DynaMax® LT, DynaMax® MD, DynaMax® Plus Structural Suspension System

Assembly and Installation Instructions

Hardware That Needs to be Purchased Separately:

- **3/8"-16 Threaded Rod for Connections to Structure**
- **#8 Pan Head Screws**

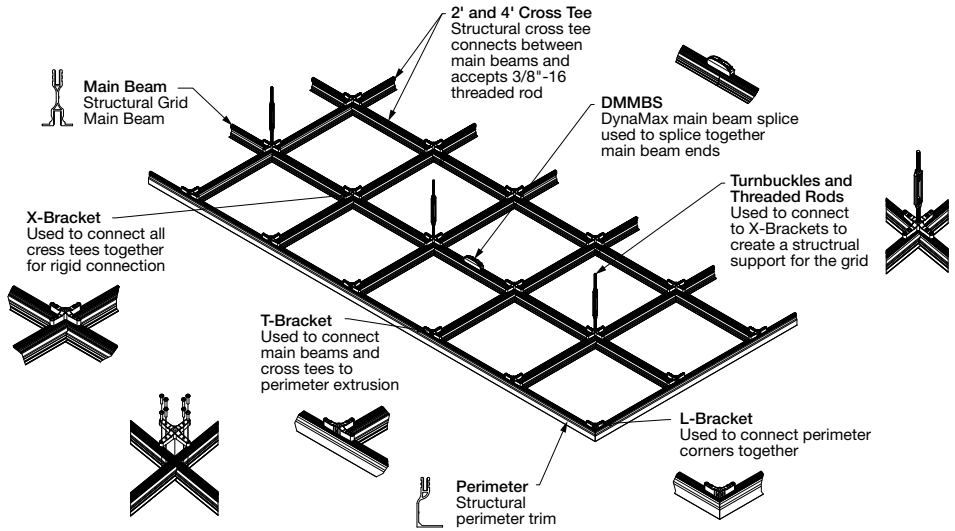
DO NOT REMOVE SUSPENSION SYSTEM FROM THE CARTON UNTIL YOU READ THESE INSTRUCTIONS IN THEIR ENTIRETY.

1. SYSTEM OVERVIEW

DynaMax® LT, DynaMax® MD, and DynaMax® Plus Structural Aluminum Data Center Suspension Systems are designed to offer flexible and reconfigurable support of heavy loads, including data center components like bus bars, hot and cold aisle containment, and other hanging elements via 3/8"-16 threaded rod connections to structure. All three of these systems combine the ceiling system with a structural component, and integrate seamlessly with Armstrong ceiling panels. Please reference bottom of page 16 for a list of ceiling panels that are specially sized and engineered for the DynaMax LT, DynaMax MD, and DynaMax Plus suspension systems and must be used with the systems.

NOTE: These panels are specially sized and engineered for DynaMax LT, DynaMax MD, and DynaMax Plus suspension systems and must be used with the systems. These panels do not fit in other suspension systems.

The diagram in ***(Fig 1A)*** provides an overview of the DynaMax MD suspension system components, clips, and accessories. For this same overview with DynaMax LT, please refer to ***(Fig 1B)*** on the next page. The diagram in ***(Fig 1C)*** on the next page provides an overview of DynaMax Plus main beans and cross tees.

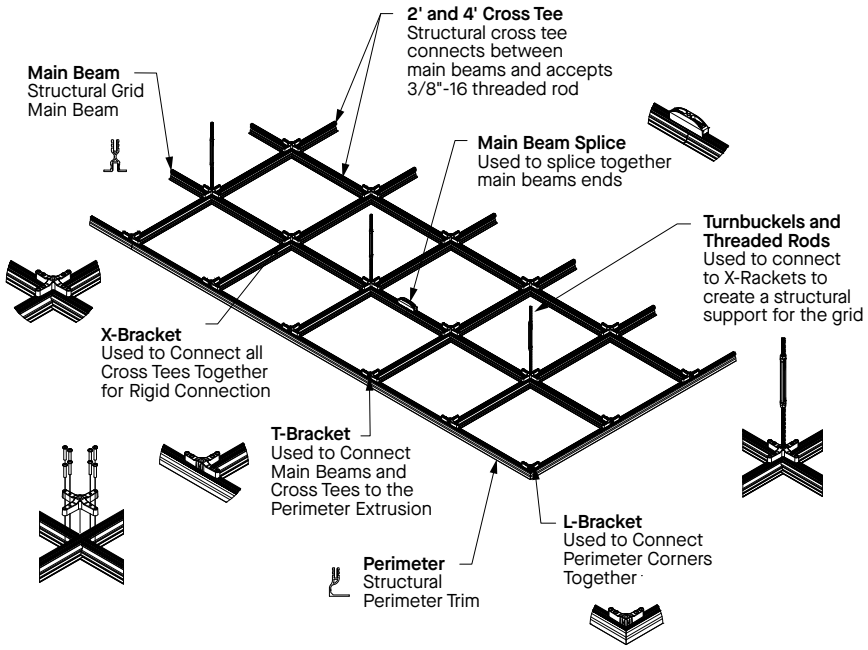


(Fig 1A)

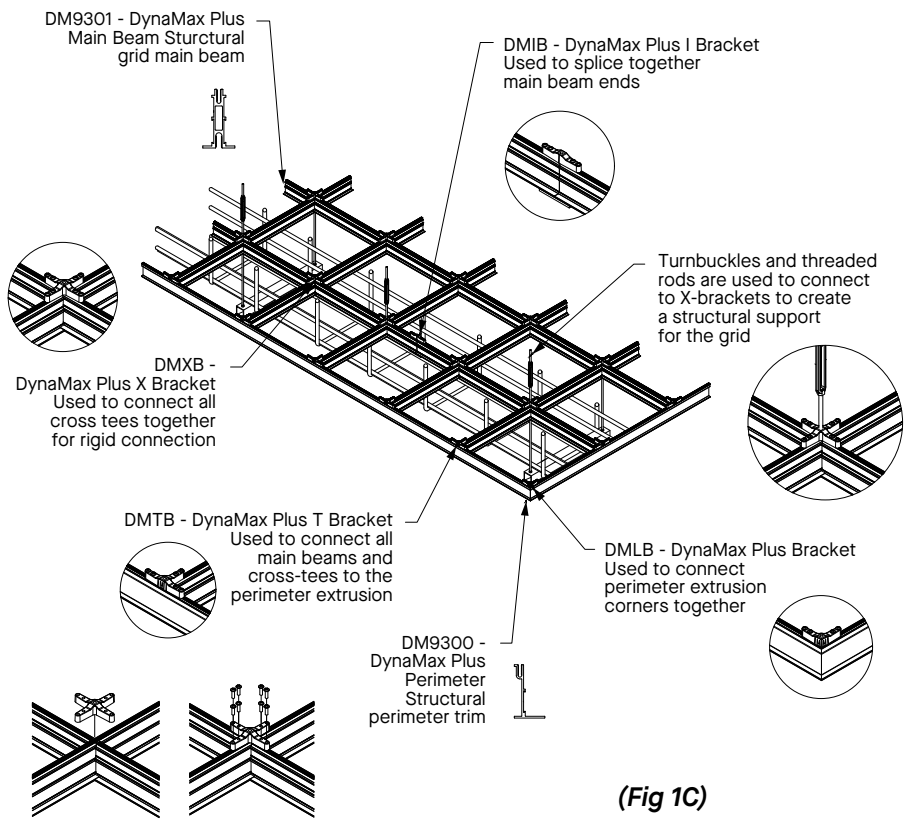
Armstrong®
World Industries

IMPORTANT: The DynaMax® brackets are designed to be used with DynaMax® LT, DynaMax® MD, and DynaMax® Plus only. The DynaMax Main Beam Splice (DMMBS) is to be used on DynaMax LT and DynaMax MD to splice main beams. The DynaMax I Bracket (DMIB) is used in conjunction with the DynaMax Bottom Splice Plate (DMBSP) on DynaMax Plus to splice main beams. They are designed for specific duty loads that are specified in the load charts provided in our DynaMax LT, DynaMax MD, and DynaMax Plus Technical Guides. When hanging heavy loads greater than those specified in the load charts, consultation by a local engineer is required. Also, please be sure to review the installation and securing recommendations for any load that will be supported by the suspension system. Armstrong is not liable for improper use or improper installation of DynaMax LT, DynaMax MD, DynaMax Plus, or its components.

Please refer to Section 10 for specific information on the allowable loads for the suspension system.



(Fig 1B)

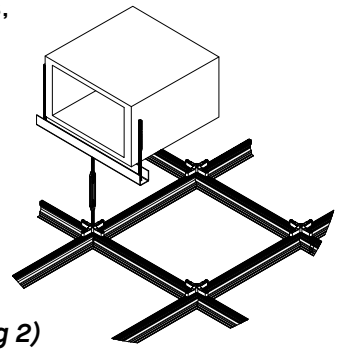


(Fig 1C)

2. INSTALLATION CONSIDERATIONS

The DynaMax ® LT, DynaMax® MD, and DynaMax® Plus Structural Aluminum Data Center Suspension Systems are designed to be installed with 3/8"-16 threaded rod from structure.

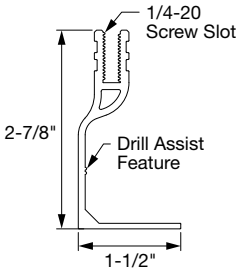
2.1 Lay out the space, marking the locations of the hanger rods, main beams, and cross tees, and note any mechanicals that will be supported overhead. Be sure to follow the locations and direction of the threaded rod, hangers, main beams, and cross tees a specifying architect/engineer. If plumb threaded rod drops are not possible, then a trapeze or sub framing may be required ***(Fig 2)***. This sub or trapeze framing must be engineered to support the designed loads.



