

CEDES

— APS LANDING SYSTEM —

VERSION 3.0



 SMARTRISE

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Document History

Date	Version	Summary of Changes
June 24, 2021	3.0	Updated the CEDED APS Landing information due to new bracket Deleted test procedures
June 13, 2020	2.7	Changed cover page New document format Updated references Added additional figures for clarity
August 23, 2018	2.6	Added minimum SRU version software to perform tests Updated all testing procedures Added extra byte 2 to troubleshooting
July 2, 2018	2.5	Updated header and footer
June 19, 2018	2.4	Updated cover page
June 19, 2018	2.3	Updated Upper Tape Mount Assembly positioning Added ETS Switch Positioning table Specified NTS Learning for traction only Added 150 fpm or slower for hydraulic and traction type after learning the hoistway
Marcy 27, 2018	2.2	Updated figure numbers
January 29, 2018	2.1	Initial release

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1 CEDES APS Landing System

The CEDES Absolute Positioning System (APS) consists of:

- Coded Tape
- Sensor Array Assembly
- Tape Clip Assembly
- Top Tape Mount Assembly
- Bottom Tape Mount Assembly
- Emergency Tape Break Switch Assembly

1.1 Coded Tape

The tape is a special coded tape that provides the absolute positioning feedback to the CEDES camera.



Figure 1: Coded Tape

WARNING

THE TAPE EDGE IS SHARP. CUT-PROOF GLOVES MUST BE WORN WHILE HANDLING THE TAPE.



Figure 2: Gloves Required

The following procedure describes how to install the tape.

1. Open the tape box at the top corner, being mindful of the sharp end or edges, and pull out tape as needed.
CAUTION: Do not pull too much tape out of the box as excessive bending can occur and damage the tape.

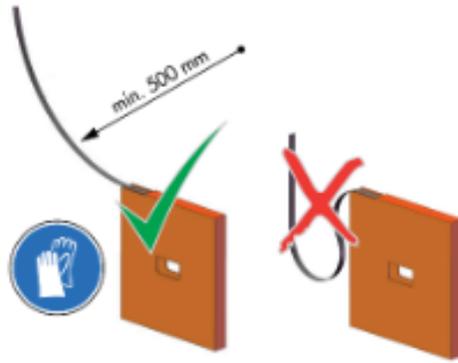


Figure 3: Tape Minimum Bend Radius

2. Serpentine and secure the tape through the bracket then zip tie loose end.
NOTE: Verify the words Left are on the left side of the tape with the barcode facing out towards the camera.

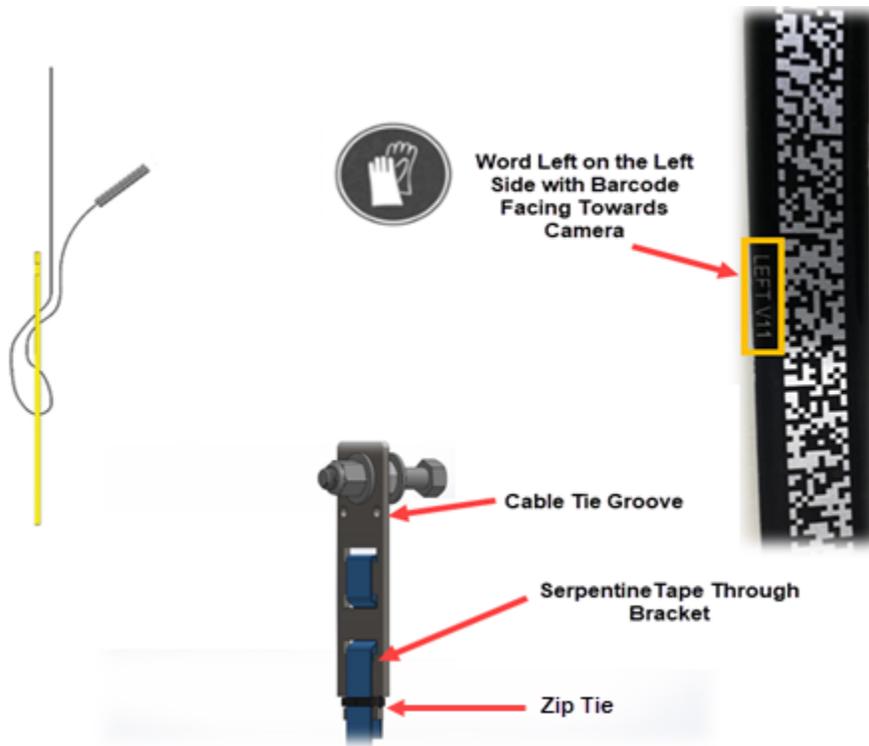


Figure 4: Routing Tape

1.2 Sensor Assembly Installation

The following procedure describes how to secure the Sensor Assembly to the Car Top Frame C-Channel.

NOTE: Exact positioning and lengths of the Unistrut can be adjusted as needed if the Sensor Array is positioned as shown in Figure 5.

1. Cut the lengths of Unistrut as follows:
 - Two 18"
 - One 24"
2. Bolt the two 18" lengths of Unistrut to the C-Channel.

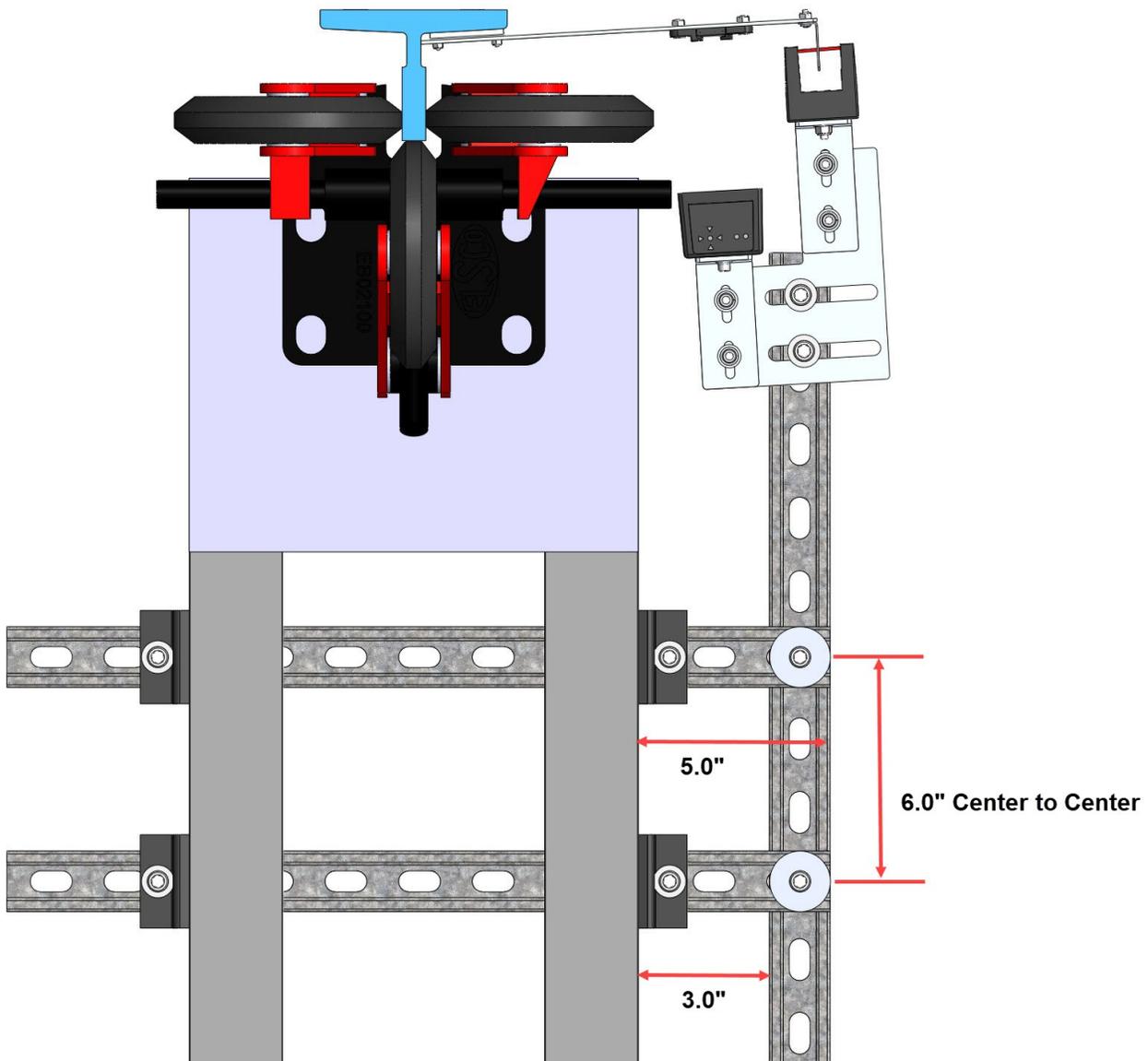


Figure 5: Unistrut Installation

3. Bolt the 24" length of Unistrut to the two 18" lengths of Unistrut. See Figure 5.
NOTE: The 24" length may be bolted to the top of the two 18" lengths if applicable.
4. Temporarily affix a Tape Clip Assembly on the guide rail to use as an alignment for the Sensor Array Assembly.

