

Installation Instructions Diva[®] Acoustical Ceiling



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Visit the Diva Acoustical Shell web page at wengercorp.com for more information.

Note: Please read and understand these instructions before using or setting up.
Note: Review all of the Installation Drawings and Reference Drawings.
Note: It is recommended that three or more people work together during the assembly.
Note: If you need additional information, contact Wenger Corporation using the information below.

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Questions? Call.....USA: (800) 4WENGER (493-6437) • Worldwide: +1-507-455-4100 • wengercorp.com

Important User Information

General

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The information in this document is not intended to cover all possible conditions and situations that might occur. The end user must exercise caution and common sense when assembling or installing Wenger Corporation products. If any questions or problems arise, call the Wenger Corporation at (800) 4WENGER (493-6437) or +1-507-455-4100 worldwide.

Manufacturer

The Diva® Acoustical Ceiling is manufactured by:

Wenger Corporation 555 Park Drive Owatonna, MN 55060 (800) 4WENGER (493-6437) • +1 (507) 455-4100 wengercorp.com

Intended Use

- The ceiling is intended for indoor use only and is not intended for outdoor use.
- Never expose the ceiling components to wind, humidity, or wet conditions.
- This product is intended to be assembled only as described in these instructions.

Installation

- The ceiling installation and use must comply with local regulations and codes.
- All personnel (including all temporary workers) installing or maintaining the ceiling must read and understand these and other related installation instructions.

Warranty

This product is guaranteed free of defects in materials and workmanship for five full years from date of shipment. A full warranty statement is available upon request.

Safety Precautions

Throughout this document you may find cautions and warnings which are defined as follows:

- WARNING: Failure to follow the instruction could result in serious injury or damage to property.
- CAUTION: Failure to follow the instruction could result in minor injury or damage to property.

Read all of these safety instructions before using the equipment.

AWARNING

Make sure that anyone working with the Diva Acoustical Ceiling has read and understands these instructions.

AWARNING

Failure to comply with Warnings and Cautions in this document can result in damage to property or serious injury.

AWARNING

Always observe and comply with the Warnings and Cautions posted on the system equipment.

Required Tools

The following tools are required for assembly.

- Assorted wrenches
- Cordless drill and cordless impact driver
- 3/8", 1/2" and 9/16" hex nut bit
- Rubber mallet
- 24" (610 mm) carpenters' square
- 9/32" and 25/64" drill bit
- Chalk line
- Box level
- Phillips screwdriver
- Hex wrench set

- 3/8", 1/2" and 3/4" drive sockets
- 7/16" deep well socket and drive adapter
- Ratchet
- Angle finder
- 100" (2.5 meter) measuring tapes (2)
- 25' (8 meter) tape rule
- Claw hammer
- Caulk gun
- Rivet gun
- * Save the wood blocks from the tower frame and ceiling truss packaging. They will later be used during the tower assembly.

Fasteners

The fasteners shown below are contained in various Diva hardware kits. Any fasteners remaining when an the installation is complete can be discarded.



Ceiling Assembly Description



Before Installation

- **Note:** The weight of each ceiling assembly is calculated and does not include the weight of the rigging or rigging hardware.
- **Note:** Unless specifically agreed by Wenger Corporation, all rigging and rigging hardware is furnished by the general contractor or facility owner.

Make sure that all rigging and rigging hardware is capable of lifting the calculated weight of the ceiling assemblies. AWARNING

Personnel must always wear a safety harness when working above the floor surface.

ACAUTION

Components can be heavy or difficult to handle and may require three or more people working together to lift or assemble.

- 1. Read and understand the entire ceiling installation section before starting the installation.
- 2. Make sure that all personnel installing (including any temporary workers) are trained and understand the installation procedure.
- 3. Review all installation drawings and reference drawings. Save these drawings for future reference.
- 4. Make sure that all items on the shipment packing list are present.

ACAUTION

To avoid damage to surfaces:

• Always wear gloves during assembly and installation.

• Lay any finished surfaces onto the cardboard and foam packaging to help protect from damage.

During assembly, dropped hardware can roll under other components and cause damage to finished surfaces.

Ceiling Installation



Always refer to the installation drawings for the location and arrangement of ceiling panels.

