DVN-3001/3051 SERIES
DAKT-0203-09

DISPLAY MANUAL

P2293

DD4827974
Rev 04
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DAKTRONICS

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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 **DD4827974**.

Numbering Conventions

Drawing Number

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-4771571**.

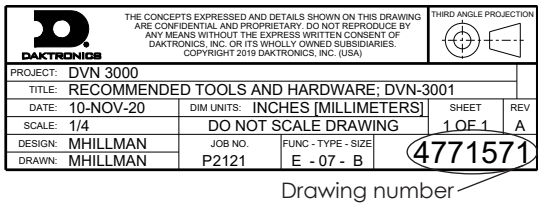

Figure 1: *Drawing Label*

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

> Refer to **DWG-4771571** in **Appendix B: Reference Drawings (p.11)** for recommended tools and hardware.

Part Number

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.

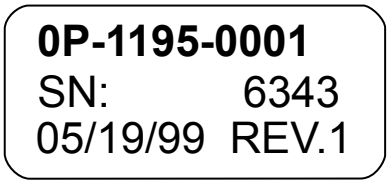

Figure 2: *Typical Label*

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 Number

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

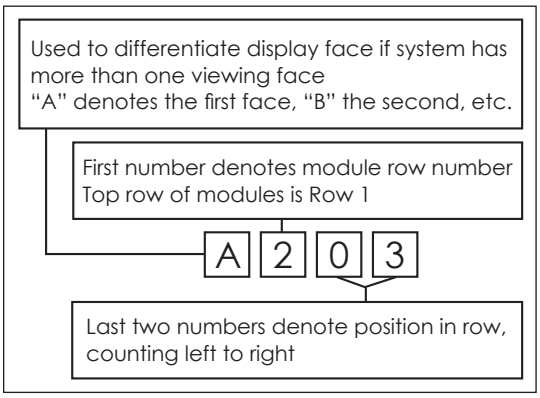

Figure 3: *Module Numbering Breakdown*

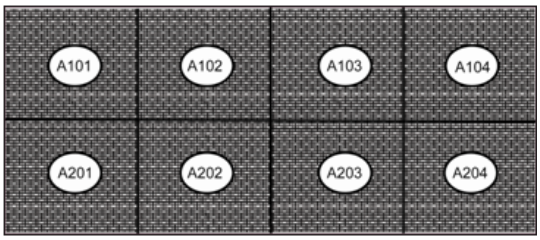

Figure 4: *Module Numbering*

Model Number

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

DVN-30X1-2.5/2.9/3.9/5.9MN-HHHxWWW		
DVN	=	Product series
3001/3051	=	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 Number (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.**

   United States & Canada: 1-800-DAK-TRON (325-8766)

   Outside the United States & Canada: +1-605-275-1040

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-3001

- **DVN-3001 Series 1x4 Horizontal Tube Substructure Quick Guide (DD4836876)**
- **DVN-3000/3001 Series 2x4 Horizontal Tube Substructure Quick Guide (DD4732854)**
- **DVN-3001 Series 1x4/2x4 Horizontal Tube Panel Installation Quick Guide (DD4836907)**
- **DVN-3001 Series Vertical Tube Substructure Installation (Contract-Specific Drawings)**
- **DVN-3000/3001 Series Vertical Tube Panel Installation Quick Guide (DD4306005)**
- **DVN-3001 Series 3x2 Panel Basics Quick Guide (DD5024938)**
- **DVN-3001 Series Panel Basics Quick Guide (DD4774160)**
- **DVN-3001 Series Panel Installation Quick Guide (DD4836909)**
- **DVN-3001 Series Electrical Installation Quick Guide (DD4774519)**
- **DVN-3001 Series Border Installation Quick Guide (DD4830860)**
- **DVN-3001 Series Service Quick Guide (DD4774243)**

DVN-3051

- **DVN-3050/3051 Series Substructure Quick Guide (DD4617019)**
- **DVN-3051 Series Panel Installation Quick Guide (DD4882876)**
- **DVN-305X Series $^{1}/_{4}$-Module Panel Installation Quick Guide (DD4793625)**
- **DVN-305X Series $^{1}/_{4}$-Module Border Installation Quick Guide (DD4793636)**
- **DVN-305X Series $^{1}/_{4}$-Module Service Quick Guide (DD4793527)**

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DVN-3001 Series 1x4 Horizontal Tube Substructure Quick Guide

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 4" 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**.

   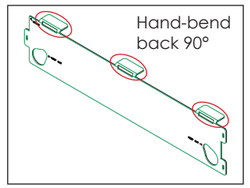

   Figure 1: *Hand-Bend Bracket Tabs*

   b. Align the top-left ("TL") corner of the tube face with the top-left corner of the first jig at START.

   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**.

   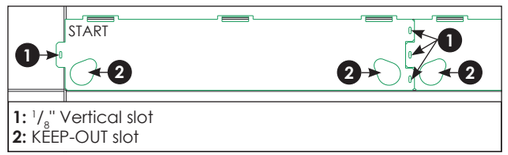

   Figure 2: *Panel-Interference Jig*

   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.

   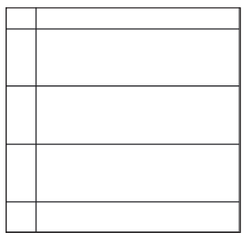

   Figure 3: *Mark Tube Locations*

   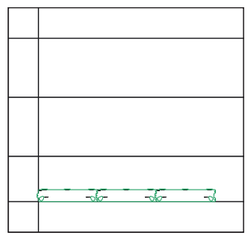

   Figure 4: *Use Jigs*

   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**.

   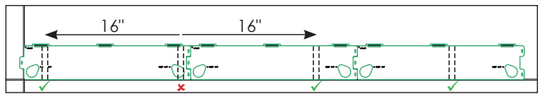

   Figure 5: *Move Studs at Interference Locations*

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**.

   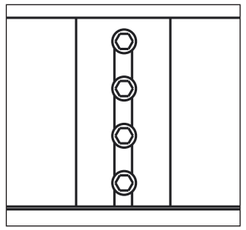

   Figure 6: *Clearance Holes*

   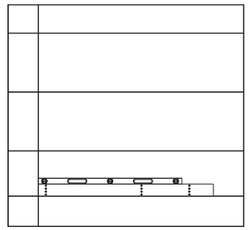

   Figure 7: *Place Tube*

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. Start with one screw per stud mounting location, but do not fully tighten down. Continue to level and add shims to make the tube plumb and straight. When the tube is level, plumb, and straight, add the remaining self-drilling screws. 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**.

   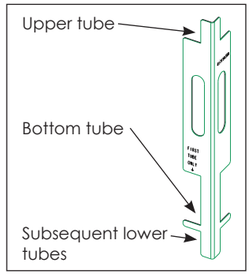

   Figure 8: *Horizontal Tube Layout Jig*

   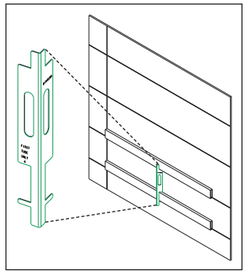

   Figure 9: *Use Horizontal Tube Layout Jig for Bottom Row*

   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**.

   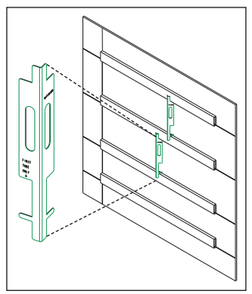

   Figure 10: *Use Horizontal Tube Layout Jig for Subsequent Rows*

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

9. Repeat the stud attachment pattern from the bottom row. Refer to **Figure 12**. 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.

   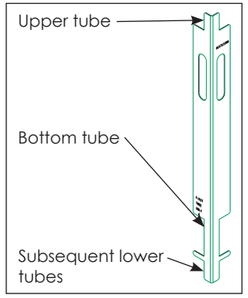

   Figure 11: *3-High Horizontal Tube Layout Jig*

   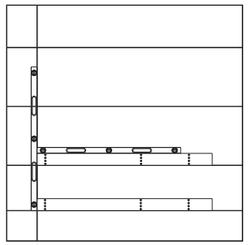

   Figure 12: *Repeat Stud Attachment Pattern*

   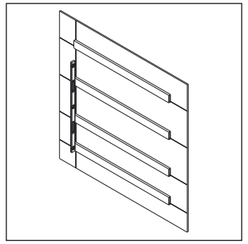

   Figure 13: *Ensure Plumb & Flat Tube Faces*

10. Use a level to ensure the tube faces are plumb to the wall and flat to each other within $^{1}/_{16}$". Refer to **Figure 13**. 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 14**. Ensure the shims bear the full height of the tube as shown in **Figure 15**. Tighten down the hardware.

    

    Figure 14: *Shim*

    

    Figure 15: *Add Shims between Wall & Tube*

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DVN-3000/3001 Series 2x4 Horizontal Tube Substructure Quick Guide

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**.

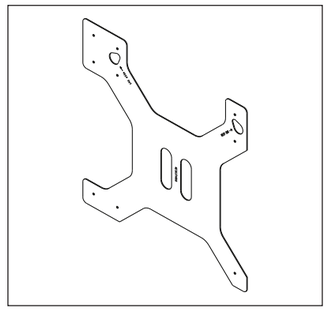

Figure 1: *Structure Jig*

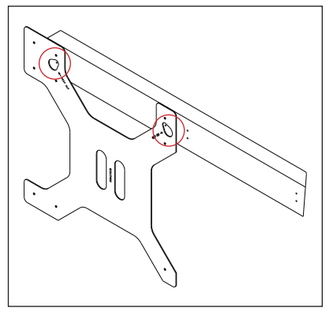

Figure 2: *Trace Keep-Out Areas on Structure Jig*

   - **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.

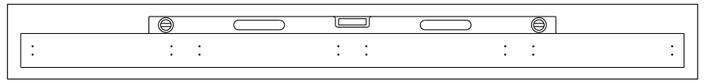

Figure 3: *Level First Wall Tube*

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

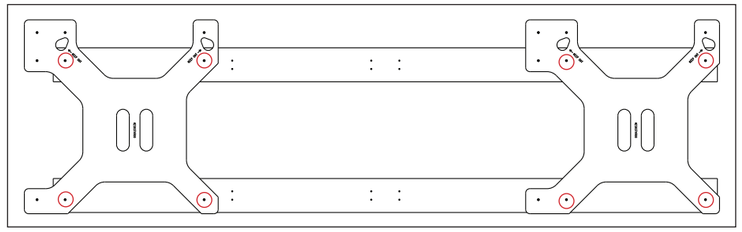

Figure 4: *Install Second Wall Tube*

   - **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**:

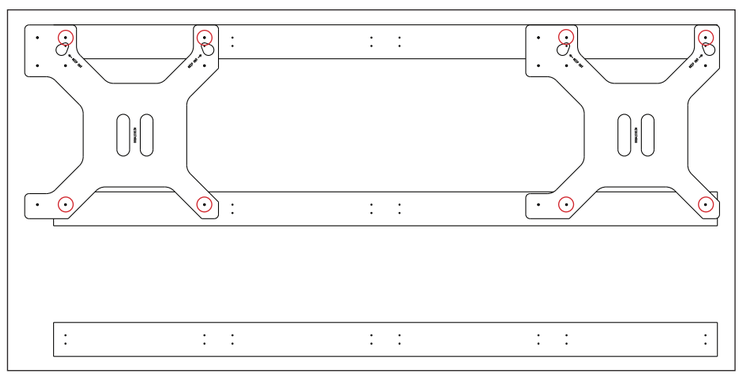

Figure 5: *Install Third & Higher Wall Tubes*

   - **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**:

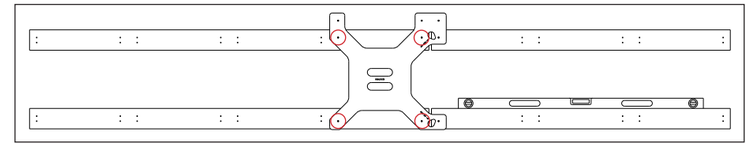

Figure 6: *Install Adjacent Wall Tubes*

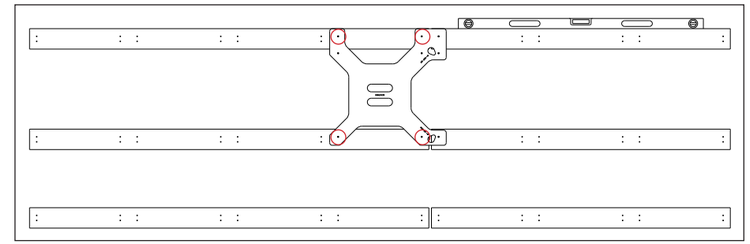

Figure 7: *Install Adjacent Wall Tubes*

   - **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.

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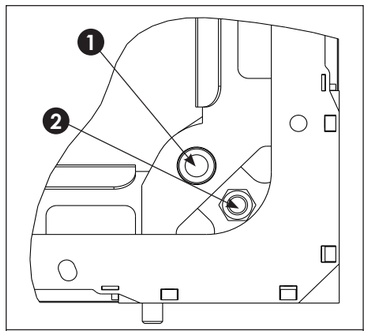
Mechanical

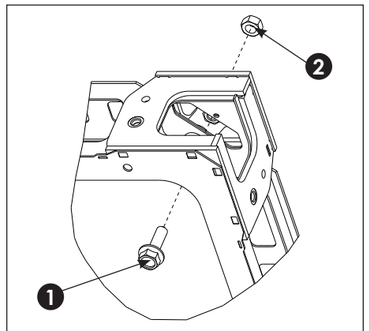
Panel-to-Tube Attachment

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 bolt if Z-axis adjustment is needed.



