



MK52 Series
**ULTRA-LOW FREQUENCY
VIBRATION ISOLATION
WORKSTATION**

**ASSEMBLY AND OPERATION
INSTRUCTIONS**

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Section I: Preliminary Information

Congratulations! The MK52 Vibration Isolation Workstation you have purchased has been jointly designed by Kinetic Systems, Inc. and Minus K Technology, Inc., for many years of trouble-free user service. It will deliver superior vibration isolation performance for a broad range of research, quality assurance, and production applications.

The MK52 Workstation utilizes an airless all-mechanical Minus K Technology negative-stiffness vibration isolation system.

Each MK52 is designed to accommodate a specific range of load weight. The correct model should have been determined when you ordered your MK52. To look up the payload range for your model, look at the purchase order or cross-reference the exact model number with the Minus K website:

<http://minusk.com/content/products/standard/mk52-optical-tables-vibration-isolation-systems.html> .

In order to get full benefit from your MK52 Table, we suggest you follow the easy, step-by-step instructions in this manual.

Technical Assistance

Need Technical Assistance? First, refer to the “Troubleshooting” Section of this Manual. If your problem persists, the technical support staff at Kinetic Systems, Inc. or Minus K Technology, Inc. will be glad to answer any questions. KSI can be reached at (617) 522-8700, or FAX (617) 522-6323 or email kineticsystems.com. You can call Minus K at (310) 348-9656.

Damage Due to Shipping

When your MK52 table arrives, inspect it carefully for any damage due to shipping. If ANY DAMAGE IS DETECTED, NOTIFY THE SHIPPING CARRIER IMMEDIATELY. SAVE ALL PACKING MATERIALS.

Section II: Set Up Procedure

Tool Requirements

The following equipment's and tools are recommended to set up your MK52 Series Vibration Isolation System:

- Hydraulic lifting device
- Carpenter's level
- Screwdriver
- 3/16" hex key
- Adjustable or 3/4" open-end wrench
- Socket for a 1/2" hex nut (*for vertical stiffness adjustment, if needed*)

Refer to Fig. 1 for controls and part location of the MK26 table. The parts on the MK52 are similar, but there are two isolators instead of one, so there are two vertical position indicators, two load adjustment cranks, and two vertical stiffness adjustments. All MK52 tables are completely assembled and tested at the factory, except for optional items such as Guardrails, Faraday Enclosure and Adjustable Shelf, prior to shipment.

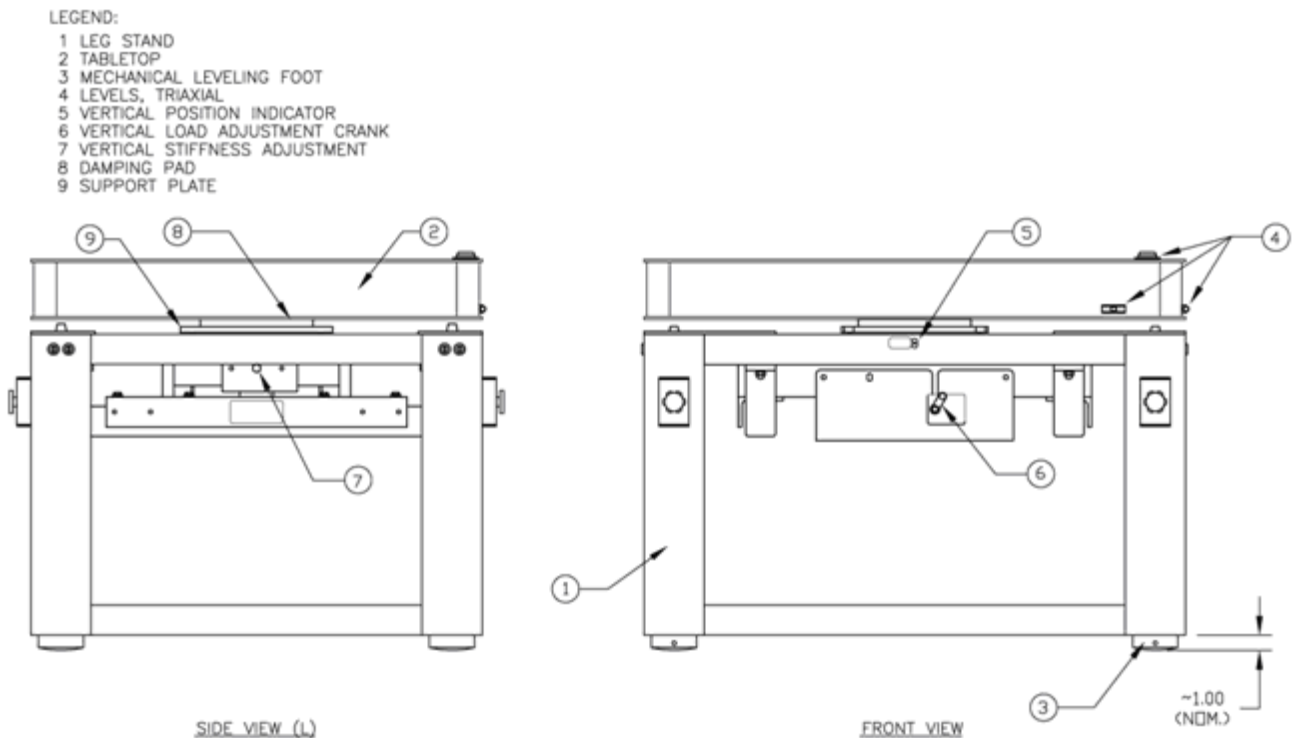


Fig. 1 MK52 Series Vibration Isolation Workstation.

Setting Up and Mounting the Payload

THE FOLLOWING INSTRUCTIONS ARE VERY IMPORTANT. FAILURE TO PERFORM THE REQUIRED STEPS MAY RESULT IN DAMAGE TO THE MK52 WORKSTATION.

1. Carefully remove all shipping material (metal strapping, cardboard, etc.). Additional parts such as optional Guardrails, Faraday Enclosure and Adjustable Shelf have been packed separately inside the shipping container. Set these parts aside for later installation.
2. Remove the protective wood blocks from the bottom of each leg. The Mechanical Leveling Feet are fully retracted for shipping. Rotate each foot COUNTERCLOCKWISE (See Fig. 2) so that they extend $\frac{3}{4}$ to 1" below bottom of the leg.
3. Carefully move the leg stand to final location. If the back of the table is to be positioned against the wall, be sure to leave enough access space to permit attachment of the rear optional Guardrail(s).
4. **REMOVE THE TWO RED SHIPPING RETAINERS LOCATED AT THE TOP CENTER COLUMN BEFORE INSTALLING THE TABLETOP. DO NOT REMOVE THE DAMPING PAD FROM THE SUPPORT PLATE. DO NOT REMOVE THE PROTECTIVE PLASTIC COVER OFF THE DAMPING PAD.**
5. The Tabletop weighs several hundred pounds, so use of a hydraulic lifting device is recommended for its installation. Means should be made for aligning edges of Tabletop with the edges of Legstand before lowering it onto the Damping Pad. Proper positioning of the Tabletop is important for the system to work.