Assemble the Truss

- 1. Assemble the first truss assembly under the batten or cables as follows.
 - a. Attach a truss splice into the lower channel of the truss using one 1/4-14 x 3/4" self-drilling screw on the upstage side. Tighten only finger tight until all screws are installed.
 - b. Attach a truss splice bar into the upper channel of the truss using two 1/4-14 x 3/4" self-drilling screws. Tighten only finger tight until all screws are installed.
 - c. When all screws are installed and the trusses are aligned, tighten all screws.
 - d. Make sure that the truss caps are installed.
- 2. Find and mark the center location of the truss assembly.



Mark the Stage Area

- 1. Mark the centerline of the stage as follows. Refer to the illustration below.
 - a. Make sure that the line sets are in the correct position.
 - b. Mark the mid point downstage between the two sides of the proscenium.
 - c Measure an equal distance from the two sides of the proscenium and mark the mid point upstage as shown in the illustration below.
 - d. Snap a chalk line between the mid points marked upstage and downstage.



Typical Stage

2. Place the battens or lift lines at the lowest position and mark the stage centerline position on the batten.



Attach the Hanger Arms to the Batten

Note: Always refer to the installation drawings for the location and arrangement of components.

- 1. Lower the batten to a working height.
- 2. Attach hanger assemblies to the batten at the locations indicated on the installation drawings as follows.
 - a. Remove a turnbuckle assembly with attached pipe clamp from the hanger kit hardware bag.
 - b. Remove the lock nut/hex head screw or the cotter key/cross pin that attach the pipe clamp to the turnbuckle upper jaw.

Save this hardware for reattachment.

c. Adjust the turnbuckle to a position midway between the upper jaw and the lower jaw.



Attach the Hanger Arms to the Batten (continued)

- 2. continued...
 - d. At the proper locations, attach the pipe clamp to the batten using two hex head screws and tighten securely.



- e. Reattach the turnbuckle upper jaw to the pipe clamp using the hardware set aside in step 2b. If using a cotter key, bend the ends in opposite directions around pin to secure cotter key.
- f. Attach other turnbuckle assemblies to the batten by repeating steps 2a to 2e.



Attach the Hanger Arms to the Batten (continued)

- 3. Attach a hanger arm to each turnbuckle assembly as follows.
 - a. Remove the lock nut and hex head screw form a turnbuckle lower jaw. Set aside the lock nut and screw.
 - Insert the hanger arm upper eye into the turnbuckle lower jaw and re-attach the lock nut and screw set aside in step 3a with a pair of 9/16" combination wrenches.
 Refer to the illustration below. Align the hanger arms as shown on the installation drawings.
 - c. Attach other hanger arms to the turnbuckle assemblies by repeating steps 3a and 3b.



Attach the Hanger Arms to the Truss Assembly

- 1. Attach the hanger assemblies to the ceiling truss.
 - a. Remove a hanger assembly from the hanger kit hardware bag.
 - b. Unscrew the two lock nuts and remove the carriage bolt and the hex head screw. Save the hanger straps, lock nuts, carriage bolt, and screw.



- c. With the ceiling truss centered below the batten, attach a hanger assembly to the truss by fitting the two hanger assembly straps onto the truss as shown below. Attach the carriage bolt and a lock nut set aside in step 1b finger tight.
- d. Slide the hanger assembly on the truss so that it aligns to a hanger arm. Tighten the lock nut with a 3/4" combination wrench.



e. Assemble additional hanger assemblies below each hanger arm by repeating steps 1a to 1d.



Attach the Hanger Arms to the Truss Assembly (continued)

- 2. Connect the hanger arms to the ceiling row truss assembly.
 - a. Lower the batten and hanger arms until the each hanger arm lower eye will fit into each hanger assembly as shown in the illustration below.
 - b. Attach a hanger arm lower eye to a hanger assembly with the hex head screw and lock nut set aside in step 1b on the previous page. Tighten with a pair of 3/4" combination wrenches.
 - c. Attach the other hanger arms to the ceiling panel row by repeating steps 2a and 2b.
 - d. Adjust the turnbuckles so that there is equal tension on each hanger arm.
 - e. Using a pair of 3/4" combination wrenches, tighten all of the lock nuts and screws.
- 3. Raise the batten to allow for room to work.



Assemble a Ceiling Row Panel

Assemble a ceiling panel row as follows.

Note: Always refer to the installation drawings for the location and arrangement of ceiling panels.

