















**INSTALLATION, SERVICE, AND OPERATING MANUAL TEXT REVISION HISTORY
(p/n 02363-000)**

Revision	Description	Release Date
A	INITIAL RELEASE OF MANUAL ECR 4469	February 2005
B	UPDATED SPECIFICATIONS	March 2005
C	PAGES ADDED FOR UL	May 2011
D	UPDATED INSTRUCTIONS	Aug 2012
E	UPDATES FOR RAIL CONSOLIDATION	Sept 2014
F	REMOVED 1B; REPLACED ITEMS IN 1A WITH SYMBOL TABLE	Nov 2016
G	UPDATE ADDRESS TO NILES, IL ON COVER SHEET; ADDED "INTENDED USE" STATEMENT TO SHEET 4	June, 2017
H	REPLACED SECTION H TO SHOW PROCEDURE WITH NEW TRANSVERSE ARM COVERS	September, 2021

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I. DEFINITIONS AND SPECIFICATIONS**A. Definition of symbols used on the equipment**

Symbol Legends	
Symbol	Definition
	Date of manufacture
	Manufacturer
	Serial Number
	Reference Number (Model/Part Number)
	Keep Dry
	NOTE This symbol represents Information that assists the user of the manual in the performance of a task. It may provide the user with better methods of conducting the task, or it may point out conditions that could cause the system to fail to operate properly.
 CAUTION	Points out special procedures, or precautions, that personnel must follow to avoid equipment damage.
 WARNING	Identifies situations or actions that may affect patient or user safety. Disregarding a warning could result in patient or user injury.
	TYPE B APPLIED PART This symbol indicates equipment providing a particular degree of protection against electric shock, particularly regarding allowable leakage currents and reliability of the protective earth connection (if present).
	This symbol indicates an Electro Sensitive Device is present which must be carefully handled to prevent damage to the device.
	ELECTRIC SHOCK HAZARD WARNING This symbol indicates an electric shock hazard.
	DANGER VOLTAGE This symbol indicates hazards arising from dangerous voltages.
	DIRECT CURRENT This symbol indicates a direct current source.
	PROTECTIVE EARTH TERMINATIONS This symbol indicates protective earth terminations in device.

B. General Precautions



NOTE

The UL Classification does not include X-Ray Generator, Collimator, X-ray Tube, or Image Detector.



WARNING

All of the components used with the tubestand shall comply with UL 60601 standards.






NOTE

The 24Vdc power shall be provided by a generator certified to UL 60601-1 standards or Summit accessory power supply part no. 05960.

Intended Use

This is an x-ray Tubestand, a mechanical device intended to support and position an x-ray tube and collimator as required for radiographic procedures.

C. Specification Summary Table

SPECIFICATION SUMMARY TABLE																	
Electrical Ratings	24VDC, 1.5 A  (or equivalent)																
Maximum Safe Working Load	75 lbs / 34 kilograms																
Environmental Conditions	<p>Temperature range for:</p> <table border="0"> <tr> <td>Transport and Storage</td> <td>Use</td> </tr> <tr> <td>-40° F to +158° F</td> <td>+50° F to +104° F</td> </tr> <tr> <td>-40° C to +70° C</td> <td>+10° C to +40° C</td> </tr> </table> <p>Relative Humidity Limits for:</p> <table border="0"> <tr> <td>Transport and Storage</td> <td>Use</td> </tr> <tr> <td>10% to 100%</td> <td>30% to 75%</td> </tr> </table> <p>Atmospheric pressure range for:</p> <table border="0"> <tr> <td>Transport and Storage</td> <td>Use</td> </tr> <tr> <td>14.67 inHg to 31.30 inHg</td> <td>20.67 inHg to 31.30 inHg</td> </tr> <tr> <td>500 hPa to 1060 hPa</td> <td>700 hPa to 1060 hPa</td> </tr> </table>	Transport and Storage	Use	-40° F to +158° F	+50° F to +104° F	-40° C to +70° C	+10° C to +40° C	Transport and Storage	Use	10% to 100%	30% to 75%	Transport and Storage	Use	14.67 inHg to 31.30 inHg	20.67 inHg to 31.30 inHg	500 hPa to 1060 hPa	700 hPa to 1060 hPa
Transport and Storage	Use																
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500 hPa to 1060 hPa	700 hPa to 1060 hPa																
Information regarding potential EMC interference and advice for avoidance	<ul style="list-style-type: none"> • Mains power quality should be that of a typical commercial or hospital environment • Power frequency magnetic fields should be at levels characteristic of a typical location in a commercial or hospital environment 																
Degree of protection against harmful ingress of water	IPX0/Ordinary																
Degree of protection against electric shock	Class I, Type B Applied Parts 																
Applicable Standards	<p>This X-ray Tubestand complies with the following regulatory and design standards:</p> <ul style="list-style-type: none"> • UL 60601-1 • CAN/CSA C22.2 NO601.1 • IEC60601-2-32:1994 • CSA C22.2 No. 601.2.32-98 																
Safety Label	<div style="border: 1px solid black; padding: 10px;">  <p>MEDICAL EQUIPMENT WITH RESPECT TO ELECTRICAL SHOCK, FIRE AND MECHANICAL HAZARDS ONLY. IN ACCORDANCE WITH UL 60601-1, CAN/CSA-C22.2 No.601.1 IEC 60601-2-32:1994 CSA C22.2 No. 601.2.32-98</p> <p style="text-align: center;">20GP 05616</p> </div>																
<p>Note: The UL Classification does not include the Image Receptor</p>																	
<p>Equipment not suitable for use with flammable anesthetic mixture with air or with oxygen or nitrous oxide.</p>																	

II. GENERAL INFORMATION

A. Important



NOTE

This manual contains information for assemblers and users. This manual is to be delivered to the assembler of the product, who upon completion of installation, is to transfer it to the product user. Any person responsible for failure to comply with these instructions may be liable for resultant damages in accordance with the law.

Careful attention to all the details and instructions enclosed herein is necessary for proper installation. Should there be any questions, problems, or suggestions with either these instructions or the equipment supplied, please feel free to contact Summit Industries (see the address and telephone numbers on the cover sheet). Applicable comments or suggestions are welcome.

The equipment supplied and described in this manual will perform reliably when operated, maintained, and repaired in accordance with these instructions. Check it periodically and repair when necessary to ensure reliable operation. Replace broken, missing, worn, inaccurate or non-functioning parts. The equipment or its components should not be modified.

Neither the seller nor the manufacturer can assume responsibility for any malfunction of this equipment resulting from improper operation, maintenance or repair, or if any of its components are damaged or modified.

