

## Accessories

### Coupled Optical Tops

#### Introduction

TableTops can be coupled end-to-end or joined in **L** or **T** shape configurations. They also can be configured with two working heights by coupling tables with different thickness.

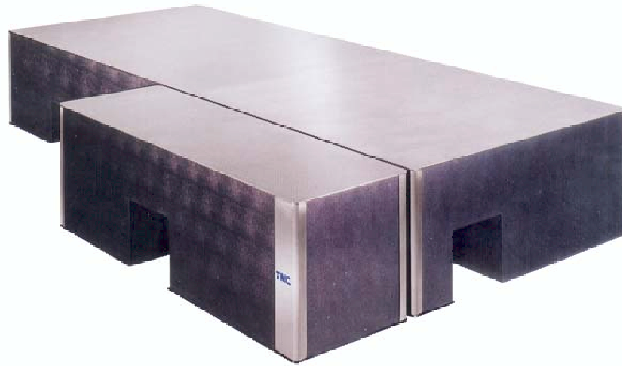


Figure 1 *Typical coupled optical top*



**Caution** Moving and coupling optical tops together should be performed by professional riggers. The following instructions are to assist professional machinery movers.

#### Safety

- If you are uncertain of your ability to safely accomplish any aspect of any work requirement **Stop Work and Seek Assistance**.
- Plan your moving and assembly of equipment ahead of time. Conduct a practice walk through prior to beginning any work.
- Ensure all safety procedures for the proper use of hand tools and power lifting equipment are used.
- Never place anyone under a suspended load.
- Contact the appropriate site safety authority for project approval prior to commencing all work. If possible have a safety supervisor present during work
- Determine the number of people necessary to accomplish this task safely; typically a minimum of three people.

## Suggested Tools and Equipment

- Gantry crane  
*(rated capacity greater than gross load)*
- Chain hoist and Gantry dolly  
*(rated capacity greater than gross load)*
- Assortment of cargo straps and attachment shackles  
*(recommend 2 each of 6 foot, 8 foot, 10 foot and 12 foot lengths)*
- Lifting hoist  
*(as required to assemble the Gantry crane at work site)*
- 2 ratchet style 2 inch wide cargo straps 20 feet long
- Assorted hand tools  
*(Snips, 24 inch Pry Bar, 3/8 inch Drive Ratchet and Socket Set, Allen Wrench Set, Adjustable Wrench with 1-1/2 inch opening, #2 Phillips Screwdriver, #2 Slot Screwdriver)*
- Assorted blocking and shimming materials  
*(include 2 x 4's, 4 x 4's etc.)*
- 3 hydraulic lift table carts (or suitable substitute)  
*(Confirm gross load requirements are met.) Carts used to position tables for assembly. They must be able to provide up/down, left/right and tilt adjustments necessary to align the tables for assembly.*
- 2 Johnson Bars or Dollies (or other suitable equipment)  
*To move tables from unloading site to assembly area.*
- TMC provided assembly wrench, minimum 1, best 2
- TMC provided slotted 0.030 inch thick x 2 inch wide x 7 inch long backing shim
- 4 foot (minimum) level. 4 foot long (minimum) straight edge
- 7/16–20 tap and die
- 1-20 tap and die
- Anti-seize compound (tube) and Q-tips
- Lock-tight (tube)

## Preparation

*Unloading and uncrating optical tables and support posts.*

- When the equipment arrives the optical tops and associated crates will require a staging area (loading dock) or other area in which to unload the truck. This will often require a forklift.
- The crates will most likely arrive laying flat on the truck. To safely unload them, it will be necessary to lift them from the bottom using a fork lift or similar device (pallet jack – dock mules).
- Uncrate the optical tops and support posts in accordance with the un-packaging instructions on the crate.
- Uncrate all isolator/post assemblies as required. Place in a safe location with all other related parts packaged for later use.  
Discard all unnecessary crating materials from the work area.
- Lift and move the optical top to the installation location. It may be necessary to lift and rotate the optical table to its side position using a Gantry and hoist.

## Assembly and setup

- Step 1** Mark the floor with masking tape to outline the exact placement for each optical table.

Identify table number 1 placement; the first and primary reference table that the others will be aligned with.

