



Modular Vision Tunnel with DataMan 580s Installation Guide

1/20/2023
v1.0

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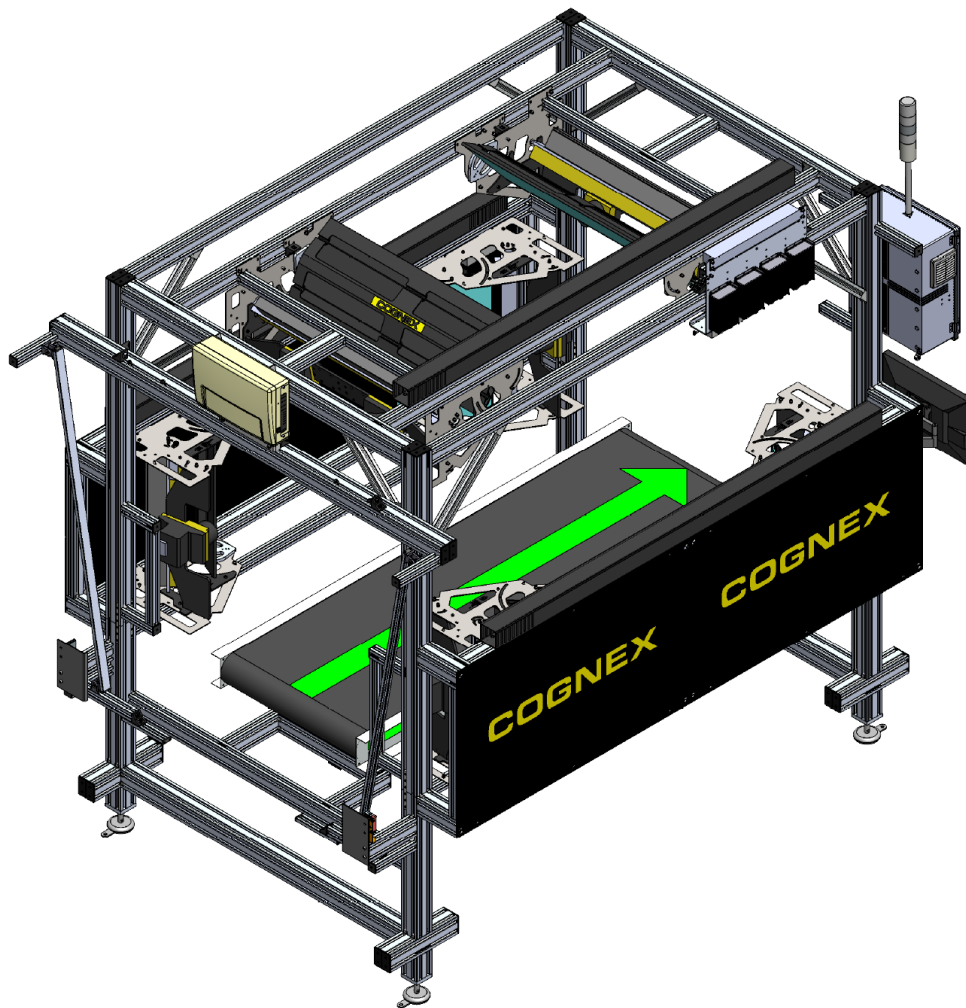
Introduction

1 Introduction

The Cognex Modular Vision Tunnel (MVT) is designed to scan five sides of packages as they are inducted into the tunnel. This solution can be paired with other standards such as bottom side solutions, or dimensioner, to enhance its functionality.

Depending on the application, performance target, required product coverage, and model of DataMan readers, the number of readers required may vary however the reader naming remains the same as the positions will not change. Left and right are defined based on direction of flow and looking downstream.

The MVT has several configurations and options to choose from for your project. If your project has a bottom-side reader, Mettler-Toledo Dimensioner, or other options, there may be additional components to install and commission.



How to Use this Manual

2 How to Use this Manual

Throughout this manual, Warnings, Cautions, and Notes are used to draw your attention to important information in the body of the text. It is important to pay attention to the content provided under these headings.



WARNING: This symbol indicates a hazard that could cause death, serious personal injury, or electrical shock.



CAUTION: This symbol indicates a hazard that could result in property damage.



Note: This symbol indicates additional information about a subject.

Prerequisites

3 Prerequisites

3.1 Prerequisites

- All materials have been accounted for on site.
- Materials have been staged at the predetermined installation location.
- Surrounding equipment can be properly locked out while work is being done to install the system.
- Minimal 15 Amp dedicated power source has been provided and accessible.
- Ethernet communication drop supplied.
- Validate configuration to mount encoder is correct.

3.2 Safety

When performing installation and system troubleshooting or maintenance, it is important to take appropriate precautions to ensure your safety and to avoid the possibility of equipment damage. Review this section prior to beginning any work.

3.2.1 Warnings and Notices



WARNING: Failure to follow instructions in this section may cause serious injury or equipment failure.

- Do not attempt to service or repair the Scan Tunnel components. Return components to Cognex for service.
- Do not permit anyone other than Cognex Corporation to service, repair, or adjust the Scan Tunnel components.



Note: For the most up-to-date regulations and conformity information, please refer to the Cognex online support site: <http://support.cognex.com>

Prerequisites

3.3 Additional Requirements

- Before you begin, ensure that your work area is clean and free from debris.
- Open shipping boxes and identify the system assemblies.
- Cut any conveyor side guards that would block the field of view of any system readers, according to the specifications for the project prior to installation.
- Isolate main 120VAC/220VAC (minimal 15A) power drop for control cabinet.
- All safety equipment on site as required by the site.



Note: If your shipping boxes are missing parts required for installation, contact your site Project Manager.



Note: Prior to completing any work on site, it is imperative to understand all safety requirements for lock out tag out to safely control the work area, protective equipment to safely complete the work, and to complete any additional training that may be required.

Gather all tools and equipment needed prior to beginning installation. Review these installation instructions before getting started to familiarize yourself with the system. If the position has not already been set, use these guidelines for placement of the frame.

- When possible, the conveyor gap should be outside the frame area.
- The conveyor gap should be located near the exit of the tunnel.
- The conveyor gap step height should be specified $\leq 3\text{mm}$.

3.3.1 Tools Required

You will need the following tools during installation:

- | | |
|---|--|
| • Box Cutter/Knife | • Flush cutters/zip tie gun |
| • Microfiber Cleaning Cloths | • Rubber Mallet |
| • Cleaning solution | • Tongue-and-groove pliers |
| • Metric Hex Keys T-Handle long with ball end | • Socket set |
| • Various Philips (cross) head screw drivers (Including small size for electrical terminations) | • Adjustable Wrench/Spanner |
| • Various Flat head screw drivers (Including small size for electrical terminations) | • Multi Meter capable of checking continuity and measuring AC/DC voltage for diagnostics |
| • Wireway cutting tool (Example Panduit Part No. DCT) | • Murr (CIO) torque wrench |
| • Large zip ties (8 in. or 20cm) | |

Prerequisites

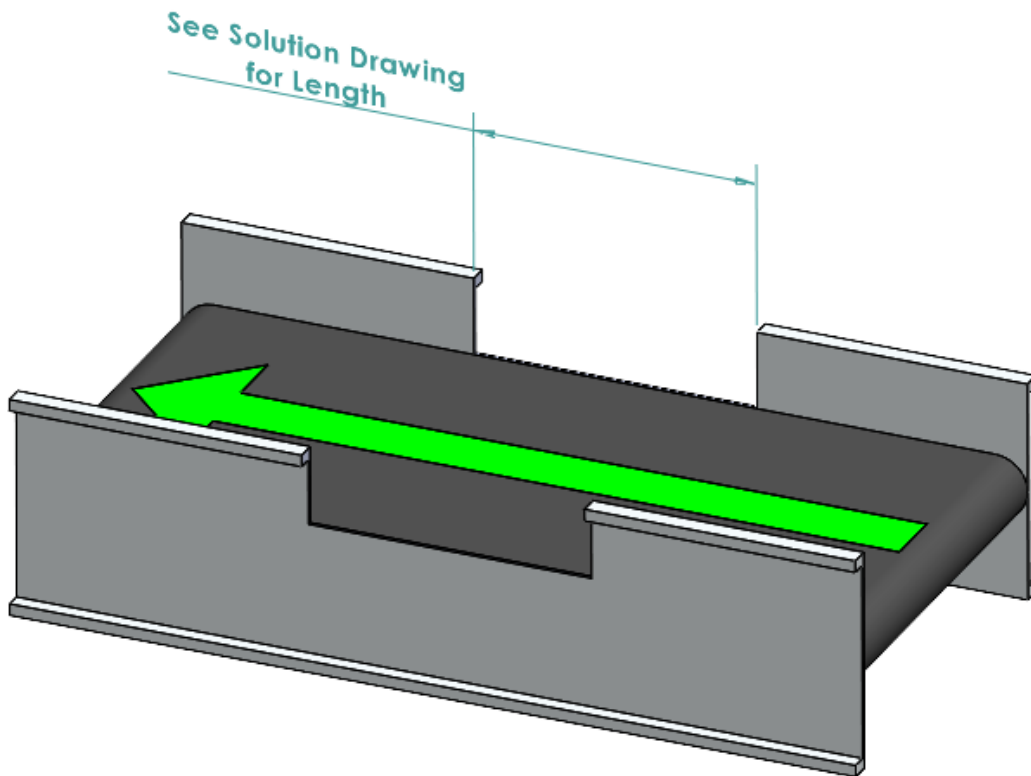
3.3.2 Conveyor cutout



WARNING: Conveyor cutouts should be completed prior to mounting any readers/modules. Cutting afterwards could result in damage to the equipment which would be at your own expense.

Conveyor rails that extend above the top surface of the conveyor must be cut to allow Cognex readers to see the product.

- Cutouts must be centered on scan tunnel.
- Refer to the drawings for the required cutout length.



System Overview

4 System Overview

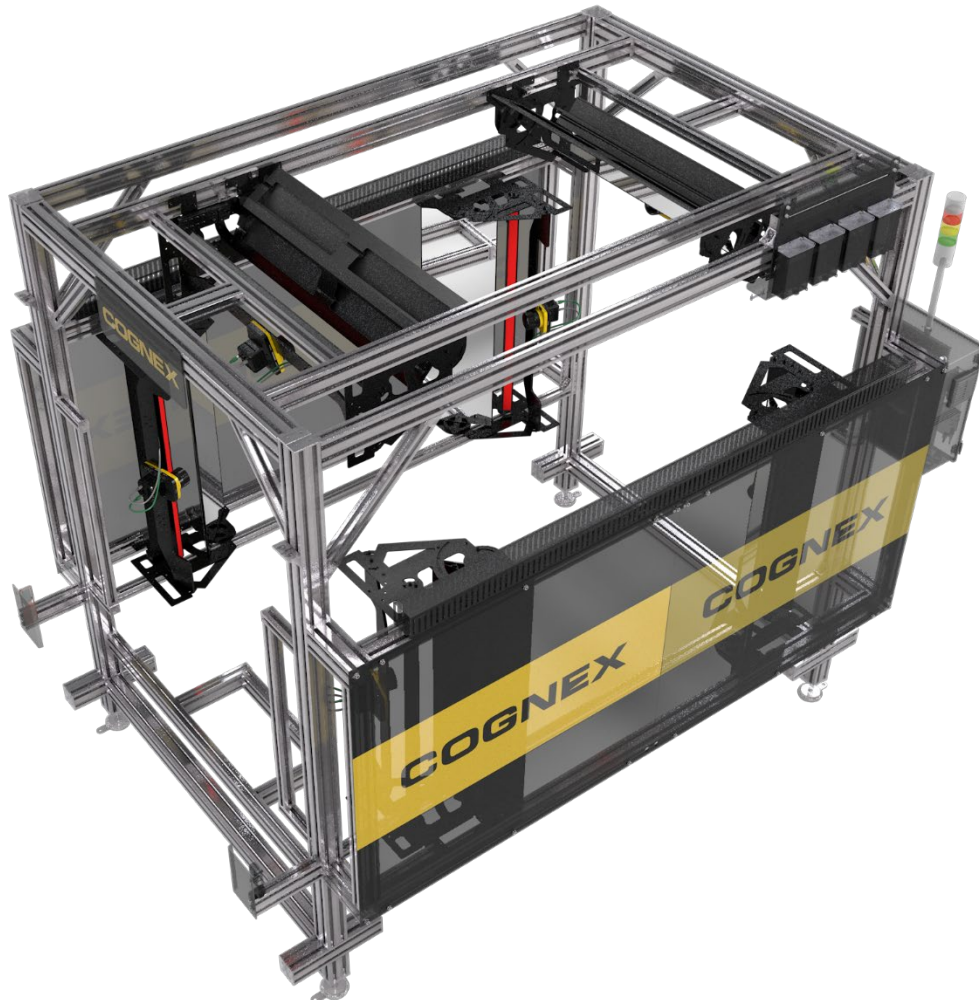
There are multiple variants of the frame with different quantity and models of readers. For this guide, we will use the DM580-standard frame. There may be physical differences between the variant frames, but they are assembled using the same methods.



Note: All mechanical frame drawing reference lengths are represented in millimeters. 25.4mm = 1 in.



WARNING: Make sure to use the proper cable length with the appropriate reader. See the Parts List and cable diagrams for details.



System Overview

Reference diagram showing the standard reader layout and naming schema:

1. Leading-Top

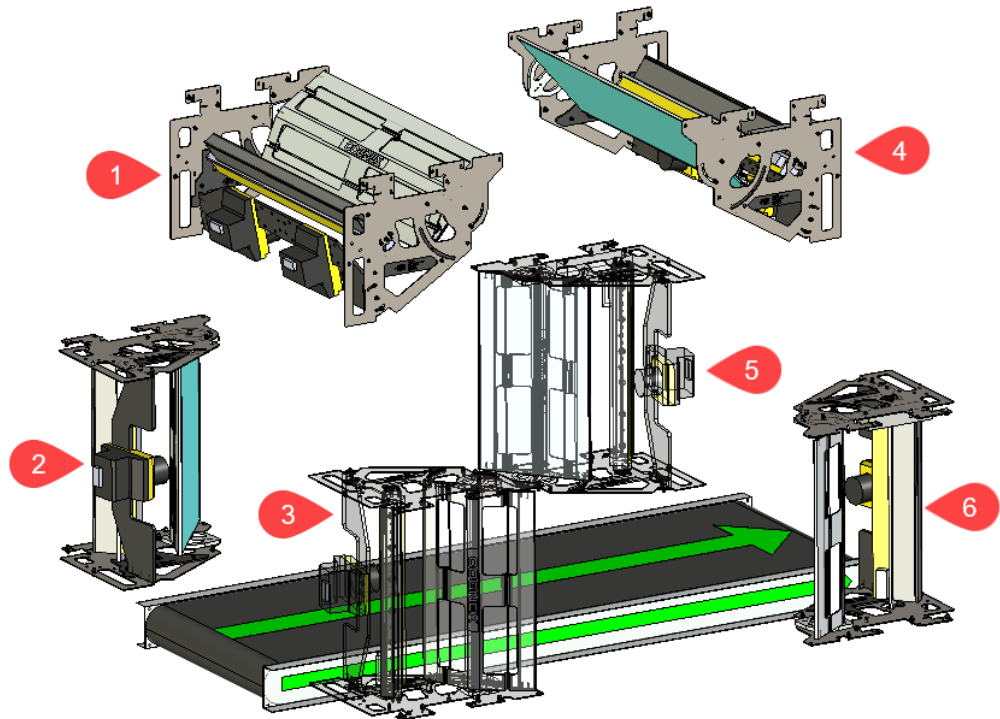
2. Leading-Left

3. Leading-Right

4. Trailing-Top

5. Trailing-Left

6. Trailing-Right



System Overview

4.1 Variants

There are parts of the frame what will vary based upon site specifications. Pay close attention to site specific drawing package documentation about the size and placement of these elements of the frame. The length of these particular pieces is based on calculations which are shown in the drawing package.

- Module lengths side vs top
- Side platforms length and height
- All beams that go across the conveyor (under or over)
- Module gap spacers, left vs. right
- Top reader back support width pieces



5 Installation

5.1 Assemble the Core Frame

To begin, start by assembling the frame's core structure by using the corresponding components. These **Item Numbers** can be found in each frame's mechanical drawings (DriveWorks PDF) under the corresponding sub-assembly.

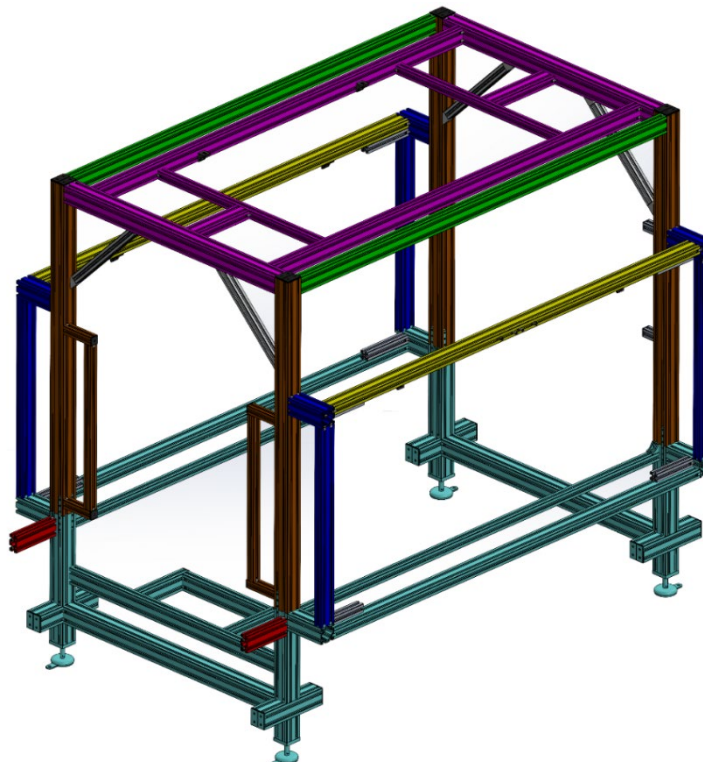


Note: The upper and lower frame pieces are in different packages. We recommend you do not mix them. There are preset t-nuts intended for specific locations and mixing the boxes may cause these to be installed at an incorrect part of the tunnel.

If the solution has an optional integrated Mettler Toledo Dimensioner, the framing will be packaged separately. Follow the framing installation instructions found in the Mettler Toledo Installation.

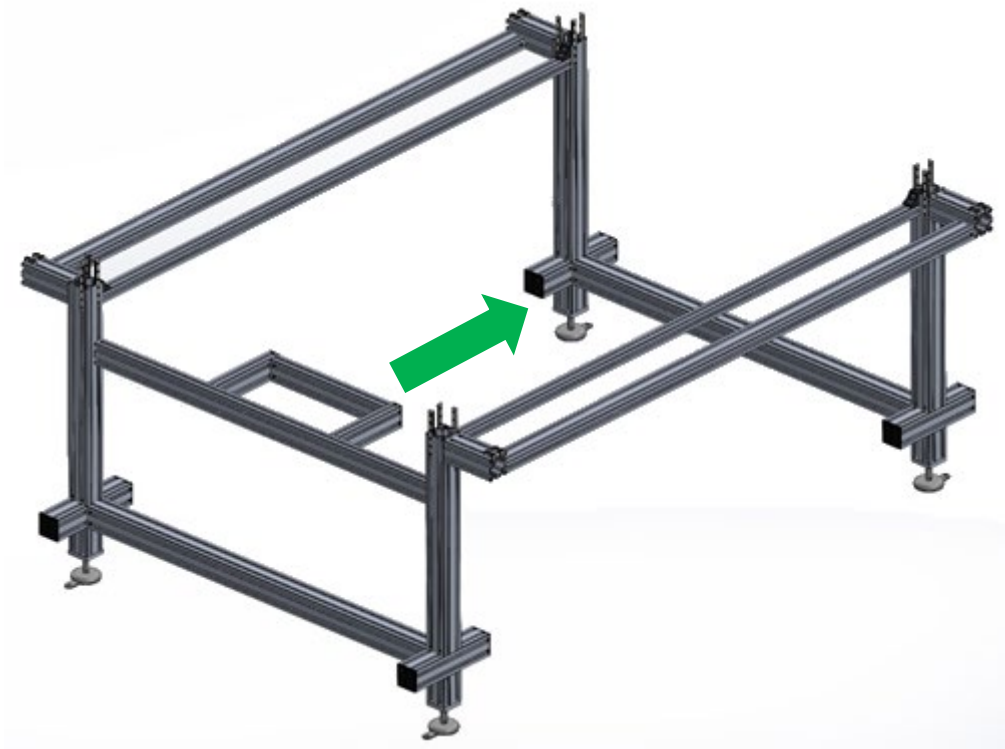
Order of frame assembly:

1. Base (lower) assembly with legs, stabilization bars, encoder bar and side reader module supports (**Teal**)
2. Leading and trailing upright posts with box guards (**Brown**)
3. Side Reader Bank vertical supports (**Blue**)
4. Top support (**Purple**)
5. Top Outside supports (**Green**)
6. Side Reader Bank top supports (**Yellow**) (added after reader modules are installed)
7. Photo Eye mount (**Red**)



Installation

5.2 Base (lower) Frame Assembly



5.2.1 Legs – 4 pre-built

1. The 4 feet (Item 1.1) come pre-assembled in a separate box.
2. Confirm the belt height.
3. Use the drawing to confirm the leveling feet of each of the 4 pre-built legs are at the correct height relative to the belt.



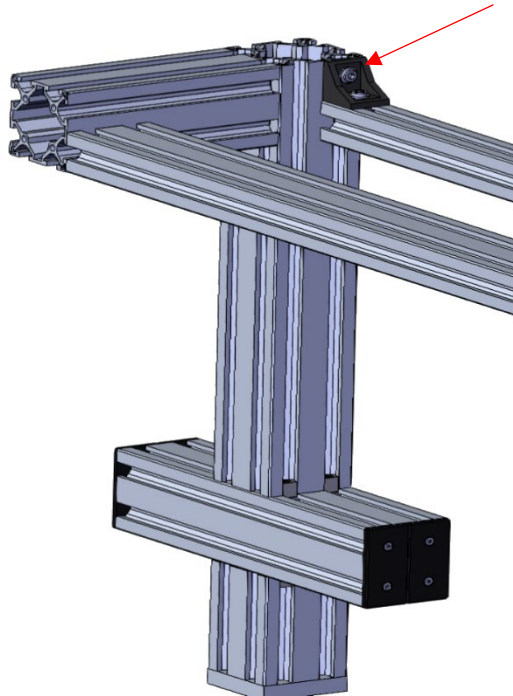
Installation

5.2.2 Side Platform

Assemble the Side Platforms for reader modules, repeat these steps to build two, one on each side of the conveyor:



4. Attach the horizontal small extrusion to each leg.
5. Connect two leg frames with the horizontal bar (Part 1.9.1) using corner gussets. Top of gusset should be flush with top of leg extrusion (see below picture).
6. Connect the horizontal bar (1.7) to the outside of the small extrusions on the lower rail.

