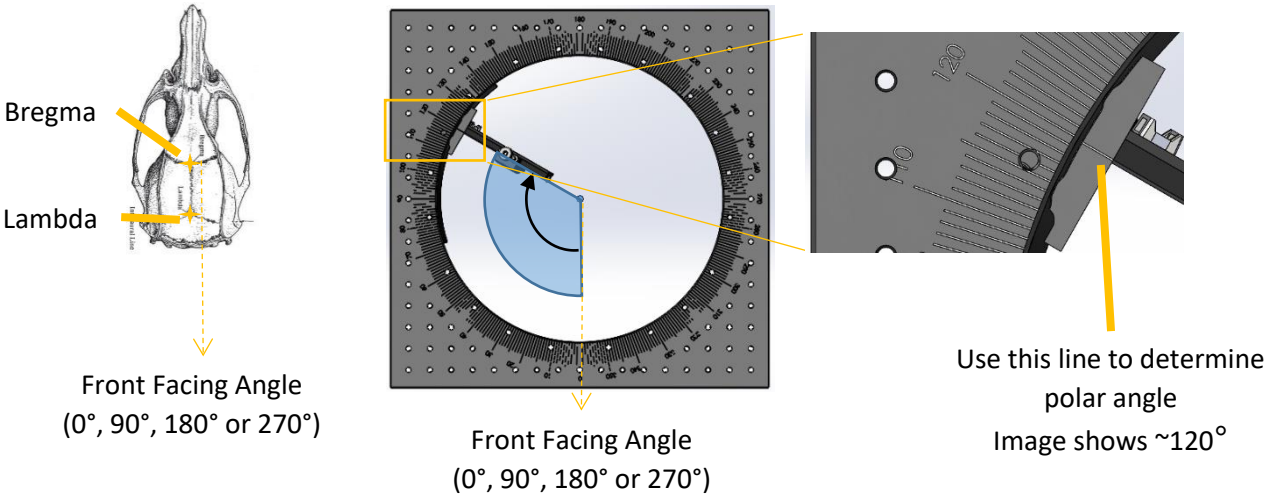
MPM-4 DOF Arm-Inverted & MPM-4 DOF Arm-Inverted-Extended

Item #	Description
06463-3-0000	MPM-4 DOF Arm-Inverted
06463-3-0010	MPM-4 DOF Arm-Inverted-Extended

MPM-4 DOF Arm-Inverted shown installed on MPM-Ring-72 DEG, with M3-USB-3:1-6V and M3-LS-3.4-15-XYZ-MPM-Inverted mounted on the Arm.

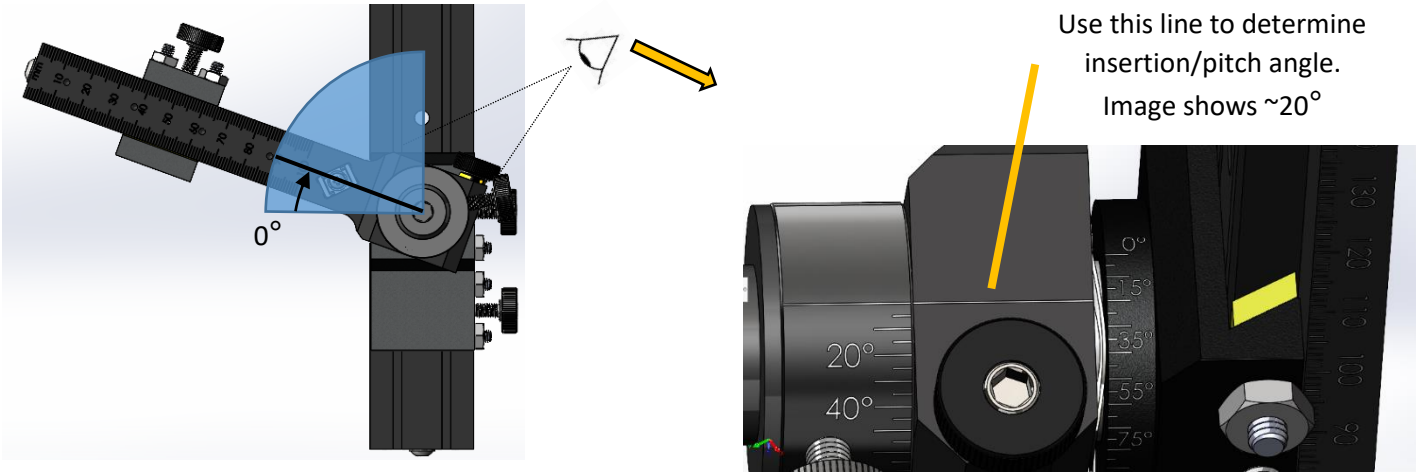


MPM-4 DOF Arm-Inverted & MPM-4 DOF Arm-Inverted-Extended: How to use position marks



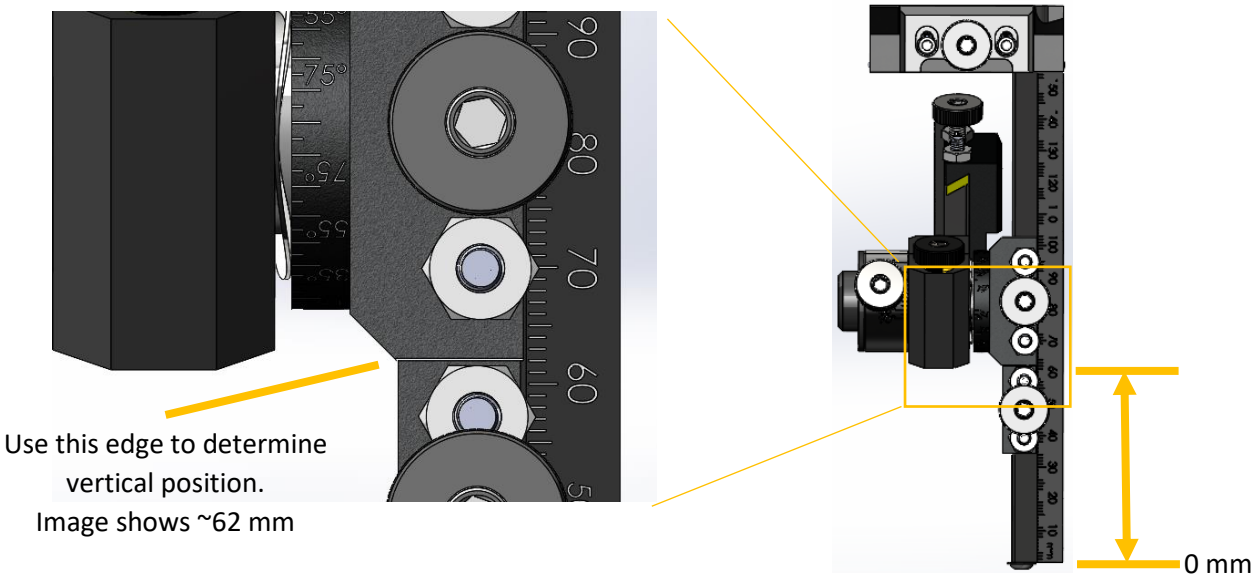
Polar Angle: Assume a "front facing angle" aligned with the bregma/lambda axis, facing the tail of the subject, as shown. Polar angle is measured as positive offset to the front facing angle. When the Arm is used with an MPM-Platform and MPM-Ring-72 DEG section, use the markings on the mounting plate and the line on the Arm to determine the polar angle. For more precise polar angle measurement, a digital protractor is recommended (for example iGaging Digital Protractor with 7 inch rule, digital protractor not included).