All operators of this x-ray equipment must know and understand the dangers of excessive radiation exposure. This equipment is sold with the understanding that, since its proper use and application is in the control of the operator and beyond the control of the manufacturer or its agents, the seller disclaims all responsibility for any injury resulting from improper use and application of this equipment.

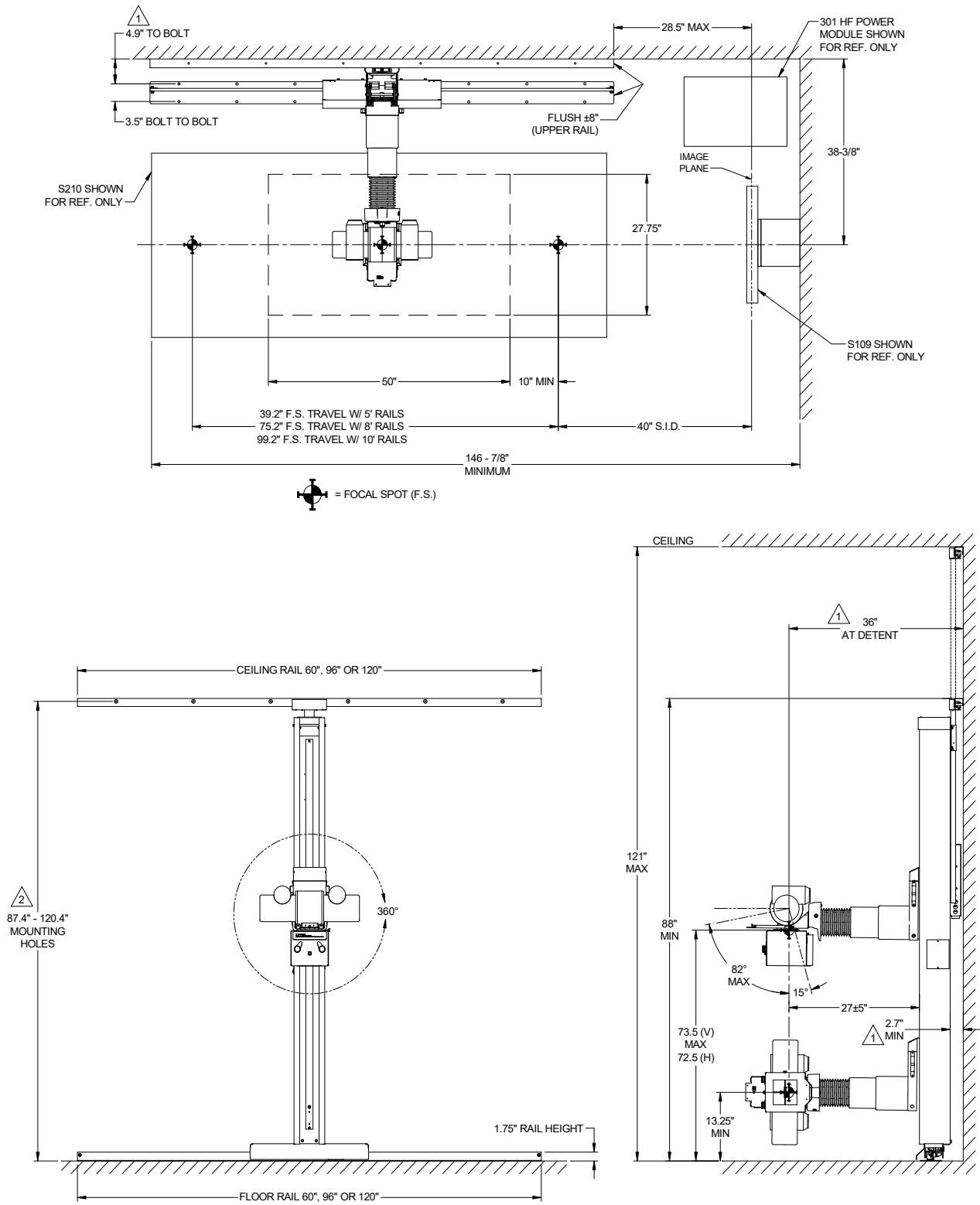
B. Unpacking

The manufacturer is relieved of any responsibility for damages during shipment after it is in the possession of the carrier.

Examine all cartons carefully at the time of delivery. If damage is apparent, have the delivering driver write a "bad order" note on all copies of the freight bill and sign it. Should you discover concealed damage, immediately notify the transportation agent and ask for an "Inspection Report for Damage". Carriers will not accept concealed damage claims if filed after 15 days from date of receipt of the merchandise.

Open the crates and cartons carefully. Do not dispose of them until you have located all parts and the machine is fully assembled.

C. System Dimensions



▲ ASSUMES NO HEADER BOARD INSTALLED, DIMENSION TO BACK OF UPPER RAIL.

▲ IF HEADER BOARD IS NEEDED FROM UPPER RAIL, MOUNT IT WITH ITS CENTER AT 87.4" - 120.4" ABOVE FLOOR.

Figure 1: Mechanical Dimensions

III. INSTALLATION

Plan a layout of the x-ray room before starting installation. The site must comply with federal regulations and local codes as well as the dimensional and power requirements of this and other equipment.

If the floor, wall, or ceiling conditions are not suitable for level / secure rail installation, corrective action must be taken before proceeding.

A. Rail and Column Installation

1. Upper Rail Installation



WARNING

Vertically align the ends of the upper and lower rail. The horizontal travel stops are on the lower rail. Proper alignment ensures that the upper bearing assembly stays engaged to the rail at all times.

Place the floor rail close to its final location, but do not attach permanently yet. See figure 2 below.

Secure the upper rail to the wall or ceiling using appropriate fasteners (not included).



NOTE

For proper operation of the upper bearing assembly in the rail, do not use washers larger than 0.5 inch outside diameter. See assembly detail figure 6.

It is important that the front surface is vertical, the rail is not twisted, and that it is level and square in all directions. Shimming may be necessary.

