

DVN-3000 SERIES
DVN-3050 SERIES
DAKT-0203-09
DISPLAY MANUAL

P2121

DD4145409
Rev 07
08 December 2023

FCC Statement

Supplier Declaration of Conformity (SDoC)

This product complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Warning: The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

Industry Canada Regulatory Information

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Inquiries

Contact Daktronics with any questions regarding our product compliance.

Mail:

Daktronics
201 Daktronics Dr.
Brookings, SD 57006 USA

Phone:

800-325-8766

Website:

www.daktronics.com



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1 Introduction

How to Use This Manual

This manual explains the installation, maintenance, and troubleshooting of this video display system. For additional information regarding the safety, installation, operation, or service of this system, refer to the telephone numbers listed in **Daktronics Exchange and Repair & Return Programs (p.7)**. This manual contains only generic installation topics and is not specific to a particular installation. Contract-specific information takes precedence over any general information found in this manual.

Daktronics identifies manuals by the DD number located on the cover page of each manual. For example, this manual would be referred to as **DD4145409**.

Numbering Conventions

Drawing Numbers

Figure 1 illustrates a Daktronics drawing label. This manual refers to drawings by listing the last set of digits. In the example, the drawing would be referred to as **DWG-4135479**.

All references to drawing numbers, appendices, figures, or other manuals are presented in bold typeface, as shown in the example below:

Refer to **DWG-4135479** in **Appendix B: Reference Drawings (p.11)** for the locations of internal display components.

PROJECT: DVN-3000		TITLE: DVN-3000 CONCEPTUAL RISER		SHEET: 00	
DATE: 4 MAR 19		DIM UNITS: INCHES [MILLIMETERS]		REV: 00	
SCALE: NTS		DO NOT SCALE DRAWING			
DESIGN: JFIXSEN		JOB NO. P2121		FUNC - TYPE - SIZE F - 01 - C	
DRAWN: JFIXSEN				4135479	

Figure 1: Drawing Label

Part Numbers

Most display components within a display carry a white label that lists the part number. The component part number uses the following format: 0A-XXXX-XXXX (multi-component assembly) or 0P-XXXX-XXXX (display interface board). **Daktronics Exchange and Repair & Return Programs (p.7)** contains the Daktronics Exchange Policy as well as the Repair & Return Program.

0P-1195-0001
SN: 6343
05/19/99 REV.1

Figure 2: Typical Label

Refer to these instructions if any display components need replacing or repairing. **Figure 2** illustrates a typical label. The part number is in bold.

Part Type	Part Example	Part Number
Assembly	Display interface board and its mounting plate or bracket	0A-XXXX-XXXX
Individual display interface board	ProLink Router (PLR)	0P-XXXX-XXXX
Wire or cable	SATA cable	W-XXXX

Module Numbers

Figure 3 explains the module labeling method in more detail, and **Figure 4** illustrates how Daktronics numbers modules on a video display.

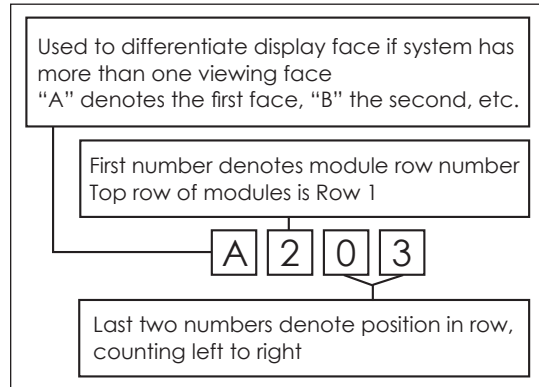


Figure 3: Module Numbering Breakdown



Figure 4: Module Numbering

Model Numbers

Each video display system has a model number that explains the display specifications.

DVN-3000-2.5/2.9/3.9/5.9MN-HHHxWWW DVN-3050-2.5/2.9/3.9/5.9MN-HHHxWWW		
DVN	=	Product series
3000 3050	=	Product generation
2.5/2.9/3.9/5.9MN	=	Pixel pitch/layout
HHH	=	Matrix height
WWW	=	Matrix width

Important Safeguards

- Read and understand the installation instructions before beginning the installation process.
- Do not drop the control equipment or allow it to get wet.
- Do not disassemble the control equipment or electronic controls of the display; failure to follow this safeguard will make the warranty null and void.
- Disconnect the display power when not in use or when servicing.
- Disconnect the display power before servicing the power supplies to avoid electrical shock. The power supplies run on high voltage and may cause injury if touched while powered.

2 Warnings/Disclaimers

Review the reference documents and drawings in **Appendix A: Reference Documents (p.9)** and **Appendix B: Reference Drawings (p.11)** prior to installation as well as during the installation process.

Display

Daktronics engineering staff must approve any changes that may affect the strength or protective integrity of the display frame or enclosures. If any modifications of this nature are made, detailed drawings of the change(s) must be submitted to Daktronics engineering staff for evaluation and approval, or the warranty will be null and void.

Displays must be lifted appropriately to ensure the display sections will not be damaged. It is the installer's responsibility to ensure the installation meets all local codes and standards. All hardware processes used during display installation must meet the approved, stamped drawings from a professional engineer.

The display is intended to be installed in accordance with the requirements of Article 600 of the National Electrical Code and/or other applicable local codes. This includes proper grounding and bonding of the sign.

Only qualified individuals should access the electrical components of this display and its associated equipment.

- Ensure that all electrical work meets or exceeds all local or national electrical codes.
- Provide the required power to the display as listed on the product labels, specifications, or site-specific riser drawings. The conductor size may vary based on the length of the power run.
- Consider implementing a separate circuit for the display using an isolation transformer or dedicated transformer.
- Daktronics assumes no liability for any issues caused by line voltage fluctuations or other improper power conditions.

Structure

It is the installer's responsibility to ensure the mounting structure and hardware are built per the stamped engineering drawings and are capable of supporting the display prior to beginning the installation.

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3 Glossary

Display interface (DI): an interface that drives video to the display while also dimming, providing gamma and color controls, and displaying test patterns.

Hub board: a display interface that distributes power and signal to modules in a panel.

Light emitting diode (LED): a low energy, high intensity lighting unit.

Module lanyard: a safety cable that attaches at both ends to two modules and prevents either module from falling.

Module latch: a safety device that mechanically attaches a module to a panel. A steel plate in the latch allows it to be magnetically disengaged with the module removal tool from the front of the display or manually disengaged with the two tabs on the rear of the module. Module latches are used in all tilted displays but may be used in other applications.

Module removal tool: a device that aids in removing a module from a panel by engaging the magnets.

Panel: the base building block for a display system. Each panel is comprised of four modules (standard) with supporting electronics and power.

Pixel: the smallest single point of light on a display that can be turned on and off. For LED displays, a pixel is the smallest block of light emitting devices that can generate all available colors.

Power supply: a display component that converts AC line voltage from the termination panel to low DC voltage for one or more module driver boards. One power supply may power multiple modules.

ProLink Router (PLR) 6280: a data interface component that receives a signal from the display control system and converts and distributes the signal to individual panels. The ratio of PLRs to panels varies with display application.

ProLink Router (PLR) enclosure: an assembly of machined parts that houses a PLR.

Receiver card: a data distribution component that receives information from a PLR and distributes the information through a hub board to modules in a panel. The receiver card mounts to the hub board.

Termination block: an electrical point usually used to connect internal power and signal wires to wires of the same type coming into the display from an external source.

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4 Replacement Parts

Replacement Parts List

Most display components have a white label that lists the part number in bold. Refer to **Part Numbers (p.1)** for information on how to read the part number. Part numbers may also appear on illustrations and reference drawings as well as in the Bill of Materials (BOM) for the project. If a replacement part cannot be identified, contact Daktronics Customer Service. The following is a list of components that are commonly replaced: PLR (ProLink Router), receiver card, and power supply.

Daktronics Exchange and Repair & Return Programs

To serve customers' repair and maintenance needs, Daktronics offers both an Exchange Program and a Repair & Return Program.

Exchange Program

Daktronics unique Exchange Program is a quick service for replacing key parts in need of repair. If a part requires repair or replacement, Daktronics sends the customer a replacement, and the customer sends the defective part to Daktronics. This decreases display downtime.

Before contacting Daktronics, identify these important part numbers:

Display Serial Number: _____

Display Model Number: _____

Contract Number: _____

Installation Date: _____

Sign Location: _____

Daktronics Customer ID Number: _____

To participate in the Exchange Program, follow these steps:

1. Call Daktronics Customer Service.

Market Description	Customer Service Number
Schools (primary through community/junior colleges), religious organizations, municipal clubs, and community centers	877-605-1115
Universities and professional sporting events, live events for auditoriums, and arenas	866-343-6018
Financial institutions, petroleum, sign companies, gaming, and wholesale/retails establishments	866-343-3122
Department of Transportation, mass transits, airports, and parking facilities	800-833-3157

2. Mail the old part to Daktronics when the new exchange part is received.

If the replacement part fixes the problem, send in the problem part which is being replaced.

- a. Package the old part in the same shipping materials in which the replacement part arrived.
- b. Fill out and attach the enclosed UPS shipping document.
- c. Ship the part to Daktronics.

Daktronics will charge for the replacement part immediately, unless a qualifying service agreement is in place. In most cases, the replacement part will be invoiced at the time it is shipped.

3. Return the part within 30 working days if the replacement part does not solve the problem, or Daktronics will charge the full purchase price.

If the part is still defective after the exchange is made, please contact Daktronics Customer Service immediately. Daktronics expects immediate return of an exchange part if it does not solve the problem. Daktronics also reserves the right to refuse parts that have been damaged due to acts of nature or causes other than normal wear and tear.

Repair & Return Program

For items not subject to exchange, Daktronics offers a Repair & Return Program. To send a part for repair, follow these steps:

1. Call Daktronics Customer Service.

Refer to the telephone number listed on the previous page.

2. Receive a Return Materials Authorization (RMA) number before shipping.

Refer to the telephone number listed on the previous page.

3. Package and pad the item carefully to prevent damage during shipping.

Electronic components, such as printed circuit boards, should be placed in an antistatic bag before boxing. Daktronics does not recommend packing peanuts when shipping.

4. Enclose the following information:

- Name
- Address
- Phone number
- RMA number
- Clear description of symptoms

Shipping Address

Daktronics Customer Service
600 E 54th St N
Sioux Falls, SD 57104
Case #

A Reference Documents

Use the following documents in the order listed:

DVN-3000

- DVN-3000 Series 1x4 Horizontal Tube Substructure Quick Guide (DD4156307)
- DVN-3000/3001 Series 2x4 Horizontal Tube Substructure Quick Guide (DD4732854)
- DVN-3000 Series 1x4/2x4 Horizontal Tube Panel Installation Quick Guide (DD4732853)
- DVN-3000 Series CMU/Concrete Substructure Installation Quick Guide (DD4732532)
- DVN-3000 Series CMU/Concrete Panel Installation Quick Guide (DD4732560)
- DVN-3000 Series Vertical Tube Substructure Installation (Contract-Specific Drawings)
- DVN-3000/3001 Series Vertical Tube Panel Installation Quick Guide (DD4306005)
- DVN-3000 Series Panel Basics Quick Guide (DD4148268)
- DVN-3000 Series 3x2 Panel Basics Quick Guide (DD4692795)
- DVN-3000 Series Panel Installation Quick Guide (DD4731666)
- DVN-3000 Series Electrical Installation Quick Guide (DD4732380)
- DVN-3000 Series Border Installation Quick Guide (DD4163366)
- DVN-3000 Series Service Quick Guide (DD4732368)

DVN-3050

- DVN-3050/3051 Series Substructure Quick Guide (DD4617019)
- DVN-3050 Series Panel Basics Quick Guide (DD4617180)
- DVN-3050 Series Panel Installation Quick Guide (DD4673311)
- DVN-3050 Series Border Installation Quick Guide (DD4617067)
- DVN-3050 Series $\frac{1}{4}$ -Module Panel Basics Quick Guide (DD4731586)
- DVN-305X Series $\frac{1}{4}$ -Module Panel Installation Quick Guide (DD4793625)
- DVN-3050 Series $\frac{1}{4}$ -Module Electrical Installation Quick Guide (DD4793519)
- DVN-305X Series $\frac{1}{4}$ -Module Border Installation Quick Guide (DD4793636)
- DVN-305X Series $\frac{1}{4}$ -Module Service Quick Guide (DD4793527)

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Refer to the contract-specific Shop Drawing for details on substructure type.

1. Set the first tube on the ground or prep work surface with one of the 3" walls touching the surface. Mark the top-left corner of the tube with "TL" to create a starting point for the panel-interference jigs (Daktronics part number 0M-4103843). Use the jigs to ensure the screws do not land in a KEEP-OUT zone.

- a. Hand-bend the top three bracket tabs on the jigs (if not already bent). Refer to **Figure 1**.
- b. Align the top-left ("TL") corner of the tube face with the top-left corner of the first jig at START.

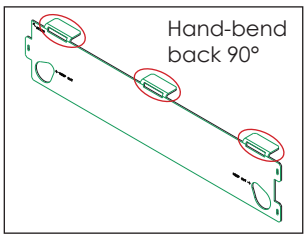


Figure 1: Hand-Bend Bracket Tabs

- c. Use a marker to mark the outline of the KEEP-OUT slots and fill in the three 1/8" vertical slots. Refer to **Figure 2**.

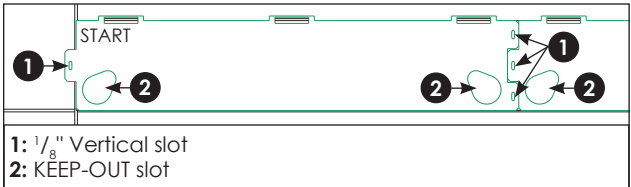


Figure 2: Panel-Interference Jig

- d. Place another jig to the right of the first jig and piece them together.
- e. Remove the left jig and continue down the tube, using as many jigs as supplied/necessary. Refer to **Figure 4**.
2. Mark the wall for tube placement. Refer to **Figure 3**. A horizontal line represents the bottom of a tube, and a vertical line represents the end of a tube or the side of a display.

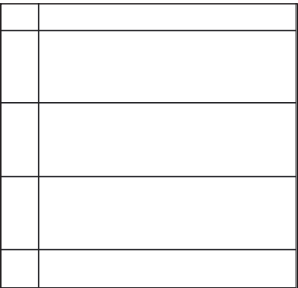


Figure 3: Mark Tube Locations



Figure 4: Use Jigs

Except for the bottom row of the display, each row of panels has only one tube. The tube will be undersized by 1/4" at each end of the display. Refer to the contract-specific Shop Drawing for site-specific dimensions.

3. Find and mark the stud on the wall closest to the vertical tube edge line along the horizontal tube line within 16" from the edge of the tube. Continue down the horizontal tube line, marking stud locations at 32" increments. Measure the distance from the vertical tube line on the wall to the edges of the first stud. Go back to the marked-up tube and use the measurement to mark the tube mounting locations on the tube. Continue down the tube, marking the tube mounting locations at 32" increments.

4. Mark new tube mounting locations at 16" increments on both sides of the stud if a stud location directly overlaps with a KEEP OUT slot. Refer to **Figure 5**.

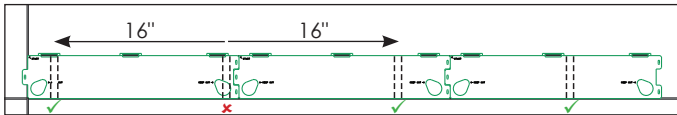


Figure 5: Move Studs at Interference Locations

5. Drill four 0.266" (~17/64") clearance holes through the front and rear walls of the tube at each marked stud location. Refer to **Figure 6**.

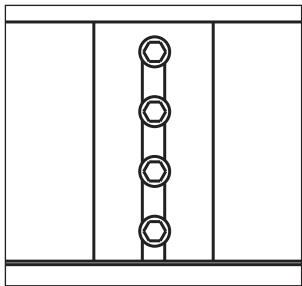


Figure 6: Clearance Holes

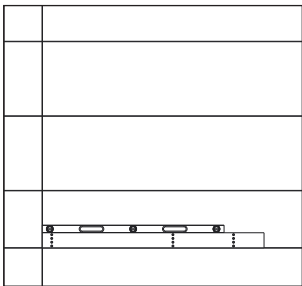


Figure 7: Place Tube

6. Place the marked-up bottom tube on the wall so the bottom horizontal line aligns with the bottom of the tube, the vertical line aligns with its respective edge, and "TL" is in the top-left corner. Refer to **Figure 7**. Use a level (digital is recommended) to fine-tune the tube position, which has a ±1/4" tolerance in all directions.

7. Screw the supplied hardware into the wall as shown on the contract-specific Shop Drawing, but do not tighten the hardware all the way. Ensure the holes are properly aligned in the front and rear tube walls so they are not out of plane by more than 1/16" and install screws in the center of the stud flange. Repeat this for all stud locations along the bottom row of tube(s).

8. Use a horizontal tube layout jig (Daktronics part number 0M-4171903) between the bottom tube and the next tube to set and verify the vertical spacing between the two tubes. Place the jig on the face of the tubes so the bottom tube sits in the cutout at the bottom of the jig and the upper tube rests on the cutout at the top of the jig. Refer to **Figure 8** and **Figure 9**.

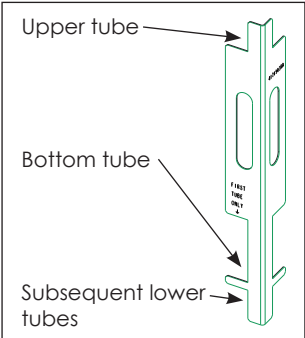


Figure 8: Horizontal Tube Layout Jig

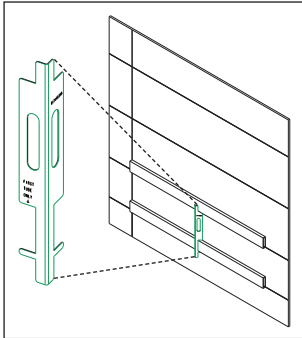


Figure 9: Use Horizontal Tube Layout Jig for Bottom Row

For all subsequent rows, place the jig on the face of the tubes so the lower tube sits below the cutout at the bottom of the jig and the upper tube rests on the cutout at the top of the jig. Refer to **Figure 8** and **Figure 10**.

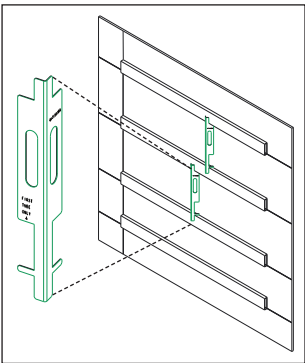


Figure 10: Use Horizontal Tube Layout Jig for Subsequent Rows

Note: Use a 3-high horizontal tube layout jig (0M-4697695) for rows with 3-high panels. Refer to **Figure 11** and **Figure 12**.

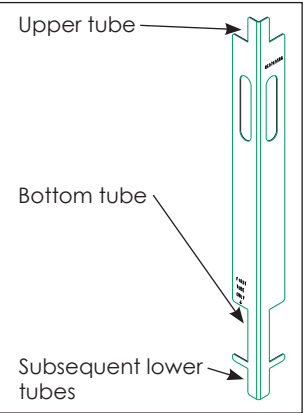


Figure 11: 3-High Horizontal Tube Layout Jig

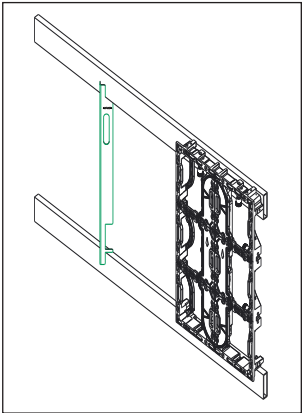


Figure 12: Use 3-High Horizontal Tube Layout Jig

9. Repeat the stud attachment pattern from the bottom row. Refer to **Figure 13**. Verify the tube is horizontally level and the tubes are plumb and level to each other by a tolerance of ±1/4" in the X-axis and by +1/4"-1/2" in the Y-axis. Y-axis tolerance for the top tube is ±1/4" to prevent the tube from extending above the top of the display.

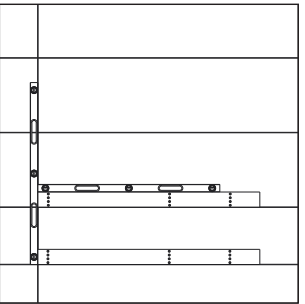


Figure 13: Repeat Stud Attachment Pattern

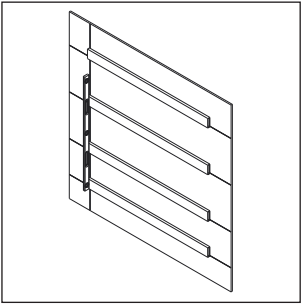


Figure 14: Ensure Plumb & Flat Tube Faces

10. Use a level to ensure the tube faces are plumb to the wall and flat to each other. Refer to **Figure 14**. If the tubes need Z-axis adjustment, add shims between the wall and the tube to adjust up to 1/2" maximum. Refer to **Figure 15**. Ensure the shims bear the full height of the tube as shown in **Figure 16**. Tighten down the hardware.



Figure 15: Shim



Figure 16: Add Shims between Wall & Tube

Refer to the contract-specific Shop Drawing for details on substructure type. There are two different 2x4 horizontal tube lengths: three-panel-wide and four-panel-wide. Multiple tubes may be needed for the full width of the display.

1. Determine the display location:

- a. Locate the Mechanical Spec Drawing and review the overall display dimensions (height and width).
- b. Find an unobstructed section of wall larger than the overall display dimensions and verify the wall is flat and plumb within 1/2".
- c. Measure and mark the location of the lower-left display corner on the wall.

2. Install the first wall tube:

- a. Use a structure jig (Daktronics part number 0S-4230372) and insert the alignment pins on the jig into the top row of holes on the wall tube. Refer to **Figure 1**.

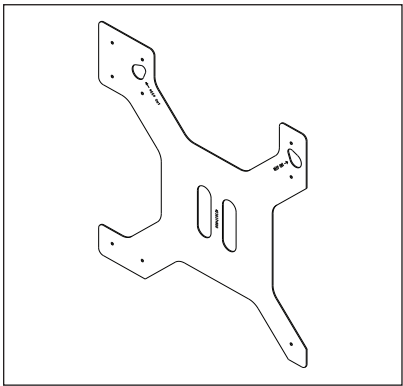


Figure 1: Structure Jig

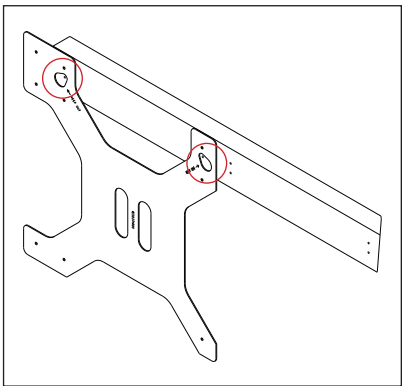


Figure 2: Trace Keep-Out Areas on Structure Jig

- b. Use a marker to trace both keep-out areas on the jig. Refer to **Figure 2**.
- c. Move the jig over to the next set of holes and trace both keep-out areas on the jig again.
- d. Repeat **Step 2.c.** until all keep-out areas on the first row of wall tubes have been marked.
- e. Locate and mark the first stud closest to the marked left edge of the display. This stud must be within 16" from the left edge of the display.
- f. Continue locating and marking stud locations at 32" increments until the right edge of the display is reached. The furthest right stud location must be within 16" from the right edge of the display.
- g. Drill four 17/64" (~0.266") clearance holes through the front and rear walls of the tube at all stud locations on the first wall tube.

- h. Level the wall tube and attach the tube to the wall with four 1/4" ITW® Buildex® self-drilling TEK screws of sufficient length at each stud location. Refer to **Figure 3** and to the contract-specific Shop Drawing for specific TEK screw length and fastening schedule.

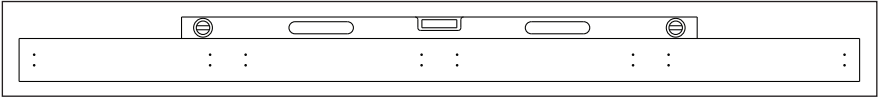


Figure 3: Level First Wall Tube

3. Install the second wall tube above the first tube while referring to **Figure 4**:

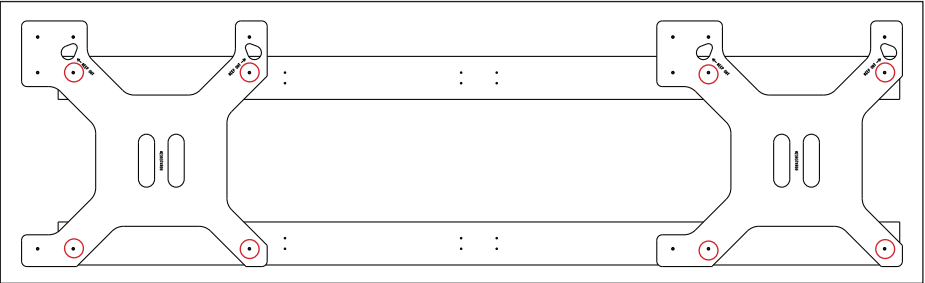


Figure 4: Install Second Wall Tube

- a. Use a structure jig (0S-4230372) at each end of the wall tube and insert the bottom two alignment pins on each jig into the bottom set of holes on the first wall tube.
- b. Place the second wall tube above the first tube and insert the middle two alignment pins on the jig into the top set of holes on the second wall tube.
- c. Drill four 17/64" (~0.266") clearance holes through the front and rear walls of the tube at all stud locations on the tube. Refer to **Figure 4**.
- d. Attach the wall tube to the wall with four 1/4" ITW® Buildex® self-drilling TEK screws at each stud location.

4. Install the third and higher wall tubes while referring to **Figure 5**:

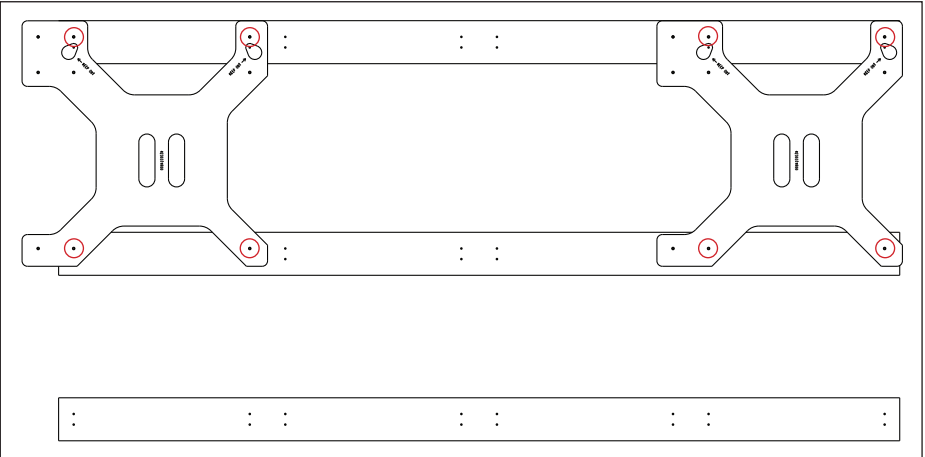


Figure 5: Install Third & Higher Wall Tubes

- a. Use a structure jig (0S-4230372) at each end of the wall tube and insert the bottom two alignment pins on each jig into the top set of holes on the second wall tube.
- b. Place the third wall tube above the second wall tube and insert the top two alignment pins into the top set of holes on the third wall tube.
- c. Drill four 17/64" (~0.266") clearance holes through the front and rear walls of the tube at all stud locations. Refer to **Figure 5**.
- d. Attach the wall tube to the wall with four 1/4" ITW® Buildex® self-drilling TEK screws at each stud location.
- e. Repeat **Step 4** until all third and higher wall tubes are installed.

5. Install adjacent wall tubes while referring to **Figure 6** and **Figure 7**:

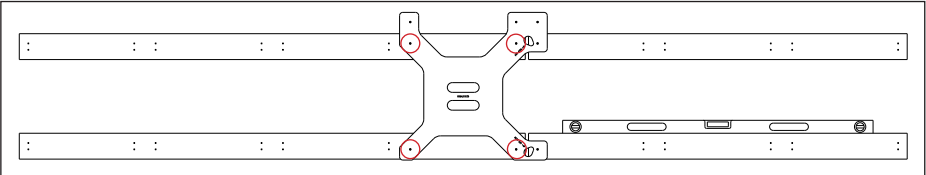


Figure 6: Install Adjacent Wall Tubes

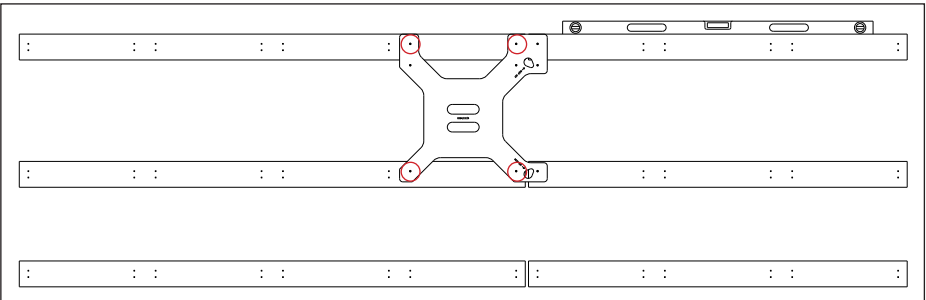


Figure 7: Install Adjacent Wall Tubes

- a. Rotate a structure jig (0S-4230372) 90° clockwise and insert the alignment pins on the jig into the furthest right set of holes on the wall tube.
- b. Place additional wall tubes to the right of the previous wall tubes and insert the alignment pins on the jig into the wall tubes.
- c. Verify the wall tubes are level with the previous wall tubes.
- d. Drill four 17/64" (~0.266") clearance holes through the front and rear walls of the tube at all stud locations. Refer to **Figure 6** and **Figure 7**.
- e. Use shims between the wall tube and wall (if needed) to bring the wall tube flush with the adjacent wall tubes.
- f. Use four 1/4" ITW® Buildex® self-drilling TEK screws to attach the wall tube to the wall.
- g. Repeat **Step 5** until all adjacent wall tubes are installed.

Mechanical

Panel-to-Tube Attachment

Panels provide holes to self-drill the tube and threads to jack the panel away from the tube by approximately 1/4" [6.35 mm] with an M10 bolt if Z-axis adjustment is needed.

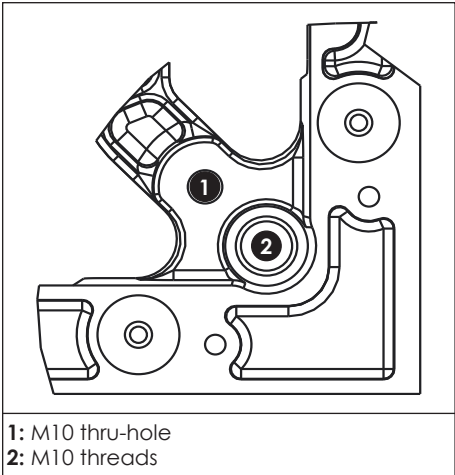


Figure 1: Mount Panel to Tube

M10 nuts are required at every panel attachment location to space the panel away from the tube and avoid interference with the self-drilling screw heads on the tube. The nut should be installed so it touches the rear of the panel with the bolt flush or slightly recessed from the other end of the nut. Refer to Figure 3.

These steps provide only a general overview of panel-to-tube attachment. Refer to **Panel Installation (p.1)** for more detailed instructions.

1. Insert one self-drilling screw and one M10 jacking bolt in the upper-left and upper-right corner on each panel. Refer to Figure 4.
2. Insert one self-drilling screw and one M10 jacking bolt in the lower-left and lower-right corner on each panel in the bottom row of panels only. Refer to Figure 4.