 To prevent damage, lay the ceiling panels on 4' x 8' sheets of packing material. Make sure that the ceiling panels are arranged below the batten with about a 4" (102 mm) of space between each panel as shown below.



Assemble a Ceiling Row Panel (continued)

- 2. Where two ceiling panels join together, insert a foam strip into the recess of one of the two ceiling panels as shown below.
 - a. Trim the foam strip length if necessary.
 - b. Make sure that the foam strip is fully seated into the recess.



Insert a Foam Strip into one Recess betwee two Ceiling Panels being joined together.

- 3. Connect two adjacent ceiling panels together. Refer to the illustrations below.
 - a. Insert a 1/4-20 x 3-1/2" carriage bolt through the square hole in a panel inner corner clip, through the two outer corner clips, and through the other panel inner corner clip.
 - b. Attach a 1/4-20 hex nut to the carriage bolt so that it is snug.
 - c. Attach a 1/4-20 x 3-1/2" carriage bolt and 1/4-20 hex nut on the opposite side of the panels by repeating steps 3a and 3b.
 - d. With two people working together, use 7/16" sockets with universals and tighten the hex nuts (keep the tension equal on both sides by tightening each side at the same time) until the two panel inner corner clips begin to bend.



Assemble a Ceiling Row Panel (continued)

4. Connect the other ceiling panels by repeating step 2 and step 3.



Attach the Truss Assembly to the Ceiling Panel Row

Refer to the illustration below and follow the installation drawings for proper location.

1. Place the truss assembly onto the ceiling panel center channel.



- b. Insert a hanger bracket assembly into each truss hanger bracket slot that aligns with a ceiling panel joint or end edge.
- c. Slide one bearing into each side of the hanger bracket leg until they touch each other.



Attach the Truss Assembly to the Ceiling Panel Row (continued)

- 2. Use a rubber mallet to seat each hanger bracket onto the ceiling panel center channel.
- **Note:** Each hanger bracket assembly faces the upstage side and must be centered on the seam between two adjacent ceiling panels.



- 3. Attach the hanger bracket assemblies to the truss assembly.
 - a. Use a cordless drill and a 9/16" hex nut bit.
 - b. Screw two 1/4-14 x 3/4" self-drilling screws, through each side of the hanger bracket legs and ceiling panel center channel as shown below.



Assemble the Bowstring to the Truss

- 1. Attach a bowstring assembly to a ceiling panel as follows. Begin at one end of the ceiling panel row.
 - a. Using a 3/8-16 x 2-1/4" hex head screw, and a 3/8-16 lock nut, attach the bowstring jack to the bowstring as shown in the illustration below.
 - b. Slide a ceiling clip onto each end of the bowstring. The ceiling clip flanges must face to the inside or each other.



c. Place the bowstring jack into the hanger bracket jack tube as shown below.



Assemble the Bowstring to the Truss (continued)

- 2. Position the ceiling clips flush with the outer edge of the ceiling panel. Make sure neither ceiling clip extends beyond the ceiling panel edge. Refer to the illustration below.
- 3 Using a cordless drill and the 9/32" drill bit, drill holes into the rear flange of the panel extrusion using the ceiling clip mounting holes as a template for the drill bit. **Do not drill through the to face of the panel.**
- 4. Using a 1/2" open end wrench, screw two tapping screws into the 9/32" holes in the rear flange of the ceiling panel extrusion drilled in step 3. Do not over tighten the screw!
- **Note:** If the tapping screw is over tightened and strips the thread, fasten a 9/32" nut to the screw.
- Using a cordless drill and a 3/8" hex drive bit, screw two self-drill screws through the two ceiling clip bowstring mounting holes in each ceiling clip into the bowstring. *Do not over tighten the screw!*



6. Attach the additional bowstrings to the ceiling row by repeating steps 1a to 5. *Make sure that the bowstrings are centered on the panel seams.*



Apply Tension to the Bowstring

AWARNING

Do not load weights onto the Arbor until tension is applied to all of the Bowstrings.

- 1. Lift a bowstring upward by hand to remove any slack.
- 2. While lifting the bowstring, turn the hex jam nut, 1-8, clockwise as shown below until the jam nut is snug against the jack tube.
- 3. Use a 1-1/2" open end wrench and turn the jam nut an addition full turn clockwise (six flats).
- 4. Repeat steps 1 through 3 above on all of the other bowstrings.