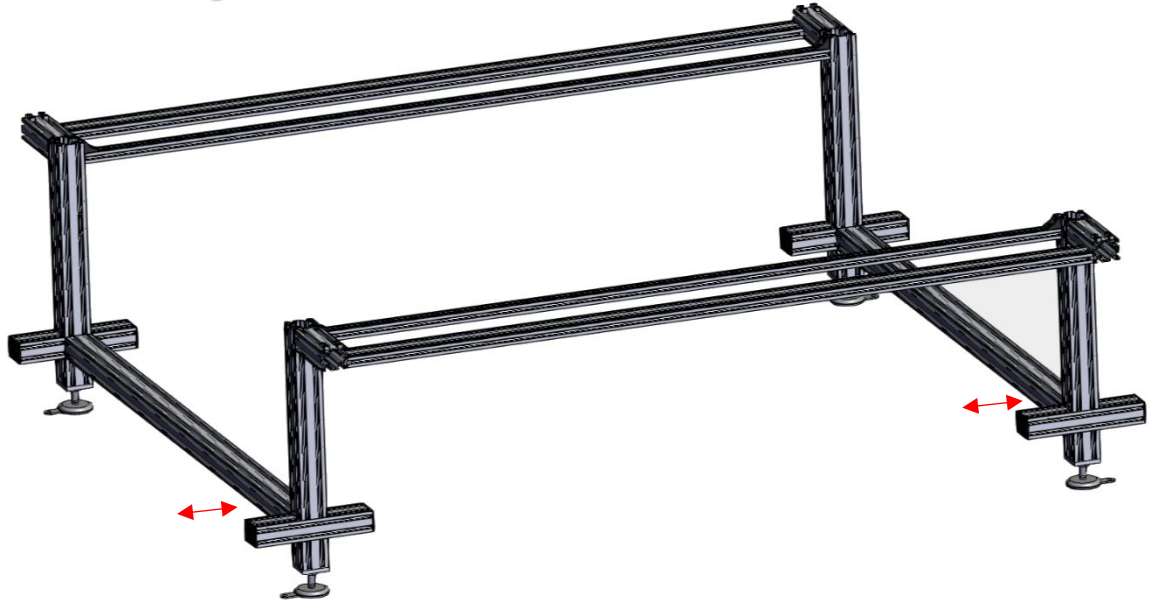


Installation

5.2.3 Bottom stabilizing bars

If there are obstructions under the belt, adjust the placement of the stabilizing bars as needed along the short horizontal extrusion as shown with the red arrows below. Likewise, the Leveling Feet can be adjusted to work around any obstructions on site.

7. Connect the bottom stabilizing bars (x2 item 1.2) at the same height as the small extrusions on the legs.

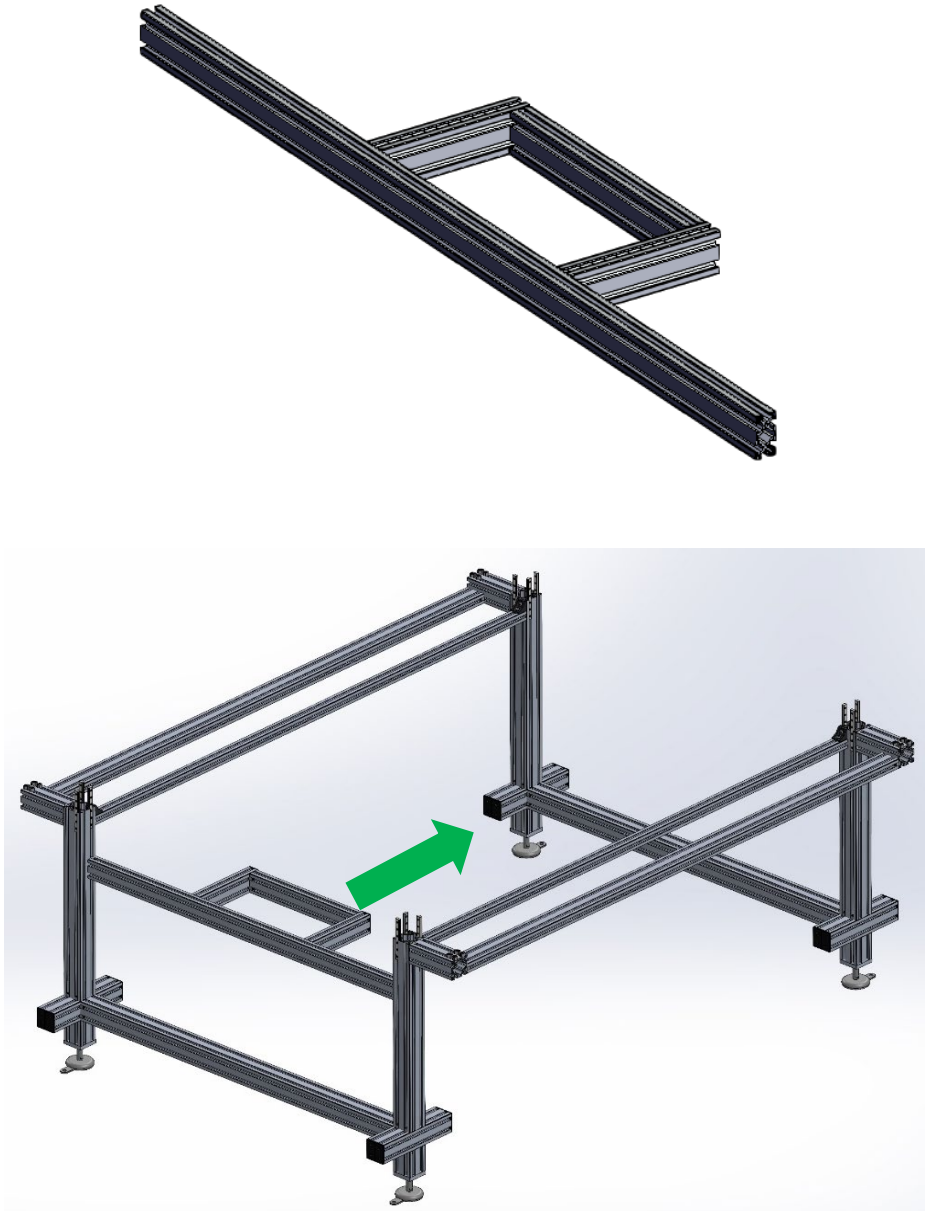


8. Once placed in the correct location, point the Leveling Feet outward and mark their location with blue tape.

Installation

5.2.4 Encoder mount

9. Assemble encoder mount as shown. Items 1.3, 1.4, and 1.5.



10. Assemble the encoder bar.
11. Slide it into the inside channel of the downstream legs.
12. Adjust the height of the encoder frame as necessary along the leg frame to fit the encoder snug against the belt.

Installation

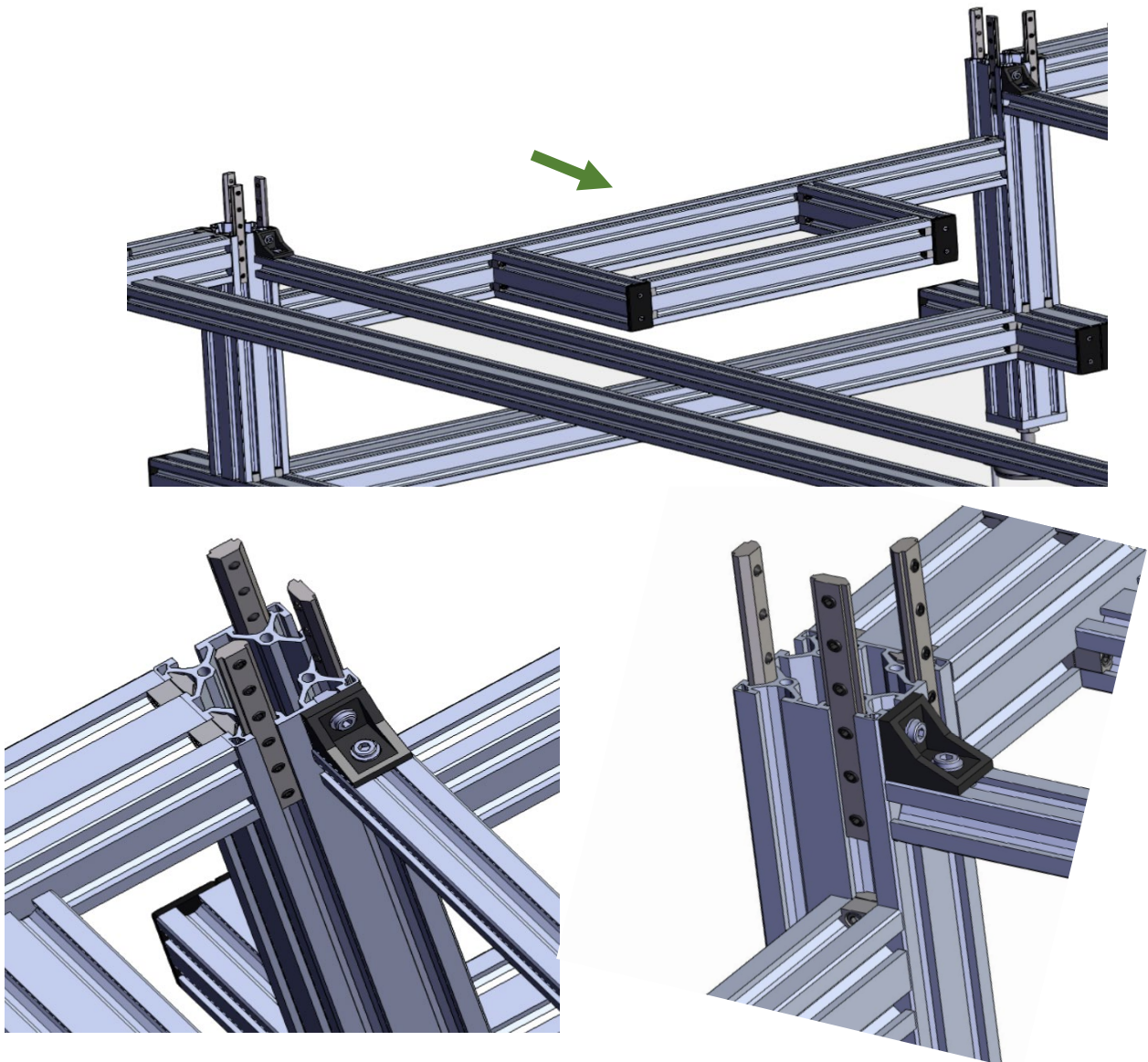
5.2.5 In-Line Fasteners



Note: These in-line fasteners must be placed in the specified channels of the leg base frame to ensure the successful assembly and attachment of the top frame and accessories.

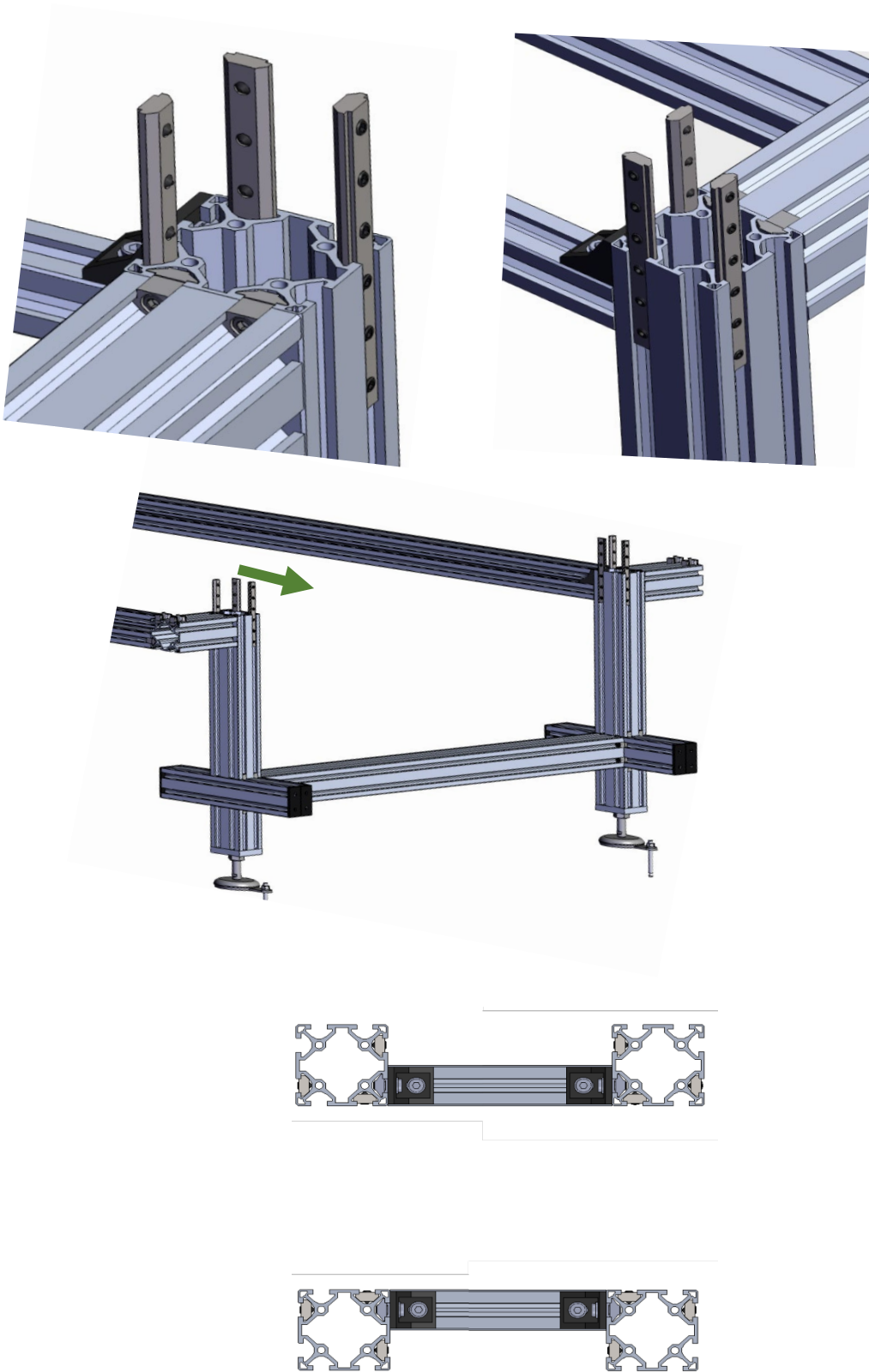
13. Insert 3 T-Nut In-Line Fasteners into each leg assembly. Pay close attention to insert them in the appropriate channel. Leave 1 above the profile of the lower leg. Slide the other two below this line so that they are out of the way during connection of the vertical uprights.

Figure 1: Upstream Base Frame



Installation

Figure 2: Downstream Base Frame



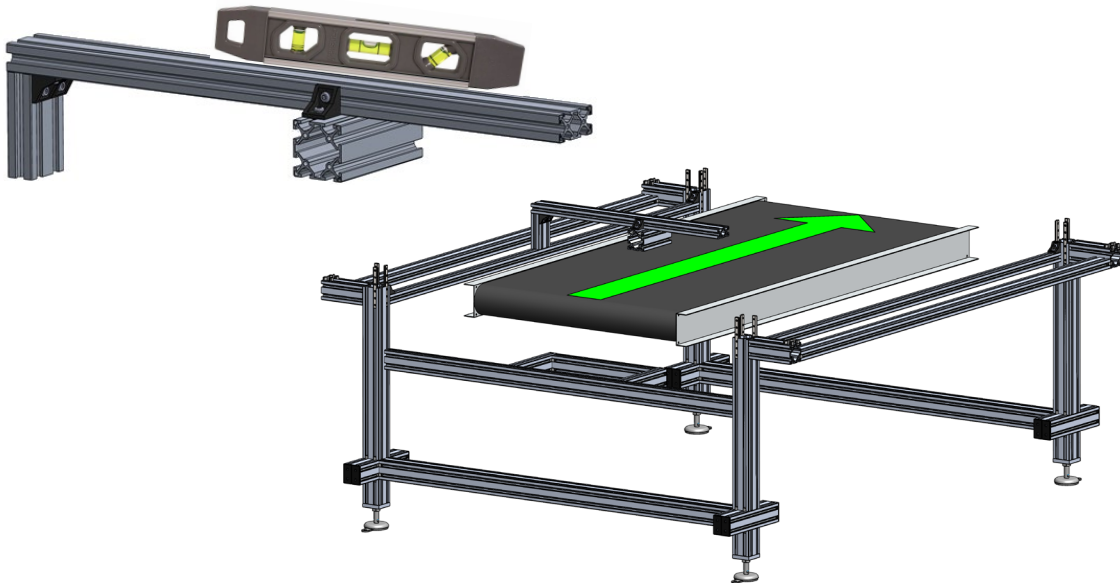
Installation

5.2.6 Verify height and position relative to conveyor

1. Assemble the Height Confirmation tool as shown (items 2.15, 2.17.2, 2.17.3).
2. Before attaching the upper section of the frame, confirm the height relative to the conveyor using the Height Confirmation tool and a level. Repeat on both sides and adjust the leveling feet as needed.



WARNING: Be mindful to keep the tool level on the conveyor by positioning it to avoid roller dips when installing the tunnel over that type of conveyor.



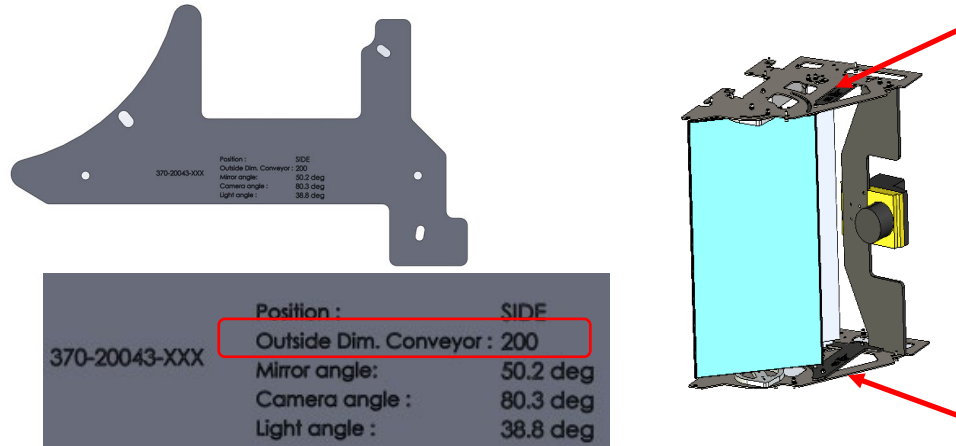
3. Reference the site drawings for centering the tunnel around the conveyor.



WARNING: The conveyor may be set at an angle too, so make sure to use the leveling feet to match the angle of the MVT to the angle of the conveyor.

Installation

4. Consult the information etched on the modules of the side reader bank angle set plate for the measurements needed to position the system over the conveyor correctly. **Outside Dim. Conveyor** is listed in millimeters (mm) as measured from the edge of the belt to the reader module edge.



5.3 Upper Frame Assembly



5.3.1 Uprights

Build out the vertical uprights that support the top frame.

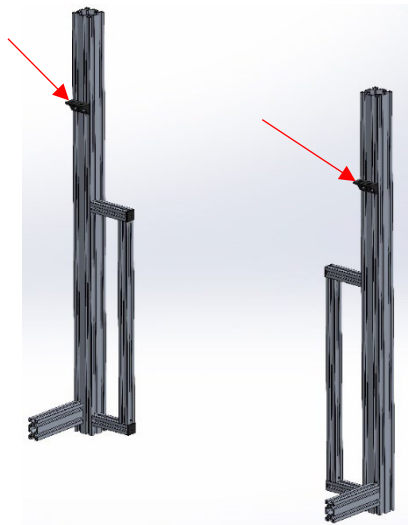
Installation



Note: There will be pre-mounted gussets present on ALL vertical uprights. Remove the gussets from all uprights if there is no Mettler Toledo (MT) dimensioning system on this installation. If there is a MT remove them from only the downstream uprights as they are not needed. Use the remaining two (2) uprights with gussets and be sure these uprights are oriented so that these gussets are on the upstream end above where the photo eye extrusion will be added.



Assemble on the floor the Upstream Uprights that include a box guard and the photo eye extrusion(x2):



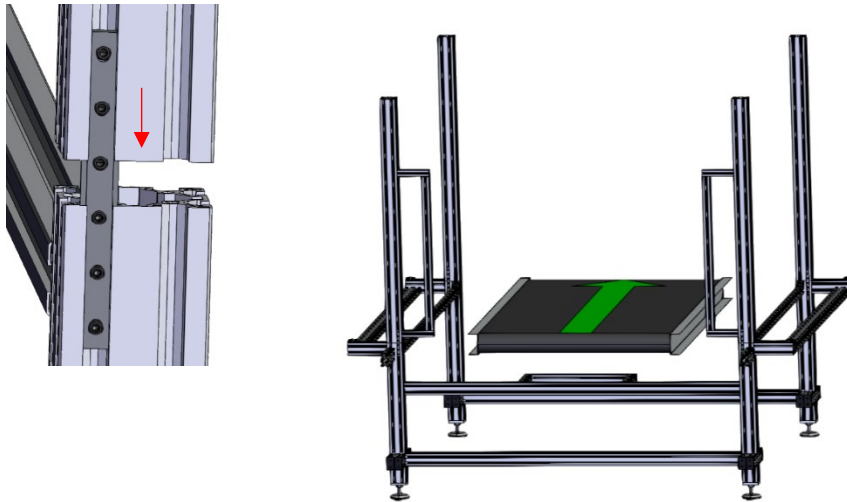
1. Attach the lower extrusions (item 2.10) to the uprights perpendicular to the conveyor in the outside channel in relation to the tunnel. This lower extrusion should line up with the conveyor.
2. Attach the long extrusion (item 2.7) vertically on the lower extrusions.
3. Attach the upper extrusions (item 2.10) to the uprights and the long extrusion.
4. Attach the photo eye extrusions (item 2.9) to the uprights parallel to the belt.

All 4 upright posts are ready to be attached to the base frame.

Attach the 2 Upstream Uprights.

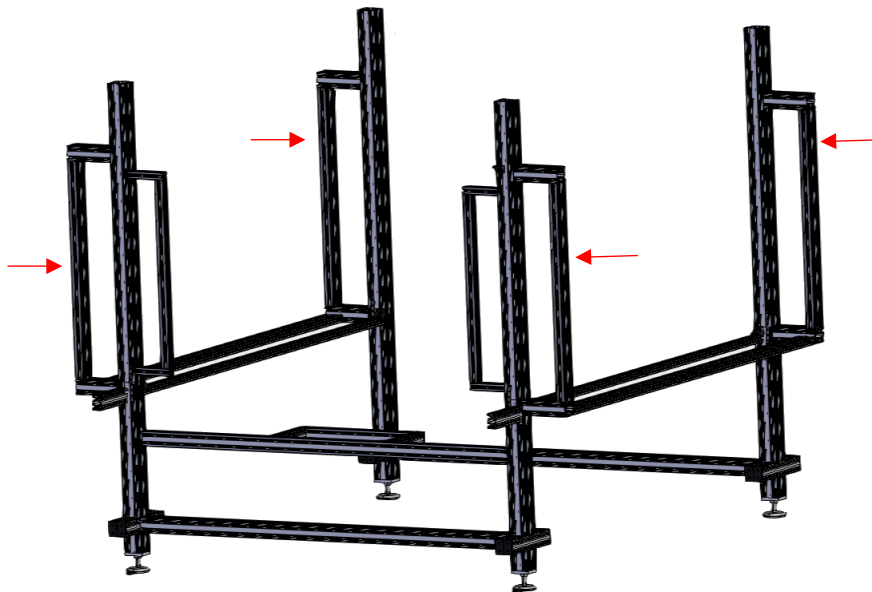
5. One person should lift the upright vertically directly over the base leg assembly while their partner aligns the in-line fastener with the channel. Carefully, lower the upright down onto the base ensuring the in-line fastener is seated correctly in a channel and tighten all screws of the in-line fastener.
6. Slide up the other 2 in-line fasteners and tighten on each leg.
7. Using the same strategy, with a partner, attach the 2 Downstream Uprights to the downstream base legs.