1: $^1/_4$" Self-drilling screw thru-hole
2: M6x1.0 threaded bolt

Figure 1: *Mount Panel to Tube*



1: M6 bolt
2: M6 nut

Figure 2: *Adjust Z-Axis*

M6 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.

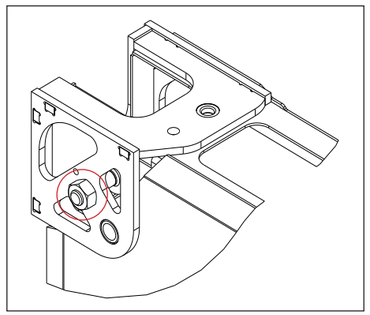


Figure 3: *M6 Nut*

Note: Remove modules before attaching panels to tubes.

1. Insert one self-drilling screw *and* one M6 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 M6 jacking bolt in the lower-left and lower-right corner on each panel in the bottom row of panels only. Refer to **Figure 4**.

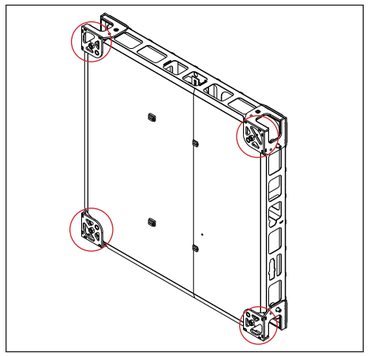


Figure 4: *Attach Panel to Tube*

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.

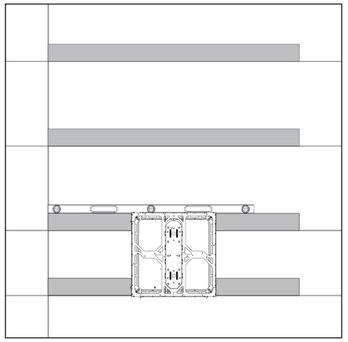


Figure 5: *Install First Panel*

2. Place a level toward the front of the panel to verify the panel is level in the X and Y directions.
3. Install all four self-drilling screws per the contract-specific Shop Drawing and the self-drilling screw installation instructions in the **DVN-3001 Panel Installation Quick Guide (DD4836909)**. Seat the screws just until snug, leaving $^1/_8$" [3.175 mm] between the screw head and the bushing.
4. Place the second panel next to the existing panel.
5. Engage all knurled captivated bolts per the panel interconnect and alignment instructions in the **DVN-3001 Panel Installation Quick Guide (DD4836909)**.
6. Tighten self-drilling screws per the contract-specific Shop Drawing and the self-drilling screw installation instructions in the **DVN-3001 Panel Installation Quick Guide (DD4836909)**.
7. Repeat **Steps 4-6** for each panel in the row, ensuring the machined surfaces are as flush as possible. Refer to **Figure 6**.

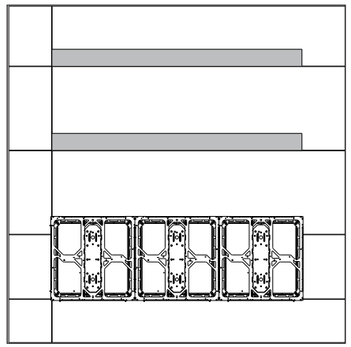


Figure 6: *Install Bottom Row of Panels*

8. Start on the next row after the bottom row is completed, working from the center out and performing the top-to-bottom connections before the side-to-side connections. Refer to **Figure 7**.

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

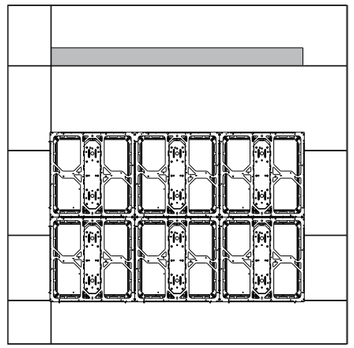


Figure 7: *Install Second Row of Panels*

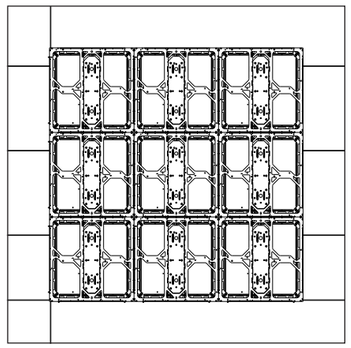


Figure 8: *Install Remaining Panels*

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 M6 jacking hardware to brace the panels away from the tubes by no more than $^1/_2$" [12 mm]. After verified, tighten down the hardware in all applicable corners.

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DVN-3001 SERIES VERTICAL TUBE SUBSTRUCTURE INSTALLATION

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.

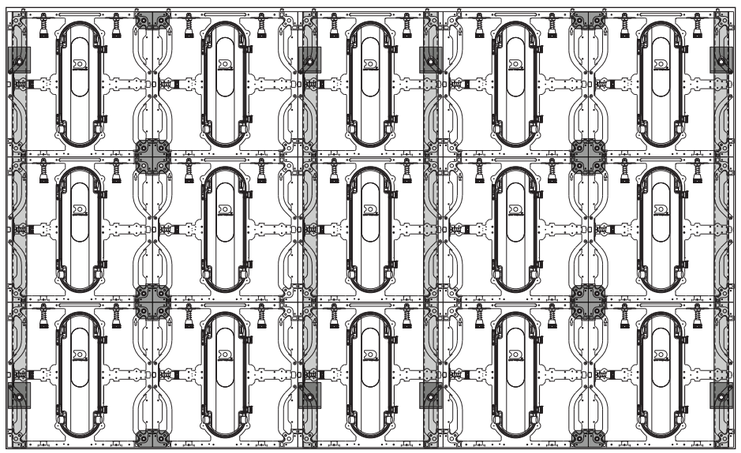

Figure 1: *Single Panel Center Display*

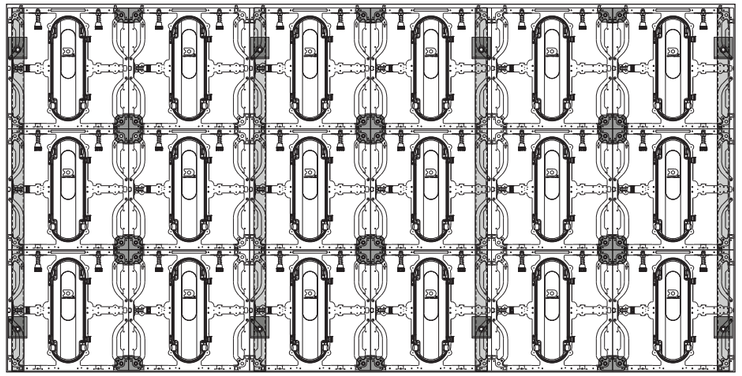

Figure 2: *Dual Panel Center Display*

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**.

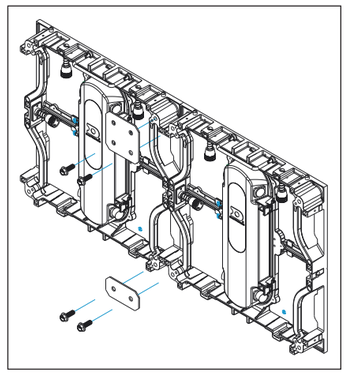

Figure 3: *Connect Panels*

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**.

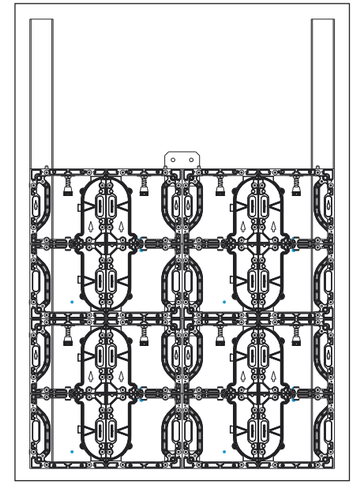

Figure 4: *Install Second Row*

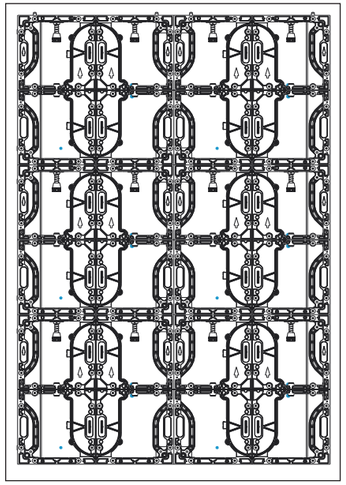

Figure 5: *Install Remaining Rows*

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.

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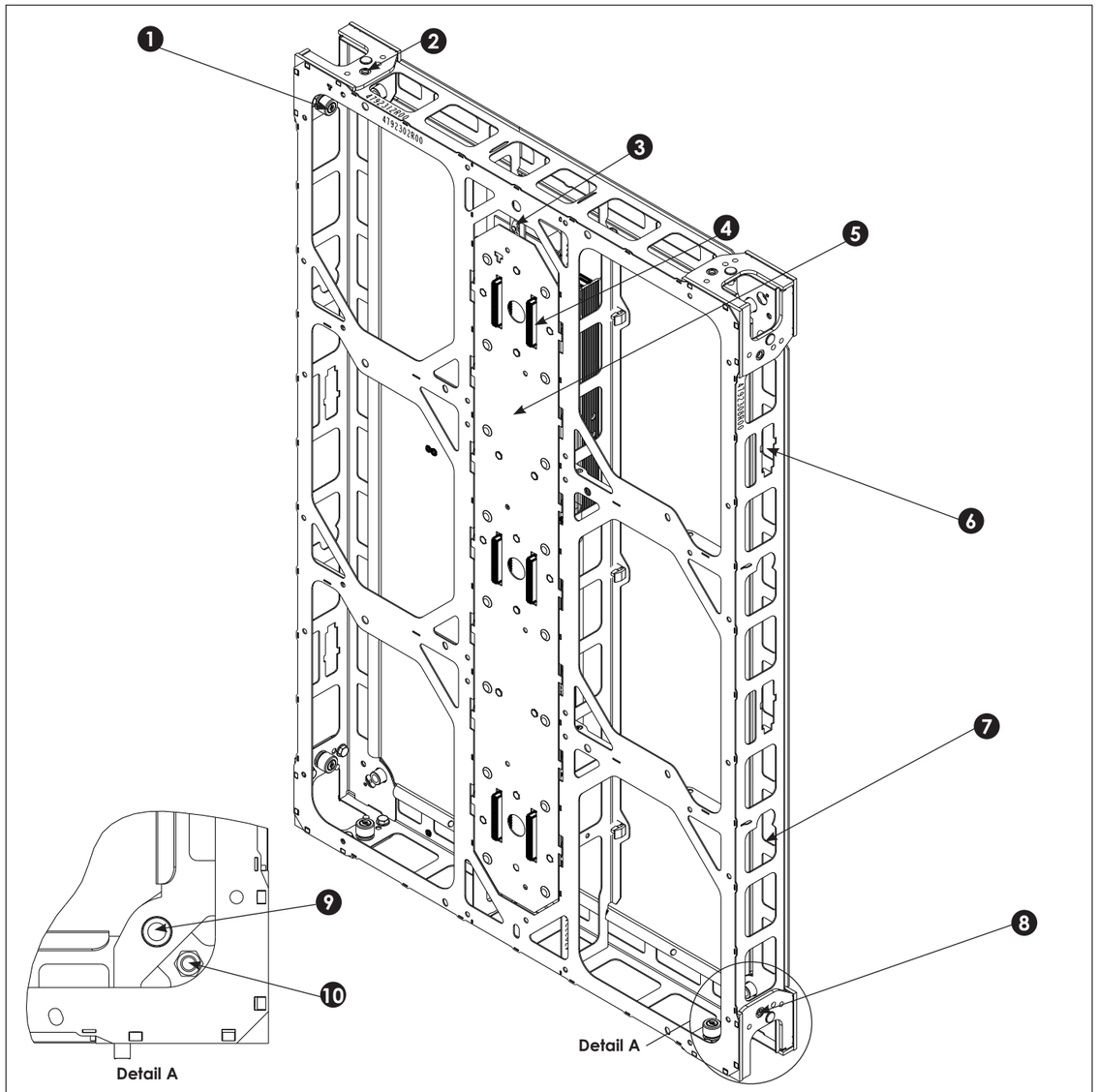
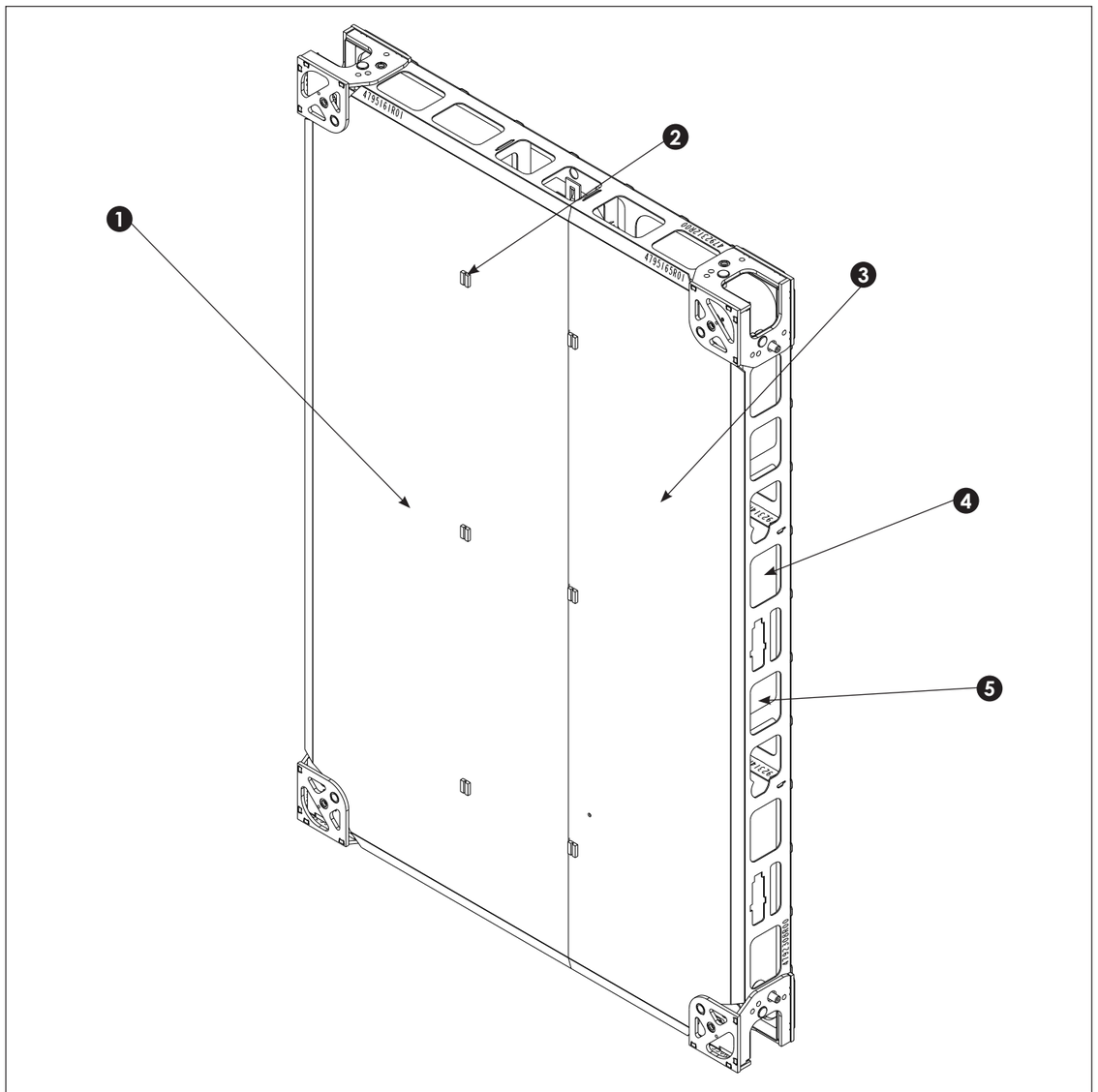
Figure 1 (rotated front view) and **Figure 2** (rotated rear view) show the basic features of a typical DVN-3001 series 3x2 display panel.