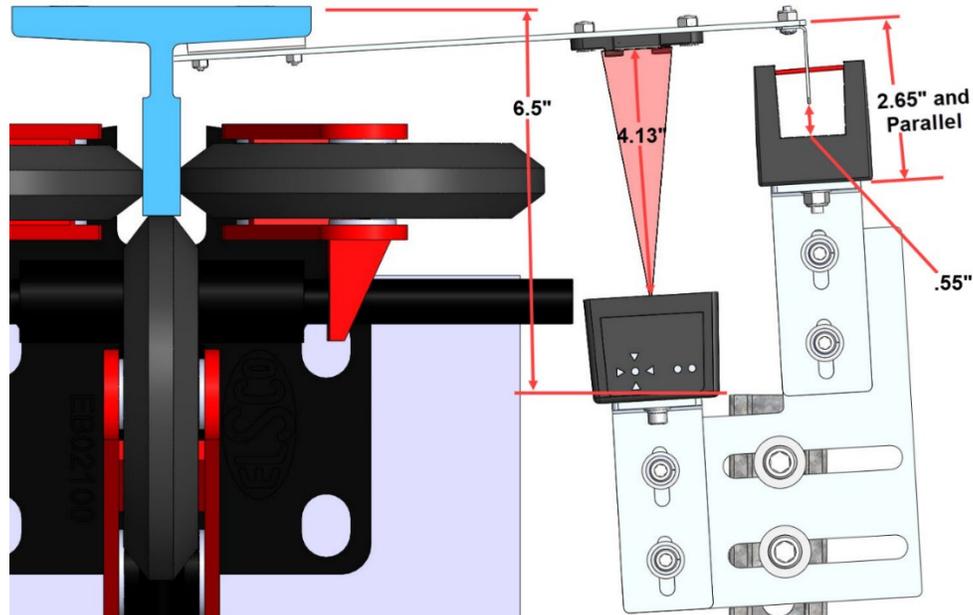


Figure 6: Sensor Array Assembly Positioning

5. Set the end of the 24" length Unistrut at 6.5" from the rear surface of the guide rail. See Figure 6.
6. Loosely bolt the Sensor Array Assembly onto the 24" length of Unistrut with the Door Zone Blade centered horizontally in the GLS Reader and parallel to the Tape Clip Assembly. See Figure 6.
7. Position the Sensor Array Assembly according to the distances shown in then tighten all bolts.
NOTE: The Optical Sensor Mount bolts may be loosened if needed to adjust the position of the sensor.

After the Sensor Array Assembly positioning has been completed, the Sensor Array Assembly needs to be fine-tuned for proper operation. See section 1.8 Fine Tune.

1.3 Upper Tape Mount Assembly

The Upper and Lower Tape Mount Assemblies are located as shown.

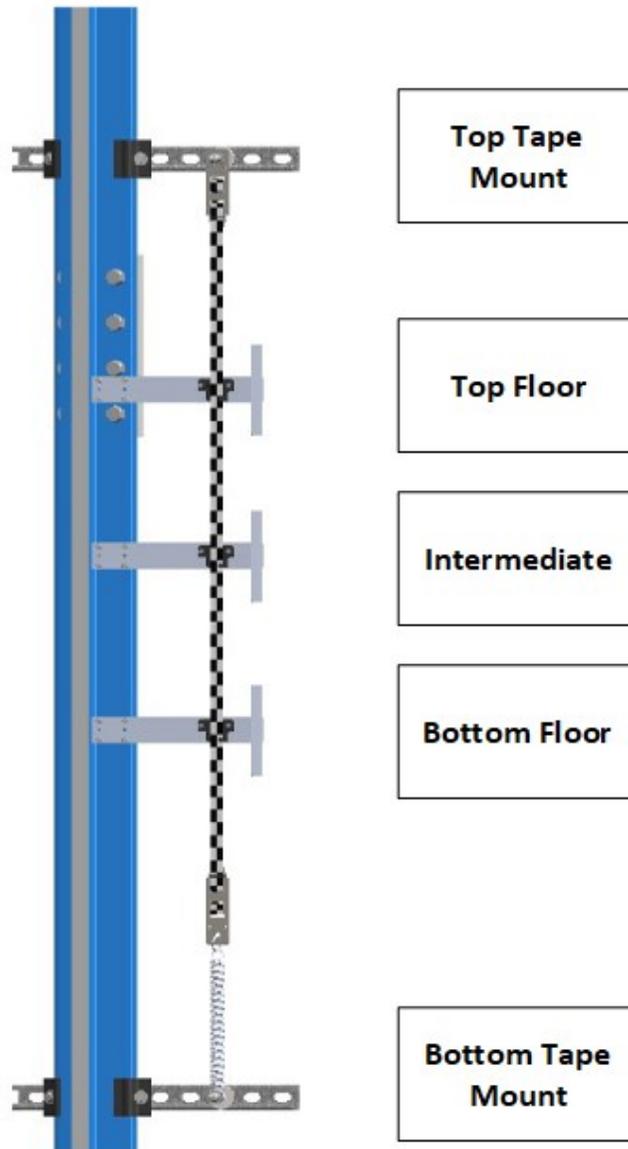


Figure 7: Location of Tape Mount Assemblies

The following procedure describes how to install the Upper Tape Mount Assembly.