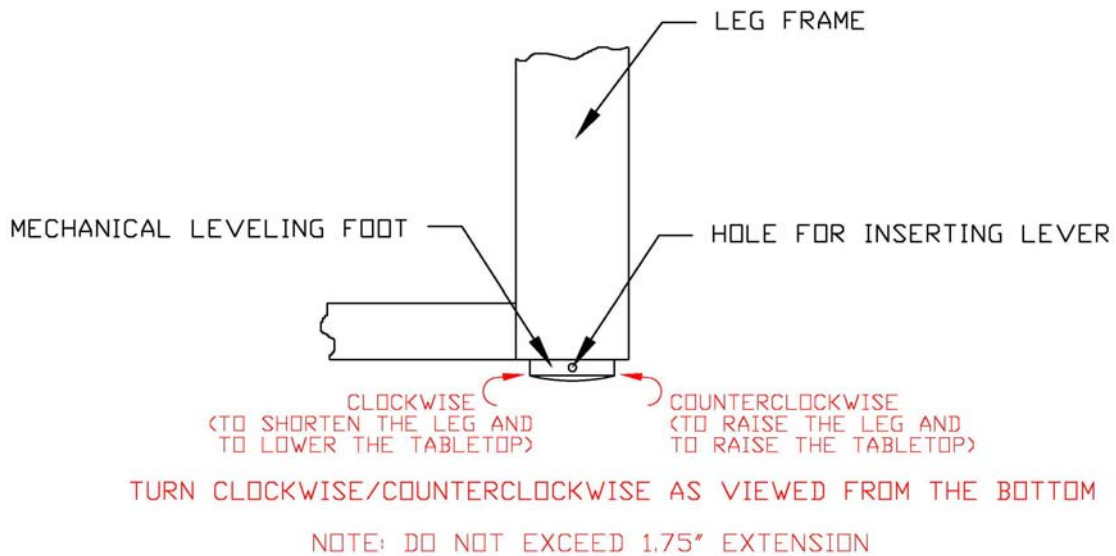


Fig. 2 Mechanical Leveling Foot Height Adjustment

6. After the table is moved and located at its final destination, place a carpenter's level diagonally across the Tabletop or use the built-in levels on the Tabletop to check for level condition in all directions. If an out-of-level condition is detected, adjust the Leveling Feet by inserting a thin rod or screwdriver (as shown in Fig. 2) into the hole on the side of the Leveling Foot. Looking from the bottom, rotate the leveling foot **CLOCKWISE** to shorten the leg and lower the Tabletop. Rotate the foot **COUNTERCLOCKWISE** to lengthen leg and raise Tabletop. After leveling the tabletop, ensure that all the four leveling feet are in contact with the floor. If any gap is observed, rotate the leveling foot counterclockwise to close the gap as shown in Fig. 2. Check the tabletop level and repeat if necessary.
7. Remove the Lock Nuts and carefully place the payload (and ballast weight if needed) on the Tabletop and position it so that the Tabletop is still approximately level. Visually check the gap between the bottom of the Tabletop and the leg stand and ensure that it is approximately uniform. **Adjusting the total center-of-mass to be closer to the center (horizontal neutral) of the Table is critical for the system to work efficiently.**
8. All MK52 units are pre-assembled and tested for rated capacity load prior to shipping. This means your unit has already been loaded and 'floated' at the rated combined isolator nominal (usually at or near the maximum) load and adjustments made to float the tabletop when you locate the appropriate payload (rated capacity minus tabletop weight).
9. The MK52 must be floating vertically and horizontally for it to provide vibration isolation. The table will be floating when the following conditions are satisfied:

1. The Tabletop has to be loaded at the correct weight for the given position of the load adjustment on the isolators. When this is the case, the Vertical Position Indicators will be centered in their slots.
 2. The load center of gravity must be pretty well centered over the center of the table in both horizontal directions.
 3. The gap between the table top and the stand is nearly equal all the way around.
 4. The table top moves freely and equally between its horizontal stops when gently pushed in either horizontal direction and then released.
10. If your payload has the same weight as the MK52 nominal load, on placing the payload with its center of gravity properly centered on the tabletop, the system will automatically float and vertical position indicator will be centered on the horizontal line. If your total payload (equipment + tabletop weight) is different from rated load capacity, you will need to turn both load adjustment cranks by the same amount until the payload and tabletop is floating vertically and the tip of each vertical position indicator is approximately centered on the horizontal line. If the payload center of gravity is not centered, the system may go out of level. In this case, reposition the payload (and/or ballast weight) so that the center of mass is centered on the tabletop, both side to side and front to back. **Caution: To avoid damage, turn the load adjustment crank only clockwise when the indicator tip is below the line, and only counterclockwise when it is above the line. Never force the load-adjustment crank as that could cause damage.**
11. Depending on the payload weight, you may have to turn the cranks a large number of turns before the table begins to float. Once floated, the crank adjustment is sensitive and needs to be turned only a few turns to raise or lower the tabletop to the top and bottom end limits. If the vertical position indicator is erratic and tends to stay either above or below the line, see **Vertical Stiffness and Frequency Adjustments** below.
12. Your MK52 Vibration Isolation Workstation is now ready for operation.