1: Interconnect latch @ 4 per panel
2: M5 border attachment tap screw thru-hole @ 8 per panel
3: Push button for component front-access assembly @ 1 per panel
4: Module power/signal jack location @ 6 per panel
5: Component front-access assembly @ 1 per panel
6: Power jack @ 1 per panel
7: Signal jack @ 1 per panel
8: M6x1.0 threaded nut @ 4 per panel
9: $^1/_4$" self-drilling screw thru-hole @ 4 per panel
10: M6x1.0 threaded bolt @ 4 per panel

Figure 1: *Display Panel (Rotated Front View)*



1: Component rear-access door @ 1 per panel
2: Quarter-turn latch @ 6 per panel
3: Module rear-access door @ 1 per panel
4: Power distribution exit @ 1 per panel
5: Signal distribution exit @ 1 per panel

Figure 2: *Display Panel (Rotated Rear View)*

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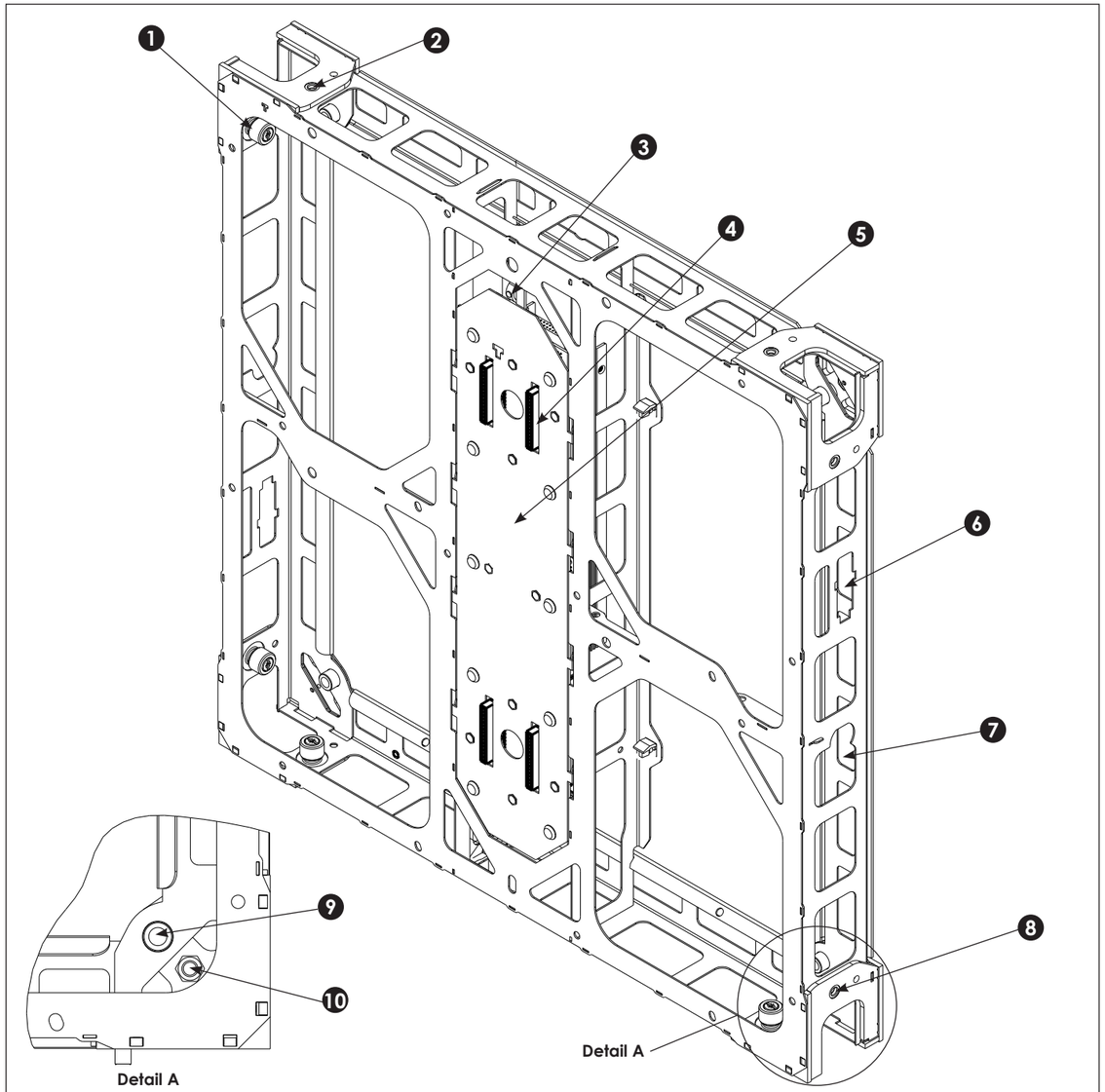
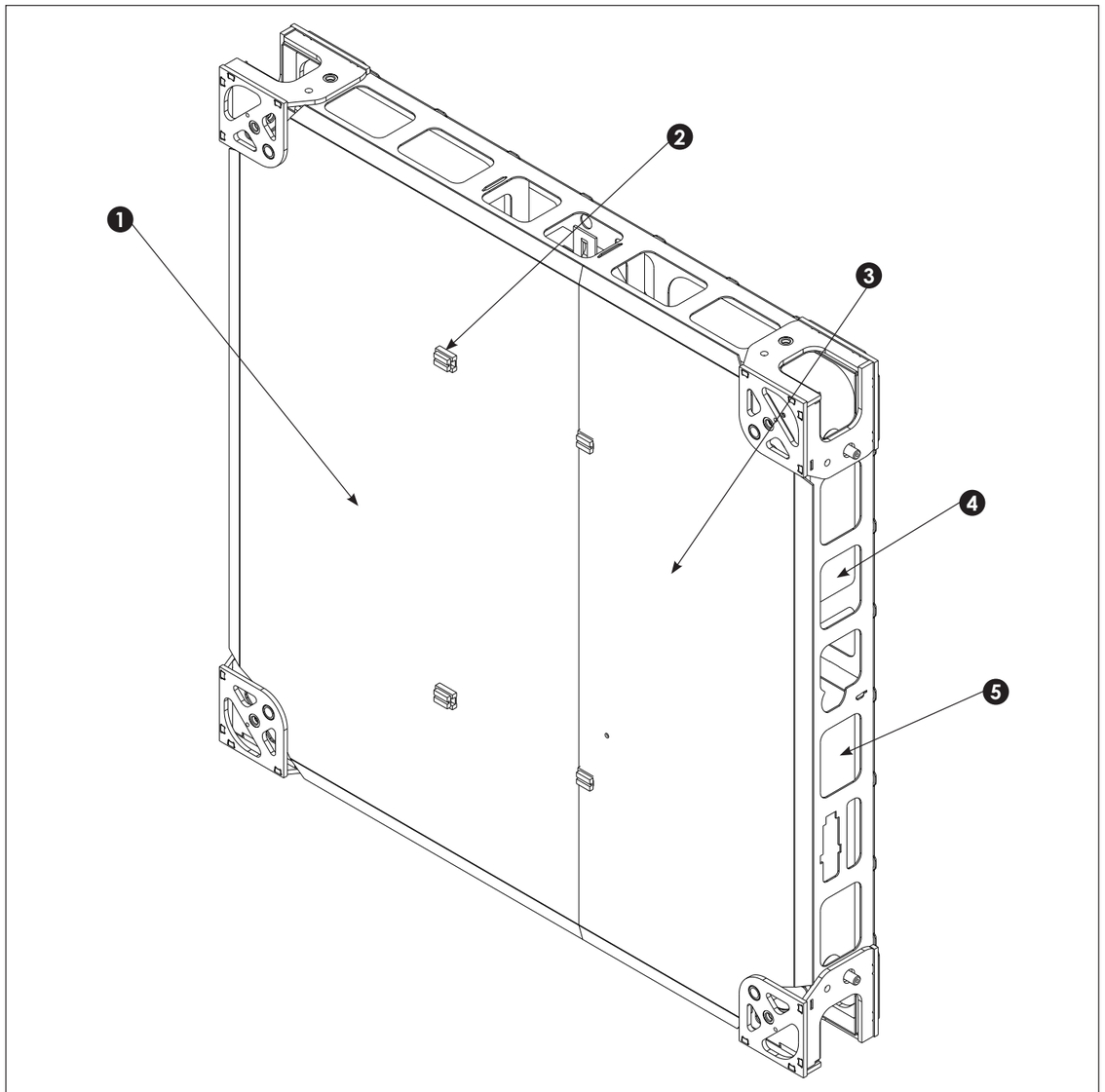
DVN-3001 Series Panel Basics Quick Guide

Figure 1 (rotated front view) and **Figure 2** (rotated rear view) show the basic features of a typical DVN-3001 series display panel.



1: Interconnect latch @ 4 per panel
2: M5 border attachment tap screw thru-hole @ 8 per panel
3: Push button for component front-access assembly @ 1 per panel
4: Module power/signal jack location @ 4 per panel
5: Component front-access assembly @ 1 per panel
6: Power jack @ 1 per panel
7: Signal jack @ 1 per panel
8: M6x1.0 threaded nut @ 4 per panel
9: $^{1}/_{4}$" self-drilling screw thru-hole @ 4 per panel
10: M6x1.0 threaded bolt @ 4 per panel

Figure 1: *Display Panel (Rotated Front View)*



1: Component rear-access door @ 1 per panel
2: Quarter-turn latch @ 4 per panel
3: Module rear-access door @ 1 per panel
4: Power distribution exit @ 1 per panel
5: Signal distribution exit @ 1 per panel

Figure 2: *Display Panel (Rotated Rear View)*

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DVN-3001 Series Panel Installation Quick Guide

Mechanical

Panel Interconnect Engagement

1. Push the knurled captivated bolts through the cabinet to attach the adjacent cabinets. Refer to **Figure 1**.
2. Hand-tighten the knurled captivated bolts loosely until the cabinets are mated but still able to move for adjusting.
3. Check the top-to-bottom panel alignment to ensure the panels are level. Adjust the jacking hardware until the panels are flush.
4. Finish hand-tightening the captivated bolts as much as possible and then use a Phillips or standard screwdriver to do a final $^{1}/_{2}$ to $^{3}/_{4}$ turn.
5. Feel the top, bottom, and center of the seam to ensure the seam between the panels feels smooth, ensuring proper panel alignment.

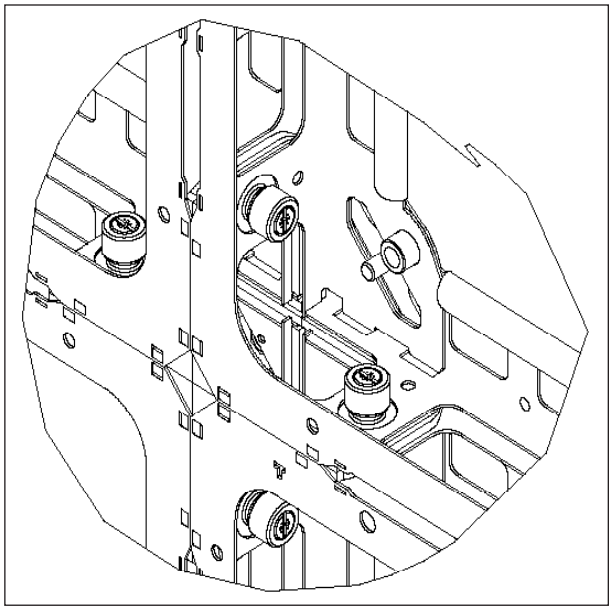

Figure 1: *Knurled Captivated Bolt*

Self-Drilling Screw Installation

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

If standard $^{1}/_{4}$"-14 screws are being used, use a pilot hole size of $^{13}/_{64}$" [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.