Insertion Angle/Pitch Angle: 0° is parallel to the base/table, angle is measured in the direction shown. For more precise angle measurement, a digital angle sensor is recommended. Available range is 0° - 90°. An inclinometer (Klein digital angle gauge/level) is included to help with precise angle measurements. Before use, be sure to read the instruction sheet, especially how to zero the device.

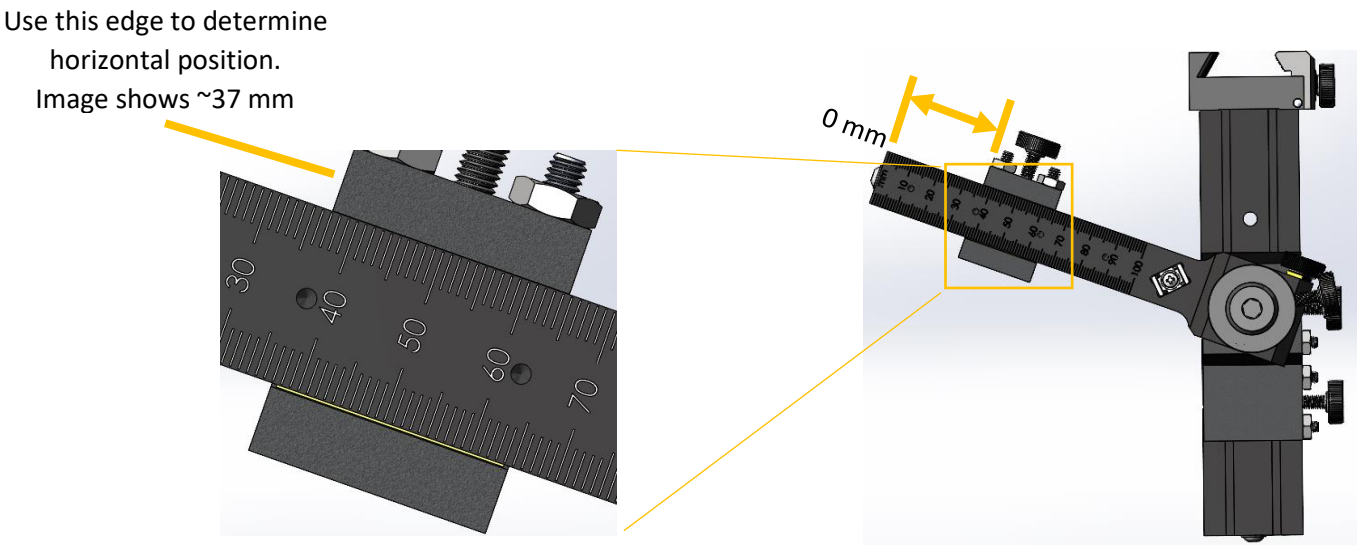


MPM-4 DOF Arm-Inverted & MPM-4 DOF Arm-Inverted-Extended: How to use position marks (continued)

Vertical Position: Measured from the bottom of the vertical dovetail ("0 mm") to the bottom of the vertical slide (**not** the locking vertical stop), as shown. Available range is 28 mm – 114 mm.

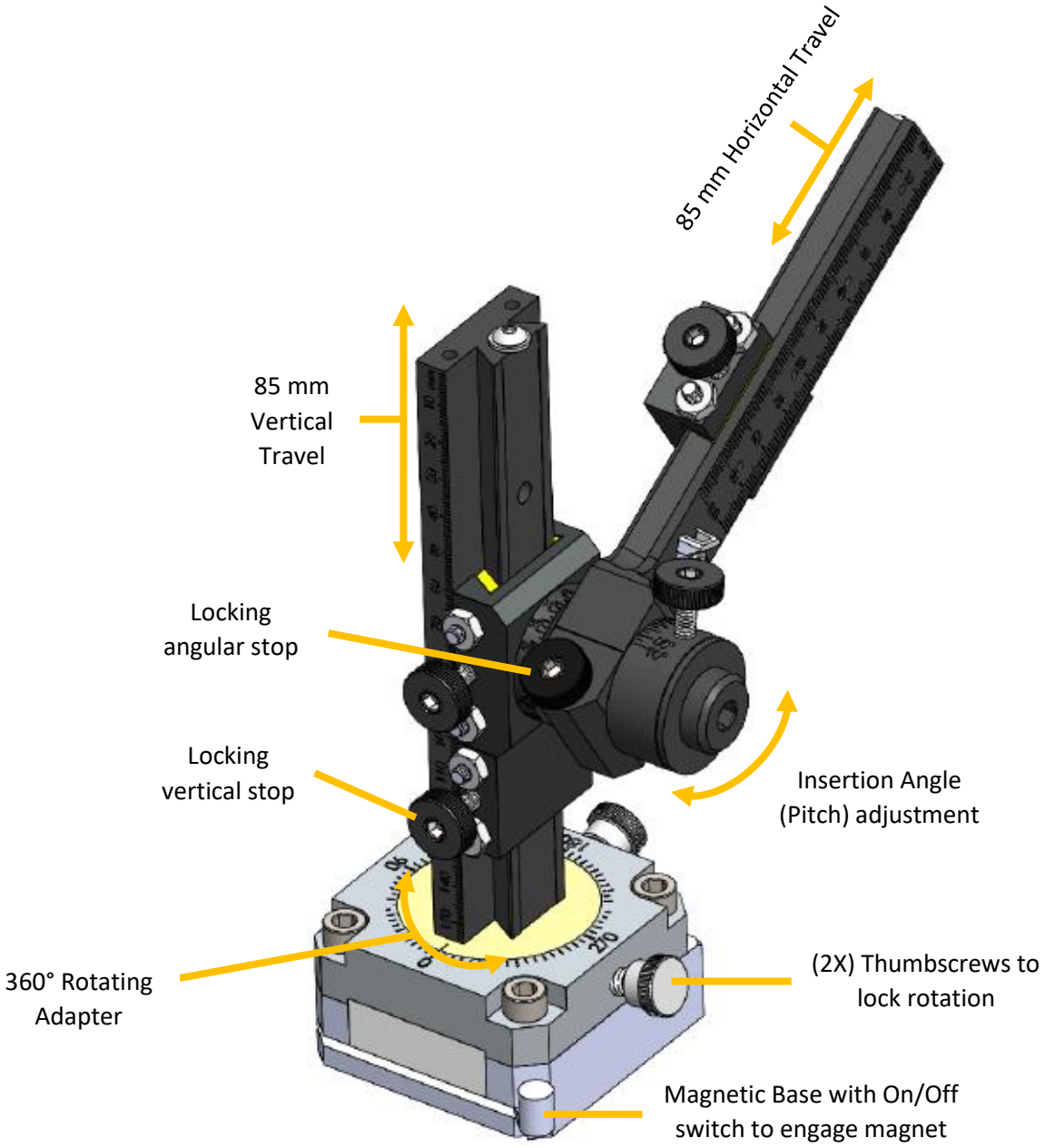


Horizontal Position/Arm Slider Position: Measured from the end of the horizontal dovetail facing the subject ("0 mm") to the edge of the horizontal slide, as shown. Available range is 0 mm – 93 mm.