1. Affix an 18" length of Unistrut to the top of the guide rail.

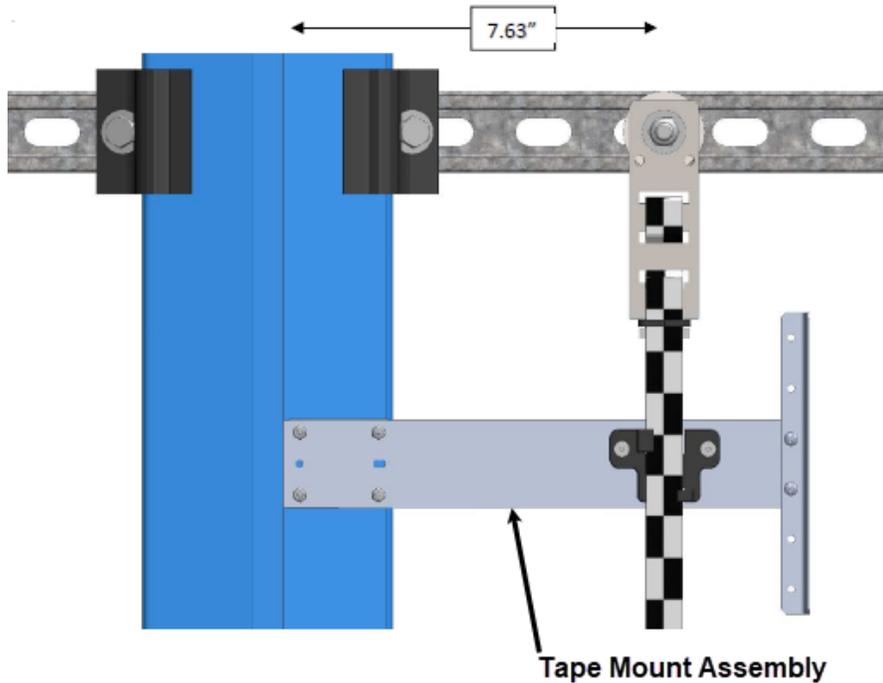


Figure 8: Upper Tape Unistrut Installation

2. Loosely attach the hardware to the Upper Tape Mount Assembly.

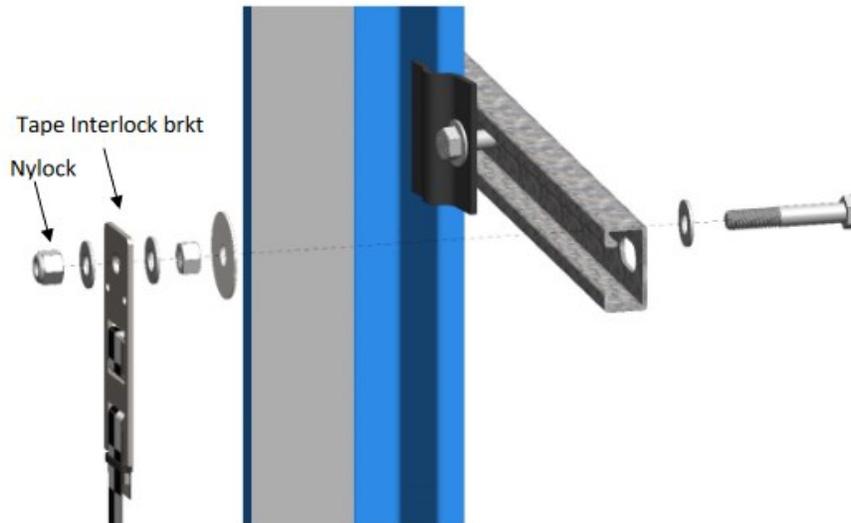


Figure 9: Hardware

3. Position the Upper Tape Mount assembly 7.63" from the wheel surface of the guide rail to the center of the 3/8" bolt. See Figure 8.
4. Temporarily affix a Tape Clip Assembly to the guide rail and onto the tape to verify location.
5. Tighten the first hex nut to secure the assembly in place.

6. Thread the Nylock nut on the bolt until there is a 0.2" gap between the two flat washers that are on either side of the Tape Interlock bracket. This gap is required to relieve twist in the tape.

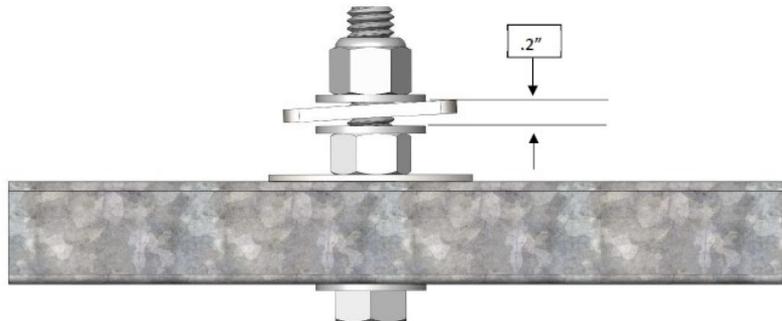


Figure 10: Gap Verification

1.4 Tape Clip Assembly

As you descend, unspool the tape, install the Tape Clip Assemblies and set the door zones.

The Tape Clip Assembly includes:

- Tape guide clip
- Door zone (DZ) blade
- Mounting magnets (preassembled)

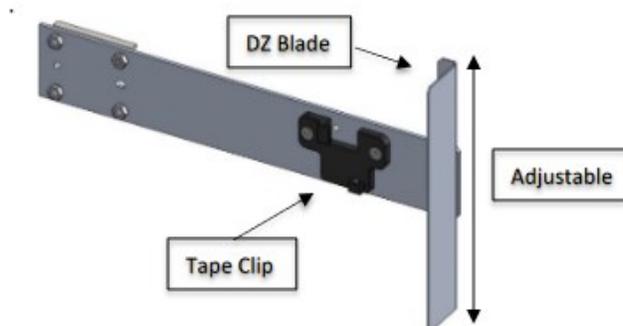


Figure 11: Tape Clip Assembly

NOTE: In applications where there is 15 ft. of distance between door zones, an extra bracket needs to be placed between those door zones. The bracket will only contain the tape clip and NOT the DZ blade. This will minimize tape twisting caused by long distances between the door zones. These extra tape clip brackets will be provided as needed.

The following procedure describes how to install the Tape Clip Assembly.

1. Bring the car to floor level.
2. Wipe the rail clean where the Tape Clip Assembly is being attached.

3. Holding the Tape Clip Assembly with one hand and the tape with the other, rotate the tape into the tape clip.

CAUTION: Do not twist or bend the tape as this may damage the tape.

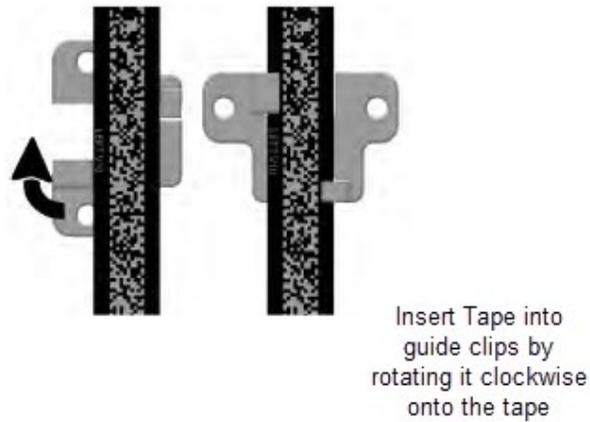


Figure 12: Tape Clip Insertion

4. Place the Tape Clip Assembly onto the guide rail with the edge flush to the rail.
CAUTION: There are strong magnets. Do not remove the bracket from the rail by pulling the bracket from the far end as this may bend the bracket.