   Note: For 1x4 tubes, pilot holes must be drilled through both the front and rear walls of the tube to prevent screw strip-out.

2. Start the attachment of the self-drilling screws in the pilot holes, but do not tighten the screws down.

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Electrical

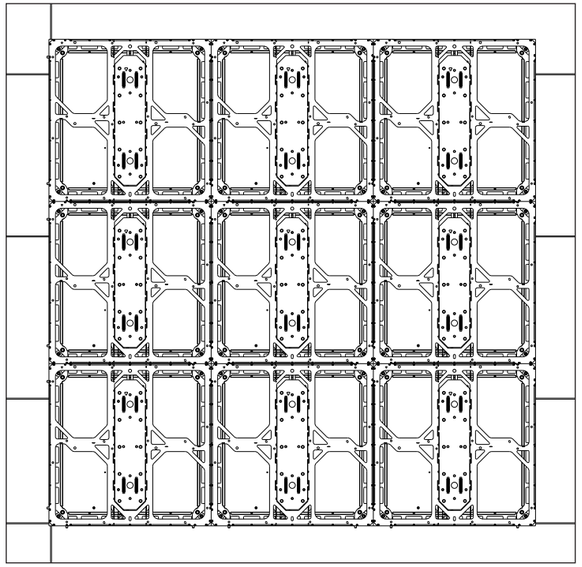

Figure 1: *Standard Panel*

PLR Installation

Refer to the contract-specific Riser Diagram for the correct PLR location.

The PLR hook mounts to the center vertical inside the display and secures with a screw.

1. Use a $^{5}/_{16}$" nutdriver to remove the screw from the mounting plate. Refer to **Figure 2**.

Figure 2: *PLR*

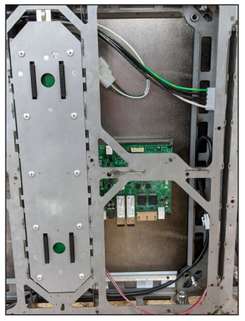

Figure 3: *Install PLR*

2. Line up the tabs on the side of the mounting plate with the hook mount on the center vertical inside the panel. Refer to **Figure 3**.
3. Secure the mounting plate to the panel with the screw removed in **Step 1**.

Signal Connection

The panels daisy-chain between sections per the contract-specific Riser Diagram.

1. Connect a Cat 5e/Cat 6 cable from the panel to the PLR.
2. Route the Cat 5e/Cat 6 cable hanging loosely from the panel and plug it into the adjacent panel-mounted RJ45 jack.
3. Connect the last panel back to the PLR for redundant signal connection. Refer to the Riser Diagram.

Refer to **Figure 4** for an example of four panels connected together. Standard signal routing is horizontal with configurable jumpers available to vertically jump a row if necessary.

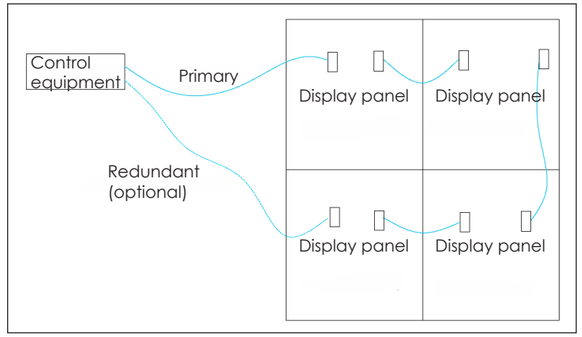

Figure 4: *Signal Connection*

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 12 panels when using a one-phase power entrance and for every 36 panels when using a three-phase power entrance. Refer to the contract-specific Riser Diagram for more details.

Both vertical and horizontal interconnects are available. A typical horizontal solution is depicted in **Figure 5**. Standard power routing is horizontal with configurable jumpers available to vertically jump a row if necessary.

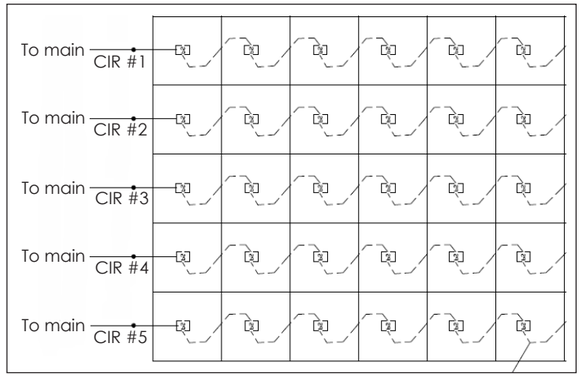

Figure 5: *Horizontal Power Connection*

A configurable power termination panel will be installed on-site. Refer to the contract-specific Riser Diagram for more details.

Power Entrance

Refer to the contract-specific Riser Diagram for the correct power entrance location.

The power entrance hook mounts to the center vertical inside the display and secures with a screw.

1. Use a $^{5}/_{16}$" nutdriver to remove the screw from the mounting plate. Refer to **Figure 6** and **Figure 7**.

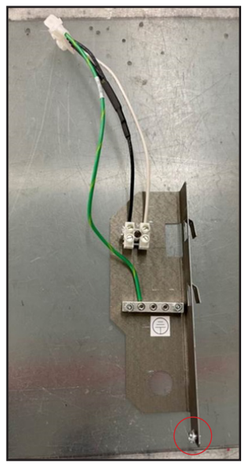

Figure 6: *1-Phase Power Entrance*

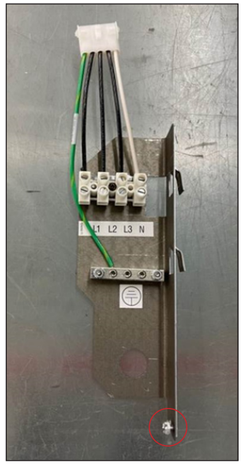

Figure 7: *3-Phase Power Entrance*

2. Line up the tabs on the side of the mounting plate with the hook mount on the center vertical inside the panel. Refer to **Figure 8**.
3. Secure the mounting plate to the panel with the screw removed in **Step 1**.

Connect the power harnesses together between panels for power interconnection. Refer to the contract-specific Riser Diagram for more details.

Figure 8: *Install Power Entrance*

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. Press firmly (with a gloved hand flat against the module face) in locations shown.

Follow the front-access and rear-access module removal steps in the **DVN-3001 Series Service Quick Guide (DD4774243)** to remove a module.

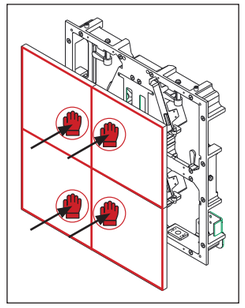

Figure 9: *Modules on Panel*

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Tools

Part	Part Description
Cordless screw gun with T25 6-lobe bit	Attaches borders to panel

Part Identification

There are four different border sizes for the DVN-3001 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**	**Horizontal Wall Angle**
Border Spacer	6-Long	0M-4825849	0M-4825865	0M-4825833	0M-4825881
	4-Long	0M-4825851	0M-4825867	0M-4825835	0M-4825883
	3-Long	0M-4825853	0M-4825869	0M-4825837	0M-4825885
	2-Long	0M-4825855	0M-4825871	0M-4825839	0M-4825887
Border	6-Long	0M-4825857	0M-4825873	0M-4825841	0M-4825889
	4-Long	0M-4825859	0M-4825875	0M-4825843	0M-4825891
	3-Long	0M-4825861	0M-4825877	0M-4825845	0M-4825893
	2-Long	0M-4825863	0M-4825879	0M-4825847	0M-4825895

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 the panel) borders are available. Longer borders must be installed after the display sections are mounted to the structure.

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 border spacer and border into position with the border spacer oriented so the rear end of the slot aligns with the border mounting holes when all edges are aligned. Refer to **Figure 1**. Ensure the borders are oriented with the countersink exposed and the front edge even with the front of the LED face.

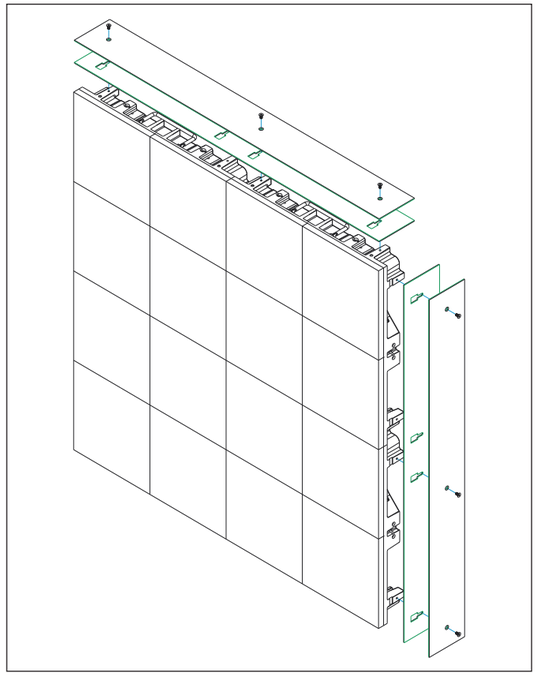

Figure 1: *Bring Border Spacer & Border into Position*

4. Adjust the border spacer back to the wall up to $^{3}/_{4}$" [20 mm] (if necessary) to fill any gaps created while adjusting the display with shims and jacking hardware. Refer to **Figure 2**.
5. Use a T25 6-lobe bit to attach the M5-0.8 x 12 mm thread-rolling screws (HC-4782939) and fasten the border to the panels in all pre-punched countersink hole locations on the borders. Each panel has holes for borders on all four sides. Refer to **Figure 3** for the finished appearance.

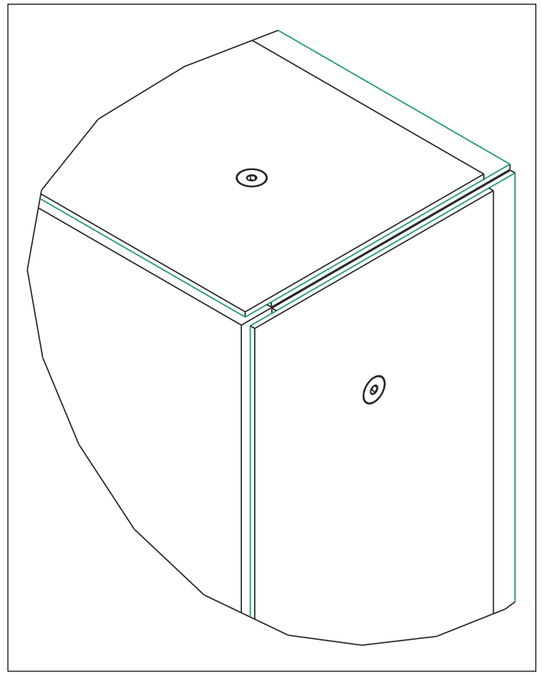

Figure 2: *Adjust Border Spacer*

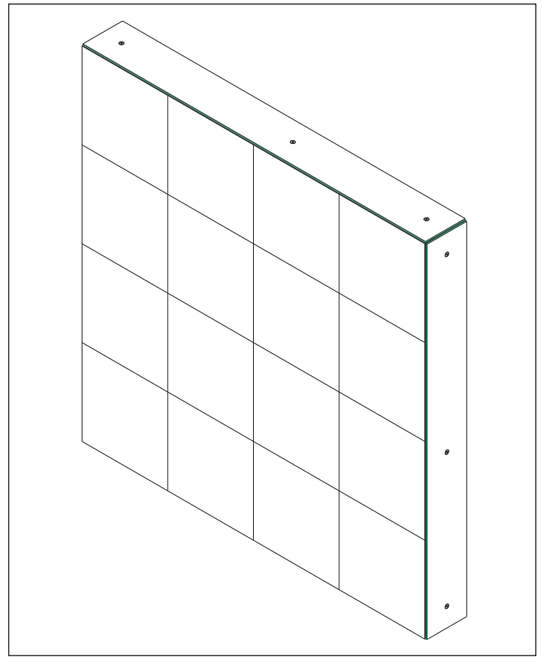

Figure 3: *Fasten Border to Panel*

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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 component front-access assembly. Refer to **Component Front-Access Assembly 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 **Component Front-Access Assembly Removal (p.1)** to reinstall the component front-access assembly.
6. Complete the module installation steps in the **DVN-3001 Series Electrical Installation Quick Guide (DD4774519)** to reinstall the module.

Rear-Access Display

1. Disconnect power to the display.
2. Remove 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. Reinstall 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*

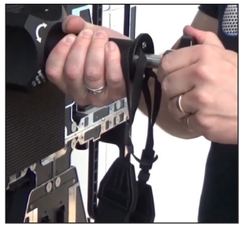

Figure 2: *Remove Module*

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**.

   Note: The module safety lanyard should already be attached but replace as shown in **Figure 3** if needed.
4. Pull the module straight out until it disengages from the display face.
5. Detach the lanyard from the removed module.

Rear-Access Module Removal

1. Disconnect power to the display.
2. Remove the rear-access door.
3. Disengage the module from the panel:

   Note: The module safety lanyard should already be attached but replace as shown in **Figure 3** if needed.