Installation



5.3.2 Side Reader Bank Supports

Assemble the Side Reader Support (x4) that attach from the uprights to the side reader supports on the base frame:



8. Loosely connect the four small extrusions (item 2.11) to the outside of the uprights up high enough to allow clearance for inserting the vertical connector extrusion.
9. Connect the vertical support beams (item 2.6) between the small extrusions just added and the Side Platform on the base frame. Tighten completely.

Installation

10. Repeat this for all 4 uprights.



5.3.3 Top Reader Bank Supports

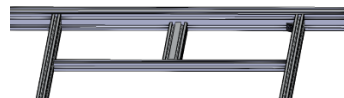
Assemble the Top Reader Bank Support (x1) on the ground and then lift and slide down into the channel of the uprights in one piece. Uses Items 2.1, 2.5, 2.8, and 2.13.



Note: Items 2.12 and 2.13 are the same, but have different end fasteners. Double check which ones you're using before assembly.

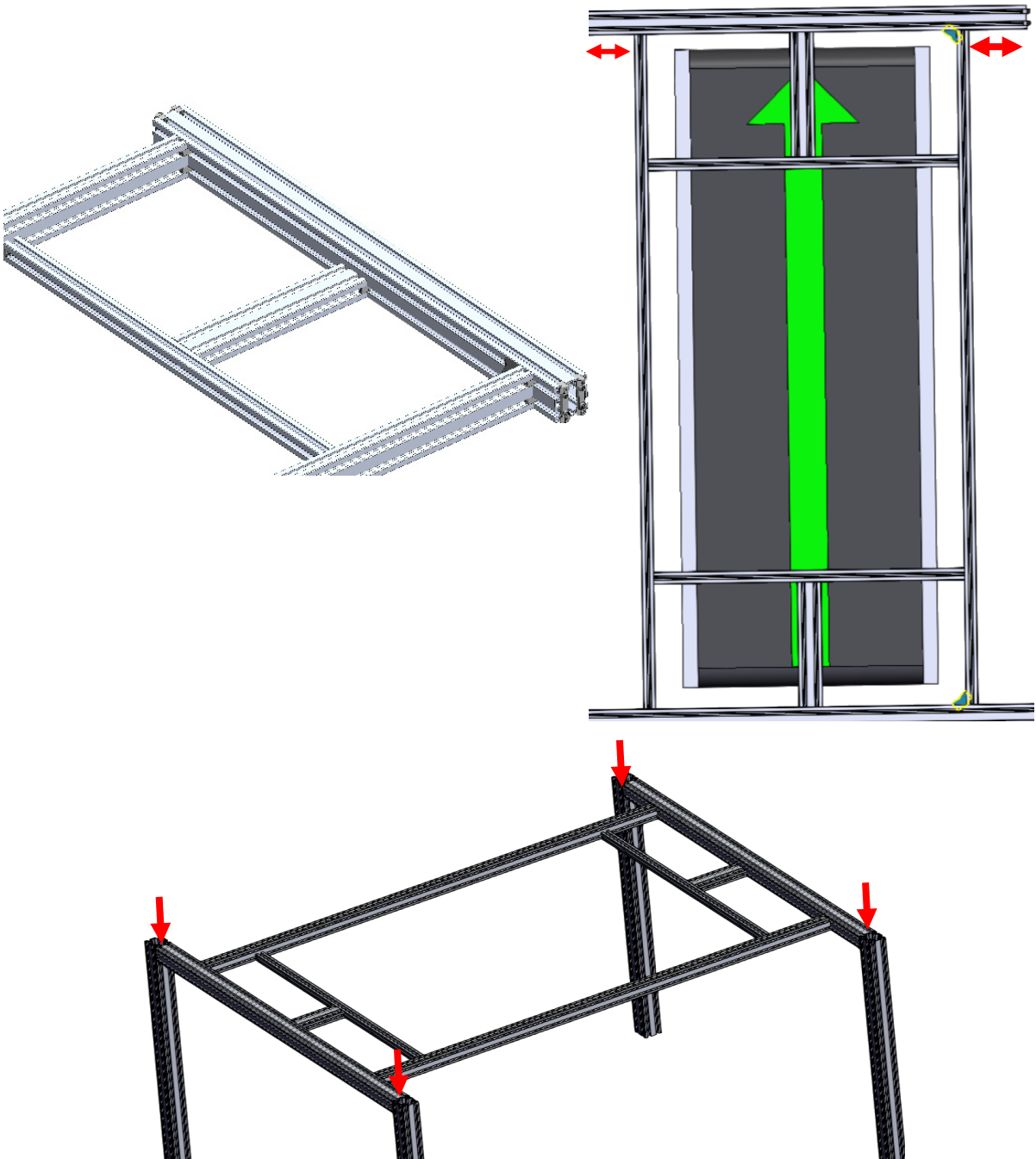


Note: The inner T section (Items 2.1 and 2.5) must be installed on the **bottom** channel of the top frame. The preset gussets must be installed on the right side of the frame.



Installation

11. The 8080 cross belt extrusion has pre-set gussets installed at exact locations to position the top reader modules correctly over the conveyor.



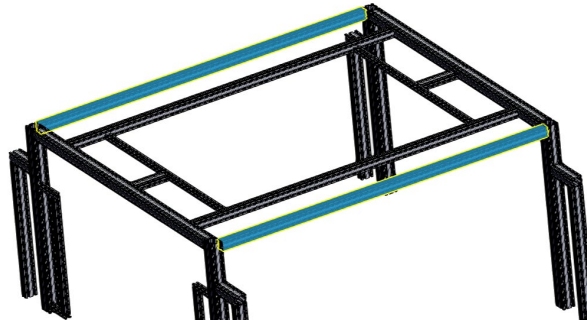
12. Slide the assembly down into the uprights until the horizontal surfaces are flush with the vertical supports.

Installation

5.3.4 Top Outside supports

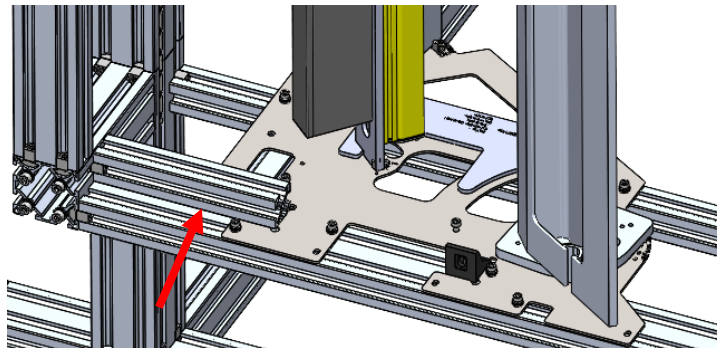
Connect Outside Supports:

13. Attach upper outside support rails (item 2.12) flush to the top in the outside channel of the uprights.



5.3.5 Side reader bank gap spacers- bottom

Gap Spacers are used to ensure the exact placement of the reader modules on the frame. The length of the gap spacers is determined during design and may vary. Check the drawing to ensure the correct length spacers are installed in each location (four on left side, four on right side):

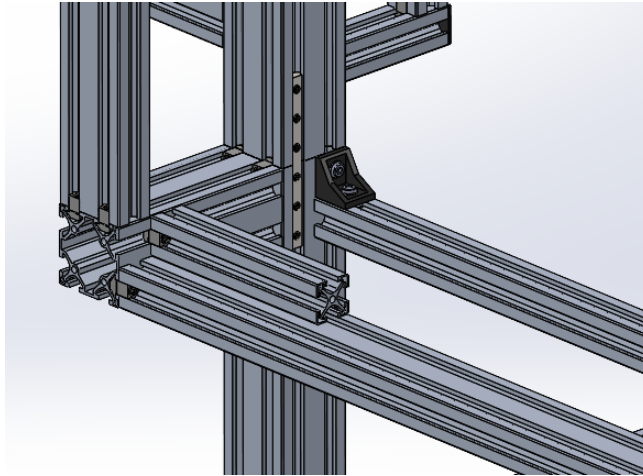


14. Attach the gap spacers on the inside channel of the Outside Support Rails on the left (item 2.2) and right (item 2.3) – 2 per side during this step. Note: The 4 upper-side reader gap spacers (two per side) will be installed after the reader modules are mounted.
15. Left and right side can differ in length. Item 2.2 always installed on left side, item 2.3 always installed on right side.



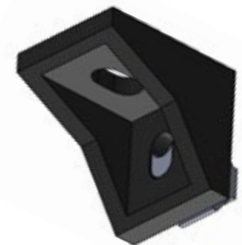
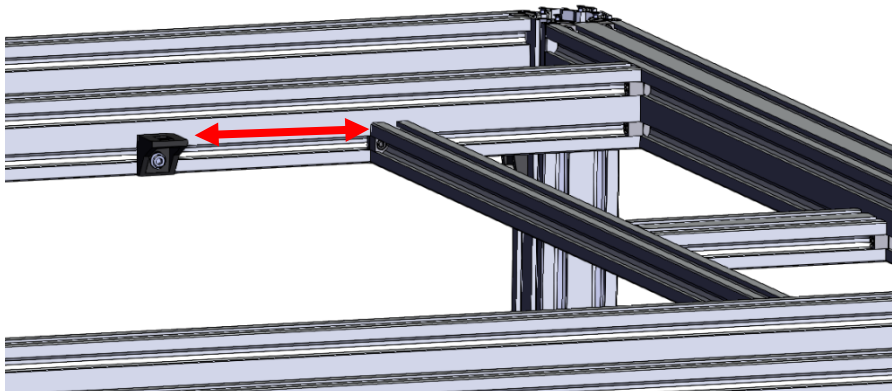
Note: Refer to the drawing and BOM if gap spacers are not identical to ensure spacers are on the correct side and orientation (leading or trailing reader bank).

Installation



5.3.6 Top reader bank corner gusset supports

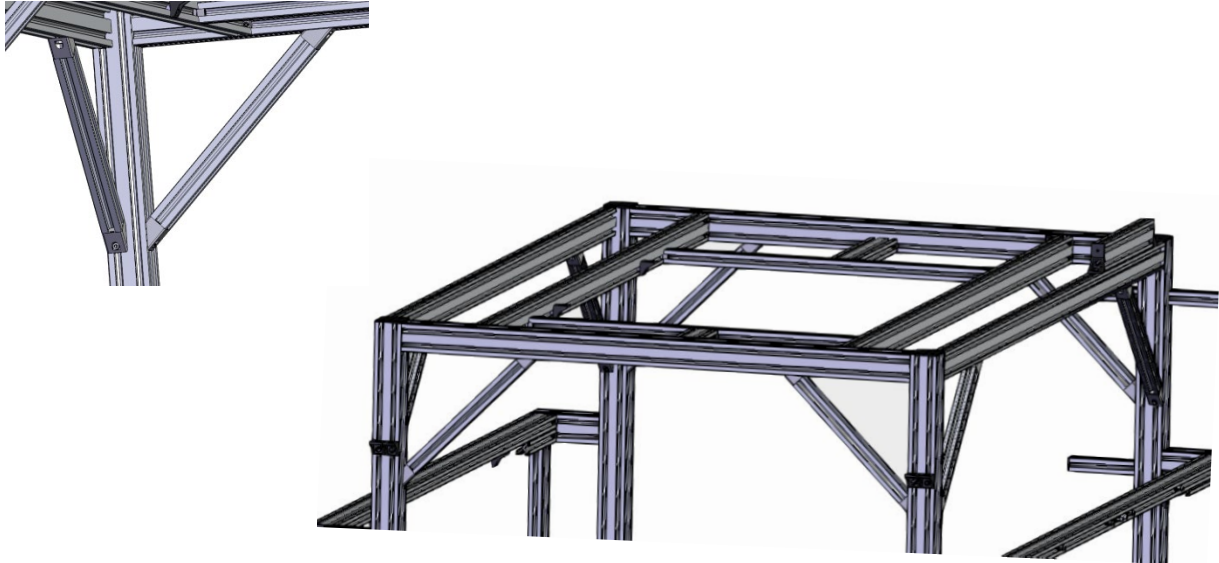
16. Prepare the gusset insert oriented as shown.
17. Insert 2 support gussets per top reader module to serve as alignment and support when each module is lifted and hung in place on the top rails. Each gusset should be placed at approximately 3 – 8 inches (76 -203 mm) in from the top cross bar. Do not tighten down completely since the final position and tightening will be done after the module is in place.



Installation

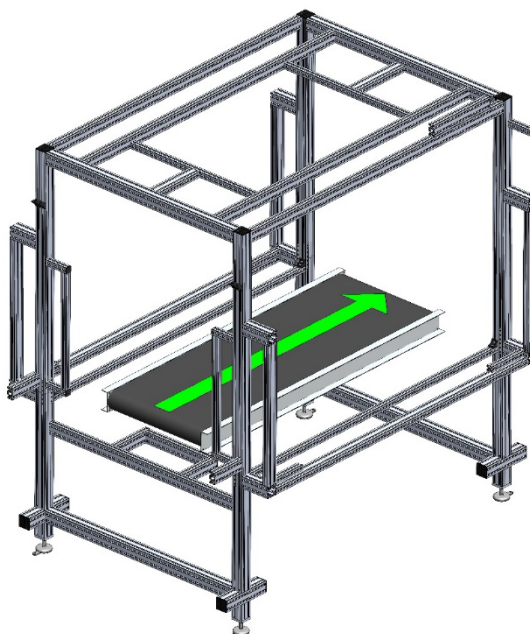
5.3.7 Frame Angle supports

18. Mount 45-degree support beams on the inner channel of all 4 corners of the tunnel on the upstream and downstream ends.



Note: If the solution has an optional integrated Mettler Toledo Dimensioner, follow the framing installation instructions found in the Mettler Toledo Installation.

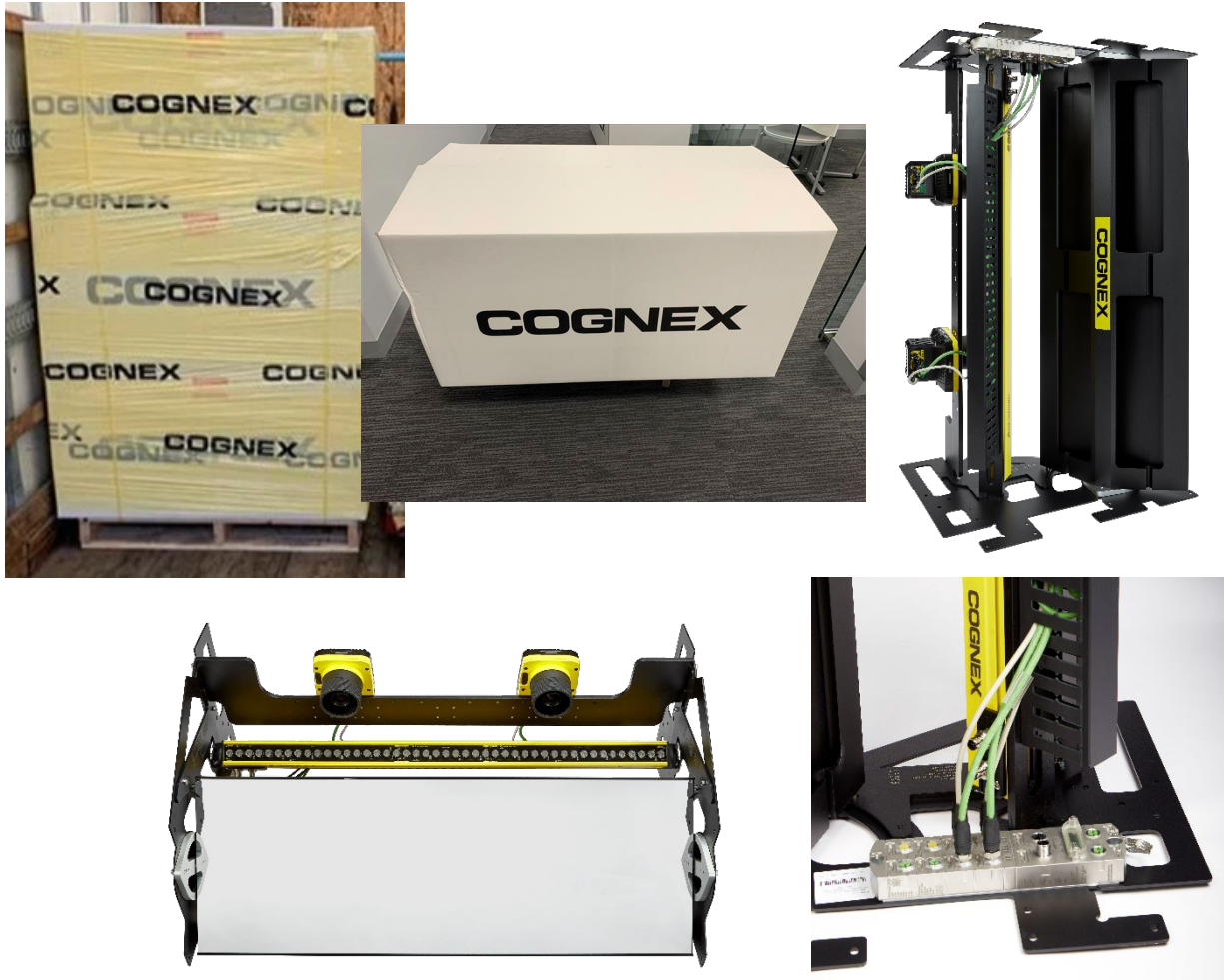
At this point, the frame is ready for reader module installation. We recommend that you take the time to remove the part number stickers from the assembled frame. This will be more difficult to do once the reader modules and other accessories are in place.



Installation

5.4 Cognex Reader Modules

Each reader module will arrive on site pre-assembled in Cognex packaging shown below.



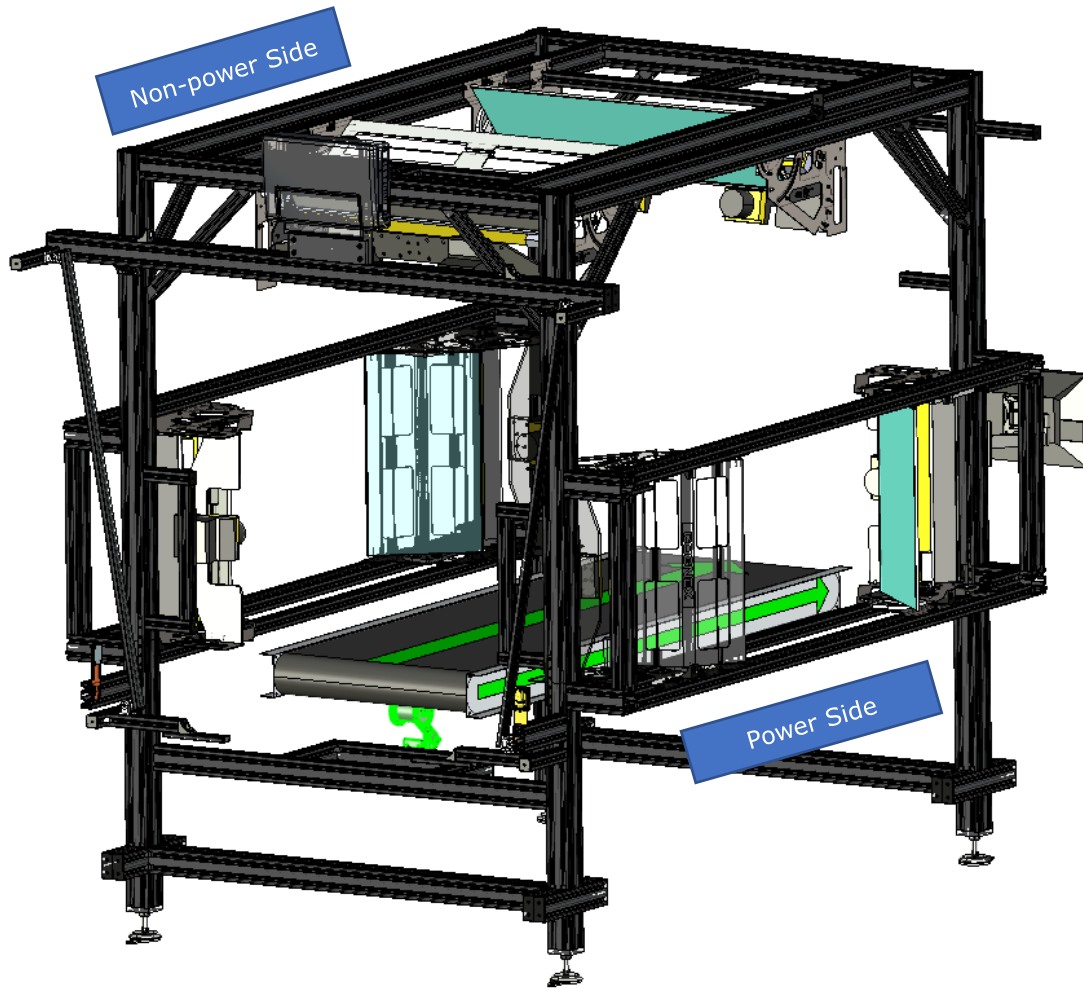
Note: Before installing the reader modules take note of access issues on either side of the solution. Determine if it is possible to transport the reader modules to each side of the tunnel. If you have access to only one side, it will be necessary to pass the modules that belong on the opposite side through the center of the solution and therefore it is best to mount the far side first. Then proceed to the top modules. And lastly the close side.

Installation

5.4.1 Identify Module Mounting and Installation Location

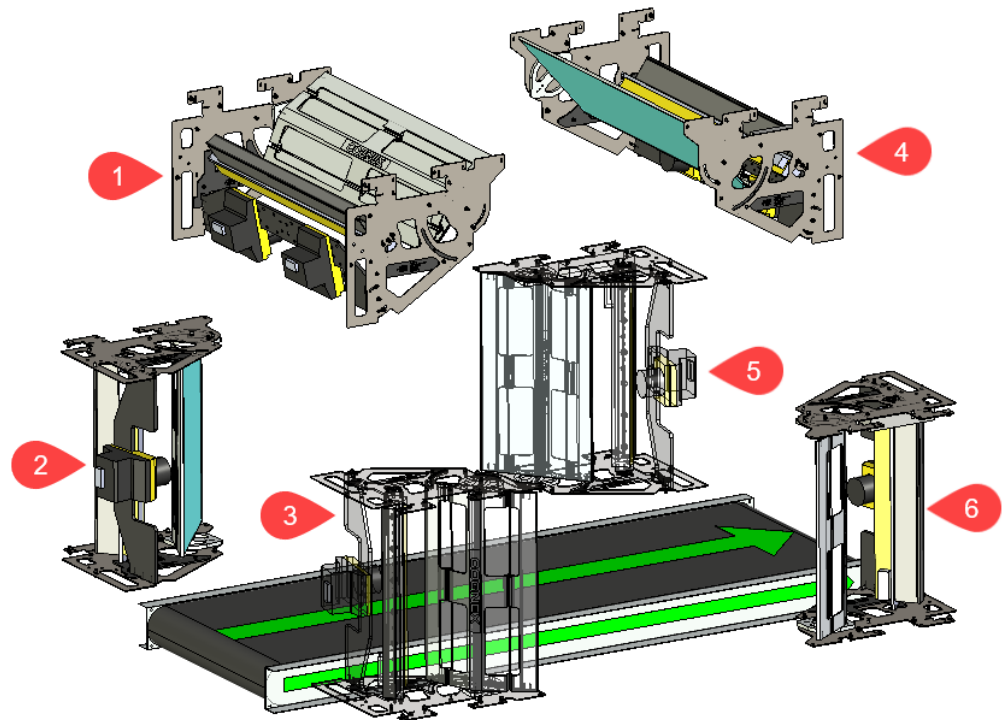
Power Side: The side of the system that contains the power drop. The EI Control Box and Cognex I/O Power Bracket is mounted on the power side for accessibility.