Note: Turn the jam nut clockwise until it is snug against the jack tube. Then, turn the jam nut an additional full turn clockwise (six flats).

Install the Ceiling Stays

Refer to the installation drawings and determine where each ceiling stay assembly must be installed.

1. Remove and set aside the hex head screw, washer, and lock nut from the ceiling stay base bracket.



- 2. Attach a ceiling stay base bracket to the truss assembly.
 - a. Hold the base bracket mounting hole against the truss assembly and align the hole in the base bracket to the ceiling stay mounting hole in the truss assembly. Always assemble the ceiling stay on the upstage side (refer to the illustration below).
 - b. Insert the hex head screw removed in step 1 through the base bracket mounting hole and the ceiling stay mounting hole in the truss and attach the washer and lock nut (set aside in step 1 above) to the screw as shown in the illustration below.
 - c. Use a 9/16" combination wrench and tighten the lock nut.



Install the Ceiling Stays (continued)

- 3. Attach the ceiling stay end bracket to the ceiling panel.
 - a. Extend the ceiling stay rod so that the ceiling stay end bracket is flush with the edge of the ceiling panel as shown below.
 - b. Use a cordless drill and a 3/8" hex bit and screw a #10-16 x 0.75" self-drilling screw through the stay end bracket mounting hole and rear flange of the panel extrusion as shown below.
 Do not over tighten the screw!
 - c. Use four 0.19 dia tri-fold blind rivets through the four mounting holes into the ceiling panel as shown below.



Note: Place the ceiling stay end bracket flush with the edge of the ceiling panel.

Fly The Ceiling Assembly

Only qualified personnel who are familiar with rigging systems should set up the rigging, add weights to the arbor, or fly the ceiling panels.

AWARNING

Make sure that all rigging and rigging hardware is capable of lifting the ceiling panel component calculated weight plus a reasonable margin of safety. Always comply with local codes and regulations.

AWARNING

Make sure that all fasteners are tight before adding any weight to the arbor.

AWARNING

Never climb on the ceiling panels.

- 1. Clean all debris from the ceiling panels and remove any tools resting on the ceiling panels.
- 2. Get the weight of the ceiling assembly and the arbor weight calculation from the installation drawings.
- 3. Start adding the weights to the arbor.
 - a. Three or more persons should work together, one person adding weights and one person tending to the line to see if the ceiling assembly can be lifted from the floor.
 - b. Check the ceiling assembly counter balance early and often (after adding each increment of one hundred pounds).
- Using the rigging system, lift the ceiling panels from the stage surface and apply about 100 lb (45 kg) of tension to each lead-set cable (to set each cable).
- 5. Keeping the ceiling assembly horizontal, lift it 4' to 5' (1219 to 1524 mm) from the floor.



Level the Ceiling Assembly

- 1. Position the ceiling panel row 4' to 5' (1219 to 1524 mm) from the floor surface.
- 2. Use a box level and check the length of the ceiling panel row and make sure that it is straight and level.
 - a. Adjust turnbuckles to correct any non-straight or out-of-level conditions.
 - b. Rotate the ceiling assembly as little as possible when adjusting the turnbuckle.
- 3. With one person standing and observing at the end of the ceiling panel row, do as follows.
 - a. Rotate the ceiling panel row so that the bottom surface faces downstage.
 - b. Then, rotate the ceiling panel row so that the bottom surface faces upstage.
 - c. Any ceiling panel row bowing in either vertical position indicates that further leveling is required.
- 4. When leveling is complete, lock the turnbuckles into place with nylon cable ties (contained in the hanger kit hardware bag).

5. Make sure that all fasteners are tight.



Set the Ceiling Stay Performance Angle

Refer to the installation drawings when setting the ceiling stay performance angle.

- 1. Rotate the ceiling panel row into the storage (vertical) position.
- 2. Use a pair of 7/16" combination wrenches to loosen (finger tight) all of the hex head screws (four) and lock nuts on the latch receiver assembly.
- 3. Slide the latch receiver assembly away from the ceiling stay latch. **Do not tighten the screws.**



Set the Ceiling Stay Performance Angle (continued)

- 4. Rotate the ceiling panel row slightly past the performance angle (perhaps 5 to 10 degrees). Ceiling panel rows are heavier on the upstage side.
- 5. Slide the ceiling stay receiver toward the ceiling stay latch until the receiver engages the ceiling stay latch.
- 6. Use a pair of 7/16" combination wrenches and tighten all of the hex head screws (four) and lock nuts on the latch receiver assembly.
- 7. Check the performance angel and make any necessary adjustments.