   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.

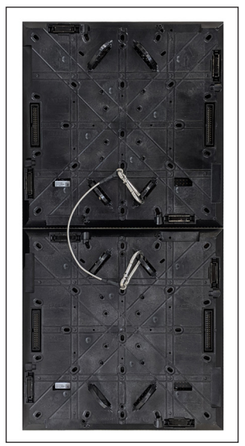

Figure 3: *Module Safety Lanyard*

4. Rotate the module and pull it through one of the two openings in the panel. Refer to **Figure 4**.

   Only two openings allow for module pass-through. An adjacent module may need to be removed to access an opening.
5. Detach the lanyard from the removed module.

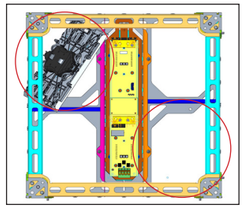

Figure 4: *Pull Module through Opening*

Component Front-Access Assembly Removal

1. Disconnect power to the display.
2. Press and hold the push button at the top of the component front-access assembly and slide the assembly up. Rotate the bottom of the assembly out until the top tab is free. Refer to **Figure 5**.
3. Pull the assembly 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)**.

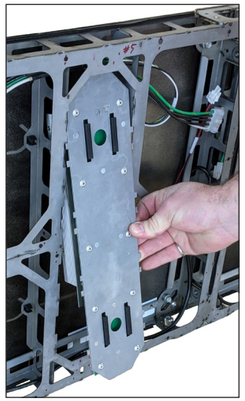

Figure 5: *Remove Component Front-Access Assembly*

Reverse these steps to install a component front-access assembly, ensuring the cables do not get pinched.

Hub Board/Receiver Card Removal

1. Disconnect power to the display.
2. Remove the component front-access assembly on the panel to be serviced if the display is front-access. Refer to **Component Front-Access Assembly 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 6**.
4. Disconnect the power supply from the hub board via one of the following methods:

   - Use a Phillips screwdriver to loosen the connections on the power supply and disconnect the cables extending from the board. Refer to **Figure 6**.
   - Push in the positions on the spring-loaded terminal block and disconnect the cables extending from the board. Refer to **Figure 6**.

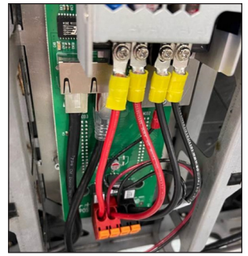

Figure 6: *Disconnect Cables from RJ45 Jacks & Power Supply*

5. Use a Phillips screwdriver to remove the screws securing the hub board to the component front-access assembly.

Reverse these steps to install a hub board.

Power Supply Removal

1. Disconnect power to the display.
2. Remove the component front-access assembly on the panel to be serviced if the display is front-access. Refer to **Component Front-Access Assembly 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 Phillips screwdriver to remove the screws securing the power supply strap to the panel.

Reverse these steps to install a power supply.

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DVN-3050/3051 Series Substructure Quick Guide

There are two common substructures for DVN-3050 and DVN-3051: 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 ±1/4" level and ±1/4" plumb face (horizontal rolled tube) or ±1/4" level and ±1/4" plumb face (directly to horizontal tube).

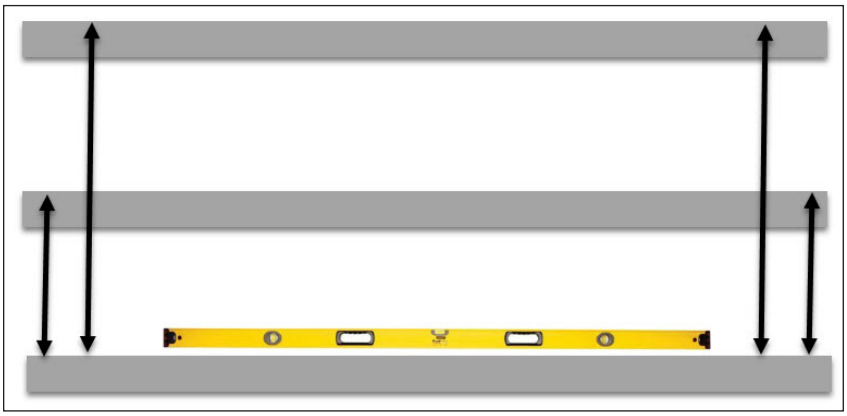

Figure 1: *Verify Level Horizontal Rolled Tubes (Front View)*

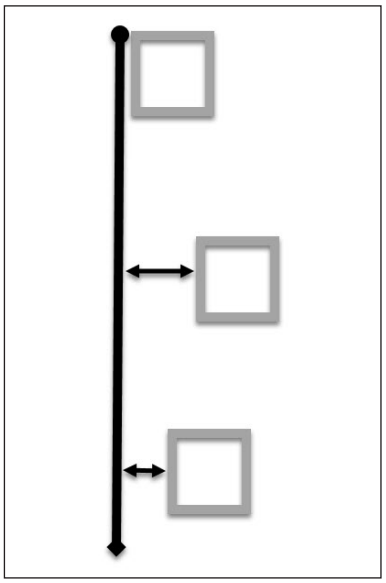

Figure 2: *Verify Plumb Horizontal Rolled Tubes (Side View)*

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**.

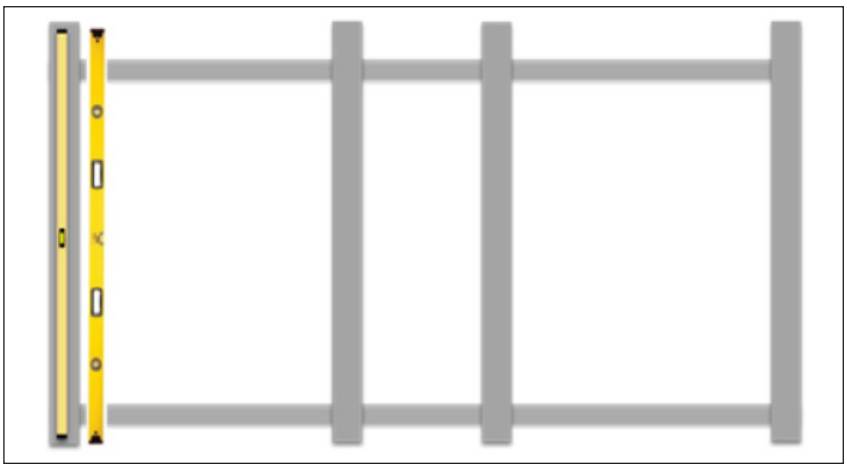

Figure 3: *Verify Level & Plumb Vertical Tubes (Front View)*

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 ±1/4 in all directions.

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

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Mechanical

Apply one of the two methods to attach a display: mounting clip-to-panel or 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 M6-1x20 mm hex-head bolts. Refer to **Figure 1**. Clip quantity and location may differ by panel location. Refer to the contract-specific Shop Drawing for clip locations.

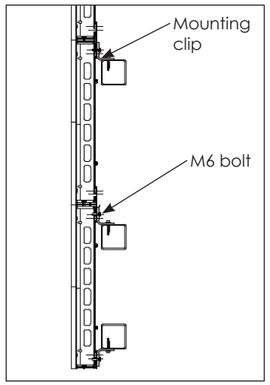
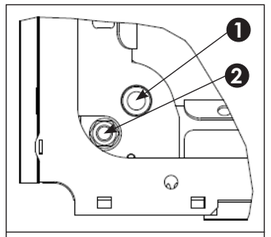


Figure 1: *Attach Mounting Clips to Panel*

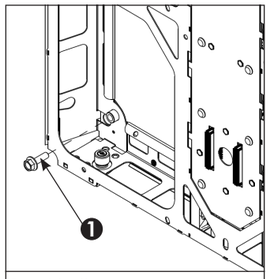
Panel-to-Tube Attachment

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 M6-1x20 mm serrated-head bolt if Z-axis adjustment is needed. Refer to **Figure 2** and **Figure 3**.



1: $^{1}/_{4}$" Self-drilling screw thru-hole
2: M6 threaded thru-hole

Figure 2: *Mount Panel to Tube*



1: M6 bolt

Figure 3: *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 M6-1x20 mm jacking bolt in the lower corners on each panel. Refer to **Figure 4**.

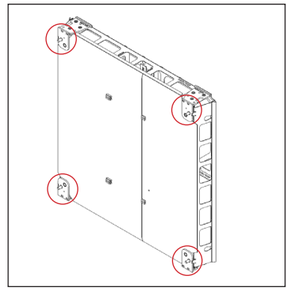


Figure 4: *Attach Panel to Tube*

2. Insert one self-drilling screw and one M6-1x20 mm jacking bolt in the upper corners on each panel in the bottom row of panels only. Refer to **Figure 4**.

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.

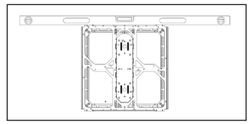


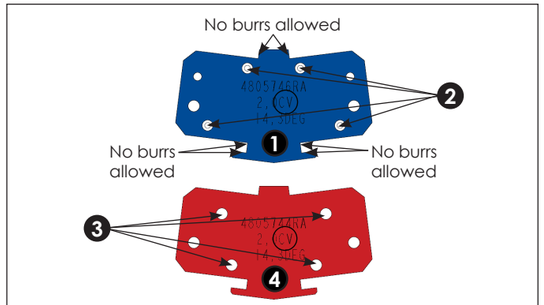
Figure 5: *Install First Panel*

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 M5-0.8x12 mm tap screws per bottom interconnect angle plate to attach to the bottom of the first row of panels. Tighten the screws to 15 in-lbs. Use four M6-1x12 mm Allen-drive screws per mid-display interconnect plate to attach to the top of the panels, leaving the screws finger-loose. Refer to **Figure 7**.

> **Note:** This may be done prior to installing the panel on the structure.

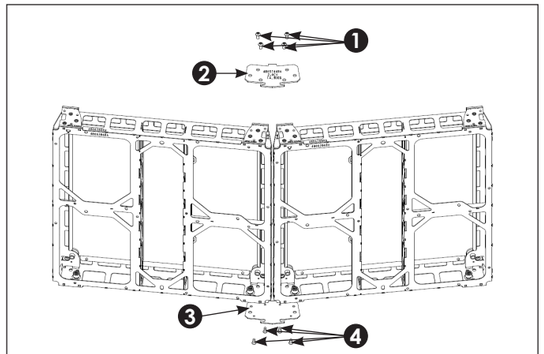
The interconnect angle plates are designed to sit tight against the mating machined surface of the panel. Each plate is etched to show if it is for a concave "CC" or convex "CV" display. Refer to **Figure 6**.

> **Note:** Top and bottom interconnect angle plates are only used on the bottom of the first row and the top of the last row. Refer to **Figure 11** for typical installation location. The Top Interconnect bracket is shown in (**blue**). The Mid Display interconnect plate is shown in (**red**).



1: Top & bottom interconnect plate (0.090") [2.2 mm]
2: M5 countersink hole for panel attachment
3: M6 clearance hole for panel attachment
4: Mid-display interconnect plate (0.125")[3.175 mm]

Figure 6: *Interconnect Angle Plate*



1: M6-1x12 mm screw
2: Top interconnect plate
3: Bottom interconnect plate
4: M5-0.8x12 mm tap screw

Figure 7: *Install Interconnect Plates*

4. Position the next panel beside the existing panel and use M6-1x12 mm screws to attach the interconnect plate.

   It is normal for panels to have a vertical gap. Refer to **Figure 8**.

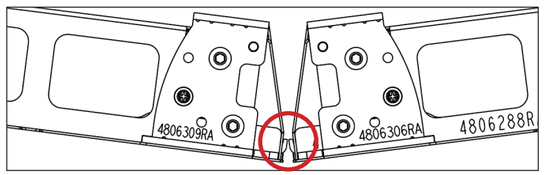


Figure 8: *Vertical Gap*

5. Tighten the M6-1x12 mm screws on top of each panel. Torque the screws to 55 in-lbs. Refer to **Figure 9**.

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

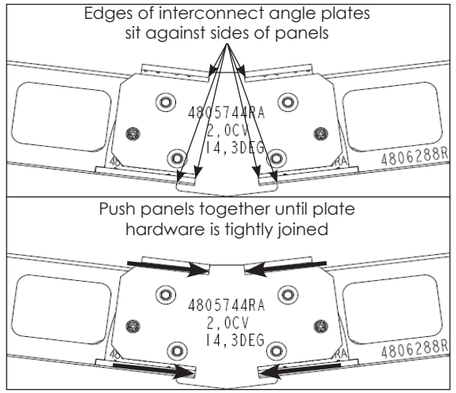


Figure 9: *Install Interconnect Plates*

6. Repeat **Steps 3-5** for the remaining panels in the row, building from the center out and tightening the vertical interconnect hardware to 55 in-lbs. Refer to **Figure 10** and **Figure 11**. Ensure each panel is level and plumb.