Non-power Side: The side of the system opposite to the power side.



Installation

1. Leading-Top
2. Leading-Left
3. Leading-Right
4. Trailing-Top
5. Trailing-Left
6. Trailing-Right



Not all DataMan 580 MVT modules include a hybrid switch. If the modules do include a hybrid switch, they must be mounted in the correct location on the frame. Follow these instructions to install the Side and Top modules correctly:

Side Modules

All side modules are installed in pairs. The left (non-powered) side and right (powered) side will each have a pair of modules: one with a hybrid switch and one without. The module **with** the hybrid switch must be installed on the **trailing end** of the system, and the module must be oriented so that the hybrid switch is located at the top of module. Reference the drawings to determine which side the modules should be installed on, based on the required Outside Dimension as indicated on the engraved plate on either end of each module.

Top Modules

As least one of the top modules will include a hybrid switch, and in some cases, both top modules will include a hybrid switch. Ensure that the **trailing top module includes a hybrid switch** and that the hybrid switch(es) is **located on the power side** of the system.

Installation

The label on the reader module shipping box will indicate if the module is configured for a **side** bank or the **top** bank.

Note: The R or L on this label does **NOT** indicate the side of the tunnel.

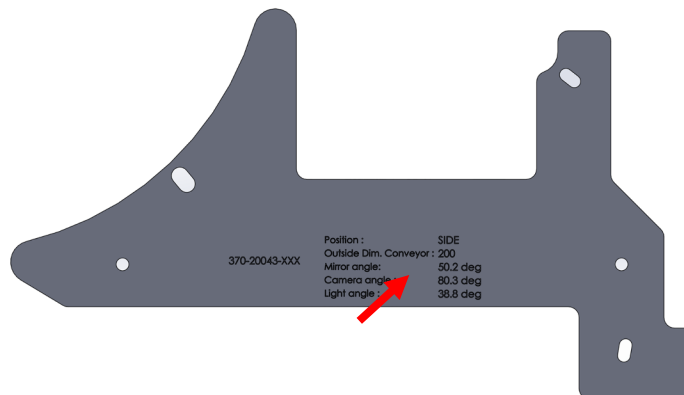


Confirm the installation location for each module by referencing the etching on the angle set plate located on the ends of each module.



Note: If the box label does not match the etched plate, always use the etched plate to determine the configuration of the module.

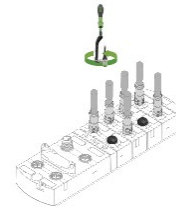
Both reader modules on a side are identical, meaning the leading left and trailing left are the same. Remember, the hybrid switch of each installed side reader module will be on the upper end of the module once mounted.



Installation



Note: Prior to mounting, we recommend that you use the Murr torque wrench to verify the integrity of the connection of each cable to ensure none have loosened during transport.

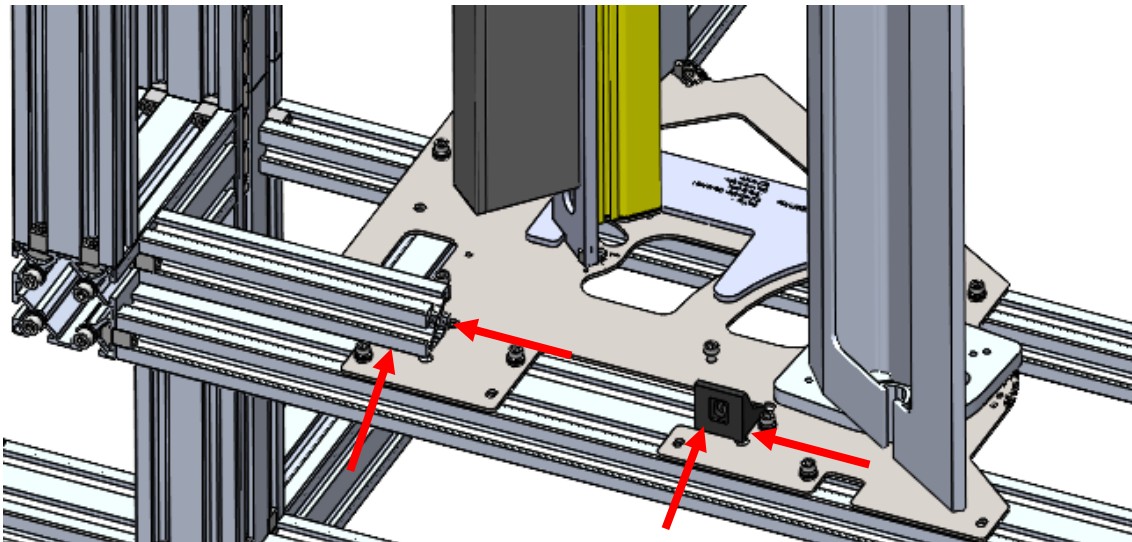


5.4.2 Side Reader Bank Installation – Hybrid Switch will always be on the top.

1. Slide the side reader module onto the base frame side platform as shown below. Make sure the opening on the reader module bracket fits on the gap spacing extrusion.
2. Secure the gusset in place. Ensure that insert is oriented as shown and the gusset is oriented to make contact with the module bracket as shown.

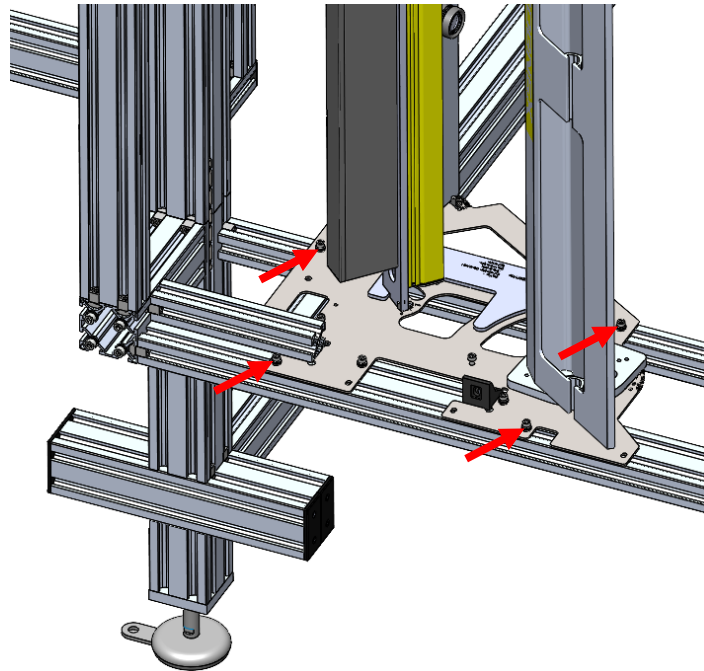


3. The module must be in flush contact with both the gusset and the spacer to ensure it is square to the tunnel.

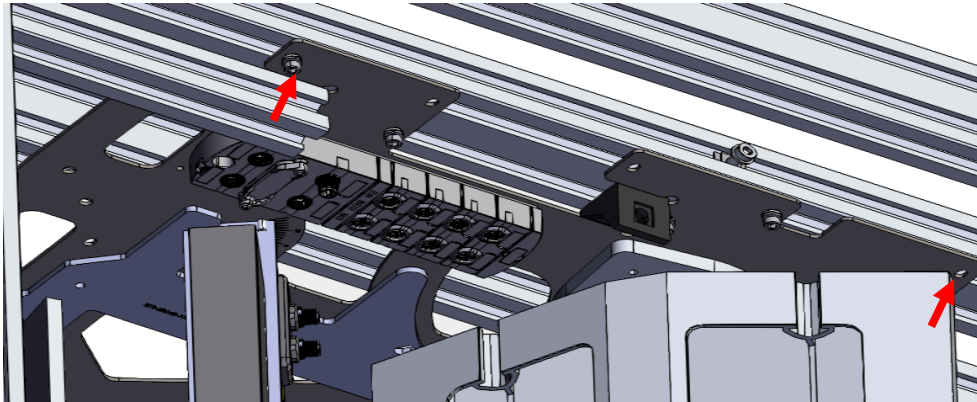


Installation

- Secure modules using 4 SEM screw (PN 195-20080) & M6 T-nut. **Leave these screws loose for now.**



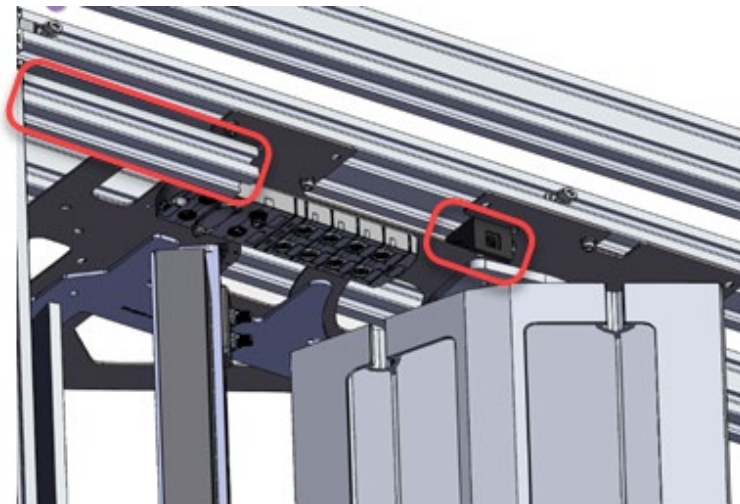
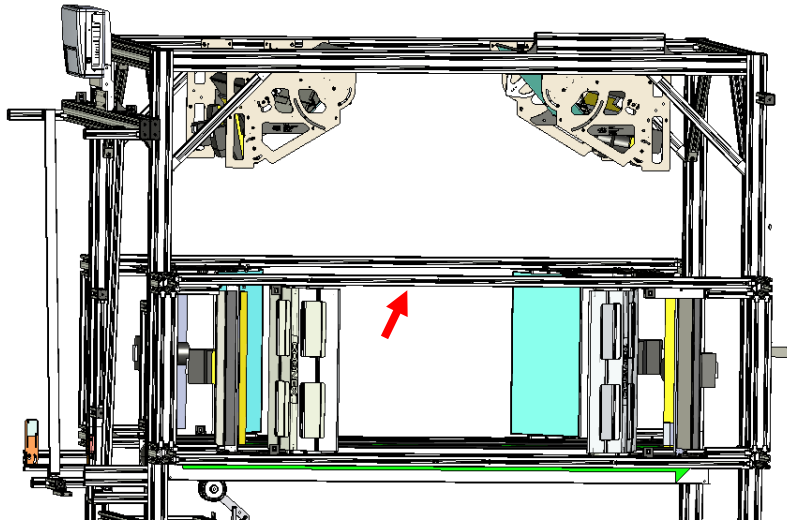
- Once both side reader modules are in place mount the top side reader support rail (item 2.12).
- Secure modules using 2 SEM screw (PN 195-20080) and M6 T-nut. **Leave these screws loose for now.**



- Mount the top gap spacers and gusset module supports for both modules. *See note in section 5.3.5 for correct positioning.

Installation

8. Tighten the four SEM screws on bottom and the two SEM screws on top of the module, ensuring that the module is positioned correctly.

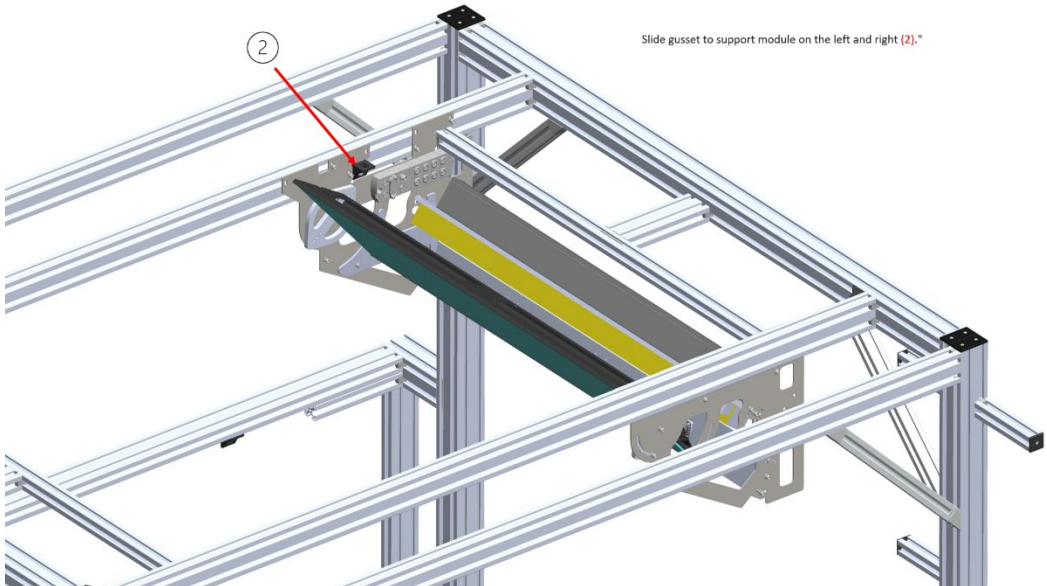
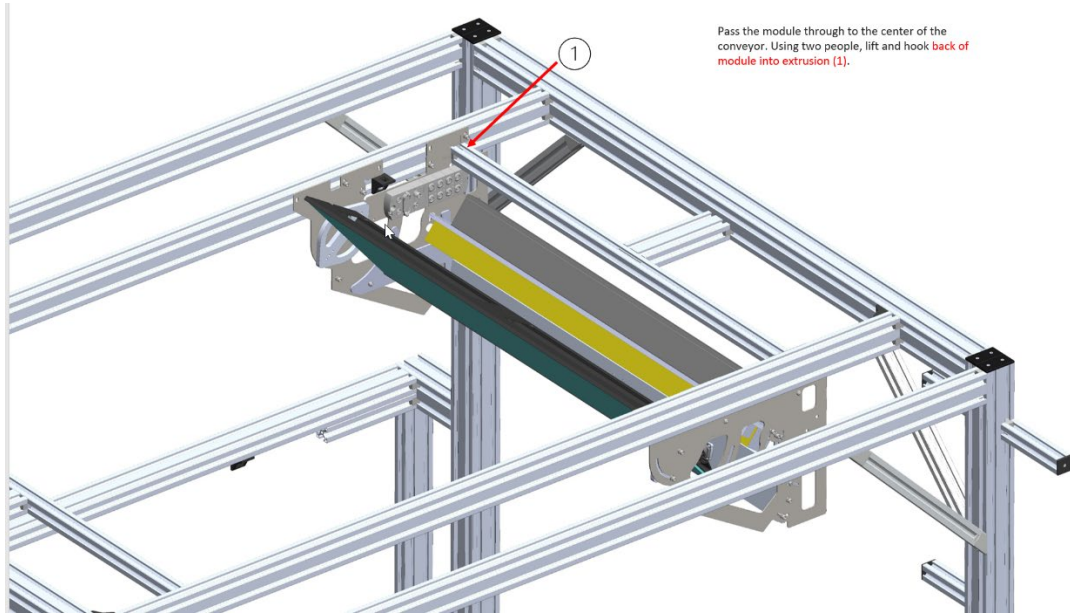


9. Next, mount the two top reader modules.

Installation

5.4.3 Top Reader Banks – Hybrid Switch on the Power Side of tunnel.

10. Pass the module through to the center of the conveyor. Using two people, lift and hook module and slide gusset to support module on the left and right.



11. Secure with same hardware as side module.
12. **Repeat** these mounting steps for the other top module.
13. Mount and secure the remaining 2 side modules according to [5.4.2 Side Reader Bank Installation – Hybrid Switch](#) will always be on the top..

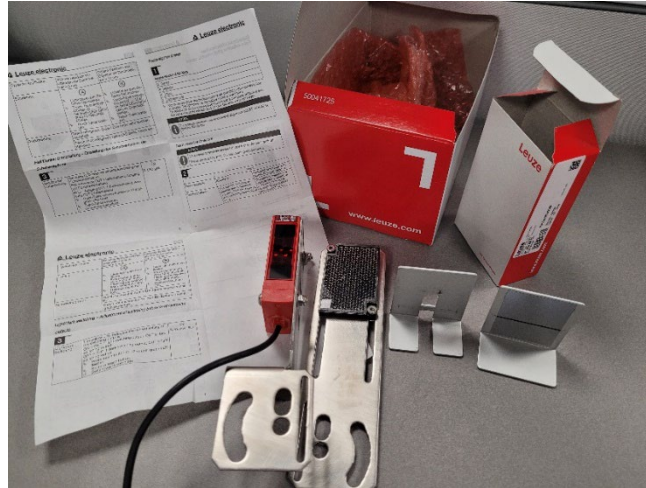
Installation

5.5 Photo Eye and Guards Mounting

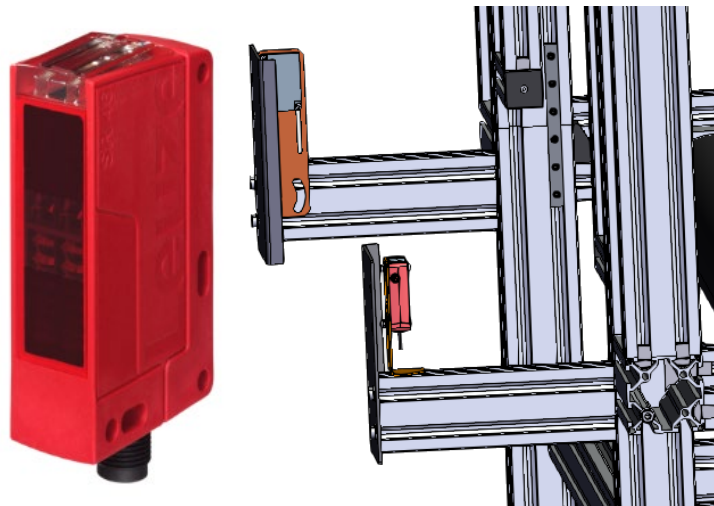
The photo eye used in this solution is a Leuze retro-reflective photoelectric sensor with a broad, powerful light-band for the reliable detection of objects with variable shape and openings.



Note: This photo eye (PE) **must** be trained and aligned using the alignment bracket included in the kit prior to first use.



1. Mount photo eye (PE) on the Power side and the reflector on the Non-Power side.
2. Mount the PE guard to extrusion item 2.9 on each side. Brackets and mounting hardware in kit 820-20870-001.

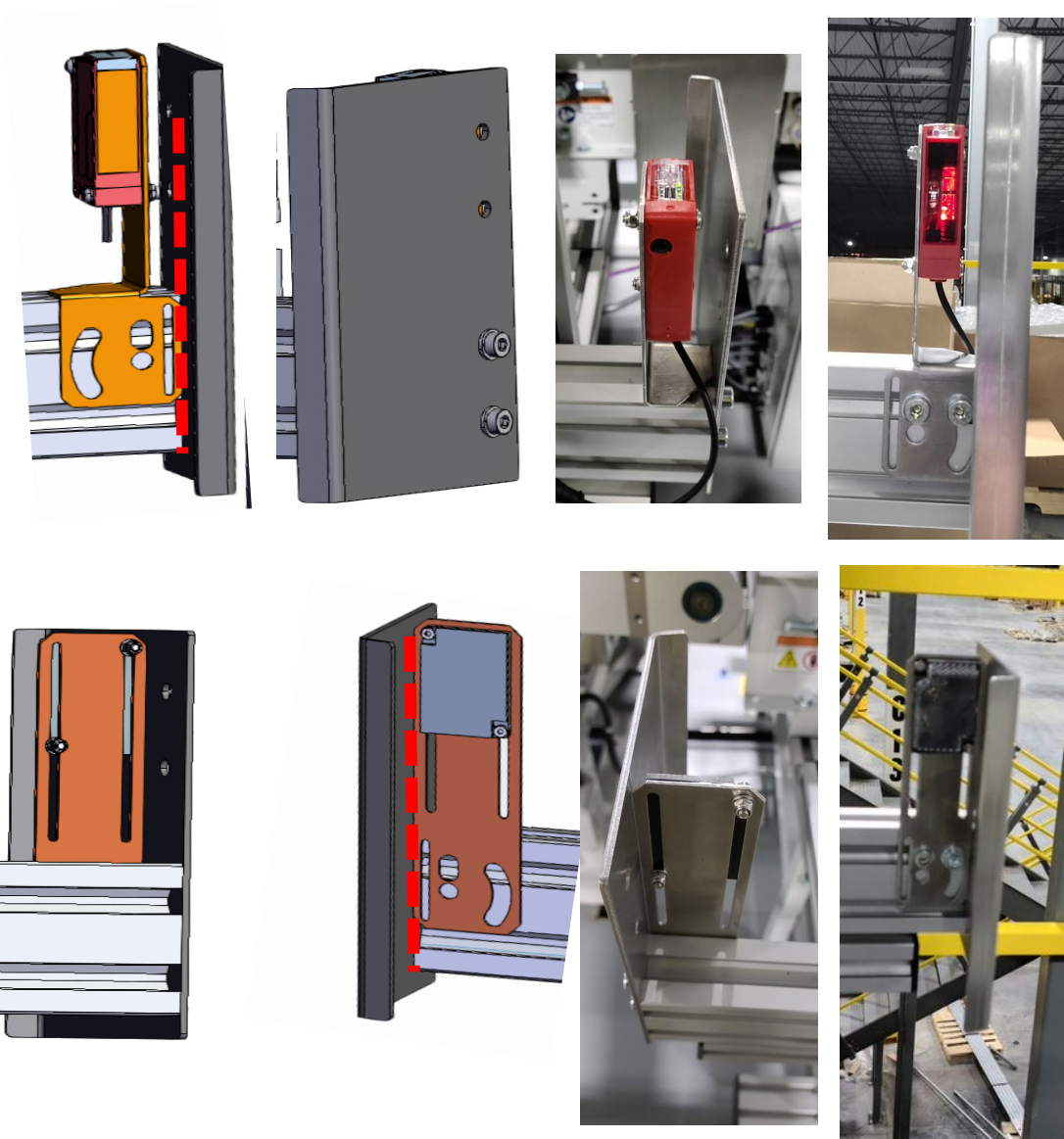


RK46C VarOS – Sensor with light-band

Installation



Note: Photo eye must be mounted flush against the guard.
Be careful because applying excessive torque while tightening may deform the bracket



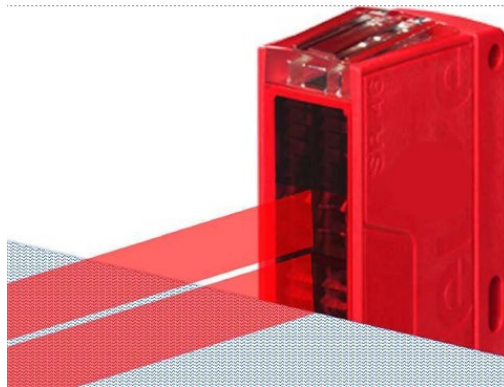
Installation

5.5.1 Photo eye alignment

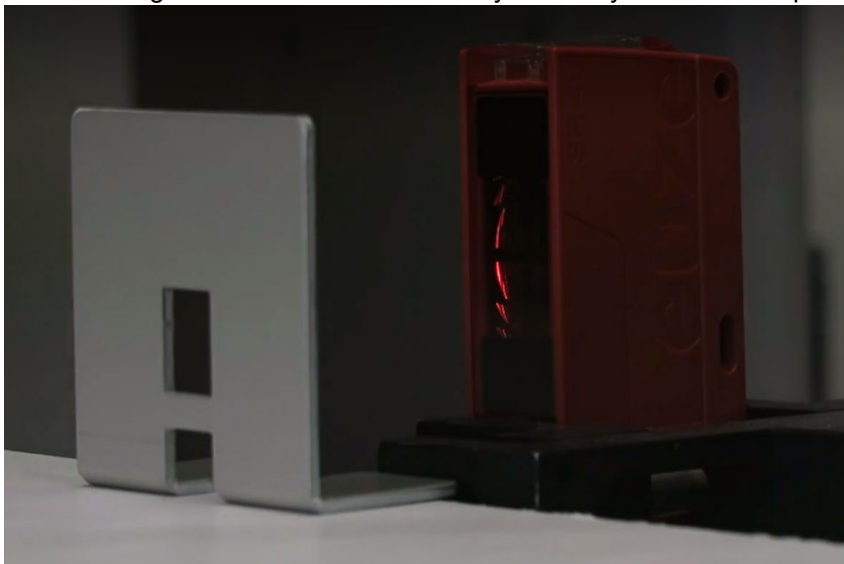
3. Position the solid alignment aid in front of the reflector and use the short side to check the correct height of the reflector mounting.