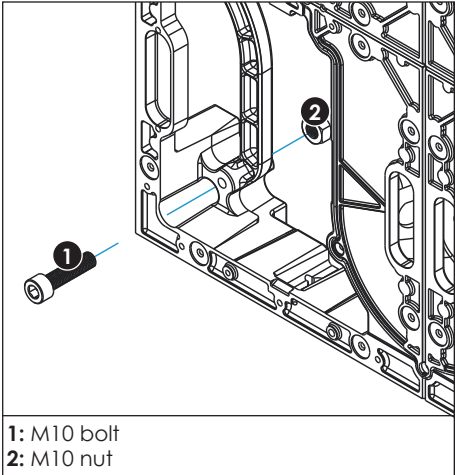


Figure 2: Adjust Z-Axis

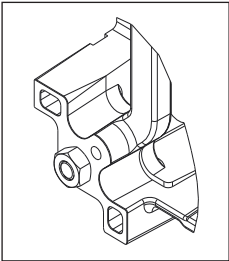


Figure 3: Nut

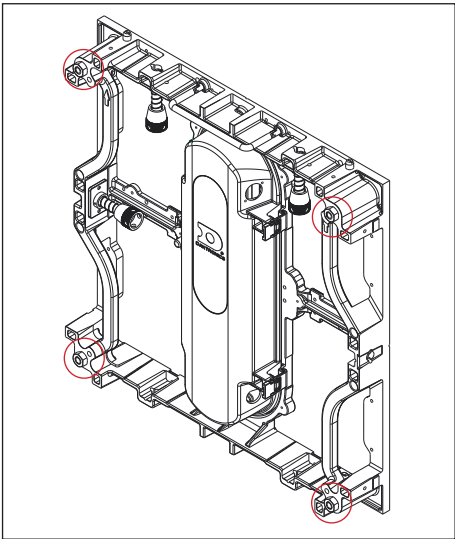


Figure 4: Attach Panel to Tube

Panel Installation

Note: Use a level through this section to verify each panel is level in the X and Y directions.

1. Start the first panel (with the modules removed) at the middle of the bottom tube. Refer to Figure 5. Use a straight edge to position the panel so the bottom is flush with the bottom of the tube and does not hang below the bottom of the tube by more than 1/4" [6.35 mm]. The left and right edges of the panel should align with the dashed vertical lines created with the interference jig.

Note: This step is easiest with three people.

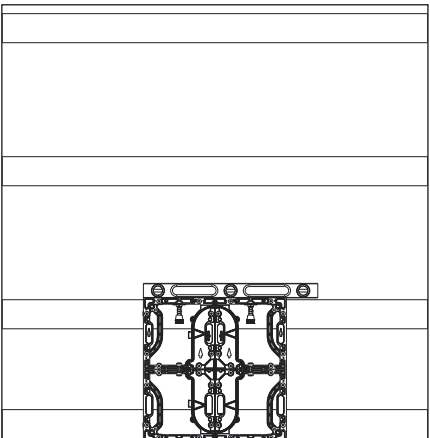


Figure 5: Install First Panel

2. Use a level to verify the panel is level in the X and Y directions.
3. Install self-drilling screws per the contract-specific Shop Drawing and the self-drilling screw installation instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)**.
4. Place the second panel next to the existing panel.
5. Engage all applicable draw latches per the panel interconnect engagement instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)**.
6. Install self-drilling screws per the contract-specific Shop Drawing and the self-drilling screw installation instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)**.
7. Repeat Steps 4-6 for each panel in the row, ensuring the machined surfaces are as flush as possible. Refer to Figure 6.

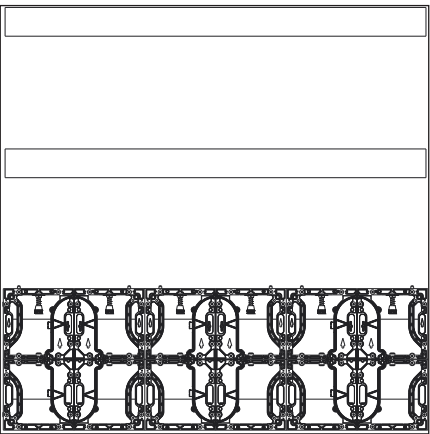


Figure 6: Install Bottom Row of Panels

8. Start on the next row after the bottom row is completed, working from the center out. Refer to Figure 7.

Note: After the bottom row, all subsequent rows only attach in the top mounting locations.

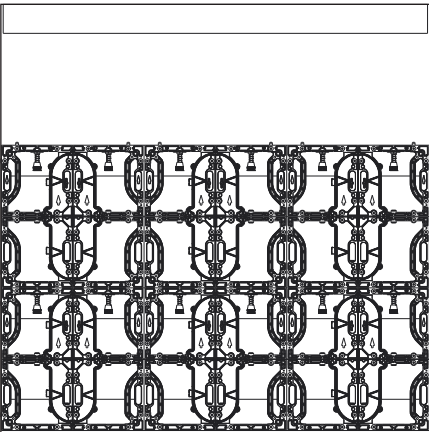


Figure 7: Install Second Row of Panels

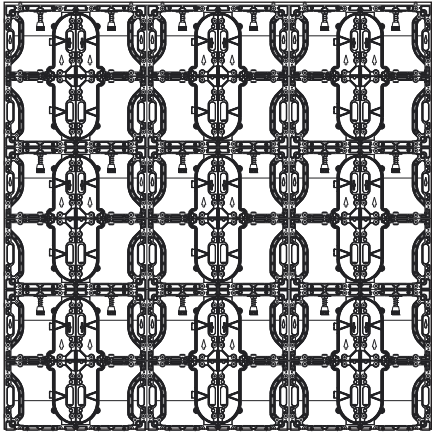


Figure 8: Install Tubes

9. Continue attaching panels up to the top row. Refer to Figure 8.
10. Use a level after all panels are up and the hardware is started to verify the panels are all plumb, flat, and level to each other in the X, Y, and Z directions. Use the M10 jacking hardware to brace the panels away from the tubes by no more than 1/4" [6.35 mm]. After verified, tighten down the hardware in all applicable corners.

Refer to the contract-specific Shop Drawing for details on substructure type.
DVN-3000 displays use anchors for mounting to a CMU or concrete wall. Anchor type varies by wall material:

Wall Material	Anchor Type	Installation	Embedment
Concrete (seismic)	1/4" DEWALT® Screw-Bolt+™ screw anchor	Per manufacturer's recommendations and ICC-ES® ESR-3889	Minimum depth of 2.5"
Grout-filled CMU block (seismic)	1/4" Simpson Strong-Tie® Titen HD® screw anchor	Per manufacturer's recommendations and ICC-ES® ESR-1056	Minimum depth of 2.5"
Hollow CMU block (non-seismic)	1/4" ITW® TapCon® anchor	Per manufacturer's recommendations and ICC-ES® ESR-1671	Minimum depth of 1"

1. Determine the display location:
- a. Locate the Structure Layout Drawing and review the overall display dimensions (height and width).

b. Find an unobstructed section of wall larger than the overall display dimensions and verify the wall is flat and plumb within 1/2".

c. Measure and mark the location of the lower-left display corner on the wall.

d. Mark the first anchor hole location for mounting the first horizontal wall angle per the dimensions on the Structure Layout Drawing. This should be the center of the CMU block cavity to ensure proper alignment with the block. If the anchor location is within 1" of any grout seam or block edge, adjust the display location to meet anchor location requirements.

2. Install the first horizontal wall angle while referring to **Figure 1**:

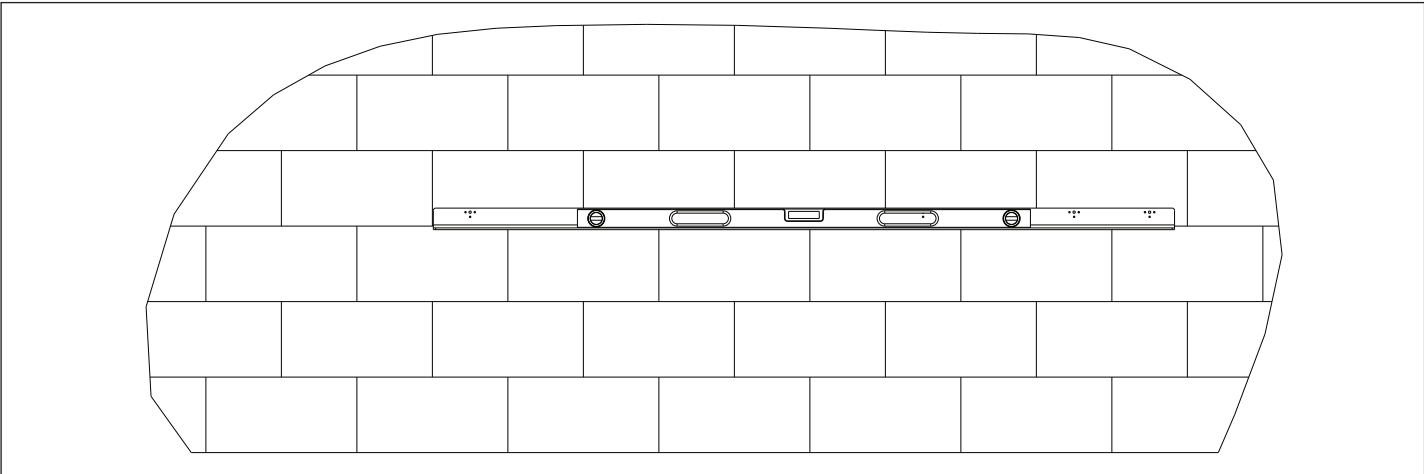


Figure 1: Install First Horizontal Wall Angle

- a. Locate the first horizontal wall angle (etched with "1") to be mounted.
- b. Pre-drill the first anchor location in the wall.
- c. Position the horizontal wall angle on the wall. Insert and tighten the anchor to secure the horizontal wall angle to the wall.
- d. Ensure the horizontal wall angle is level and then drill pilot holes in the remaining mounting locations. Insert and tighten anchors in those locations to secure the horizontal wall angle to the wall.

3. Install additional horizontal wall angles horizontally while referring to **Figure 2**:

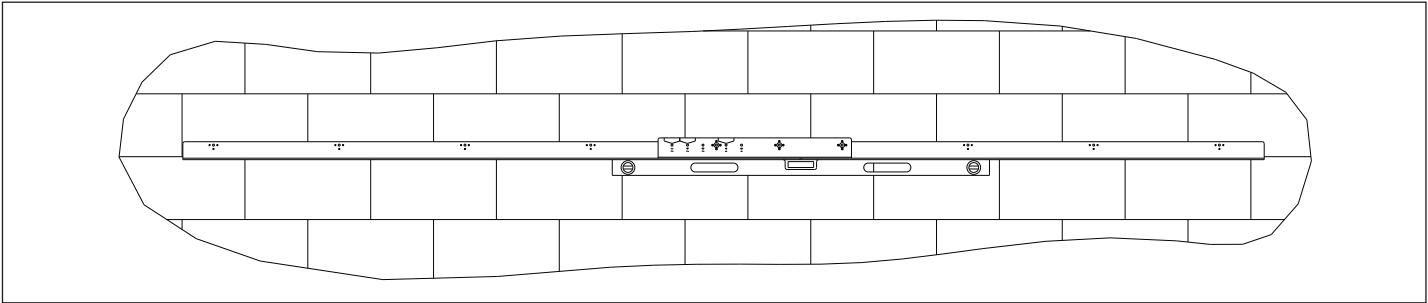


Figure 2: Install Additional Horizontal Wall Angles Horizontally

- a. Locate the next horizontal wall angle (etched with "2") to be mounted in the row.
- b. Attach the jig (Daktronics part number 0M-4199804) to the horizontal wall angle with the supplied thread-forming screws (HC-3601959). This sets the horizontal spacing of the horizontal wall angle. Refer to **Figure 3**.
- c. Verify the horizontal wall angle is level with the first horizontal wall angle.
- d. Mark the location for the pilot hole at the opposite end of the horizontal wall angle and pre-drill the hole at the marked location. Insert and tighten an anchor to secure the horizontal wall angle to the wall.
- e. Drill pilot holes in the remaining mounting locations. Insert and tighten anchors in those locations to secure the horizontal wall angle to the wall.
- f. Repeat **Step 3** for any remaining horizontal wall angles in the first row. Remove the jig after all horizontal wall angles in the first row are mounted.

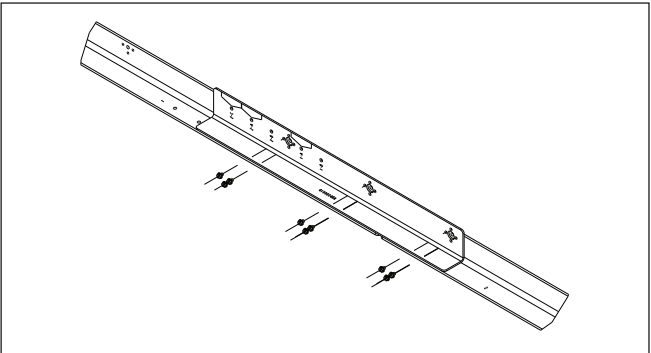


Figure 3: Attach Jig Horizontally

4. Install the second row horizontal wall angles vertically while referring to **Figure 4**:

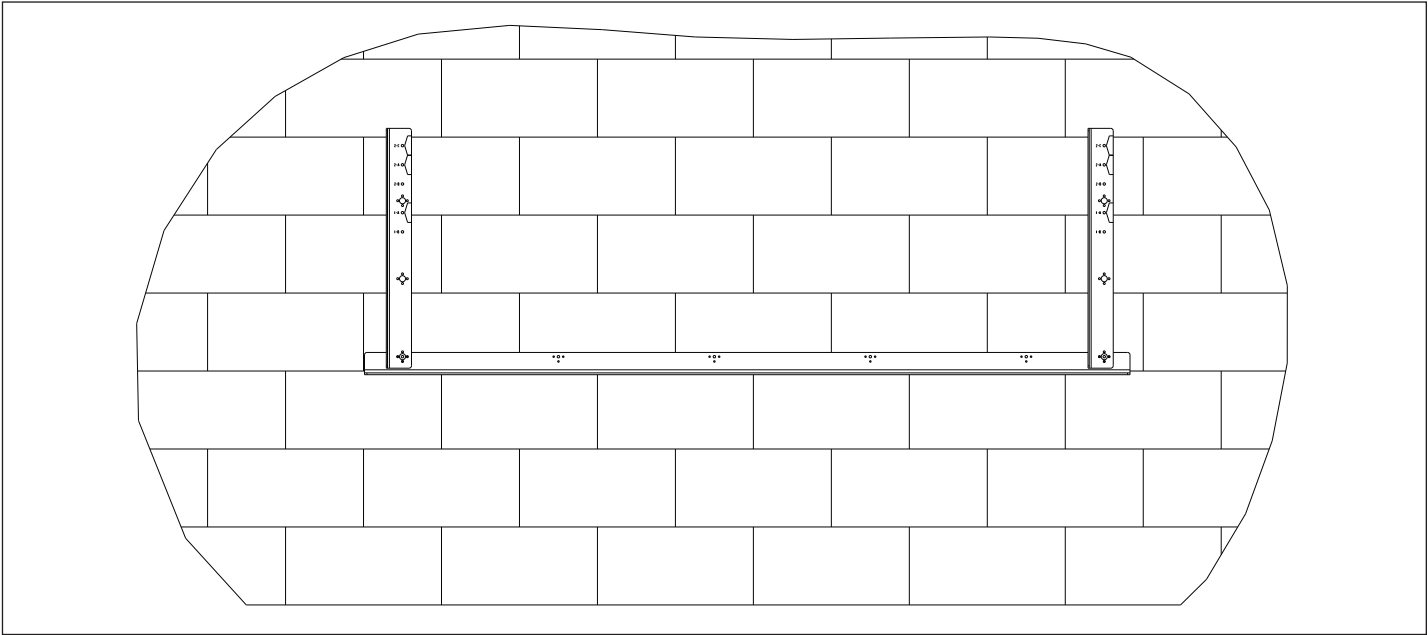


Figure 4: Install Second Row Horizontal Wall Angles Vertically

- a. Position jigs (0M-4199804) vertically over the mounting locations on the outer edges of the horizontal wall angle in the row beneath the row to be mounted.
 - b. Attach the jigs with the supplied thread-forming screws (HC-3601959). This sets the vertical spacing of the horizontal wall angle. Refer to **Figure 5**.
 - c. Pre-drill a hole at the anchor location. If the grout line or block edge does not fall within the etched marking on the jig at anchor location 1A, use this anchor location. Otherwise use anchor location 1B.
 - d. Remove the jigs and drill pilot holes at the remaining mounting locations. Insert and tighten anchors to secure the horizontal wall angle to the wall.
 - e. Repeat **Step 4** to install additional horizontal wall angles vertically in the row.
5. Install third row and higher horizontal wall angles vertically while referring to **Figure 6**:

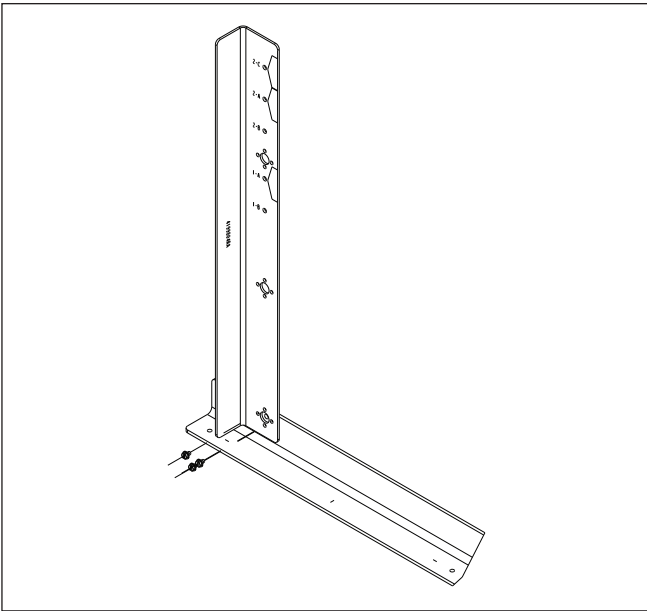


Figure 5: Attach Jigs Vertically

- c. Pre-drill a hole at the anchor location. If anchor location 1A or 2A was used in the horizontal wall angle below and if the grout line or block edge does not fall within the etched marking, use anchor location 2A. Otherwise use anchor location 2B. If anchor location 1B or 2B was used in the horizontal wall angle below and if the grout line or block edge does not fall within the etched marking, use anchor location 2C. Otherwise use anchor location 2A. If anchor location 2C was used in the horizontal wall angle below, use anchor location 2A.
- d. Repeat **Step 5** to install any remaining horizontal wall angles vertically.

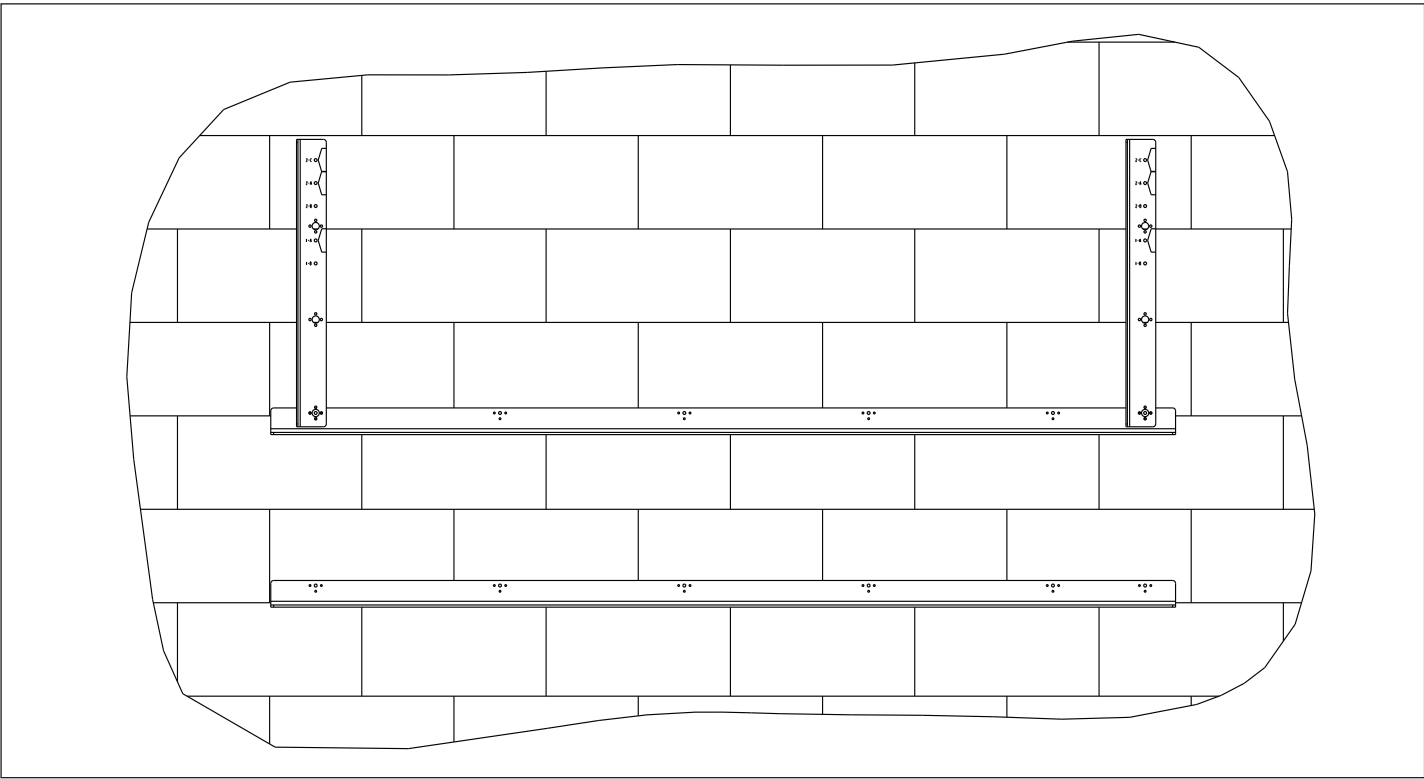


Figure 6: Install Third Row & Higher Horizontal Wall Angles Vertically

- a. Position the jigs (0M-4199804) vertically over the mounting locations on the outer edges of the horizontal wall angle in the row beneath the row to be mounted.
- b. Attach the jigs with the supplied thread-forming screws (HC-3601959). This sets the vertical spacing of the horizontal wall angles. Refer to **Figure 5**.

Panel Installation

1. Install the first row of display panels.

- a. Attach a panel angle in each corner of the display panels for the first row. Refer to **Figure 1**. Use short panel angles (HS-4196773) in the bottom corners and short or tall (HS-4198232) panel angles in the top corners. If anchor location 1A was used for the second row of horizontal wall angles, use short panel angles in the top corners. If anchor location 1B was used, use tall panel angles. Center each panel angle in its slotted hole and use a bolt (HC-4207944) to attach the panel angle to the panel. Tighten the bolt with a 15 mm socket.

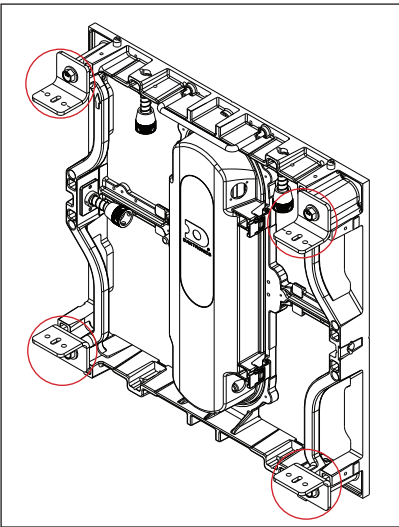


Figure 1: First Row Panel Angles

- b. Start in the center of the display and position the first display panel on the horizontal wall angles. Insert a partially tightened TEK screw (HC-3880111) into the slotted hole in each panel angle.
- c. Adjust the display panel until it is level and plumb. Refer to **Figure 2** and **Figure 3**.

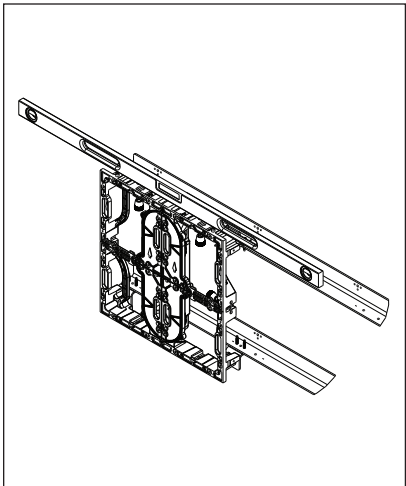


Figure 2: Level Panel

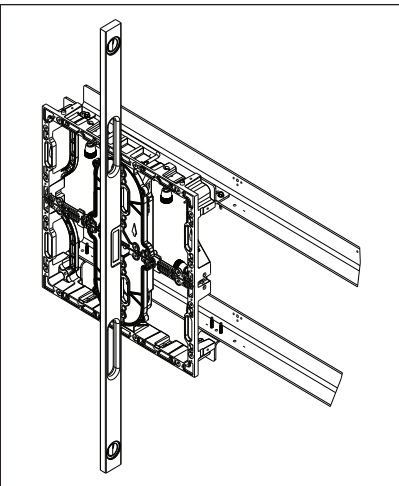


Figure 3: Plumb Panel

- d. Tighten the bolts (HC-4207944) securing the panel angles to the rear of the display panel.
- e. Tighten the TEK screws (HS-3880111) in the slotted holes in each panel angle and verify the panel is still level and plumb. If minor adjustments are needed to level the panel, a rubber mallet may be used to gently tap the panel into position. If additional adjustments are needed, it may be necessary to loosen the mounting hardware.

- f. Insert and tighten TEK screws (HS-3880111) into the two non-slotted panel angle holes in all panel angles.
- g. Position the next display panel in place on the substructure beside the existing panel and engage all applicable draw latches per the panel interconnect engagement instructions in the **DVN-3000 Series Panel Installation Quick Guide (DD4731666)**. Refer to **Figure 4**.

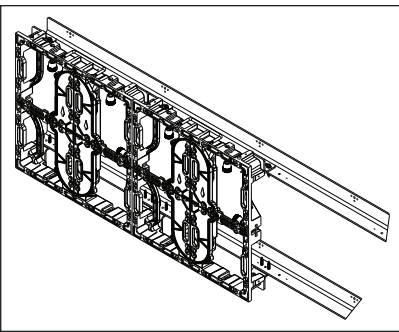


Figure 4: Install Side-to-Side Display Panels

- h. Repeat **Steps 1.c.-1.f.** to install the panel, ensuring it is level and plumb before fully tightening the mounting hardware.
- i. Repeat **Step 1.g.-1.i.** to install any remaining horizontal panels in the first row before continuing to the next row.

2. Install second row and higher display panels.

- a. Attach a panel angle in the top corners of the display panels for the row. Refer to **Figure 5**. Use short (HS-4196773) or tall (HS-4198232) panel angles to match up with the horizontal wall angles. Center each panel in its slotted hole and use a bolt (HC-4207944) to secure the panel angle. Tighten the bolt with a 15 mm socket.

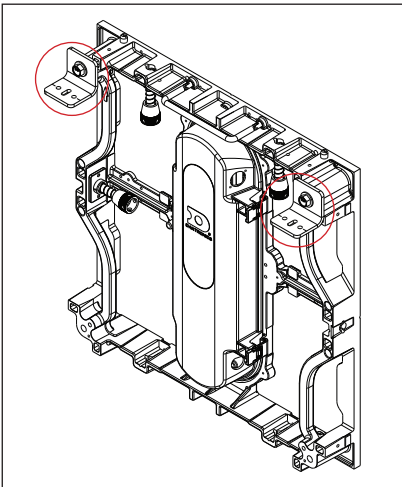


Figure 5: Second Row & Higher Panel Angles

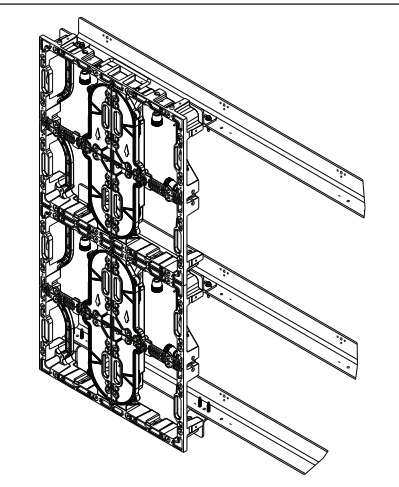


Figure 6: Install Top-to-Bottom Display Panels

- b. Start in the center of the wall and position the first display panel on the horizontal wall angles with the top panel angles on the horizontal wall angle and the bottom of the panel resting on the panel below. Refer to **Figure 6**.
- c. Engage all applicable draw latches per the panel interconnect engagement instructions in the **DVN-3000 Series Panel Installation Quick Guide (DD4731666)**. Ensure the panels are level and plumb with no seam issues.

- d. Tighten the bolts (HC-4207944) securing the panel angles to the rear of the display panel.
- e. Tighten the TEK screws (HS-3880111) in the slotted panel angle holes and verify the panel is still level and plumb. If minor adjustments are needed to level the panel, a rubber mallet may be used to gently tap the panel into position. If additional adjustments are needed, it may be necessary to loosen the mounting hardware.
- f. Insert and tighten TEK screws (HC-3880111) into the two non-slotted panel angle holes in the upper corners of the display panel.
- g. Position the next display panel in place on the substructure beside the existing panel and engage all applicable draw latches per the panel interconnect engagement instructions in the **DVN-3000 Series Panel Installation Quick Guide (DD4731666)**. Ensure the panels are level and plumb with no seam issues.
- h. Repeat **Steps 2.c.-2.g.** to install the panel, ensuring it is level and plumb before fully tightening the mounting hardware.
- i. Repeat **Step 2.g.** and **Step 2.h.** to install any remaining horizontal panels in the row.

Refer to the contract-specific drawings for details on vertical tube substructure installation.

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Mechanical

The design and installation of the vertical tube substructure is highly customized per contract and based on seismic location as well as display size and display tilt. Refer to the contract-specific Shop Drawing for details on substructure installation.

Substructure Verification

- 1. Verify the substructure is installed per the contract-specific Shop Drawing.
- 2. Verify the panel attachment tubes are level and plumb within a 1/4" tolerance in all directions.

Panel Spanning Plate Attachment

A spanning plate is required at each panel seam that does not have at least one of the two panels connected to a tube. Spanning plates require one M10 structural bolt at each panel corner. There are two types of plates: a mid-spanning plate with four connection points and an end-spanning plate with two connection points.

Panel Installation

- 1. Identify the center of the display. Refer to the contract-specific Shop Drawing to identify where self-drilling screws and M10 jacking bolts are required.

Note: Use a level through this section to identify the middle of the display.

- 2. Start the first panel/paired panels (with the modules removed) at the bottom-center of the display. The installation can start with either a single panel or two panels connected via the standard interconnect latch and spanning plate(s). Refer to **Figure 1** and **Figure 2**.

Note: This step is easiest with three people.