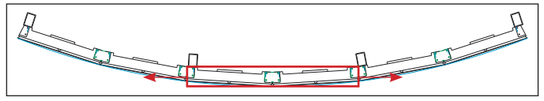


Figure 10: *Install First Row of Panels (Top View)*

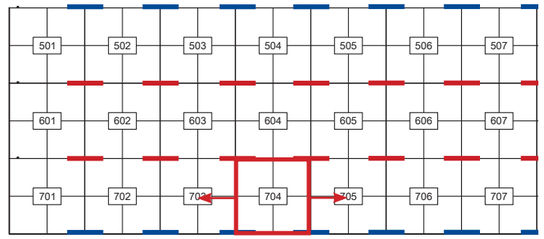


Figure 11: *Install First Row of Panels (Front View)*

7. Start installing the upper plates on the next row after the first row is completed, working from the center out.

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

8. Continue attaching panels up to the top row.

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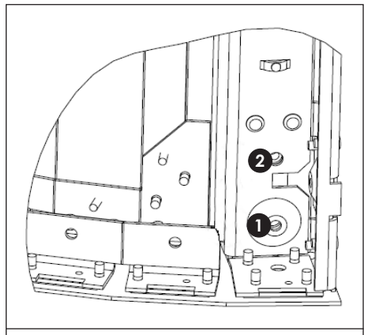
DVN-305X Series $^{1}/_{4}$-Module Panel Installation Quick Guide

Mechanical

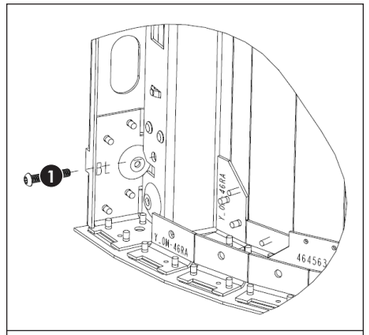
Panel-to-Tube Attachment

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.



1: M6 thru-hole
2: M6 threads

Figure 1: *Mount Panel to Tube*



1: M6 bolt

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**.

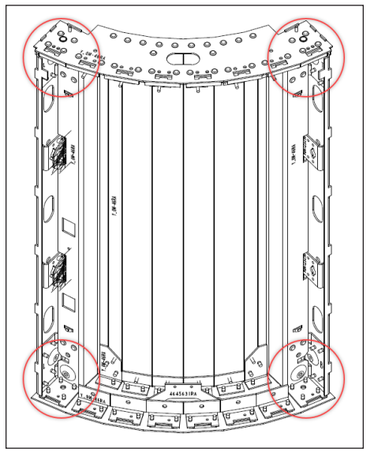


Figure 3: *Attach Panel to Tube*

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.

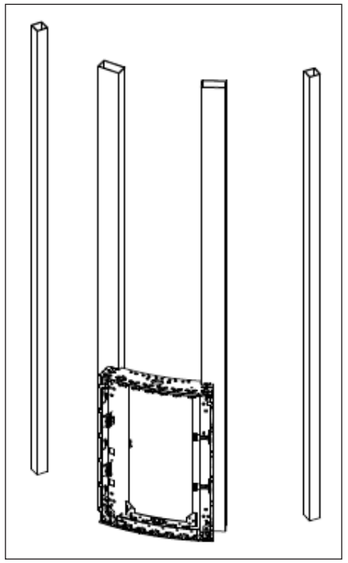


Figure 4: *Install First Panel*

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)**.

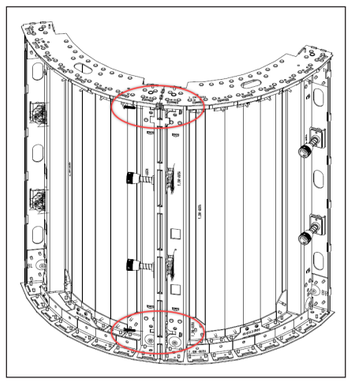


Figure 5: *Install M5 Screws through Side Perimeter*

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**.

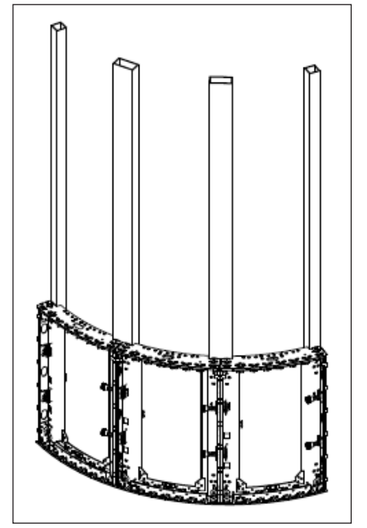


Figure 6: *Install Bottom Row of Panels*

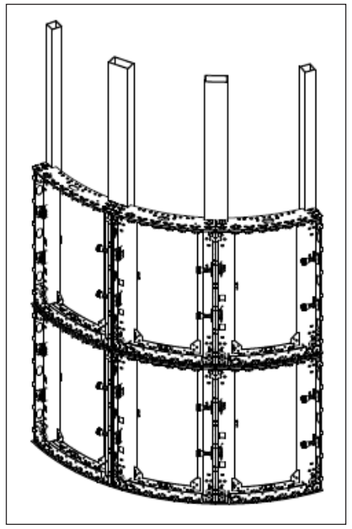


Figure 7: *Install Second Row of Panels*

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.

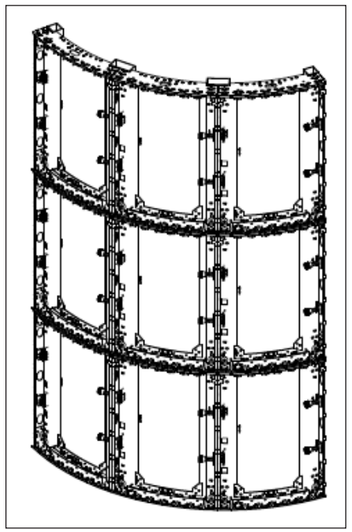


Figure 8: *Install Tubes*

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DVN-305X Series $^{1}/_{4}$-Module Border Installation Quick Guide

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.

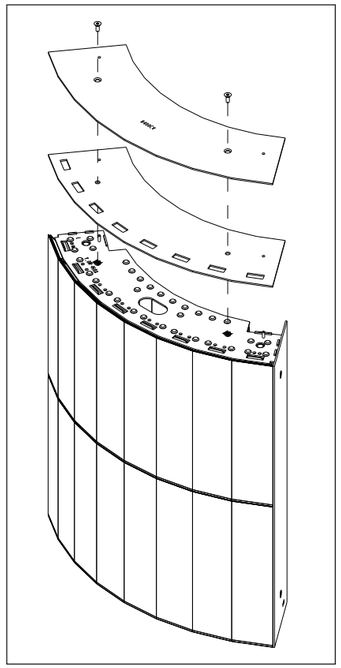

Figure 1: *Bring Top Border Spacer & Top Border into Position*

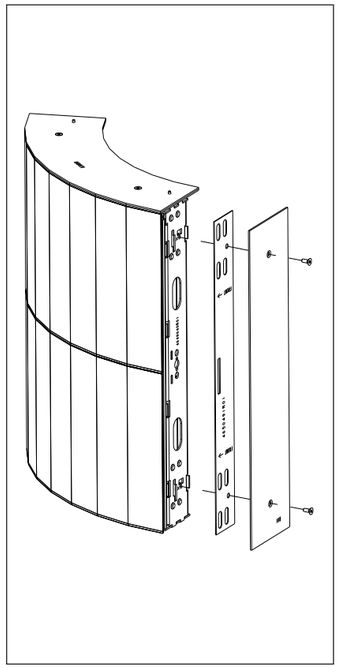

Figure 2: *Bring Side Border Spacer & Side Border into Position*

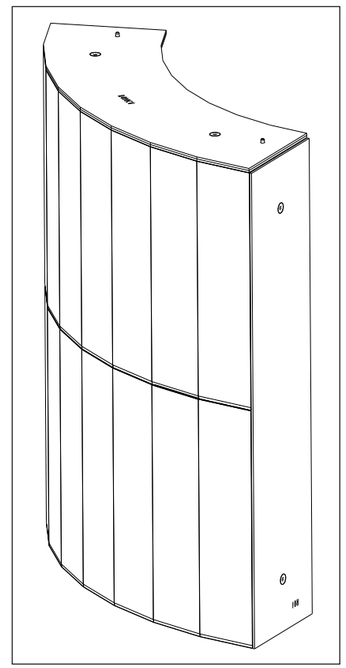

Figure 3: *Top & Side Borders Attached to Panel*

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.

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Rev 01
7 December 2023

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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*

Figure 2: *Center Tool on Module*

   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 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**.

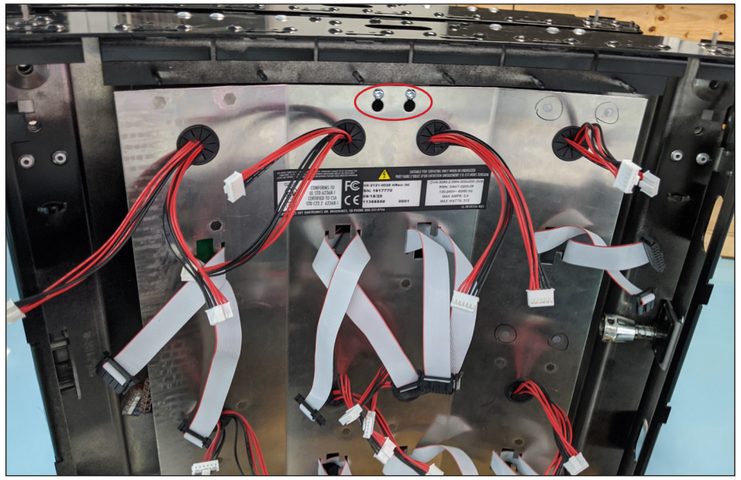

Figure 7: *Remove Component Plate*

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.

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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**.

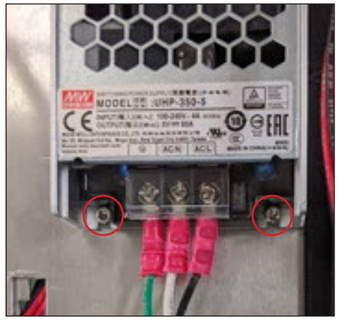


Figure 8: *Three-Ring Terminals*

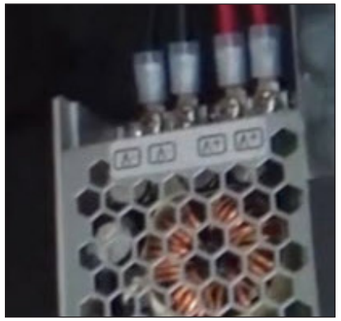


Figure 9: *Four-Ring Terminals*

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**.

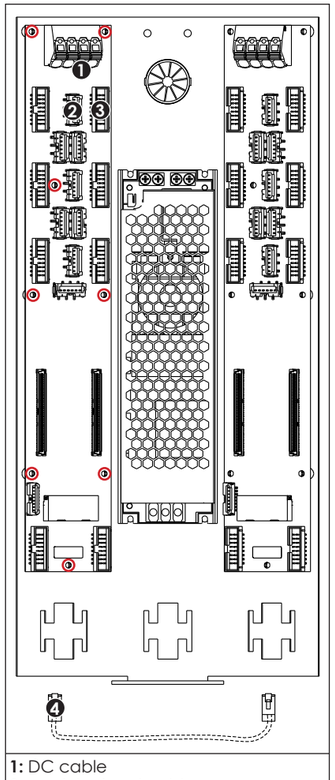
Reverse these steps to install a power supply.

Hub Board

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

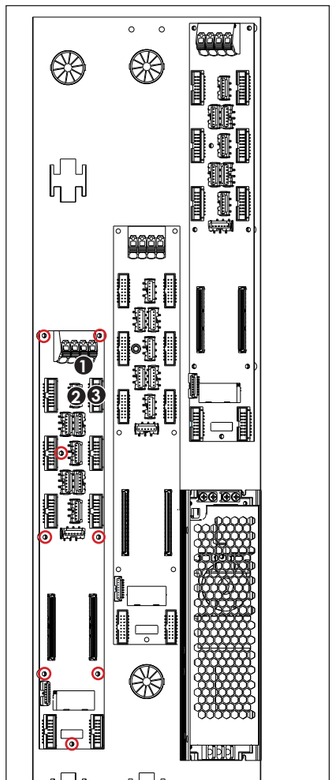
To remove a hub board, follow these steps:

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**.



1: DC cable
2: Module signal cable
3: Module power cable
4: Cat 6 cable

Figure 10: *2-High Component Layout*



1: DC cable
2: Module signal cable
3: Module power cable
4: Cat 6 cable

Figure 11: *3-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.

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**.

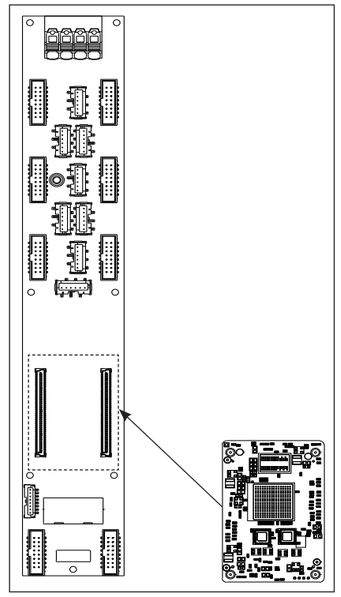


Figure 12: *Install Receiver Card*

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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-30X1 series displays and are listed in numeric order. Any contract-specific drawings take precedence over the general drawings.