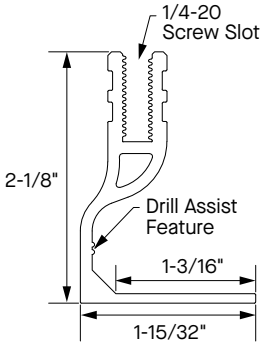
(Fig 2)

2.2 Perimeter Options

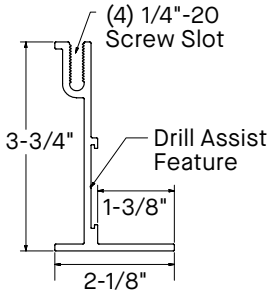
Install the DynaMax® MD Perimeter Molding DM5800 ***(Fig 3A)***, DynaMax LT Perimeter Molding DM2800 ***(Fig 3B)*** or DynaMax Plus Perimeter Molding DM9800 ***(Fig 3C)***. It is recommended to predrill holes in the perimeter 16" or maximum 24" O.C. to allow screws to pass through and secure the perimeter to studs or structure. **OPTION A** ***(Fig 4A, Fig 4B & 4C)***. The wall angle can be attached to studs or structure using screws. A groove is present on the perimeter to assist in drilling. Perimeter molding needs to have threaded rods (4' O.C. max) if loads are applied. If not, screws are acceptable ***(Fig 5A, Fig 5B & Fig 5C)***.



(Fig 3A)

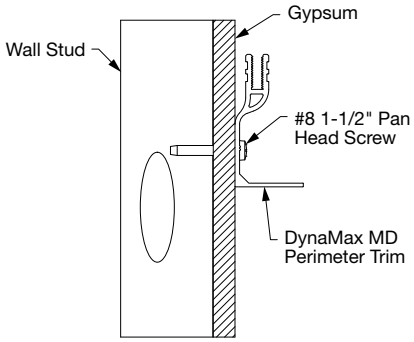


(Fig 3B)

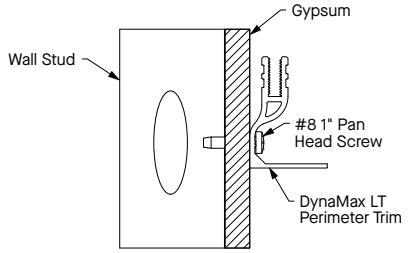


(Fig 3C)

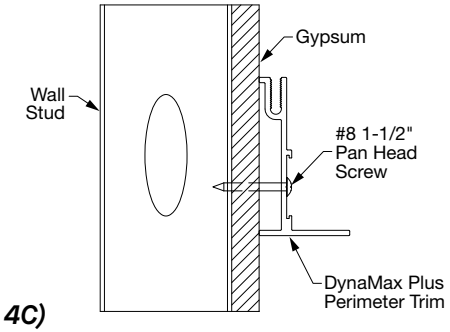
OPTION A



(Fig 4A)

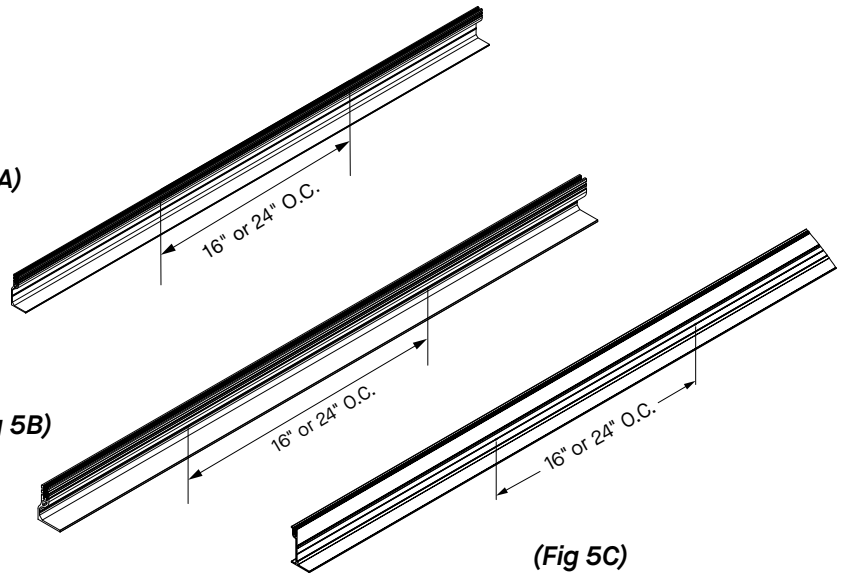


(Fig 4B)



(Fig 4C)

(Fig 5A)

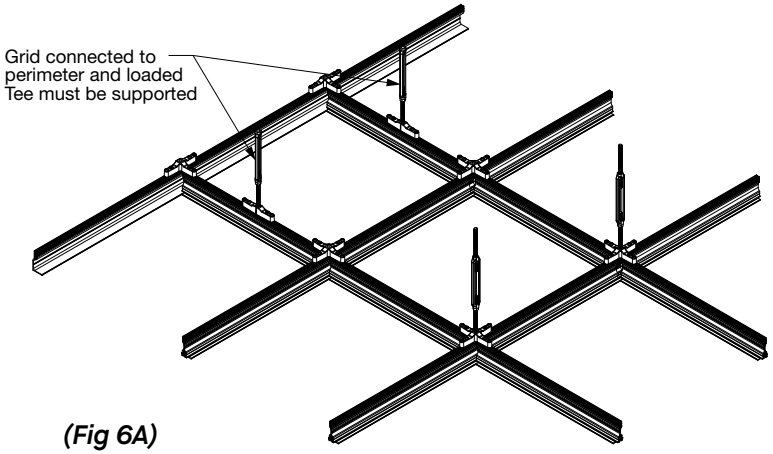


(Fig 5B)

(Fig 5C)

2.2.1 Perimeter Loads

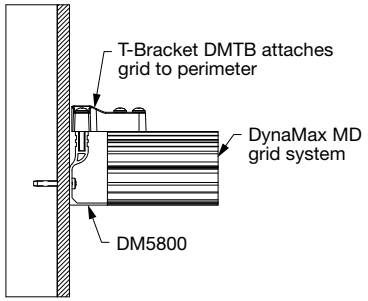
Any loaded grid member at the perimeter requires a support between the perimeter and the load as shown in ***(Fig 6A)***. Cross members require support for the grid on either end of the cross member. In situations where grid member is supported within 7" of the perimeter, the perimeter does not require rod drop supports.



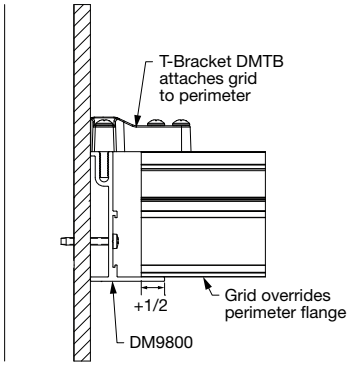
(Fig 6A)

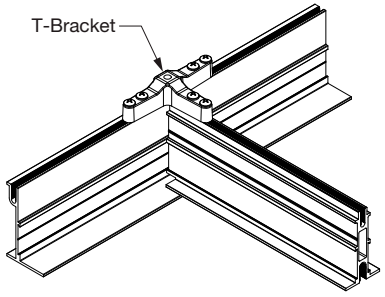
All cross tees and main beams are to be connected to the structural wall angle with a T-Bracket (DMTB) for DynaMax® MD, using the provided 1/4"-20 screws ***(Fig 6B)***. Screws should be fully seated but not over-torqued, in order to avoid damage to the threaded channel. Perimeter moldings should be butt cut and joined together using an I-Bracket (DMIB) for DynaMax Plus or DynaMax Main Beam Splice for DynaMax LT or DynaMax MD in the middle of the wall.

For DynaMax MD and DynaMax LT, perimeter cross tees do not sit on top of the perimeter molding. They will need to be butt cut to fit at the perimeter ***(Fig 6B)***. For DynaMax Plus, perimeter cross tees will sit on top of perimeter molding with the override. Gasketing may be required ***(Fig 6C)***. When gasketing is applied on wall molding additional cuts may be necessary to gasket on either side of grid member to relieve gasket compression at overrides. At corners, perimeter should be mitered and joined together using a L-Bracket (DMLB) for DynaMax ***(Fig 6D)***.

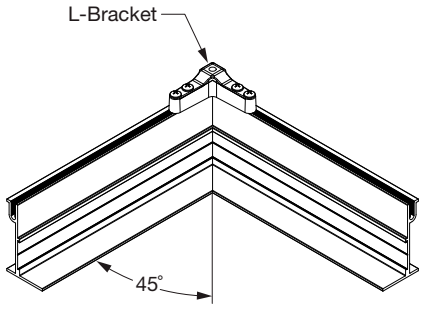


(Fig 6B)





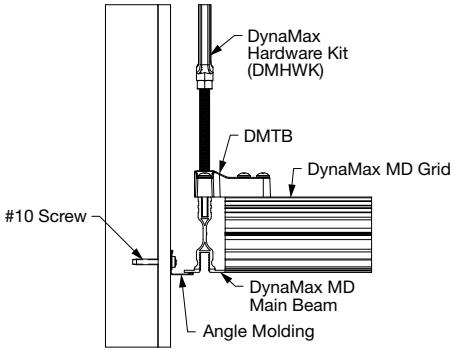
(Fig 6C)



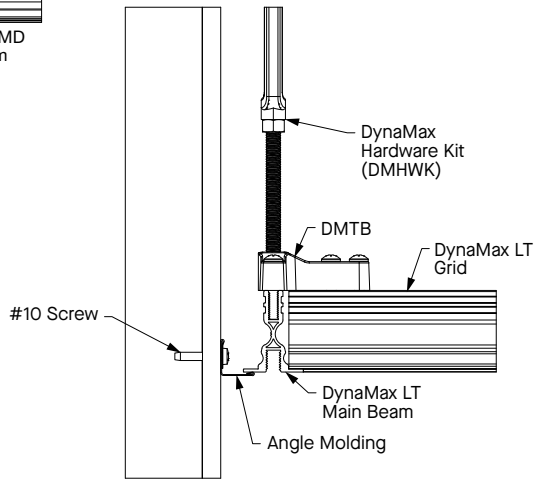
(Fig 6D)

2.2.2 With some layouts, a full modular system can be possible with factory sized tees and mains at the perimeter. In this application, 7/8" wall molding is used to allow for any imperfections in the walls with added tolerance **OPTION B** ***(Fig 7A, 7B, & 7C)***.