The beam is split and must be aligned correctly with the help of the alignment aid with the solid bridge.



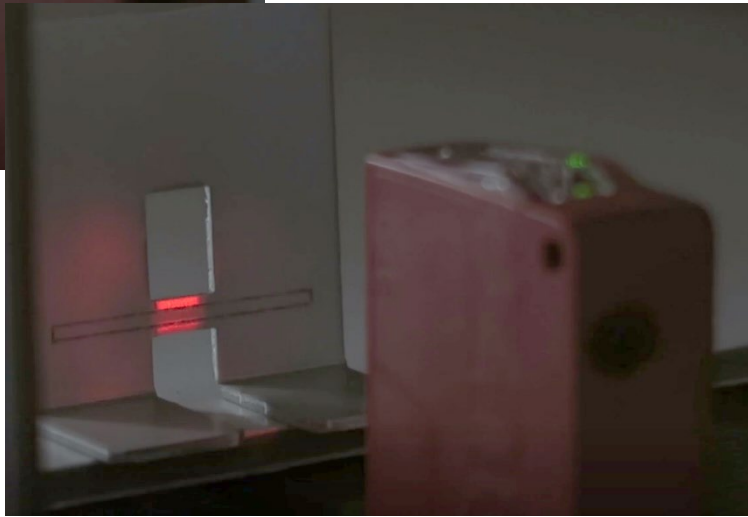
4. Place the alignment bracket on the conveyor directly in front of the photo eye.



Installation

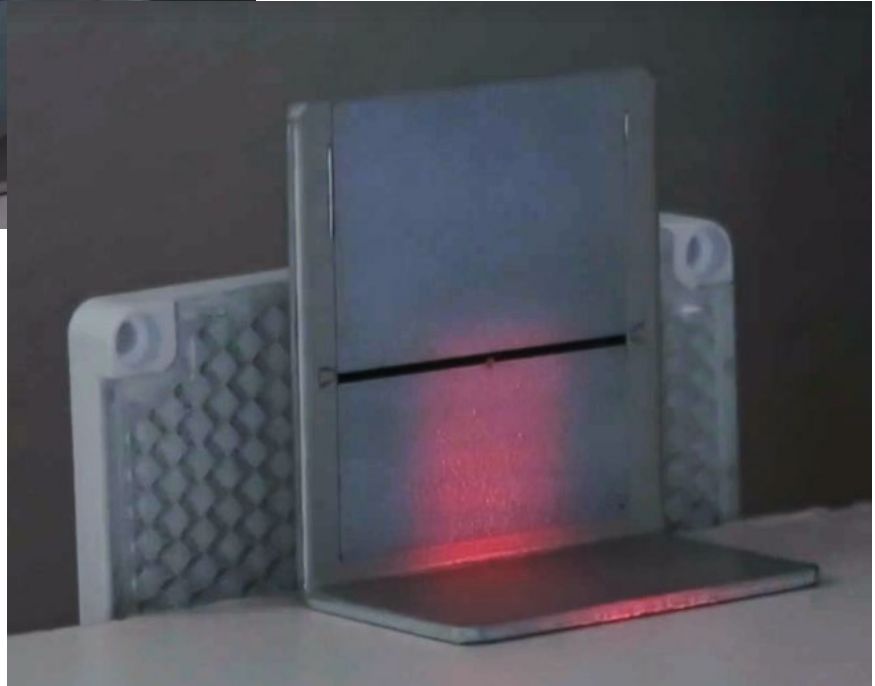
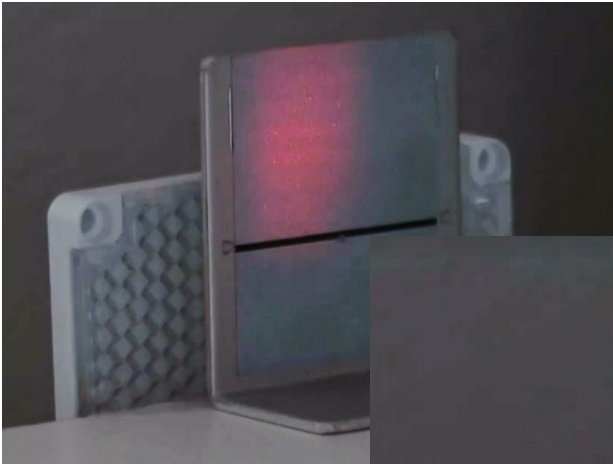
5. Adjust the position of the sensor to align the gap of the beam at the bridge of the alignment bracket.

In this example the initial alignment is too high. The sensor needs to be lowered to show the gap aligned within the bridge on the alignment aid.



Installation

6. Adjust the height of the PE sensor so that the beam is lies entirely below the solid black line of the other alignment aid placed near the reflector.



5.5.2 Photo eye training

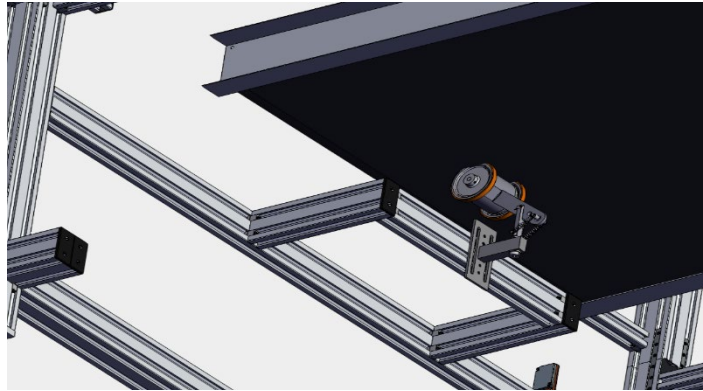
7. Remove both parts of the alignment set to train the photo eye for the desired precision.
8. Press the teach button of the sensor for the appropriate amount of time for the specs of this installation:
 - 2 to 7 seconds to train it to detect objects $\geq 5\text{mm}$
 - 7 to 12 seconds to train it to detect objects $\geq 10\text{mm}$



Installation

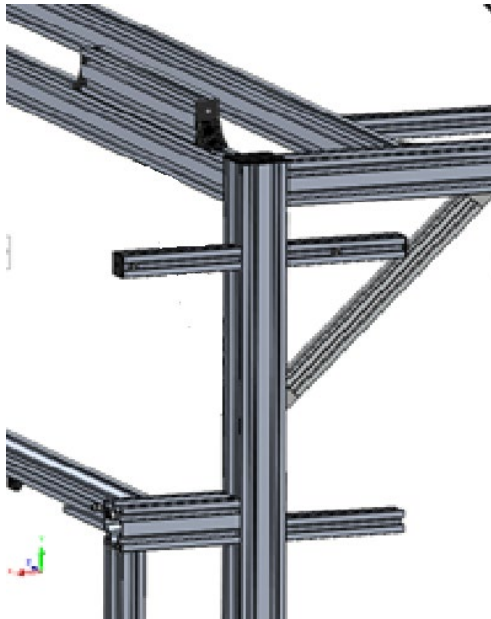
5.6 Encoder

1. Assemble the spring-loaded encoder according to manufacturer's directions.
2. Adjust framing to ensure proper contact with the underside of the conveyor.
3. Mount encoder to frame using M8x16 screws, M8 washer, M8T-nut.



5.7 Edge Intelligence (EI) Control Box

1. On the Power Side of the frame at the downstream end, mount the EI support extrusion as shown. Mount extrusions (3x items 2.14) on the upright toward top of frame (height may be lower based on overhead obstructions and presence of stack light on EI box).



Installation

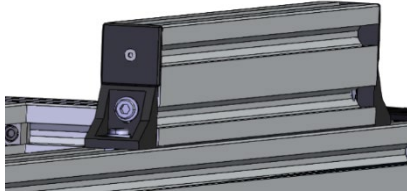
2. Configure EI Control Box with or without stack light. If not using the stack light, be sure to block the opening to ensure integrity of the enclosure.
3. Hang EI Control Box using M5 set screw provided with box and M5 T-nuts from frame. Secure using hex nut.



Installation

5.8 Power and I/O Bracket

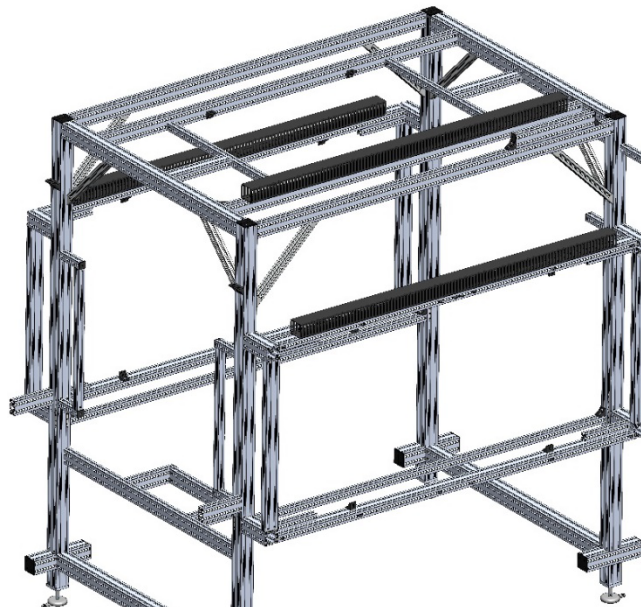
1. Mount with corner gussets the extra extrusion used to raise up the Power and I/O Bracket on the power-side topmost part of the frame offset from center to be closer to the EI Control Panel.



5.9 Cable trays

Cable trays are used to organize and protect all cables in this solution. There are cable trays pre-mounted on each reader module. Cable trays need to be installed for the Power Chain and Ethernet Chain cables.

2. Mount cable trays along the top of the side reader bank support beams (x3).



5.10 Cognex I/O Components and Cabling

The Cognex I/O components will be the same across variants of the Scan Tunnel. The Ethernet and power cable lengths will differ depending on tunnel specification. Pay close attention to the part

Installation

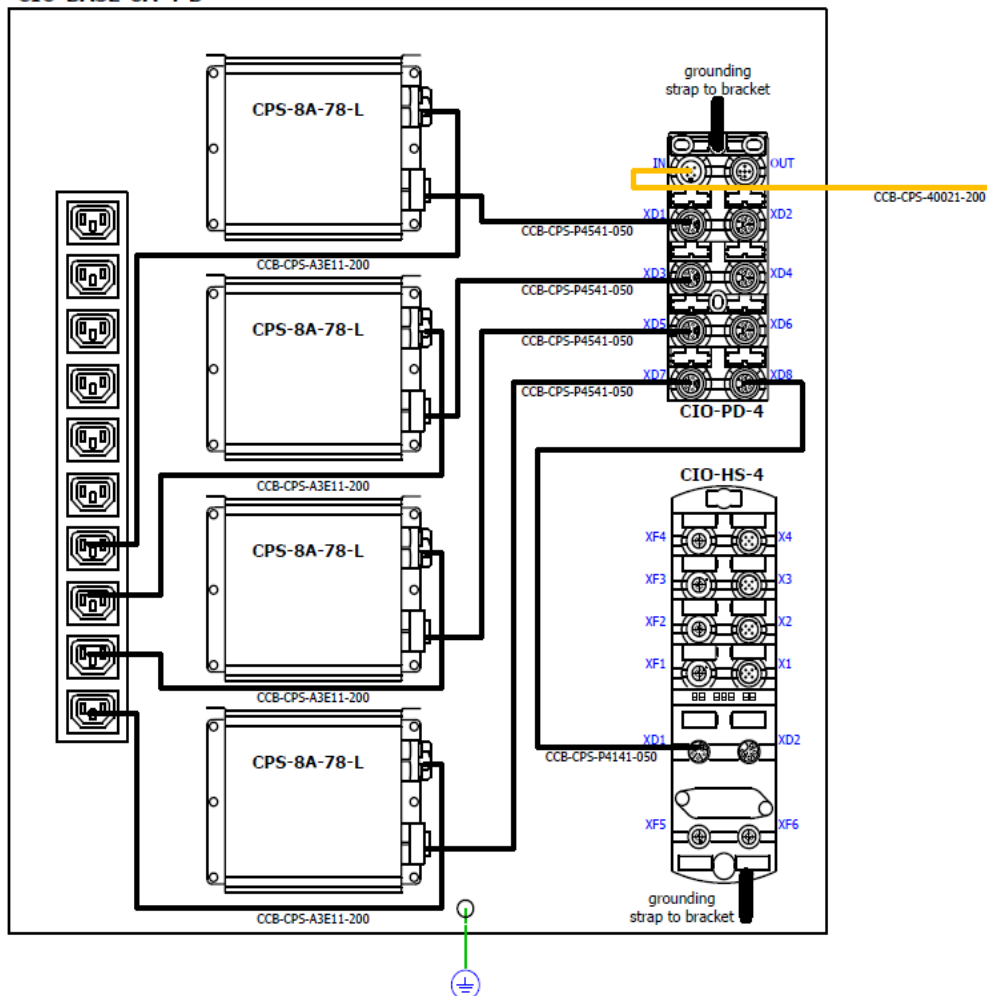
numbers listed in the cabling diagrams that accompany the solution specific document package. The diagrams and depictions shown here are for reference only. Due to cable lengths, the Power & I/O Bracket should be mounted close to the EI Control Box.

5.10.1 Cognex Power and I/O Bracket with Power Distribution Unit (PDU)

Cognex I/O uses the universal C14 style strip to power the Power Distribution Units (PDU). Each installation will include a C14 power strip and require site/region specific cable to connect the power strip to the site power drop.

	Power Chain L-coded cable (length 0.5m)	CCB-CIO-P4141-050	1
	Emparro Input 7/8" to C14 (2m)	CCB-CPS-A3E11-200	1

CIO-BASE-8A-4-B



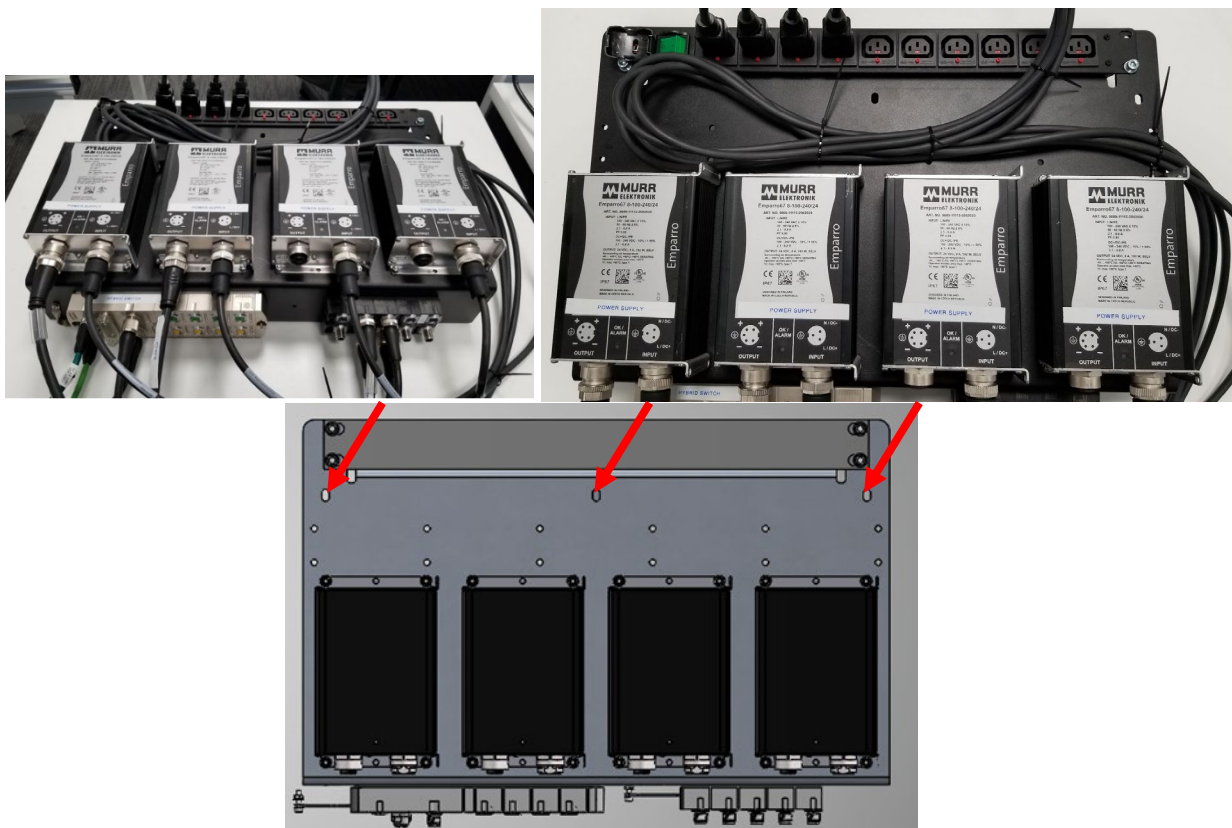
Proper grounding is necessary for safety and to ensure proper operation. If mounted to an already grounded aluminium frame no further grounding is needed.

Installation

1. The power cables will be shipped with cabling already completed from each PDU to the C14 power strip.
2. Mount the power bracket on the top outer support rail offset from center to be closer to the EI Control Box using the hardware contained in the bracket kit.



Note: Slide the CIO bracket to the angle support bracket closest to the EI Control box. This allows the cables to be long enough to reach their port.



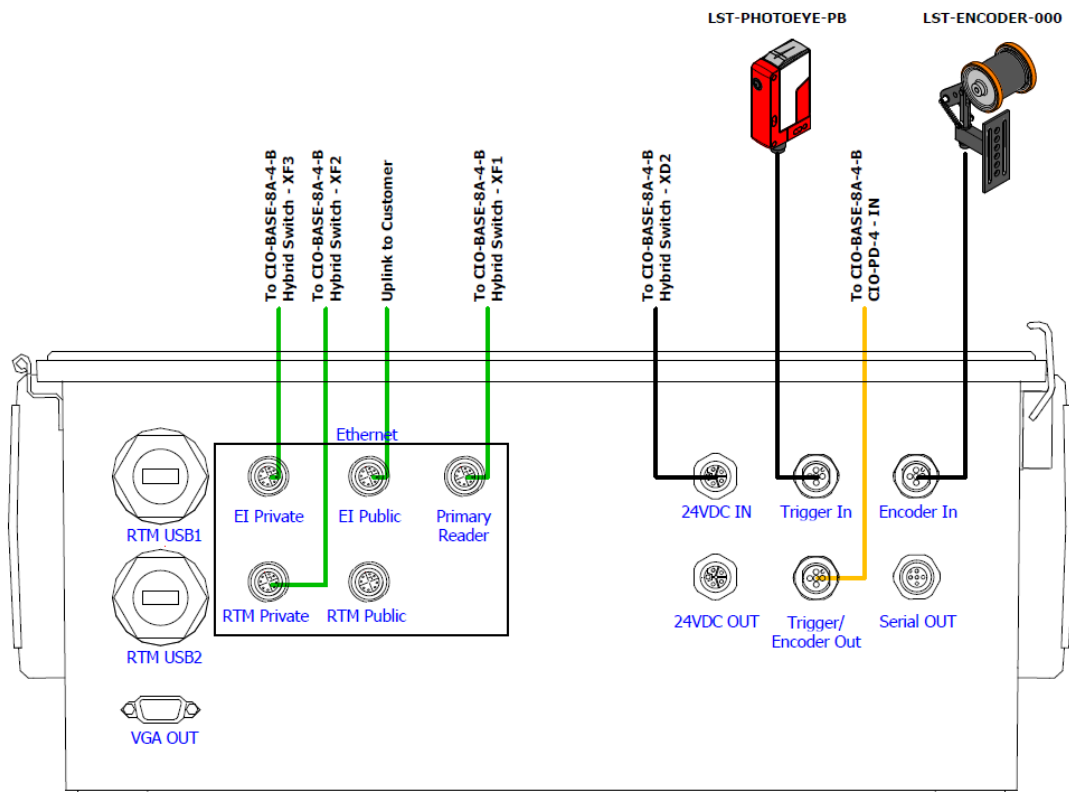
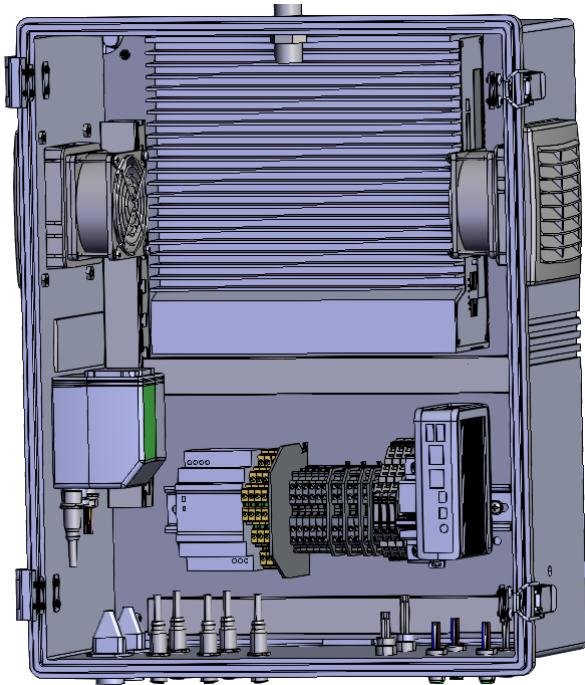
Installation

3. Once mounted, reroute the cables neatly into the cable tray by clipping the wire ties used in delivery and bundling them together with the power strip power cable to run them down into the cable tray and back up to each unit.