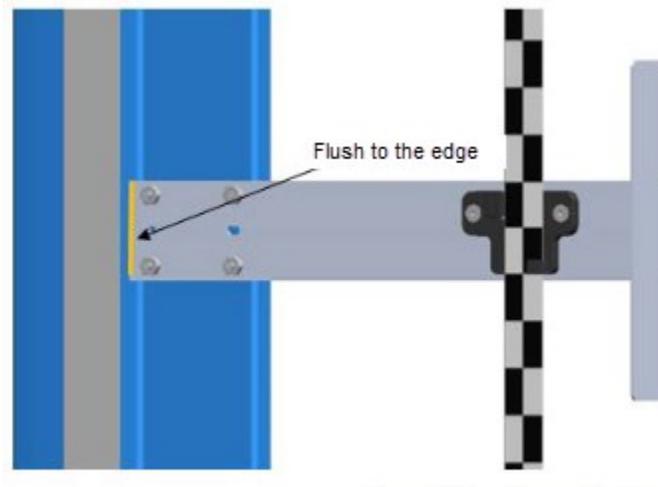


Figure 13: Tape Clip Assembly Alignment

5. Verify that the DZ blade is vertically centered with the GLS Reader optical axis.



Figure 14: Optical Axis

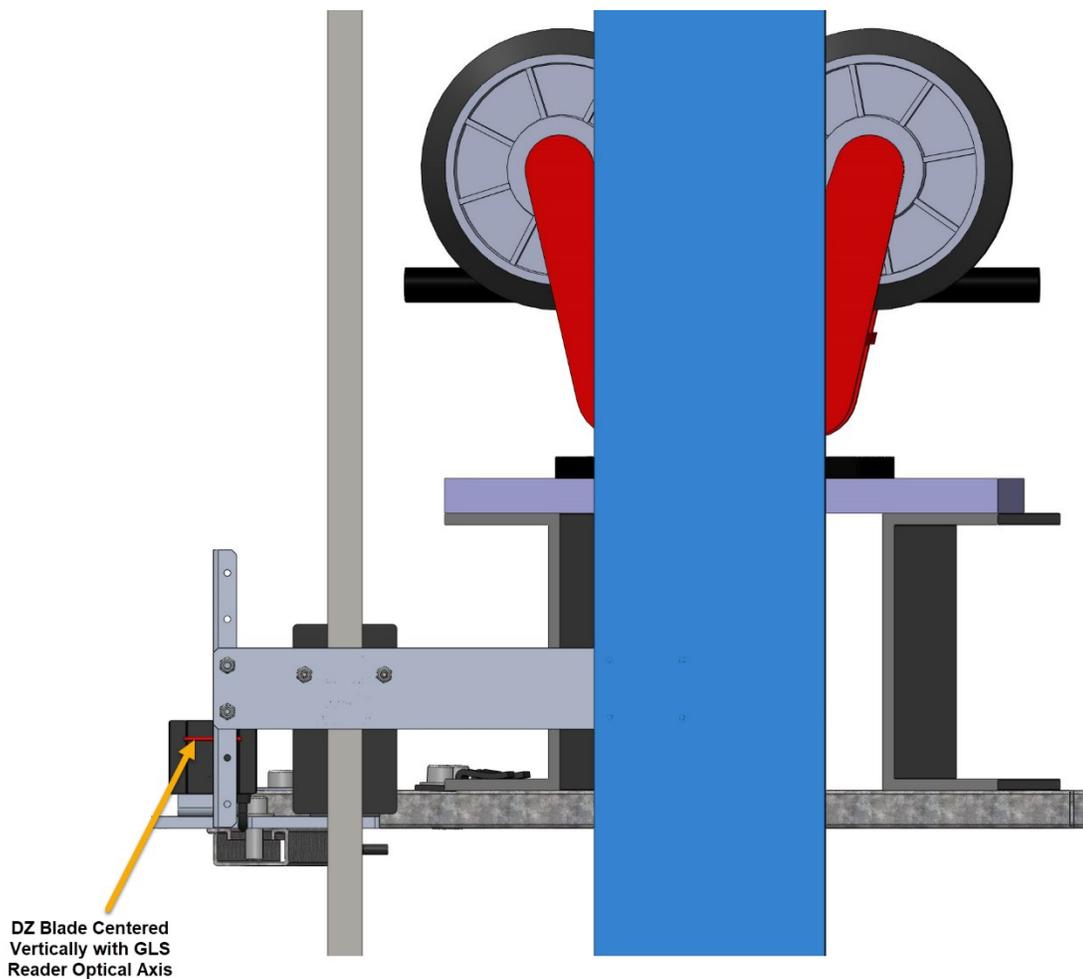


Figure 15: Tape Clip Assembly Placement (Rear View)

6. Are there any bolts or obstructions preventing the Tape Clip Assembly to be placed where needed?
 - a. If there are bolts or other obstructions, remove the two screws, washers and nuts securing the DZ blade and adjust the blade up or down. Go to step 7.
 - b. If there are no obstructions, go to step 9.

7. Has the Tape Clip Assembly been placed as needed after the DZ blade has been moved up and down?
 - a. If there are still obstructions, an extension arm is required. Go to step 8.
 - b. If there are no obstructions, go to step 9.
8. Install extension arm as follows:
 - Remove the DZ blade from the Tape Clip Assembly.
 - Install the door zone extension arm using the same screws, nuts, and washers. See Figure 16.
 - Using two more screws, nuts and washers provided in the install kit, mount the DZ blade to the DZ extension arm at the desired location.

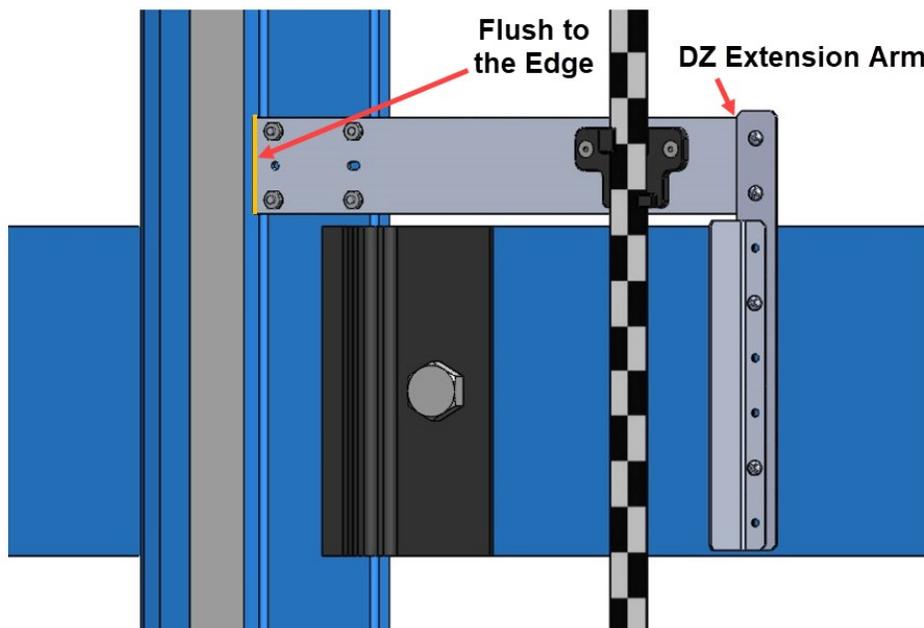


Figure 16: Tape Clip Assembly Alignment

9. Continue down the hoistway, placing the Tape Clip Assembly at each landing.

1.5 Lower Tape Mount Assembly

See Figure 7 for the location of the Lower Tape Mount Assembly.

The following procedure describes how to install the Lower Tape Mount Assembly.

1. Affix an 18" length of Unistrut to the bottom of the guide rail.

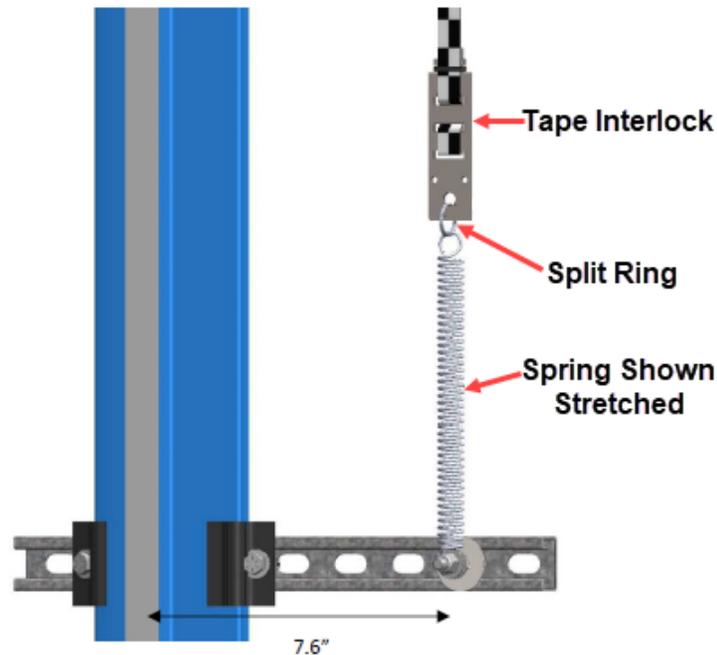


Figure 17: Lower Tape Mount Assembly

2. Loosely attach the hardware to the Lower Tape Mount Assembly.

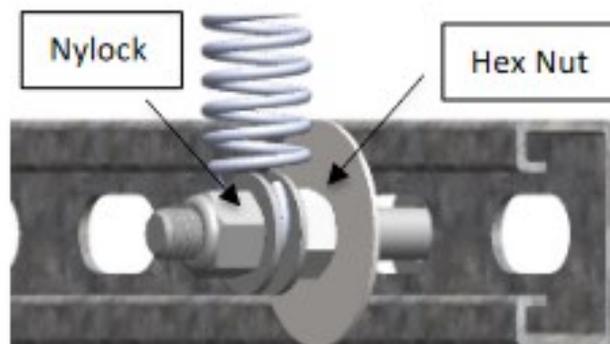


Figure 18: Hardware to Lower Tape Mount Assembly

3. Position the Lower Tape Mount Assembly 7.6" from the surface of the guide rail to the center of the 3/8" bolt. See Figure 17.
4. Tighten the first hex nut to secure the Lower Tape Mount Assembly in place.
5. Thread the Nylock nut onto the bolt until the two flat washers located on each side of the spring are just touching the spring loop. This nut does not need to be tightened.

6. Connect the spring to the tape interlock bracket using the split ring. See Figure 17.
7. Adjust the spring tension by raising or lowering the Unistrut mounting point so that the spring is stretched to approximately 3”.

1.6 Sensor Array Assembly

The Sensor Array Assembly contains the CEDES Optical Sensor, CEDES Exact Position GLS Reader, mounting brackets, and associated hardware. The sensors can be oriented differently as long as the corresponding tape and blades are aligned correctly.

After assembly is complete, connect the CEDES Optical Sensor and the CEDES Exact Position GLS Reader to the CT board and secure cabling.