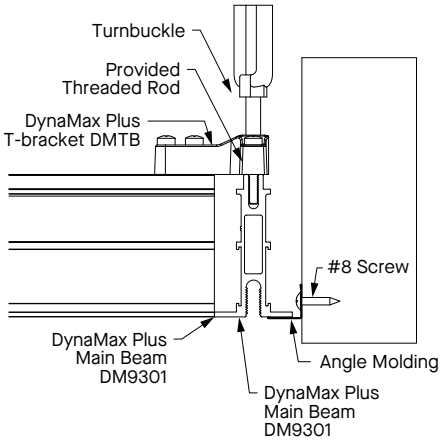
OPTION B



(Fig 7A)



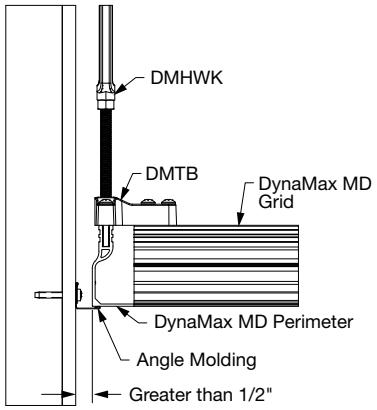
(Fig 7B)



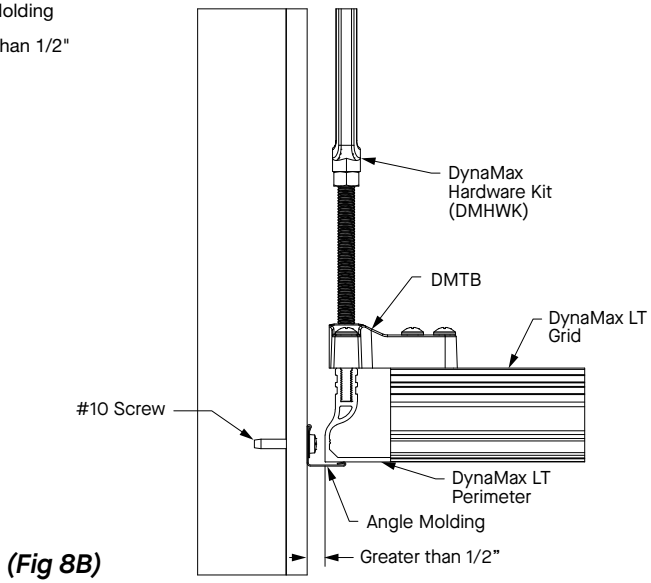
(Fig 7C)

2.2.3 For areas where you have a floating perimeter condition and a threaded rod drop, **OPTION C** ***(Fig 8A, 8B, & 8C)*** is possible. Recommend having greater than 1/2" between the wall and perimeter molding for DynaMax® LT, DynaMax® MD, or DynaMax® Plus to allow for proper adjusting of the turnbuckle.

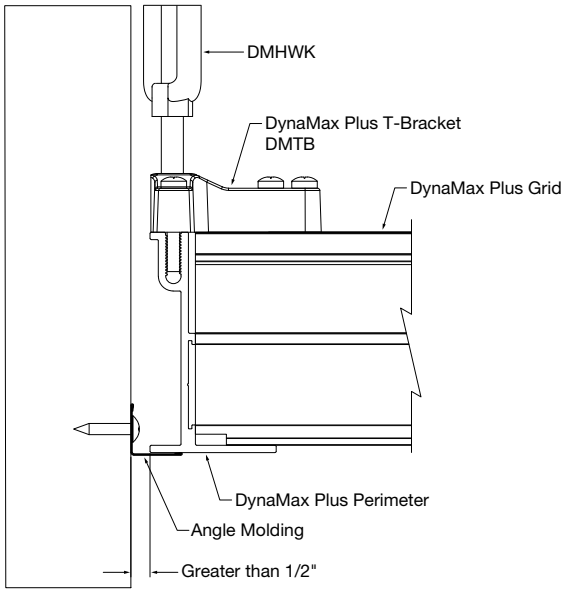
OPTION C



(Fig 8A)



(Fig 8B)



(Fig 8C)

DynaMax® LT, DynaMax® MD, and DynaMax® Plus can be designed to connect to perimeter walls and support loads using perimeter molding for DynaMax (DM5800), DynaMax LT (DM2800), or DynaMax Plus (DM9800), or the walls can be designed with seismic separation joints as shown in **OPTIONS B and C**. This is ultimately up to the structural engineer on each project. There is no attachment of the acoustical grid to the structural wall molding, so typical seismic requirements do not apply here.

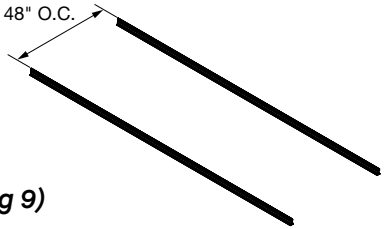
3. Install 3/8"-16 threaded rod hangers into the deck per the recommendations from the deck anchor manufacturer. Threaded hanger rods must be installed plumb with the X-Bracket (DMXB) for DynaMax in all main beam-to-cross tee intersections 4' O.C., unless otherwise specified.

4. Constructing the ceiling suspension system can be pre-fabbed into 4' × 12' modules with a jig table or template. A jig can be used to align and square the main beams and the cross tees of the modules. The X-Bracket (DMXB) and I-Bracket (DMIB) have nubs at the bottom to help self-square, and the DynaMax Main Beam Splice uses a c-channel to capture the upper threaded channel.

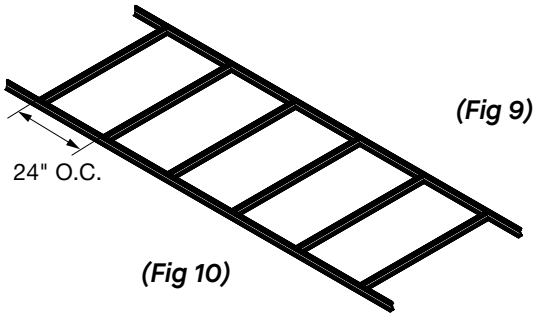
4.1 For each module, DynaMax LT and DynaMax MD main beams are spaced 4' O.C. ***(Fig 9)***

NOTE: DynaMax Plus main beams can be spaced at 4', 5', 6', or 8' due to the system's enhanced load-carrying capability and 4', 6', and 8' DynaMax Plus cross tees.

NOTE: The main beams are symmetric. The 4' cross tees are placed 2' O.C. ***(Fig 10)*** and are aligned to the notches located in the top of the main beams. The main beams are notched every 2' O.C. starting at 1' from the end to aid in a faster installation, preventing jobsite layout measuring and marking.

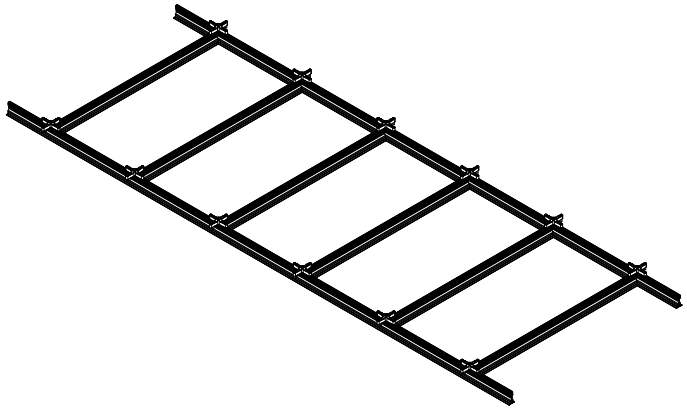


(Fig 9)



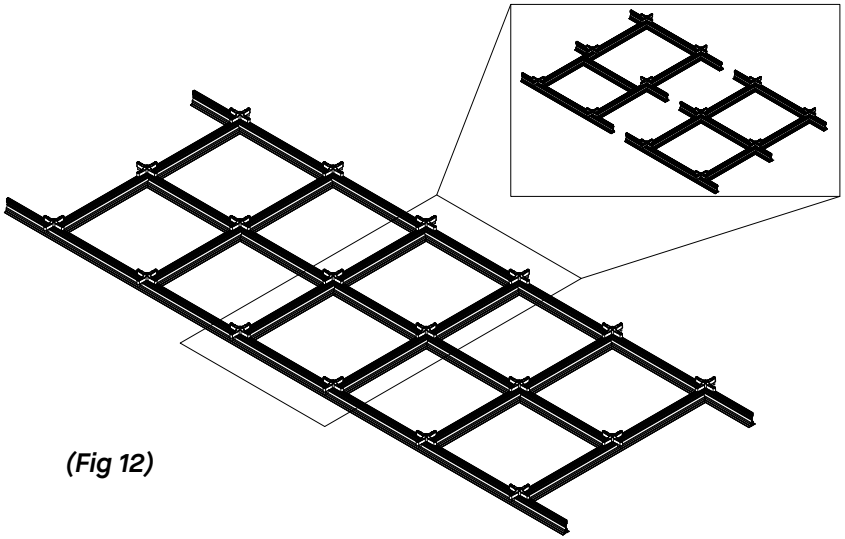
(Fig 10)

4.2 Insert X-Bracket (DMXB) for DynaMax at every intersection between main beam and cross tee. The DMXB is secured to the main beam and cross tee using the provided 1/4"-20 screws ***(Fig 11)***. Screws should be fully seated but not over-torqued, in order to avoid damage to the threaded channel.



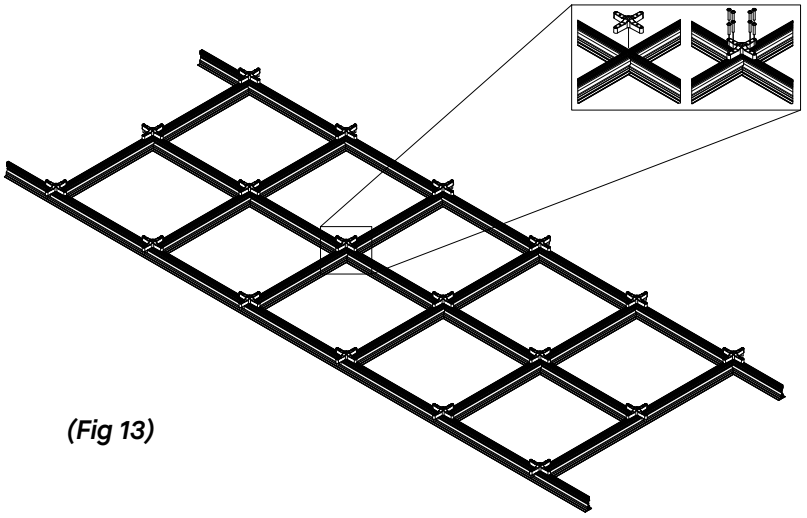
(Fig 11)

4.3 Depending on layout, it may be required to install a 2' cross tee in between each 4' cross tee. Insert the 2' cross tee in between the 4' cross tee on its side. Rotate the 2' cross tee until it is aligned with the notches on the top of the 4' cross tee. Twist the 2' cross tee upright ***(Fig 12)***.