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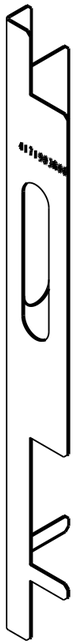
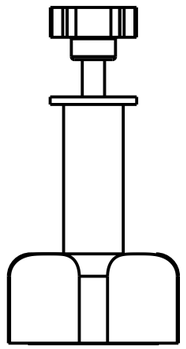
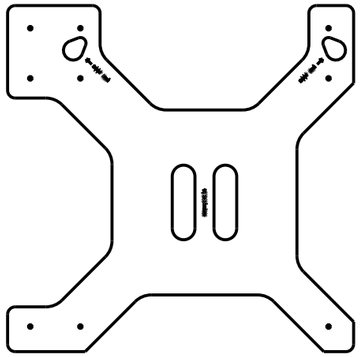
REQUIRED TOOLS AND ALIGNMENT JIGS (PROVIDED)



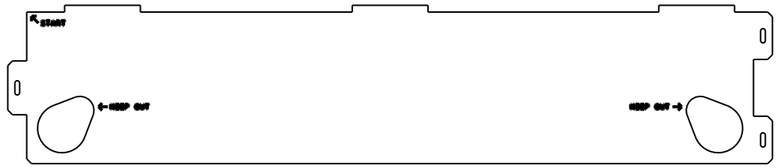
TUBE PLACEMENT JIG
(0M-4171903 OR 0M-4697695)
HORIZONTAL TUBE ONLY



MOD REMOVAL TOOL
(TH-3786574)

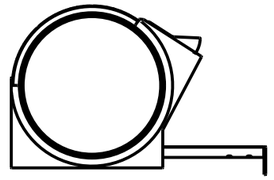


STRUCTURE JIG; HSPR ANGLE
0S-4230372
HSPR HORIZONTAL ANGLE ONLY



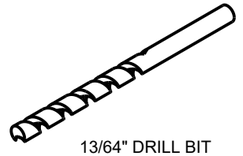
PANEL INTERFERENCE JIG
(0M-4103843)
HORIZONTAL TUBE ONLY

REQUIRED TOOLS (NOT PROVIDED)

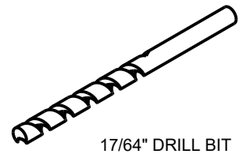


TAPE MEASURE

3/8" SOCKET
3/8" DRIVE

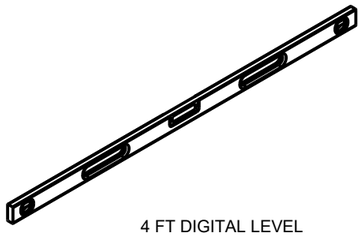


13/64" DRIL BIT



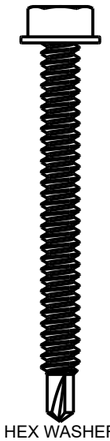
17/64" DRILL BIT

TORX T25 BIT



4 FT DIGITAL LEVEL

REQUIRED HARDWARE (PROVIDED)



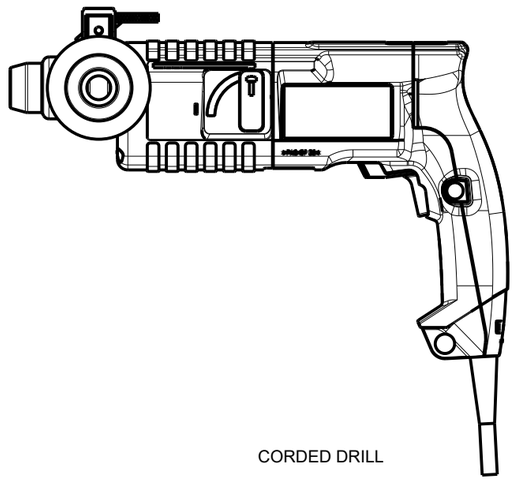
1/4" HEX WASHER HEAD
PN: HC-2070, HC-3880111, HC-3979953
(PANEL TO TUBE MOUNTING)

BOLT, M6X1 - 20MM LENGTH, HEX SERR FL, BLK ZN
PN:HC-3464941
(PANEL Z-ADJUST AND CLIP ANGLE MOUNTING)

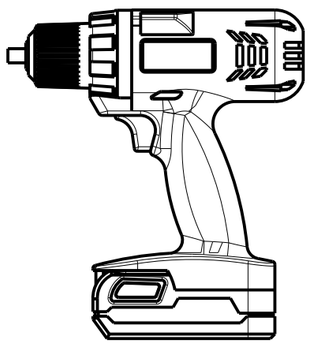
NUT, M6-1, HEX HEAD, ZN PLTD
PN: HC-3937323
(PANEL Z-ADJUST REAR SPACER)

TAP SCR, M5 X 0.8 X 12MM, FLAT HEAD, T25, BLK ZINC
PN: HC-4782939
(BORDER HARDWARE & MOD Z-ADJUST HARDWARE)

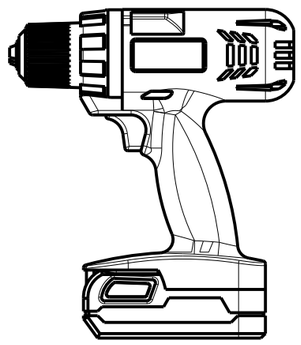
REQUIRED TOOLS (NOT PROVIDED)



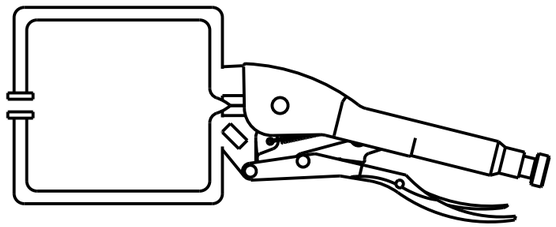
CORDED DRILL



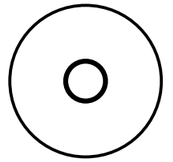
CORDLESS IMPACT
DRILL



CORDLESS DRILL



C-CLAMPS



ELECTRICAL TAPE

REV	DATE:		BY:	

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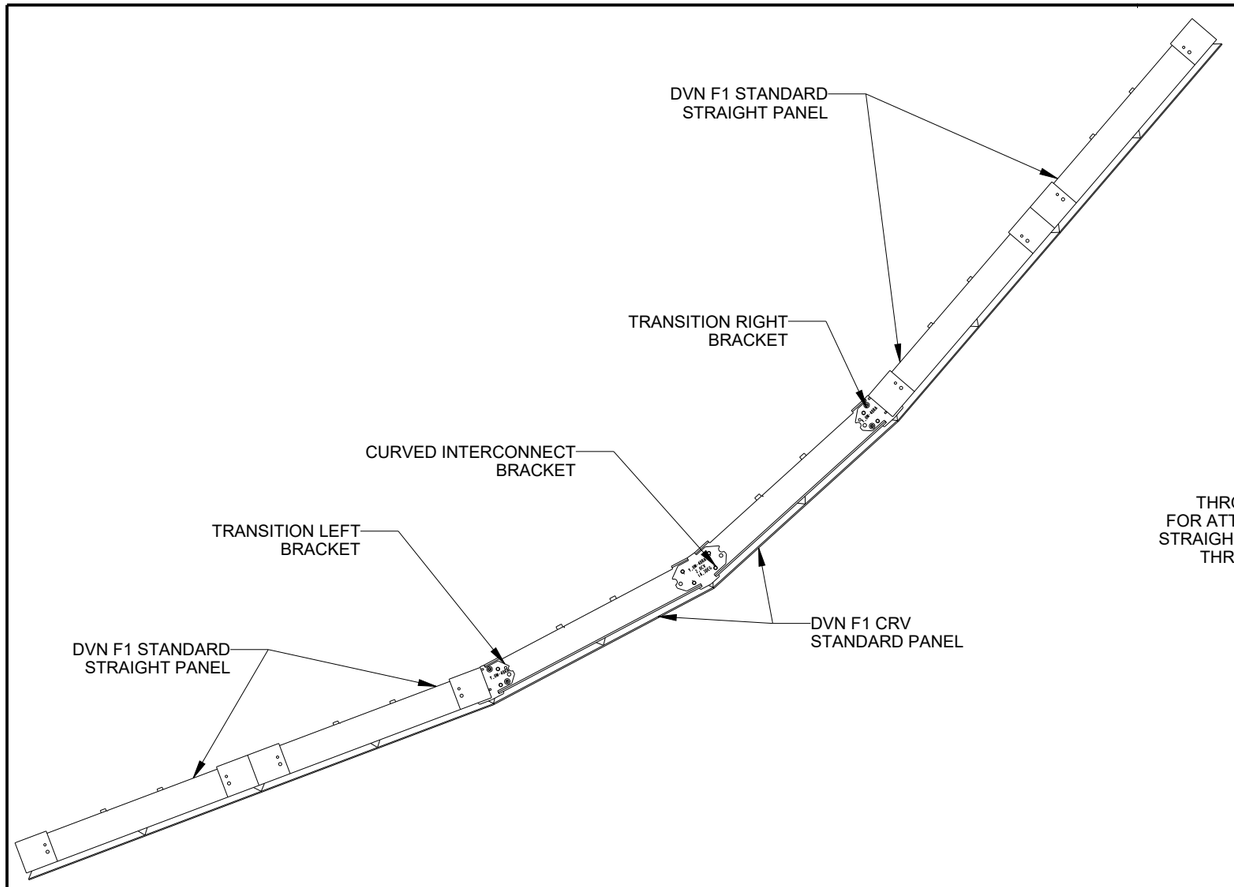
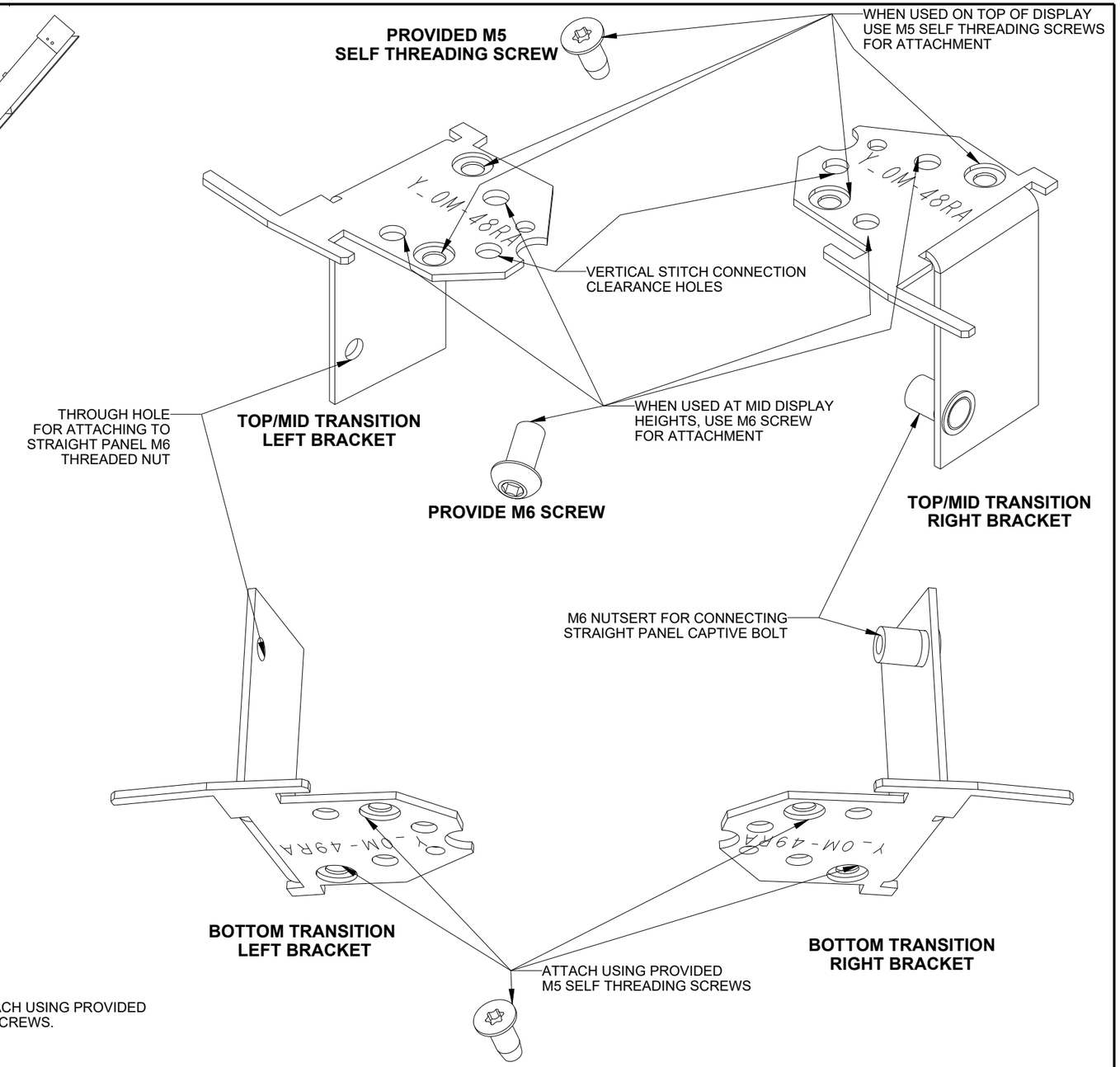
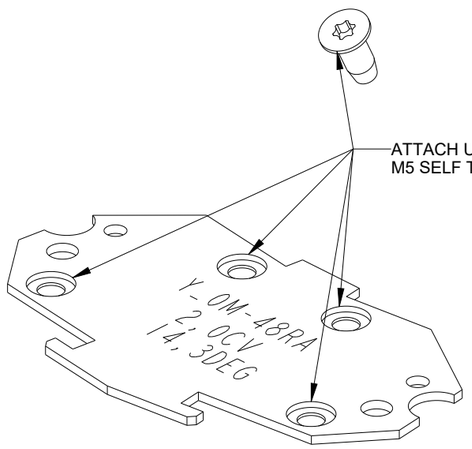
THIRD ANGLE PROJECTION

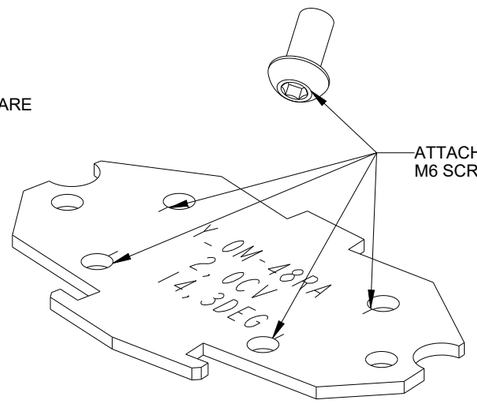
PROJECT:	DVN 3000			
TITLE:	RECOMMENDED TOOLS AND HARDWARE; DVN-3001			
DATE: 22-APR-21	DIM UNITS: INCHES [MILLIMETERS]		SHEET	REV
SCALE: 1/4	DO NOT SCALE DRAWING		1 OF 1	00
DESIGN: MHILLMAN	JOB NO.	FUNC - TYPE - SIZE	4771571	
DRAWN: MHILLMAN	P2121	E - 07 - B		







TOP AND BOTTOM OF DISPLAY INTERCONNECT BRACKET.