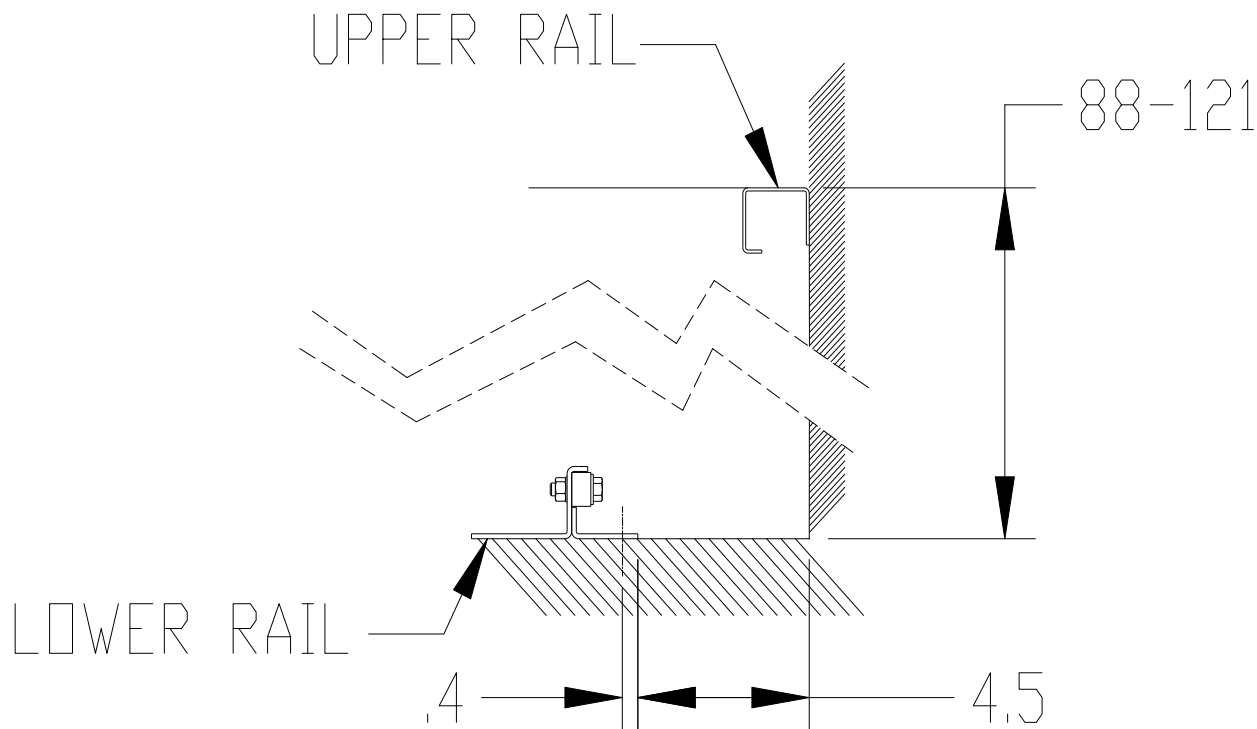


Figure 2: Rail Layout

**NOTE**

For best performance of the system do not install the lower rail on a compressible surface/material such as carpet with padding.

2. Column Preparation

Remove the column assembly from its carton and place it horizontally for access to the rear and bottom. The assembly is over 180 lbs (82 kg) so plan personnel appropriately. Preparation and assembly will be facilitated by having two floor dollies or 2x4 boards available to place the column on. The column is shipped in as complete an assembly state as possible.

Attach the upper clamp to the column assembly, leaving the screws loose enough to slide the upper bearing assembly under the clamp (note the spacer at the bottom on the surface facing the column) from the top and allow it to move all the way down. Tighten the clamp mounting screws to reduce the clearance but still allow the upper assembly to slide through the clamp. See *figure 3*.

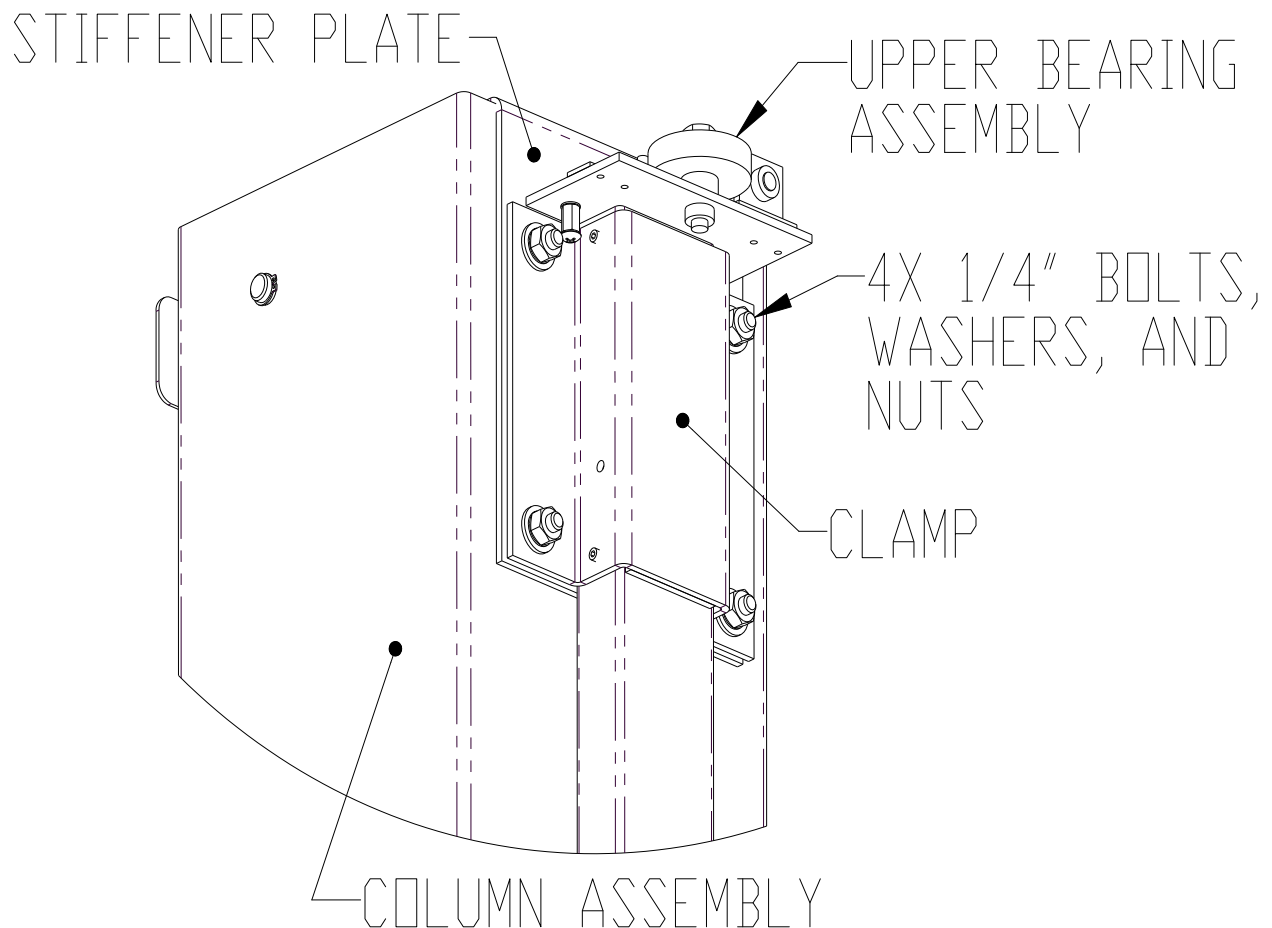


Figure 3: Clamp and Upper Bearing Assembly

Install the floor car. Locate the 2X 5/16-18x3.25 bolts and washers taped to the top of the floor car. Remove the 2X 3/8-16x0.75 bolts and washers from the back of the floor car. Place the floor car into the bottom of the column and secure as shown. See *figure 5*. Plastic plugs are included with the floor car to insert into the unused tapped holes on the front of the column at the bottom.