(Fig 12)

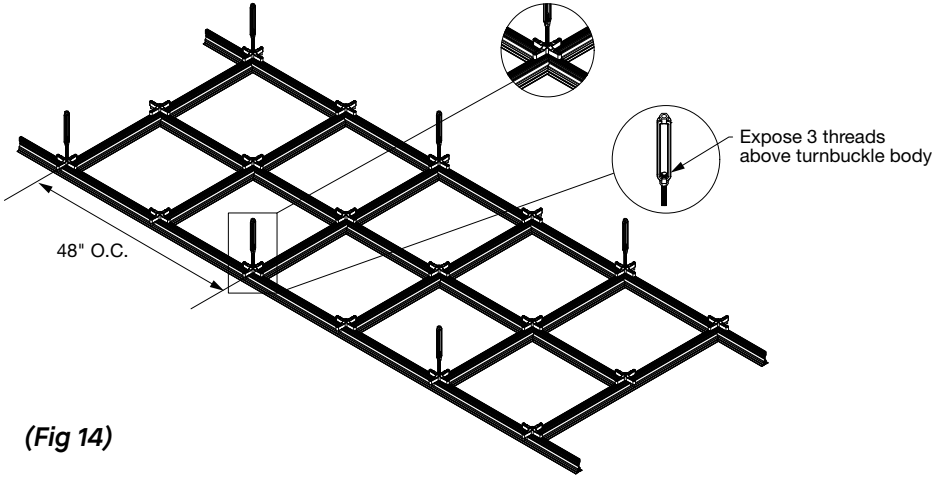
4.3.1 Align the 2' cross tees with the notches on the top of the 4' cross tee notches. Secure the 2' cross tee to the 4' cross tee at every intersection using an X-Bracket (DMXB) for DynaMax® and the provided 1/4"-20 screws ***(Fig 13)***. Screws should be fully seated but not over-torqued, in order to avoid damage to the threaded channel.



(Fig 13)

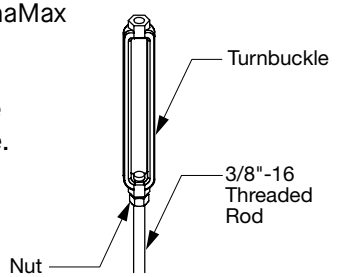
4.3.2 Cut threaded rod hanging from the deck 11" up from the finished ceiling height for DynaMax® LT and DynaMax® MD. For DynaMax Plus, cut threaded rod 12" up from the finished ceiling height.

4.4 Threaded rods, nuts, and turnbuckles are installed into the X-Bracket (DMXB) for DynaMax every 4' O.C. The threaded rods must be fully engaged with the DMXB and it is recommended that 3 threads are exposed in the turnbuckle ***(Fig 14)***.

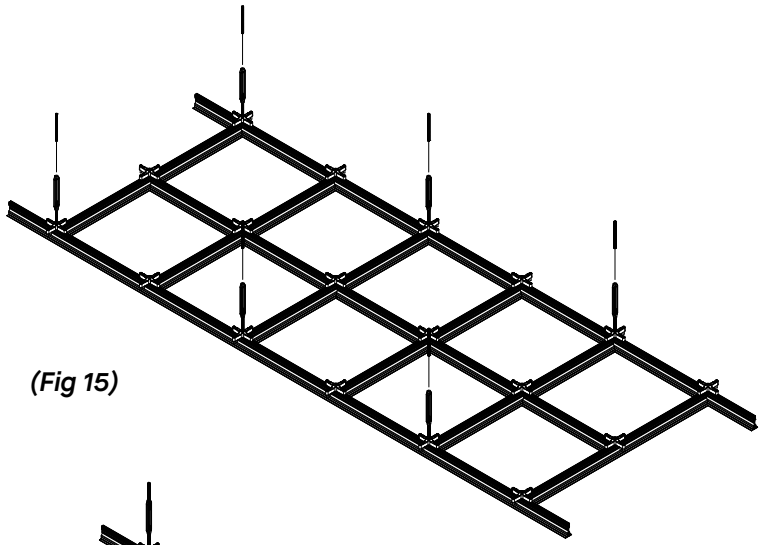


(Fig 14)

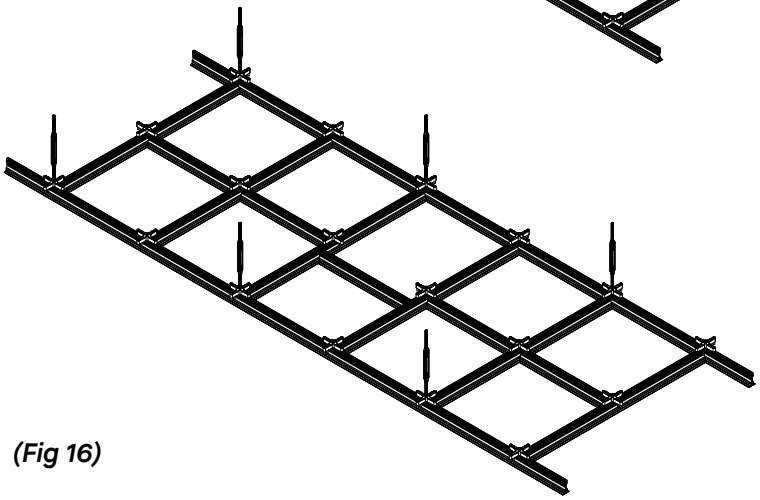
NOTE: Threaded rods are directional with 1" of RH threads that will be inserted into the DynaMax X-Bracket and 3" of LH threads that will be inserted into the turnbuckle. An LH jam nut is provided and should be installed onto the threaded rod before attaching to turnbuckle.



5. Raise each module to the threaded rod drops and attach using the turnbuckles ***(Fig 15)***. Ensure 3 threads are exposed inside the turnbuckle from the ceiling rod drop. Failure to do so can compromise the integrity of the system. The ceiling height can be adjusted by twisting the turnbuckles ***(Fig 16)***. After ceiling height is set and leveled, lock the turnbuckle in place using the nut attached to the threaded rod.



(Fig 15)

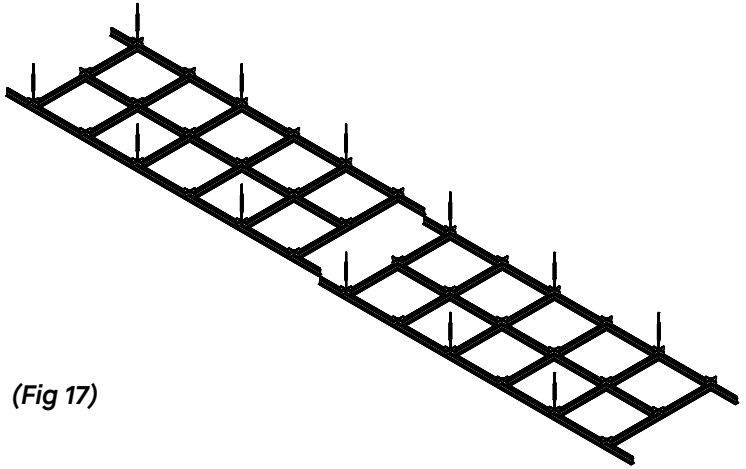


(Fig 16)

NOTE: The 12' × 4' modules are directional. One end of the module will have the turnbuckles and the other ends will not. Ensure the modules are the correct direction before suspending.

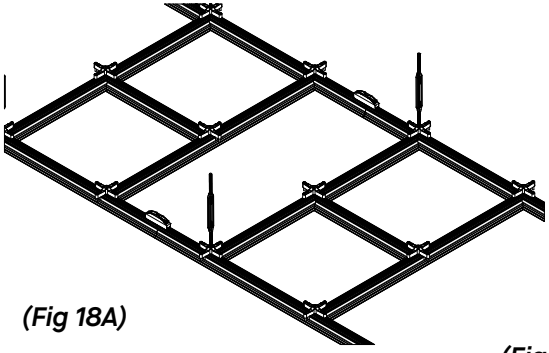
6. Suspend the other modules in the same row, adjusting the height and level of each module ***(Fig 17)***. At locations where the main beam ends butt against each other, both DynaMax LT and DynaMax MD only require the DynaMax Main Beam Splice (DMMBS). DynaMax Plus requires both the I-Bracket (DMIB) and the Bottom Splice Plate (DMBSP). Screws should be fully seated but not over-torqued, in order to avoid damage to the threaded channel.

NOTE: It is acceptable to align splices throughout the installation and they are not required to be staggered. However, all splices must be supported by a threaded rod support within 12-inches of the splice.

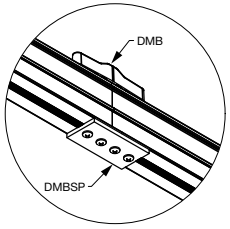


(Fig 17)

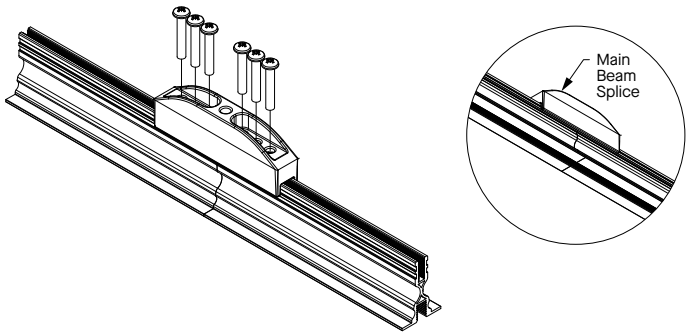
Ensure the I-Bracket (DMIB) for DynaMax and the Bottom Splice Plate (DMBSP) for DynaMax is roughly centered on DynaMax Plus, and 2 screws are installed into each main beam ***(Fig 18A & 18B)***. For DynaMax LT and DynaMax MD, ensure the DynaMax Main Beam Splice is centered and 3 screws are installed in each main beam ***(Fig 18C)***.