Install the Ceiling Catch

Refer to the installation drawings for the ceiling catch location.

- 1. Remove a ceiling catch assembly from the shipping container.
- 2. Remove the two lock nuts from the u-bolt, remove the u-bolt from the ceiling catch pivot plate, and set the u-bolt and lock nuts aside.



- 3. Using the installation drawings as a reference, place the ceiling catch assembly into the place on a hanger arm.
- 4. Attach the ceiling catch assembly to the hanger arm with the u-bolt and two lock nuts set aside in step 2 above. Tighten the lock nuts with a 7/16" combination wrench.
- 5. Attach the other ceiling catch assemblies by repeating steps 1 to 4.



Light Fixture Installation



This procedure details installing the Lieto[™] LED Light Fixture. If installing other light fixtures, contact Wenger.

Inspection

Before installing, inspect the light fixtures for any signs of damage. If any damages are present, immediately contact Wenger.

Lieto LED Light Fixture Installation

Install the light fixtures into the pre-cut ceiling panel holes. Refer to the installation drawings for locations.

A licensed electrician must perform the electrical installation. Branch circuits that connect to ceiling panel lights must always be designed by an electrical engineer and comply with electrical codes and user requirements. All electrical sources must be permanently wired and comply with local electrical codes. Each ceiling panel light must connect to a grounded, three-wire receptacle that connects to a fused circuit breaker.

- 1. Insert the light fixture into the pre-cut ceiling panel light mounting hole.
- 2. Attach the light assembly to the ceiling panel.
 - a. Use a 13/64" bit to drill a pilot hole through the upper panel surface only.



Light Fixture Installation (continued)

Lieto LED Light Fixture Electrical Connection

- 1. Ensure the light fixture power source is compliant with local electrical codes.
- 2. Connect the PowerCON and RJ-45 or XLR DMX cables to the corresponding ports on the first light fixture control box.
- 3. Connect the PowerCON and RJ-45 or XLR DMX cable to the next light fixture in the row.
- **Note:** Ensure the supply voltage meets the Lieto LED light fixture requirements before securing connections. The Lieto light fixture requires non-dimmed mains power in the range of 100-240VAC 50/60Hz.
- 4. Power up the light fixture to ensure proper connections.

For troubleshooting, refer to the Lieto LED Light Fixture Owner's Manual 188A559.



Insert the safety cable through the eye bolt on the light box assembly, then secure the other end of the safety cable to the truss assembly or other substantial connection point such as a bowstring.
 Minimize the slack in the safety cable where possible.



Light Fixture Operation

Adjustment and Aiming

To adjust the angle and orientation of the LED array, use the adjustment knobs located in the underside of the light fixture.

- 1. Loosen the adjustment knobs to change the LED array angle and orientation.
- 2. Use the knobs, to orient the LED array to the desired angle.
- 3. Tighten the adjustment knobs to secure the LED array in the new position.



For troubleshooting, refer to the Lieto LED Light Fixture Owner's Manual 188A559.



Light Fixture Operation (continued)

Photometrics



Light Fixture Operation (continued)

Photometrics (continued)



Light Fixture Operation (continued)

Photometrics (continued)



Schematics





Decals, Numbers and Logos

- 1. Place a ceiling operation decal near each ceiling stay approximately 2" (51 mm) from the upstage edge.
- 2. Place a Warning decal near each ceiling stay approximately 2" (51 mm) from the upstage edge.
- 3. Place a light troubleshooting decal near each Lieto LED light fixture.

Final Inspection

- 1. Check the rigging.
 - a. Make sure that it operates smoothly and safely.
 - b. Determine if additional weights need to be added to any arbors to offset the additional weight of ceiling stays, lights, etc.
- 2. Make sure that all cable clamps are not missing any hardware.
- 3. Inspect all ceiling panels for surface finish damage.
- Touch up as required.
- 4. Make sure that all wiring for lighting is tied away from the light canisters and that the wiring does not interfere with ceiling panel row rotation.
- 5. Discuss the preferred light focus with the general contractor or the site's lighting technician.