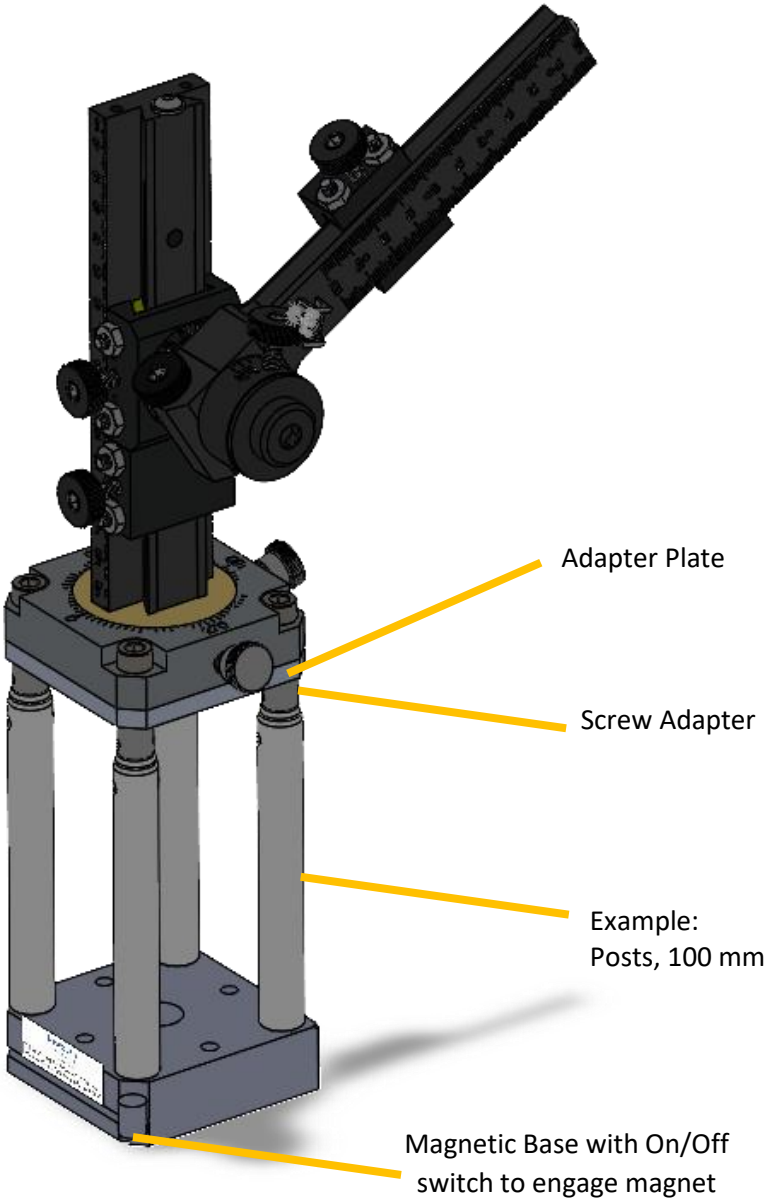
Multi-Probe Micromanipulator: MPM-4 DOF Arm-Upright-Magnetic

Item #	Description
07330-3-0000	MPM-4 DOF Arm-Upright-Magnetic



Without Posts

Item #	Description
08233-3-0000	MPM-4 DOF Arm-Upright-Mag Base Package



With Posts

MPM-4 DOF Arm-Upright-Magnetic: Extender Post Kit Instructions

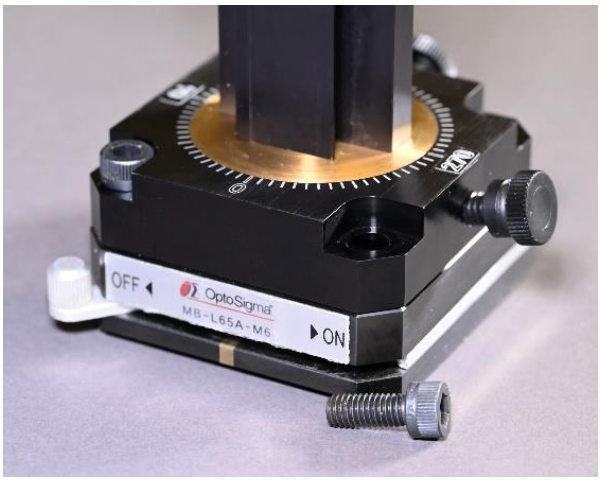
It's sometimes necessary to raise the MPM arm when used with the magnetic base. This can be accomplished with a small adapter plate, four Thorlabs Inc. posts and various connecting hardware.

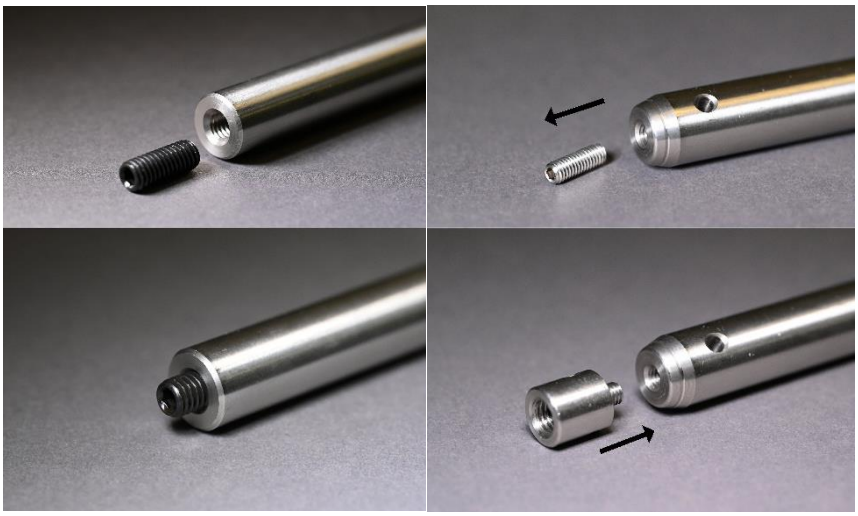
New Scale Technologies supplies the adapter plate and necessary screws. It is up to the customer to purchase the desired length posts (Thorlabs Part Number: TRXX/M) and thread adapters directly from Thorlabs Inc.