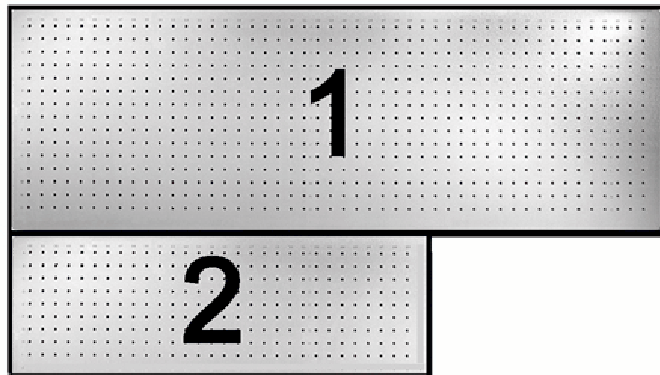


Figure 2 *Sample coupled table layout*

- Step 2** Assemble the isolators or posts in accordance with the instructions provided for your model system.
- Step 3** Place isolators/posts in the marked location for the installing the primary optical top.  
If multiple tops are being joined together, indented numeric codes for the joining order are provided and must be complied to.
- Step 4** Lift the optical top and place it on the isolators/posts using care to evenly balance the top on the Gantry crane.
- Step 5** Carefully level and adjust the height position.  
*This optical top will become the reference to which all the other optical tops will be positioned and joined.*
- Step 6** Apply a small amount of anti-seize compound to all the female joiner plate **1-20** threads.
- Step 7** Position the isolators/posts for the next optical top to be joined to the reference top in its respective position but low enough as to not interfere with the alignment of the top to be joined.
- Step 8** Lift and move the second top and position it just above the isolators/posts as shown in figure 3 below using the Gantry.
- Step 9** Position the second top so that it is within a few inches from touching the “reference” optical top.
- Step 10** Place the second top on the adjustable support stands or jacks and align the dowels with the dowel holes in the face of the joiner plates such that when appropriate pressure is exerted to the second top towards the “reference” top, the dowel pins will easily mate with the female dowel holes referenced in figure 4 insert below.  
This can be facilitated by placing a straight edge across the two top surfaces as shown in figure 3 below.