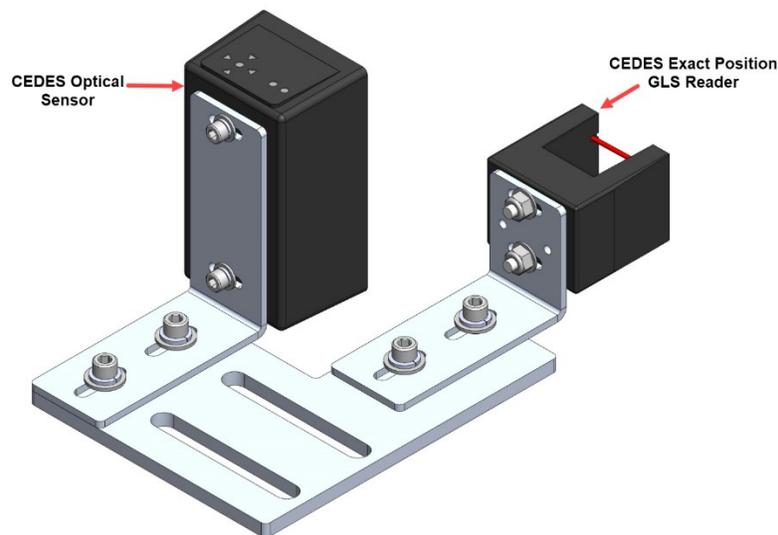


Figure 19: Sensor Array Assembly

The Sensor Array Assembly can be connected to either the left or right C-Channel.

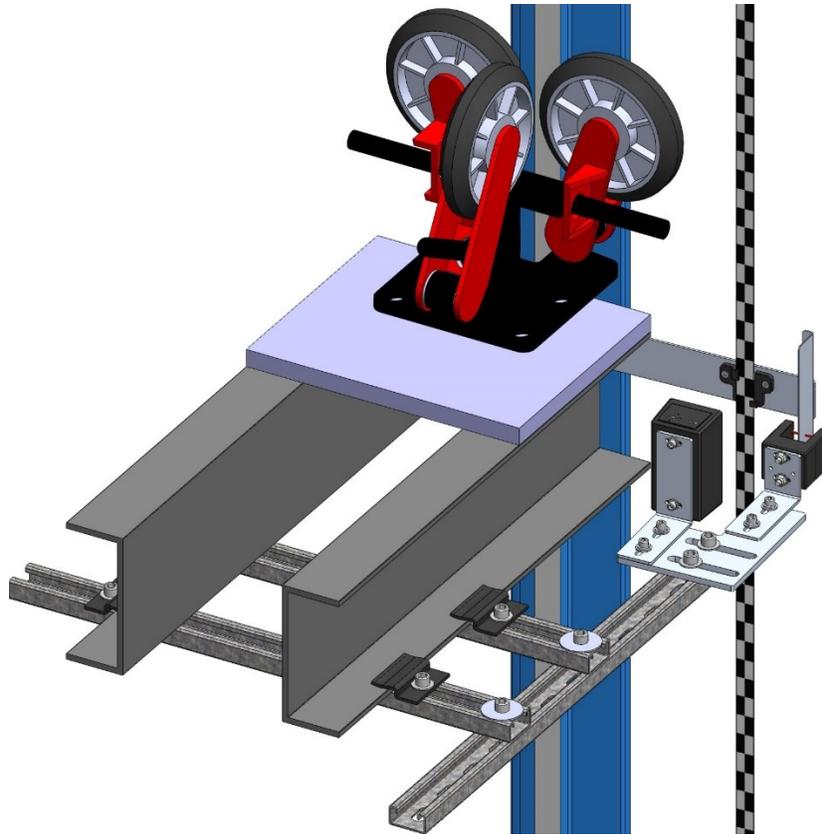


Figure 20: Sensor Array Assembly Connected to C-Channel (Right Side)

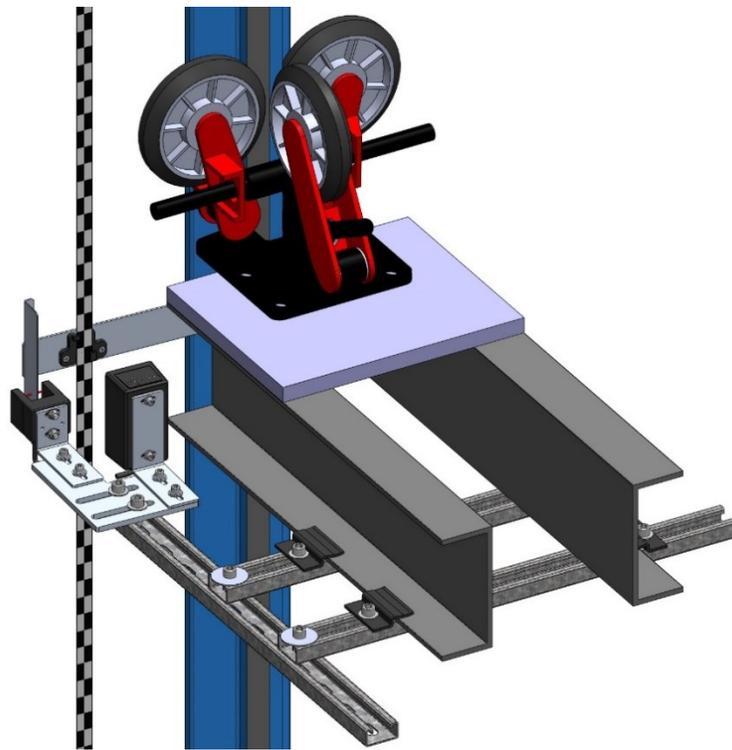


Figure 21: Sensor Array Assembly Connected to C-Channel (Left Side)

The Cedes Optical Sensor and Reader can be connected to either side of the sensor base plate depending upon which side the Sensor Array Assembly is connected to the C-Channel.

The following procedure describes how to connect the Optical Sensor and Reader to either side of the sensor base plate.

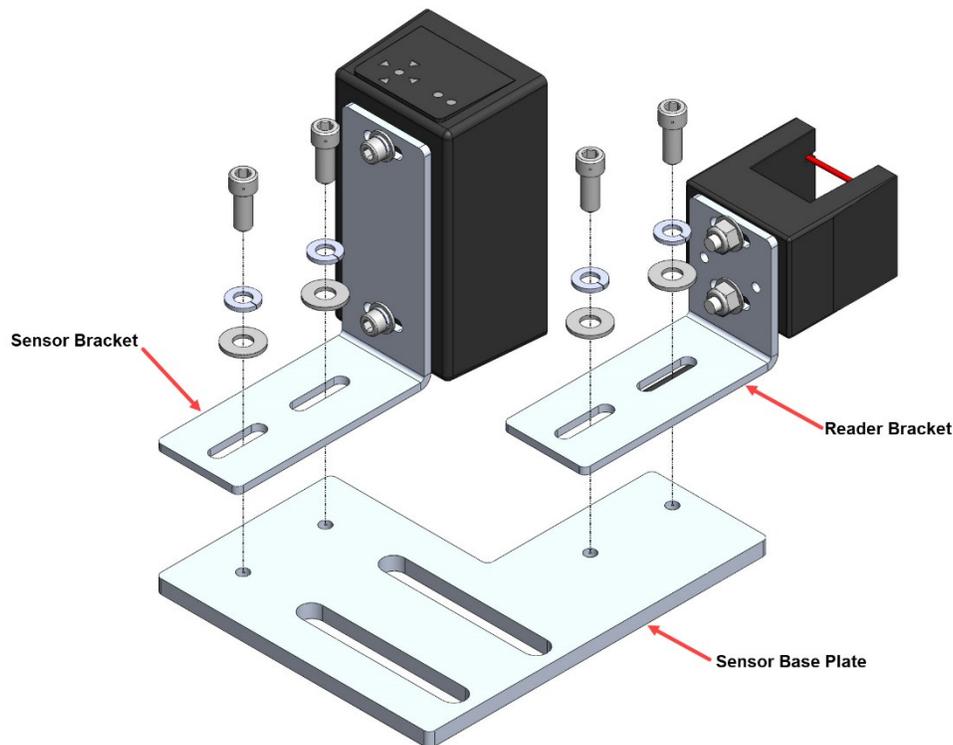


Figure 22: Sensor Array Assembly (Right Side)

1. Remove screws, lock washers, and washers securing the sensor and reader brackets to the sensor base plate.
2. Remove both sensor and reader brackets from the sensor base plate.
3. Flip the sensor base plate.

- Place the sensor and reader brackets back onto the sensor base plate and secure.