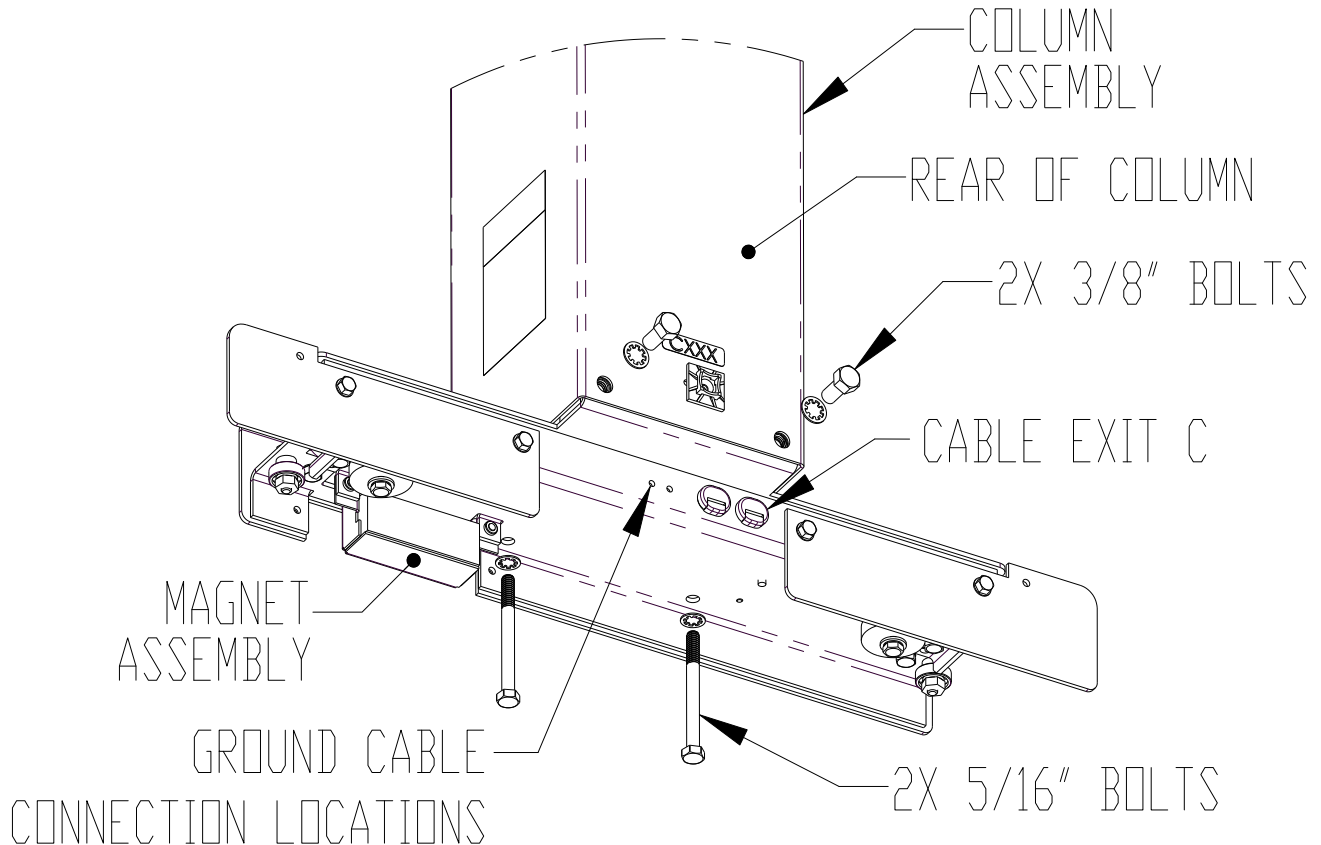


Figure 4: Installing the Floor Car



Torque the 5/16-18 bolts to 144-170 lb-in (12-14 lb-ft or 16.3-19.2 N-m). Do not over-torque.

Locate the free cable end from the junction box labeled "TO TB3 (FLOOR CAR)". Remove the strain relief bushing from exit C opening (see figure 4) and push 4-6" of cable in toward the terminal strip. Replace the strain relief bushing. Locate free end of the ground cable from the junction box labeled "GND TO FLOOR CAR" (gray cable with yellow/green end). Remove the screw and lock washer from the unoccupied ground cable connection location (see figure 4) and reuse them to secure the ground cable, placing the lock washer between the floor car and the cable lug.

Detach the magnet assembly from the floor car, leaving the cable connected. Use masking tape to temporarily hold the magnet to the top of the floor car. See figure 5.