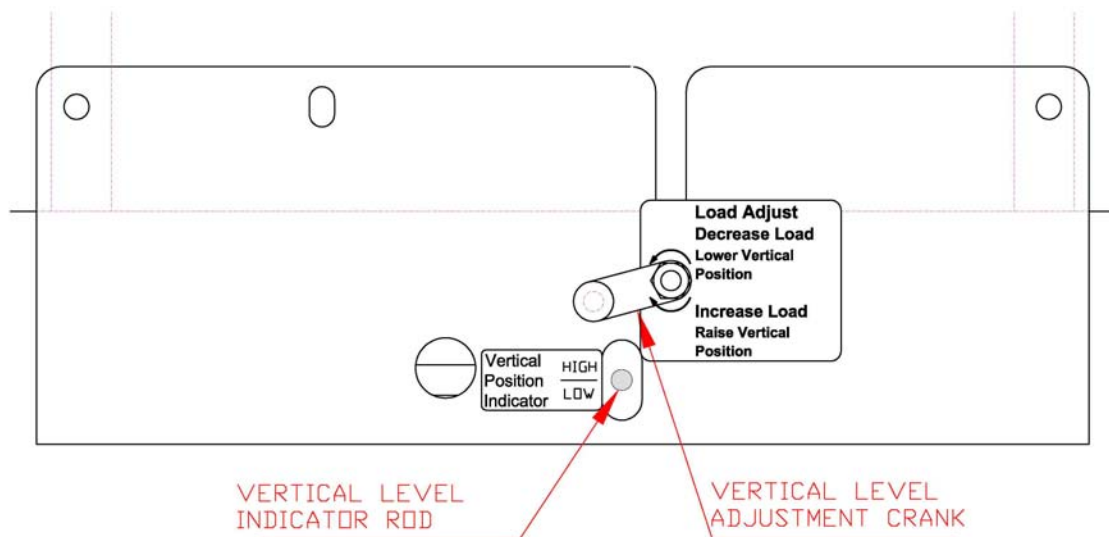


Fig 2a. Height Adjustment Crank and Vertical Position Indicator

Vertical Stiffness and Frequency Adjustments

The Vertical Stiffness Adjustment on each isolator can be used to alter the vertical stiffness of that isolator and, therefore, the vertical natural frequency of the system, although this adjustment is seldom required. Clockwise rotation reduces the natural frequency. Counter-clockwise rotation increases the natural frequency. This is a sensitive adjustment. The vertical stiffness adjustment screw should be rotated only slightly before checking the frequency, and the same amount of adjustment should be made on each isolator. If the vertical load adjustment is erratic where the indicator is stuck above the line or below the line, then this indicates there is too much negative stiffness. Turn the vertical stiffness adjustment screw counterclockwise only a few degrees. Then readjust the vertical position. Repeat as necessary until the indicator can be centered on the line.

Horizontal Frequency Adjustments

The horizontal natural frequency can only be changed or improved by varying the payload weight. Increasing the weight lowers the frequency; decreasing the weight increases it.

Section III: Operation and Set Up Procedure for Optional items

Guardrail Adjustment

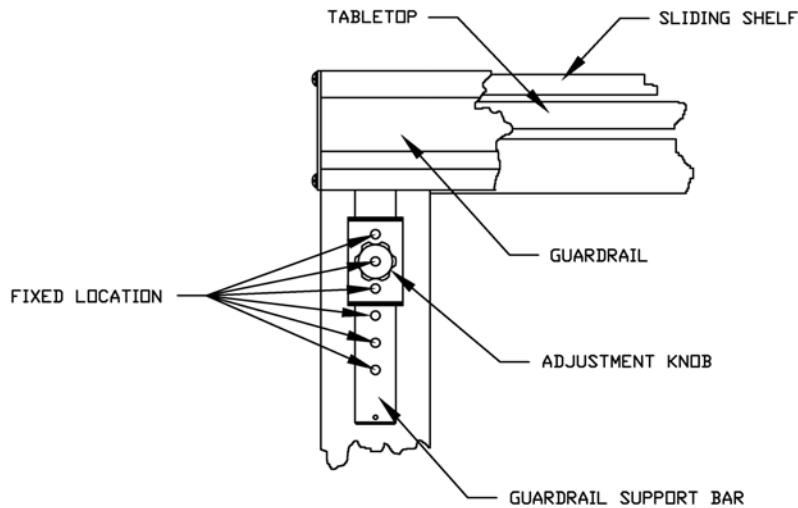


Fig. 3 MK52 Guardrail Height Adjustment.

1. The Guardrails on the MK52 Series Isolation Table were designed to allow the operator to vary the height to accommodate for different Tabletop thickness. Optional Sliding Shelves may be retrofitted. There are four fixed locations on the Guardrail Support Bar that allow the operator to find the right location for him/her.
2. To adjust the Guardrail height, loosen the Adjustment Knob on both sides of the Guardrail and raise or lower the Guardrail evenly (as shown in Fig. 3). It is not necessary for the front and rear Guardrails to be at the same height, except when used with an optional Sliding Shelf, with a Sliding Shelf, the Guardrail must be adjust to allow a minimum of $\frac{1}{4}$ inch clearance between the bottom surface of the Shelf and the Top surface of the Tabletop (as shown in Fig. 4).

Optional Sliding Shelf

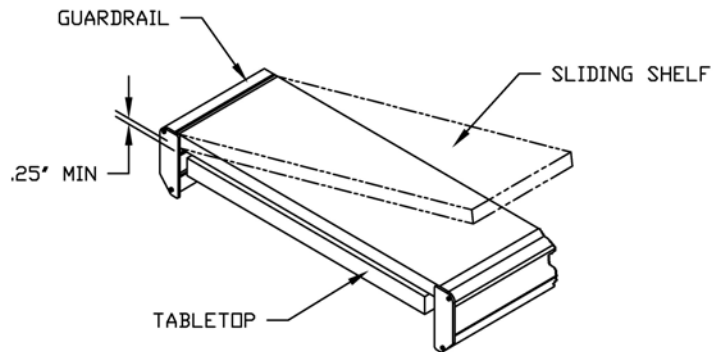


Fig. 4 Sliding Shelf Illustration

1. The optional Sliding Shelf can be ordered in different widths to provide the operator with enough surface area needed for equipment not isolated.
2. The Guardrail height must be adjusted as previously discussed to allow for the Shelf or Shelves.
3. The Sliding Shelf or shelves simply drop onto the front and back guardrails (as shown Fig. 4). They can then be slide into any position desired.

Optional Padded Armrest

1. The optional adjustable padded Armrest is ordered in pairs.

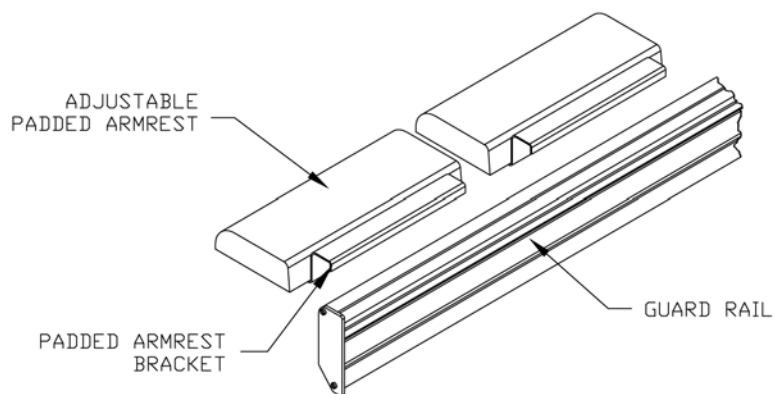


Fig. 5 Adjustable Padded Arm Rest Illustration.