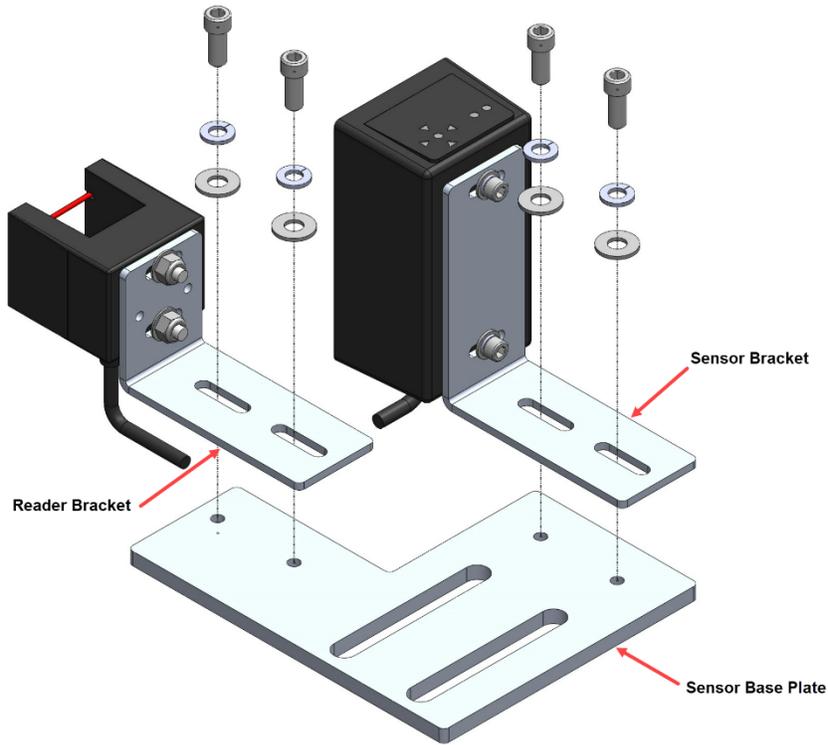


Figure 23: Sensor Array Assembly (Left Side)

A Dual Sensor Array Assembly can be installed if applicable.

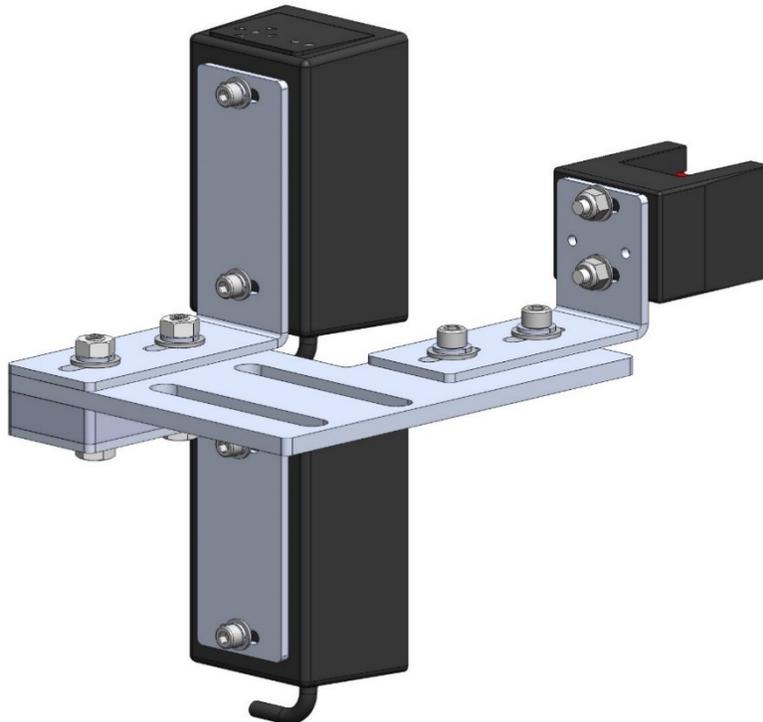


Figure 24: Dual Sensor Array Assembly

The following procedure describes how to connect the Optical Sensor and Reader to either side of the sensor base plate used on a Dual Sensor Array Assembly.

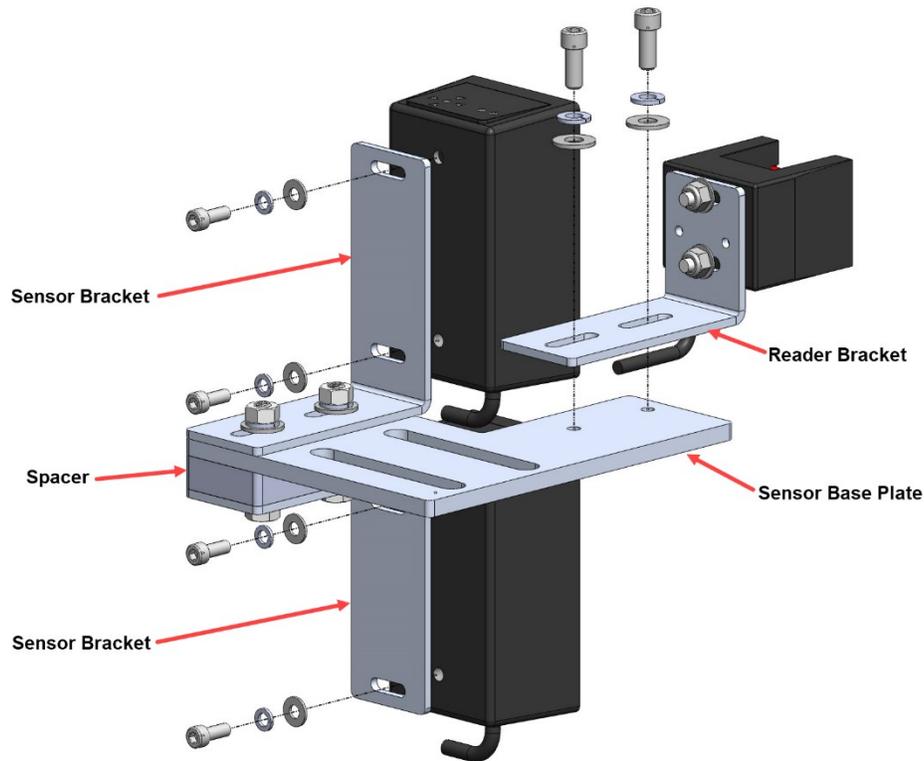


Figure 25: Dual Sensor Array Assembly (Right Side)

1. Remove screws, lock washers, and washers securing both optical sensors to the sensor brackets and remove optical sensors.
2. Remove screws, lock washers, and washers securing the reader bracket to the bottom sensor base plate and remove reader bracket.
NOTE: Do not remove the reader from the reader bracket.
3. Flip the sensor base plate. The spacer is secured to the top of the sensor base plate.
4. Place both optical sensors back onto the sensor brackets with the optical sensor cables facing down and secure.
5. Place the reader bracket back onto the sensor base plate and secure.

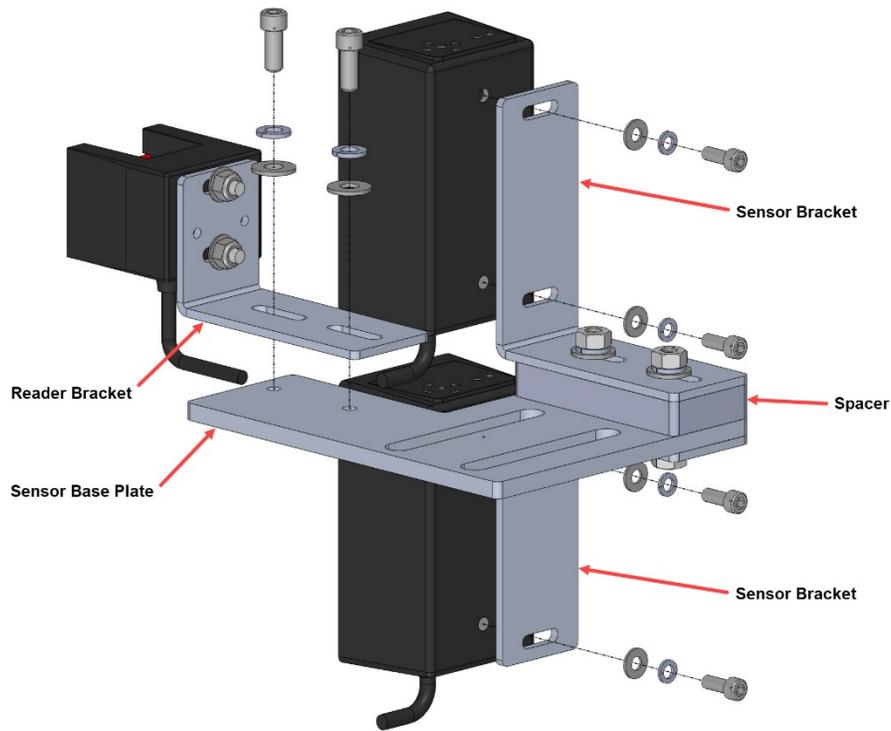


Figure 26: Dual Sensor Array Assembly (Left Side)

1.7 Emergency Tape Break (ETB) Switch Assembly

The ETB Switch Assembly is optional.