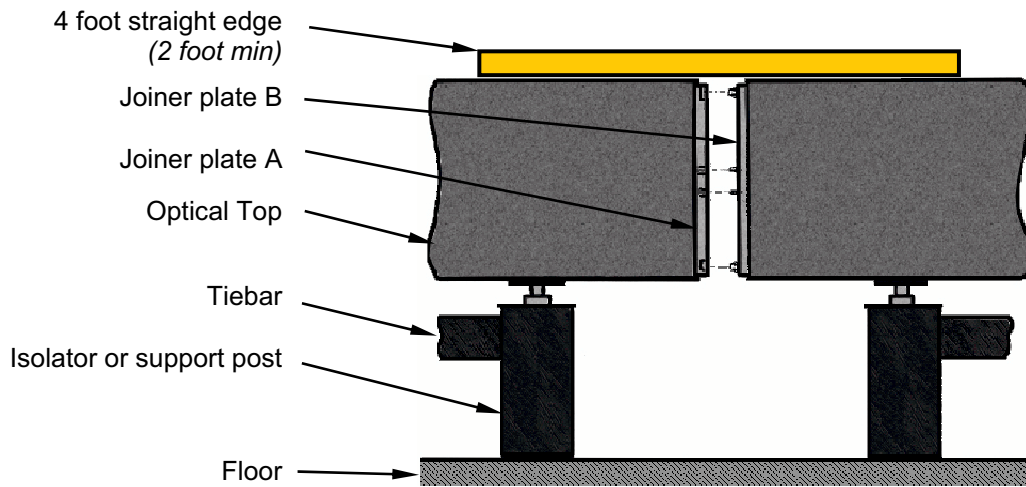


Figure 3 Joiner plates

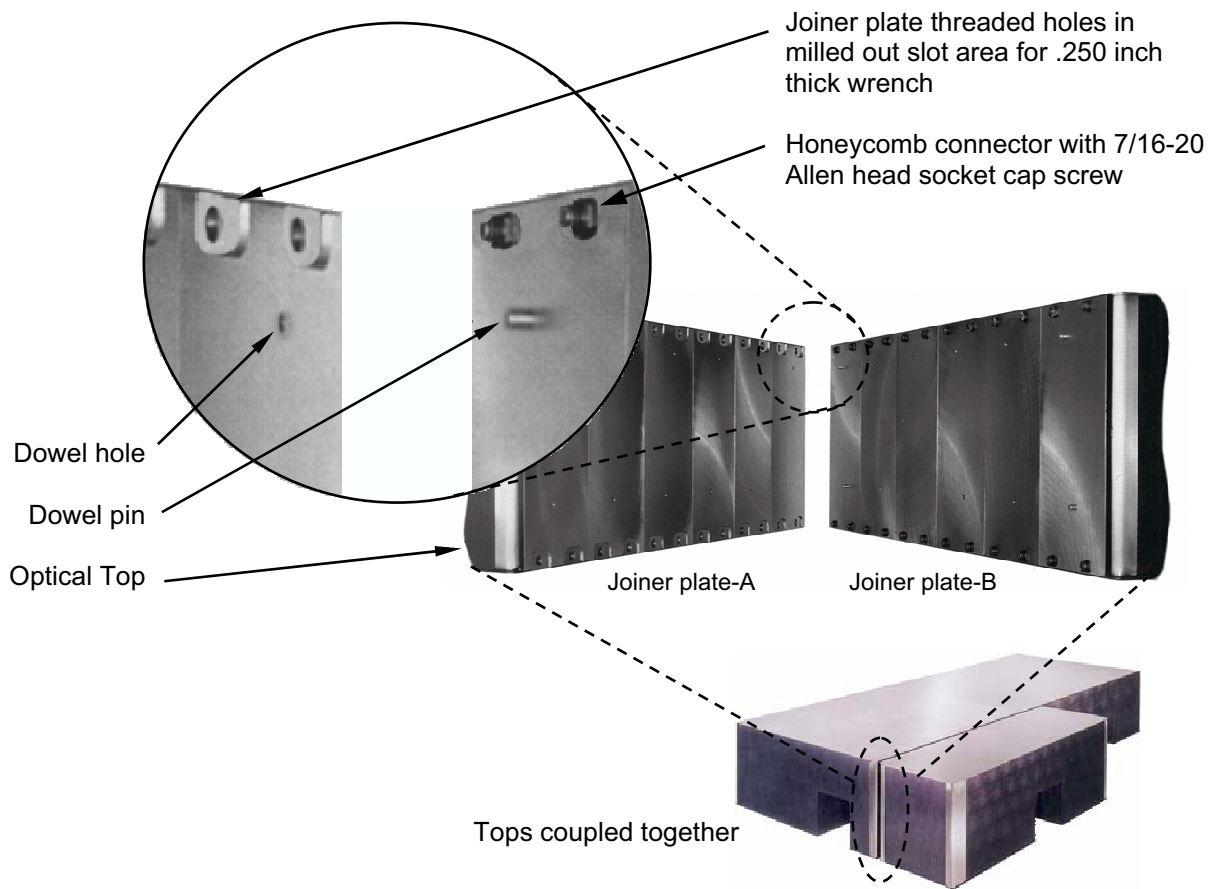


Figure 4 Attaching Joiner plates together

The second top must be level and co-planar with respect to the “reference” top to facilitate proper joining. Continuously check and adjust as required.

You can continue using the Gantry crane and straps for this procedure with the optical top suspended in the air, but it will be more difficult to maintain top alignment during leveling and co-planar adjust necessary to engage the dowel pins.

**Step 11** Place a ratchet strap of appropriate length around the girth of the two optical tops to be joined.

**Step 12** Slowly ratchet the two tops together while ensuring that the tops remain co-planar and level with respect to one another as referenced in figure 3 above.

The dowel pins and holes referenced in figure 4 insert will mate as tops come together.

Ensure that the honeycomb connectors (nuts) do not jam against the corresponding joiner plate threaded holes.

**Step 13** Ensure you can freely turn ALL honeycomb connectors with your fingers. Then engage the first thread into the threaded hole in joiner plate-A as reference in figure below.



**Note** Once you have verified that all honeycomb connectors are free to turn, it is recommended that you use the supplied **0.030 inch** shim tool and wrench referenced in figure 5 & 6 below to start the first thread of each honeycomb connector. Using the shim will insure that all connectors start straight.