(Fig 18A)

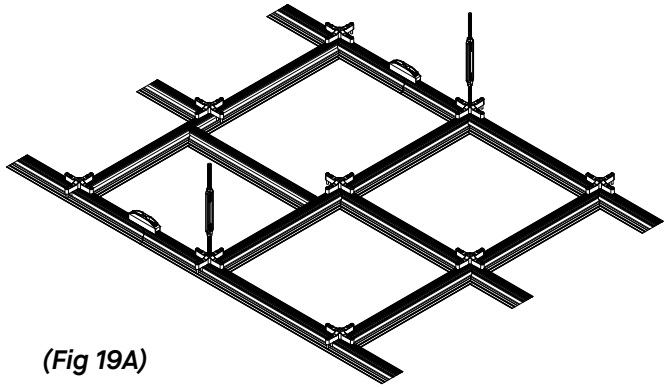


(Fig 18B)

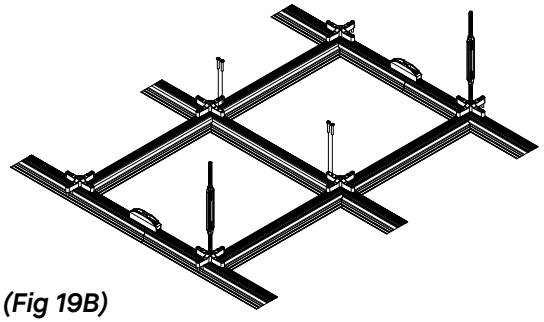


(Fig 18C)

7. Depending on layout, it may be required to install a 2' cross tee in and slide underneath the X-Bracket (DMXB) for DynaMax ***(Fig 19A)***. Secure the 2' cross tee to the 4' cross tee at every intersection using DMXB and the provided 1/4"-20 screws ***(Fig 19B)***. Screws should be fully seated but not over-torqued, in order to avoid damage to the threaded channel. For DynaMax Plus, ensure a threaded rod is within 12 inches of the I-Bracket (DMIB) for DynaMax®, or within 12 inches of the DynaMax Main Beam Splice for DynaMax LT and DynaMax MD, in conditions where plumb threaded rod drops are not possible.

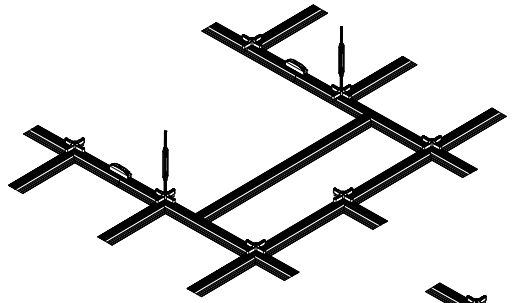


(Fig 19A)

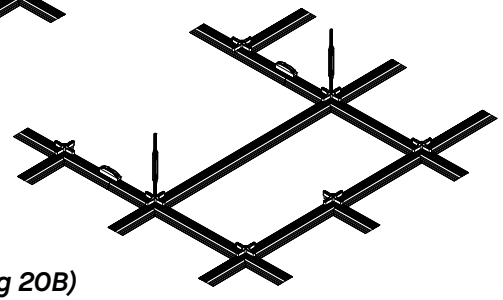


(Fig 19B)

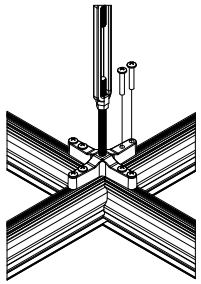
8. Each run of modules are installed 4' apart from each other with 4' cross tee connecting each run. Insert the 4' cross tee in between the modules and slide underneath the X-Bracket (DMXB) for DynaMax ***(Figs 20A & 20B)***. Secure the 4' cross tee to the main beam at every intersection using an DMXB and the provided 1/4"-20 screws ***(Fig 21)***. Screws should be fully seated but not over-torqued, in order to avoid damage to the threaded channel.



(Fig 20A)

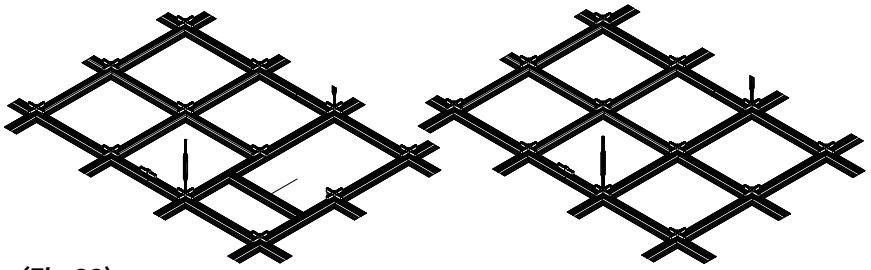


(Fig 20B)

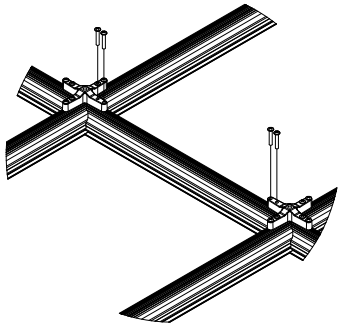


(Fig 21)

9. Depending on the layout of each run of modules, it may be required to install a 2' cross tee in between each module. Insert the 2' cross tee in between the 4' cross tee and slide underneath the DMXB (***Fig 22)***. Secure the 2' cross tee to the 4' cross tee at every intersection using a DMXB and the provided 1/4"-20 screws ***(Fig 23)***. Screws should be fully seated but not over-torqued, in order to avoid damage to the threaded channel.



(Fig 22)



(Fig 23)

10. LOAD CHARTS

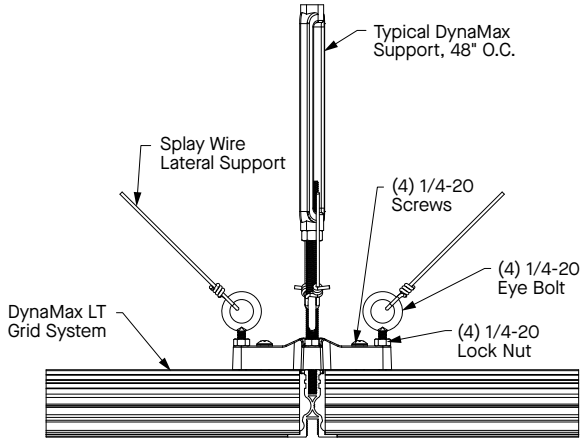
For all structural load data please refer to the DynaMax LT Technical Guide found at: armstrong.com/DYNAMAXLT

For all structural load data please refer to the DynaMax MD Technical Guide found at: armstrong.com/DYNAMAX

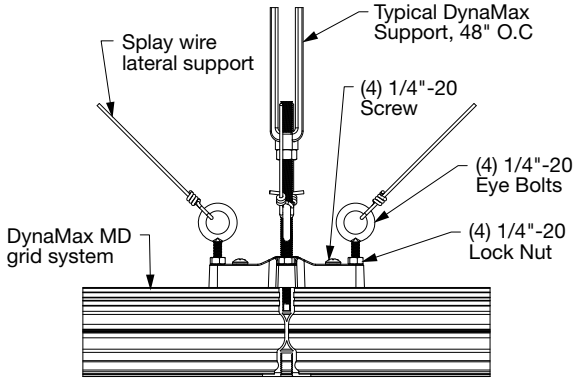
For all structural load data please refer to the DynaMax Plus Technical Guide, found at: armstrong.com/DYNAMAXPLUS

11. SEISMIC CONSIDERATIONS

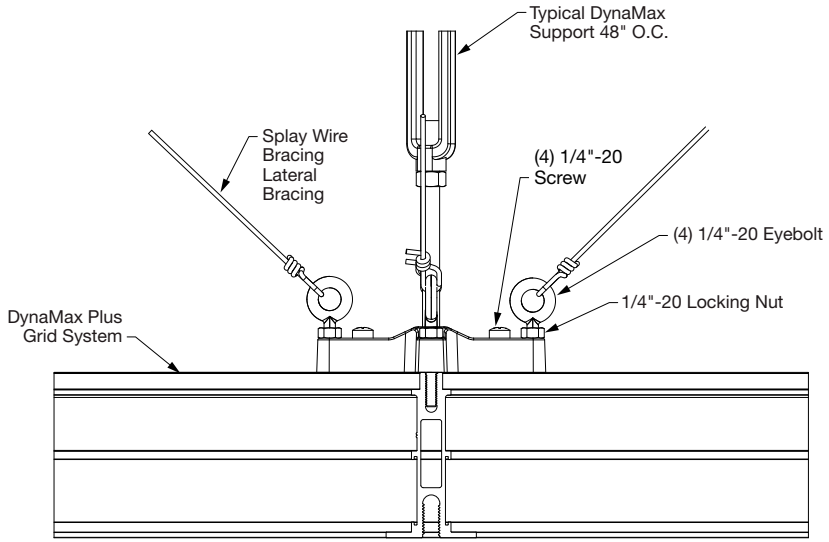
These are options/suggestions if lateral bracing is needed. Cable trays need to be independently designed and braced for seismic zone areas ***(Figs 24A, 24B, 24C, 24D, 24E, 24F, 24G, 24H, & 24I)***.