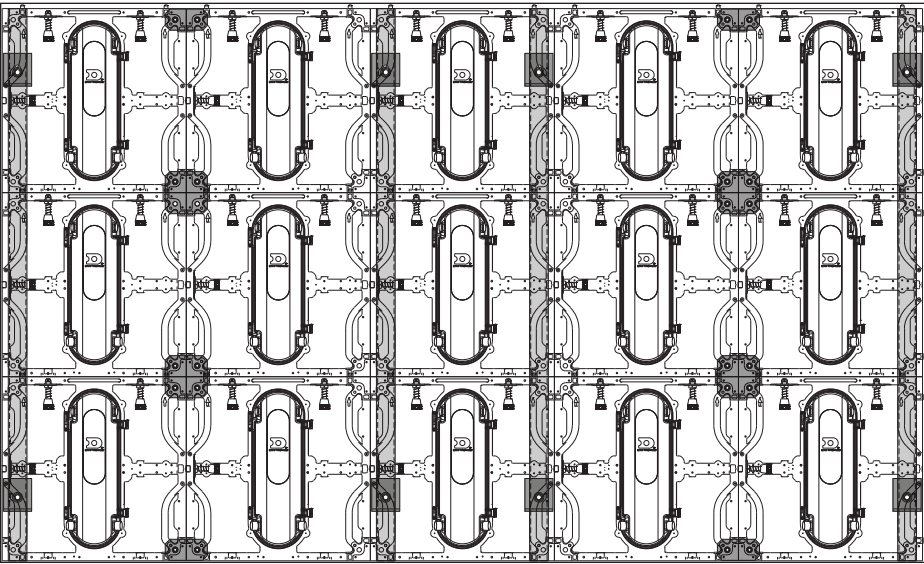


Figure 1: Single Panel Center Display

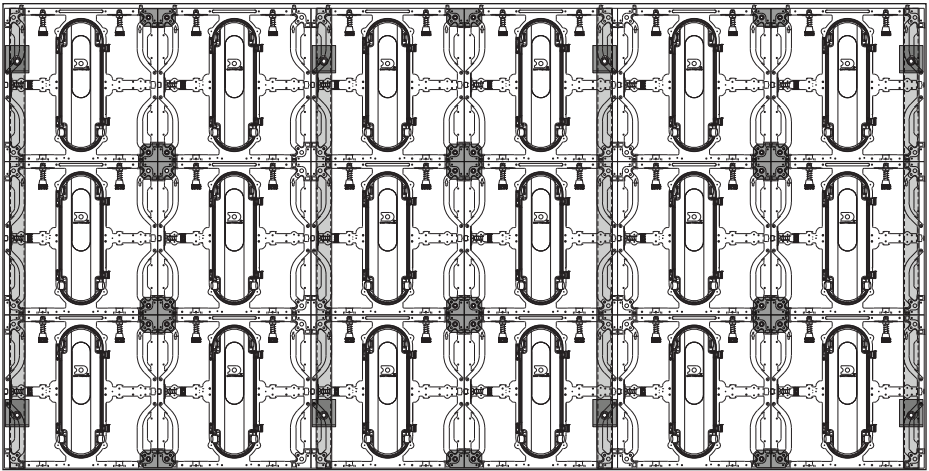


Figure 2: Dual Panel Center Display

Make the necessary panel connections on the ground per the panel interconnect engagement instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)** or the panel interconnect and alignment instructions in the **DVN-3001 Panel Installation Quick Guide (DD4836909)** if two panels are connected to each other in the bottom-center row of the display. Refer to **Figure 3**.

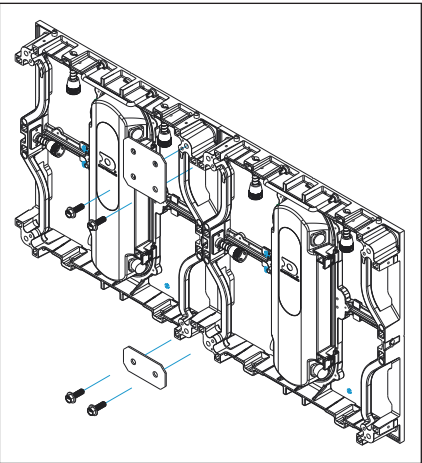


Figure 3: Connect Panels

- 3. Use a level to verify the panel is level in the X and Y directions.
- 4. Install self-drilling screws per the contract-specific Shop Drawing and the self-drilling screw instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)** or the **DVN-3001 Panel Installation Quick Guide (DD4836909)**.
- 5. Place the next adjacent panel beside an installed panel and engage all applicable draw latches per the panel interconnect engagement instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)** or the panel interconnect and alignment instructions in the **DVN-3001 Panel Installation Quick Guide (DD4836909)**.
- 6. Attach spanning plates between the panels as needed.
- 7. Install self-drilling screws per the contract-specific Shop Drawing and the self-drilling screw installation instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)** or the **DVN-3001 Panel Installation Quick Guide (DD4836909)**.
- 8. Repeat **Steps 5-7** for the remainder of the row, ensuring the machined surfaces are as flush as possible, and continue attaching the spanning plates per the contract-specific Shop Drawing.

- 9. Continue installing panels in the next row and up until all panels are installed. Refer to **Figure 4** and **Figure 5**.

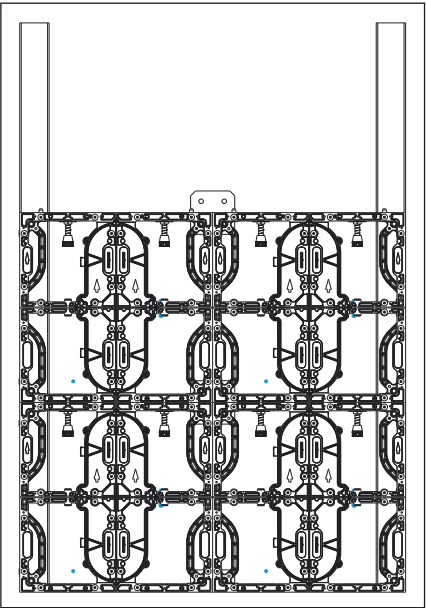


Figure 4: Install Second Row

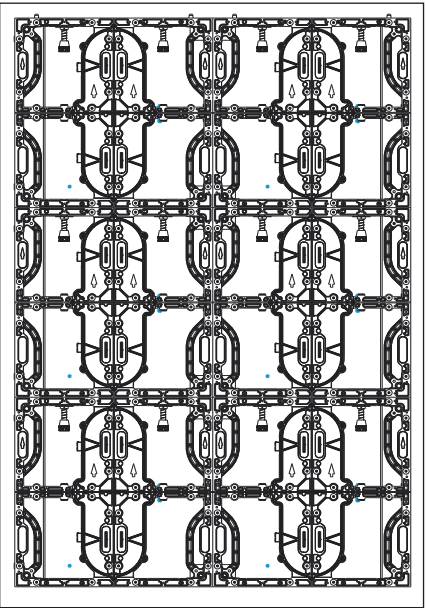


Figure 5: Install Remaining Rows

- 10. Use a level after all panels are installed and the hardware is started to verify the panels are plumb, flat, and level to each other in the X, Y, and Z directions. Use the M10 jacking hardware (where available) to brace the panels away from the tubes by no more than 1/4" [6.35 mm]. After verified, tighten down the hardware in all applicable corners.

Mechanical

The design and installation of the vertical tube substructure is highly customized per contract and based on seismic location as well as display size and display tilt. Refer to the contract-specific Shop Drawing for details on substructure installation.

Substructure Verification

- 1. Verify the substructure is installed per the contract-specific Shop Drawing.
- 2. Verify the panel attachment tubes are level and plumb within a 1/4" tolerance in all directions.

Panel Spanning Plate Attachment

A spanning plate is required at each panel seam that does not have at least one of the two panels connected to a tube. Spanning plates require one M10 structural bolt at each panel corner. There are two types of plates: a mid-spanning plate with four connection points and an end-spanning plate with two connection points.

Panel Installation

- 1. Identify the center of the display. Refer to the contract-specific Shop Drawing to identify where self-drilling screws and M10 jacking bolts are required.

Note: Use a level through this section to identify the middle of the display.

- 2. Start the first panel/paired panels (with the modules removed) at the bottom-center of the display. The installation can start with either a single panel or two panels connected via the standard interconnect latch and spanning plate(s). Refer to **Figure 1** and **Figure 2**.

Note: This step is easiest with three people.

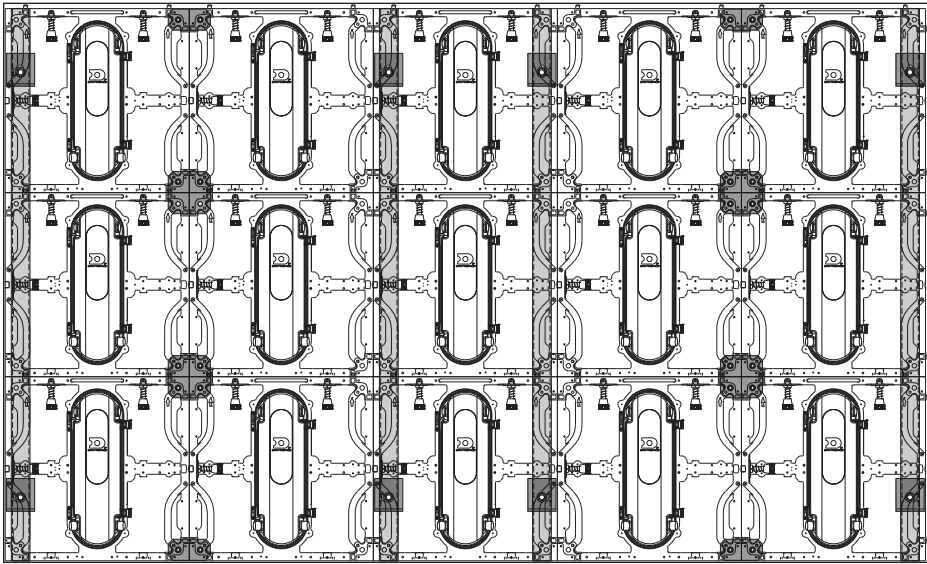


Figure 1: Single Panel Center Display

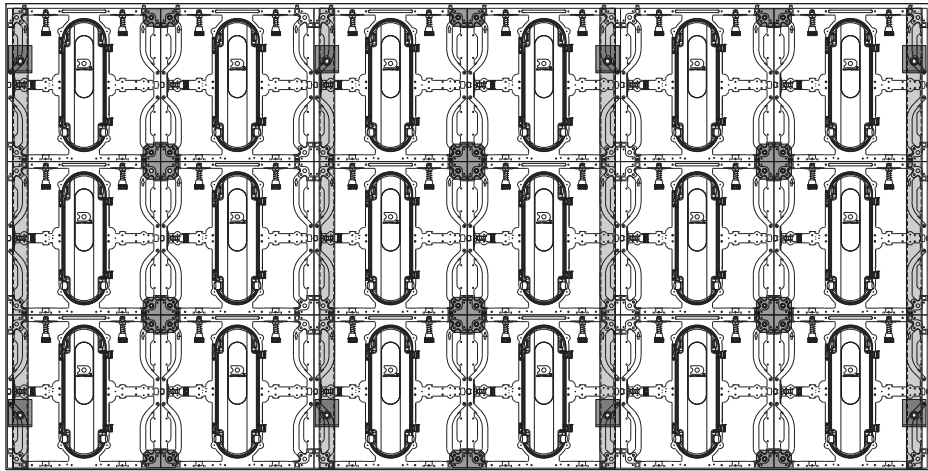


Figure 2: Dual Panel Center Display

Make the necessary panel connections on the ground per the panel interconnect engagement instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)** if two panels are connected to each other in the bottom-center row of the display. Refer to **Figure 3**.

- 3. Use a level to verify the panel is level in the X and Y directions.
- 4. Install self-drilling screws per the contract-specific Shop Drawing and the self-drilling screw instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)**.
- 5. Place the next adjacent panel beside an installed panel and engage all applicable draw latches per the panel interconnect engagement instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)**.
- 6. Attach spanning plates between the panels as needed.
- 7. Install self-drilling screws per the contract-specific Shop Drawing and the self-drilling screw installation instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)**.
- 8. Repeat **Steps 5-7** for the remainder of the row, ensuring the machined surfaces are as flush as possible, and continue attaching the spanning plates per the contract-specific Shop Drawing.
- 9. Continue installing panels in the next row and up until all panels are installed. Refer to **Figure 4** and **Figure 5**.

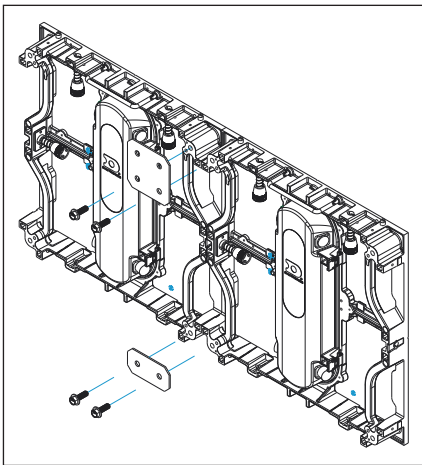


Figure 3: Connect Panels

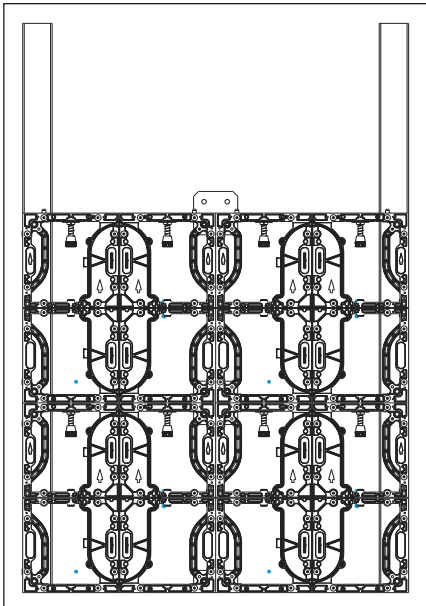


Figure 4: Install Second Row

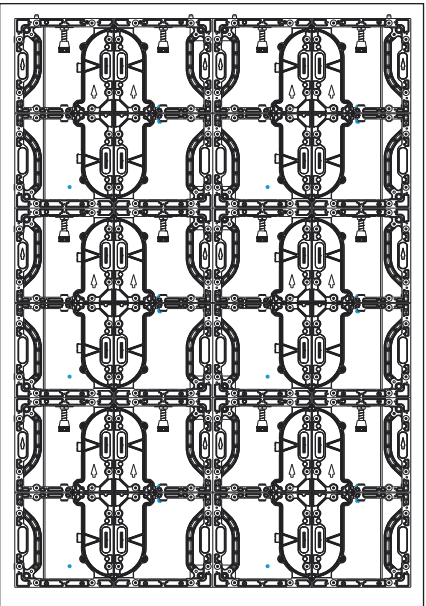


Figure 5: Install Remaining Rows

- 10. Use a level after all panels are installed and the hardware is started to verify the panels are plumb, flat, and level to each other in the X, Y, and Z directions. Use the M10 jacking hardware (where available) to brace the panels away from the tubes by no more than 1/4" [6.35 mm]. After verified, tighten down the hardware in all applicable corners.

Figure 1 (rotated front view) and Figure 2 (rotated rear view) show the basic features of a typical DVN-3000 series 3x2 display panel.

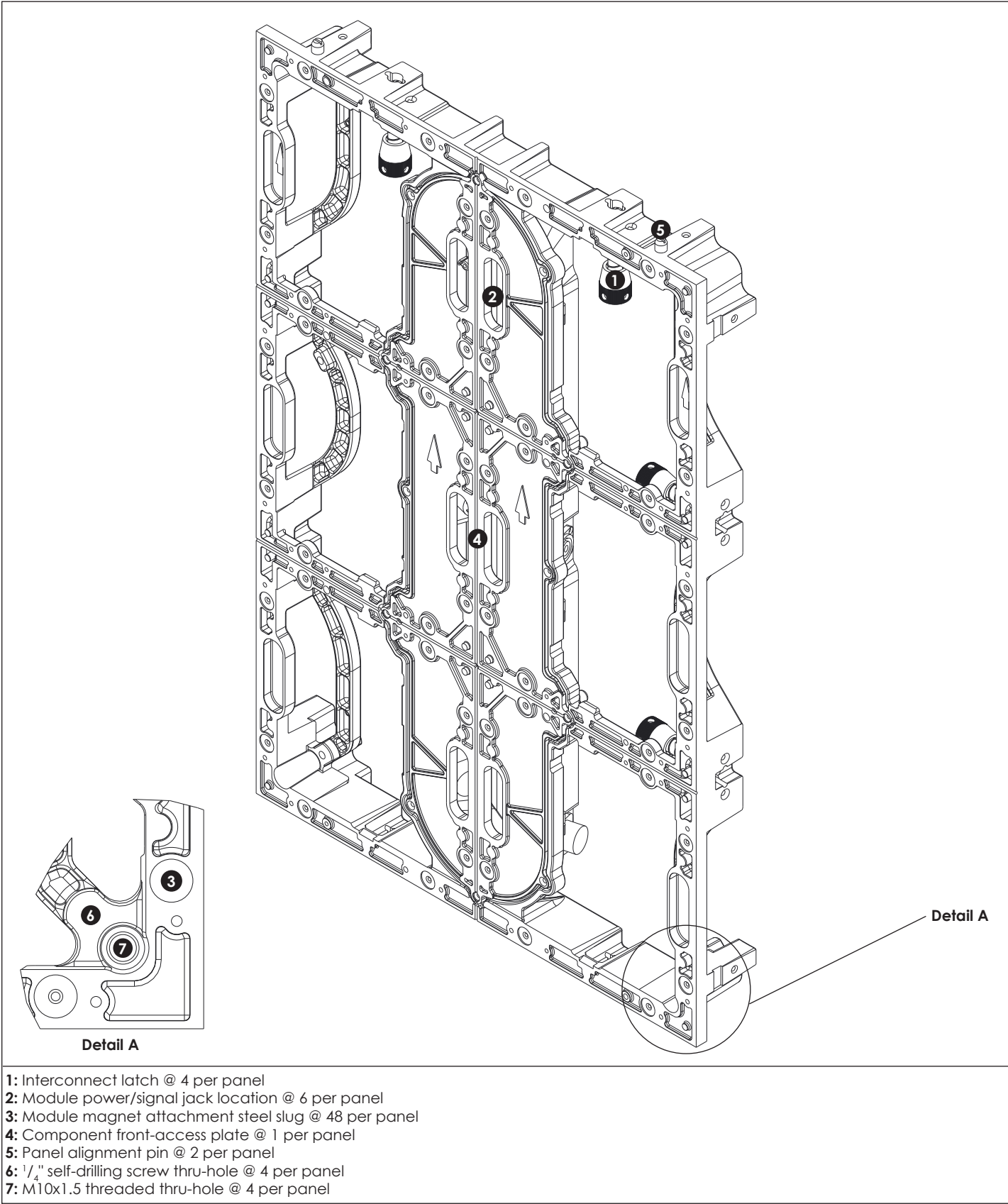


Figure 1: Display Panel (Rotated Front View)

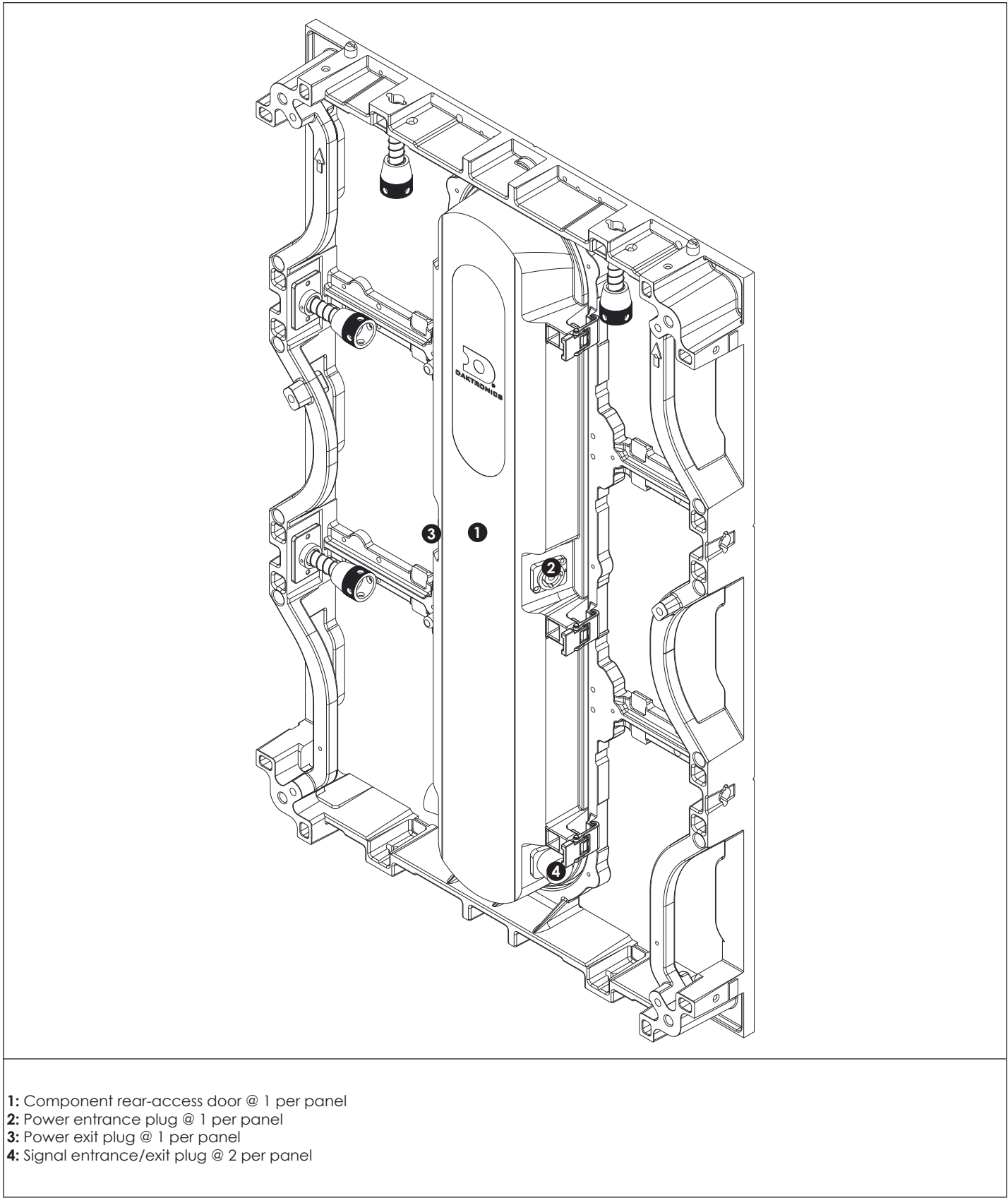


Figure 2: Display Panel (Rotated Rear View)

Figure 1 (rotated front view) and Figure 2 (rotated rear view) show the basic features of a typical DVN-3000 series display panel.

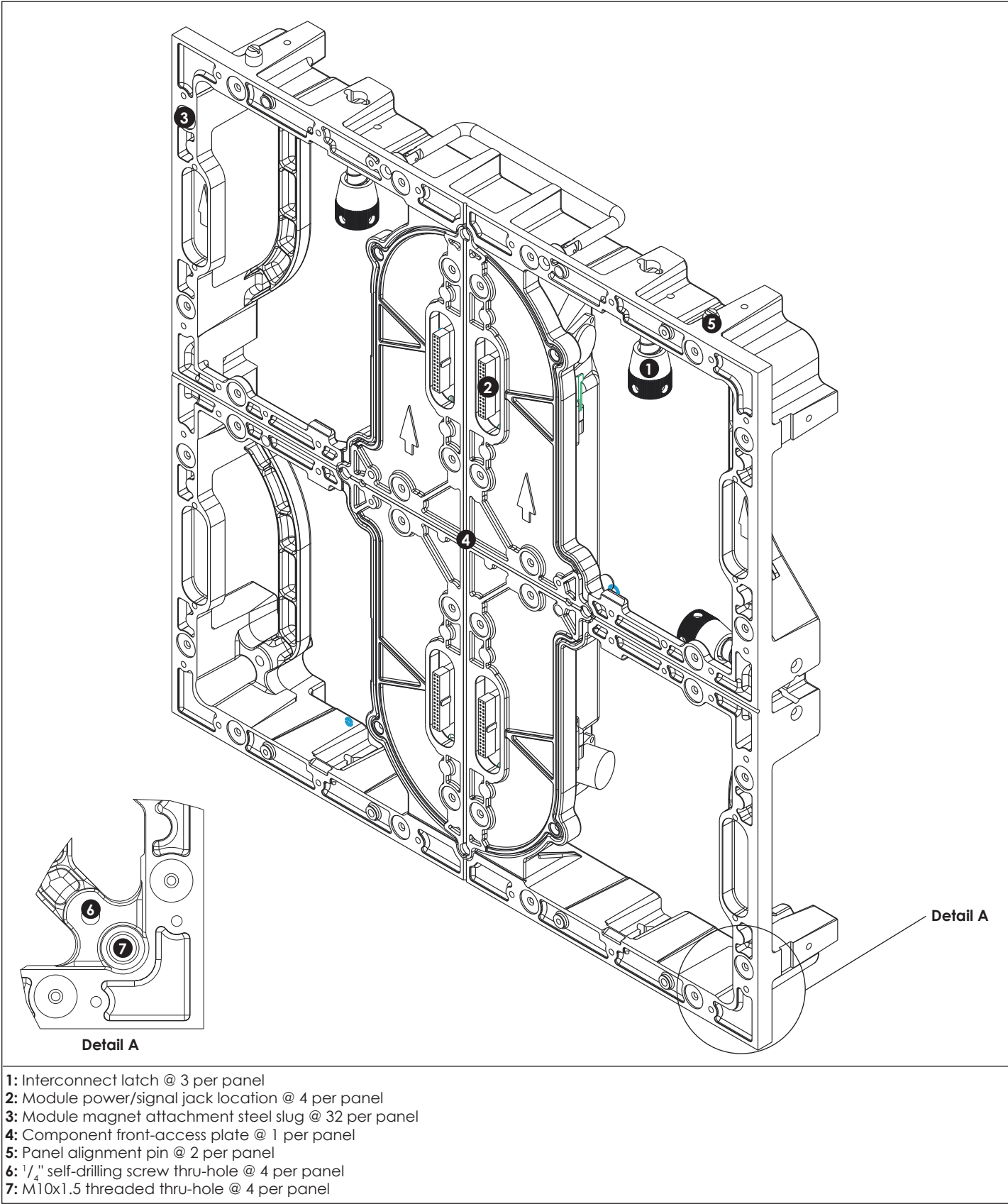


Figure 1: Display Panel (Rotated Front View)

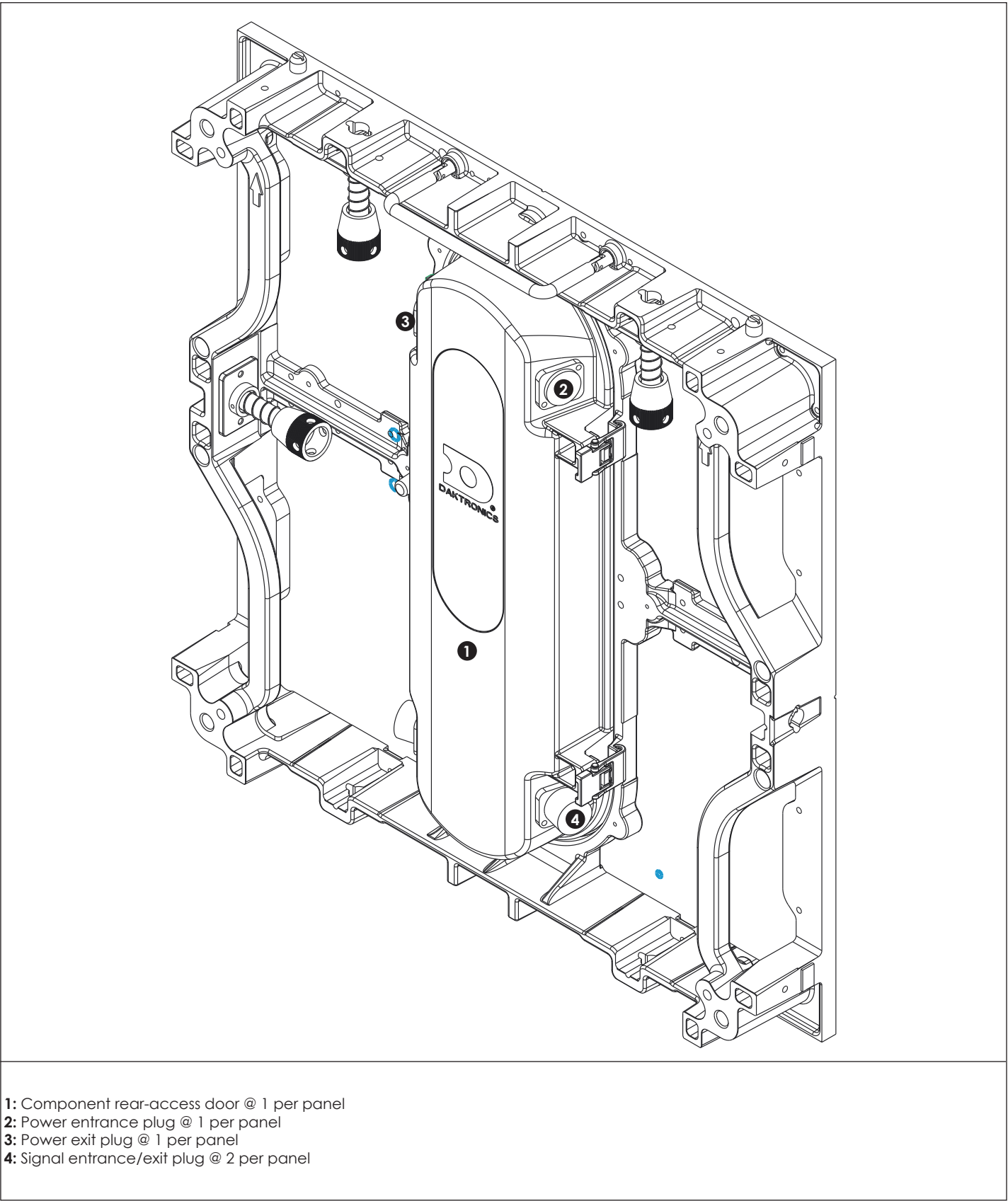


Figure 2: Display Panel (Rotated Rear View)

Mechanical

Panel Interconnect Engagement

1. Unscrew the knurled latch piece until the cross-pin catches and engages the interconnect hardware between the panels. Refer to **Figure 1**.
2. Push the cross-pin through to the next panel and turn the cross-pin a quarter turn in the opposite direction to align the panels. Rest the cross-pin in the machined indent.
3. Turn the knurled latch piece while holding the cross-pin in place to hand-tighten the latch.
4. Place a screwdriver or similar tool through two holes of the knurled latch piece to create a pry bar. Tighten the latch piece with this pry function until tight but before the pry tool starts to deflect.
5. Check the top-to-bottom panel alignment to ensure the panels are level.
6. Feel the top, bottom, and center of the seam to ensure the seam between the panels feels smooth, ensuring proper panel alignment.
7. Clamp the panels together with two C-clamps (if necessary), one at the top and one at the bottom. Refer to **Figure 2**.

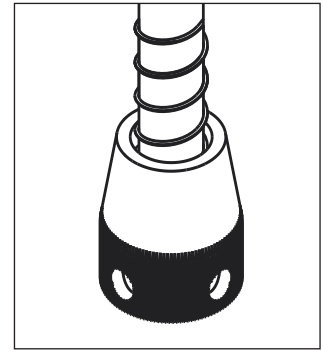


Figure 1: Knurled Latch Piece

Self-Drilling Screw Installation

Use the contract-specific Shop Drawing to determine self-drilling screw quantities and locations per panel.

If standard $\frac{1}{4}$ "-14 screws are being used, use a pilot hole size of $\frac{13}{64}$ " [5.16 mm]. If alternative screws are being used, find the correct pilot hole size per the hardware specified on the contract-specific Shop Drawing.

1. Mark the locations of the self-drilling screws and drill pilot holes at those locations if pilot holes do not already exist.
2. Start the attachment of the self-drilling screws in the pilot holes, but do not tighten the screws down.