2. To install the adjustable padded arm rests simply drop onto the guardrail (as shown Fig. 5). They can then be slide into any position desired.

Optional Fixed Shelf

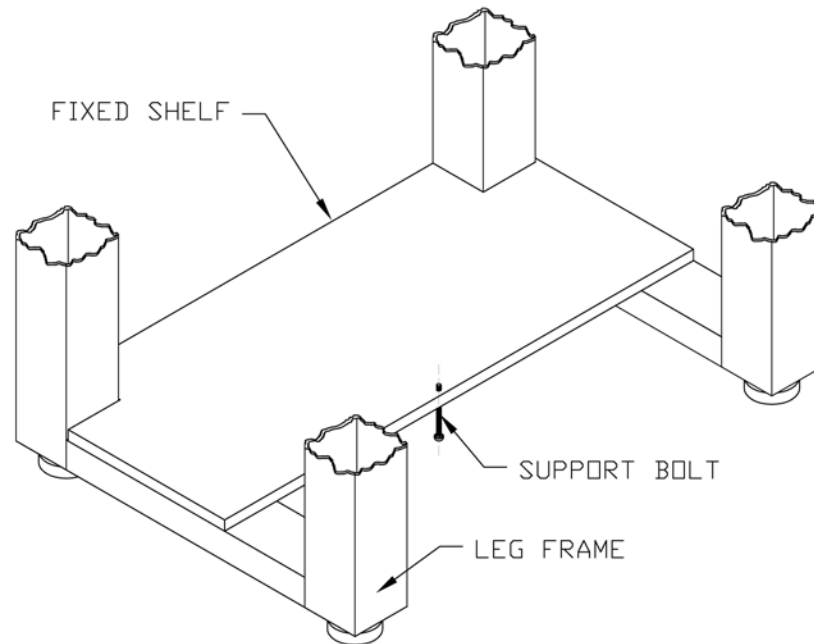


Fig. 6 Optional Fixed Shelf Assembly.

Unpack and place the Fixed Shelf on the bottom Leg Stand brace (Refer to Fig. 6).

1. Adjust support bolt by raise or lower to contact with the floor surface.
2. Tight down the nut with support bolt adjustment.

Optional Monitor Support

The following instructions explain how to install the optional Monitor Support assembly (Refer to Fig. 7).

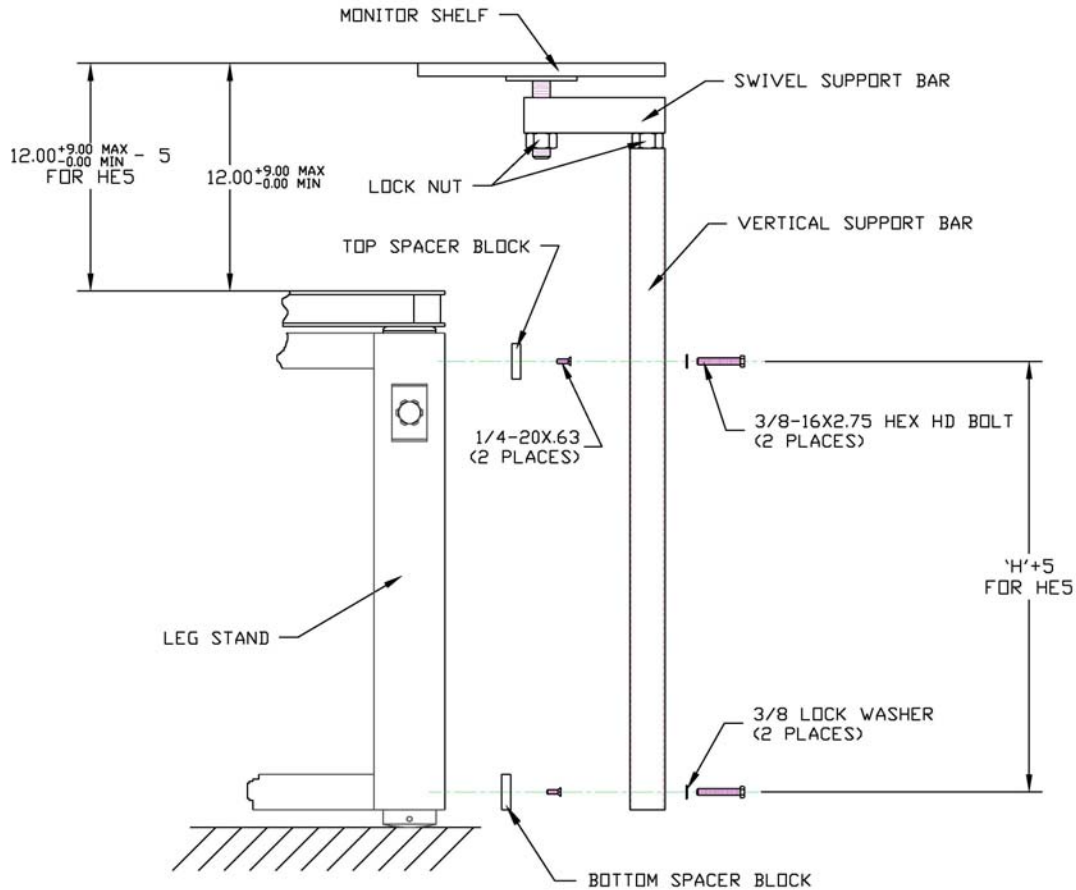


Fig. 7 Optional Monitor Support.

1. Be sure your MK52 table is set up as described in the previous section of this manual.
2. The Monitor Support is shipped in three sub assemblies: The Monitor Shelf Assembly, the Swivel Support bar Assembly, and the Vertical Support Bar assembly.
3. Remove the two screws and washers that covered the side-facing mounting holes on the top of the legstand. Install Top and Bottom Spacer blocks in place by lining up the two holes of the two spacer blocks with the 1/4-20UNC hole on legstand secure into place using two 1/4-20x.75" flat head screws for Top Spacer block and Bottom Spacer block.
4. Hold the Vertical Support Bar firmly in place, lining up the lower hole with the hole in the Top Spacer block. Bolt the Vertical Support Bar into place using the two 3/8 spring lock washers and two 3/8-16x2.50" hex head bolts provided.