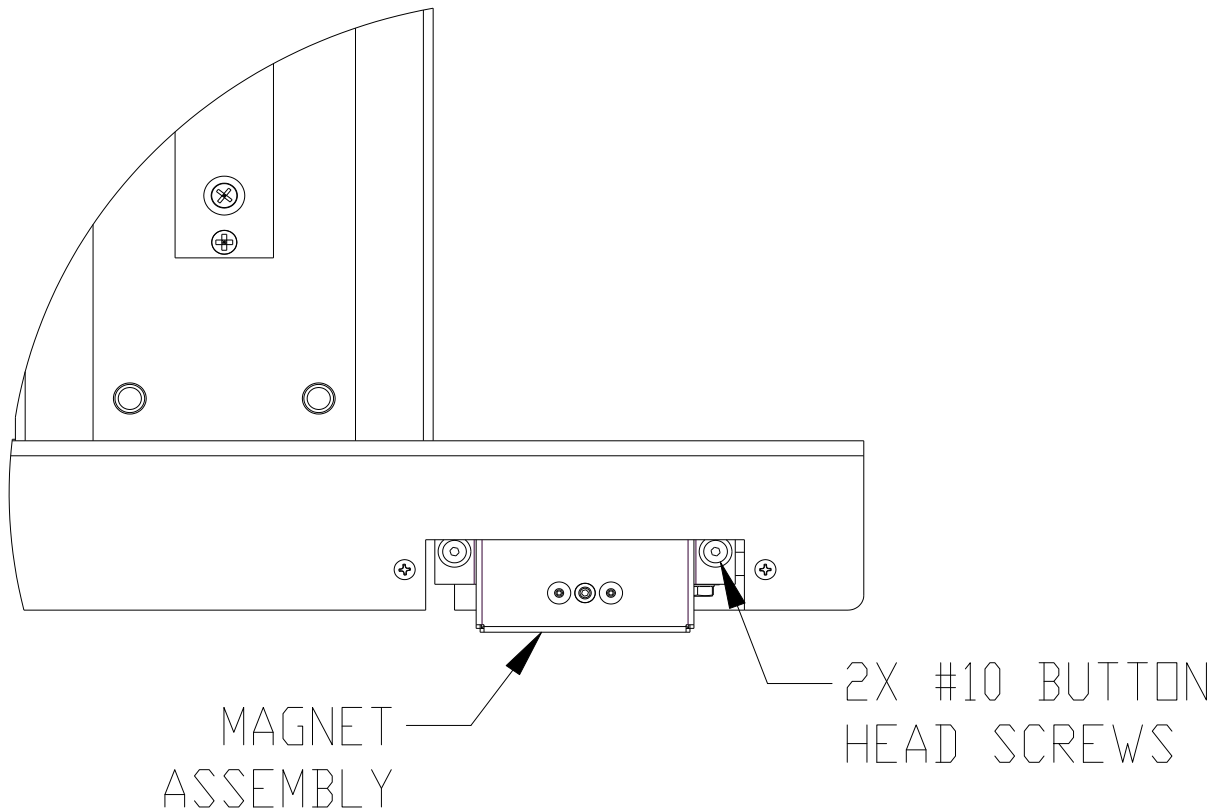


Figure 5: Detaching the Magnet



CAUTION

Failure to detach the magnet assembly could result in damage to the magnet assembly or floor when maneuvering the column to install on the floor rail.

3. Column Installation on the Rails

Remove the travel stop from the lower rail on the installation side. Stand the column up and move into position as shown in *figure 6*. Check that the upper bearing assembly is free to move up and down. Lift the column on the rail side and shift to engage the lower bearing assembly. Continue moving the column toward center until the upper bearing assembly is close to the end of the upper rail. At this time lift the upper assembly to the proper height and engage it to the upper rail. Lift again to engage the lower bearings on the outside and roll the column toward rail center.



NOTE

A piece of plywood 21" x 6"x 5/8" thick will facilitate engaging the floor car to the lower rail. Place the column on the plywood in the figure 6 position and it will be very close to the proper height to minimize lifting.

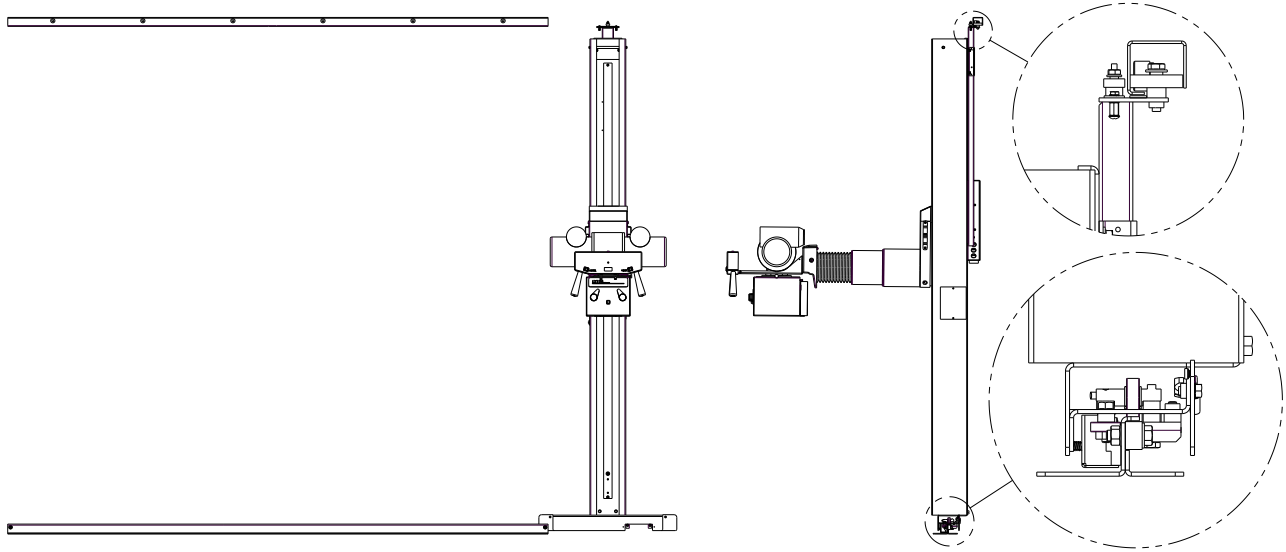


Figure 6: Bearing Assembly Engagement

Replace the travel stop on the lower rail.



WARNING

Failure to reinstall the travel stop could result in the column disengaging from the rails and falling.

Set the height of the upper bearing assembly by inserting a 12" zip tie (~.050 thick) between the upper rail and both plastic strips on the upper bearing assembly (see figure 7). Push the upper assembly up against the zip tie to set the spacing and tighten the clamp mounting bolts. Remove the 12" zip tie.