Figure 2: Clamp Panels Together

Electrical

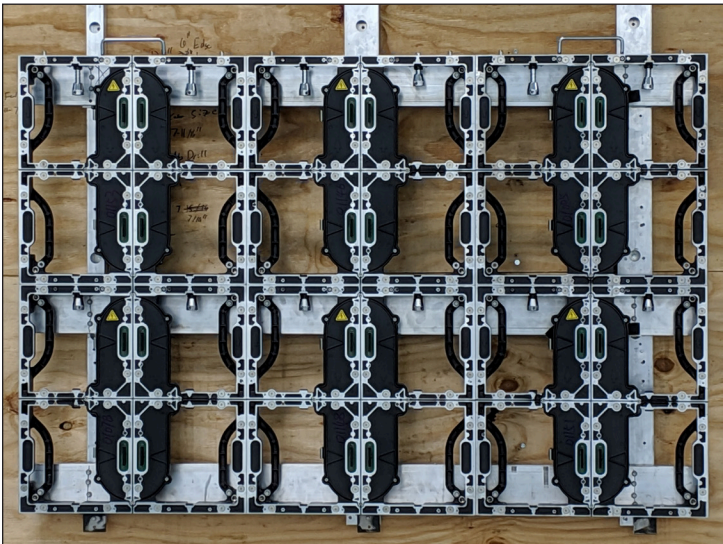


Figure 1: Standard Panel

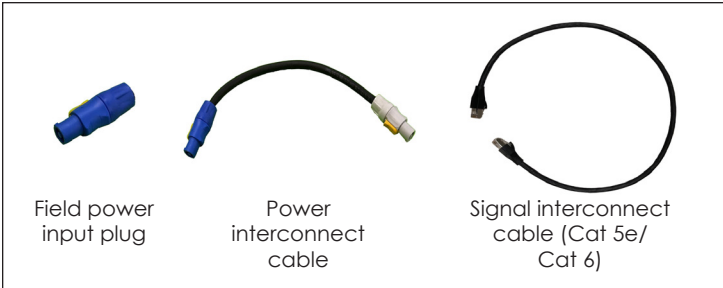


Figure 2: Accessories

Behind-the-Panel PLR Installation

Some display installations require PLR enclosures to be mounted behind the display. Refer to the contract-specific Riser Diagram for installation locations.

Endwall Display

For endwall displays, PLR enclosures must be installed before the modules and borders.

1. Slide the PLR enclosure behind the display per the Riser Diagram with the enclosure ~3" [76.2 mm] from the edge of the display to ensure proper wire relief. Refer to **Figure 3**. Power connectors should point toward the inside of the display.

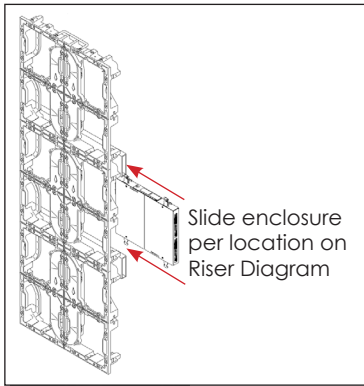


Figure 3: Slide PLR Enclosure behind Panel

2. Use the self-threading screws (HC-1186) to attach the PLR enclosure to the horizontal mounting structure. It is recommended to leave 1/2" [12 mm] gap from the top of the enclosure to the bottom of the tube to provide clearance for removal. Refer to **Figure 4**.
3. Connect power and signal as specified on the Riser Diagram.

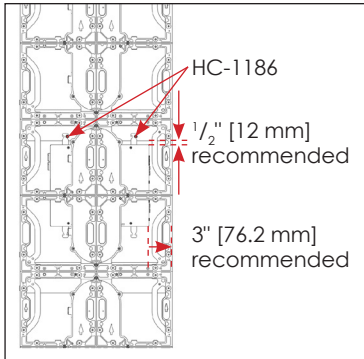


Figure 4: Attach PLR Enclosure to Horizontal Mounting Structure

Signal Connection

An external ProLink Router (PLR) enclosure is located within 100 m [328.08'] of the display. Signal routes to the display via Cat 5e/Cat 6 cables. The panels daisy-chain between sections per the contract-specific Riser Diagram.

1. Connect a Cat 5e/Cat 6 cable from the external PLR enclosure output jack to the RJ45 jack on the first panel rear door. Refer to the contract-specific Riser Diagram.
2. Route the Cat 5e/Cat 6 cable from the signal output jack to the signal input jack on the next panel. Refer to the Riser Diagram.
3. Connect the last panel back to the PLR enclosure for redundant signal connection if desired. Refer to the Riser Diagram.

Refer to **Figure 5** for an example of four panels connected together.

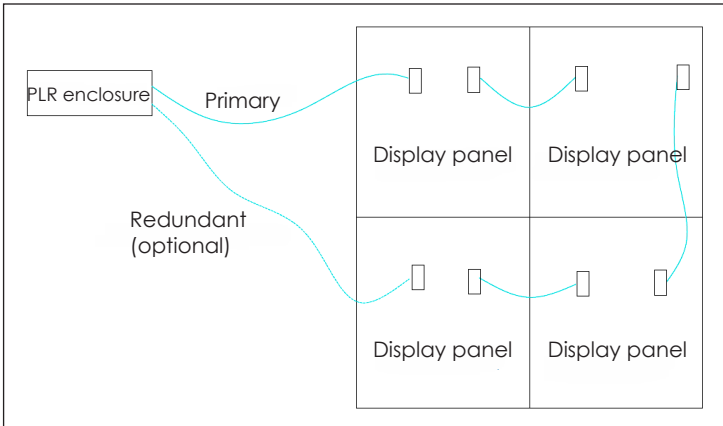


Figure 5: Connect Signal

Power Connection

Standard panels include power quick connects with pre-terminated connectors at each end.

Power interconnect cables are shipped with the displays. A new field power input cable is required for every 11 panels. Refer to the contract-specific Riser Diagram for more details.

The main field power input plug (Daktronics part number P-1235) is provided. Both vertical and horizontal interconnects are available. A typical horizontal solution is depicted in **Figure 6**.

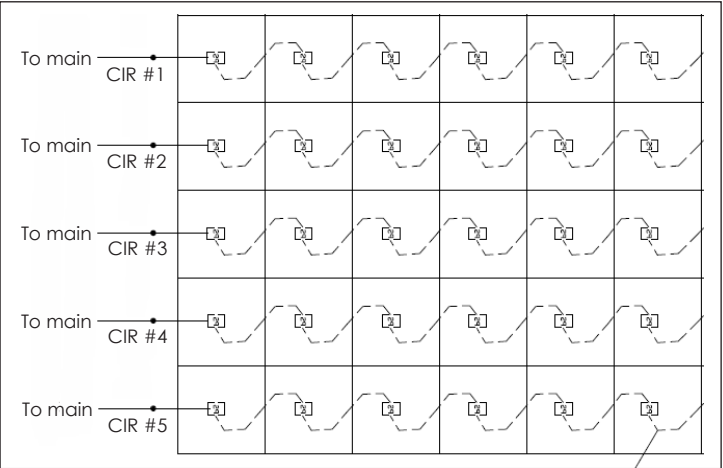


Figure 6: Horizontal Power Connection

For displays with a 1x4 horizontal tube substructure, vertical power connections are only acceptable at the ends of the display. Tuck the power cable between the chamfer and the wall. Refer to **Figure 7** and **Figure 8**.

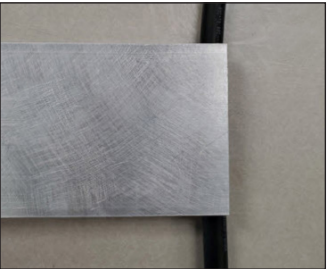


Figure 7: Vertical Power Connection

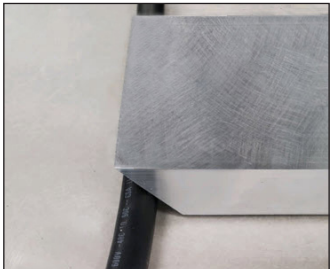


Figure 8: Vertical Power Connection

Module Installation

Panels have four modules as shown in **Figure 9**.

1. Disconnect power to the display.
2. Align the connector on the rear of the module with the corresponding connector on the panel.
3. Place the module into position and gently snap it into place.

Follow the front-access and rear-access module removal steps in the **DVN-3000 Series Service Quick Guide (DD4732368)** to remove a module.

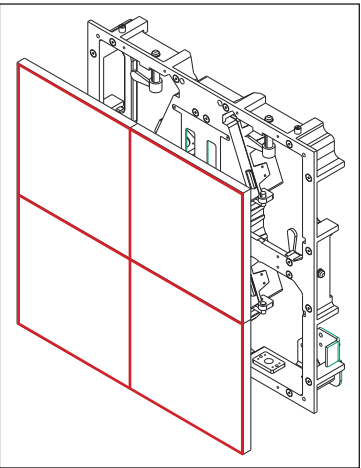


Figure 9: Modules on Panel

Tools

Part	Part Description
Cordless screw gun with 3 mm hex bit	Attaches borders to panel
Flat-head bit or screwdriver	Removes top alignment pins

Part Identification

There are four different border sizes for the DVN-3000 display series: two-, three-, four-, and six-module-long borders. Borders can be identified by their size. Each border requires a border spacer, which can be identified by either the size or the etched part number on the spacer. Refer to the tables below for part information. Border depth is determined by the mounting structure solution.

		Mounting Solution				
		1x4 Horizontal Tube	2x4 Horizontal Tube	1" Vertical Tube	3" Vertical Tube	Horizontal Wall Angle
Border Spacer	6-Long	0M-4086533	0M-4244863	0M-4617171	0M-4244844	0M-4244844
	4-Long	0M-4086529	0M-4244861	0M-4617169	0M-4244842	0M-4244842
	3-Long	0M-4086527	0M-4244859	0M-4617167	0M-4244840	0M-4244840
	2-Long	0M-4086525	0M-4244857	0M-4617165	0M-4244838	0M-4244838
Border	6-Long	0M-4086551	0M-4244871	0M-4624694	0M-4244852	0M-4244852
	4-Long	0M-4086547	0M-4244869	0M-4624692	0M-4244850	0M-4244850
	3-Long	0M-4086545	0M-4244867	0M-4624690	0M-4244848	0M-4244848
	2-Long	0M-4086543	0M-4244865	0M-4624688	0M-4244846	0M-4244846

Border Installation

Borders are attached either before the display is mounted to the structure or after if site conditions allow for tool clearance around the mounted display. If borders must be installed before the sections, only one-panel-long (two or three modules, depending on panel) borders are available. Longer borders must be installed after the display sections are mounted to the structure.

1. Remove the top alignment pins from the top row of panels. Refer to **Figure 1**.
2. Select the correct border size per the contract-specific Shop Drawing.
3. Use a clean rag to wipe off the perimeter of the panel receiving the border.
4. Bring the border spacer and border into position with the rectangular cutout on the border spacer oriented so it is closer to the face of the display than to the slot and the side alignment tab sitting in the rectangular cutout. Refer to **Figure 2**. The border countersinks are centered about the border display depth, so they can be oriented any way. Ensure the countersink is exposed for installation.

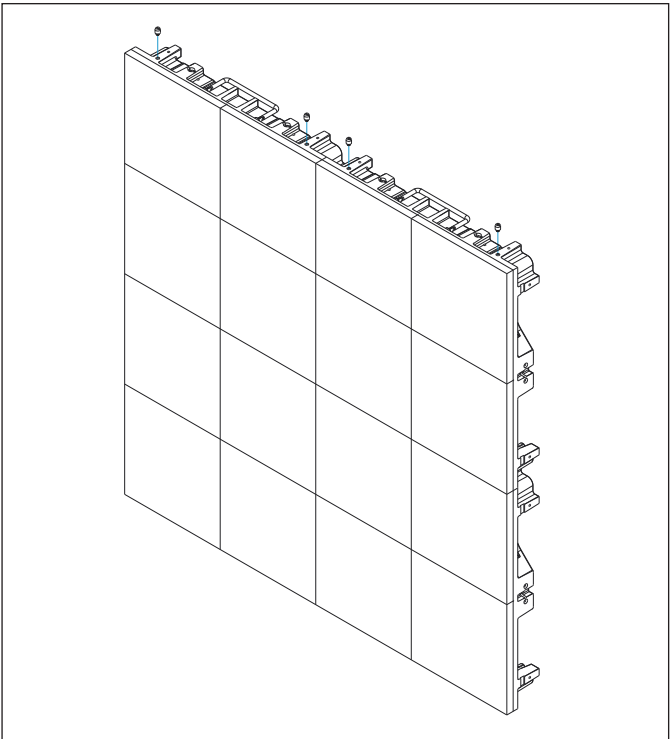


Figure 1: Remove Top Alignment Pins

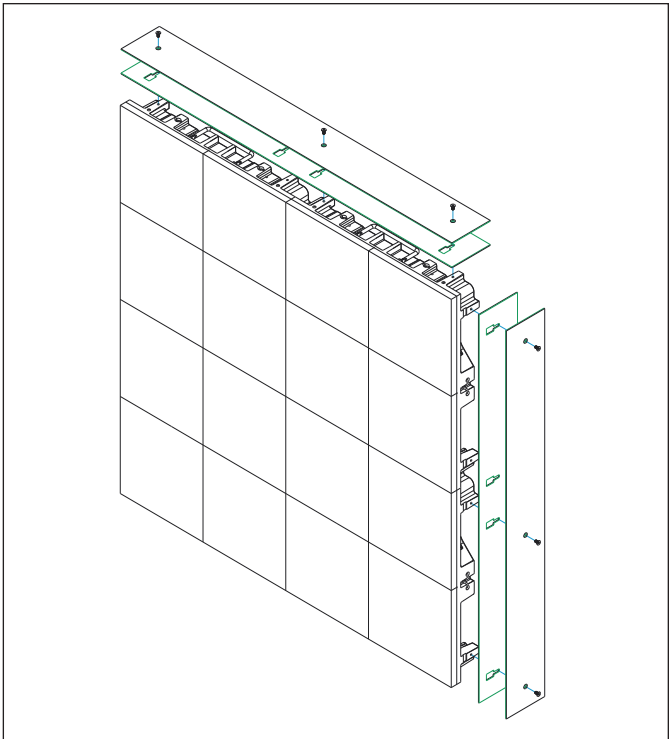


Figure 2: Bring Border Spacer & Border into Position

5. Adjust the border spacer back to the wall by 1/2" (if necessary) to fill any gaps created while adjusting the display with shims and jacking hardware. Refer to **Figure 3**.

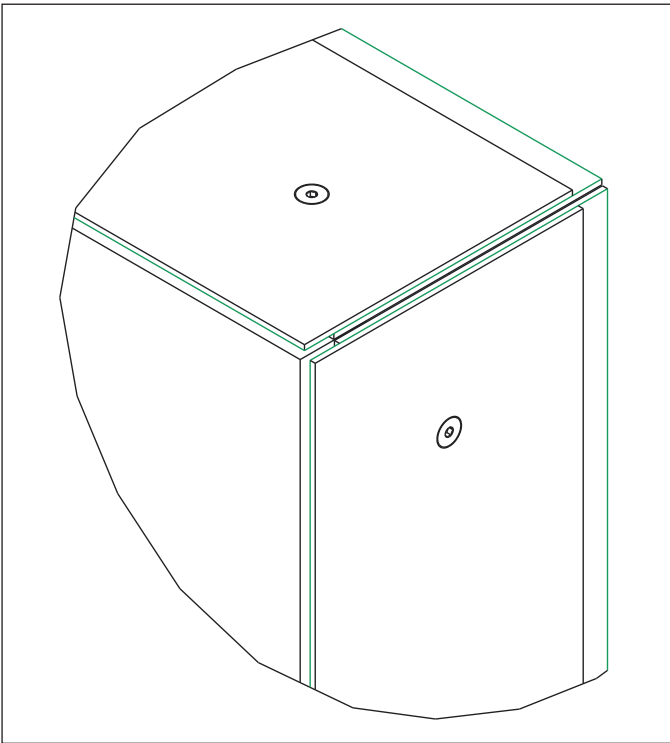


Figure 3: Adjust Border Spacer

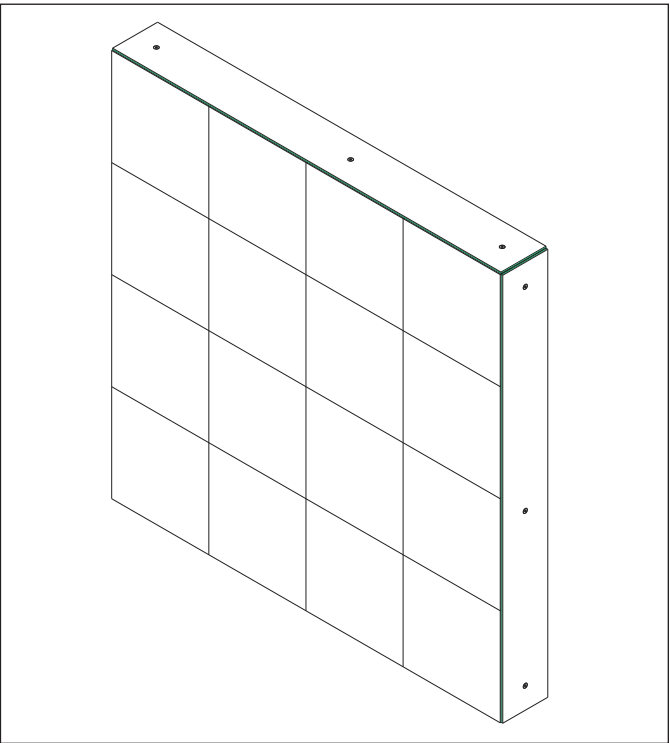


Figure 4: Fasten Border to Panel

6. Use a 3 mm hex bit to attach the M5-0.8 x 10 mm machine screws (HC-4090079) and fasten the border to the panels in all pre-punched countersink hole locations on the borders. Each panel has threaded holes for borders on all four sides. Refer to **Figure 4** for the finished appearance.

Service

Display Access

Front-Access Display

1. Disconnect power to the display.
2. Remove the module. Refer to **Front-Access Module Removal (p.1)**.
3. Remove the front-access plate. Refer to **Front-Access Plate Removal (p.1)**.
4. Remove the component(s). Refer to **Power Supply Removal (p.1)** or **Hub Board/Receiver Card Removal (p.1)**.
5. Reverse the steps in **Front-Access Plate Removal (p.1)** to reinstall the front-access plate.
6. Complete the module installation steps in the **DVN-3000 Electrical Installation Quick Guide (DD4732380)** to reinstall the module.

Rear-Access Display

1. Disconnect power to the display.
2. Unlatch and open the rear-access door.
3. Remove the component(s). Refer to **Rear-Access Module Removal (p.1)**, **Power Supply Removal (p.1)** or **Hub Board/Receiver Card Removal (p.1)**.

Note: The Power Out cable may need to be removed prior to removing the module from the panel.

4. Close and latch the rear-access door.

Component Access

Front-Access Module Removal

Note: Refrain from attaching the module removal tool to any highly magnetic objects, as it is difficult to disengage the tool from these objects.

1. Disconnect power to the display.
2. Turn the knob on the module removal tool clockwise to disengage the tool. Refer to **Figure 1**.



Figure 1: Module Removal Tool



Figure 2: Remove Module

3. Center the tool on the face of the module to be removed and turn the knob on the tool counterclockwise to engage the magnets. Refer to **Figure 2**.
4. Pull the module straight out until it disengages from the display face.

Rear-Access Module Removal

1. Disconnect power to the display.

Note: The module safety lanyard should already be attached. If not attached, replace as shown in **Figure 3**

2. Disengage the module from the panel:

For a module without a latch, hold on to the finger loops on the module and gently push the module straight out toward the display face.

For a module with a latch, pinch the two vertical actuating arms together to retract them. The module will still be magnetically attached to the panel. Hold on to the finger loops, retract the arms on the latch, and gently push the module straight out toward the display face.

3. Rotate the module and pull it through the opening in the panel. Refer to **Figure 4** and **Figure 5**.

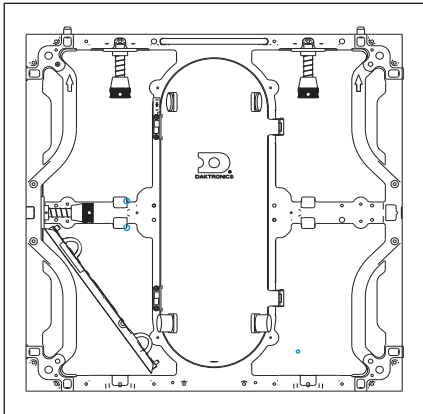


Figure 4: Pull Module through Opening

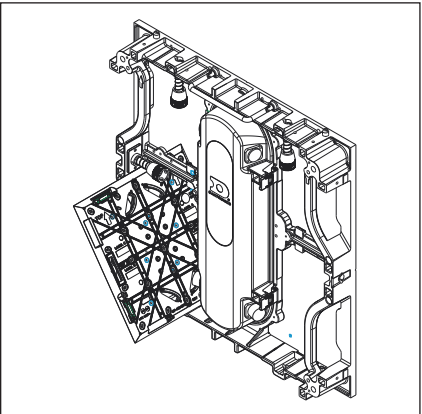


Figure 5: Pull Module through Opening

4. Detach the lanyard from the module removed.

Front-Access Plate Removal

1. Disconnect power to the display.
2. Use a Phillips screwdriver to loosen the eight screws securing the front-access plate to the panel. Refer to **Figure 6**.



Figure 3: Safety Lanyard

3. Pull the plate gently from the panel to expose the harnesses.
4. Disconnect the power supply from the hub board per **Step 4** in **Hub Board/Receiver Card Removal (p.1)**.

Reverse these steps to install a front-access plate.

Hub Board/Receiver Card Removal

1. Disconnect power to the display.

2. Remove the front-access plate on the panel to be serviced if the display is front-access. Refer to **Front-Access Plate Removal (p.1)**. If the display is rear-access, unlatch and open the rear-access door.

3. Disconnect the Cat 6 cables from the RJ45 jacks on the hub board. Refer to **Figure 7**.

4. Disconnect the power supply from the hub board. There are two ways to do this:

- Use a Phillips screwdriver to loosen the connections on the power supply and disconnect the cables extending from the board. Refer to **Figure 8**.
- Push in the positions on the spring-loaded terminal block and disconnect the cables extending from the board. Refer to **Figure 8**.

5. Use a 2 mm Allen tool to remove the screws securing the hub board to the front-access plate.

Reverse these steps to install a hub board.

Power Supply Removal

1. Disconnect power to the display.
2. Remove the front-access plate on the panel to be serviced if the display is front-access. Refer to **Front-Access Plate Removal (p.1)**. If the display is rear-access, unlatch and open the rear-access door.
3. Use a Phillips screwdriver to loosen and remove the power cables extending from the power supply.
4. Use a 3 mm Allen tool to remove the screws securing the power supply strap to the panel.

Reverse these steps to install a power supply.

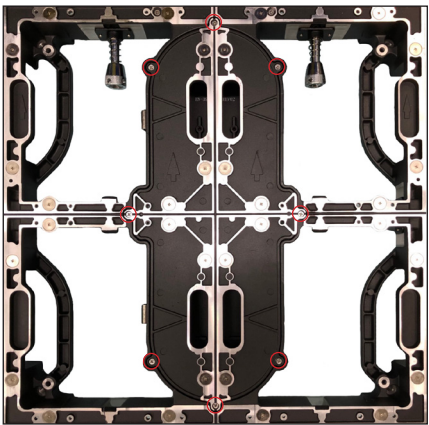


Figure 6: Loosen Eight Screws

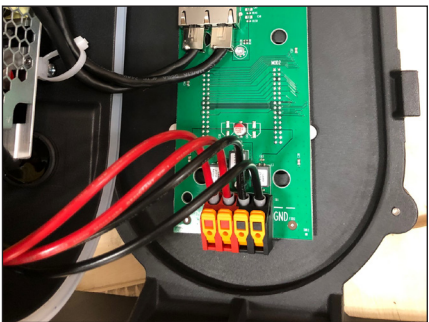


Figure 7: Disconnect Cat 6 Cables from RJ45 Jacks

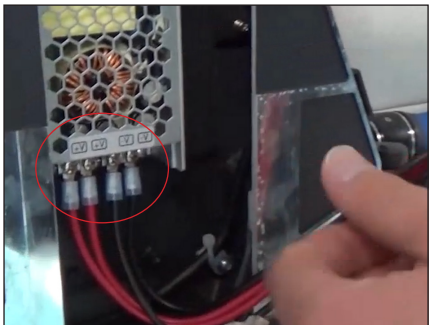


Figure 8: Disconnect Cables from Power Supply

There are two common substructures for DVN-3050: horizontal rolled tube and vertical tube.

Horizontal Rolled Tube

1. Verify the substructure is installed per the contract-specific Shop Drawing.
2. Verify the horizontal rolled tubes are level and plumb per the contract-specific Shop Drawing. Refer to **Figure 1** and **Figure 2**. If no tolerances are listed on the drawing, use $\pm 1/4"$ level and $\pm 1/4"$ plumb face (horizontal rolled tube) or $\pm 1/4"$ level and $\pm 1/4"$ plumb face (directly to horizontal tube).

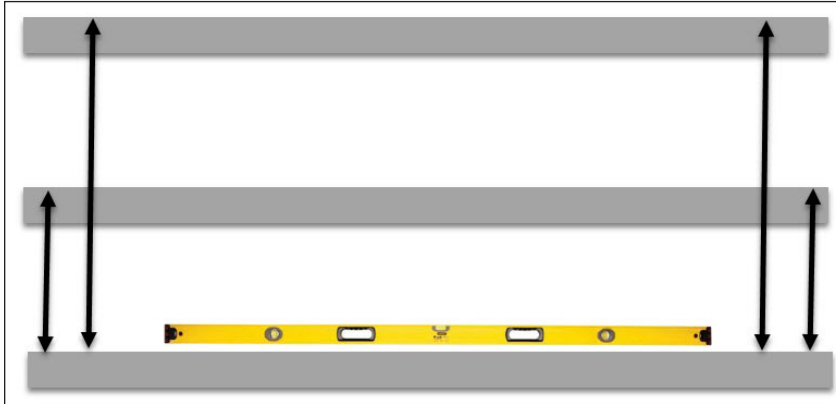


Figure 1: Verify Level Horizontal Rolled Tubes (Front View)

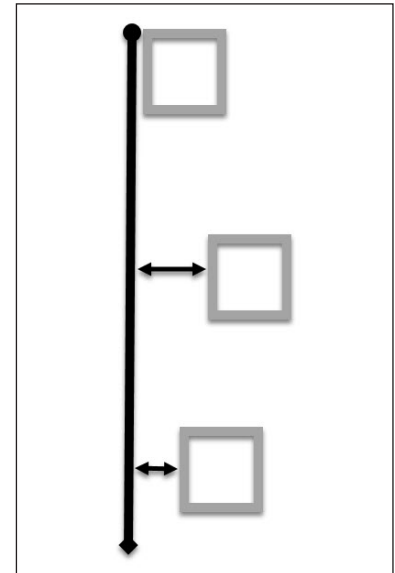


Figure 2: Verify Plumb Horizontal Rolled Tubes (Side View)

Vertical Tube

1. Verify the substructure is installed per the contract-specific Shop Drawing.
2. Verify the vertical tubes are level and plumb. Refer to **Figure 3**.



Figure 3: Verify Level & Plumb Vertical Tubes (Front View)

3. Use a jig or the measurements on the contract-specific Shop Drawing to verify the tube-to-tube distance. Refer to **Figure 4**. If no tolerances are listed on the drawing, use $\pm 1/4"$ in all directions.



Figure 4: Verify Tube-to-Tube Distance (Top View)

Concave

Refer to **Figure 1** (rotated front view) and **Figure 2** (rotated rear view) for the basic features of a typical DVN-3050 series concave display panel.

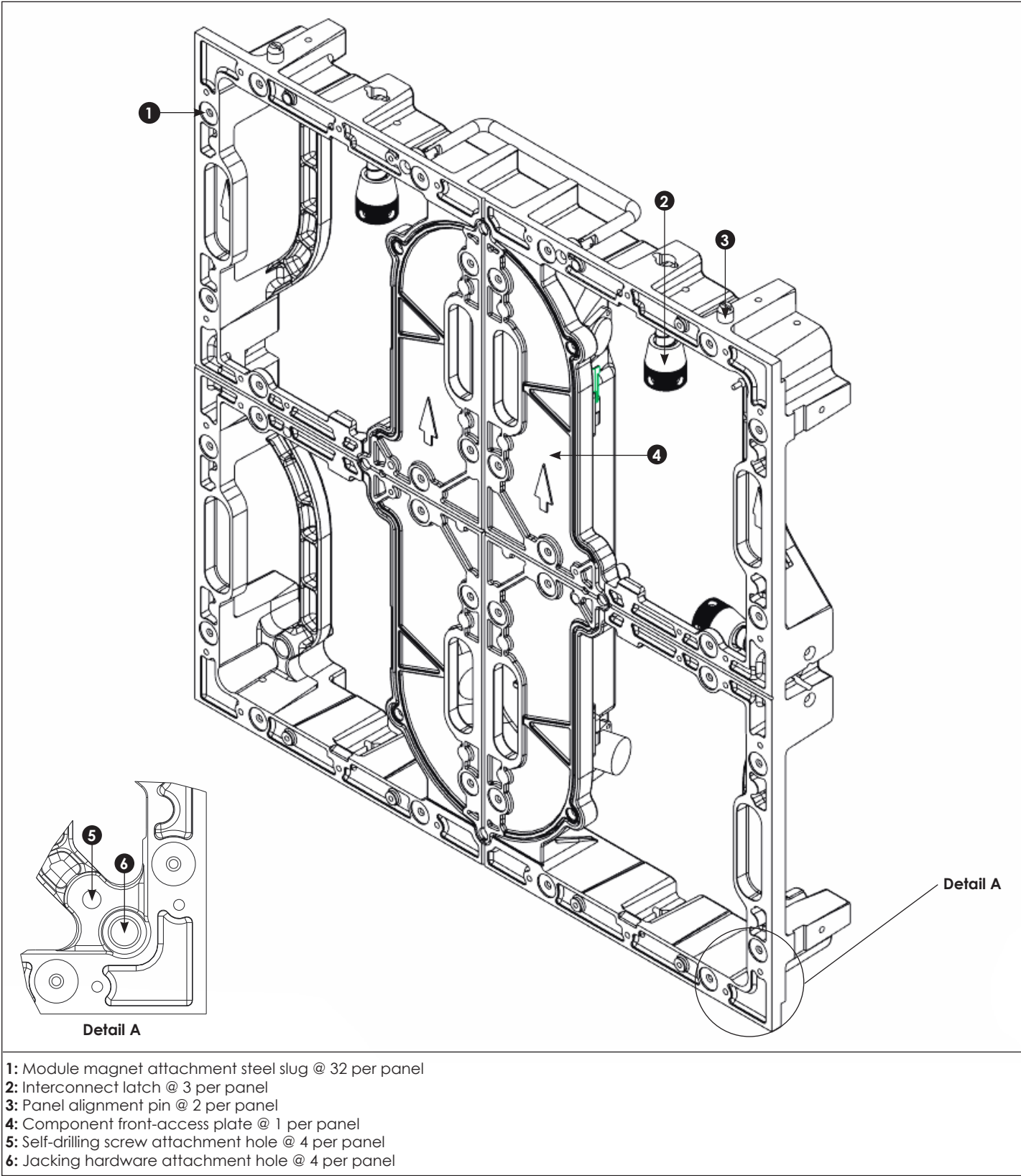


Figure 1: Concave Display Panel (Rotated Front View)

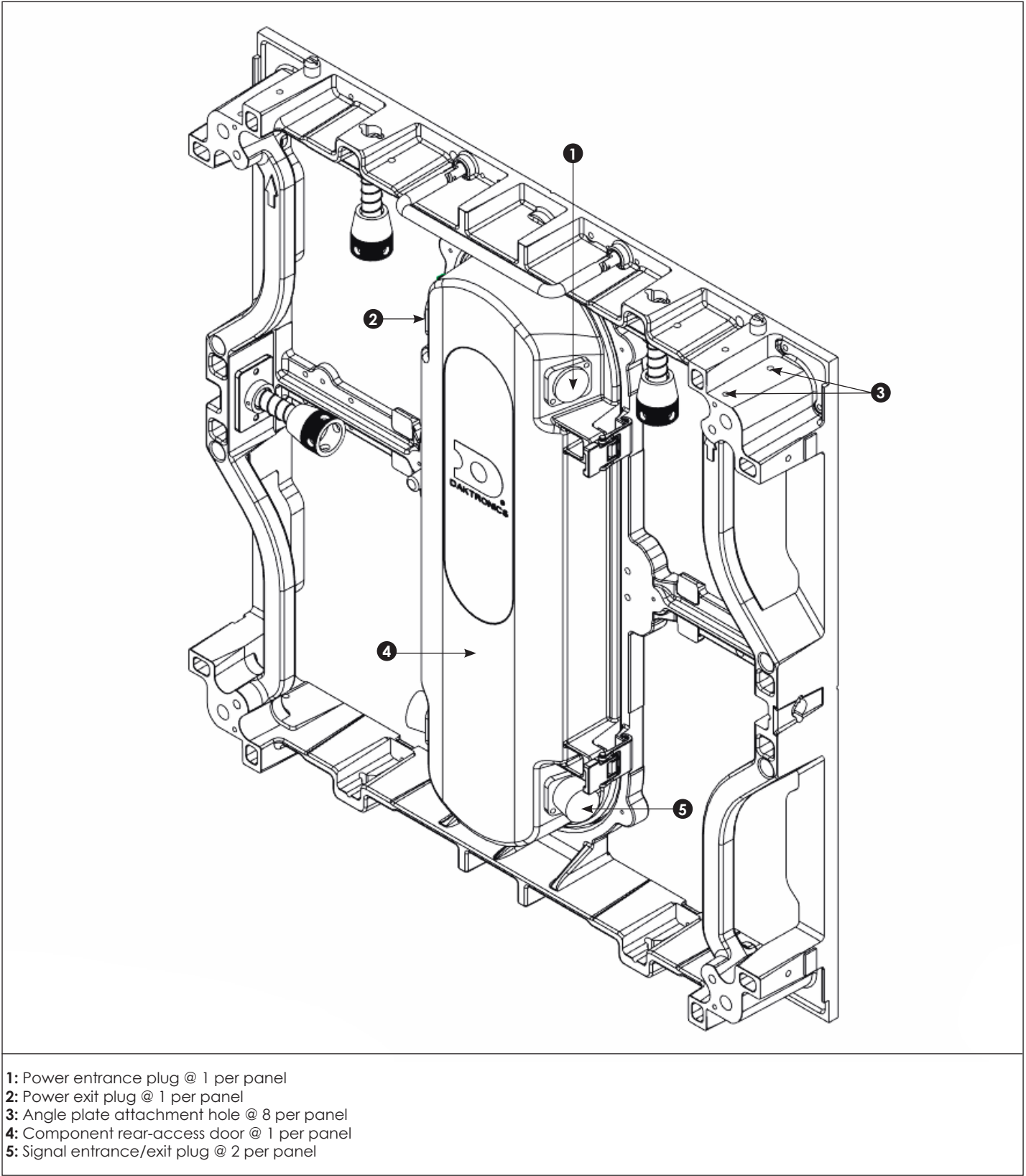


Figure 2: Concave Display Panel (Rotated Rear View)

Convex

Refer to **Figure 1** (rotated front view) and **Figure 2** (rotated rear view) show the basic features of a typical DVN-3050 series convex display panel.