5. Position the Swivel Support Bar on top of the Vertical Support Bar, and screw in clockwise until the desired height is reached.
6. Screw the Monitor Shelf Assembly into the threaded portion of the Swivel Support Bar until the desired height is reached.
7. Tighten both lock nuts to prevent unwanted movement.
8. Further adjustments of the monitor shelf can be made by rotating the Swivel Support bar Assembly or the Monitor Support Assembly.

Optional LCD Monitor Support Assembly

The LCD monitor support assembly is shipped in two parts, the LCD monitor support and the Support Post assembly. Refer to steps 2 & 3 of previous section '*Optional Monitor Support Assembly*' to secure the support post to your table. Refer to figure 7a for securing the LCD monitor support to your support post.

1. Attach the LCD monitor support back plate to the monitor support post using four 1/4-20 X 0.5 long hex head screws with washers. If the mounting plate is not attached to the post already, use four 10-32 screws (provided) to secure it to the post.
2. Attach the LCD monitor support to the back plate using the four M6X12mm screws as shown in the figure.

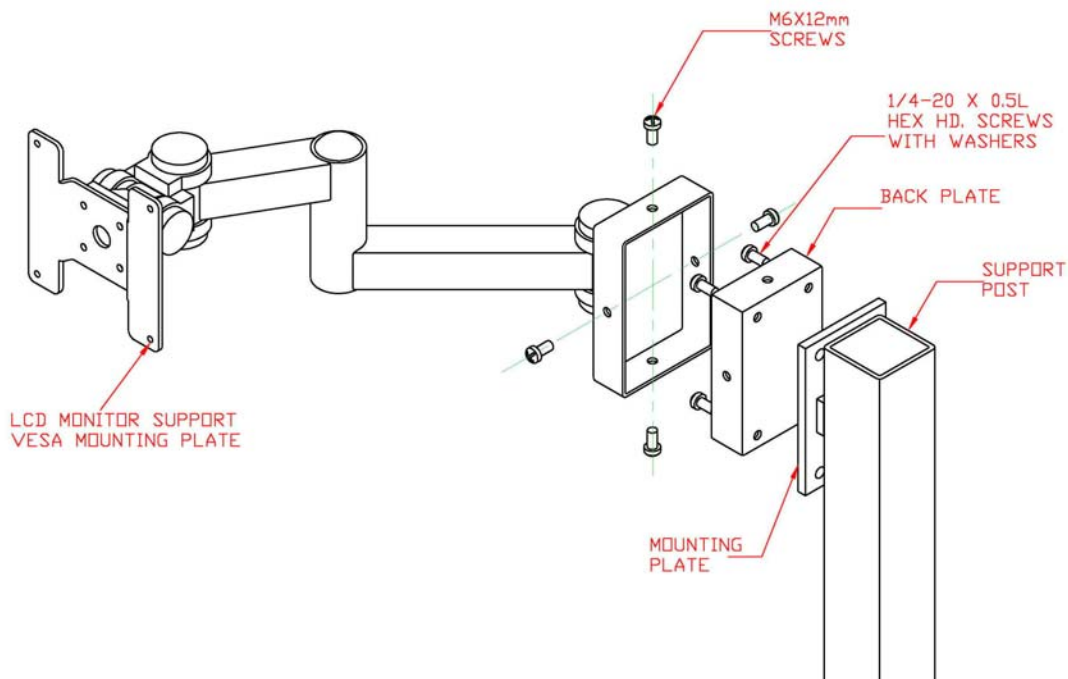


Figure 7a. Optional LCD Monitor Support Assembly

Optional Rear and Side Equipment Shelf Assembly

The following instructions explain how to install the Optional Rear and Side Equipment Shelf Assembly (Refer to Fig. 8)

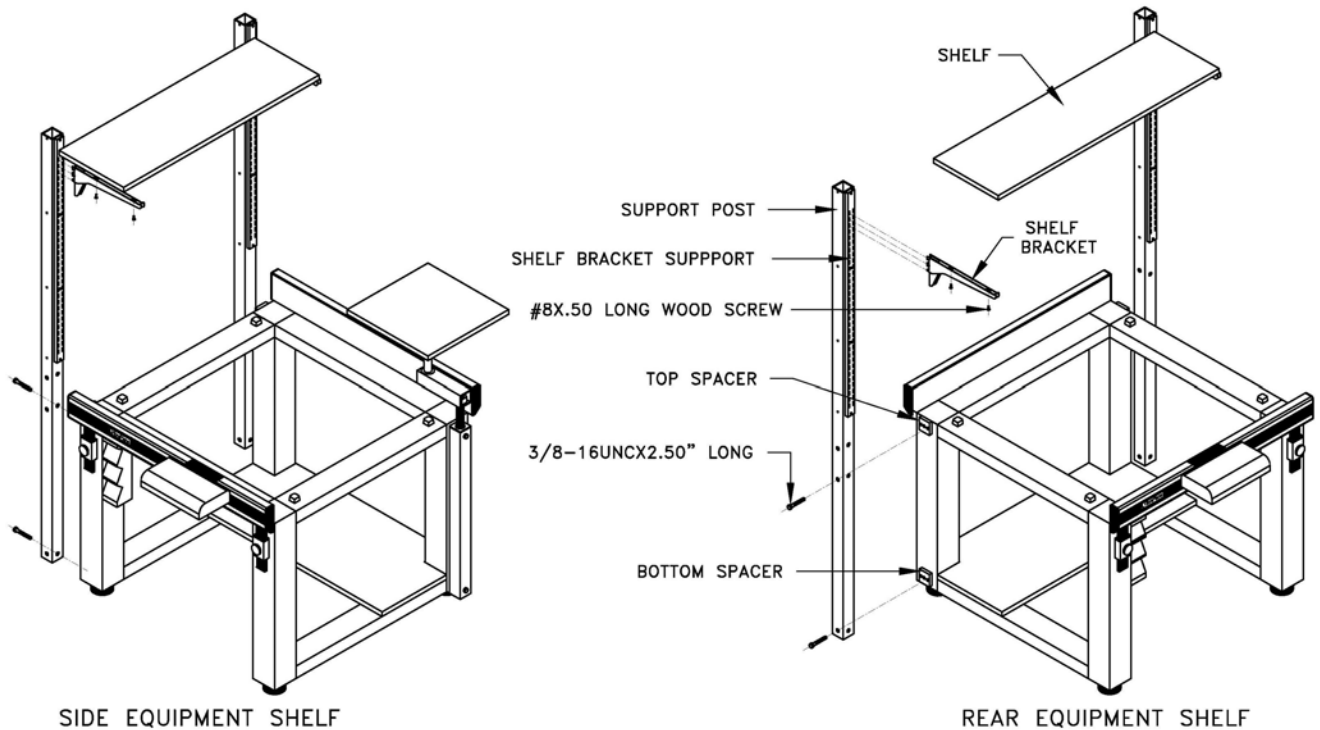


Fig. 8 Optional Rear and Side Equipment Shelf Assembly.