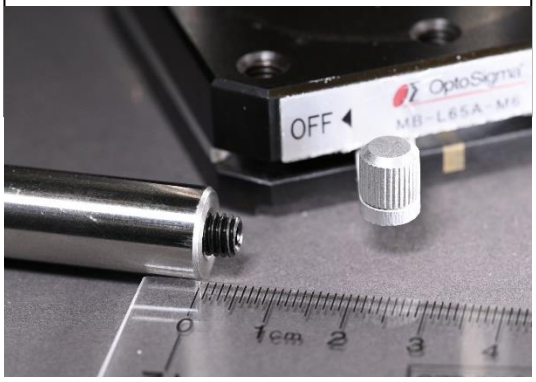
You will need four posts. The top of each post is threaded with an M4 female thread. You will need a thread adapter to convert this to an M6-1 thread, Thorlabs Inc. part number AS6M4M. Order four thread adapters, one per post.

Assembly Instructions:

1. Loosen the two locking screws in the polar assembly slightly.
2. Using a 5 mm hex key wrench (Allen™ wrench,) remove the four M6-1 x 15 socket head cap screws that hold the polar assembly to the magnetic base. Keep the brass insert in place in the frame.
3. Install a supplied M6-1 x 16 socket set screw in the bottom of each post. Tighten snugly. **The screws must protrude no more than 10 mm, or else they will damage the magnetic base.**
4. Using a 2 mm hex key wrench, remove the M4 set screw in the top of each post.
5. Install an AS6M4M thread adapter on the top of each post. Tighten firmly.

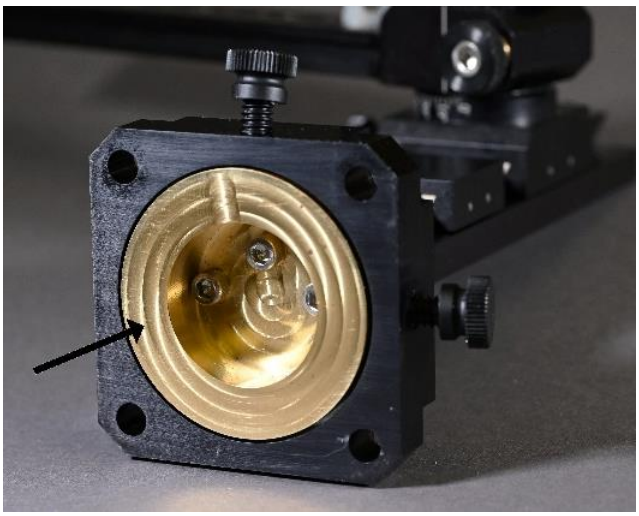


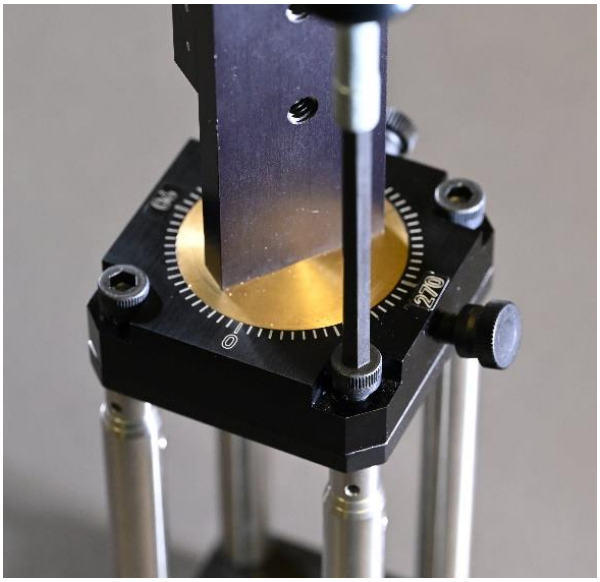




The pictured M6-1 x 16 black screws must protrude no more than 10 mm, or else they will damage the magnetic base.

6. Install the posts at each corner of the magnetic base. Tighten firmly. Check the operation of the magnetic base.
7. The flat surface of the brass insert should be given a light film of grease as shown in the photo. For smoothest motion use a damping grease.
8. Place the adapter plate on the top of the posts, followed by the polar assembly. Fasten with four M6-1 x 20 socket head cap screws. Tighten firmly with a 5 mm hex key wrench.



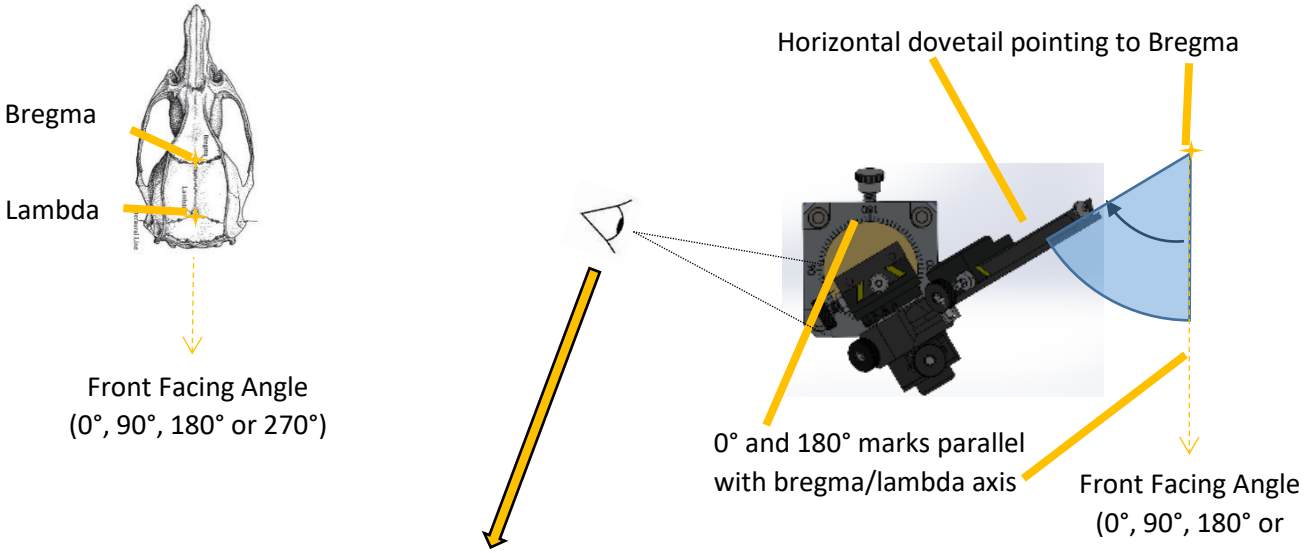


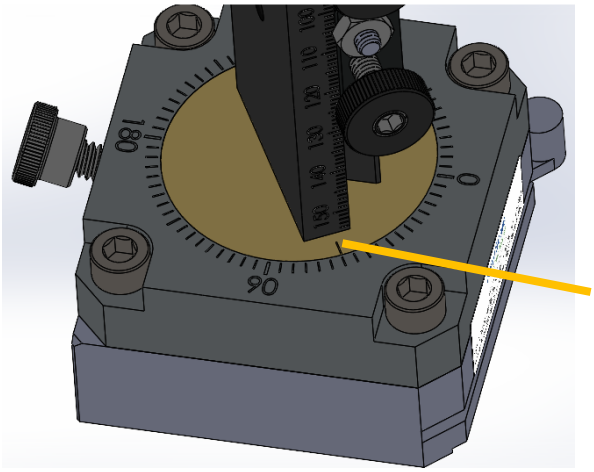
MPM-4 DOF Arm-Upright-Magnetic: How to use position marks