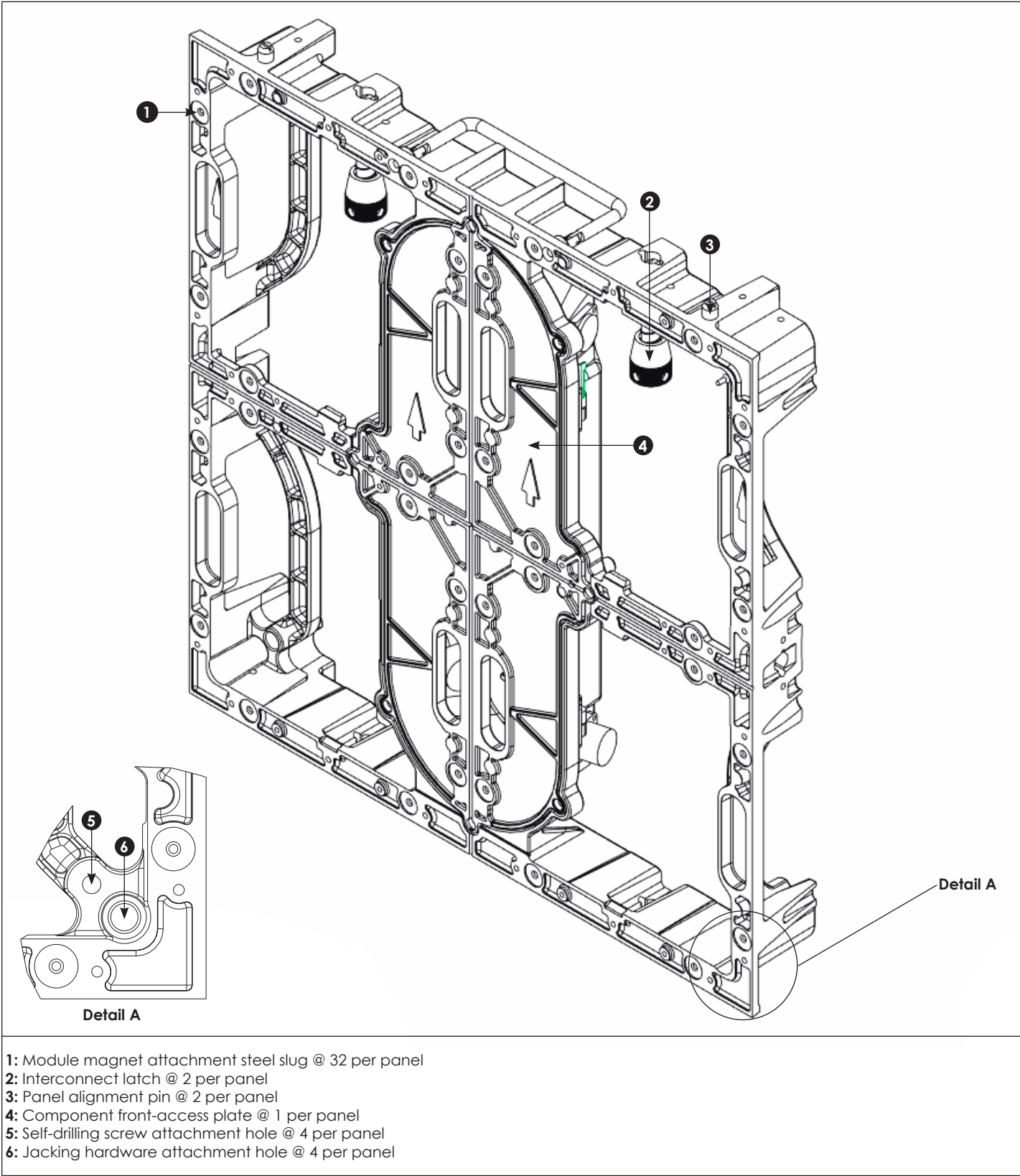


Figure 1: Convex Display Panel (Rotated Front View)

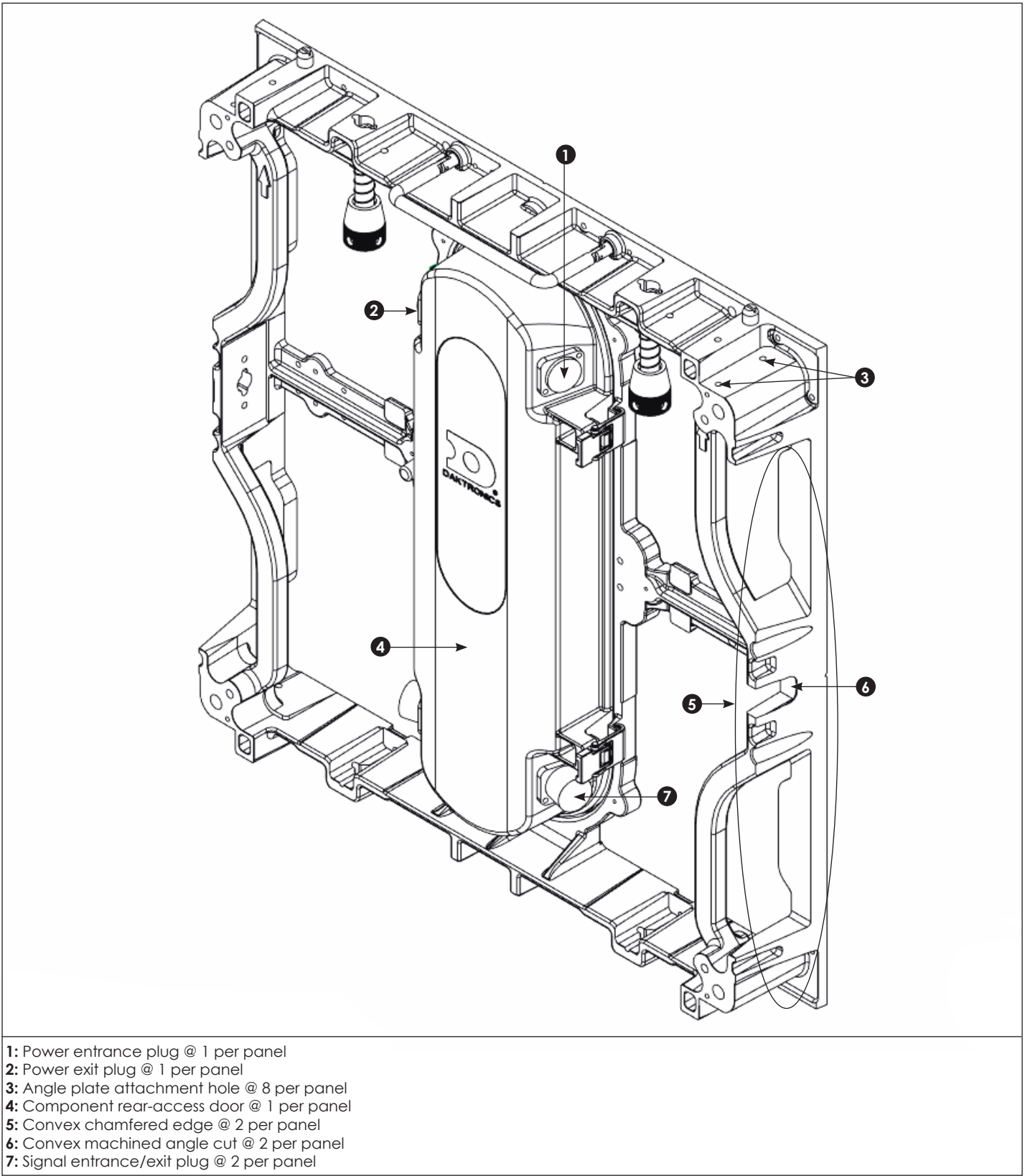


Figure 2: Convex Display Panel (Rotated Rear View)

Mechanical

There are two methods for display attachment: mounting clip-to-panel and panel-to-tube. These methods apply to both concave and convex displays. Refer to the contract-specific Shop Drawing for additional details.

Mounting Clip-to-Panel Attachment

Mounting clips attach to the rear of the panel with the supplied M10-1.5x30 mm hex-head bolts and washers. Refer to **Figure 1**. Clip quantity and location may differ by panel location. Refer to the contract-specific Shop Drawing for clip locations.

Panel-to-Tube Attachment

Panels provide holes to self-drill the tube and threads to jack the panel away from the tube by approximately 1/4" [6.35 mm] with an M10-1.5x35 mm socket-head bolt if Z-axis adjustment is needed. Refer to **Figure 2** and **Figure 3**.

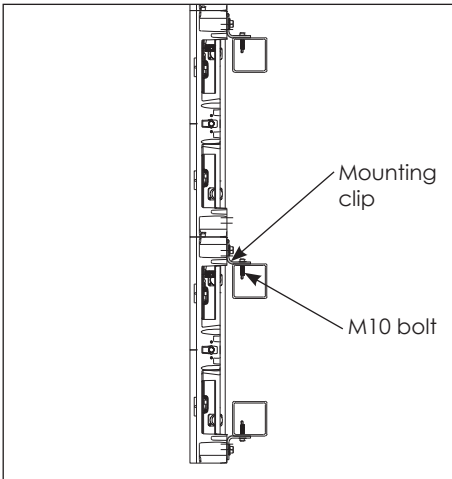


Figure 1: Attach Mounting Clips to Panel

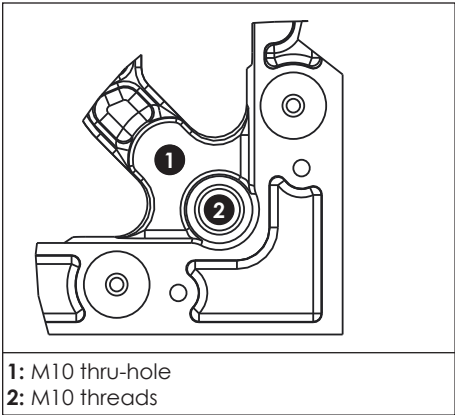


Figure 2: Mount Panel to Tube

These steps provide only a general overview of panel-to-tube attachment. Refer to **Panel Installation (p.1)** for more detailed instructions.

1. Insert one self-drilling screw and one M10-1.5x30 mm jacking bolt in the lower corners on each panel. Refer to **Figure 4**.
2. Insert one self-drilling screw and one M10-1.5x30 mm jacking bolt in the upper corners on each panel in the bottom row of panels only. Refer to **Figure 4**.

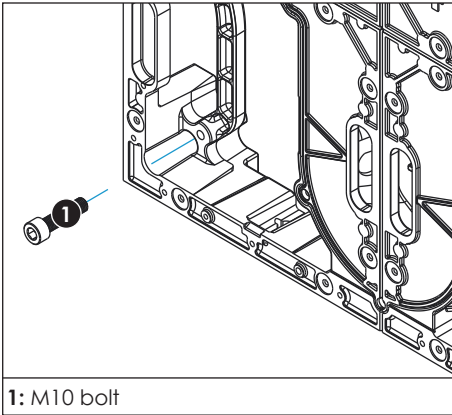


Figure 3: Adjust Z-Axis

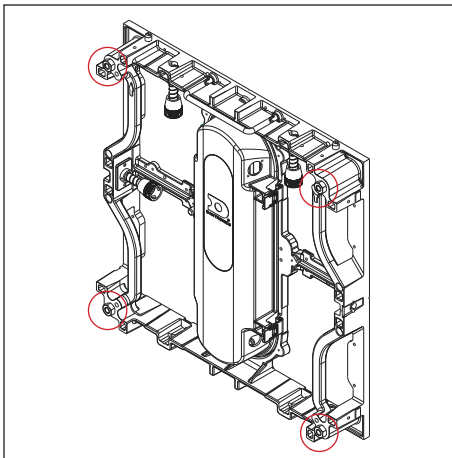


Figure 4: Attach Panel to Tube

Panel Installation

1. Start in the bottom-center of the display and position the first panel. Verify the location of the panel relative to the structure.
2. Adjust the panel until it is plumb and level. Refer to **Figure 5**.
3. Inspect the interconnect angle plates for burrs and use a file to remove any small burrs. Refer to **Figure 6**. Use four M5-0.8x10 mm hex-head screws per plate to install an interconnect angle plate on the top and bottom of the panels, leaving the screws finger-loose. Refer to **Figure 8**.

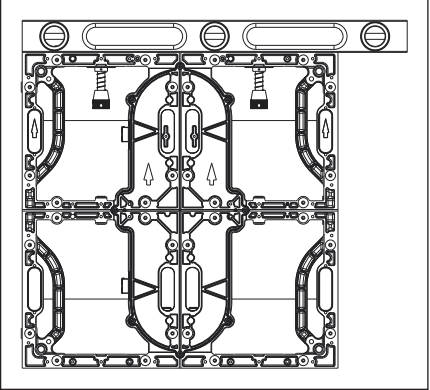


Figure 5: Install First Panel

The interconnect angle plates are designed to sit tight against the mating machined surface of the panel. Each plate is etched to show if it is for a concave "CC" or convex "CV" display. Refer to **Figure 6** and **Figure 7**.

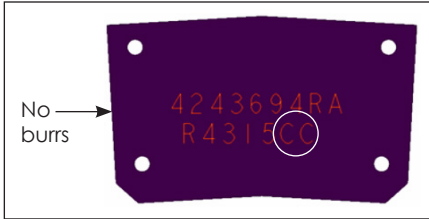


Figure 6: Interconnect Angle Plate

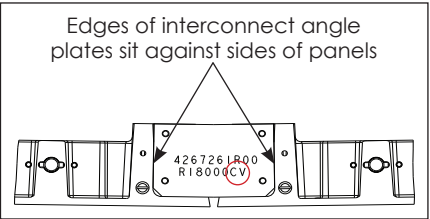


Figure 7: Install Interconnect Plates

Note: Bottom interconnect angle plates are only used on the first row.

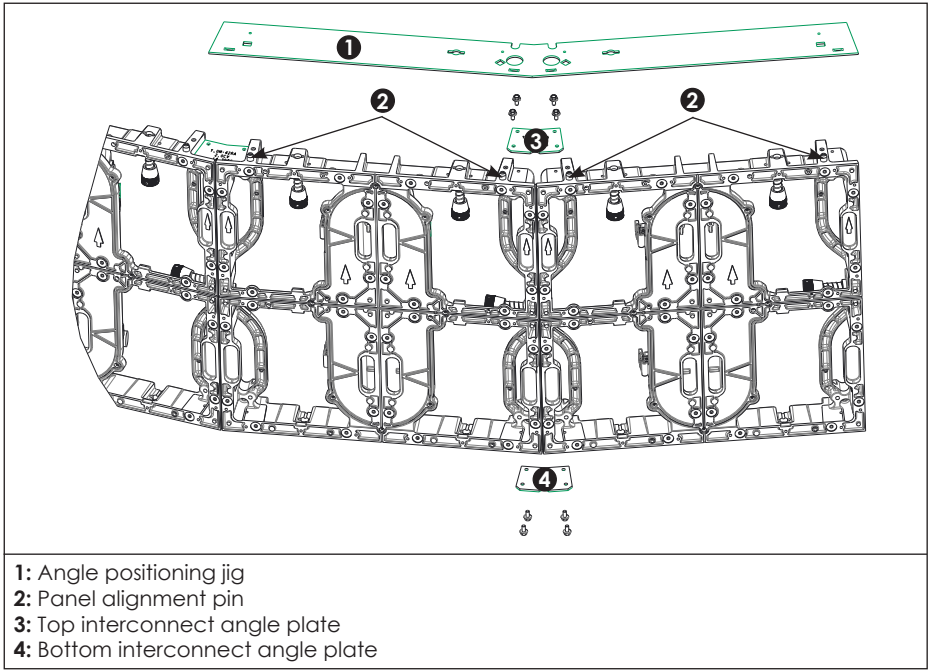


Figure 8: Install Interconnect Plates & Angle Positioning Jig

4. Install an angle positioning jig over the panel alignment pins on the panels. Refer to **Figure 8**.
5. Position the next panel beside the existing panel and then clamp the panels together. Refer to **Figure 9**.

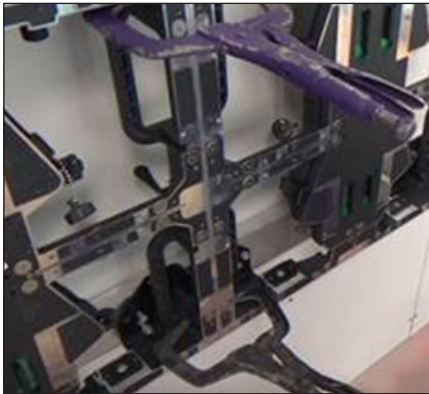


Figure 9: Clamp Panels Together

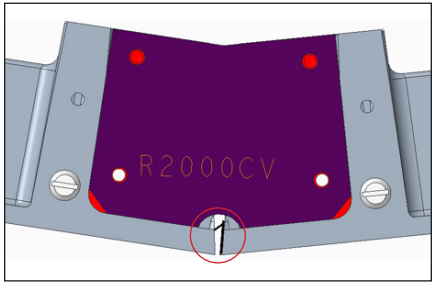


Figure 10: Vertical Gap

Note: It is normal for panels to have a vertical gap. Refer to **Figure 10**.

6. Tighten the M5-0.8x10 mm screws on the top and bottom interconnect angle plates while the angle positioning jig is in place and then remove the jig. Torque the screws to 55 in-lbs.

Note: The panel can rest on the bottom interconnect angle plate while the top screws are tightened.

7. Repeat **Steps 3-6** for the remaining panels in the row, building from the center out. Refer to **Figure 11** and **Figure 12**. Ensure each panel is level and plumb.

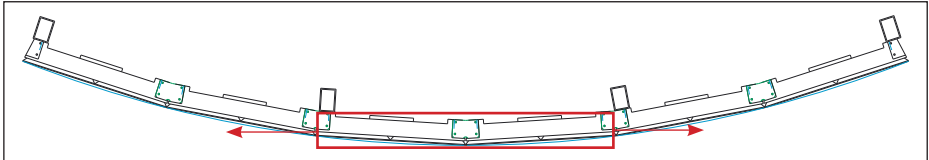


Figure 11: Install First Row of Panels (Top View)

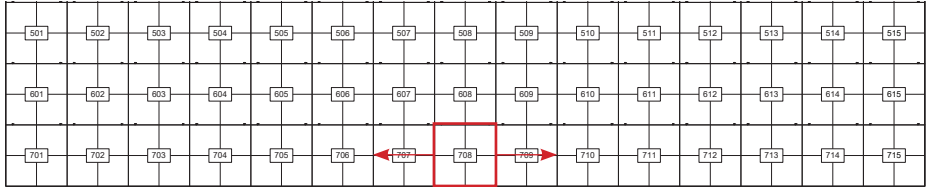


Figure 12: Install First Row of Panels (Front View)

8. Start on the next row after the first row is completed, working form the center out.

Note: After the first row, all subsequent rows only attach in the top mounting locations. Refer to **Figure 1**.

9. Continue attaching panels up to the top row.

Tools

Part	Part Description
Cordless screw gun with 1/8" Allen bit	Attaches borders to panel

Part Identification

Borders can be identified by their size. Each border requires a border spacer, which can be identified by either the size or the etched part number on the spacer.

There are four different border heights for the DVN-3050 1/4-module display series: two-, three-, four-, and six-module-high borders. Refer to the table below for part information.

Part Number	Part Description	Part Length
0M-4650491	Side border spacer, 2-high, DVN E1	N/A
0M-4650493	Side border spacer, 3-high, DVN E1	
0M-XXXXXXX	Top/bottom border spacer, radius-specific, 6-, 7- or 8-wide	
0M-4086543	Flat border, 2-wide, DVN E1	19.685" [500 mm]
0M-4086547	Flat border, 4-wide, DVN E1	39.370" [1000 mm]
0M-4086551	Flat border, 6-wide, DVN E1	59.055" [1500 mm]
0M-XXXXXXX	Top/bottom border, radius-specific, 6-, 7-, or 8-wide	N/A

There are also three different border widths for the DVN-3050 1/4-module display series: six-, seven-, and eight-module-wide borders. Refer to the contract-specific documentation for top/bottom border and border spacer part numbers

Border Installation

Borders are attached either before the display is mounted to the structure or after if site conditions allow for tool clearance around the mounted display. If borders must be installed before the sections, only one-panel-high (two or three modules, depending on panel) borders are available. Longer borders must be installed after the display sections are mounted to the structure. For top/bottom borders, only one-panel-wide (six, seven, or eight modules) borders are available.

1. Select the correct border size per the contract-specific Shop Drawing.
2. Use a clean rag to wipe off the perimeter of the panel receiving the border.

3. Bring the top border spacer and top border into position as shown in **Figure 1**. Use a 1/8" Allen wrench to install #10-32 machine screws (Daktronics part number HC-1484) through the border spacer and border into the pre-installed PEM nuts in the top/bottom members of the cabinet.

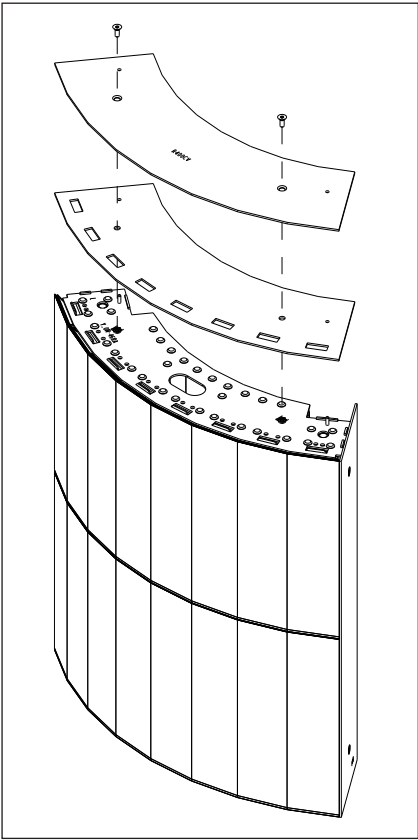


Figure 1: Bring Top Border Spacer & Top Border into Position

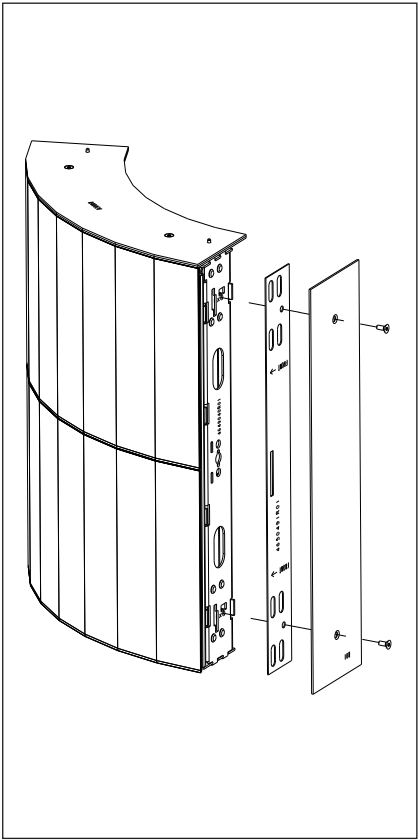


Figure 2: Bring Side Border Spacer & Side Border into Position

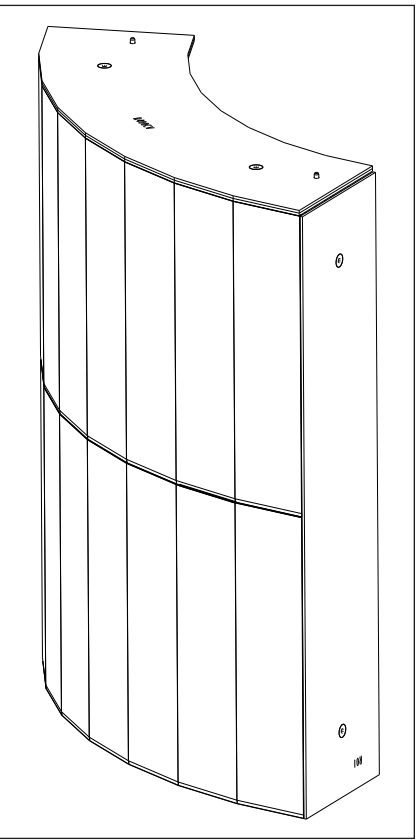


Figure 3: Top & Side Borders Attached to Panel

4. Bring the side border spacer and side border into position as shown in **Figure 2**. Insert #10-32 keps nuts (HC-1289) into the rectangular cutouts in the side members of the cabinet to line up the border with the border spacer mounting holes. Use a 1/8" Allen wrench to install the #10-32 machine screws (HC-1484) through the border spacer and border into the previously installed #10-32 keps nuts in the side of the cabinet.

Refer to **Figure 3** for the finished border appearance.

Tools

Part	Part Description
Cordless screw gun with 3 mm hex bit	Attaches borders to panel
Flat-head bit or screwdriver	Removes top alignment pins

Border Type

DVN-3050 has standard side borders and custom top/bottom borders.

Standard Side Borders

There are four standard side border sizes: two-, three-, four-, and six-module-long borders. Borders can be identified by size. Each border requires a border spacer, which can be identified by size or the etched part number on the spacer. Refer to the table below for part information.

Part Number	Part Description	Part Length
0M-4086525	Flat border spacer, 2-long	N/A
0M-4086527	Flat border spacer, 3-long	
0M-4086529	Flat border spacer, 4-long	
0M-4086533	Flat border spacer, 6-long	
0M-4086543	Flat border, 2-long	19.685" [500 mm]
0M-4086545	Flat border, 3-long	29.528" [750 mm]
0M-4086547	Flat border, 4-long	39.370" [1000 mm]
0M-4086551	Flat border, 6-long	59.055" [1500 mm]

Custom Top/Bottom Borders

There are three top/bottom border types: top-left/bottom-right, top-right/bottom-left, and middle. The top/bottom end borders have an etched identifier. Refer to **Figure 1**. Middle borders have no identifier. Refer to **Figure 2**.



Figure 1: Top/Bottom End Border



Figure 2: Top/Bottom Middle Border

Border Installation

Borders can be attached either before the display is mounted to the structure or after if site conditions allow for tool clearance around the mounted display. If borders must be installed before the sections are installed (i.e. recessed wall applications), only one-panel-long (two or three modules, depending on panel) borders are available. Longer borders must be installed after the display sections are mounted to the structure.

1. Remove the top alignment pins from the top row of panels. Refer to **Figure 3**.
2. Select the correct border size per the contract-specific Shop Drawing.
3. Use a clean rag to wipe off the perimeter of the panel receiving the border.
4. Install an adapter plate (if necessary). Only convex displays require adapter plates. Refer to **Adapter Plate Installation (p.1)**.
5. Bring the border spacer and border into position: the arrows on both pointing toward the face of the display, the rectangular cutout on the border spacer oriented so it is closer to the face of the display than to the slot, and the side alignment tab sitting in the rectangular cutout. The border countersinks are centered about the border display depth and can be oriented any direction. Ensure the countersink is exposed for installation. Refer to **Figure 4** and **Figure 5**.

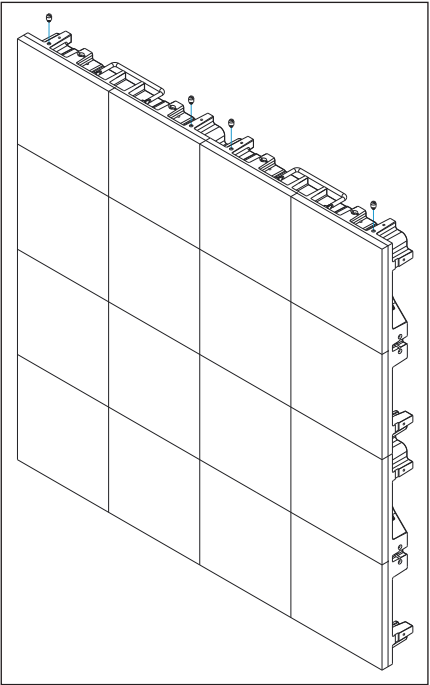


Figure 3: Remove Top Alignment Pins

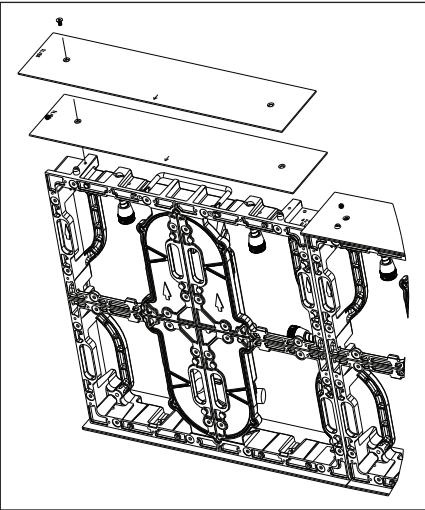


Figure 4: Top/Bottom Border Spacer & Border

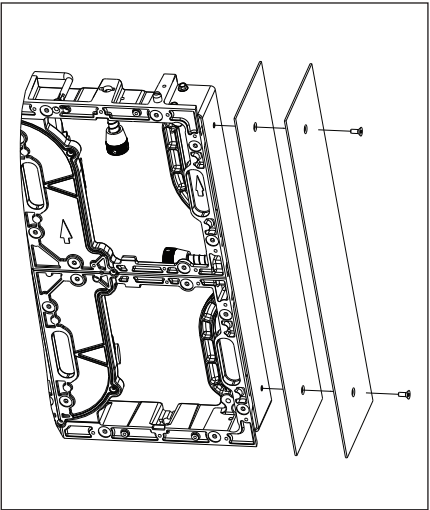


Figure 5: Side Border Spacer & Border

6. Adjust the border spacer back to the wall by up to 1/2" (if necessary) to fill any gaps that were created while adjusting the display with shims and jacking hardware. Refer to **Figure 6**.