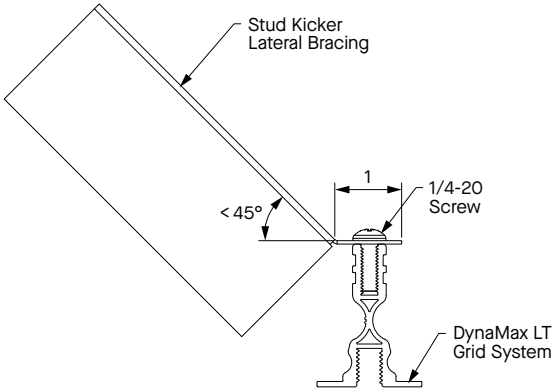
(Fig 24A)



(Fig 24B)

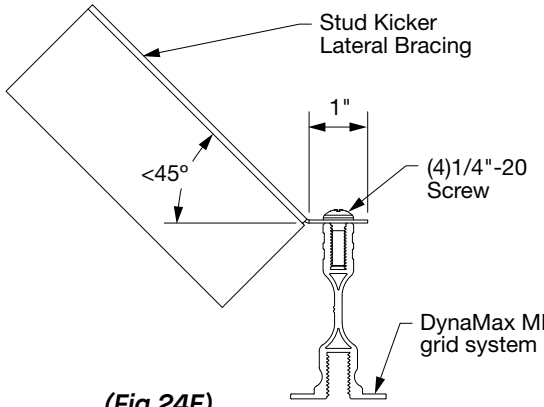


(Fig 24C)

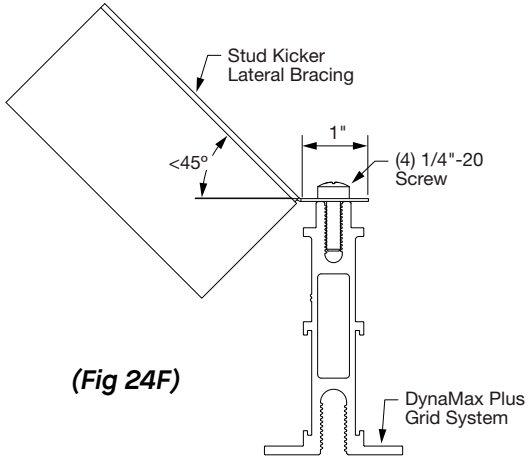


(Fig 24D)

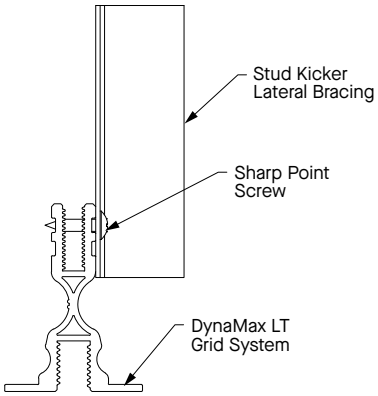
NOTE: *Contact local engineer for job specific load and/or seismic requirements.*



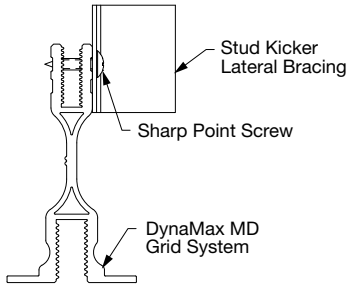
(Fig 24E)



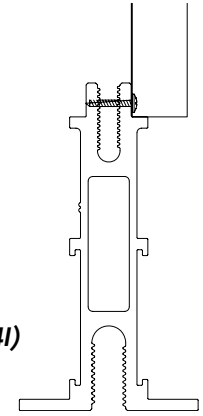
(Fig 24F)



(Fig 24G)



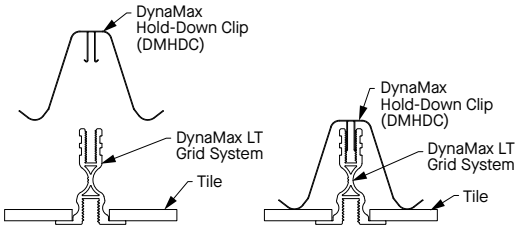
(Fig 24H)



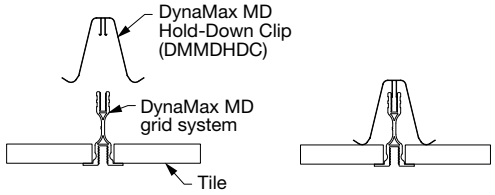
(Fig 24I)

12. HOLD-DOWN CLIPS

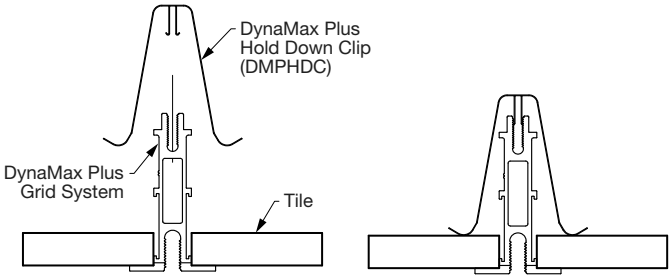
Hold-Down Clip for DynaMax® LT(DMHDC), DynaMax® MD (DMMDHDC), and DynaMax® Plus (DMPHDC) attaches to the suspension system to hold lay-in ceiling panels in place. Depending on the tile thickness being installed, spreading the DMHDC slightly on either side will help the clip engage on the bulb of the grid DynaMax LT ***(Fig 25A)***, DynaMax MD ***(Fig 25B)*** or DynaMax Plus ***(Fig 25C)*** grid.



(Fig 25A)

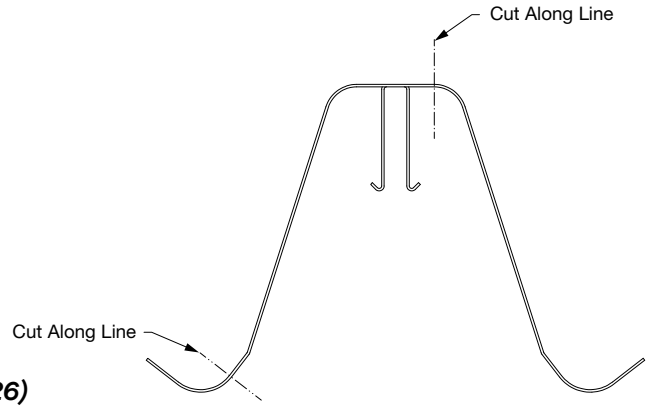


(Fig 25B)

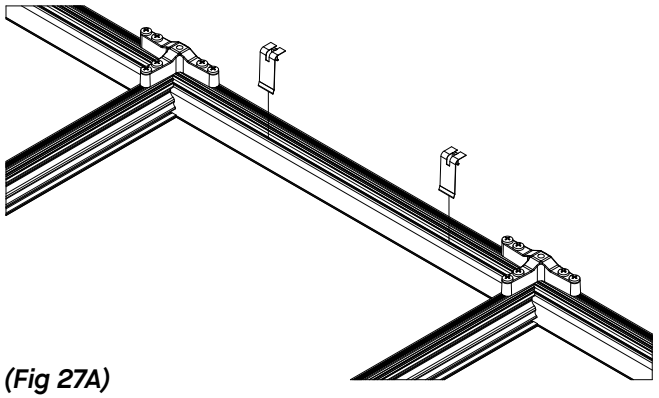


(Fig 25C)

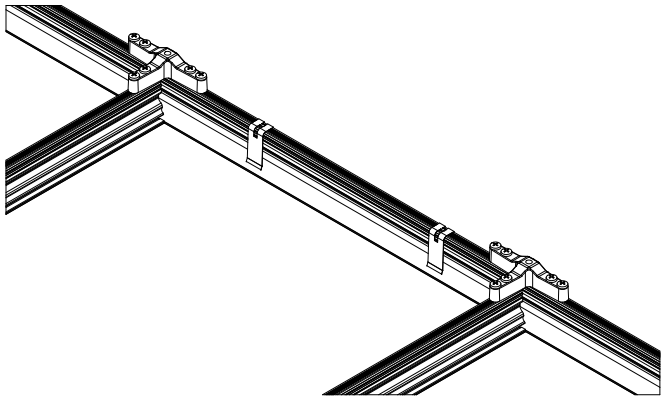
NOTE: When full-size ceiling panels and cross tees are used at the perimeter, modified hold-down clips installed on the perimeter molding are required to center the ceiling panel. Cut the hold-down clips as shown in ***(Fig 26)***. Install the modified hold-down clip prior to installing the ceiling panels ***(Fig 27A & 27B)***. These modified clips should be approximately 6" from each T-bracket (DMTB). The final installation will have the modified hold-down clips pushing against the side of the panel ***(Fig 28)***, NOT applying pressure to the top of the panel.



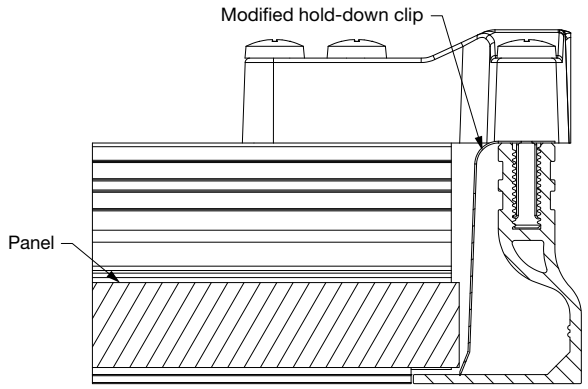
(Fig 26)



(Fig 27A)



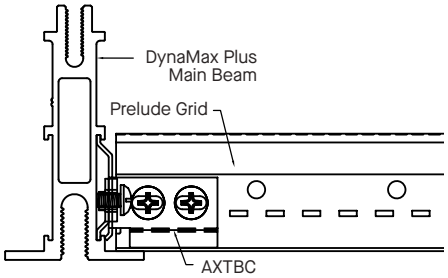
(Fig 27B)



(Fig 28)

13. T-BAR CONNECTOR CLIPS

The AXTBC (Axiom® T-Bar Connector Clip) is used in installations where the DynaMax Plus® suspension system is used in conjunction with Prelude® XL® suspension system. The AXTBC serves as the transition between the two suspension systems and fits into the attachment feature on the DynaMax Plus profile ***(Fig 29)***.