1. Be sure your MK52 table is set up as described in the previous sections of this manual.
2. Unpack the Support Posts, Shelf brackets, and the Shelf.
3. Attach the Support Posts on the Top and Bottom Spacers using the 3/8-16UNCx2.5" long hex head bolts. (See Optional Monitor Support on previous page).
4. Position the Shelf Bracket in the slots on the Shelf Bracket Support to achieve the desired height for the Shelf.
5. Place and center the shelf on the Shelf Brackets.
6. Secure the Shelf into place by screwing the #8x.50" long wood screws into the bottom of the shelf from the underside of the Shelf Bracket.

Optional Rear Wire Shelf Assembly

Refer to the following figures for detail on installing the Optional Rear Wire Shelf (RWS).

1. Attach the Rear Wire Shelf Support Rail to the guard rails using the 10-32x.75 slotted head screws and finish washers as shown in the figure.
2. Using the provided 3/8-16 X 1.25 slotted head screws attach the RWS Support Pad to the bottom of RWS Support Posts.
3. Assemble the RWS Support Posts on the RWS Support Rails using the 1/4-20X1.0L hex head bolts and 1/4 spring lock washers provided. Do not tighten the bolts yet.
4. Slide the Rear Wire Shelf over the RWS Support Posts and let it descend all the way down on table. Once in this position, align the RWS Support Post for appropriate placement on the RWS Support Rails.
5. Tighten the hex head bolts gradually going from corner to corner. Adjust for twisting and misalignment from side to side if needed.
6. Once the bolts are tightened, slide the Rear Wire Shelf off of the RWS Support Posts. Attach the RWS Split Sleeve to the four posts as shown at the preferred height.
7. Slide the Rear Wire Shelf onto the RWS Support Posts.

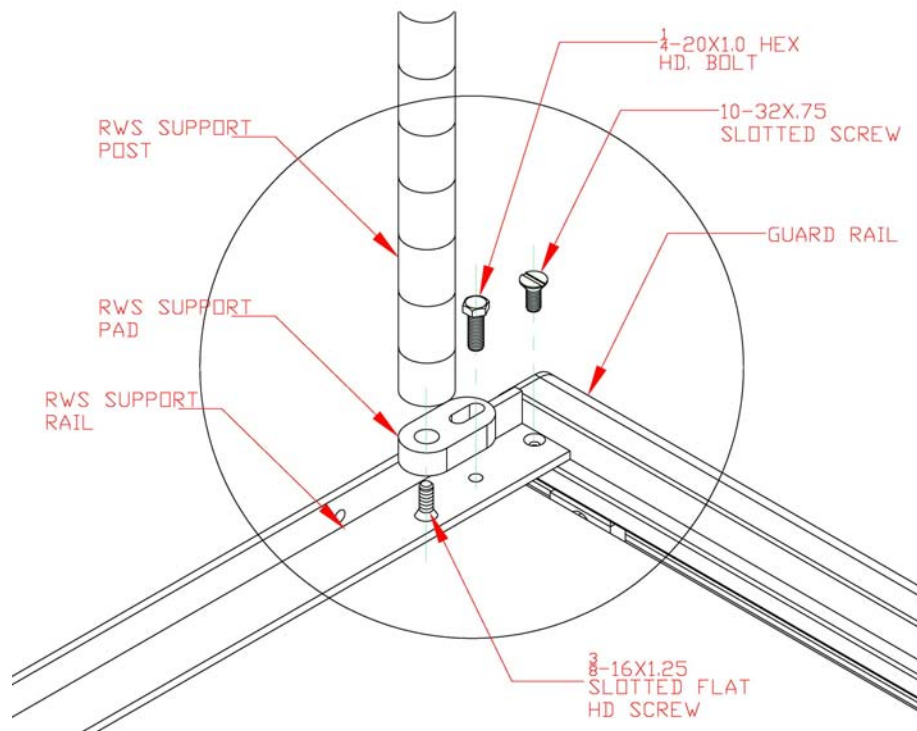


Fig. 8a Optional Rear Wire Shelf Assembly.

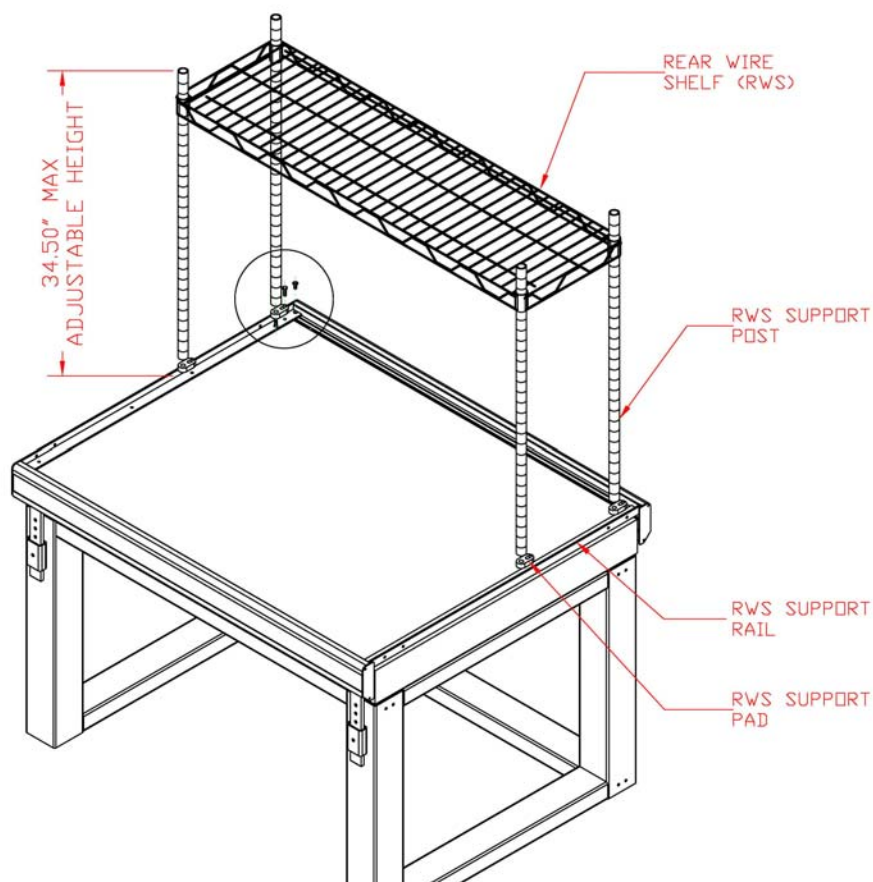


Fig. 8b Optional Rear Wire Shelf Assembly.