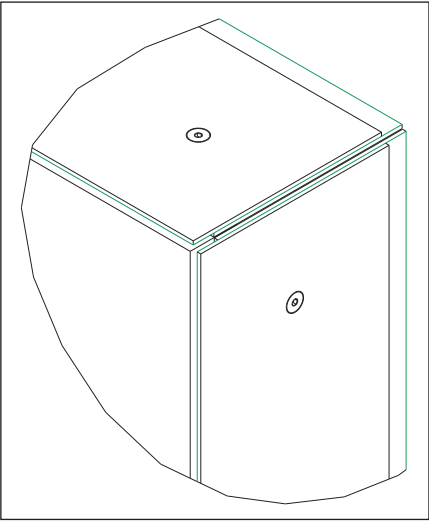


Figure 6: Adjust Border Spacer

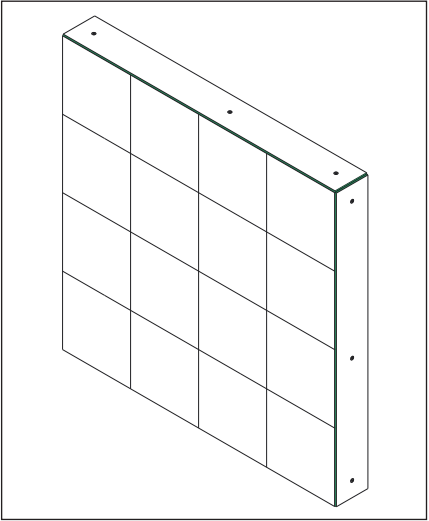


Figure 7: Fasten Border to Panel

7. Use two M5-0.8 x 10 mm flat-head screws (HC-4090079) for top/bottom borders or two #10-24 x 0.500" flat-head socket drive screws (HC-1484) for side borders to fasten the border to the panels in all pre-punched countersink hole locations on the borders. Refer to **Figure 4** and **Figure 5**. Each panel has threaded holes for borders on all four sides. Refer to **Figure 7** for the finished appearance.

Adapter Plate Installation

Because of the chamfered edges, convex displays require an adapter plate on the left side of the first column and the right side of the last column of panels.

1. Bring the adapter plate into position flush with the rear of the panel and with the notch on the plate pointing toward the front.
2. Use four M5-0.8 x 10 mm hex-head serrated flange screws (HC-4176652) to attach the adapter plate. Refer to **Figure 8**. Torque to 55 in-lbs.

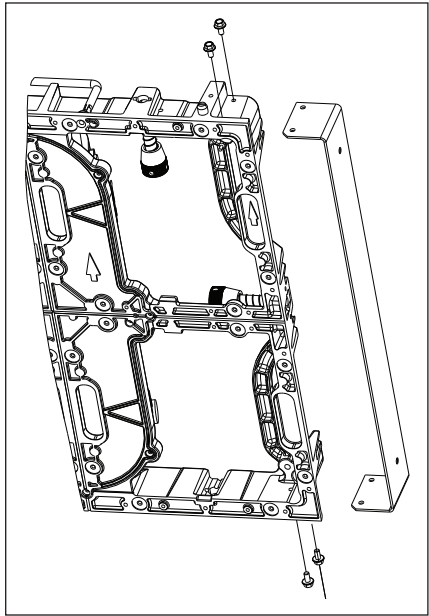


Figure 8: Attach Adapter Plate

Figure 1 (rotated front view) and Figure 2 (rotated rear view) show the basic features of a typical DVN-3050 series quarter-module display panel.

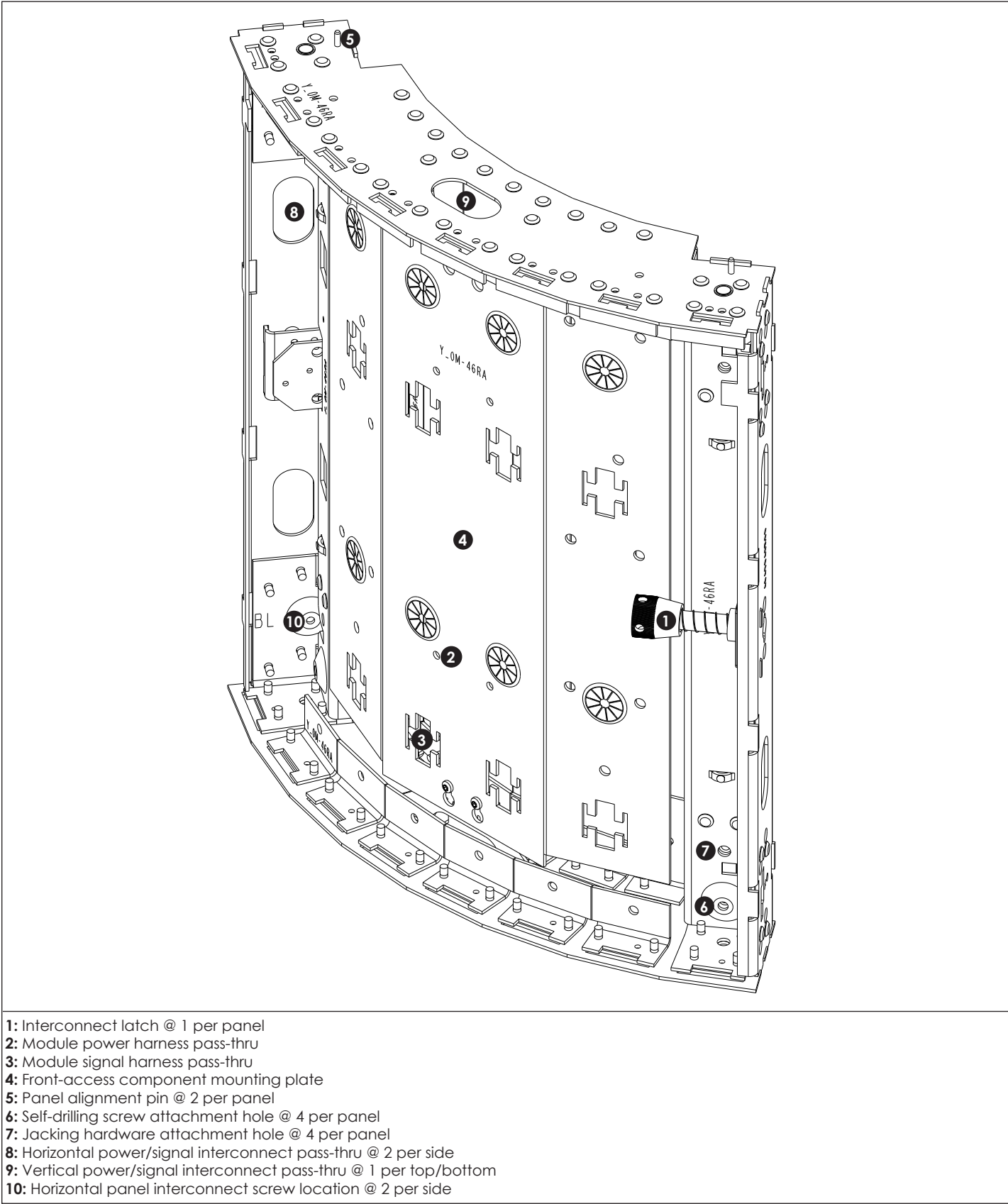


Figure 1: Display Panel (Rotated Front View)

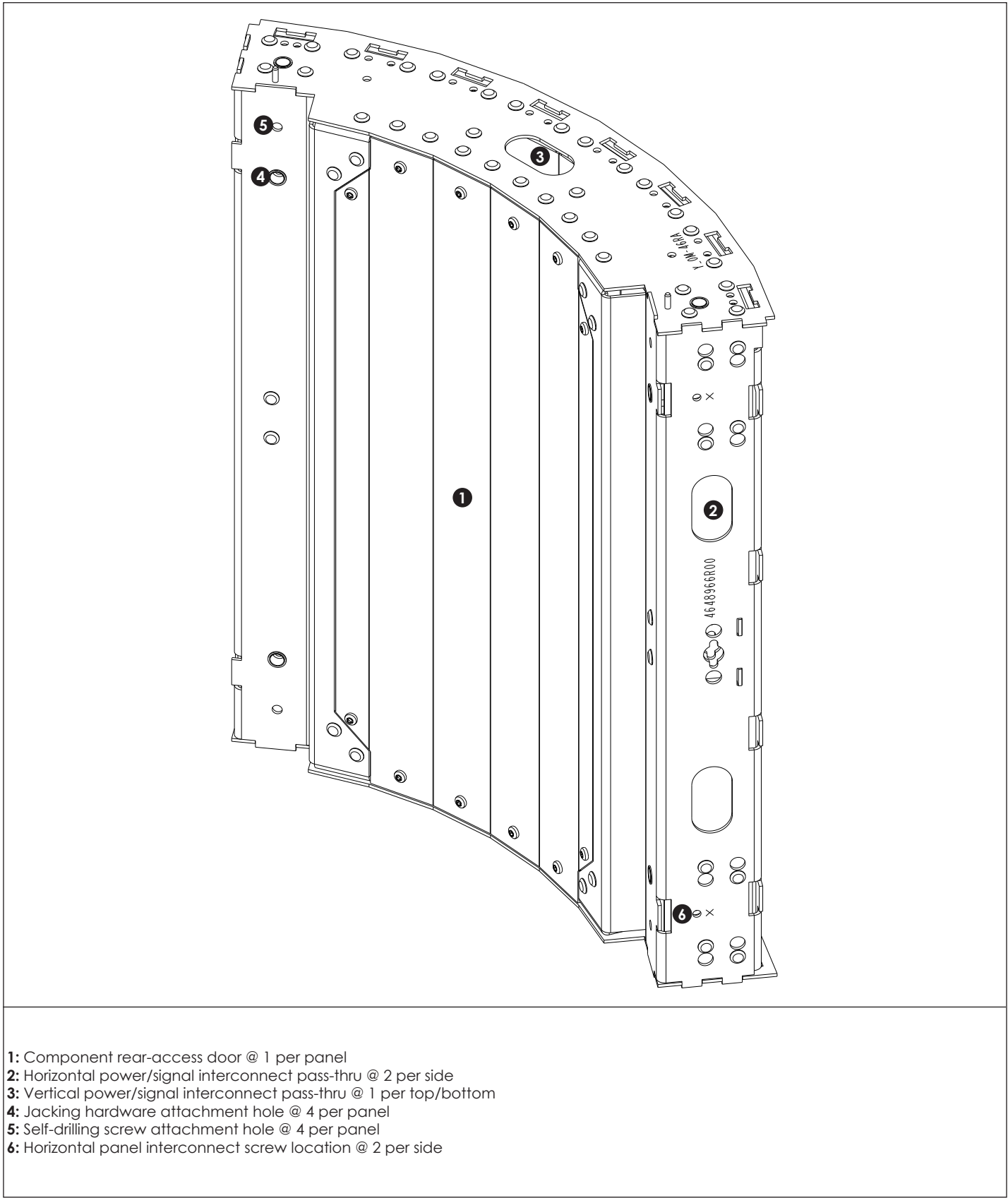


Figure 2: Display Panel (Rotated Rear View)

Mechanical

Panel-to-Tube Attachment

Panels provide holes to self-drill the tube and threads to jack the panel away from the tube by approximately 1/4" [6.35 mm] with an M6 screw if Z-axis adjustment is needed.

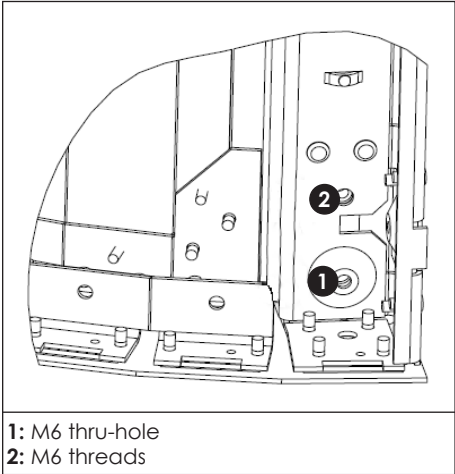


Figure 1: Mount Panel to Tube

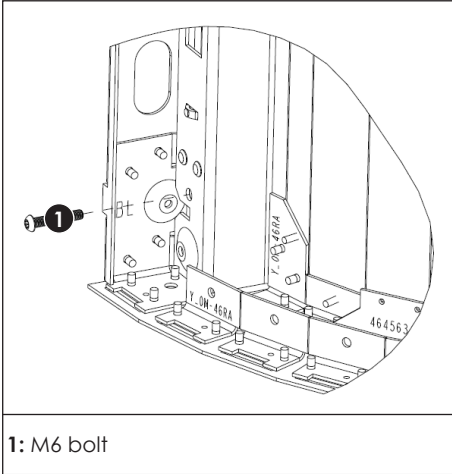


Figure 2: Adjust Z-Axis

These steps provide only a general overview of panel-to-tube attachment. Refer to **Panel Installation (p.1)** for more detailed instructions.

1. Insert one self-drilling screw and one M6 jacking bolt into the four corners of the panel. Refer to **Figure 3**.

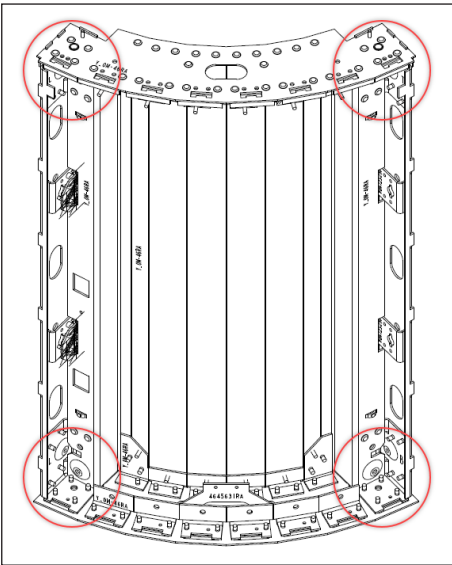


Figure 3: Attach Panel to Tube

Panel Installation

Note: Use a level through this section to verify each panel is level in the X and Y directions.

1. Start the first panel (with the module columns removed) at the bottom-center of the curved portion of the display. Refer to **Figure 4**. Use a straight edge to position the panel so the bottom is flush with the bottom of the tube and does not hang below the bottom of the tube by more than 1/4" [6.35 mm]. The left and right edges of the panel should align with the vertical centerlines of the tube.

Note: This step is easiest with three people.

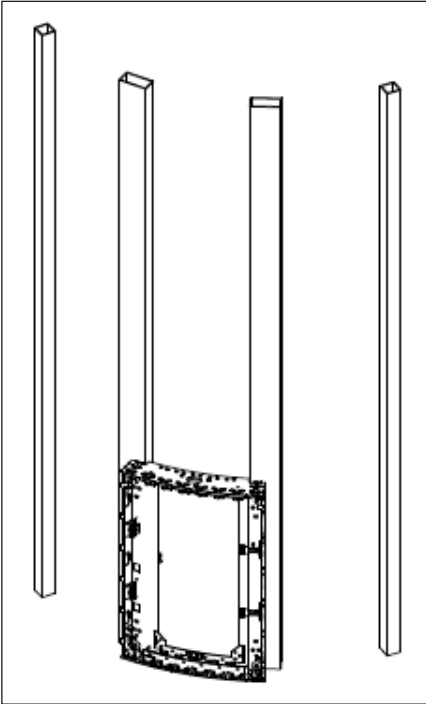


Figure 4: Install First Panel

2. Use a level to verify the panel is level in the X and Y directions.
3. Install self-drilling screws per the contract-specific Shop Drawing and the self-drilling screw installation instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)**.
4. Place the second panel next to the existing panel.
5. Engage the applicable draw latches per the panel interconnect engagement instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)**.
6. Install two M5 screws (Daktronics part number HC-3802911) through the side perimeter of the first panel and through the second adjacent panel. Secure with an M5 nut (HC-1959) in the adjacent panel. Refer to **Figure 5**.
7. Install self-drilling screws per the contract-specific Shop Drawing and the self-drilling screw installation instructions in the **DVN-3000 Panel Installation Quick Guide (DD4731666)**.

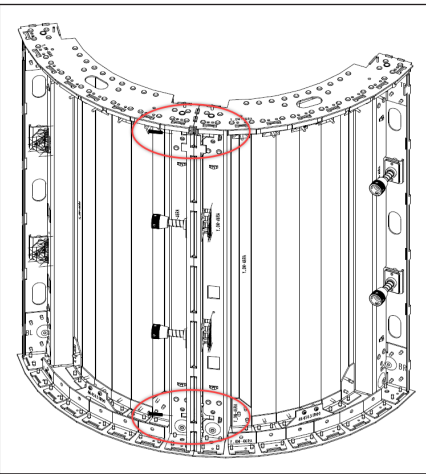


Figure 5: Install M5 Screws through Side Perimeter

8. Repeat **Steps 3-7** for each panel in the row, ensuring the punched alignment tabs are as flush as possible. Refer to **Figure 6**.

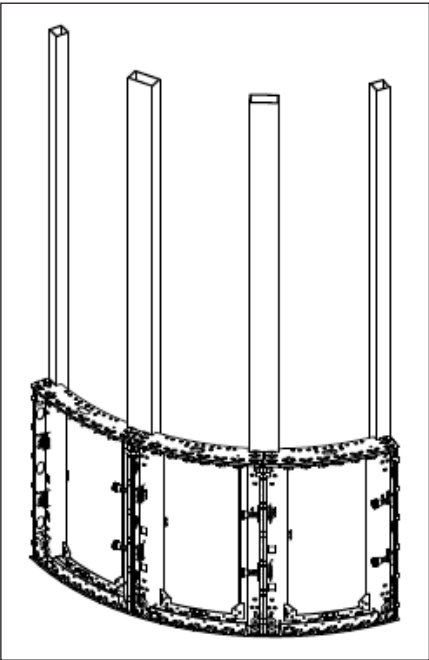


Figure 6: Install Bottom Row of Panels

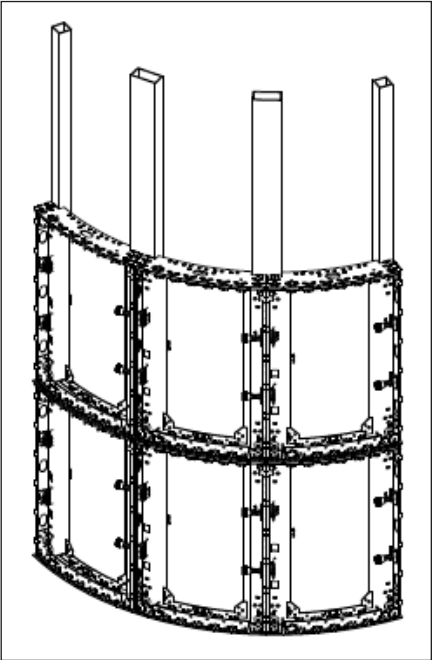


Figure 7: Install Second Row of Panels

9. Start on the next row after the bottom row is completed, working from the center out. Refer to **Figure 7**.
10. Continue attaching panels up to the top row. Refer to **Figure 8**.
11. Use a level after all panels are up and the hardware is started to verify the panels are all plumb and level to each other in the X and Y directions. Use the M6 jacking hardware to brace the panels away from the tubes by no more than 1/4" [6.35 mm]. After verification is complete, tighten down the hardware in all applicable corners.

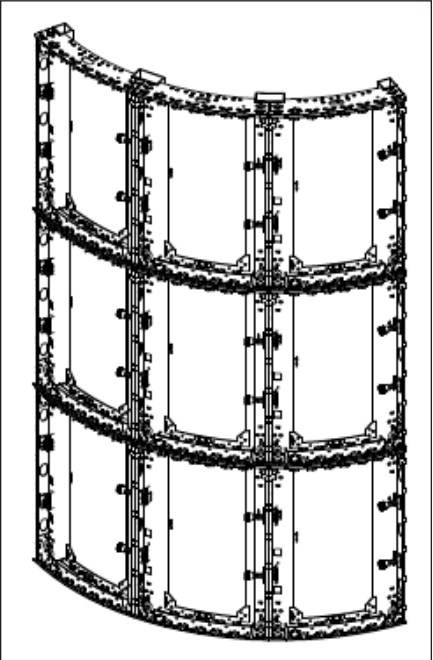


Figure 8: Install Tubes

Signal Connection

Module

Each 1/4 module connects to a hub board in the panel via ribbon cable. Pre-configured panels are pre-wired in the factory. Refer to **Figure 1** and **Figure 2**.

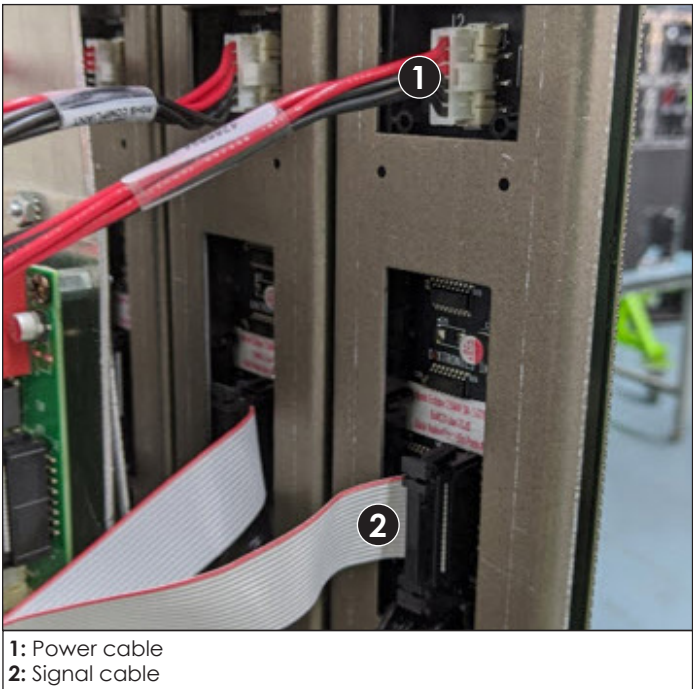


Figure 1: Module Power & Signal Connection

Refer to the contract-specific Riser Diagram for the wiring location and cable lengths used for each module.

Panel

The ProLink signal connection for a 1/4-module panel uses the same Cat 5e/Cat 6 cables as a standard DVN-3000 panel but without an external connection. Incoming/outgoing cables to the hub board connect inside the panel. Refer to **Figure 3**.

Refer to the contract-specific Riser Diagram for the overall signal path.

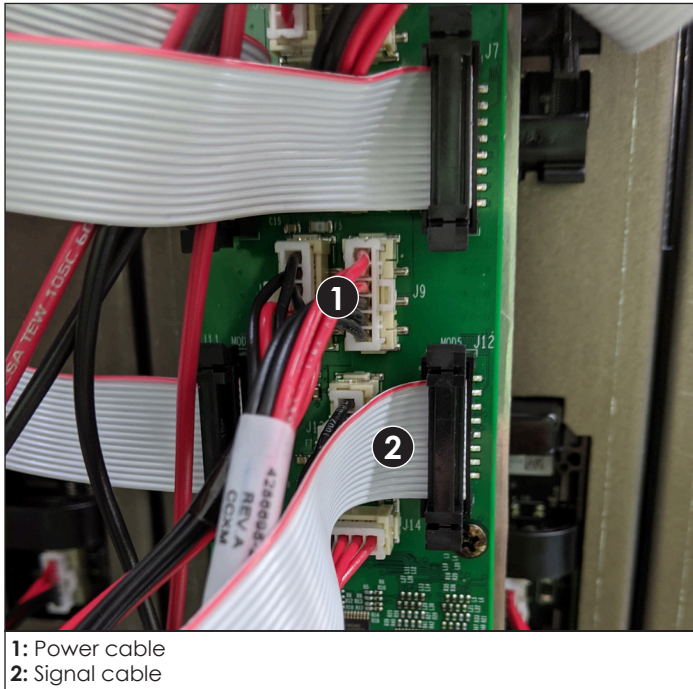


Figure 2: Hub Board Power & Signal Connection

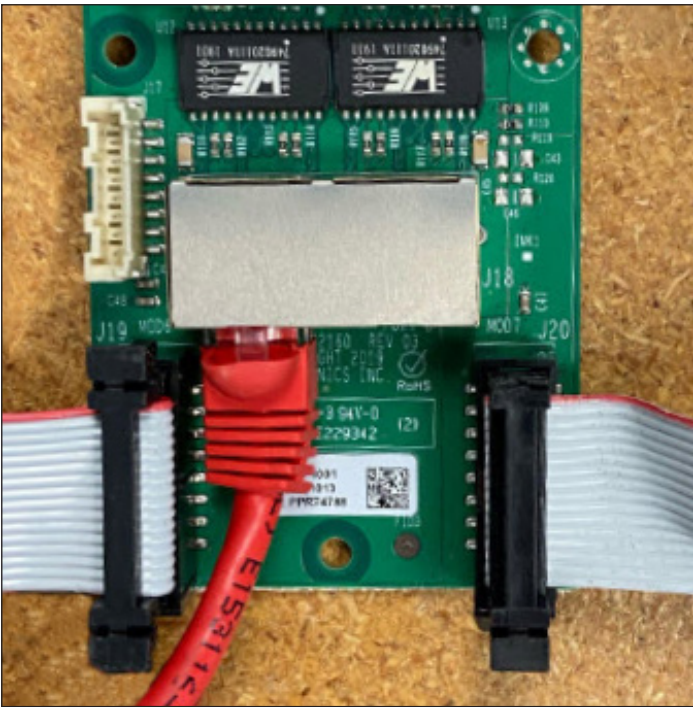


Figure 3: Hub Board Connection

Power Connection

Module

Each 1/4 module connects to a hub board in the panel via JST power cable. Pre-configured panels are pre-wired in the factory. Refer to the contract-specific Riser Diagram for the wiring location and cable lengths used for each module. Refer to **Figure 1** and **Figure 2**.

Panel

Panel AC power can connect to either a flat or 1/4-module panel. To connect to a 1/4-module panel, use a MATE-N-LOK® 3-pin female-to-male connector. Refer to **Figure 4**. To connect to a flat panel, use the appropriate In/Out MATE-N-LOK® 3-pin-to-Neutrik® connector configuration. Refer to **Figure 5** and **Figure 6**. Any MATE-N-LOK® connection is made inside the 1/4-module panel. Refer to **Figure 7** for cabinet-to-cabinet details.

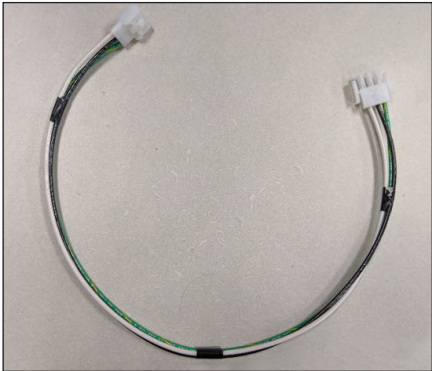


Figure 4: MATE-N-LOK® 3-Pin Female-to-Male Connector



Figure 5: MATE-N-LOK® 3-Pin-to-Neutrik® Connector



Figure 6: MATE-N-LOK® 3-Pin-to-Neutrik® Connector

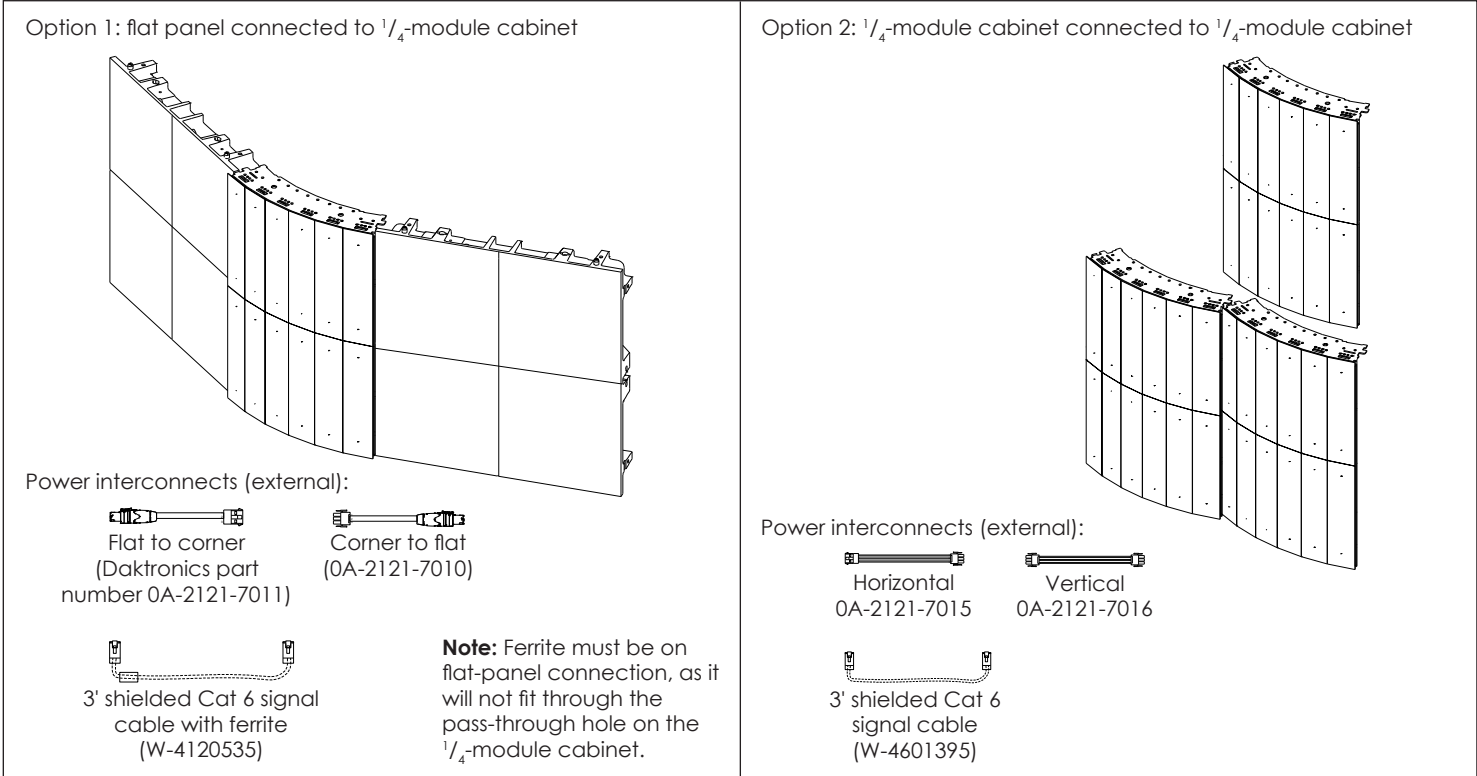


Figure 7: MATE-N-LOK® Panel Connection

Refer to **DWG-4632690** for other standard riser details and to the contract-specific Riser Diagram for additional site details.

Tools

Part	Part Description
Cordless screw gun with 1/8" Allen bit	Attaches borders to panel

Part Identification

Borders can be identified by their size. Each border requires a border spacer, which can be identified by either the size or the etched part number on the spacer.

There are four different border heights for the DVN-3050 1/4-module display series: two-, three-, four-, and six-module-high borders. Refer to the table below for part information.