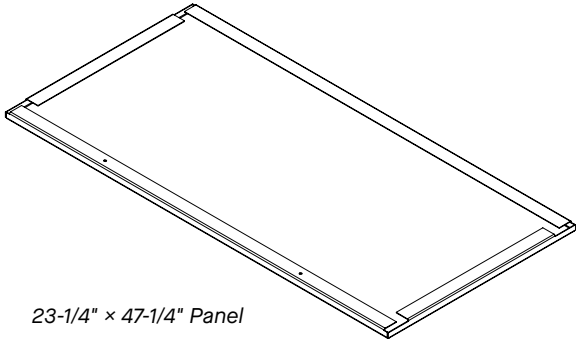


(Fig 29)

14. METALWORKS™ LAY-IN CEILING PANELS FOR DYNAMAX® MD AND DYNAMAX® PLUS STRUCTURAL GRID DATA CENTER GRID INSTALLATION DETAILS AND INSTRUCTIONS

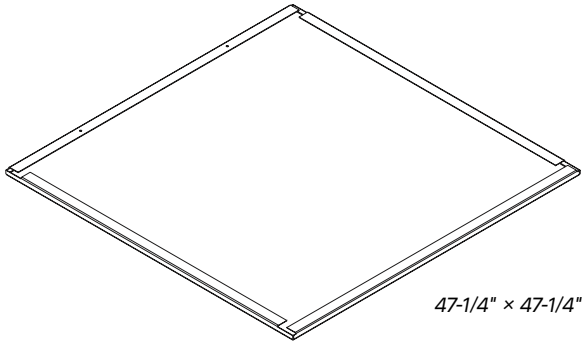
14.1 Product Description

MetalWorks™ Lay-in ceiling panels for DynaMax® structural grid is an aluminum ceiling panel available in standard 24" × 48" and 48" × 48" nominal sizes. These panels are specially sized and engineered for DynaMax® MD and DynaMax® Plus structural suspension system and should be used with this system only. MetalWorks Lay-in panels are finished in a factory-applied polyester paint (post-coated) in standard Whitelume (WHA). Panels also offer perforated options with a black acoustical fleece factory-applied to the back side of the panel for improved acoustics. The surface of these panels is washable, scrubbable, soil-resistant, and non-directional. Optional infill panels are also available for added acoustics ***(Fig 30 & 31)***.



23-1/4" × 47-1/4" Panel

(Fig 30)



47-1/4" × 47-1/4" Panel

(Fig 31)

14.2 Storage and Handling

The MetalWorks™ Lay-in ceiling panels shall be stored in a dry interior location and shall remain in cartons prior to installation to avoid damage. Proper care should be taken when handling to avoid damage or soiling.

NOTE: MetalWorks Lay-in ceiling panels are packaged with the face of the panel toward the outside of the carton. Exercise care in moving and opening cartons to prevent damage to the panel face. Each panel is foam-wrapped to protect it from dirt and scratching, keep panels foam wrapped until they are ready to be installed. Always wear safety glasses and cut-resistant gloves when handling or cutting metal.

14.3 Plenum

Installation of MetalWorks Lay-in ceiling panel is recommended to have a minimum of 8" above the grid face.

NOTE: Unless supported by the DynaMax® structural suspension system, all MEP must be independently supported to the structure. There must not be weight from any lights, diffusers, speakers, or similar devices supported by the aluminum panels.

14.4 Cleaning

An abrasive or strong chemical detergent should not be used. A mild detergent diluted in warm water, applied with a soft cloth, rinsed, and wiped off with a chamois will maintain the panels in good condition. If not removed by washing, oily or stubborn stains can be wiped with products like Fantastik®, but care is necessary to avoid affecting the gloss level of the paint finish.

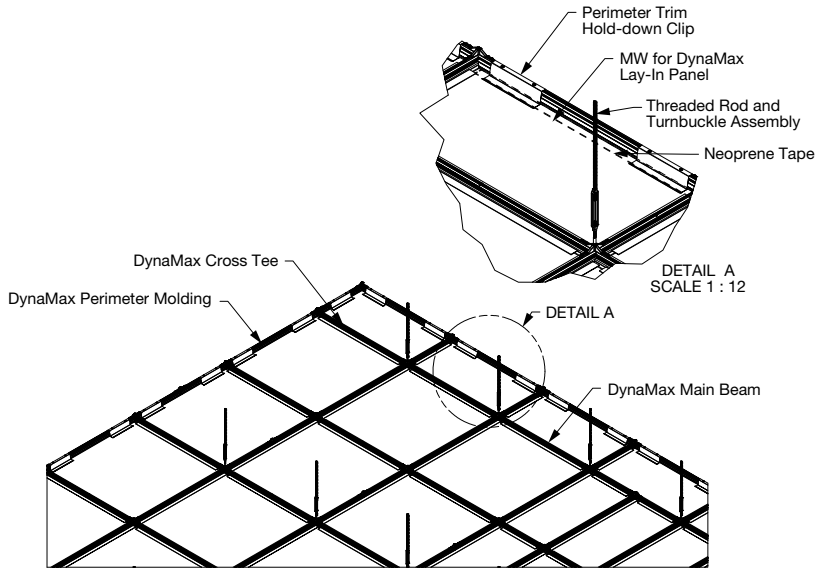
14.5 Panel Cutting & Installation Instructions

MetalWorks Lay-in ceiling panels can be cut to size at the perimeters using standard tools and methods for aluminum panels.

CAUTION: Cut edges of metal parts can be extremely sharp! Handle metal carefully to avoid injury. Always wear safety glasses and gloves when working with metal.

- It is recommended to use a metal cutting circular saw with a non-ferrous metal cutting blade (consult blade manufacturer for specific recommendation)
- The quality of the cut can impact the flatness of the cut edge, so deburring or filing might be required
- When fiberglass (Item 8200T10) infill is used, it also must be cut to size. This is best done with a large pair of shears or scissors. Reseal the poly bag with packing tape prior to installation.

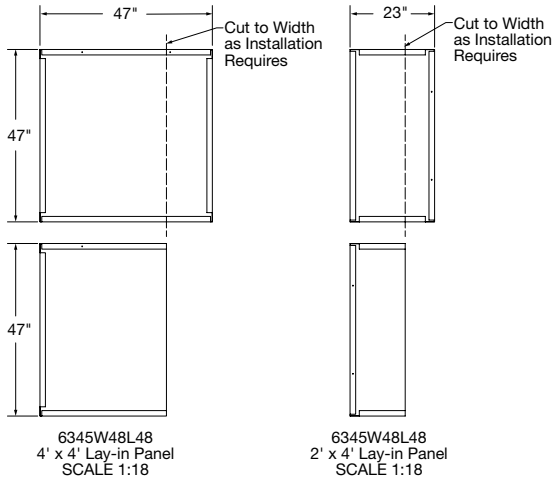
14.5.1 Cut Panel Installation *(Fig 32)*



(Fig 32)

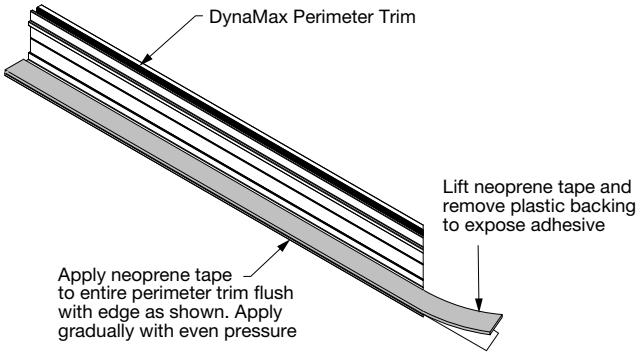
It is recommended to install all perimeter panels first starting with corner panels. White 1/8" thick neoprene tape and perimeter trim hold-down clip are required for perimeter panels and will give the best visual. The following steps should be followed for proper installation:

- Cut the panel to size ***(Fig 33)***



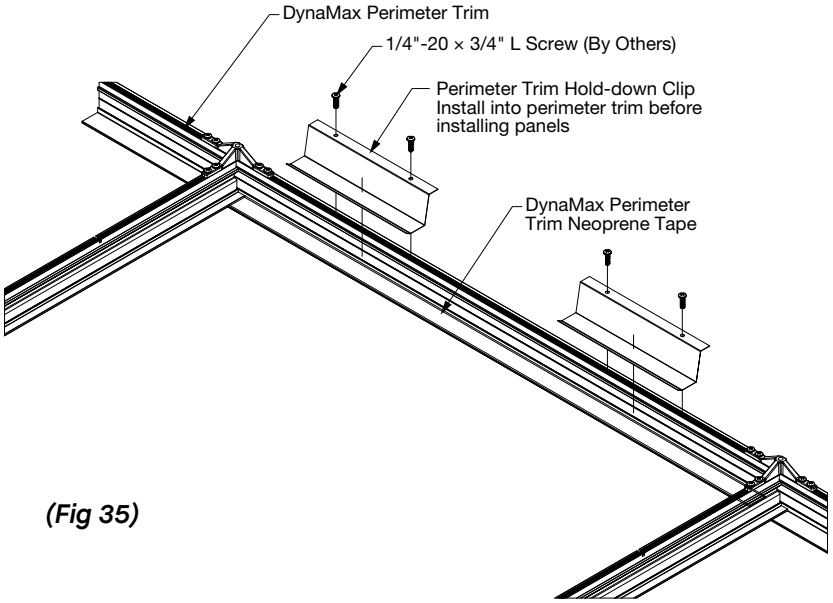
(Fig 33)

- Add 1" wide × 1/8" thick white neoprene tape (item by others), recommend using roll from MSC Direct, to the DynaMax® structural grid perimeter molding ***(Fig 34)***



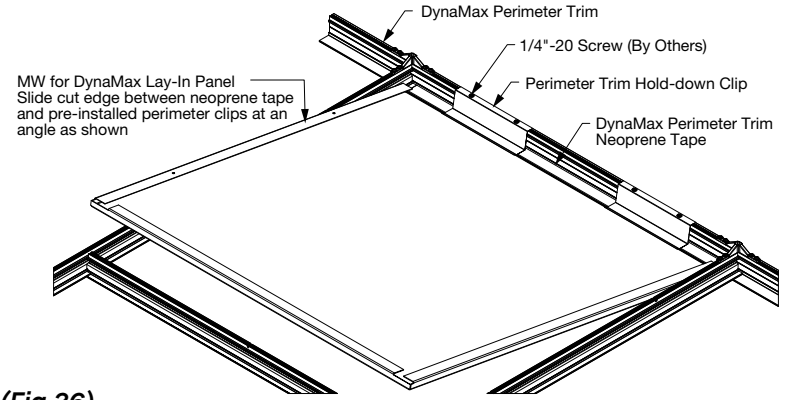
(Fig 34)

- Use 1/4"-20 × 3/4" L screws, fasten perimeter trim hold-down clips first ***(Fig 35***). Screws should be fully seated but not over-torqued, in order to avoid damage to the threaded channel.