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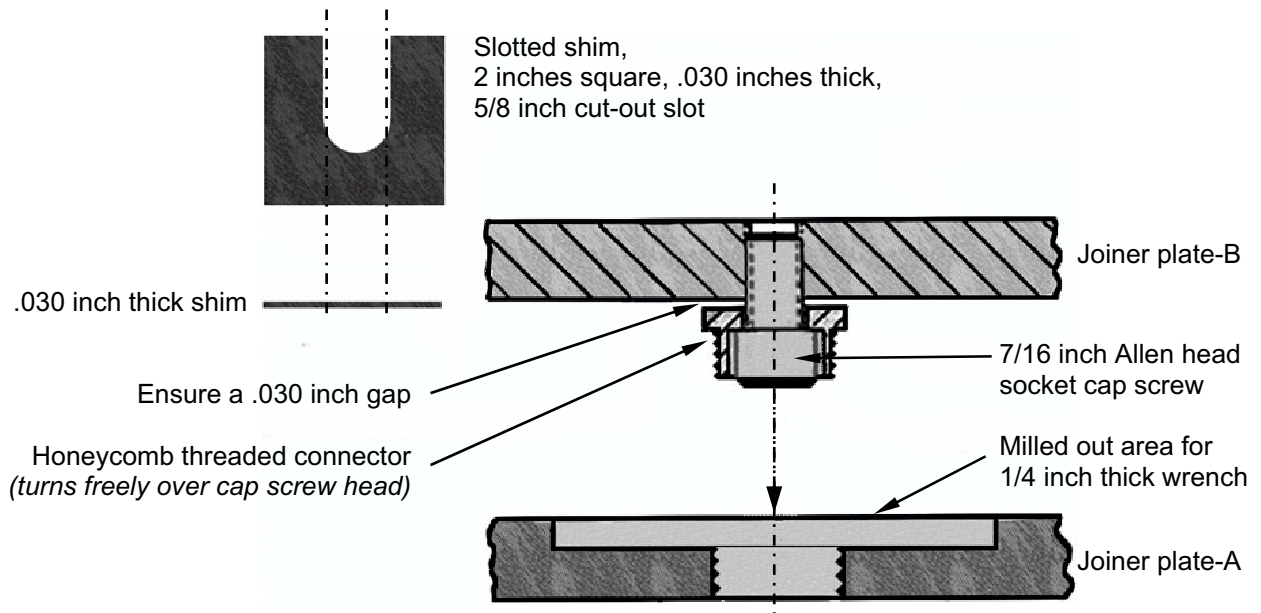


Figure 5 *Honeycomb Connectors*

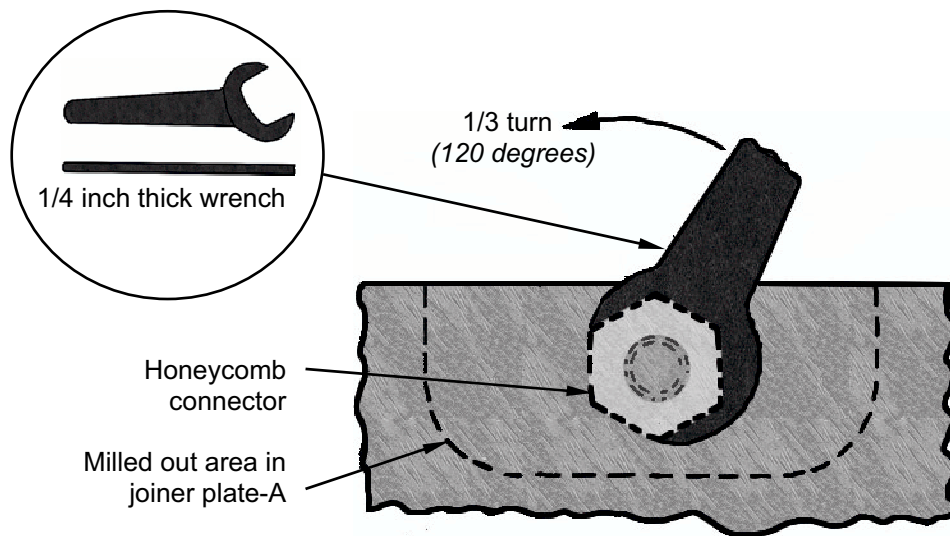


Figure 6 *Wrench tightening honeycomb connector*

**Step 14** Once all honeycomb connectors are engaged into joiner plate-B increase the pressure on the ratchet strap as required to facilitate tightening the honeycomb connectors.

- Step 15** Using the shim tool and wrench shown in figure above, start from the left side of the optical top and turn each honeycomb connector in consecutive order only **1/3** turn or **2** flats at a time, moving in a clockwise direction completely around the top.



**Important** If one or more of the honeycomb connectors becomes jammed, then stop and loosen all connectors and start over.

If at any time a connector is damaged, then all connectors must be loosened, the two tops pulled apart and the damaged components replaced.

See troubleshooting instructions at the end of this procedure.

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- Step 16** Torque each honeycomb connector to approximately **20 foot-pounds**.

This equates to approximately **40 pounds** of force applied to a **6 inch** wrench handle.

- Step 17** Raise the isolators/posts such that they provide a coplanar support across the second optical top.

*Rigid support posts:* If non-isolating posts were installed adjust the top support foot on each post until the both tops are level. This requires a #2 Phillips screw driver and adjustable wrench.