Installation

5.10.2 Cognex EI Control Box



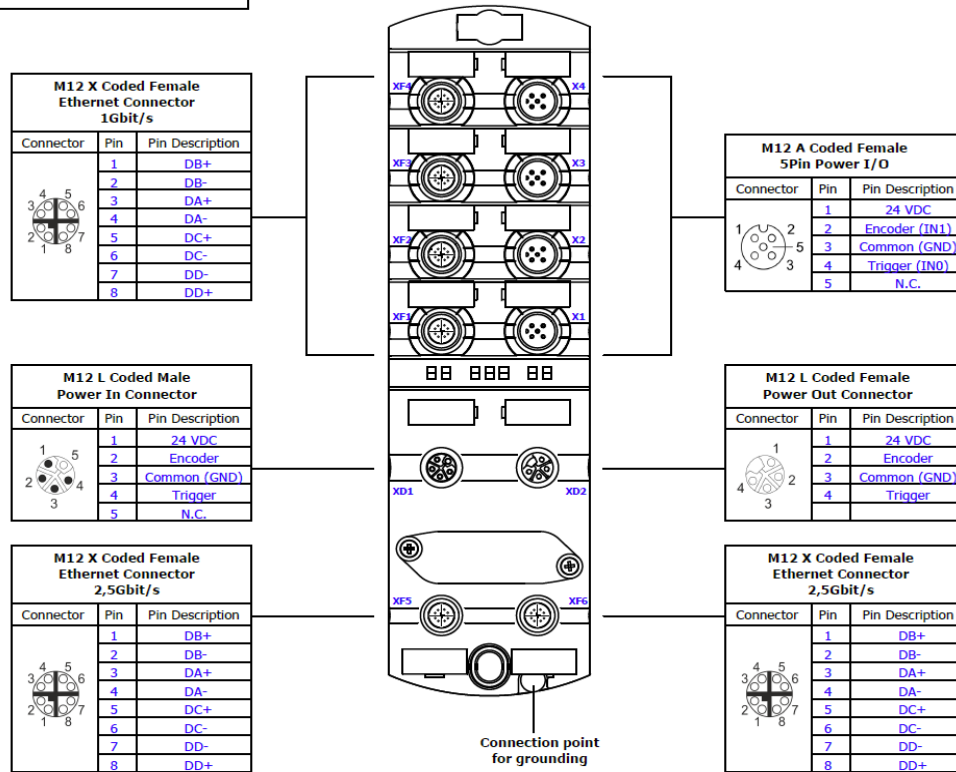
Installation

5.10.3 Hybrid Switch

Hybrid Switch CIO-HS-4

P/N 58860

IP-address:



Installation

5.10.4 Ethernet Chain – Power Chain

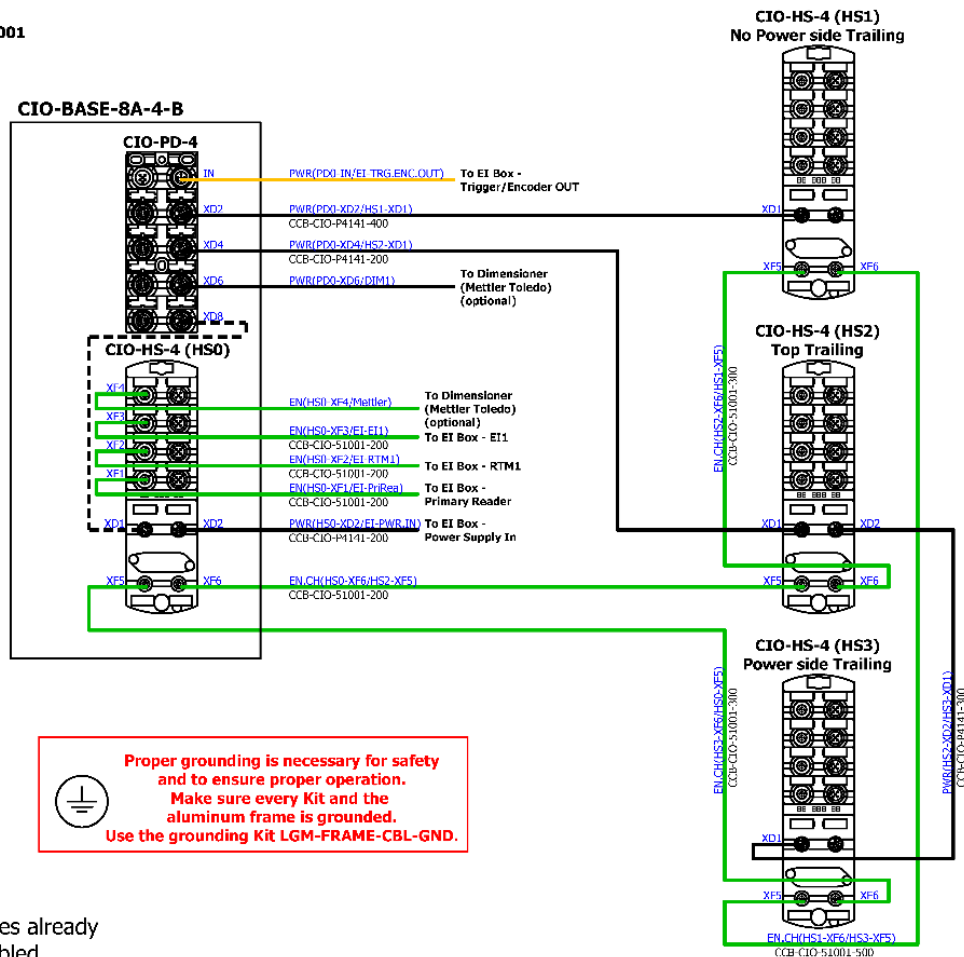
The Ethernet Chain is depicted in green in this cabling diagram. (Example: [EN.CH\(HS1-XF6/HS2-XF5\)\)](#))

The Power Chain connections are depicted in black in this cabling diagram. (Example: [PWR\(PD0-XD2/HS1-XD1\)\)](#))

1. Complete the Power Chain cabling by connecting each cable per the cabling diagram included with the solution documentation package.
2. Complete the Ethernet Chain cabling by connecting each cable per the cabling diagram included with the solution documentation package.
3. Complete the Light Chain cabling by connecting each cable per the cabling diagram included with the solution documentation package.

Cable Kit 01

Cable Kits:
823-20210-001

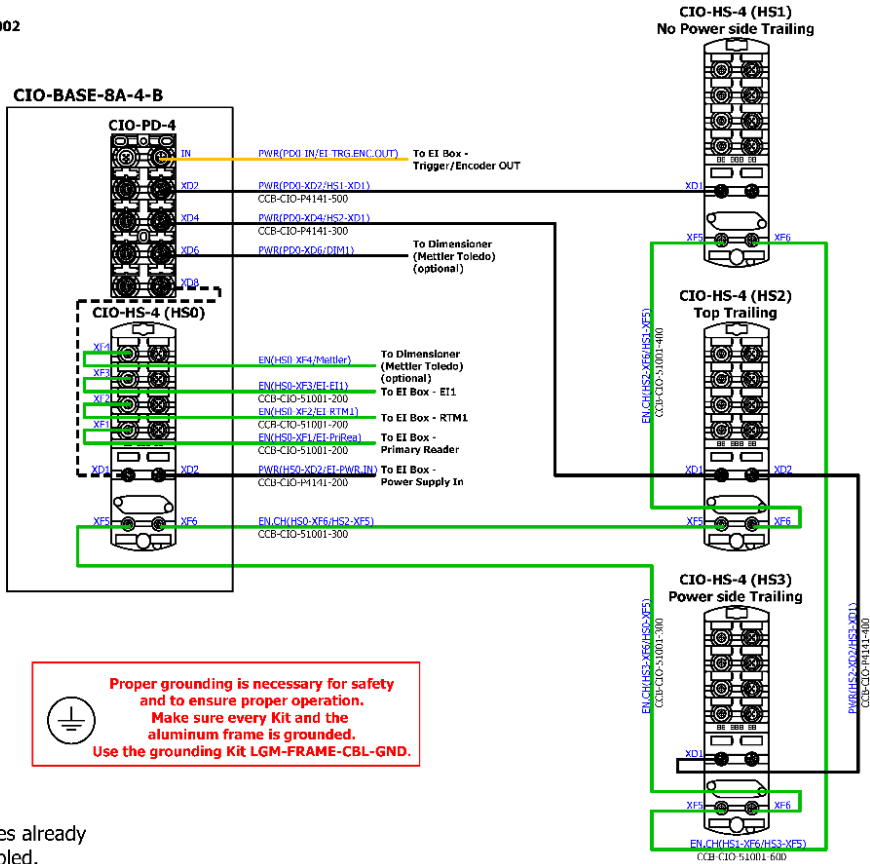


Dashed lines already pre-assembled.

Installation

Cable Kit 02

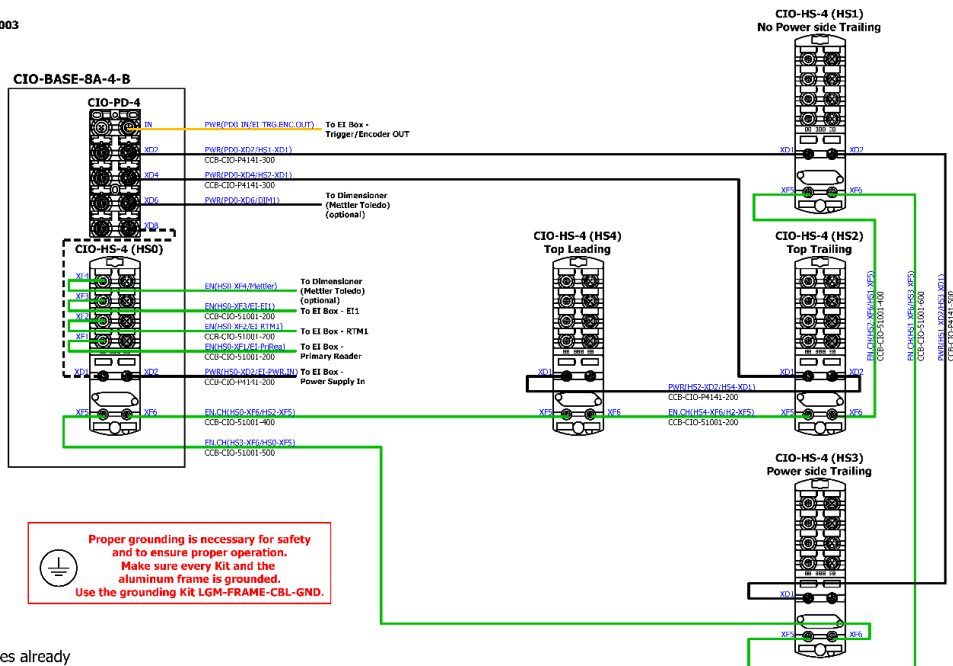
Cable Kits:
823-20210-002



Dashed lines already pre-assembled.

Cable Kit 03

Cable Kits:
823-20210-003



Dashed lines already pre-assembled.

Installation

Light Chain – Two Readers

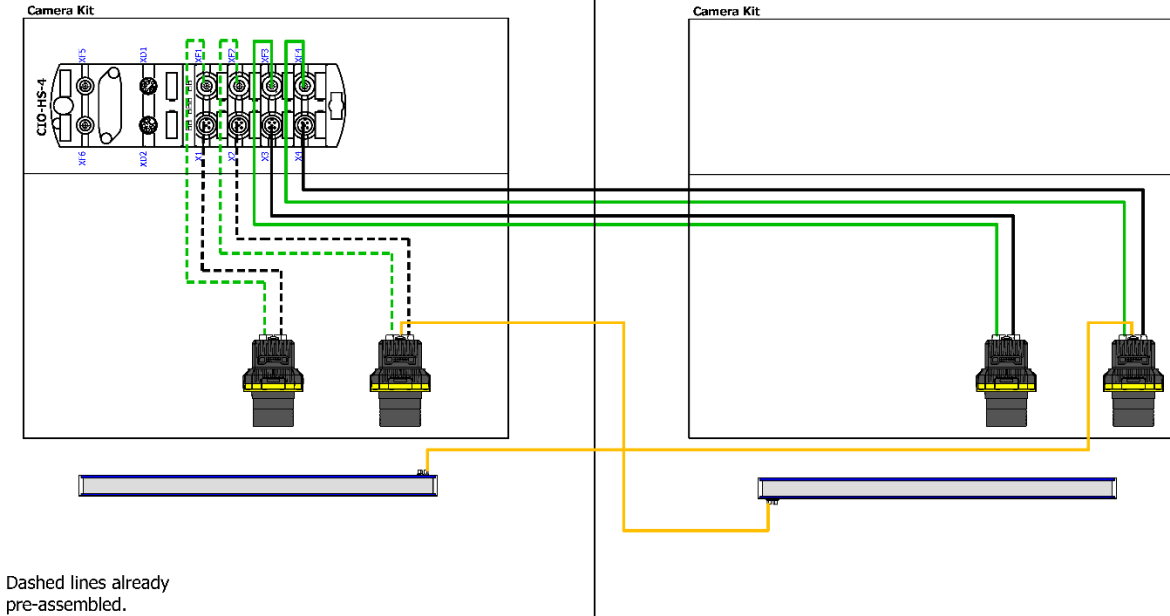
Trailing

Connect the light output of the last available reader to the light on the trailing side

Leading

Connect the light output of the last available reader to the light on the leading side

Cable Kits:
820-20750-007
820-20750-008



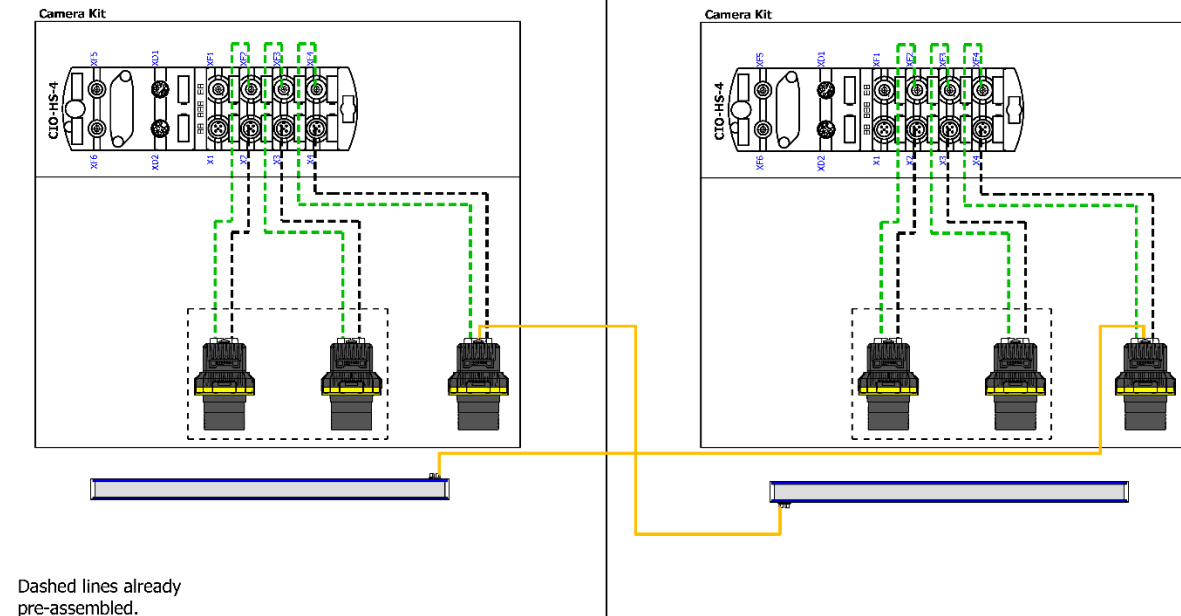
Light Chain – Three Readers

Leading

Connect the light output of the last available reader to the light on the trailing side

Trailing

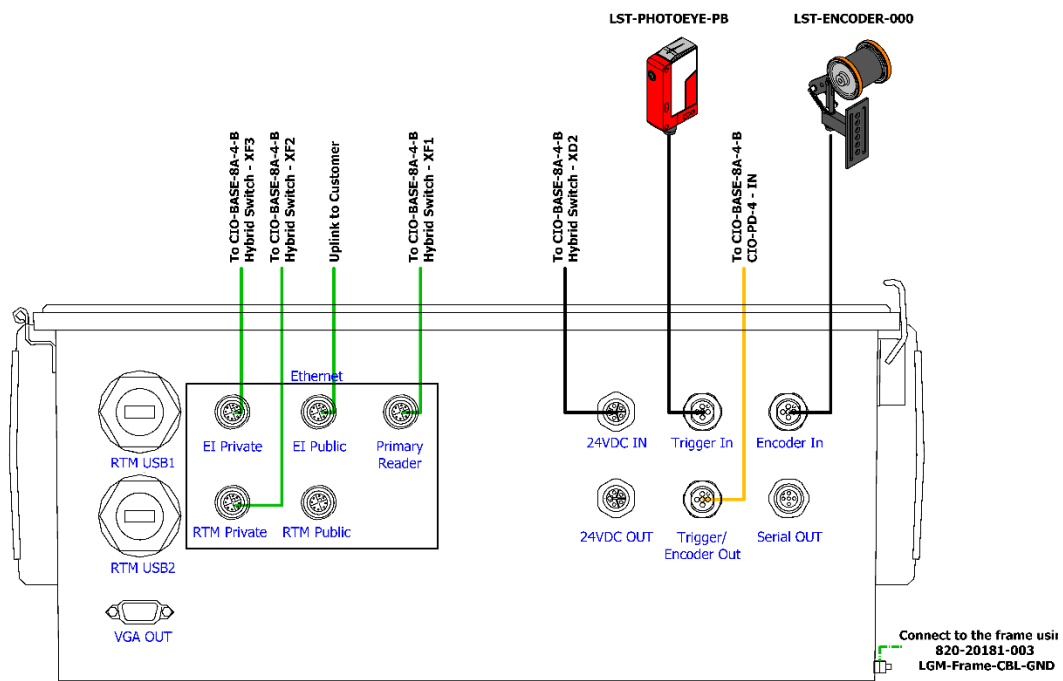
Connect the light output of the last available reader to the light on the leading side



Installation

5.10.5 Photo Eye and Encoder

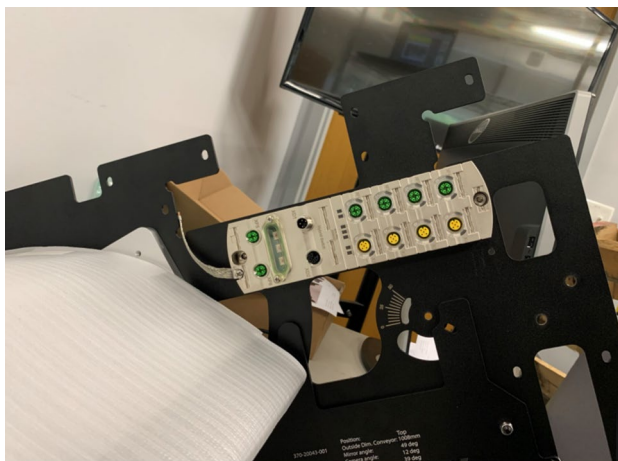
1. Connect the Photo Eye to **Trigger In** on the bottom of the EI Control Box.
2. Connect the Encoder to **Encoder In** on the bottom of the EI Control Box.



5.11 Grounding

5.11.1 Hybrid Switches

Hybrid switches are shipped already grounded by securing the strap to the side plate of the module.



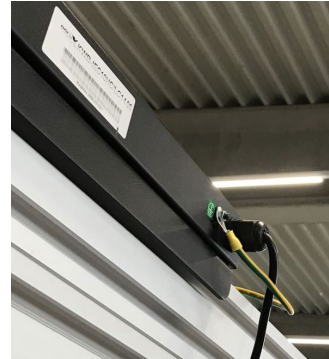
5.11.2 Reader Modules

Modules are grounded to the frame by mounting with the included conductive drop-ins and nuts -> 820-20181-001

Installation

5.11.3 Power and I/O Bracket

Power and I/O Bracket is shipped already grounded.



5.11.4 EI Control Box

EI Control Box is grounded to the frame with grounding kit the screw and wire as seen here.



5.11.5 Frame

Ground the frame directly to the conveyor using the grounding kit.



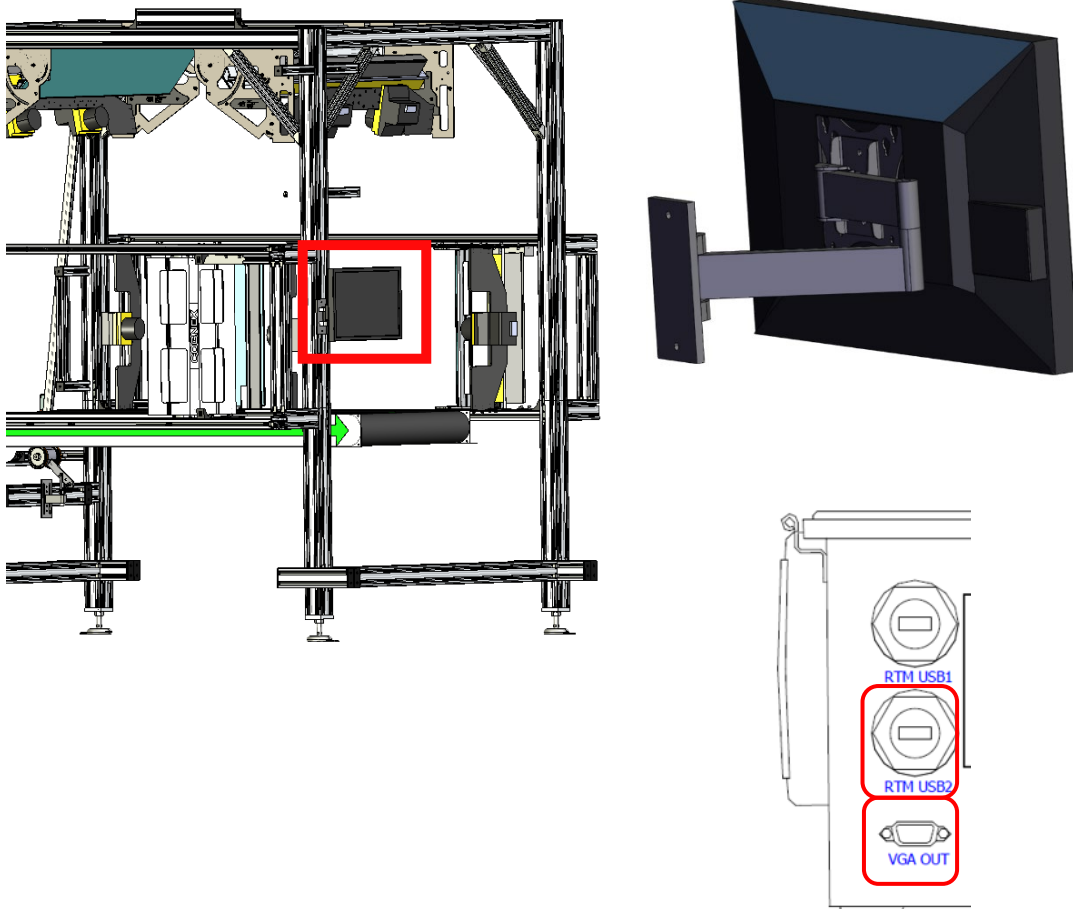
WARNING: Be sure the conveyor is powered before making the grounding link to the frame. Check that the conveyor is grounded correctly by doing a voltage check to verify there is no current on the conveyor. The voltage check can be executed by putting the positive meter probe on the conveyor surface and the negative meter probe to ground. If any voltage is measured, alert the conveyor installer before proceeding.