Optional Casters

1. The Optional Casters if purchased with the MK52 Series Isolation Table are retrofittable, which means that they could be installed on MK52 tables already in the field.
2. In order to set up the Casters, retract the casters to their lowest possible positions.
3. Adjust the Mechanical Leveling Feet on the Table so that they extend down from the leg tube by approximately 1 inch.

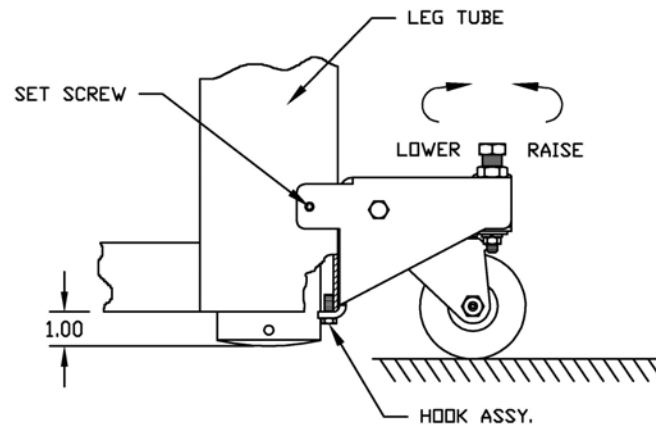


Fig. 9 Optional Caster Set Up and Use.

4. You are now ready to attach the Caster to the leg tube. The Caster can be attached to either of 2 outer sides on the leg tube.
5. Place the caster assembly onto the leg tube on 1 of the 2 sides best suited and slide the Caster assembly up, making sure the hook assemblies on the back of the caster assembly is on the inside of the leg tube.
6. Tighten the 2 nylon tipped, set screws on each Caster Assembly. These will hold the Caster Assembly in place when they are not in use.
7. To remove the Caster Assembly reverses the previous procedures.
8. Engaging the Caster can be done by turning the bolt on top of the Caster Assembly clockwise until the caster plate is horizontal or parallel with the floor. The leveling foot on that leg should rise, if more clearance is needed this can be done by raising the Leveling Foot into the leg tube.
9. Lower all four Casters and the System is ready to be removed. It is recommended to have at least $\frac{1}{4}$ inch clearance between the Leveling Foot and the floor.
10. Once the system is in its desired location retract the Casters by reversing the previous steps and revealed the System. It is not recommended to float the System while the Casters supporting the Systems.

Optional Faraday Enclosure

The following instructions explain how to install the Faraday Enclosure on the MK52 table. Refer to the assembly drawing in Figure 11.

Required Materials:

- 2 side panel assemblies.
- 1 roll-away door screen assembly.
- 1 top screen.
- 1 rear screen.
- 1 top, front connecting tube.
- 1 bottom, top connecting tube.
- 1 rear, bottom connecting tube.
- 2 side rail assemblies.
- 2 guard rail assemblies

Required Tools:

- Screwdriver.
- Rubber mallet.
- Carpenter's level

Procedure:

1. All connections are made by matching the numbers.
2. Stand the two side assemblies on a flat surface.
3. Using a rubber mallet, hammer the front, rear tube onto the black corner connectors. (As show on Fig. 10).
4. Drop the top screen into place and fasten from the bottom using #4X.25" sheet metal screw provided (if the pre-drilled holes do not align, rotate the screen 180°).
5. Place the rear screen into position and secure from the outside using #4X.25" sheet metal screw (Again, if the pre-drill holes do not align, rotate the screen 180°).
6. Level your MK52 system by placing a bubble level diagonally across the guardrails and adjusting the leveling feet until completely level.

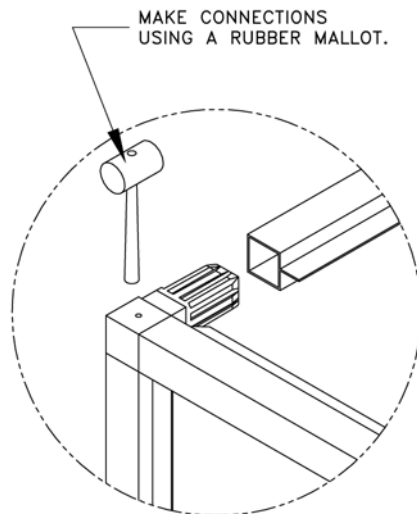


Fig. 10 Faraday Enclosure installation

7. Place the Faraday enclosure onto the front and rear angle supports.
8. Fasten the Faraday enclosure to the support angle from the bottom using #6X.38” sheet metal screw.
9. Align and secure roll-away door screen on front top and side enclosure, make sure the screen door slide close properly.
10. If the screen door misaligns after the final assembly, the system is not leveled properly.

