

# Kinematic Mounts

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The University of Wisconsin-Madison Physical Sciences Laboratory (PSL) developed two standardized sizes of kinematic mounts for supporting and adjusting instruments in a stable and non-stressful manner. The large (medium duty) set will easily support most instruments used at synchrotron facilities. (An even larger set is available upon request.) The small set is used for sub-assemblies or small instruments.

The kinematic mount consists of three assemblies. The first is a fixed point that is adjustable in the XYZ directions. It has a ground slider plate that rests on top of a ground floor plate with pusher screws on all sides of the slider plate for XY motion adjustment. The pusher screws engage sliding shoes that bear against the slider plate. A support ball rests in a detent on top of the slider plate and engages a Z jacking screw detent protruding from a threaded lug mounted to the device being supported. The use of a ball allows tilt adjustments of the device.

The second assembly is the thetaXZ adjuster. It consists of a ground slider plate with v-groove that rests on a ground floor plate. Pusher screws on the base plate perpendicular to the v-groove can adjust the slider plate in the X and theta directions. Theta is a rotation of this support about the ball of the fixed XYZ first adjuster by aligning the v-groove with the fixed XYZ adjuster centerline. A v-shaped slider rests in the v-groove of the grooved slider plate. It has a detent and a ball that engages a Z jacking screw detent from a threaded lug on the frame of the device being supported. The ball allows tilt adjustments.

The third assembly is the Z adjuster. It consists of a ground free slider plate that rests on top of a ground floor plate. It is free to slide in both the X and Y directions. A grease fitting provides lubrication when extra heavy objects are to be supported. The slider plate has a detent and a ball that engages a Z jacking screw detent from a threaded lug on the frame of the device being supported. The ball allows tilt adjustments.

Use of the complete set provides a stable kinematic support of an assembly. By aligning the thetaXZ adjuster with the fixed XYZ adjuster, thermal expansions and contractions of the frame maintain the same theta orientation of the frame while allowing slippage on two of the support points. If not aligned, a thermally driven rotation of the frame could occur. The correct arrangement of the kinematic mount in plan view is shown on the back page.

Available variations include micrometer-driven, fully captive, motorized (step or microstep), roller-bearing, extended range, ultra-high-vacuum, ultra-precision, and larger capacity.

<b>Specifications:</b>	<u>Large</u>	<u>Small</u>
Angular resolution (at 1.0 m separation)	5. microradians	5. microradians
Linear resolution XYZ	±2.5 µm	±2.5 µm
ThetaXZ adjuster range	±12.5 mm	±10 mm
XYZ adjuster range	±25 mm	±10 mm
Z adjuster range (recommended)	±25 mm	±10 mm
Load rating per set, kgf (lbs.)	4500 (10,000)	1400 (3000)



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