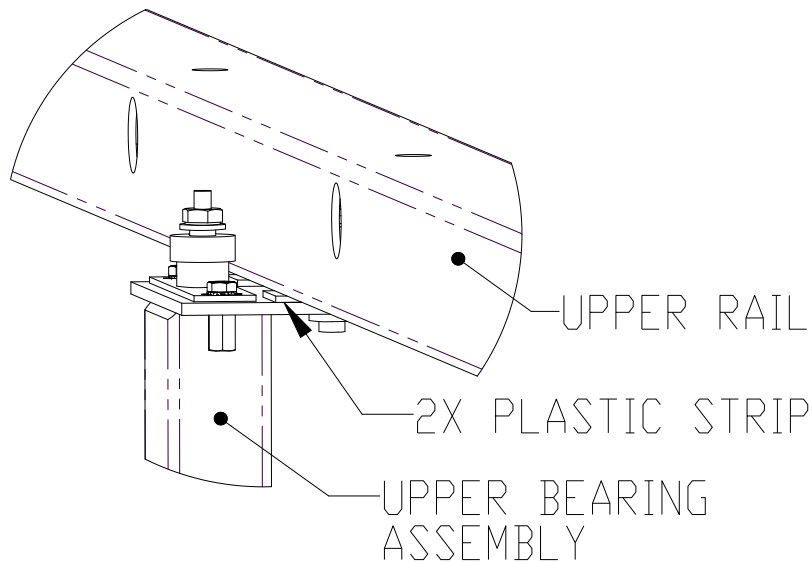


Figure 7: Upper Bearing Assembly

Reinstall the horizontal magnet assembly (see figure 5), making sure the cable & wires are pushed back up into the floor car and remain clear of the floor rail during operation.

4. Lower Rail Installation

The floor rail position is critical; adjust it to achieve the following:

- a) The column must be vertical in both directions across its entire travel.
- b) The top bearing surface of the rail must be level--shim under the rail if necessary.
- c) Free-rolling travel across the entire column range of motion.
- d) Upper bearing does not come within 3" of the end of the upper rail *on either side* when the column is at its end of horizontal travel.

When all of the above are met, secure the rail permanently to the floor using appropriate anchors and fasteners (not included). Check the clearance of the hardware used to the front flange of the floor car. Remove or substitute hardware if it is too close.

5. Upper Bearing Assembly Leveling

On each side of the upper bearing assembly clamp drive the leveling set screws against the tube, keeping it in the center (see *figure 8*). Do not fully tighten. Place a level on the side of the upper bearing assembly bar. If it is not level, adjust one set of set screws (one side out, one side in) to shift the bar and make it vertical. After the bar is level fully tighten all four set screws to lock in place.

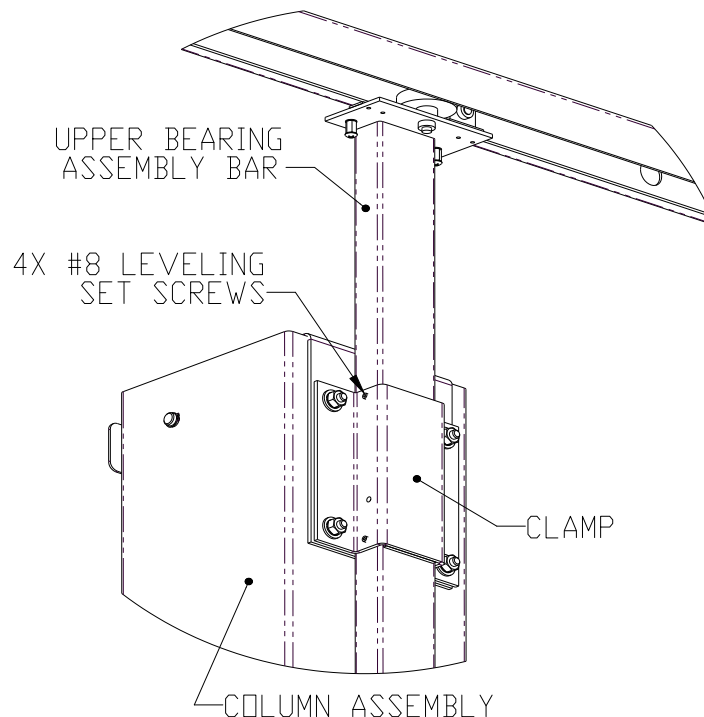


Figure 8: Leveling the Upper Bearing Assembly

Remove the shipping bracket and strap holding the slide in place.

B. Mounting the X-Ray Tube and Collimator

Install the X-ray tube and collimator per the manufacturer's recommendations.



CAUTION

Take care to ensure that the assembly does not rotate out of detent to drop the tube onto the floor or tabletop.

If equipped with trunnion rings, install the angulation box mounting plate (1/8" thick) between the tube and collimator. It is of vital importance that the proper bolt type be used. This is often easier to do with the tube angulated so that the port is pointing towards the ceiling.

☞
NOTE

Some tube types require metric thread M6 bolts, while others require English thread 1/4-20 bolts. Damage to the tube threads resulting from improper bolt selection is not covered under warranty. Refer to the tube manufacturer's installation instructions on mounting bolt requirements for the tube type used at this installation.

Verify that the appropriate spacers are installed to meet distance requirements for tube focal spot to collimator mounting surface. Refer to the individual component instructions. Note that the number of spacers required will vary, depending on the collimator and x-ray tube used.

☞
NOTE

If too many spacers are used the light field will be larger than the x-ray field. If too few spacers are used the light field will be smaller than the x-ray field.

C. Mounting the Angulation Box

Install the angulation box to the tube platform or angulation box mounting plate using the screws found there.

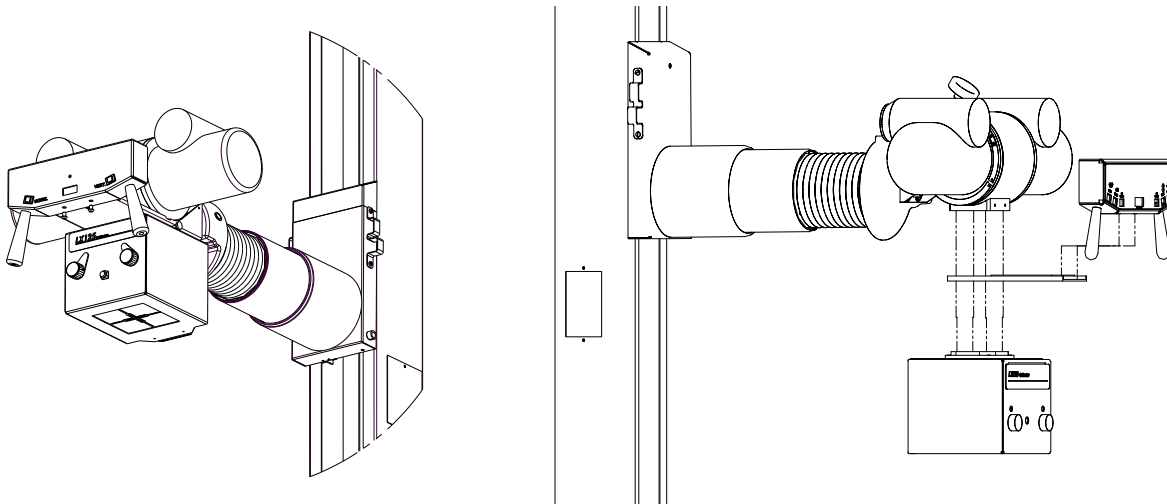


Figure 9: Installing the Angulation Box, Platform (left) and Trunnion (right)

D. Electrical Connections

1. Angulation Box

The angulation box electrical connections will be made at the junction box at the rear of the column. The wires and terminal locations are clearly marked. Refer to the electrical diagram (*figure 24*, p.25) for reference as needed.