Part Number	Part Description	Part Length
0M-4650491	Side border spacer, 2-high, DVN E1	N/A
0M-4650493	Side border spacer, 3-high, DVN E1	
0M-XXXXXXX	Top/bottom border spacer, radius-specific, 6-, 7- or 8-wide	
0M-4086543	Flat border, 2-wide, DVN E1	19.685" [500 mm]
0M-4086547	Flat border, 4-wide, DVN E1	39.370" [1000 mm]
0M-4086551	Flat border, 6-wide, DVN E1	59.055" [1500 mm]
0M-XXXXXXX	Top/bottom border, radius-specific, 6-, 7-, or 8-wide	N/A

There are also three different border widths for the DVN-3050 1/4-module display series: six-, seven-, and eight-module-wide borders. Refer to the contract-specific documentation for top/bottom border and border spacer part numbers

Border Installation

Borders are attached either before the display is mounted to the structure or after if site conditions allow for tool clearance around the mounted display. If borders must be installed before the sections, only one-panel-high (two or three modules, depending on panel) borders are available. Longer borders must be installed after the display sections are mounted to the structure. For top/bottom borders, only one-panel-wide (six, seven, or eight modules) borders are available.

1. Select the correct border size per the contract-specific Shop Drawing.
2. Use a clean rag to wipe off the perimeter of the panel receiving the border.

3. Bring the top border spacer and top border into position as shown in **Figure 1**. Use a 1/8" Allen wrench to install #10-32 machine screws (Daktronics part number HC-1484) through the border spacer and border into the pre-installed PEM nuts in the top/bottom members of the cabinet.

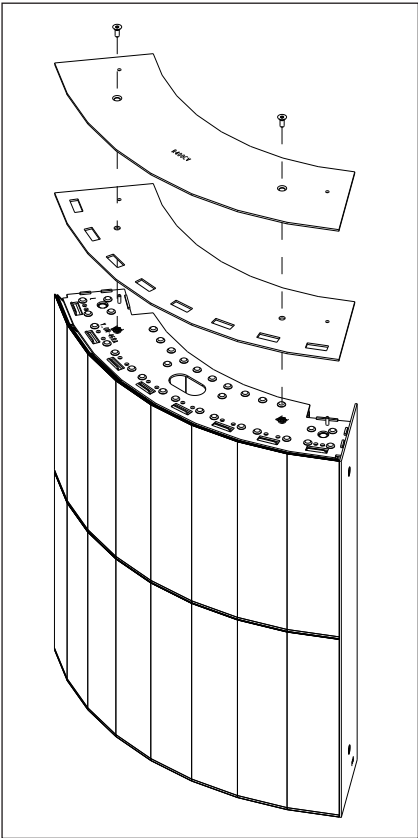


Figure 1: Bring Top Border Spacer & Top Border into Position

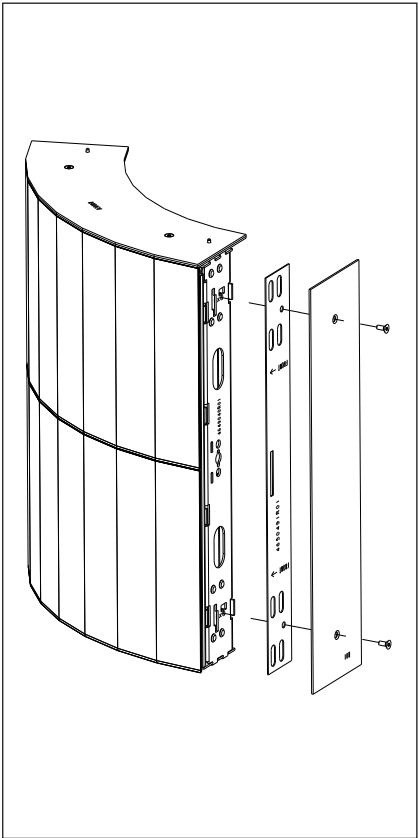


Figure 2: Bring Side Border Spacer & Side Border into Position

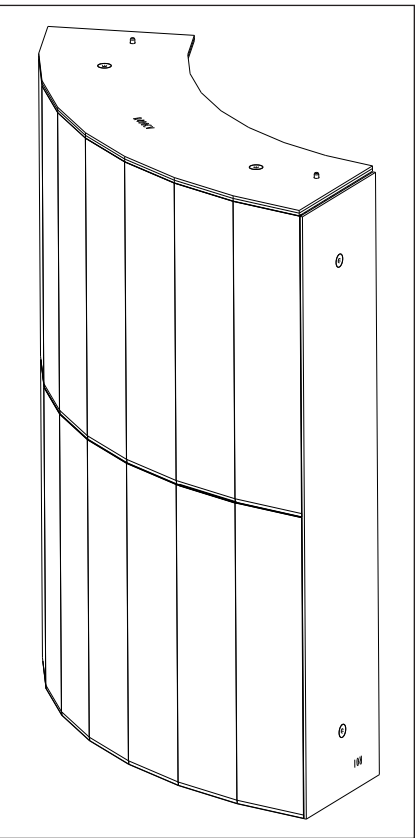


Figure 3: Top & Side Borders Attached to Panel

4. Bring the side border spacer and side border into position as shown in **Figure 2**. Insert #10-32 keps nuts (HC-1289) into the rectangular cutouts in the side members of the cabinet to line up the border with the border spacer mounting holes. Use a 1/8" Allen wrench to install the #10-32 machine screws (HC-1484) through the border spacer and border into the previously installed #10-32 keps nuts in the side of the cabinet.

Refer to **Figure 3** for the finished border appearance.

Module

Carefully remove all modules from the display before proceeding with the steps in **Component Plate** (p.1), **Power Supply** (p.2), **Hub Board** (p.2), or **Receiver Card** (p.2).

To remove a module, follow these steps:

1. Disconnect power to the display.
2. Use a module removal tool (Daktronics part number TH-4647963) to remove the module from the display. Refer to **Figure 1**.



Figure 1: Module Removal Tool

- a. Turn the knob on the module removal tool (TH-4647963) counterclockwise to disengage the tool.
- b. Center the tool on the face of the module to be removed and turn the knob on the tool clockwise to engage the magnets. Refer to **Figure 2**.
- c. Pull the module at an angle until it disengages from the display face. Refer to **Figure 3**.



Figure 2: Center Tool on Module



Figure 3: Remove Module from Display

3. Disconnect the power and signal cables from the rear of the module. Refer to **Figure 4**.



1: Module power cable
2: Module signal cable

Figure 4: Disconnect Power & Signal Cables from Each Module

4. Remove the module plate from the display.
 - a. Grip the module plate holes and slide the plate up. A flathead screwdriver can be used in the slot near the bottom of the plate if needed to help pry the plate up. Refer to **Figure 5**.
 - b. Tilt the plate out at the bottom and remove from the display. Refer to **Figure 6**.

Reverse these steps to install a module.



Figure 5: Pry Module Plate Up



Figure 6: Tilt Module Plate Out

Component Plate

Carefully remove all modules from the display before proceeding with the steps in this section. Refer to **Module** (p.1).

To remove a component plate, follow these steps:

1. Disconnect power to the display.
2. Use a T20 TORX® bit to loosen the two top and two bottom screws securing the component plate to the display and then lift the component plate up and away from the keyholes. Refer to **Figure 7**.

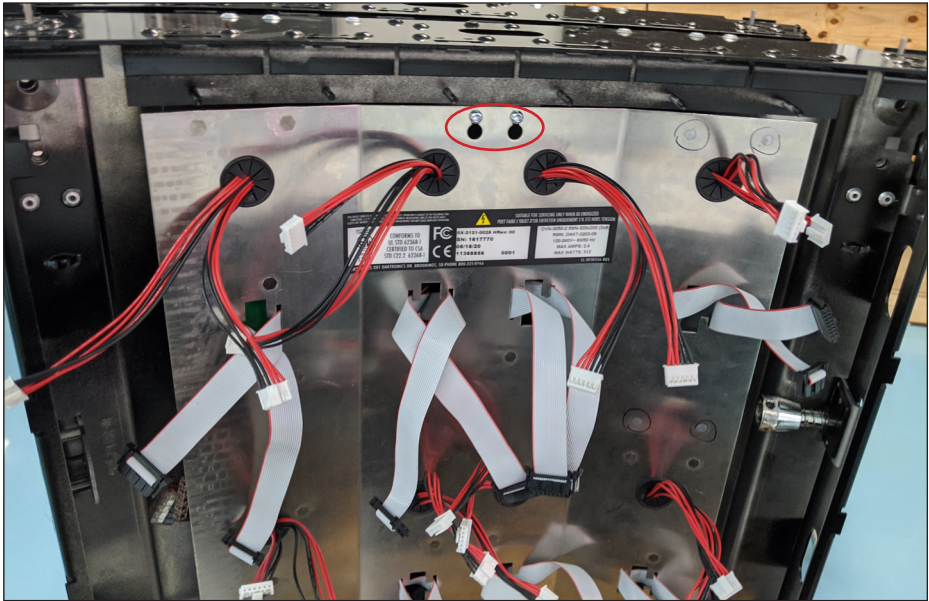


Figure 7: Remove Component Plate

3. Disconnect the AC harness from each power supply and disconnect the Cat 6 cables routing from the hub board(s) to other display sections.
4. Disconnect the AC MATE-N-LOK® cables and signal cables to other display sections if needed.

Reverse these steps to install a component plate.

Power Supply

Carefully remove all modules from the display before proceeding with the steps in this section. Refer to **Module (p.1)**.

To remove a power supply, follow these steps:

- 1. Disconnect power to the display.
- 2. Remove the three-ring terminals from the AC side of the power supply and the four-ring terminals from the DC side. Refer to **Figure 8** and **Figure 9**.

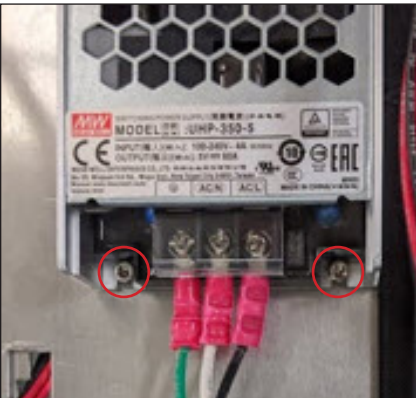


Figure 8: Three-Ring Terminals

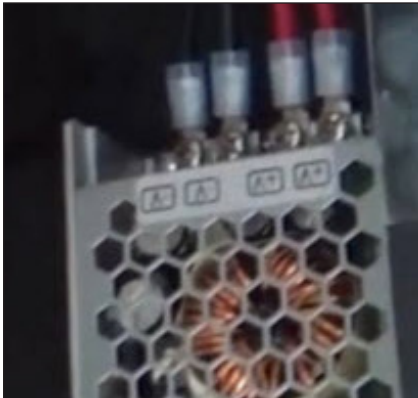


Figure 9: Four-Ring Terminals

- 3. Use a 2.5 mm Allen wrench to remove the screws from each of the four corners of the power supply and then remove the power supply. Refer to **Figure 8**.

Reverse these steps to install a power supply.

Hub Board

Carefully remove all modules from the display before proceeding with the steps in this section. Refer to **Module (p.1)**.

To remove a hub board, follow these steps:

- 1. Disconnect power to the display.
- 2. Disconnect the ribbon and power cables from the hub board. Take note of the locations on the hub board prior to disconnecting the cables. Refer to **Figure 10** and **Figure 11**.

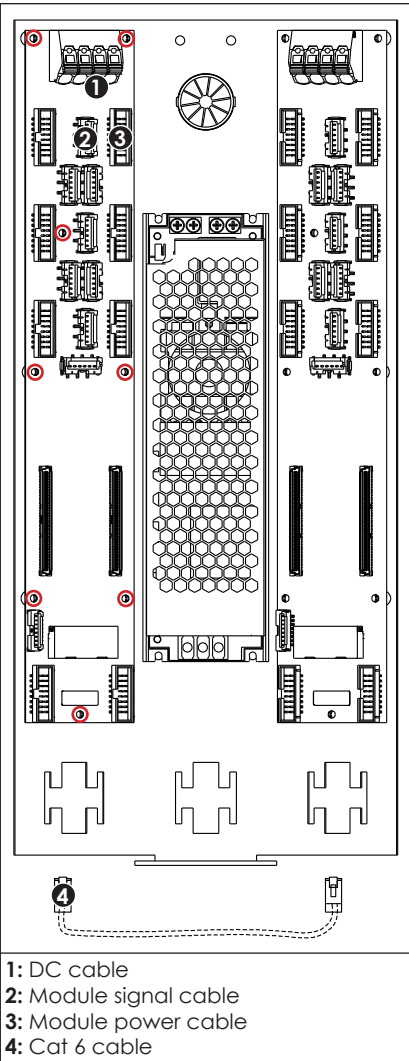


Figure 10: 2-High Component Layout

- 3. Push in the spring-loaded terminal block to disconnect the DC power cables from the hub board. Refer to **Figure 10** and **Figure 11**.
- 4. Disconnect the Cat 6 cables from the RJ45 jacks. Refer to **Figure 10** and **Figure 11**.
- 5. Use a #2 Phillips screwdriver to remove the eight screws securing the hub board to the component plate and then remove the hub board from the plate. Refer to **Figure 10** and **Figure 11**.

Reverse these steps to install a hub board.

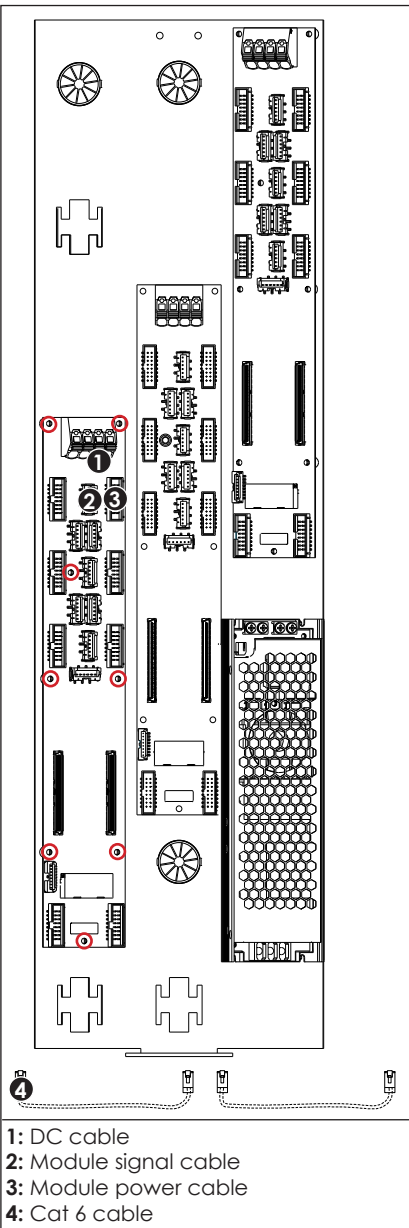


Figure 11: 3-High Component Layout

Receiver Card

Carefully remove all modules from the display before proceeding with the steps in this section. Refer to **Module (p.1)**.

To remove a receiver card, follow these steps:

- 1. Disconnect power to the display.
- 2. Pull up on the top and bottom of the receiver card evenly to remove the card from the pin slots on the hub board. The receiver card is keyed and pressure fits into place.

To install a receiver card, follow these steps:

- 1. Disconnect power to the display.
- 2. Press the receiver card snugly into place in the pin slots on the hub board. Ensure the receiver card is oriented with the larger chip at the top and the two smaller chips at the bottom. Refer to **Figure 12**.

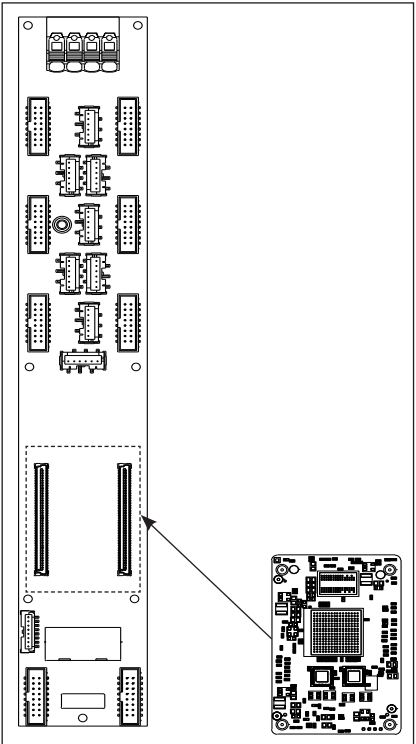


Figure 12: Install Receiver Card

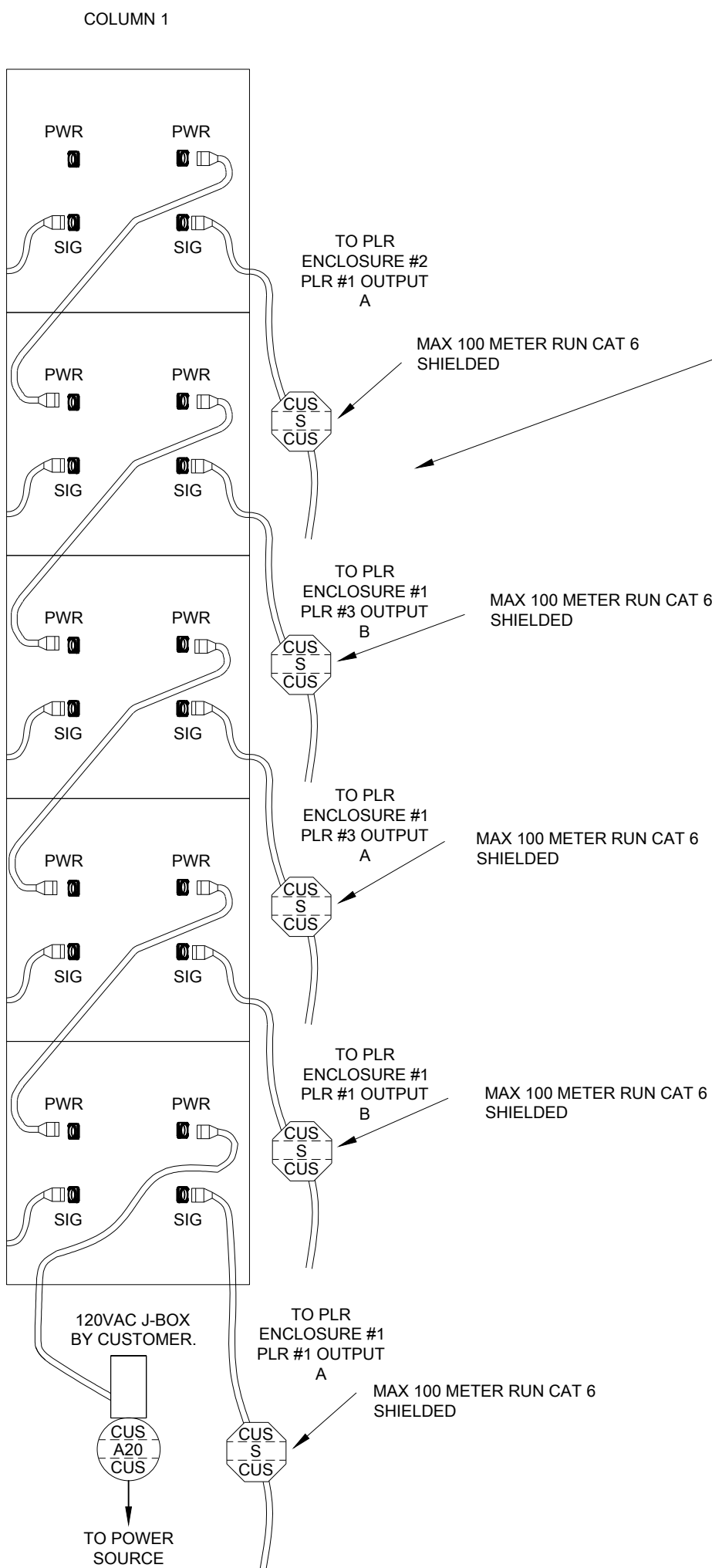
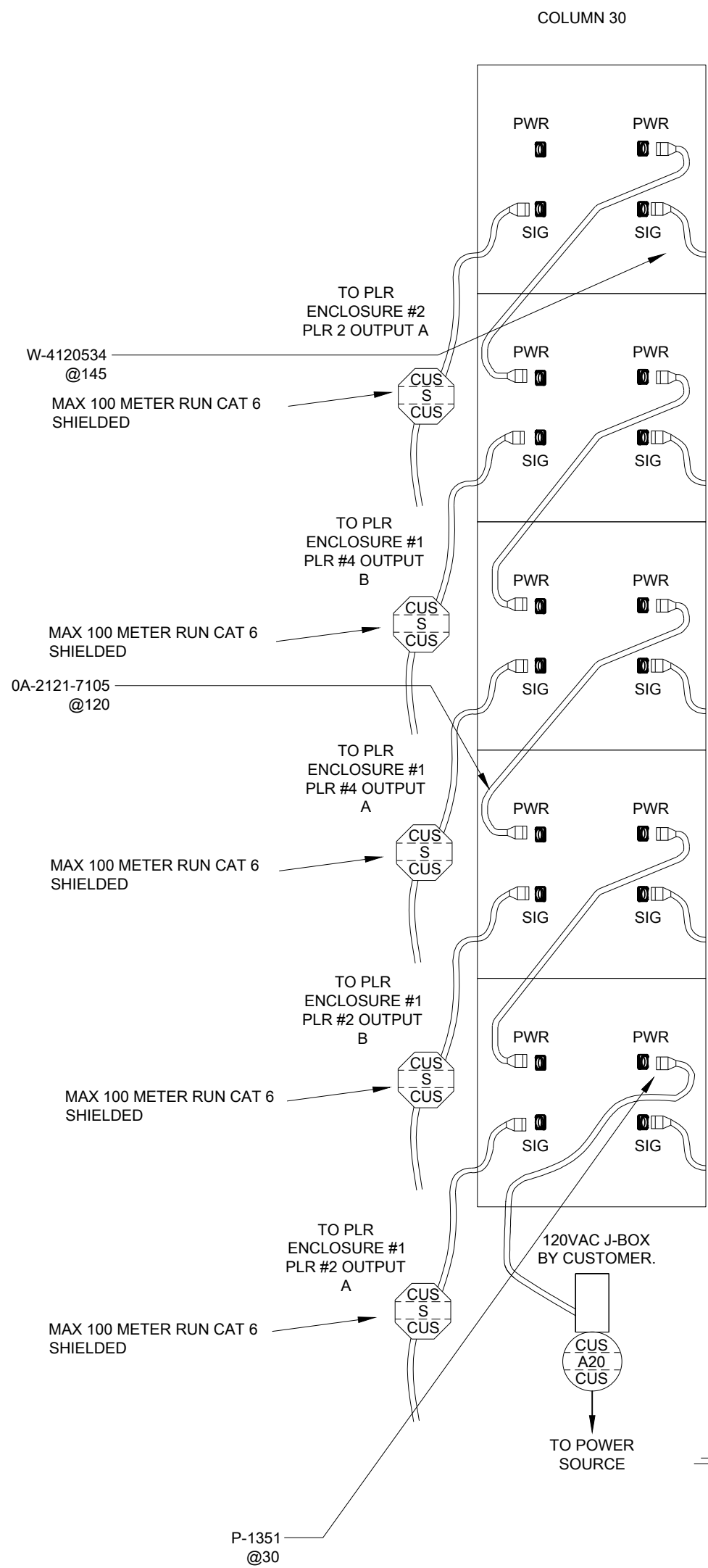
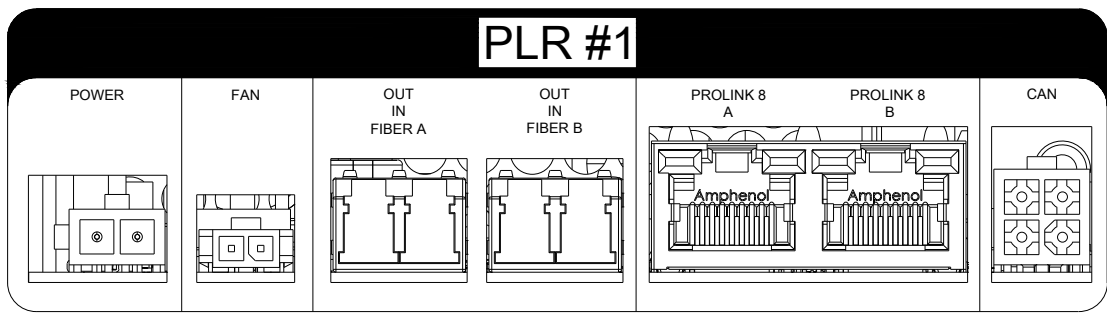
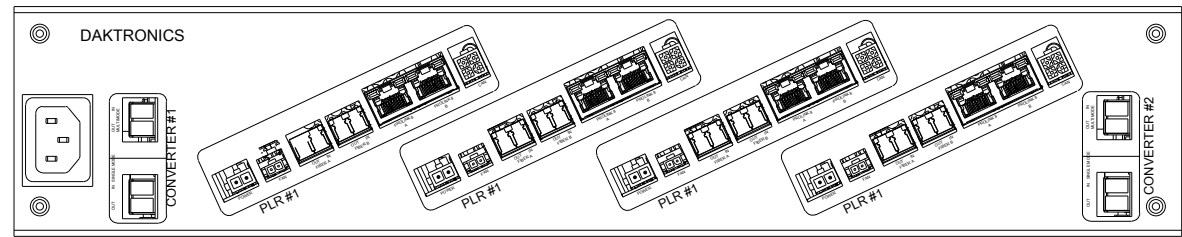
B Reference Drawings

Refer to **Numbering Conventions (p.1)** for information regarding how to read the drawing number.

These drawings offer general information pertaining to most DVN-30XX series displays and are listed in numeric order. Any contract-specific drawings take precedence over the general drawings.

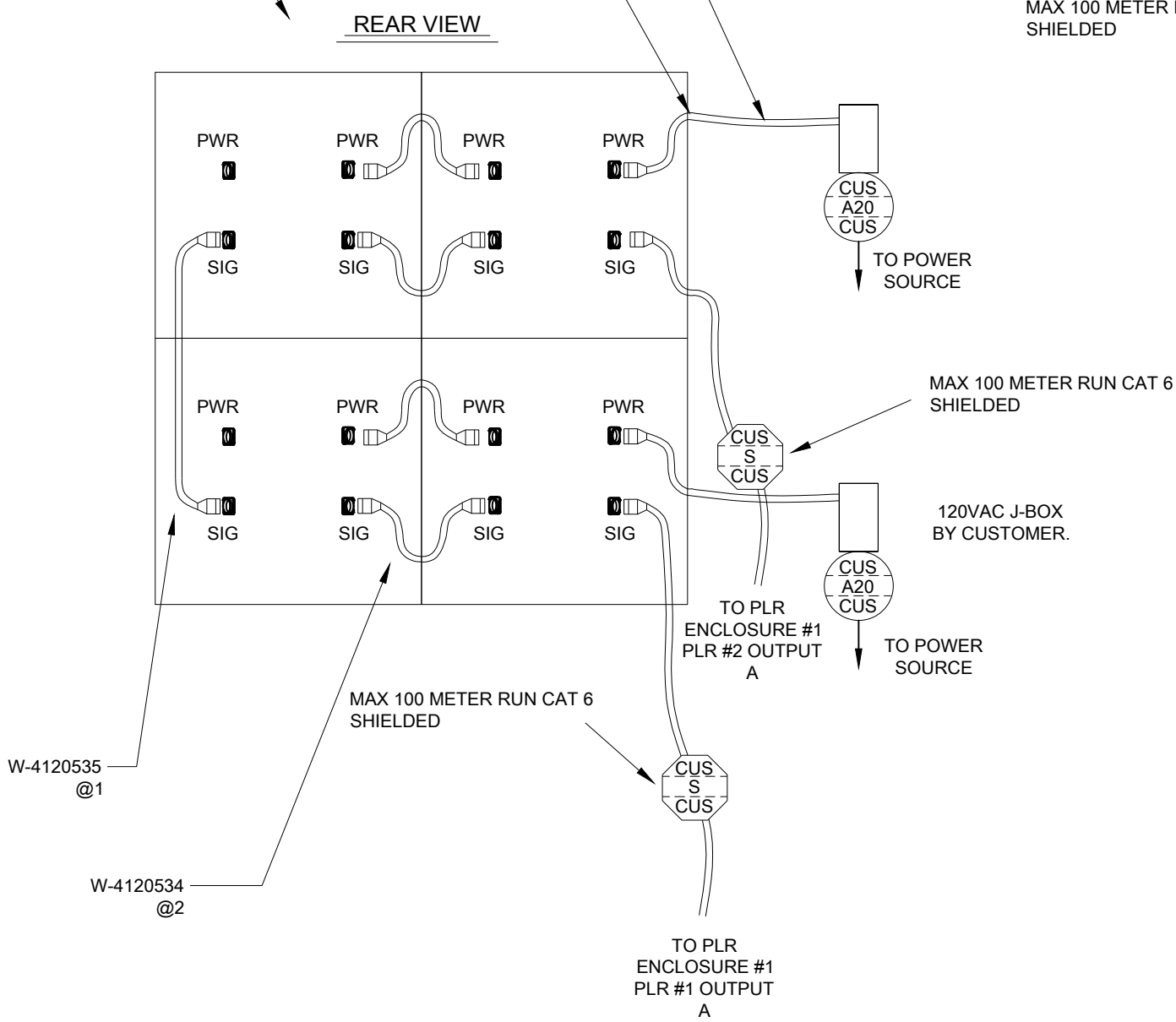
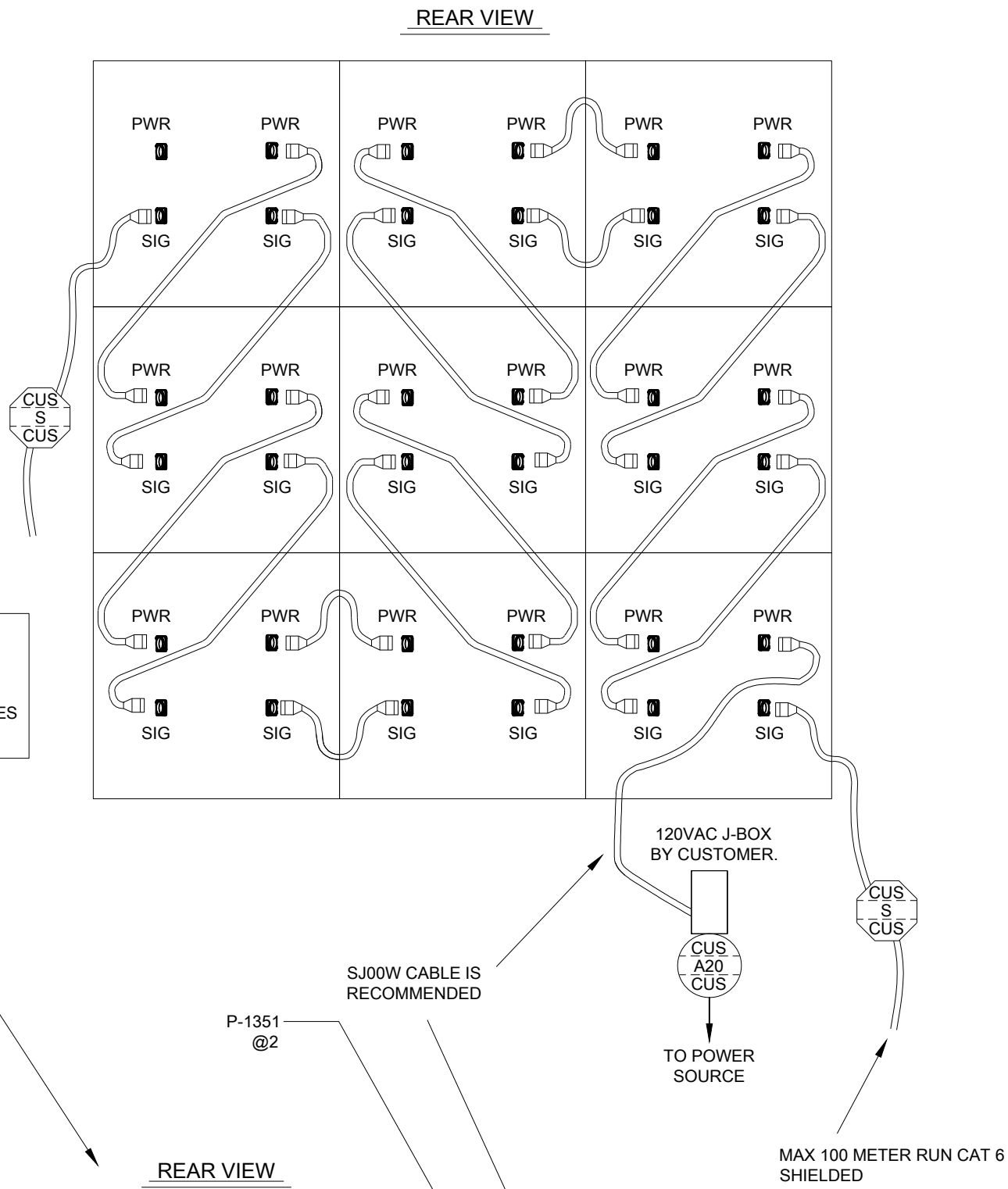
DVN-3000 Design Guide	DWG-4135479
Recommended Tools and Hardware; DVN-3000	DWG-4155909

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MAX 100 METER RUN CAT 6 SHIELDED

ILLUSTRATIONS ARE MERELY TO SHOW DIFFERENT CABLE ROUTING OPTIONS.
FOR PANELS PER D CURVE BREAKER OR PANELS PER CAT 6 RUN, REFER TO TABLES ON THE BOTTOM.