Installation

5.12 Monitor

1. Mount the monitor on the same upright as the EI Control Box to ensure power cable will reach the PDU on the Power and I/O Bracket. Neatly route and secure the cable on the upright.

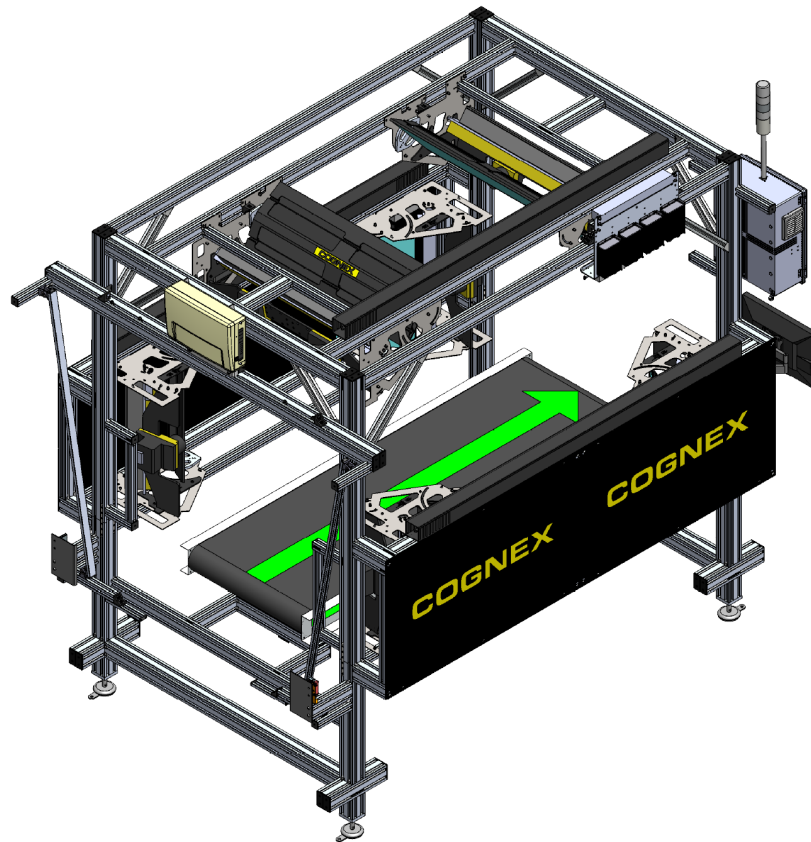


2. Attach the USB cable from the monitor to RTM USB2 port on the EI Control Box to ensure the touch screen functionality works.
3. Attach the VGA cable from the monitor to the VGA OUT port on the EI Control Box.

Light Shield

6 Light Shield

Install once commissioning is complete.



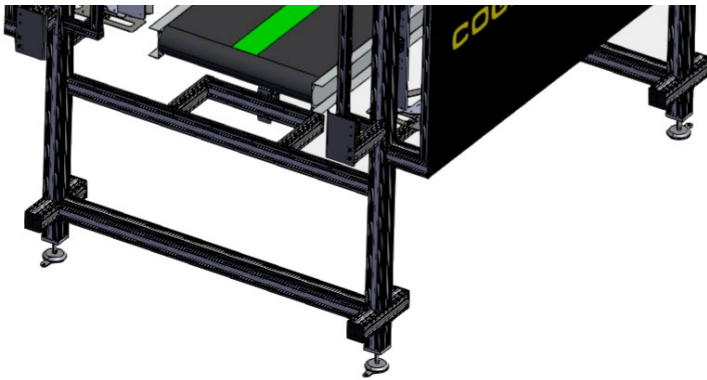
Anchor

7 Anchor

After assembly, wiring, and running the dynamic commissioning tests (but before running the 3D Field Calibration app), anchor the MVT to its commissioned location. Use the included anchoring kits to bolt the frame to the floor.



Note: Point the stabilizing feet to the outside of the frame for ease of anchoring.



8 Supporting Documentation

- DataMan Setup Tool version should at a minimum match the DataMan firmware on the readers after Tunnel Commissioning App(TCA) is completed. It is a free download from the Cognex website, and the latest version is located here:
<https://support.cognex.com/en/downloads/dataman/software-firmware>
- DataMan documentation: <https://support.cognex.com/en/documentation/dataman>
 - DM580 Reference Manual
 - Setup Tool Reference Manual

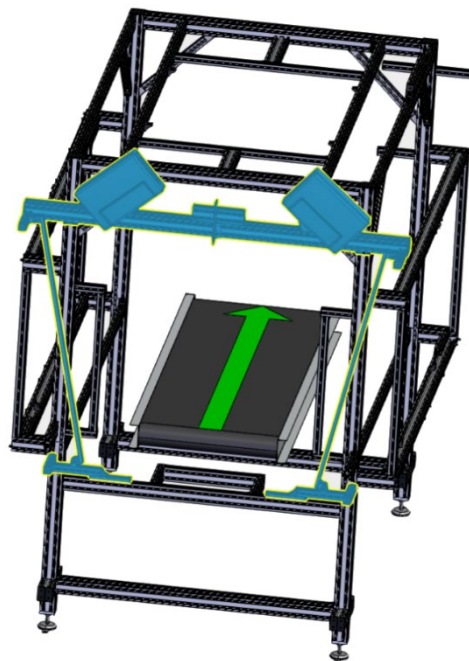
Single- and Dual-Head Mettler Toledo Installation

Appendix A Single- and Dual-Head Mettler Toledo Installation

Tools Required:

- White opaque tape
- Black electrical tape
- Calibration bar – included in MT Kit
- Calibration box – included in MT Kit

Build the support structure that the Mettler Toledo Dimensioner will sit on. This structure includes beam blocker bars on each side of the conveyor extending from the top cross conveyor support beam to underneath the conveyor and a center beam blinder mounted directly on the support beam.

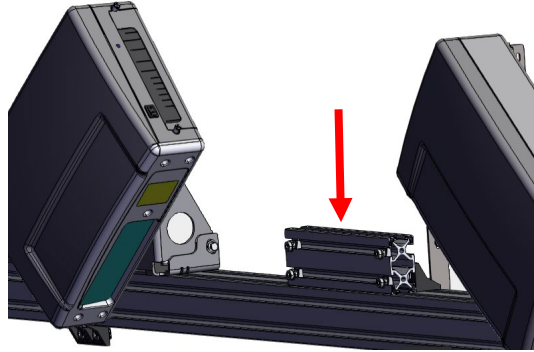


Single- and Dual-Head Mettler Toledo Installation

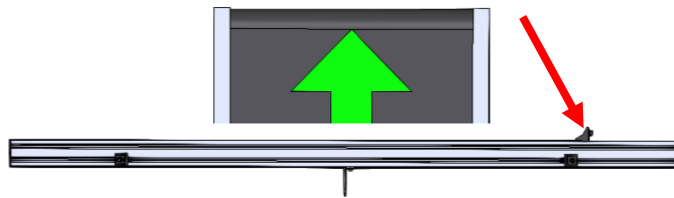
A.1 Build the support frame

1. Remove the extrusion and gussets meant to hold a single head dimensioner.

Note: Do **NOT** remove if installing the single-head dimensioner.

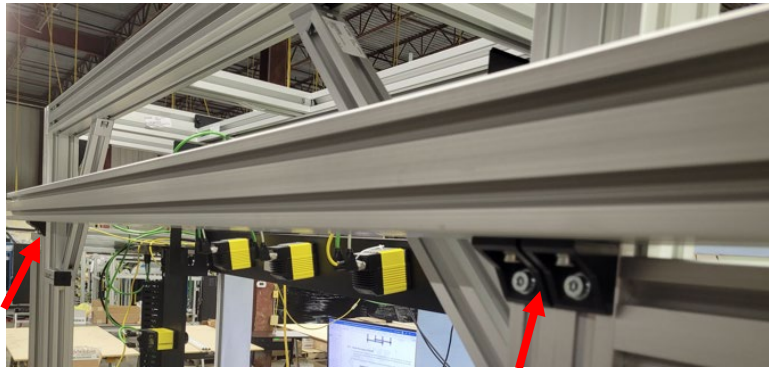


2. Orient the Mettler Toledo support beam so that the pre-set gussets are on the right side of the tunnel and will contact the inside of the right upright. These gussets set the alignment of the beam left-right across the front of the tunnel.

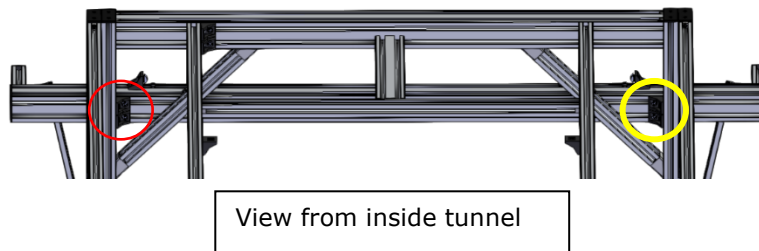


3. Remove the loose bolt and t-nut from the support beam gusset and use them to fasten to the upright once it is in place.
4. Prepare the pre-set gussets on the uprights to receive the support beam by remove the bolt and t-nut to allow the support beam to lie flat.
5. Insert conductive t-nuts in the support beam to align with the 4 gussets on the uprights.
6. Lay the support beam on the gussets being sure to align the beam left-right using the positioning gusset on the right in-side.
7. Attach the support beam to the uprights using the pre-mounted gussets (circled in red).

Single- and Dual-Head Mettler Toledo Installation



8. Insert t-nuts and attach the inside right positioning gussets to the right upright.
9. Attach another set of gussets to the inside left of the upright (circled in yellow).



10. On each end of the Mettler Toledo support beam, attach the upper beam blocker support extrusion flush with the end in the lower channel.

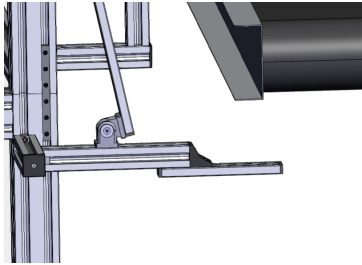


11. On each upright, attach the lower Mettler Toledo beam blocker support extrusion just below the photo eye extrusion in the outer channel of both uprights.

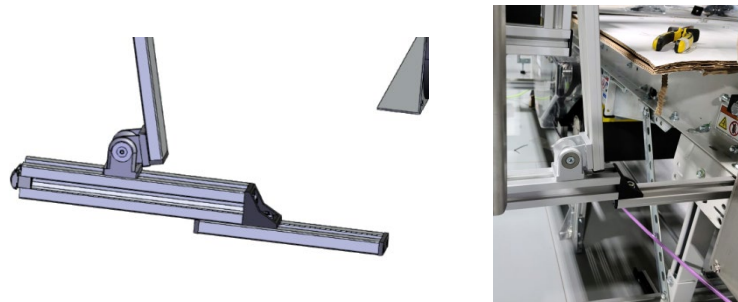


Single- and Dual-Head Mettler Toledo Installation

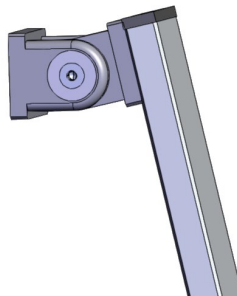
12. Assemble the adjustable beam blocker lower extension arm using the M8 bolts included in the gusset kit. Make 2.



13. Attach an elbow joint to lower end of the smooth beam blocker extrusion with the gusset insert removed where the gusset and the elbow joint meet. Make 2.

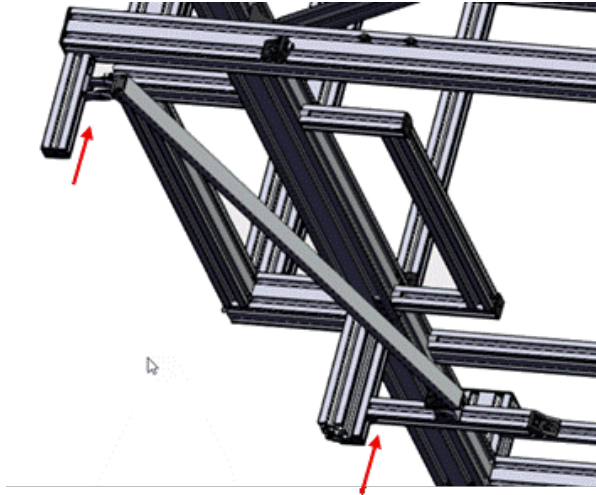


14. Attach an elbow joint to upper end of the smooth beam blocker extrusion.

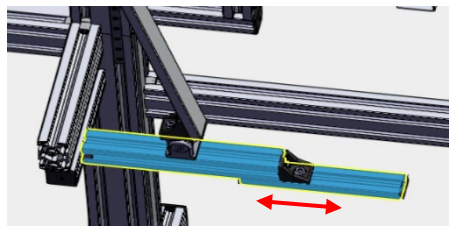


Single- and Dual-Head Mettler Toledo Installation

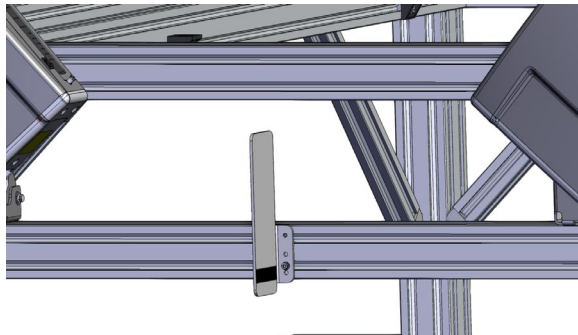
15. Slide each end of the beam blocker into the channel of extrusion.



16. Adjust the bottom extension as needed to complete the coverage to the conveyor.



17. Attach the center beam blinder with the black line on the bottom directly to the extrusion.



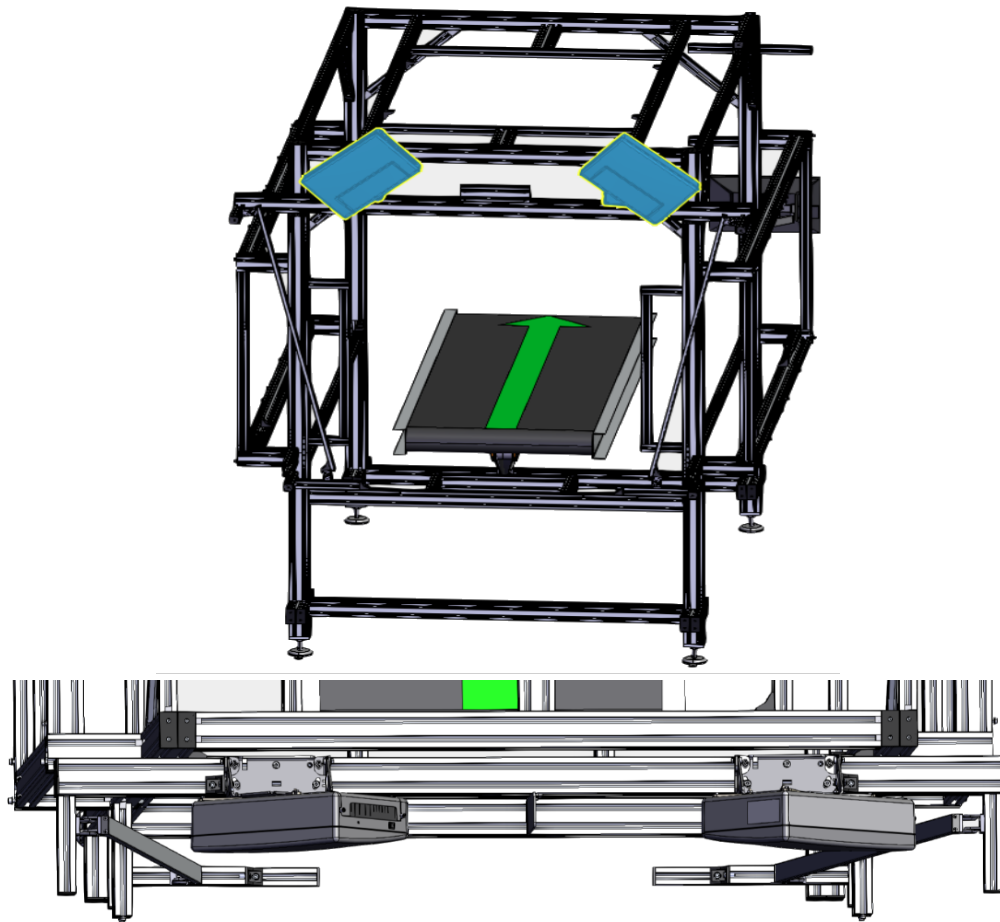
18. Attach the caps to the end of the support extrusions.

Single- and Dual-Head Mettler Toledo Installation

A.2 Mount the Mettler Toledo Dimensioners

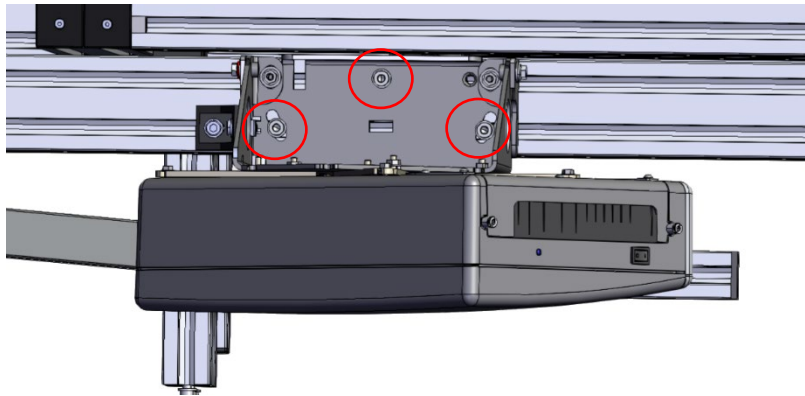
The Multi-Head Dimensioning System consists of a Primary and a Slave Dimensioner. The Primary should always be mounted on the **left** side of the tunnel. The Primary will have the USB dongle inserted and use a split cable to connect to the Hybrid Switch. The Slave unit will get power from the Hybrid Switch and send data to the Primary unit directly.

The head alignment and calibration will take place after they are powered-up.

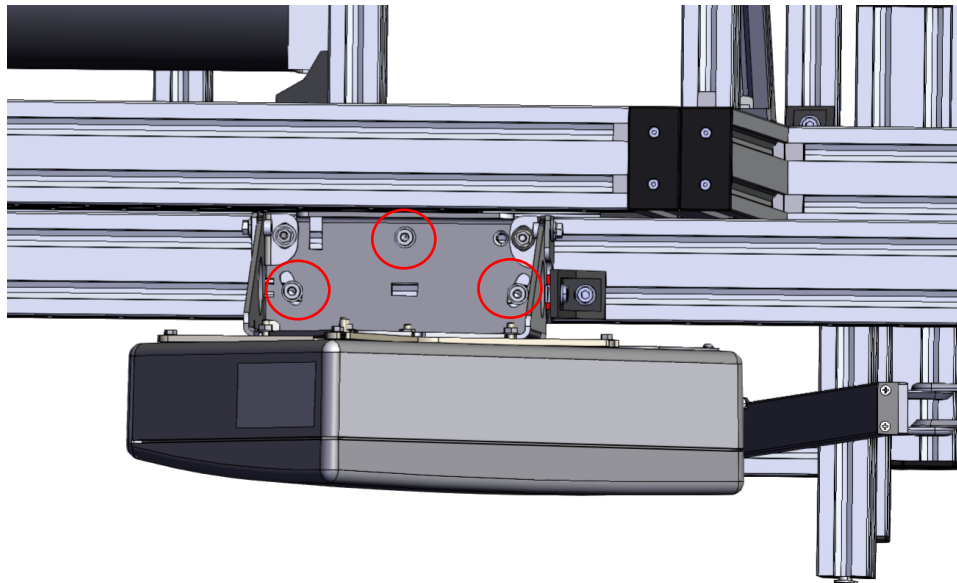


1. Mount the Primary unit on the **left**-side of the tunnel flush against the positioning gusset – insert the USB dongle into this one.
Note: Mount the Primary unit in the **Center** of the tunnel and insert the USB dongle if using a single-head dimensioner.

Single- and Dual-Head Mettler Toledo Installation



2. Mount the Slave unit on the **right**-side flush against the positioning gusset and be sure to **remove** the USB dongle.



Single- and Dual-Head Mettler Toledo Installation

A.3 Cabling Mettler Toledo Dimensioners

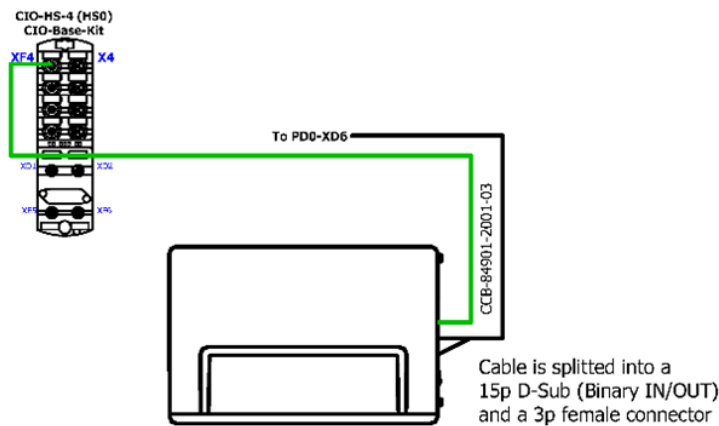
1. Connect the split power and data cable to the Primary head and the M12 to the nearest Hybrid Switch of the top module.



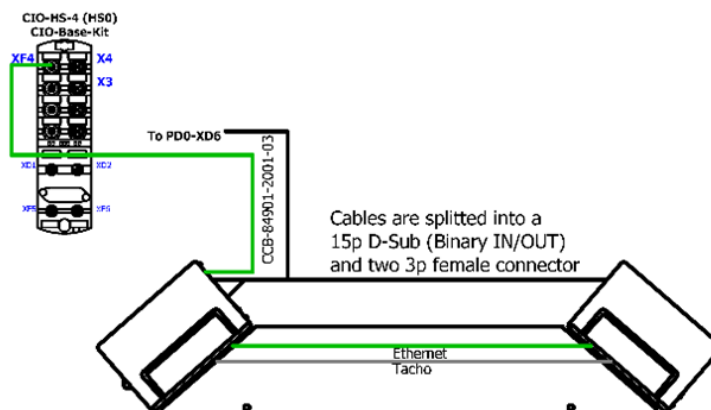
2. Connect the Slave unit using the M12 cable with the single green power connection to the closest Hybrid Switch with an open port.

Note: Use the drawing that matches the cable that you have. There will be a new cable for projects with a belt speed greater than 3m/s [590ft/min.].