Remove the junction box cover.

Route the angulation box cable through the cable drape brackets and around to the junction box. Push the cable ends through the rubber grommet (see *figure 9*). Connect the conductors the junction box terminal strip locations as marked on the wires and as indicated in *figure 24*. Use the top nut shown in *figure 10* to secure the free end of the ground cable from the angulation box to the junction box. Place the lug between the tooth washer and nut. Zip tie the cables to the junction box bracket using the holes provided.

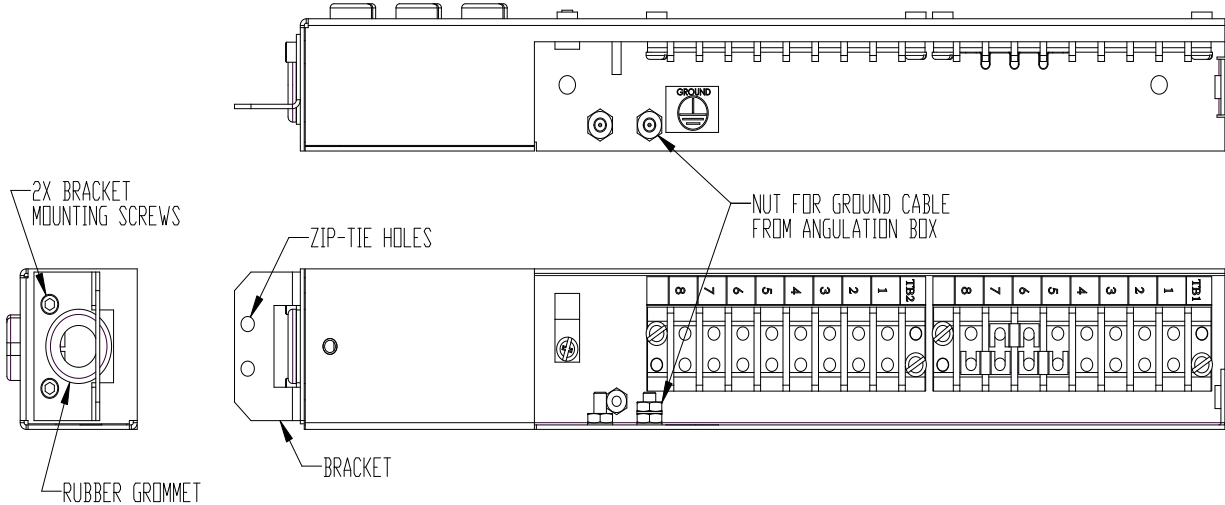


Figure 10: Junction Box (cover removed)

Connect the incoming power cable to 24 VDC from either a discrete power supply or an authorized auxiliary power supply point within the generator (1.5A minimum). For reference, +24V goes to TB2-8 and -24V goes to TB1-8.

Refer to *figure 24* Electrical Schematic (p.25) if necessary.

For angulation boxes with a hose

If the system is equipped with an angulation box that has a hose, find the hose clamp attached to the free end of the hose. Remove the junction box bracket by removing its two mounting screws (see *figure 10*). Remove the rubber grommet. Reuse the screws to mount the hose clamp in the same location. Make the electrical connections as detailed above inside the junction box. Use the clamp to secure the hose to the junction box.

2. Horizontal lock

Locate the free end of the cable from the junction box marked "TO TB3 (FLOOR CAR)". Remove the strain relief bushing in cable exit C (see *figure 4*, p.10) on the back of the floor car. Make the terminal connections as labeled on the cable (see *figure 11*). Reinstall the strain relief bushing.

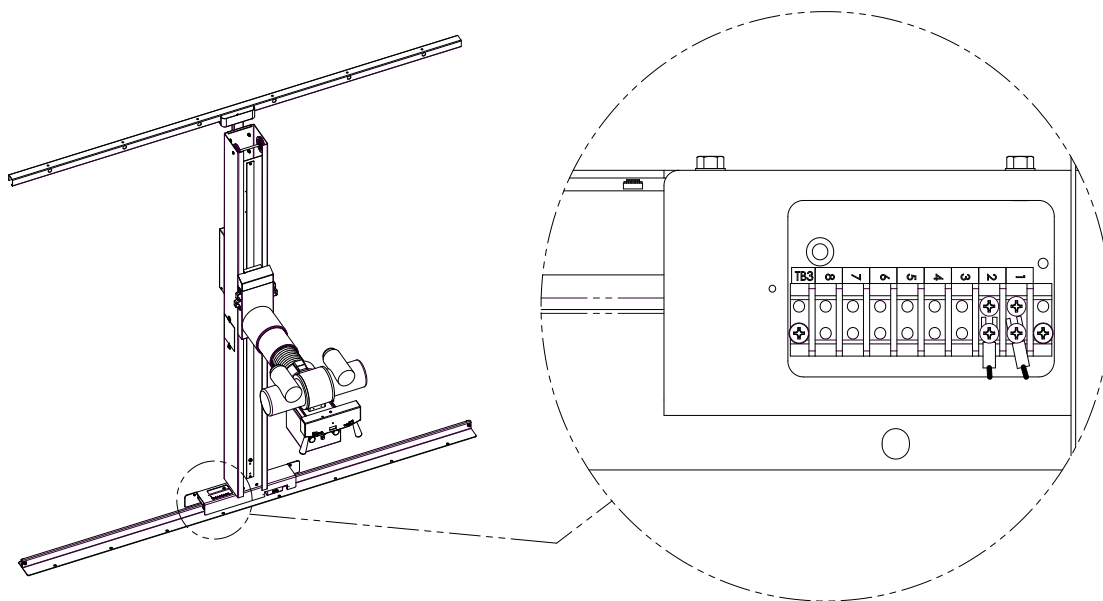


Figure 11: Floor Car Terminal Strip

E. High Voltage Cables and Cable Drape

The high voltage, stator, and collimator power cables must be routed from the head to various locations. Follow instructions in literature delivered with those components, paying special attention to vapor proofing, careful handling, and polarity of the high voltage cables. It is recommended to mark both ends of one high voltage cable with a ring of tape or string to indicate the cathode side before installation.