For **Insertion Angle/Pitch Angle**, **Vertical Position** and **Horizontal Position/Arm Slider Position**, please see **MPM-4 DOF Arm-Upright & MPM-4 DOF Arm-Upright-Extended: How to use position marks** section.

Polar Angle: The polar angle measurement is based on the orientation of the Arm relative to the subject. Assume a "front facing angle" lined up with the bregma/lambda axis, facing the tail of the subject, as shown. Polar angle is measured as positive offset to the front facing angle. For precise polar angle measurement, a digital protractor is recommended (for example iGaging Digital Protractor with 7 inch rule, digital protractor not included).

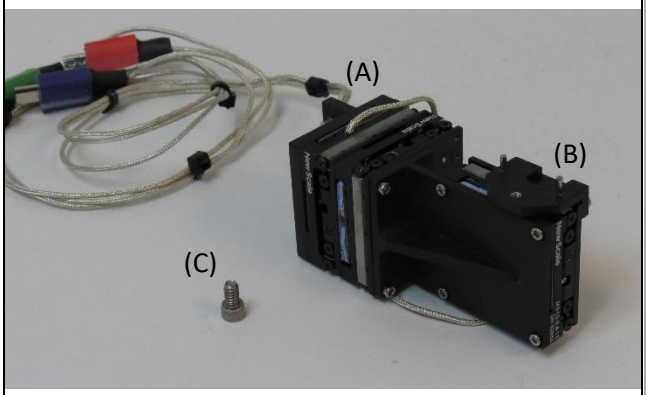
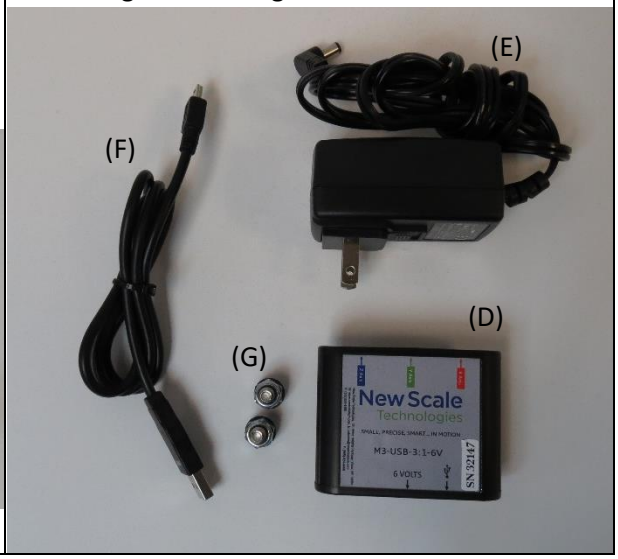
Orient the magnetic base so that the 0° and 180° marks are parallel to the bregma/lambda axis, and the horizontal dovetail is pointing to bregma. Once the Arm is placed in the correct orientation, use the etched marks on the rotating adapter to read the polar angle (angle marks are in 5° increments).





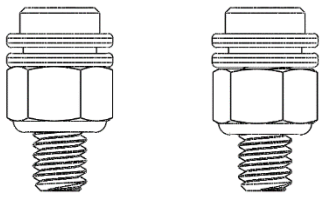
Read the polar angle using the etched marks on the rotating adapter (angle marks are in 5° increments), images show Arm placed ~60°

Multi-Probe Micromanipulator: M3-LS-3.4-15-XYZ-MPM-Upright & M3-LS-3.4-15-XYZ-MPM-Inverted

Item #	Description
06464-3-0000	M3-LS-3.4-15-XYZ-MPM-Inverted
06464-3-0001	M3-LS-3.4-15-XYZ-MPM-Upright
Each M3-LS-3.4-15-XYZ-MPM-{Inverted or Upright) includes the following:	
(3) **M3-LS-3.4-15** Linear Smart Stages assembled in an XYZ micromanipulator, with (A) L bracket to mount onto MPM-4 DOF-Arm-{Inverted or Upright}, (B) probe mount plate to install probe mounts, and (C) mounting screw. *(Shown in Upright configuration)* 	(1) (D) **M3-USB-3:1-6V** adapter, with (E) power supply, (F) Mini USB extension cable, and (G) mounting studs with grommets. 

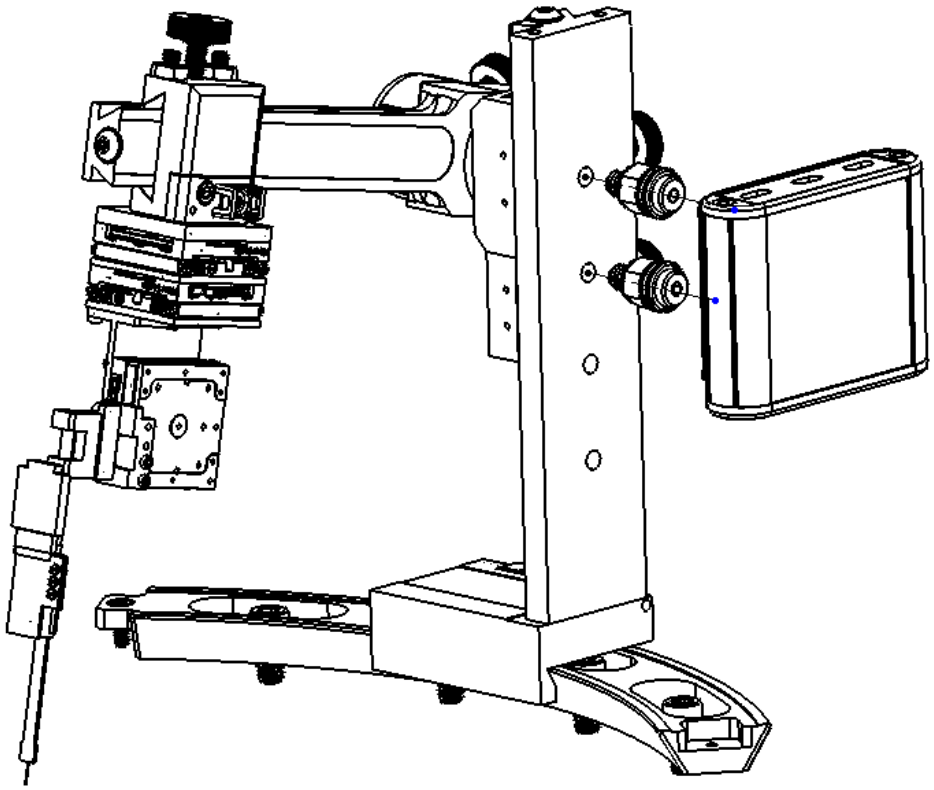
Multi-Probe Micromanipulator: Assembly of M3-LS-3.4-15-XYZ-MPM-{Upright or Inverted}