The ETB switch is installed in the safety string in series with the Buffer switch.

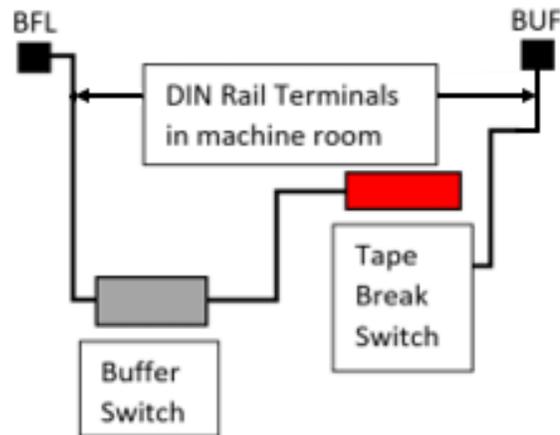


Figure 27: Emergency Tape Break Switch in Series with Buffer Switch

There is slack in the wire when the tape tension spring is fully extended. This slack allows for tape and/or building movement. If the tape breaks, the tension spring retracts and pulls the cable attachment out of the ETB switch, opening the safety string. Verify that the cable length allows the tab to pull out of the ETB switch when the spring is retracted. See Figure 29.

The following procedure describes how to install the ETB Switch Assembly.

1. Affix a 12" length of Unistrut to the bottom of the guide rail approximately 20" above the Lower Tape Mount Assembly Unistrut.

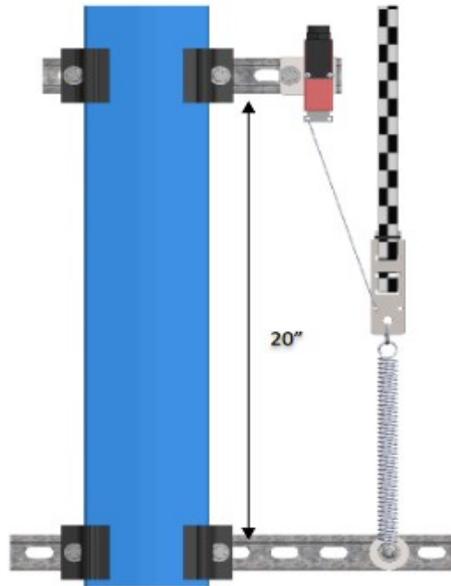


Figure 28: Unistrut to Lower Tape Mount Assembly

2. Attach bracket and ETB switch to the Unistrut.
3. Link the ETB switch to the tape interlock via the cable kit provided. Leave 1-2" for slack in the cable.

NOTE: The switch can be mounted vertically as well as by inserting a switch pull tab into the bottom end, pull should always face downward.

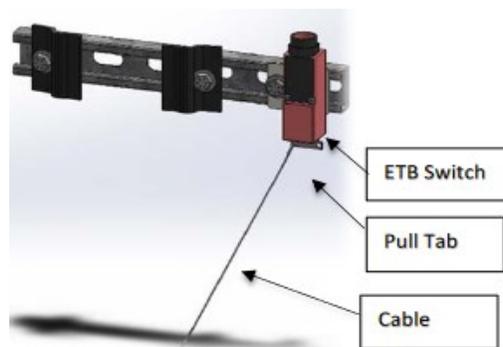


Figure 29: Emergency Tape Break Switch

1.8 Fine Tune

Prior to fine tune, verify the Sensor Array Assembly placement. The Sensor Array Assembly should be at a distance of 4.13" with a tolerance of ± 1 cm from the tape and parallel to the tape clip mounting brackets. See Figure 6.

The optical sensor and reader can move front and back, and side to side as applicable.

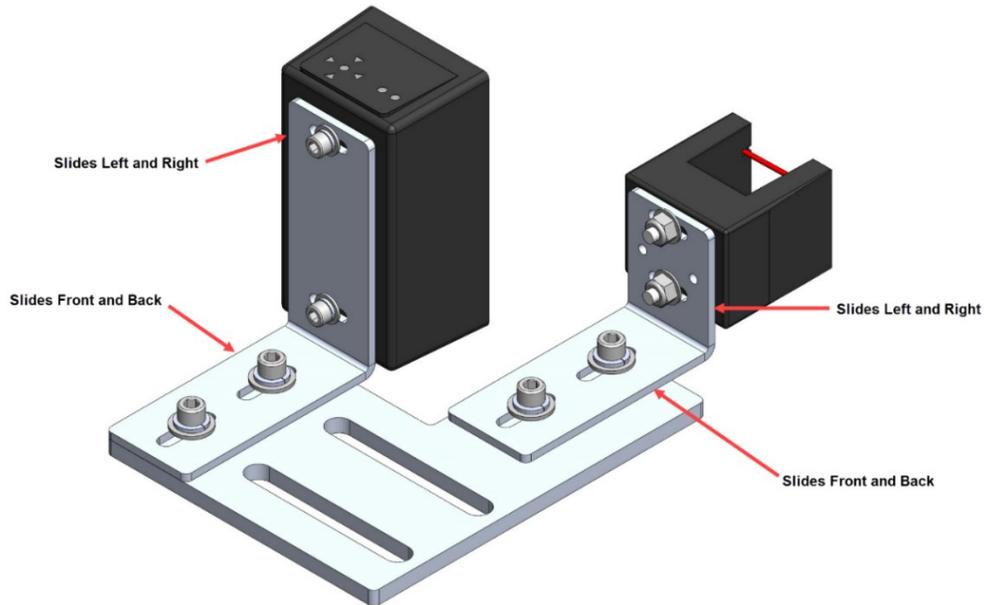


Figure 30: Sensor Array Assembly Adjustment

Power the APS camera via a RJ45 cable to the CT SRU board so a red array can be seen on the tape to allow for alignment. If there is no red array on the tape, reset the power by disconnecting and reconnecting the RJ45 cable to the SRU board CAT5 connector.

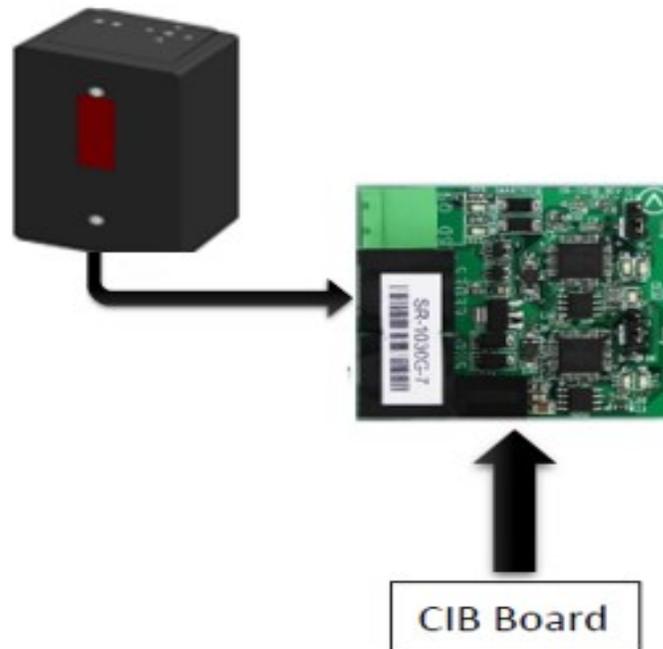


Figure 31: CAT5 Camera to CIB Board

Proceed on inspection up and down the hoistway and adjust each tape guide clip to the correct in-line position with respect to the sensor assembly.

The camera powers up when the Car Top station is powered up.

1.9 Alignment

Alignment and Position Status LEDs are located on top of the optical sensor. These LEDs are used to align the sensor to the tape.