P-1351 @30
P-1351 PROVIDED. WIRE TO PLUG BY CUSTOMER. RECOMMENDED CABLE SJ00W. 120VAC J-BOX BY CUSTOMER.

FOR ALL PIXEL PITCHES PLR 1 PORT A WILL PLUG INTO THE START OF THE CHAIN AND RUN HALF OF THE PANELS (LISTED IN THE TABLE FOR PANELS FOR TWO PLRS). PLR 2 PORT A WILL THEN PLUG INTO THE END OF THE CHAIN.

PLR 1 PORT B WILL PLUG INTO ANOTHER CHAIN OF PANELS AND PLR 2 PORT B WILL BE AT THE OTHER END IN ORDER TO HAVE REDUNDANT SIGNAL. THE TWO PLRS COMBINED WILL TOTAL THE TABLES BELOW.

2.5 MM PANELS ARE 200 X 200 PIXELS		
REDUNDANCY WILL BE STANDARD. 600K PIXELS PER PLR (480K WITH HDR). OUTPUT A ON FIRST PLR OUTPUT A ON THE SECOND PLR		
SIGNAL TYPE	8 BIT OR 10 BIT	DI-6000 OUTPUT
PANELS PER TWO PLRS	30	45
8-BIT (SDR)		
10-BIT (HDR)	24	35

2.9 MM PANELS ARE 168 x 168 PIXELS		
REDUNDANCY WILL BE STANDARD. 600K PIXELS PER PLR (480K WITH HDR). OUTPUT A ON FIRST PLR OUTPUT A ON THE SECOND PLR		
SIGNAL TYPE	8 BIT OR 10 BIT	DI-6000 OUTPUT
PANELS PER TWO PLRS	42	63
8-BIT (SDR)		
10-BIT (HDR)	33	49

3.9 MM PANELS ARE 128 x 128 PIXELS		
REDUNDANCY WILL BE STANDARD. 600K PIXELS PER PLR (480K WITH HDR). OUTPUT A ON FIRST PLR OUTPUT A ON THE SECOND PLR		
SIGNAL TYPE	8 BIT OR 10 BIT	DI-6000 OUTPUT
PANELS PER TWO PLRS	72	109
8-BIT (SDR)		
10-BIT (HDR)	57	85

5.9 MM PANELS ARE 84 x 84 PIXELS		
REDUNDANCY WILL BE STANDARD. 600K PIXELS PER PLR (480K WITH HDR). OUTPUT A ON FIRST PLR OUTPUT A ON THE SECOND PLR		
SIGNAL TYPE	8 BIT OR 10 BIT	DI-6000 OUTPUT
PANELS PER TWO PLRS	170	255
8-BIT (SDR)		
10-BIT (HDR)	136	198

POWER AND SIGNAL JUMPERS. THE VERTICAL JUMPER COULD ALSO BE USED FOR HORIZONTAL WHEN GOING LEFT TO RIGHT WITH POWER.

CABLE DIRECTION	POWER JUMPERS	SIGNAL JUMPERS
HORIZONTAL	0A-2121-7104	W-4120534
VERTICAL	0A-2121-7105	W-4120535

PER PANEL TOTAL POWER REQUIREMENTS:

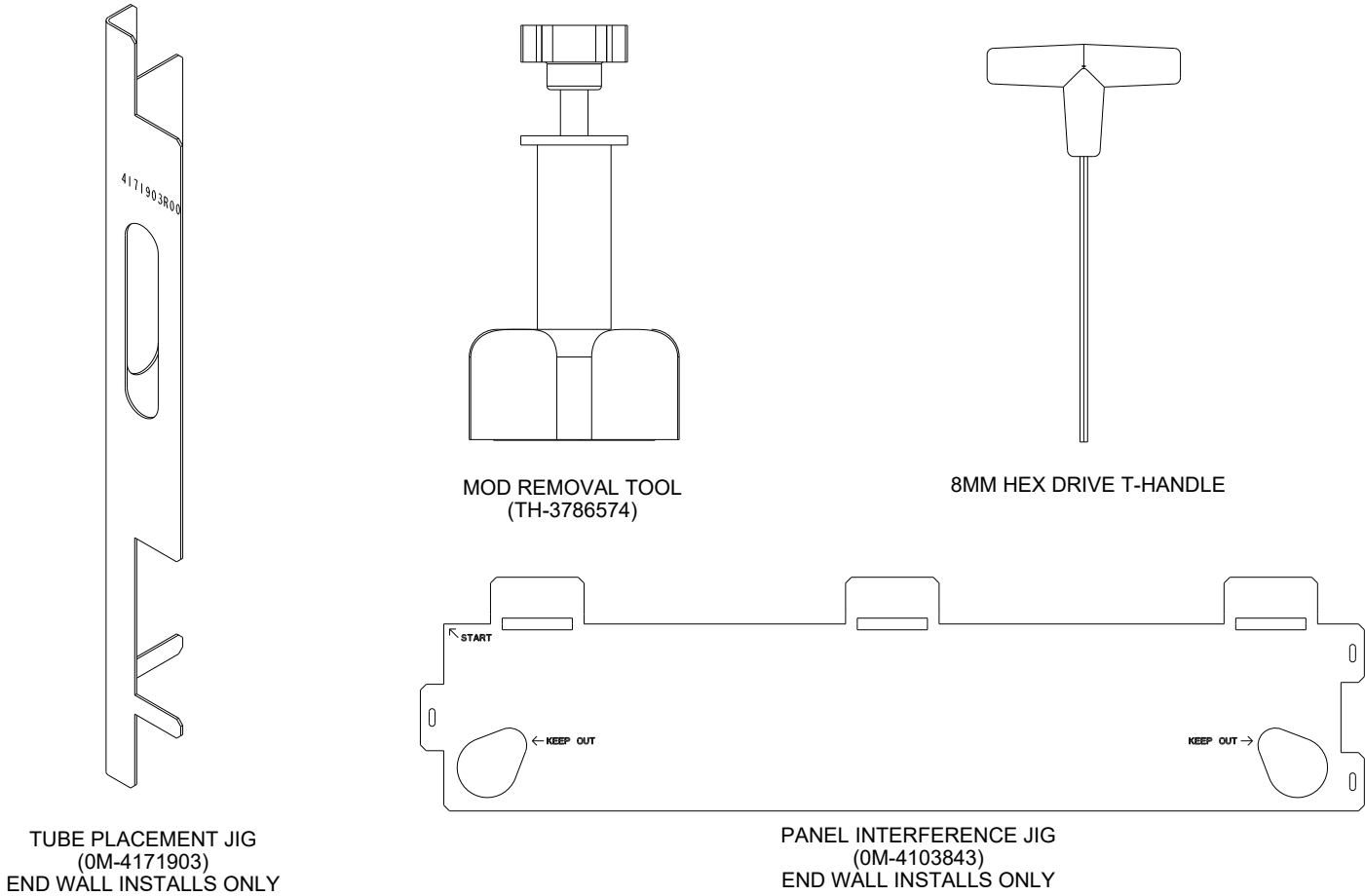
SYSTEM VOLTAGE	
120V	2 WIRES + GND
NUMBER OF POLES	
1	
MAXIMUM WATTS	
192	
AMPERES PER LINE	
1.6	

ONE 20A D CURVE BREAKER REQUIRED WILL RUN # OF PANELS LISTED BELOW

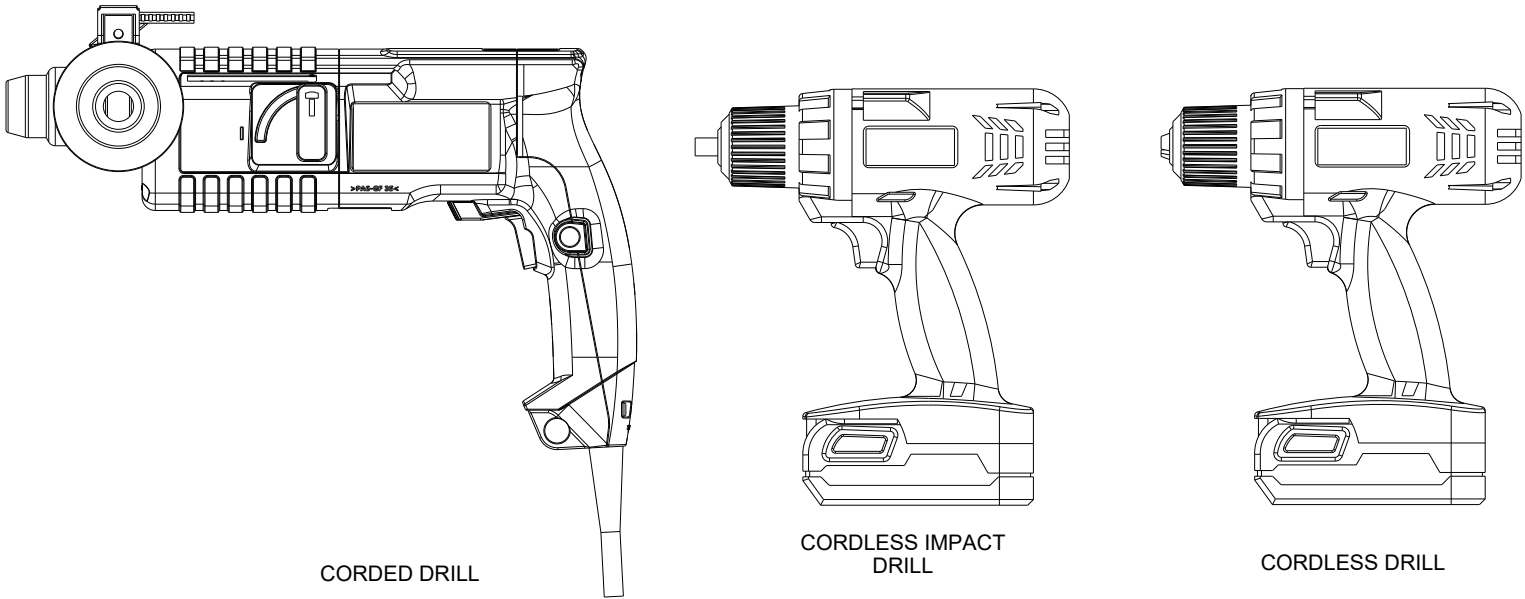
120V	11
240V	8

REV 02	DATE: 27 JUN 19	CN83063 REMOVED CAT 6 CORD END ADDED NOTE ON SJ00W CABLE IS RECOMMENDED FOR POWER.	BY: JSF
REV 01	DATE: 13 JUN 19	CN81890 UPDATED PLR PORTS TO USE	BY: JSF
DAKTRONICS THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS WITHOUT THE EXPRESS WRITTEN CONSENT OF DAKTRONICS, INC. OR ITS WHOLLY OWNED SUBSIDIARIES. COPYRIGHT 2019 DAKTRONICS, INC. (USA)			
PROJECT: DVN-3000		THIRD ANGLE PROJECTION	
TITLE: DVN-3000 DESIGN GUIDE		SHEET 02	
DATE: 4 MAR 19	DIM UNITS: INCHES [MILLIMETERS]		
SCALE: NTS	DO NOT SCALE DRAWING		
DESIGN: JFIXSEN	JOB NO. P2121	FUNC - TYPE - SIZE F - 01 - C	4135479
DRAWN: JFIXSEN			

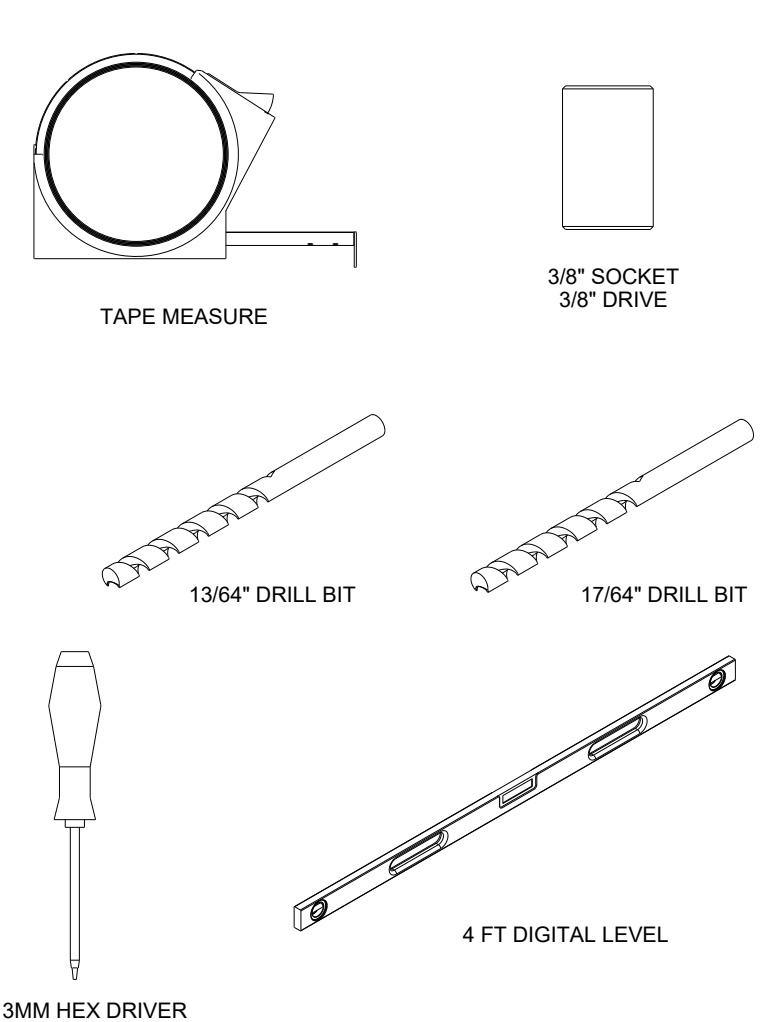
REQUIRED TOOLS AND ALIGNMENT JIGS (PROVIDED)



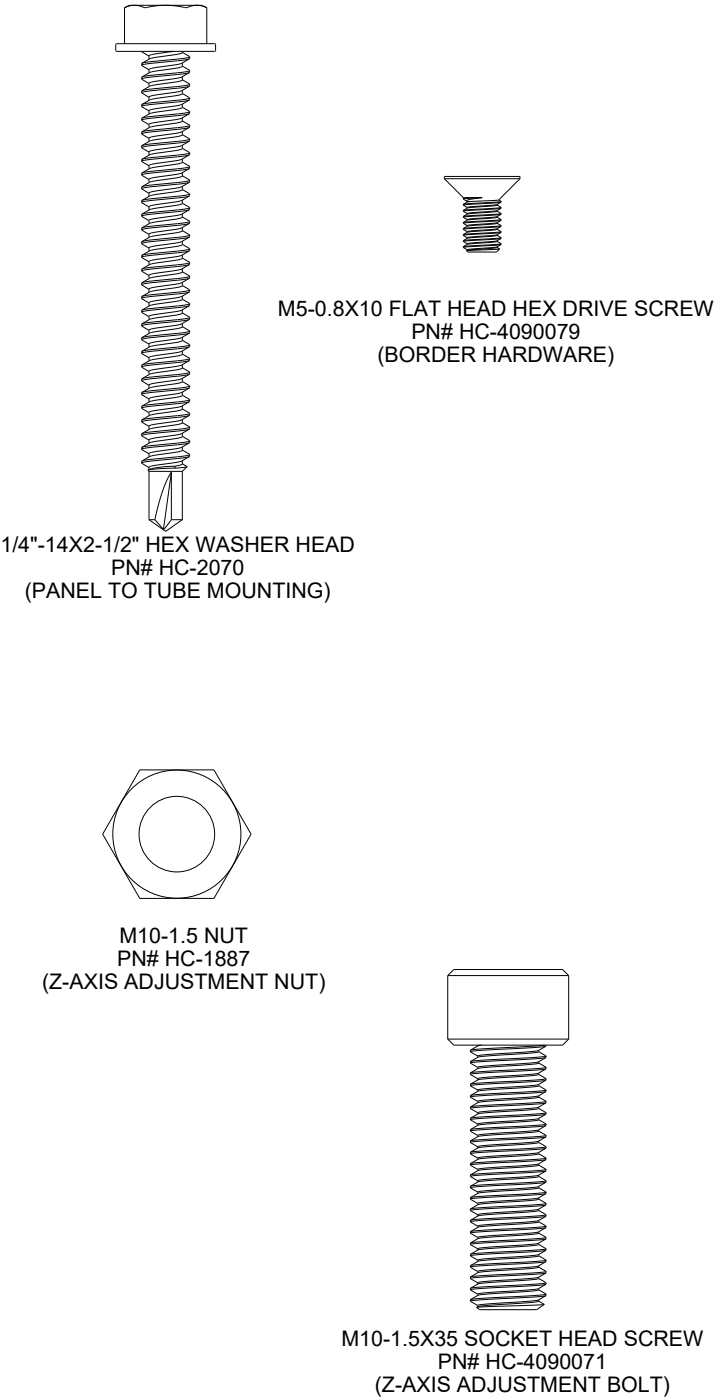
REQUIRED TOOLS (NOT PROVIDED)



REQUIRED TOOLS
(NOT PROVIDED)



REQUIRED HARDWARE
(PROVIDED)



REV	DATE:		BY:	
<div><div></div><div>THE CONCEPTS EXPRESSED AND DETAILS SHOWN ON THIS DRAWING ARE CONFIDENTIAL AND PROPRIETARY. DO NOT REPRODUCE BY ANY MEANS WITHOUT THE EXPRESS WRITTEN CONSENT OF DAKTRONICS, INC. OR ITS WHOLLY OWNED SUBSIDIARIES. COPYRIGHT 2019 DAKTRONICS, INC. (USA)</div></div>				
PROJECT: DVN 3000				
TITLE: RECOMMENDED TOOLS AND HARDWARE; DVN-3000				
DATE: 01-JUL-19	DIM UNITS: INCHES [MILLIMETERS]	SHEET 1 OF 1	REV 00	
SCALE: 1/4	DO NOT SCALE DRAWING			
DESIGN: RBJERKE	JOB NO. P2121	FUNC - TYPE - SIZE E - 07 - B	4155909	
DRAWN: RBJERKE				

C Daktronics Warranty & Limitation of Liability

This section includes the Daktronics Warranty & Limitation of Liability statement.

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DAKTRONICS WARRANTY & LIMITATION OF LIABILITY

This Warranty and Limitation of Liability (the “Warranty”) sets forth the warranty provided by Daktronics with respect to the Equipment. By accepting delivery of the Equipment, Purchaser and End User agree to be bound by and accept these terms and conditions. Unless otherwise defined herein, all terms within the Warranty shall have the same meaning and definition as provided elsewhere in the Agreement.

DAKTRONICS WILL ONLY BE OBLIGATED TO HONOR THE WARRANTY SET FORTH IN THESE TERMS AND CONDITIONS UPON RECEIPT OF FULL PAYMENT FOR THE EQUIPMENT

1. Warranty Coverage.

- A. Daktronics warrants to the original end user (the “End User”, which may also be the Purchaser) that the Equipment will be free from Defects (as defined below) in materials and workmanship for a period of one (1) year (the “Warranty Period”). The Warranty Period shall commence on the earlier of: (i) four weeks from the date that the Equipment leaves Daktronics’ facility; or (ii) Substantial Completion as defined herein. The Warranty Period shall expire on the first anniversary of the commencement date.

“Substantial Completion” means the operational availability of the Equipment to the End User in accordance with the Equipment’s specifications, without regard to punch-list items, or other non-substantial items which do not affect the operation of the Equipment
- B. Daktronics’ obligation under this Warranty is limited to, at Daktronics’ option, replacing or repairing, any Equipment or part thereof that is found by Daktronics not to conform to the Equipment’s specifications. Unless otherwise directed by Daktronics, any defective part or component shall be returned to Daktronics for repair or replacement. This Warranty does not include on-site labor charges to remove or install these components. Daktronics may, at its option, provide on-site warranty service. Daktronics shall have a reasonable period of time to make such replacements or repairs and all labor associated therewith shall be performed during regular working hours. Regular working hours are Monday through Friday between 8:00 a.m. and 5:00 p.m. at the location where labor is performed, excluding any holidays observed by Daktronics.
- C. Daktronics shall pay ground transportation charges for the return of any defective component of the Equipment. All such items shall be shipped by End User DDP Daktronics designated facility per Incoterms® 2020. If returned Equipment is repaired or replaced under the terms of this Warranty, Daktronics will prepay ground transportation charges back to End User and shall ship such items DDP End User’s designated facility per Incoterms® 2020; otherwise, End User shall pay transportation charges to return the Equipment back to the End User and such Equipment shall be shipped Ex Works Daktronics designated facility per Incoterms® 2020. All returns must be pre-approved by Daktronics before shipment. Daktronics shall not be obligated to pay freight for any unapproved return. End User shall pay any upgraded or expedited transportation charges
- D. Any replacement parts or Equipment will be new or serviceably used, comparable in function and performance to the original part or Equipment and warranted for the remainder of the Warranty Period. Purchasing additional parts or Equipment from the Seller does not extend the Warranty Period.
- E. Defects shall be defined as follows. With regard to the Equipment (excepting LEDs), a “Defect” shall refer to a material variance from the design specifications that prohibit the Equipment from operating for its intended use. With respect to LEDs, “Defects” are defined as LED pixels that cease to emit light. Unless otherwise expressly provided, this Warranty does not impose any duty or liability upon Daktronics for partial LED pixel degradation. Notwithstanding the foregoing, in no event does this Warranty include LED pixel degradation caused by UV light. This Warranty does not provide for the replacement or installation of communication methods including but not limited to, wire, fiber optic cable, conduit, trenching, or for the purpose of overcoming local site interference radio equipment substitutions.

EXCEPT AS OTHERWISE EXPRESSLY SET FORTH IN THIS WARRANTY, TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, DAKTRONICS DISCLAIMS ANY AND ALL OTHER PROMISES, REPRESENTATIONS AND WARRANTIES APPLICABLE TO THE EQUIPMENT AND REPLACES ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ACCURACY OR QUALITY OF DATA. OTHER ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY DAKTRONICS, ITS AGENTS OR EMPLOYEES, SHALL NOT CREATE A WARRANTY OR IN ANY WAY INCREASE THE SCOPE OF THIS LIMITED WARRANTY.

THIS LIMITED WARRANTY IS NOT TRANSFERABLE.

2. Exclusion from Warranty Coverage

This Warranty does not impose any duty or liability upon Daktronics for any:

- A. damage occurring at any time, during shipment of Equipment unless otherwise provided for in the Agreement. When returning Equipment to Daktronics for repair or replacement, End User assumes all risk of loss or damage, agrees to use any shipping containers that might be provided by Daktronics, and to ship the Equipment in the manner prescribed by Daktronics;
- B. damage caused by: (i) the improper handling, installation, adjustment, use, repair, or service of the Equipment, or (ii) any physical damage which includes, but is not limited to, missing, broken, or cracked components resulting from non-electrical causes;

DAKTRONICS WARRANTY & LIMITATION OF LIABILITY

altered, scratched, or fractured electronic traces; missing or gauged solder pads; cuts or clipped wires; crushed, cracked, punctured, or bent circuit boards; or tampering with any electronic connections, provided that such damage is not caused by personnel of Daktronics or its authorized repair agents;

- C. damage caused by the failure to provide a continuously suitable environment, including, but not limited to: (i) neglect or misuse; (ii) improper power including, without limitation, a failure or sudden surge of electrical power; (iii) improper air conditioning, humidity control, or other environmental conditions outside of the Equipment's technical specifications such as extreme temperatures, corrosives and metallic pollutants; or (iv) any other cause other than ordinary use;
- D. damage caused by fire, flood, earthquake, water, wind, lightning or other natural disaster, strike, inability to obtain materials or utilities, war, terrorism, civil disturbance, or any other cause beyond Daktronics' reasonable control;
- E. failure to adjust, repair or replace any item of Equipment if it would be impractical for Daktronics personnel to do so because of connection of the Equipment by mechanical or electrical means to another device not supplied by Daktronics, or the existence of general environmental conditions at the site that pose a danger to Daktronics personnel;
- F. statements made about the product by any salesperson, dealer, distributor or agent, unless such statements are in a written document signed by an officer of Daktronics. Such statements as are not included in a signed writing do not constitute warranties, shall not be relied upon by End User and are not part of the contract of sale;
- G. damage arising from the use of Daktronics products in any application other than the commercial and industrial applications for which they are intended, unless, upon request, such use is specifically approved in writing by Daktronics;
- H. replenishment of spare parts. In the event the Equipment was purchased with a spare parts package, the parties acknowledge and agree that the spare parts package is designed to exhaust over the life of the Equipment, and as such, the replenishment of the spare parts package is not included in the scope of this Warranty;
- I. security or functionality of the End User's network or systems, or anti-virus software updates;
- J. performance of preventive maintenance;
- K. third-party systems and other ancillary equipment, including without limitation front-end video control systems, audio systems, video processors and players, HVAC equipment, batteries and LCD screens;
- L. incorporation of accessories, attachments, software or other devices not furnished by Daktronics; or
- M. paint or refinishing the Equipment or furnishing material for this purpose.

3. Limitation of Liability

- A. Daktronics shall be under no obligation to furnish continued service under this Warranty if alterations are made to the Equipment without the prior written approval of Daktronics.
- B. It is specifically agreed that the price of the Equipment is based upon the following limitation of liability. In no event shall Daktronics (including its subsidiaries, affiliates, officers, directors, employees, or agents) be liable for any claims asserting or based on (a) loss of use of the facility or equipment; lost business, revenues, or profits; loss of goodwill; failure or increased cost of operations; loss, damage or corruption of data; loss resulting from system or service failure, malfunction, incompatibility, or breaches in system security; or (b) any special, consequential, incidental or exemplary damages arising out of or in any way connected with the Equipment or otherwise, including but not limited to damages for lost profits, cost of substitute or replacement equipment, down time, injury to property or any damages or sums paid to third parties, even if Daktronics has been advised of the possibility of such damages. The foregoing limitation of liability shall apply whether any claim is based upon principles of contract, tort or statutory duty, principles of indemnity or contribution, or otherwise
- C. In no event shall Daktronics be liable for loss, damage, or injury of any kind or nature arising out of or in connection with this Warranty in excess of the Purchase Price of the Equipment. The End User's remedy in any dispute under this Warranty shall be ultimately limited to the Purchase Price of the Equipment to the extent the Purchase Price has been paid.

4. Assignment of Rights

- A. The Warranty contained herein extends only to the End User (which may be the Purchaser) of the Equipment and no attempt to extend the Warranty to any subsequent user-transferee of the Equipment shall be valid or enforceable without the express written consent of Daktronics.

5. Governing Law; Election of Remedies

- A. The rights and obligations of the parties under this Warranty shall not be governed by the provisions of the United Nations Convention on Contracts for the International Sales of Goods of 1980. The parties consent to the application of the laws of the State of South Dakota to govern, interpret, and enforce each of the parties' rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Warranty, without regard to conflict of law principles.
- B. Any dispute, controversy or claim arising from or related to this Warranty, the parties shall first attempt to settle through negotiations. In the event that no resolution is reached, then such dispute, controversy, or claim shall be resolved by final and binding arbitration under the Rules of Arbitration of the International Chamber of Commerce. The language of the arbitration

DAKTRONICS WARRANTY & LIMITATION OF LIABILITY

shall be English. The place of the arbitration shall be Sioux Falls, SD. A single arbitrator selected by the parties shall preside over the proceeding. If a single arbitrator cannot be agreed upon by the parties, each party shall select an arbitrator, and those arbitrators shall confer and agree on the appointed arbitrator to adjudicate the arbitration. The arbitrator shall have the power to grant any provisional or final remedy or relief that it deems appropriate, including conservatory measures and an award of attorneys' fees. The arbitrator shall make its decisions in accordance with applicable law. By agreeing to arbitration, the Parties do not intend to deprive any court of its jurisdiction to issue a pre-arbitral injunction, pre-arbitral attachment, or other order in aid of arbitration proceedings and the enforcement of any award. Without prejudice to such provisional remedies as may be available under the jurisdiction of a court, the arbitrator shall have full authority to grant provisional remedies and to direct the Parties to request that any court modify or vacate any temporary or preliminary relief issued by such court, and to award damages for the failure of any Party to respect the arbitrator's orders to that effect.

6. Availability of Extended Service Agreement

- A. For End User's protection, in addition to that afforded by the warranties set forth herein, End User may purchase extended warranty services to cover the Equipment. The Extended Service Agreement, available from Daktronics, provides for electronic parts repair and/or on-site labor for an extended period from the date of expiration of this warranty. Alternatively, an Extended Service Agreement may be purchased in conjunction with this Warranty for extended additional services. For further information, contact Daktronics Customer Service at 1-800-DAKTRONics (1-800-325-8766).

Additional Terms applicable to sales outside of the United States

The following additional terms apply only where the installation site of the Equipment is located outside of the United States of America.

1. In the event that the installation site of the Equipment is in a country other than the U.S.A., then, notwithstanding Section 5 of the Warranty, where the selling entity is the entity listed in Column 1, then the governing law of this Warranty is the law of the jurisdiction listed in the corresponding row in Column 2 without regard to its conflict of law principles. Furthermore, if the selling entity is an entity listed in Column 1, then the place of arbitration is listed in the corresponding row in Column 3.

Column 1 (Selling Entity)	Column 2 (Governing Law)	Column 3 (Location of Arbitration)
Daktronics, Inc.	The state of Illinois	Chicago, IL, U.S.A.
Daktronics Canada, Inc.	The Province of Ontario, Canada	Toronto, Ontario, Canada
Daktronics UK Ltd.	England and Wales	Bristol, UK
Daktronics GmbH	The Federal Republic of Germany	Wiesbaden, Germany
Daktronics Hong Kong Limited	Hong Kong, Special Administrative Region of the P.R.C.	Hong Kong SAR
Daktronics Shanghai Co., Ltd.	The Peoples Republic of China	Shanghai, P.R.C.
Daktronics France, SARL	France	Paris, France
Daktronics Japan, Inc.	Japan	Tokyo, Japan
Daktronics International Limited	Macau, Special Administrative Region of the P.R.C.	Macau SAR
Daktronics Australia Pad Ltd	Australia	Sydney, Australia
Daktronics Singapore Pte. Ltd	Singapore	Singapore
Daktronics Brazil LTDA	Brazil	São Paulo, Brazil
Daktronics Spain S.L.U.	Spain	Madrid, Spain
Daktronics Belgium N. V	Belgium	Kruikebe, Belgium
Daktronics Ireland Co. Ltd.	Ireland	Dublin, Ireland

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