1. Mount the **M3-USB-3:1-6V** adapter to the **MPM-4 DOF Arm-{Upright or Inverted}**. Standoff assemblies with grommets are provided to mount the USB-3:1 Adaptor. These standoffs can be mounted to the **MPM-4 DOF Arm-{Upright or Inverted}** assembly or any standard 1" x ¼-20 optical breadboard table.



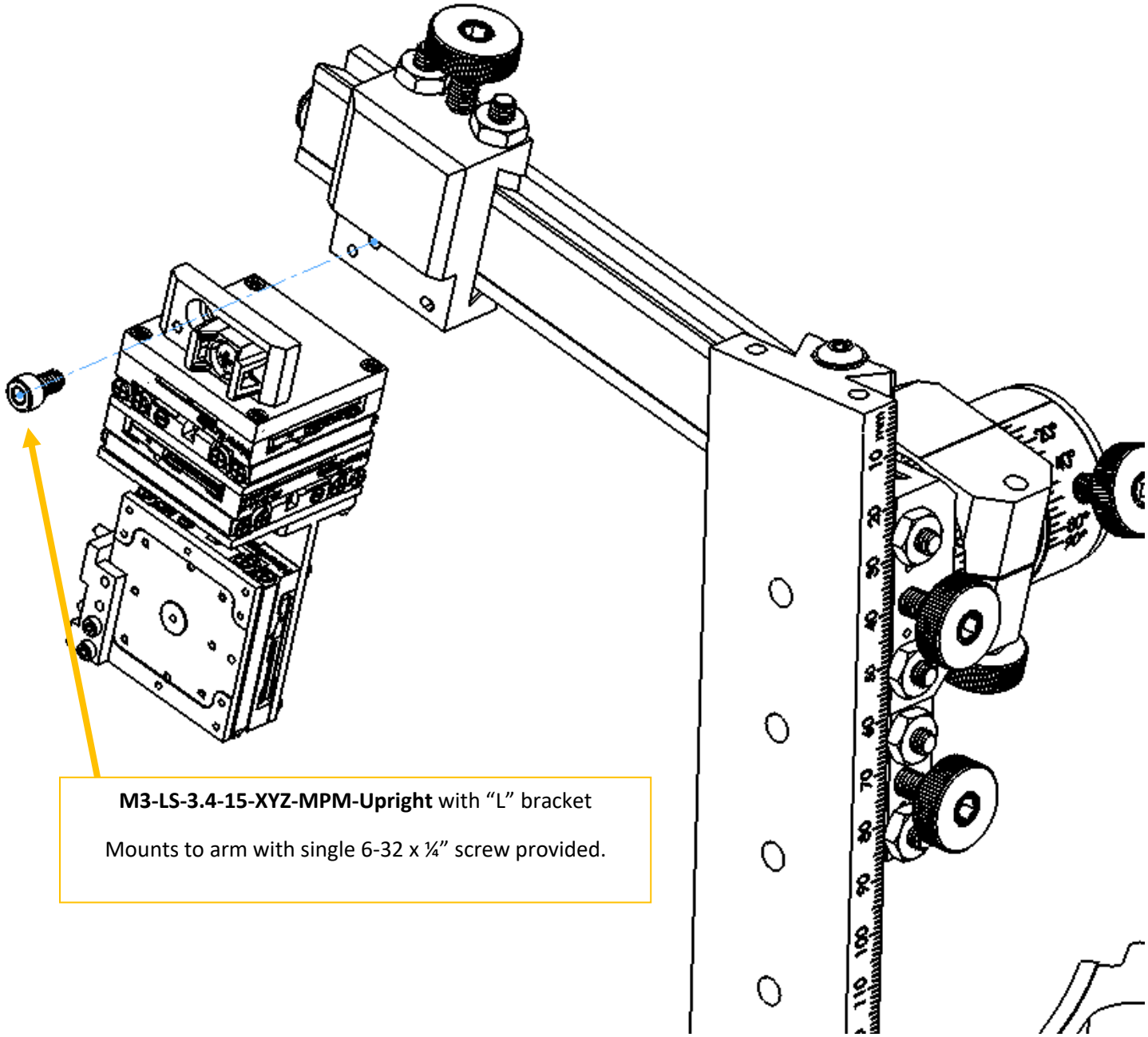
The recommended location is shown. Secure the grommet standoff assemblies to the **MPM-4 DOF Arm-{Upright or Inverted}** assembly using the provided hex wrench.

Install the **M3-USB-3:1-6V** Adapter by sliding the grommets into the slots on the back of the **M3-USB-3:1-6V** Adapter so that that X, Y & Z-axis ports face up.



Multi-Probe Micromanipulator: Assembly of M3-LS-3.4-15-XYZ-MPM-{Upright or Inverted} (continued)

2. Mount the **M3-LS-3.4-15-XYZ-MPM-{Upright or Inverted}** assembly to the **MPM-4 DOF Arm-{Upright or Inverted}**. The XYZ assembly includes an "L" bracket with mounting screw.



M3-LS-3.4-15-XYZ-MPM-Upright with "L" bracket

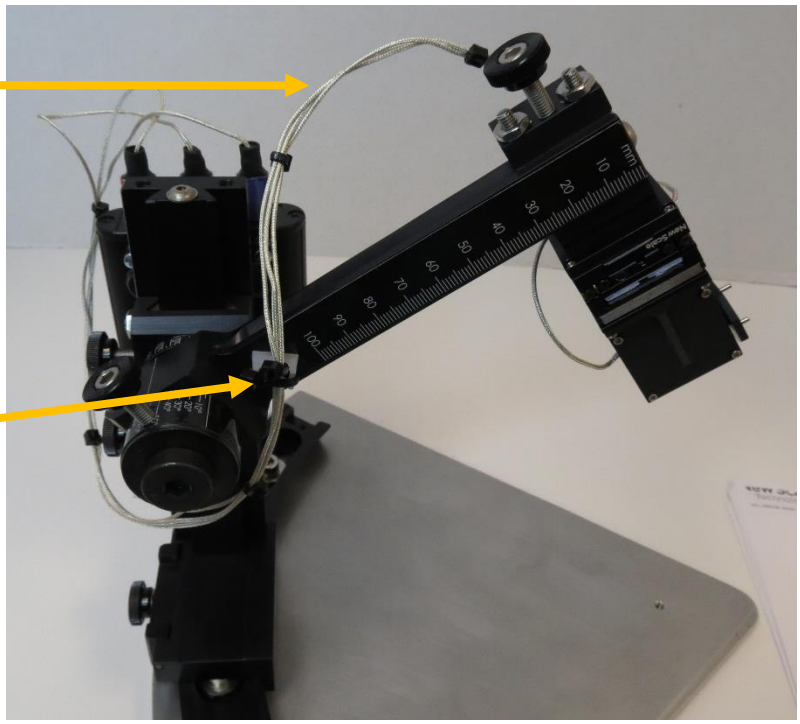
Mounts to arm with single 6-32 x ¼" screw provided.