MID DISPLAY INTERCONNECT BRACKET. ONLY USED AT MID DISPLAY HEIGHT SEAMS

REV:	DATE:	DESCRIPTION:	BY:

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THIRD ANGLE PROJECTION

PROJECT:	DVN F1				
TITLE:	DVN F1 CURVE INTERCONNECT PLATES				
DATE:	17-SEP-21	DIM UNITS:	INCHES [MILLIMETERS]	SHEET	REV
SCALE:	1/36		DO NOT SCALE DRAWING		A
DESIGN:	RBJERKE	JOB NO.	FUNC - TYPE - SIZE		
DRAWN:	RBJERKE	P2293	E - 07 - B	4945519	

CAT6 ROUTING RULES

FOR DVN-3001 SIGNAL ROUTING WILL BE DONE USING RJ45. RJ45 CABLES WILL BE IN THE PANELS FROM THE FACTORY AND WILL JUST NEED TO BE INTERCONNECTED ONSITE.

FIELD CONFIGURABLE PLR

THE PLR ASSEMBLY WILL BE A FIELD CONFIGURABLE UNIT AGAIN. ASSEMBLY 0A-2293-7XXX.

FIELD CONFIGURABLE FIBER CONVERTER

THE FIBER CONVERTER ASSEMBLY WILL BE A FIELD CONFIGURABLE UNIT AGAIN. ASSEMBLY 0A-2293-7XXX.

FIBER ROUTING RULES

FOR DVN-3001 FIBER ROUTING WILL ALSO BE A FIELD CONFIGURABLE ITEM CALLED OUT AS LINE ITEMS.

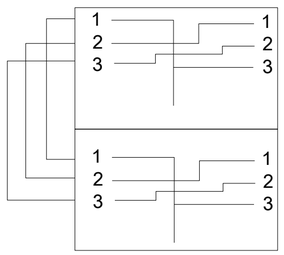
FIBER WILL BE THE SAME AS CURRENT DAKTRONICS PRODUCTS. W-1659 ETC

FIBER CONVERTER

NOTE FIBER CONVERT PLATE INSTALLS ONTO PLR ASSY
REFER TO DVN-3001 PBOM TOOL FOR LINE ITEMS CALLED OUT PER FIBER CONVERTER.

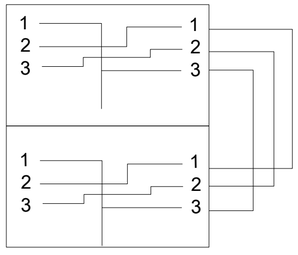
VERTICAL POWER JUMPING TO THE NEXT ROW PHASE INFO

RIGHT SIDE FEMALE TO FEMALE JUMPER FROM REAR

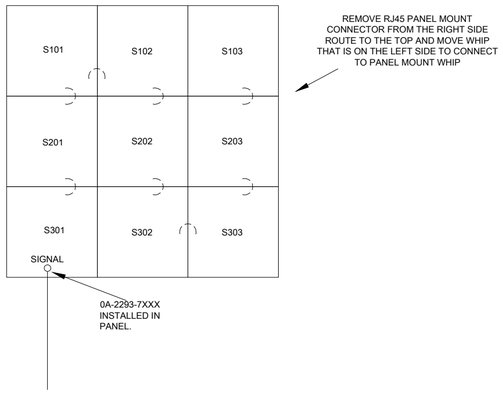


EITHER SIDE YOU END UP BEING AT THE SAME PHASE AS THE PANEL IN THE NEXT ROW WHEN JUMPING

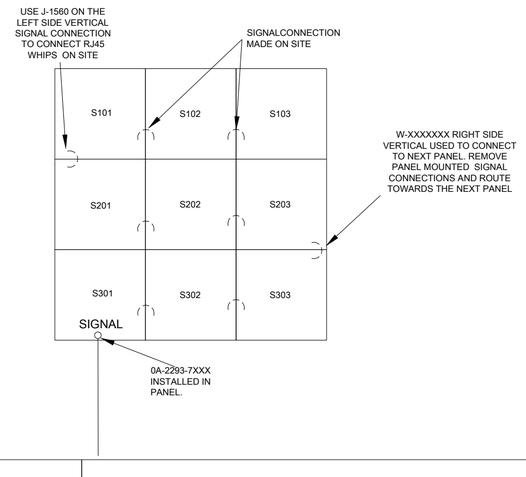
LEFT SIDE MALE TO MALE JUMPER FROM REAR



VERTICAL SIGNAL ROUTING
FRONT VIEW



HORIZONTAL SIGNAL ROUTING (DEFAULT)
FRONT VIEW



3X2 PANELS

THREE PHASE (0A-2293-7010 POWER ENTRANCE)

120V	230v INTERNATIONAL
MAX 24 PANELS PER 3 PHASE BREAKER (HIGH MAGNETIC) EACH PANEL USES A 120V SINGLE PHASE CIRCUIT. THE HARNESS IS A 3 PHASE HARNESS THAT ROTATES BETWEEN THE 3 PHASES AT EVERY PANEL TO REDUCE THE NUMBER OF POWER DROPS.	MAX 15 PANELS PER 3 PHASE BREAKER (HIGH MAGNETIC) EACH PANEL USES A 230V SINGLE PHASE CIRCUIT. THE HARNESS IS A 3 PHASE HARNESS THAT ROTATES BETWEEN THE 3 PHASES AT EVERY PANEL TO REDUCE THE NUMBER OF POWER DROPS.

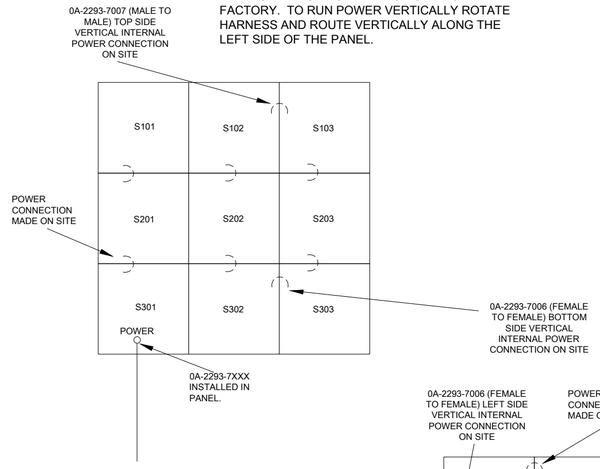
SINGLE PHASE (0A-2293-7011 POWER ENTRANCE)

120V SINGLE PHASE	230v INTERNATIONAL SINGLE PHASE
MAX 8 PANELS PER 1 PHASE BREAKER (HIGH MAGNETIC) EACH PANEL USES A 120V SINGLE PHASE CIRCUIT. THE HARNESS IS A 3 PHASE HARNESS THAT ROTATES BETWEEN THE 3 PHASES AT EVERY PANEL TO REDUCE THE NUMBER OF POWER DROPS.	MAX 5 PANELS PER 1 PHASE BREAKER (HIGH MAGNETIC) EACH PANEL USES A 230V SINGLE PHASE CIRCUIT. THE HARNESS IS A 3 PHASE HARNESS THAT ROTATES BETWEEN THE 3 PHASES AT EVERY PANEL TO REDUCE THE NUMBER OF POWER DROPS.

POWER ROUTING RULES
FRONT VIEW

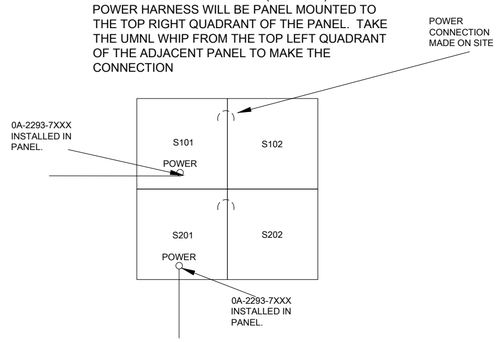
VERTICAL POWER ROUTING

FOR DVN-3001 POWER WILL BE ROUTED IN THE PANELS IN A HORIZONTAL FASHION FROM THE FACTORY. TO RUN POWER VERTICALLY ROTATE HARNESS AND ROUTE VERTICALLY ALONG THE LEFT SIDE OF THE PANEL.



HORIZONTAL POWER ROUTING (DEFAULT)

WHEN ROUTING INTERNAL AC POWER CONNECTIONS HORIZONTAL (DEFAULT) THE POWER HARNESS WILL BE PANEL MOUNTED TO THE TOP RIGHT QUADRANT OF THE PANEL. TAKE THE UMNL WHIP FROM THE TOP LEFT QUADRANT OF THE ADJACENT PANEL TO MAKE THE CONNECTION

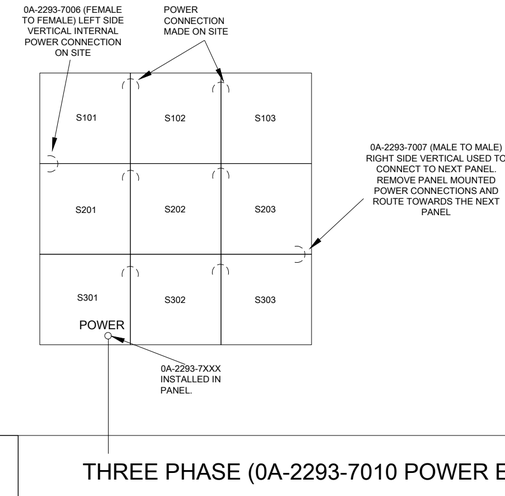


PER PANEL 2X2
TOTAL POWER REQUIREMENTS:

SYSTEM VOLTAGE	
120V 4	WIRES + GND
NUMBER OF POLES	1
MAXIMUM WATTS	180
AMPERES PER LINE	1.5

PER PANEL 3X2
TOTAL POWER REQUIREMENTS:

SYSTEM VOLTAGE	
120V 4	WIRES + GND
NUMBER OF POLES	1
MAXIMUM WATTS	264
AMPERES PER LINE	2.2



2X2 PANELS

THREE PHASE (0A-2293-7010 POWER ENTRANCE)

120V	230v INTERNATIONAL
MAX 36 PANELS PER 3 PHASE BREAKER (HIGH MAGNETIC) EACH PANEL USES A 120V SINGLE PHASE CIRCUIT. THE HARNESS IS A 3 PHASE HARNESS THAT ROTATES BETWEEN THE 3 PHASES AT EVERY PANEL TO REDUCE THE NUMBER OF POWER DROPS.	MAX 24 PANELS PER 3 PHASE BREAKER (HIGH MAGNETIC) EACH PANEL USES A 230V SINGLE PHASE CIRCUIT. THE HARNESS IS A 3 PHASE HARNESS THAT ROTATES BETWEEN THE 3 PHASES AT EVERY PANEL TO REDUCE THE NUMBER OF POWER DROPS.

SINGLE PHASE (0A-2293-7011 POWER ENTRANCE)

120V SINGLE PHASE	230v INTERNATIONAL SINGLE PHASE
MAX 12 PANELS PER 1 PHASE BREAKER (HIGH MAGNETIC) EACH PANEL USES A 120V SINGLE PHASE CIRCUIT. THE HARNESS IS A 3 PHASE HARNESS THAT ROTATES BETWEEN THE 3 PHASES AT EVERY PANEL TO REDUCE THE NUMBER OF POWER DROPS.	MAX 8 PANELS PER 1 PHASE BREAKER (HIGH MAGNETIC) EACH PANEL USES A 230V SINGLE PHASE CIRCUIT. THE HARNESS IS A 3 PHASE HARNESS THAT ROTATES BETWEEN THE 3 PHASES AT EVERY PANEL TO REDUCE THE NUMBER OF POWER DROPS.

FOR POWER LEFT OR TOP DOWN USE 0A-2293-7007 TO CONNECT POWER ENTRANCE TO BUS HARNESS

FOR DVN-3001 STRAIGHT AND CURVE WILL BE THE SAME IN TERMS OF CONNECTIONS. CURVE WILL NOT HAVE THE POWER WHIP CONNECTED TO THE SIDE AND WILL HAVE A LOOM AROUND THE POWER HARNESS (LOOM IS FACTORY INSTALLED) SINCE THERE WILL BE A GAP BETWEEN SECTIONS FROM THE REAR

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.
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THIRD ANGLE PROJECTION

PROJECT:	DVN-3001			
TITLE:	DVN-3001 EXT DESIGN GUIDE			
DATE:	14 JUN 22	DIM UNITS: INCHES [MILLIMETERS]	SHEET	REV
SCALE:	NTS	DO NOT SCALE DRAWING		A
DESIGN:	JFIXSEN	JOB NO.	FUNC - TYPE - SIZE	5090903
DRAWN:	JFIXSEN	P2293	R - 06 - C	

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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;

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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

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DAKTRONICS

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	Kruibeke, Belgium
Daktronics Ireland Co. Ltd.	Ireland	Dublin, Ireland

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