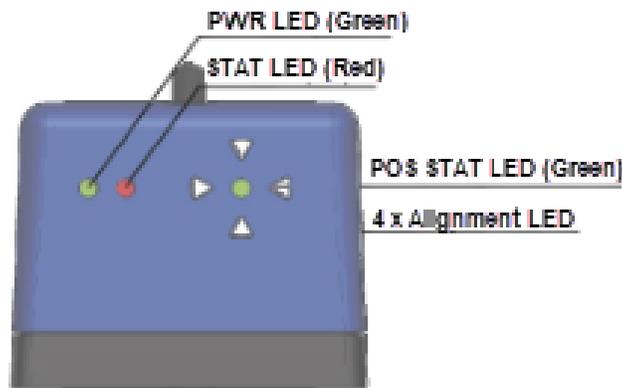


Figure 32: Optical Sensor LEDs

When the optical sensor needs to be aligned, the red arrow LEDs indicate which way to move the sensor.

The following procedure describes how to align the optical sensor.

1. Loosen the two mounting bolts on sensor base plate or sensor bracket to adjust the sensor position, as required.

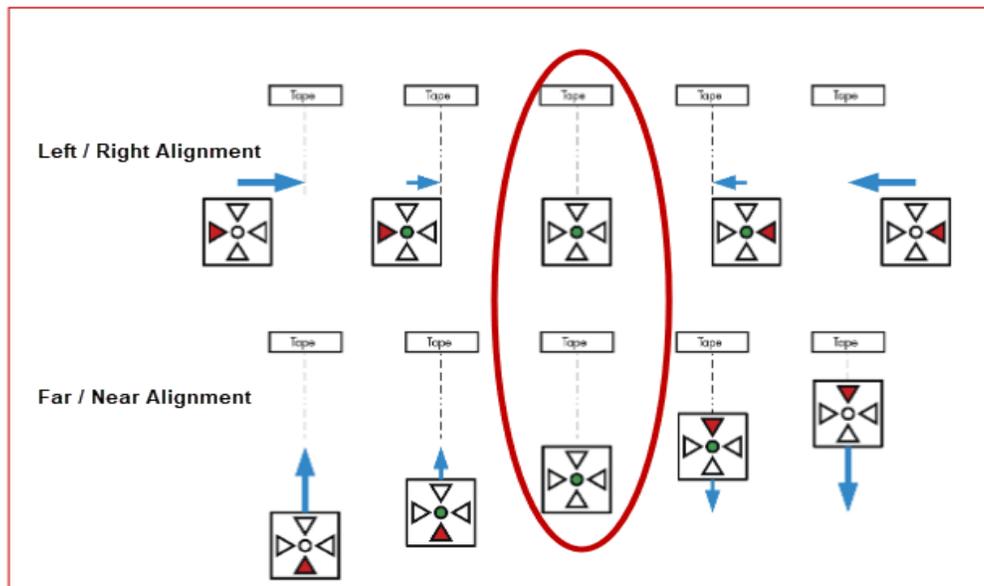


Figure 33: Alignment Arrows

2. Position the sensor according to the LEDs.
 - **Left / Right Alignment** – Using the direction arrows on top of the sensor, move the camera left or right until only the green POS STAT LED is on.
 - **Far / Near Alignment** – Using the directional arrows on top of the sensor, move the sensor closer to or further away from the tape until only the green POS STAT LED is on.
3. Once the sensor is aligned, tighten the two mounting bolts to the sensor base plate or sensor bracket as applicable.
4. Run the car on INSPECTION from terminal to terminal while watching the POS LED on top of the sensor.
5. Is the sensor aligned with the tape for the entire length of travel?
 - a. If the sensor is aligned, the process ends.
 - b. If the sensor is not aligned, go to step 1.

NOTE: As the car runs up and down the hoistway, the red alignment arrow LEDs may flash on and off. This is OK if the center green LED stays on.

2 Learning the Hoistway

Learning the Hoistway is required after the APS CEDES Landing System has been installed.

When learning the hoistway, the speed of the car needs to be 10 fpm.

The following procedure describes how to learn the hoistway.

1. Bring the car to the bottom door zone on inspection.
2. On the MR SRU board, turn DIP 2A on. The main screen should switch from Normal to Learn.

NOTE: Ensure MR inspection is in the normal state.
3. Navigate to Learn Mode commands menu located in MAIN MENU | SETUP | LEARN MODE COMMANDS.
4. Begin the LEARN MAGNETS and the car will stop at the top floor door zone.

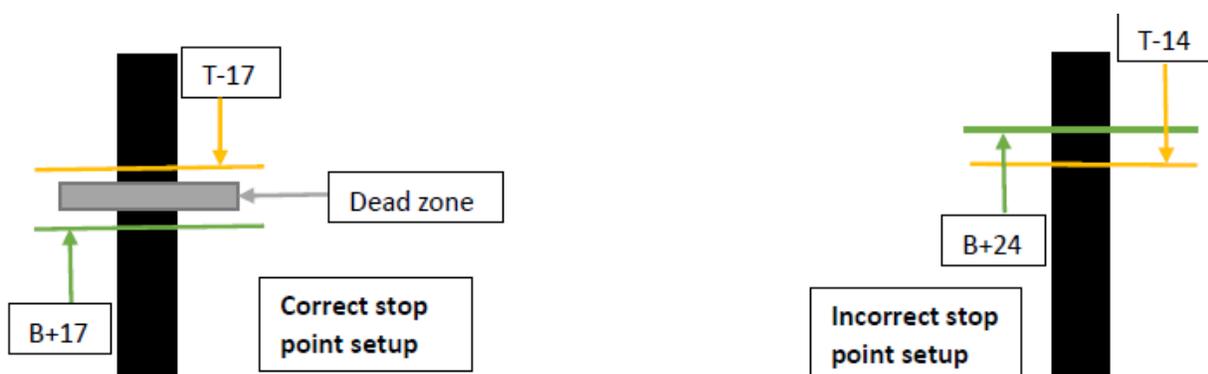


Figure 34: Stopping Points

3 Slow Down

The following must be set for traction and hydraulic type elevators after learning the hoistway has been completed.

- Traction Elevators – Emergency Terminal Slowdown (ETS)
- Hydraulic Elevators –Terminal Slowdown Reducing Device (TSRD)

3.1 Setting Up Emergency Terminal Slowdown

After learning the hoistway, record the distance of the bottom of the top door zone magnet by navigating to MAIN MENU | STATUS | MAGNETS and scroll up to the top floor. Then, record the distance for the top of the bottom door zone magnet by navigating to MAIN MENU | STATUS | MAGNETS and scroll up to the bottom floor.

To setup the ETS device, the UETS and DETS need to be adjusted.

- Navigate to SETUP | ETS SETUP | SET UETS POSITION to adjust the UETS.
- Navigate to SETUP | ETS SETUP | SET DETS POSITION to adjust the DETS.

Set the UETS POSITION parameter to a value indicating where a physical ETS switch would be placed at the top of the hoistway. When the car passes this position going up, the ETS device will open the SF1 relay if the car has failed to slowdown for the top terminal.

Set the DETS POSITION parameter to a value indicating where a physical ETS switch would be placed at the bottom of the hoistway. When the car passes this position going down, the ETS device will open the SF1 relay if the car has failed to slowdown for the bottom terminal.

The table below lists the ETS Positions.

Table 1: ETS Positions

Contract Speed	UET Position	DET Position
10-100	8"	8"
101-125	10"	10"
126-150	12"	12"
151-175	14"	14"
176-200	16"	16"
201-225	18"	18"
226-250	20"	20"
251-275	22"	22"
276-300	24"	24"
301-325	26"	26"
326-350	28"	28"
351-375	30"	30"
376-400	32"	32"

Contract Speed	UET Position	DET Position
401-425	34"	34"
426-450	36"	36"
451-475	38"	38"
476-500	40"	40"
501-525	42"	42"
526-550	44"	44"
551-575	46"	46"
576-600	48"	48"

3.2 Setting Up Terminal Slowdown Reducing Device

After learning the hoistway, record the distance of the bottom of the top door zone magnet by navigating to MAIN MENU | STATUS | MAGNETS and scroll up to the top floor.

Place the TSRD from the distance listed in the table below from the bottom of the top door zone magnet.

Table 2: TSRD Positions

Contract Speed	TSRD Position
10-100	9"
101-125	10"
126-150	12"
151-175	14"
176-200	16"

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