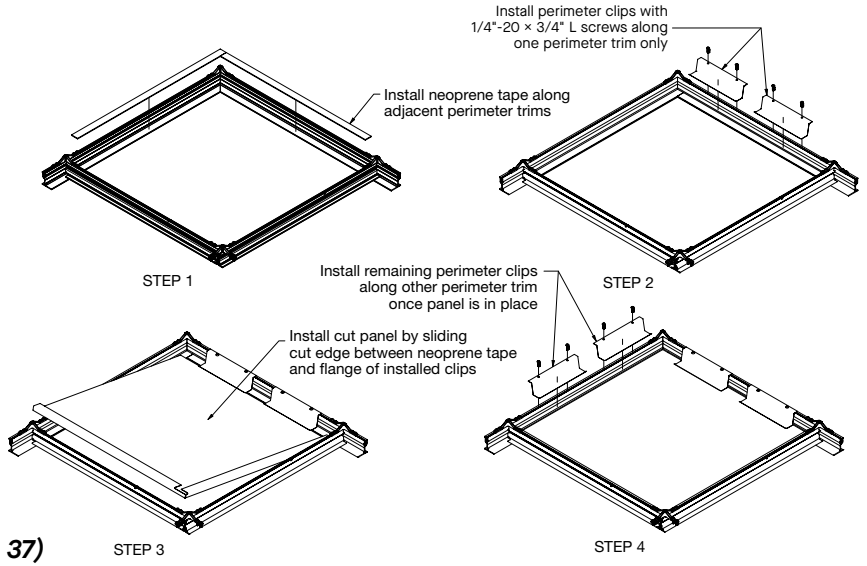
(Fig 35)

- Install cut panels once perimeter trim hold-down clips are in place ***(Fig 36)***



(Fig 36)

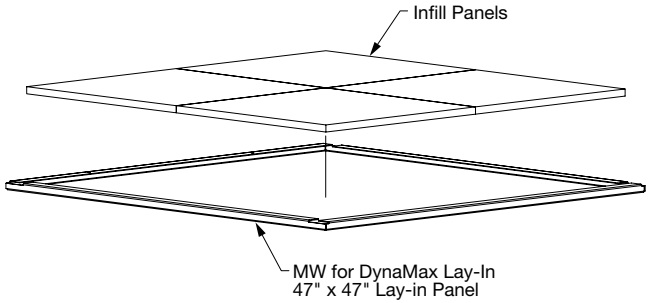
- For corner conditions, the following steps need to be followed for proper installation ***(Fig 37)***



(Fig 37)

1. Add neoprene tape to perimeter trim on both walls.
2. Install perimeter trim hold-down clip using 1/4"-20 × 3/4" L screws along one perimeter trim only. Screws should be fully seated but not over-torqued, in order to avoid damage to the threaded channel.
3. Install cut panel by sliding it between neoprene tape and perimeter trim hold-down clip.
4. Install remaining perimeter trim hold-down clips along the other perimeter trim once the panel is in place.

14.6 Infill Panel Installation *(Fig 38)*



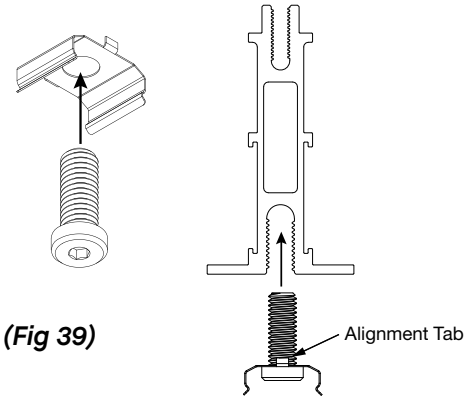
(Fig 38)

Fiberglass panels (8200T10)
Full-size panels: 8200T10 – No cutting required. Place the infill on the back side of the face of the panels.

Cut panels (including borders): 8200T10 – Must be cut to size. This is best done with a large pair of shears or scissors. Reseal the poly bag with packing tape prior to installation.

15. INSTALLING COMPATIBLE LIGHT FIXTURES

Step 1: Assemble Clips
Assemble the clips that are provided by the lighting manufacturer. Please refer to the lighting manufacturer's specific installation instructions for details on light installation, as shown in ***(Fig 39)***.



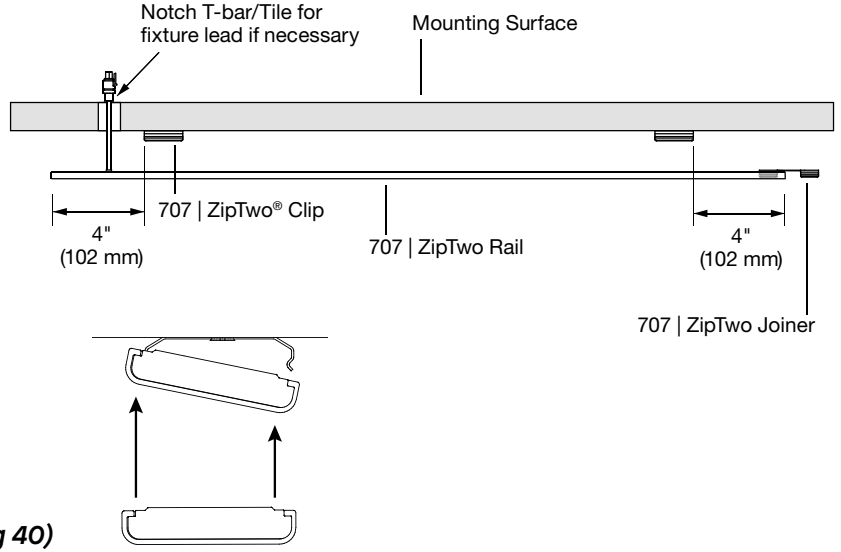
(Fig 39)

NOTE: ***(Fig 39)*** shows the DynaMax® Plus main beam profile; however, these lighting installations are also compatible with DynaMax® LT and DynaMax® MD grid.

Step 2: Install Clip to DynaMax
Using a 3/16" hex key, install all clips to installed suspended ceiling system. **DO NOT** over tighten as this could deform the clip and not allow for installation.

Fixtures will be supplied with two clips for rails under 48", four clips for rails 48" to 72" and six clips for 96" rails. Position two clips 4" (102mm) from each end of the fixture and evenly space the remaining clips.

NOTE: Clip is supplied with alignment tabs to ensure a proper installation. Clip must be installed as shown in ***(Fig 40)***.

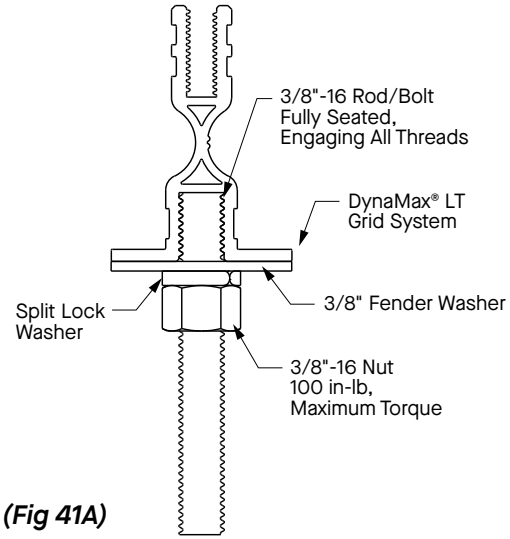


(Fig 40)

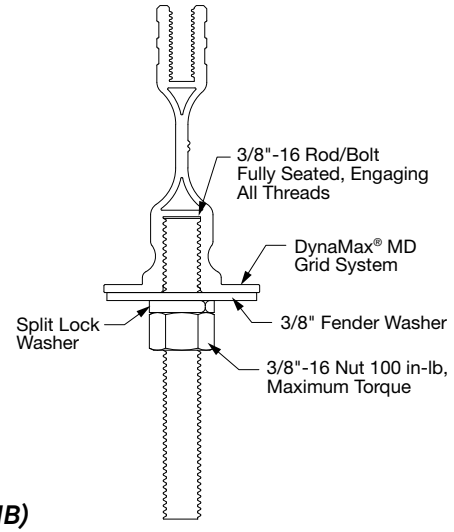
Step 3: Install light fixture provided by lighting manufacturer
Please refer to the lighting manufacturer's specific installation instructions for details on light installation.

16. 3/8" CONNECTION PROCEDURES

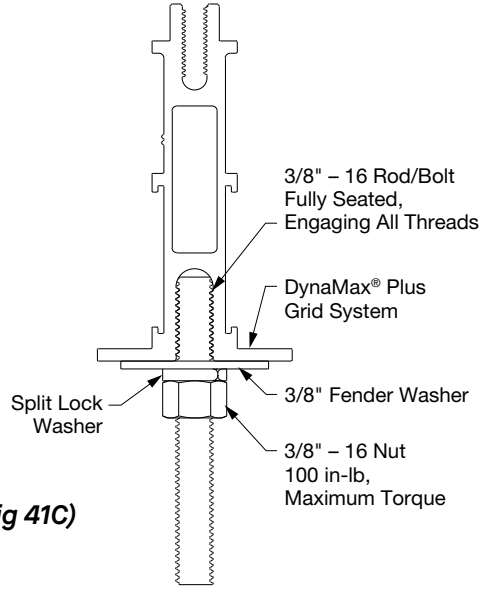
When installing services to the DynaMax® LT, DynaMax® MD, and DynaMax® Plus threaded channel, ensure compliance with the detail provided ***(Fig 41A, Fig 41B, and Fig 41C)*** and the accessory/component/equipment manufacturer's installation instructions.



(Fig 41A)



(Fig 41B)



(Fig 41C)

DataZone™ and Ultima® AirAssure® ceilings panels for DynaMax® are specially sized and engineered for the DynaMax suspension systems and must be used with these systems.

For more information about recommended ceiling panels, please visit armstrong.com/structuralgrid

MORE INFORMATION

For more information, or for an Armstrong Ceilings representative, call 877 276-7876.
For complete technical information, detail drawings, CAD design assistance, installation information, and many other technical services, call TechLine customer support at 877 276-7876.

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