*Isolator posts:* If isolation posts were installed complete their installation using the TMC instruction sheets provided.

- Step 18** Repeat above steps to join additional optical tops as appropriate.



**Step 19** Once tops have been coupled together, apply provided stainless steel strip of tape down on the joiner plate areas between the joined optical tops.

First peel away the backing tape and apply sticky side down. This provides a finished surface across the joined optical tops.

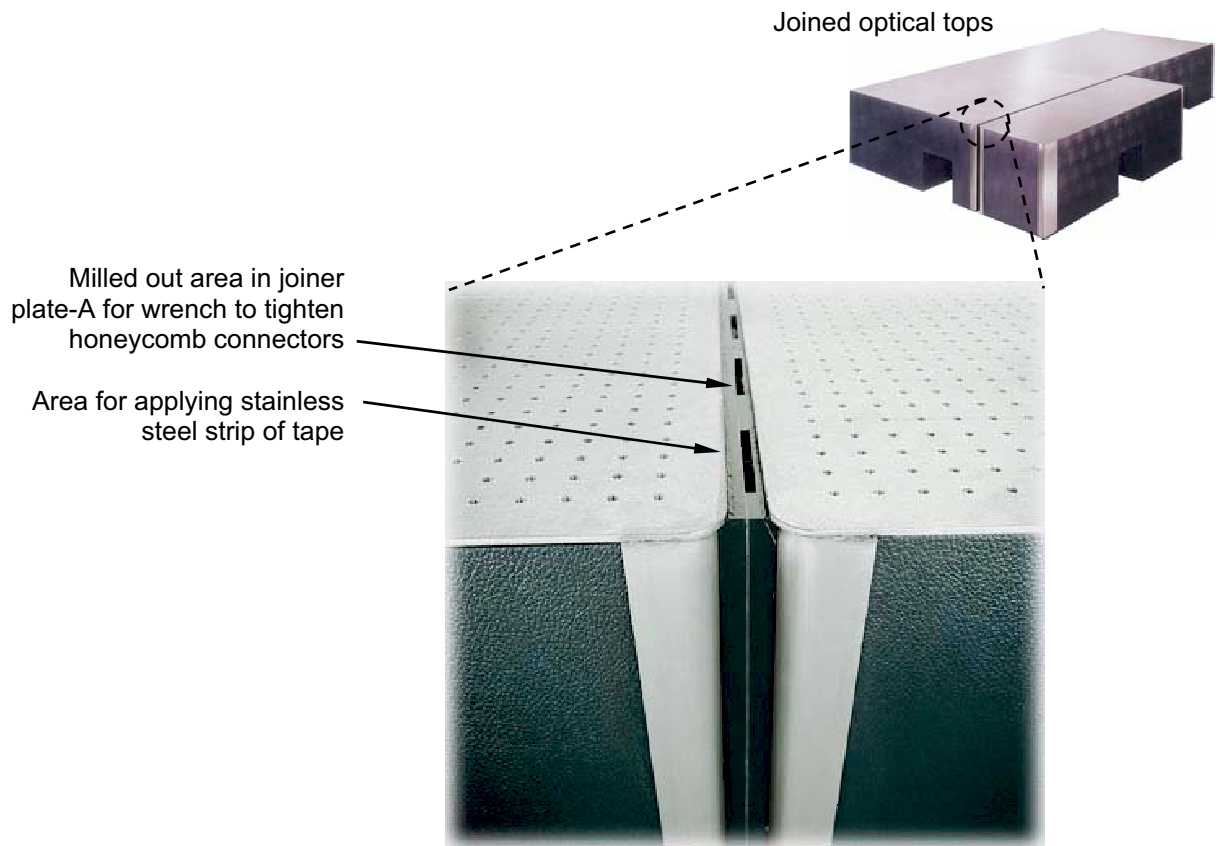


Figure 7 Joiner plate area between optical tops

## Troubleshooting

If a connector becomes jammed during the installation process, then proceed as follows.

- Back off all connectors in the opposite direction from installation using the same procedure.
- Once the optical tops are separated, remove and discard the damaged **7/16–20** cap screws.  
Discard any honeycomb connectors that have been deformed.
- Re-tap the **7/16 inch** and **1-20** holes as necessary.
- Apply lock-tight to the **7/16 inch** cap screws.
- Install the new screws and honeycomb connectors.
- Ensure that a **0.030 inch** clearance is provided between the joiner plate and **1-20** screw shoulder. Compare to an existing non-damaged honeycomb connector if in doubt.
- Once repair is completed, begin installation procedure again.