Multi-Probe Micromanipulator: Assembly of M3-LS-3.4-15-XYZ-MPM-{Upright or Inverted} (continued)

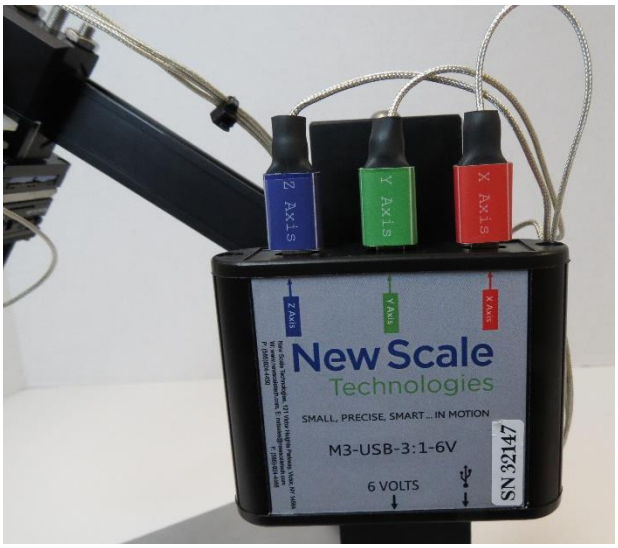
3. Install cables between **M3-LS-3.4-15-XYZ-MPM-{Upright or Inverted}** and **M3-USB-3:1-6V** Adapter. Route and secure cables as shown below and keep flexible cable loops to allow unencumbered stage movement.

Maintain sufficient cable loop to allow extension of arm without binding.

Secure cables to pre-installed tie downs using provided tie wraps.