Mettler Toledo Single Head Option

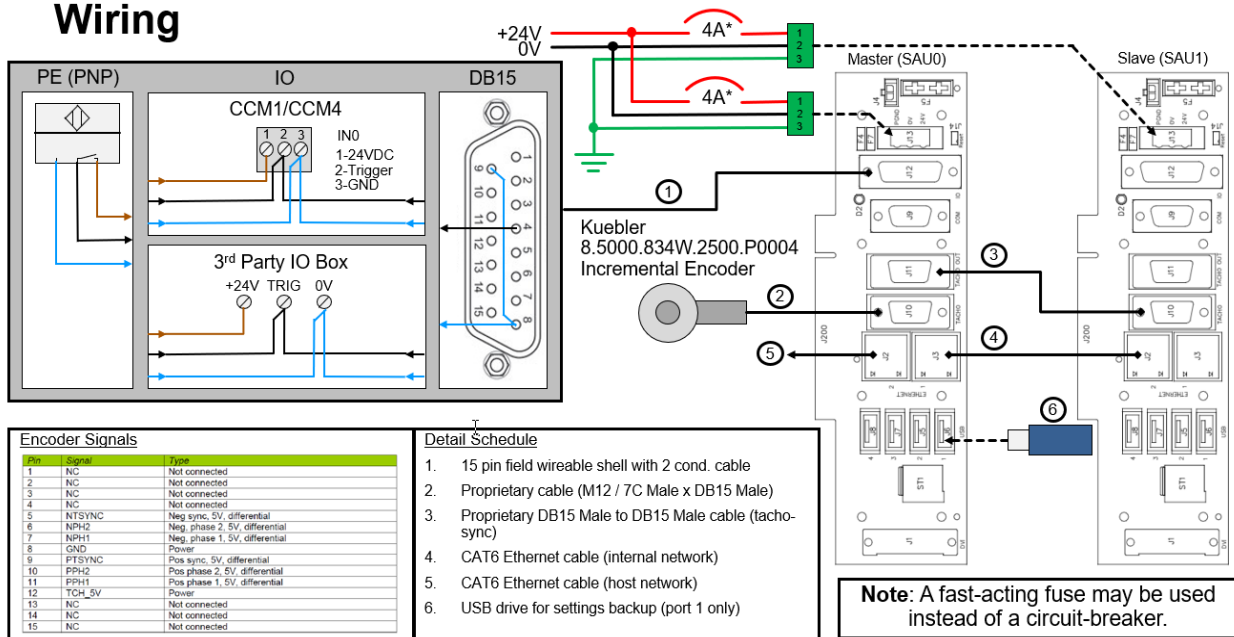


Mettler Toledo Dual Head Option



Single- and Dual-Head Mettler Toledo Installation

Wiring



- NET2 is **192.168.2.101** by default
- Username: Service technician (administrator)
- Password: **dorp007**

Hardware Pinouts

Appendix B Hardware Pinouts

B.1 Hybrid Switch

Hybrid Switch CIO-HS-4

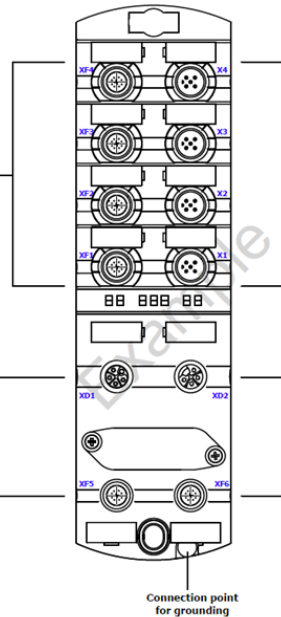
P/N 58860

IP-address:

M12 X Coded Female Ethernet Connector 1Gbit/s		
Connector	Pin	Pin Description
	1	DB+
	2	DB-
	3	DA+
	4	DA-
	5	DC+
	6	DC-
	7	DD-
	8	DD+

M12 L Coded Male Power In Connector		
Connector	Pin	Pin Description
	1	24 VDC
	2	Encoder
	3	Common (GND)
	4	Trigger
	5	N.C.

M12 X Coded Female Ethernet Connector 2.5Gbit/s		
Connector	Pin	Pin Description
	1	DB+
	2	DB-
	3	DA+
	4	DA-
	5	DC+
	6	DC-
	7	DD-
	8	DD+



M12 A Coded Female 5Pin Power I/O		
Connector	Pin	Pin Description
	1	24 VDC
	2	Encoder (IN1)
	3	Common (GND)
	4	Trigger (IN0)
	5	N.C.

M12 L Coded Female Power Out Connector		
Connector	Pin	Pin Description
	1	24 VDC
	2	Encoder
	3	Common (GND)
	4	Trigger

M12 X Coded Female Ethernet Connector 2.5Gbit/s		
Connector	Pin	Pin Description
	1	DB+
	2	DB-
	3	DA+
	4	DA-
	5	DC+
	6	DC-
	7	DD-
	8	DD+

B.2 Master Breakout Box

Master Breakout Box NPN CIO-MB-NPN

P/N 277413

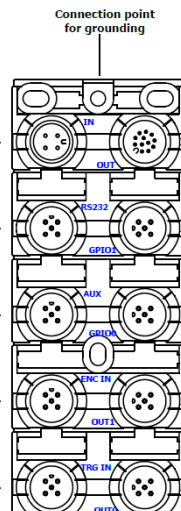
M12 A Coded Male 4Pin IN		
Connector	Pin	Pin Description
	1	24VDC
	2	Encoder OUT
	3	GND
	4	Trigger OUT

M12 A Coded Female 5Pin RS232		
Connector	Pin	Pin Description
	1	24 VDC
	2	TxD
	3	GND
	4	RxD
	5	FE

M12 A Coded Female 5Pin AUX		
Connector	Pin	Pin Description
	1	24 VDC
	2	N.C.
	3	GND
	4	N.C.
	5	FE

M12 A Coded Female 5Pin ENC IN		
Connector	Pin	Pin Description
	1	24 VDC
	2	N.C.
	3	GND
	4	Encoder IN <5mA
	5	FE

M12 A Coded Female 5Pin TRG IN		
Connector	Pin	Pin Description
	1	24 VDC
	2	N.C.
	3	GND
	4	Trigger IN <5mA
	5	FE



M12 A Coded Female 12Pin		
Connector	Pin	Pin Description
	1	GPIO2
	2	TxD
	3	RxD
	4	GPIO1
	5	Encoder IN
	6	Common IN
	7	24V
	8	GND
	9	Common OUT
	10	Trigger IN
	11	OUT0
	12	OUT1

M12 A Coded Female 5Pin Power I/O		
Connector	Pin	Pin Description
	1	24 VDC
	2	N.C.
	3	GND
	4	GPIO2/3
	5	FE

M12 A Coded Female 5Pin OUT1		
Connector	Pin	Pin Description
	1	24 VDC
	2	OUT0
	3	GND
	4	OUT1
	5	FE

M12 A Coded Female 5Pin OUT0		
Connector	Pin	Pin Description
	1	24 VDC
	2	OUT1
	3	GND
	4	OUT0
	5	FE

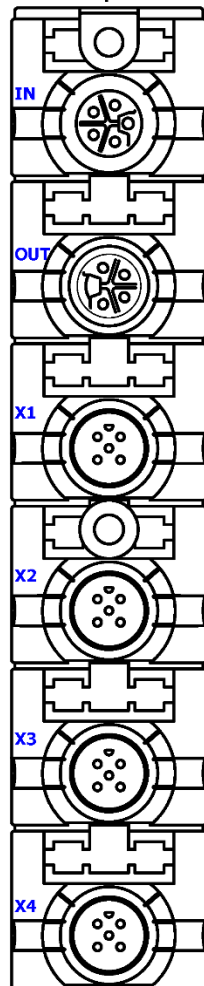
Hardware Pinouts

B.3 Power Breakout Box

Power Breakout Box CIO-PB-4

P/N 9490-41014-0200067

Connection point
for grounding



**M12 L Coded Male
Power In Connector**

Connector	Pin	Pin Description
	1	24 VDC
	2	Encoder
	3	Common (GND)
	4	Trigger
	5	N.C.

**M12 L Coded Female
Power Out Connector**

Connector	Pin	Pin Description
	1	24 VDC
	2	Encoder
	3	Common (GND)
	4	Trigger

**M12 A Coded Female
5Pin Power I/O**

Connector	Pin	Pin Description
	1	24 VDC
	2	N.C.
	3	GND
	4	GPIO2/3
	5	FE

max. 2A per channel

Calibration Box Construction

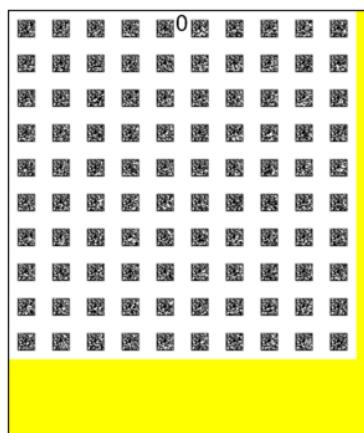
Appendix C Calibration Box Construction



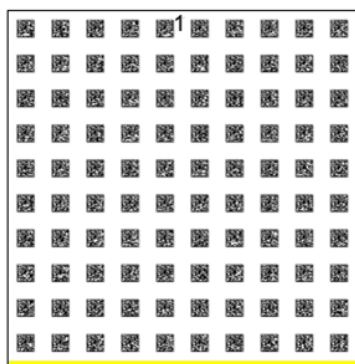
WARNING: The calibration box is only necessary if the tunnel has the DataMan Bottom Side included (a 6-side reading tunnel).

Required Supplies from Staples

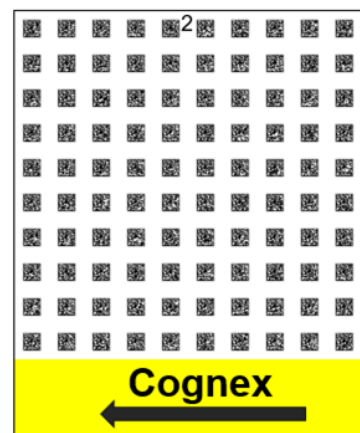
- Two heavy duty boxes 20 in. x 20 in. x 24 in. (one for backup).
- Masking tape (1.88 in. wide).
- Scotch tape (3/4 in. wide) helps with edges.
Note: Do not cover barcodes with tape.
- Spray glue (e.g., https://www.staples.com/Scotch-Spray-Mount-Repositionable-Adhesive-10-2-oz/product_130831).
Spray it onto the back of the sheet or onto the box.
- The barcode sheets located [HERE](#) (and below).



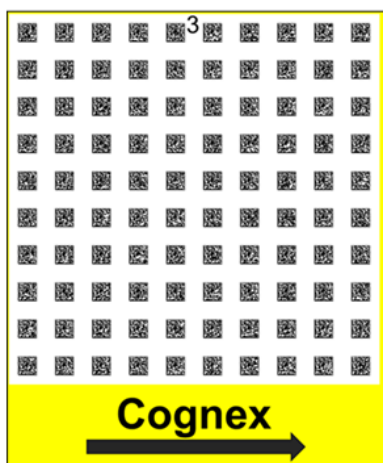
Front: sheet 0



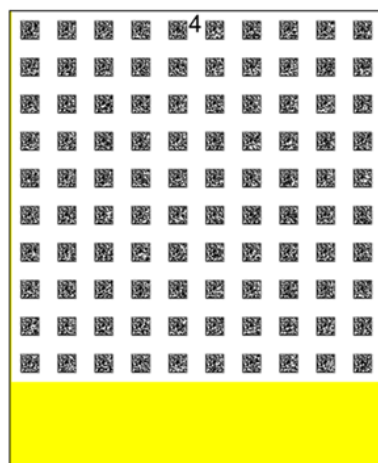
Top: sheet 1



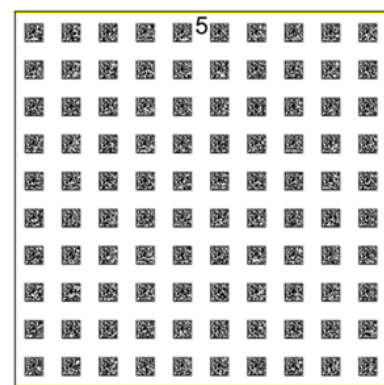
Left: sheet 2



Right: sheet 3



Back: sheet 4



Bottom: sheet 5

Calibration Box Construction

- Email the following instructions to Staples with your contact information:
 - 6 sheets.
 - Use matte polypropylene paper.
 - Print the 6 sheet documents with actual size and exact margins. Typically printed actual size with Dotted lines where they need to cut.
Note: We request that they cut exactly on the margin (as close as possible).
 - The final result for each sheet will be 500mm x 500mm when you use the actual size and exact margins (Top and left margins are critical).
 - If not already included, attach the words: “Front”, “Top”, “Right”, “Left”, “Back”, and “Bottom” to make the sides easy to identify.

To construct the box

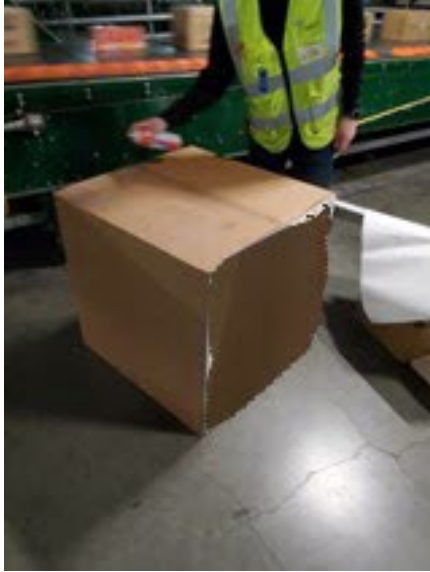
Cognex suggests two workers construct the box to hold two corners of the sheet while accurately taping it to the box. This should take about 30 minutes.

1. From the flattened box, construct either the top or bottom face.
2. Fold the flaps in and tape down with masking tape.
Note: Avoid any bubbles in the tape application and keep the box as planar as possible.
3. Follow these requirements as closely as possible:
 - a. Accurately Square (Opposite sides are all the same length and all angles are 90°). You can measure this against the printed sheets to make sure that two sides of the sheet line up with two sides of the box at a corner.
 - b. Planar surfaces (Not concave or convex).
 - c. Open only from one side if cardboard (possible bottom side). All other five sides are planar. (ideally, the sides won't be open).
 - d. Thickest/Most Durable material offered and white background with matte finish (preferred).

Calibration Box Construction

To glue the sheets to the side of the box

1. Spray the back of the sheet with glue.

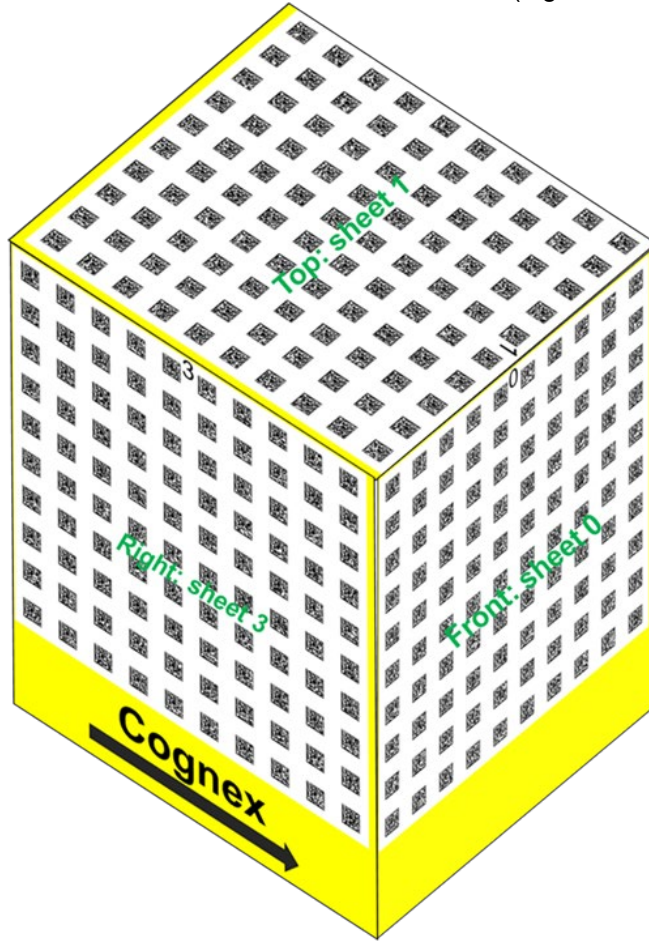


2. Align the sheet of paper to the upper left-hand corner of the box and lower that corner down.
3. Lower all the corners to the box.
4. Smooth out the seams of the sheets slowly.
Note: Avoid air pockets.
5. Tape down the sides of sheet with 3/4 in. Scotch tape (use four pieces: top, bottom, two in between).
Note: Avoid air pockets.



Calibration Box Construction

6. Attach the sheets in approximately the same configuration as follows.
Note: Orient all the numbers of the sheets (e.g., 0, 1, 3) to the top of the box:



Note: Some edges may not be clear because it's cardboard. Do your best and make sure the whole sheet is not rotated slightly.

Regulations/Conformity

Appendix D Regulations/Conformity

D.1 DataMan 475

DataMan 470 readers have Regulatory Model R00062 and meet or exceed the requirements of all applicable standards organizations for safe operation. However, as with any electrical equipment, the best way to ensure safe operation is to operate them according to the agency guidelines that follow. Please read these guidelines carefully before using your device.



Note: For the most up-to-date CE declaration and regulatory conformity information, please refer to the Cognex online support site:

<http://support.cognex.com>

Safety and Regulatory	
Manufacturer	Cognex Corporation One Vision Drive Natick, MA 01760 USA
USA	FCC 47 CFR Part 15 Subpart B, Class A This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference; and (2) this device must accept any interference received, including interference that may cause undesired operation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
Canada	ICES-003, Class A This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.
Europe	EN55022 (CISPR 22) Class A EN55024 EN60950
	CAUTION: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.
	The CE mark on the product indicates that the system has been tested to and conforms with the provisions noted within the 2014/30/EU Electromagnetic Compatibility Directive. For further information please contact: Cognex Corporation, One Vision Drive Natick, MA 01760 USA. Cognex Corporation shall not be liable for use of our product with equipment (i.e., power supplies, personal computers, etc.) that is not CE marked.
Australia	C-TICK, AS/NZS CISPR 22 / EN 55022 for Class A Equipment
Korea	KN22, KN24 A급 기기 (업무용 방송통신기자재): 이 기기는 업무용 (A급) 전자파 적합 기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라 며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다. Certificate number: MSIP-REM-CGX-DM260 MSIP-REM-CGX-DM262X MSIP-REM-CGX-DM260PoE

Regulations/Conformity

Japan	VCCI V-3/2015.04 Class A この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI-A
UL and CUL Statement 	UL and cUL listed: IEC 60950-1:2005 (2nd Edition); Am 1:2009 + Am 2:2013

D.2 For European Community Users

Cognex complies with Directive 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 on waste electrical and electronic equipment (WEEE).

This product has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment, if not properly disposed.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems for product disposal. Those systems will reuse or recycle most of the materials of the product you are disposing in a sound way.



The crossed out wheeled bin symbol informs you that the product should not be disposed of along with municipal waste and invites you to use the appropriate separate take-back systems for product disposal.

If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You may also contact your supplier for more information on the environmental performance.

Regulations/Conformity

Note: For the most current CE declaration and regulatory conformity information, see the Cognex support site: cognex.com/support.

DataMan 470 has Regulatory Model R00062, and meet or exceed the requirements of all applicable standards organizations for safe operation. However, as with any electrical equipment, the best way to ensure safe operation is to operate them according to the agency guidelines that follow. Please read these guidelines carefully before using your device.

Safety and Regulatory	
Manufacturer	Cognex Corporation One Vision Drive Natick, MA 01760 USA
USA	TÜV SÜD SCC/NRTL OSHA Scheme for UL/CAN 61010-1. FCC Part 15, Class A This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
Canada	TÜV SÜD SCC/NRTL OSHA Scheme for UL/CAN 61010-1. ICES-003, Class A This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Europe	CAUTION: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. The CE mark on the product indicates that the system has been tested to and conforms to the provisions noted within the 2014/30/EU Electromagnetic Compatibility Directive and the 2011/65/EU RoHS Directive. For further information, please contact: Cognex Corporation, One Vision Drive, Natick, MA 01760, USA. Cognex Corporation shall not be liable for use of our product with equipment (i.e., power supplies, personal computers, etc.) that is not CE.
Korea	A급 기기(업무용 방송통신기자재): 이 기기는 업무용(A급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라 며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다. For DataMan 474 with Regulatory Model R00062: R-REM-CGX-R00062.
International Product Safety	Conforms to IEC 61010-1, CAN/CSA-C22.2 No. 61010-1:2012 + UPD No. 1:2015-07, UL 61010-1:2012 + R:2015-07, UL 61010-1:2012 + R:2015-07, EN 61010-1:2010.
CB	TÜV SÜD, IEC/EN 61010-1. CB report available upon request.

Regulations/Conformity

Manufacturer	ControlTek 3905 NE 112th Avenue Vancouver, WA 98684 www.controltek.com
USA	FCC Part 15, Class A. This system, with these above mentioned devices, complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) These devices may not cause harmful interference and (2) These devices must withstand any interference received, including interference that may cause operation.
Canada	UL OSHA scheme for UL61010 ICES-001 Issue5
Europe	CE compliant 2014/30/EU & 2011/65/EU
Korea	KS C 9610-6-2, KS C 9610-6-4 Registration Number: R-R-CGX-LGM-PNL-EI-MVT
International Safety	cULus UL61010, CSA C22.2 No 61010-1-19 UL1310 to NEC Class 2 port

588600	Hybrid Switch
277411	Master Breakout Box PNP
277412	Distribution Box
9490-41014-0200067	Power Breakout Box
9000-11112-1962020	Emparro67 4-100-240/24 7/8"-7/8"

9000-11112-2062020 **Emparro67 8-100-240/24 7/8"-7/8"**

Manufacturer	Murrelektronik GmbH Falkenstraße 3 71570 Oppenweiler GERMANY
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Regulations/Conformity

	Phone +49 7191 47-0 Fax +49 7191 47-491000 www.murrelektronik.com
USA	UL OSHA scheme for UL61010 FCC Part 15, Class A. This system, with these above mentioned devices, complies with Part 15 of the FCC Rules. Operation is subject to the following conditions: (1) These devices may not cause harmful interference and (2) These devices must withstand any interference received, including interference that may cause operation.
Canada	UL OSHA scheme for UL61010
Europe	CE compliant 2014/30/EU & 2011/65/EU Additional 2014/35/EU for 9000-11112-1962020 Emparro67 4-100-240/24 7/8"-7/8" 9000-11112-2062020 Emparro67 8-100-240/24 7/8"-7/8"
Korea	KN 61000-6-2, KN61000-6-3 CIO-PD-4 Registration number ??? CIO-PB-4 CIO-MB-PNP CIO-MB-NPN CIO-HS-4 CIO-BASE-8A-4
International Safety	cULus UL61010, CSA C22.2 No 61010-1-19 UL1310 to NEC Class 2 port

Regulations/Conformity

Manufacturer	Leuze electronic GmbH + Co. KG In der Braike 1 D-73277 Owen Telefon +49 7021 573-0 Telefax +49 7021 573-199 info@leuze.de www.leuze.de
USA	
Canada	
Europe	CE compliant 2014/30/EU & 2011/65/EU
Korea	
International Safety	cULus