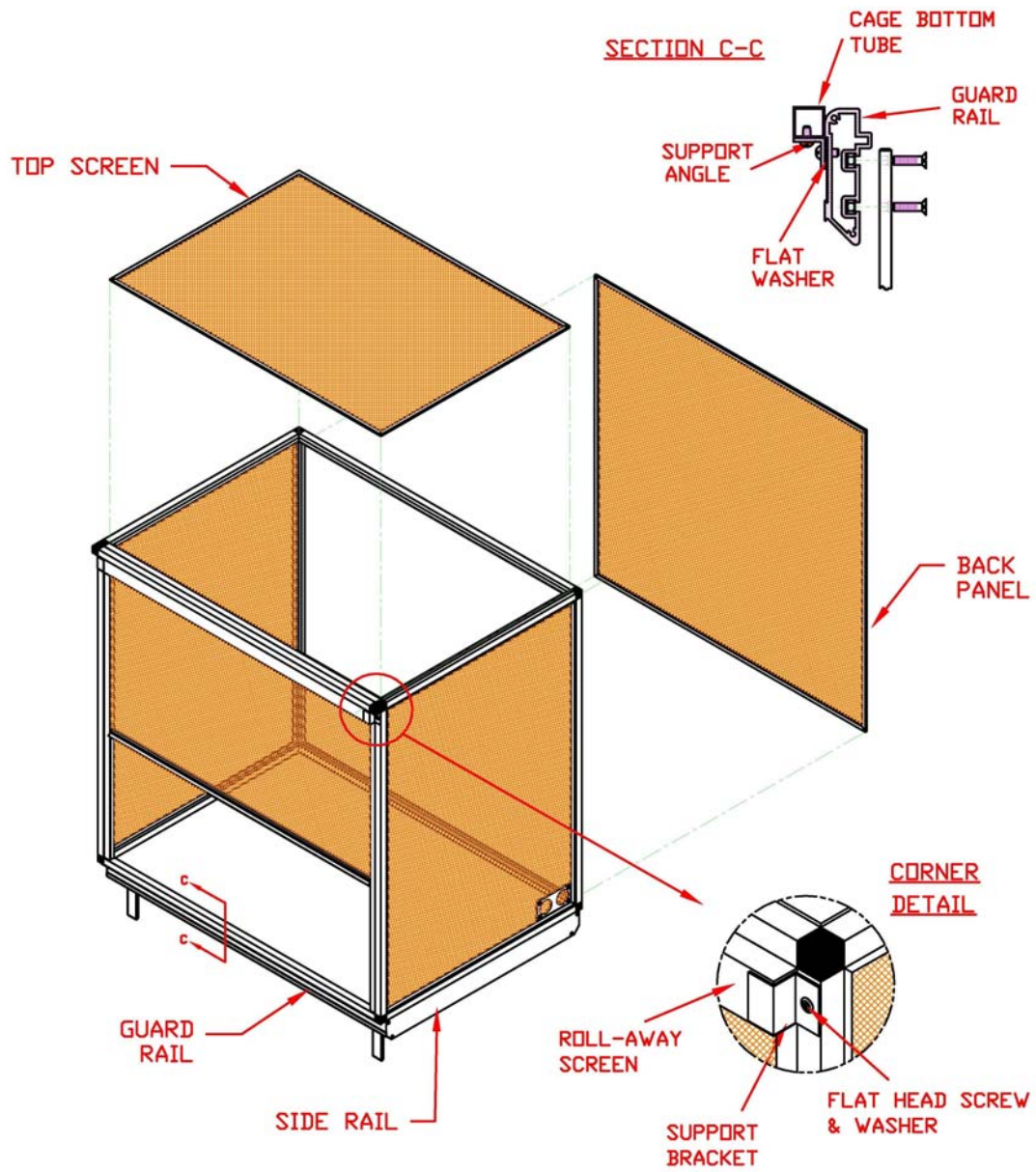


Fig. 11 Faraday Enclosure.

Optional Hanging Shelf

1. Align 11GA. triangular shelf on top corner existing Faraday enclosure prior to drill .12" dia holes (5 places) on faraday enclosure.
2. Secure triangular shelf to Faraday enclosure using #10X.50 pan head sheet metal screw provided.
3. Fasten the hanging posts to the bottom triangular using 1/4-20UNC X .75" flat head screw and finish washers.
4. Hold into place and attach the 7GA. triangular hanging shelf using the 1/4-20UNC X .75 inch Flat Head Screws and Finish Washers.

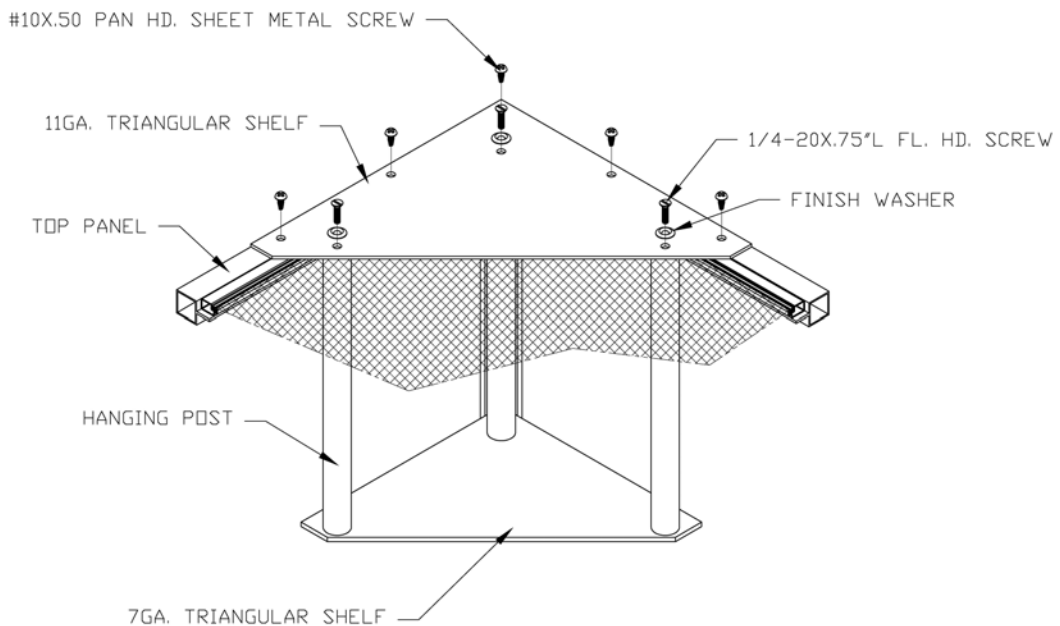


Fig. 12 Optional hanging shelf.

Section IV: Trouble Shooting

The purpose of this section is to aid the user in the diagnosis and repair of any minor problems that may occur. If your difficulty persists, call Kinetic Systems, Inc.'s technical support staff for assistance.

Symptom: Tabletop Will Not “Float”	
Probable Causes	Recommended Solution
Unit at its end stop positions	Adjust Vertical position by turning the Load Adjustment Crank
Supported load too heavy	Reduce load to system capacity
Supported load uneven	Redistribute load evenly
Too much negative stiffness	Turn the vertical stiffness adjustment screw counterclockwise only a few degrees

Symptom: Tabletop “Floats” but will not Isolate	
Probable Causes	Recommended Solution
Rubbing between Tabletop and system structure	Reposition Tabletop
Foreign object between Tabletop and system structure	Remove foreign object

Warranty

Equipment manufactured by Kinetic Systems, Inc. (KSI) is warranted against defective workmanship and materials for one (1) year from date of delivery. Defective material or items will be replaced at no charge. This warranty does not include labor to remove and install the material or item in question. Material returned under Warranty will not be accepted without the prior approval and assignment of a Return Authorization Number by KSI. All returns must be shipped Freight Prepaid unless KSI authorizes otherwise. In those instances where returns must be by Motor Freight (truck), KSI will furnish the proper commodity rate classification for lowest shipping cost.