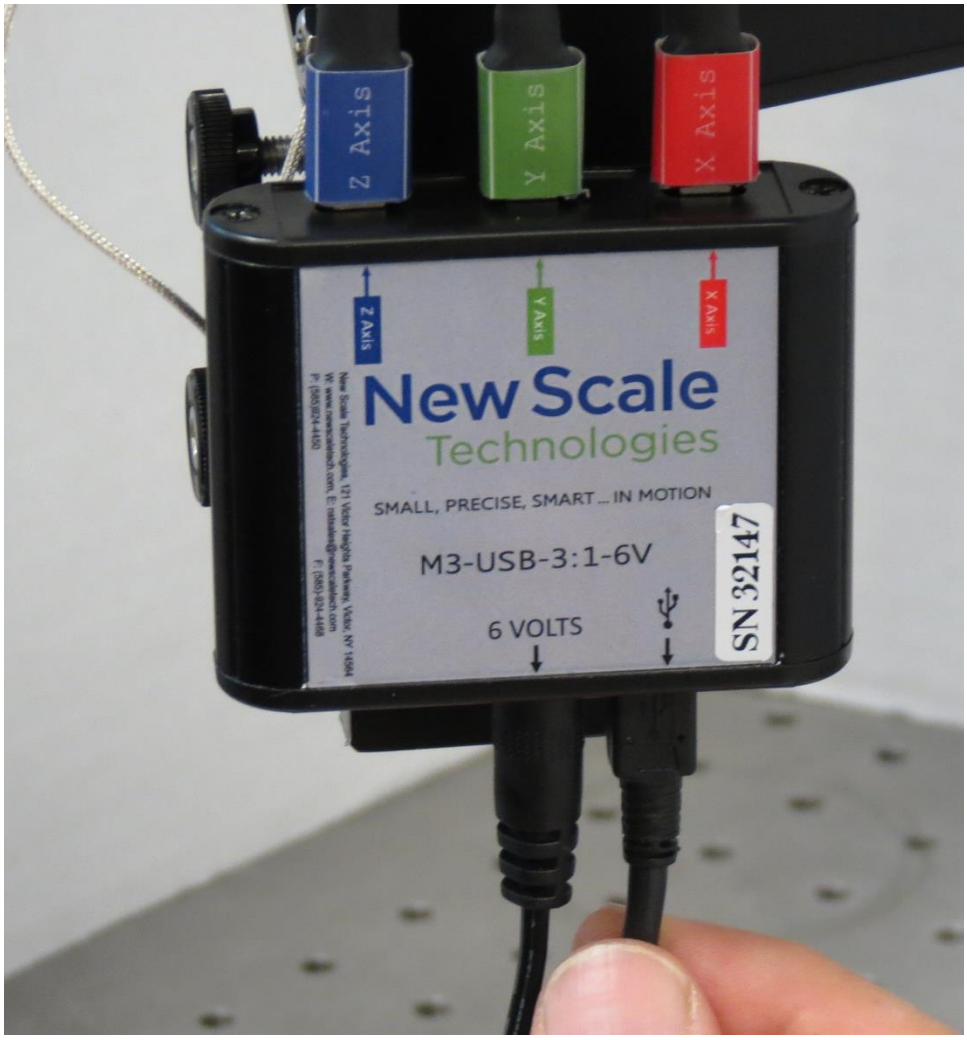


4. Connect the X, Y and Z-axis cables to the **M3-USB-3:1-6V** adapter as shown.



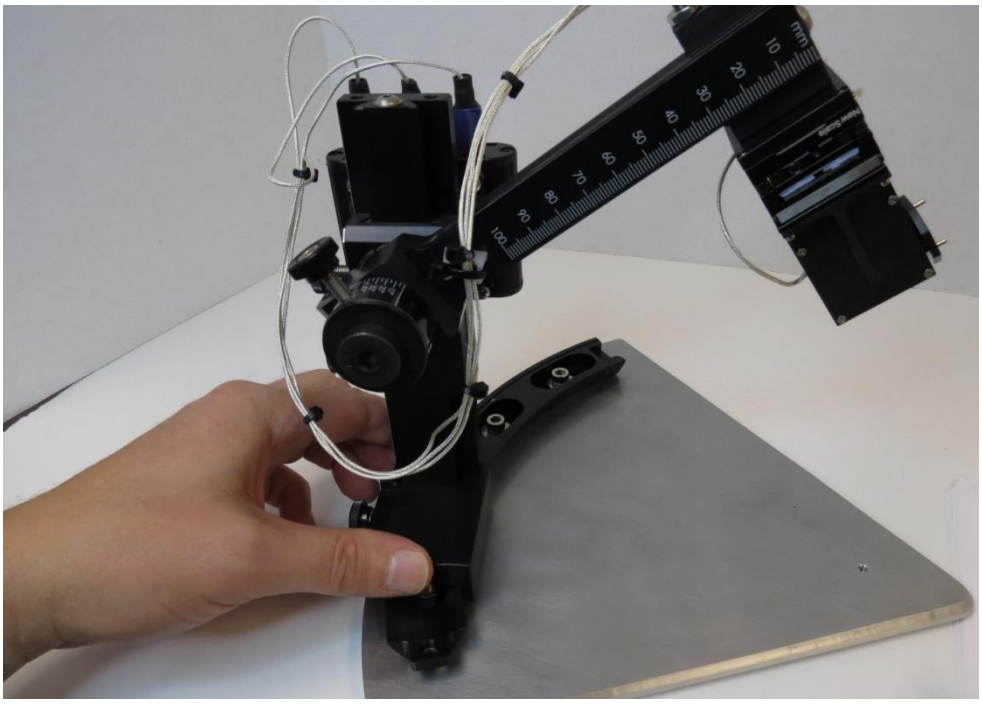
Multi-Probe Micromanipulator: Assembly of M3-LS-3.4-15-XYZ-MPM-{Upright or Inverted} (continued)

5. Connect the 6 volt power and Mini USB extension cable to the **M3-USB-3:1-6V** adapter as shown.



Multi-Probe Micromanipulator: Using MPM-Ring-72 DEG

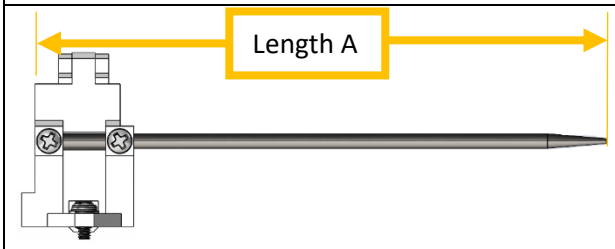
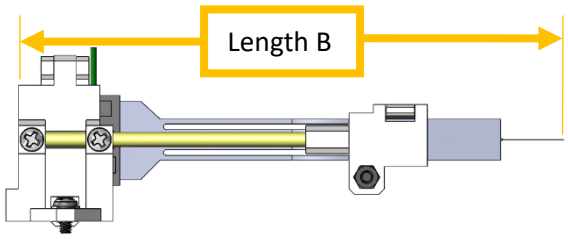
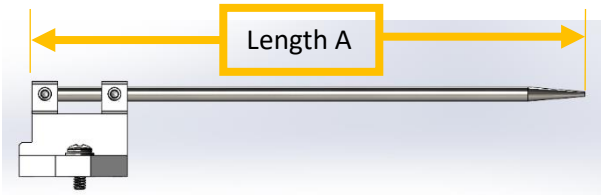
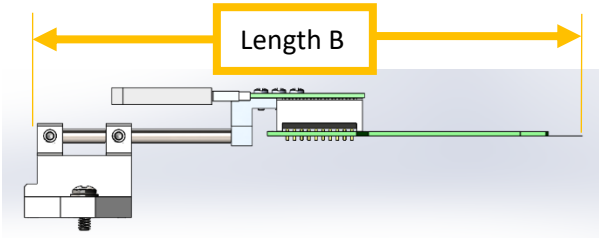
After installing the **MPM-Ring-72 Deg** section(s), slide the dovetail of the **MPM-4 DOF Arm-Upright** onto the ring(s). Move the dovetail to the desired polar angle and secure in place by tightening the thumb screw at the base of the assembly. Use the 5/32 hex wrench to tighten the thumb screw as needed.



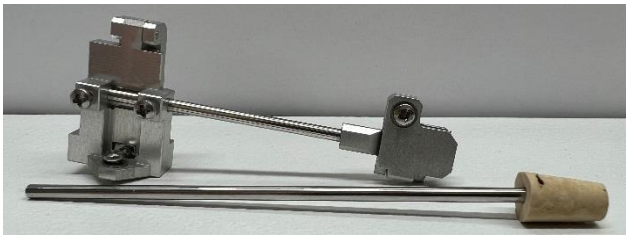
Multi-Probe Micromanipulator: Probe Length Measurement

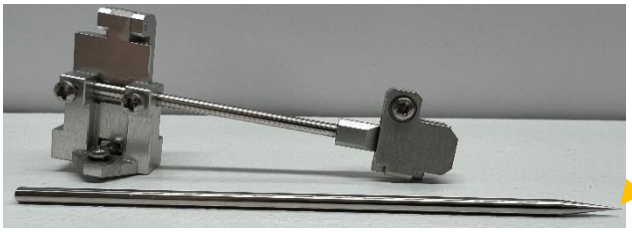
WARNING: REFERENCE PROBES ARE EXTREMELY SHARP. HANDLE WITH CAUTION.

Probe Length is defined as the measurement from the rear of an MPM Probe Mount base to the tip of the Reference Probe or installed neural probe.

Example 1	
07022-3-0002 MPM-Probe Mount-1AS with Reference Probe installed	07022-3-0002 MPM-Probe Mount-1AS with neural probe installed
	
Example 2	
06264-3-0012 MPM-Probe Mount-2M With Reference Probe installed	06264-3-0012 MPM-Probe Mount-2M with neural probe installed
	

Adjust the position(s) so Length A = Length B = desired Probe Length for your application. The factory default Probe Length assumes the Reference Probe is installed as shown (end flush with rear of MPM Probe Mount base) and has a length of ~97mm.





WARNING! Reference Probes are sharpened to a fine point to help users with precise calibration. A cork plug is provided for safety.

Please use caution when handling reference probes!

Your MPM System is now set up and ready for you to install the control software and recording probes. Please refer to the **New Scale Pathfinder MPM Software Guide** for more information on using the control software.

Please visit us online for instructional videos, technical drawings, CAD models and more!

For questions or support, please contact:

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121 Victor Heights Parkway
Victor, NY 14565

Phone: 585-924-4450

Online: www.newscaletech.com

Revision History

Revision	Description of changes	Release Date
A	Initial Release	9 June 2017
B	Added MPM-Platform-180 and MPM-Platform-Extended	10 February 2020
C	Added details about how to read position marks on Arms, added Angle Square 07332-0-0000 to MPM-System Kit	2 April 2020
D	Added information about Probe Length measurement	30 September 2020
E	Added MPM-4 DOF Arm-Upright-Magnetic	23 December 2020
F	Added information about many minor part changes to system kit, angle gauges, platform hard stops, magnetic base extension package, and sharpened reference probe tips.	7 December 2023
G	Added instructions for MPM-Ring-72 DEG ring assembly (Pages 4-10)	13 March 2025