Ensure that the cable loop is adequately long to permit all required motions and that it is not so large as to interfere with the primary beam or patient positioning. Secure the cables to the vertical carriage at the cable clamps provided.

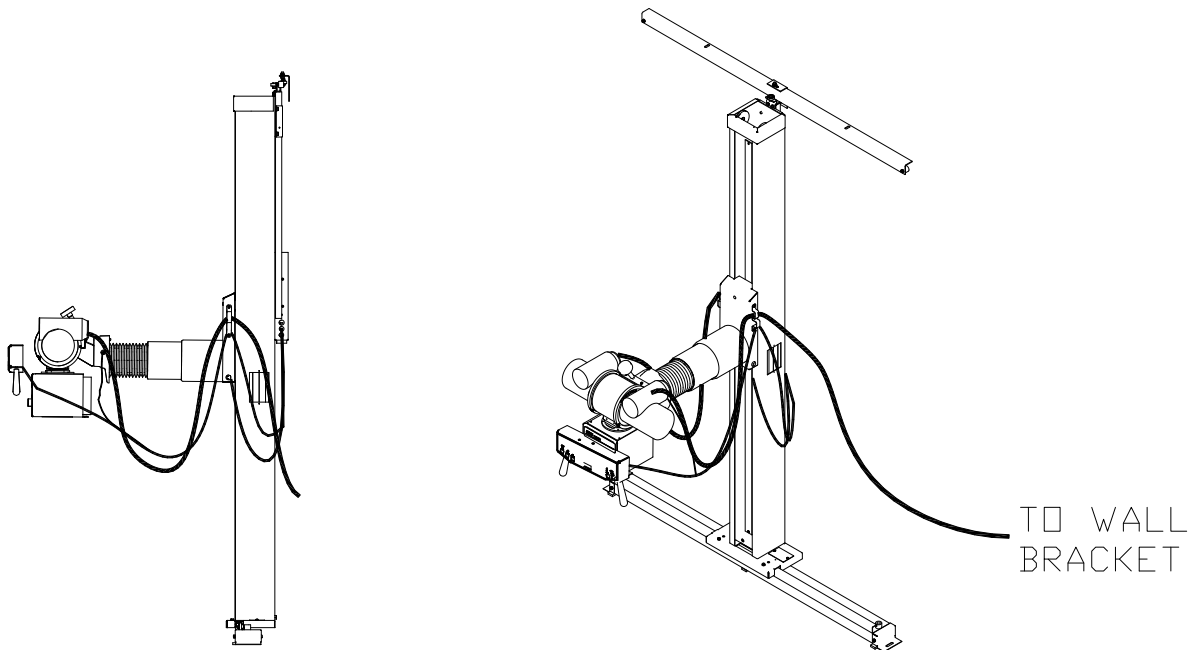


Figure 12: Cable Drape

Wiring of SID switches may be required. See section III.O

F. Release of the Main Counterweight and Trimming

Once the tube, collimator, and angulation box are mounted along with the cabling it is safe to free the main counterweight. Remove the two large bolts immediately above and below the counterweight access panel at the left side of the tubestand.

**NOTE**

It is recommended that one person hold the angulation box handles during this time to prevent uncontrolled movement of the vertical carriage when the main counterweight shipping bolts are removed. The vertical carriage should be reasonably counterbalanced, but care should be taken to avoid unexpected counterweight imbalance and a sudden rise or fall of the vertical carriage.

If necessary, remove the access panel(s) and add trim weights to achieve a balanced vertical carriage motion. The vertical carriage should neither drift up nor down when the locks are released. See *figure 13* below.

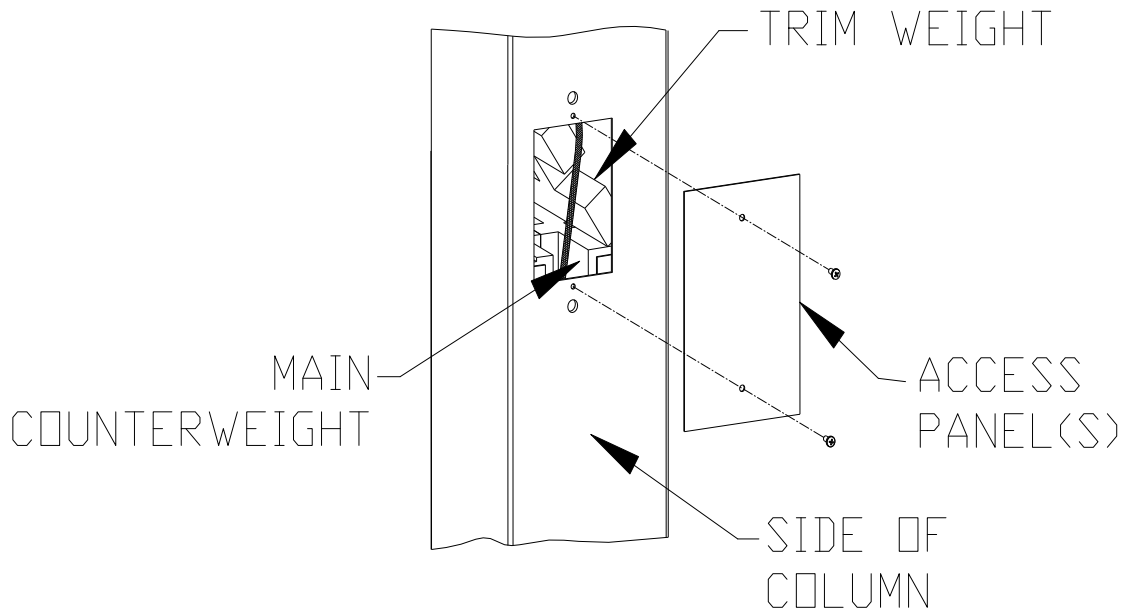


Figure 13: Trimming the Counterweight

G. Beam Alignment Procedure, Arm Adjustment

Put the table and wall holder in place, but do not attach them permanently. Before leaving the factory the transverse arm has been adjusted to be perpendicular to the column and at a horizontal right angle to the floor rail. These adjustments should make beam alignment and tracking relatively easy to achieve.

1. Verify the x-ray and light fields are coincident. Refer to the collimator manual for details on adjusting the light field to match the x-ray field.
2. Ensure that the column is vertical and the transverse arm is level.
 - a. If the column is not vertical, adjustment of the floor rail is required.
 - b. If the column is vertical but the transverse arm is not level, then the transverse arm needs adjustment. See **section H** below for a description of access and adjustment to raise or lower the transverse arm.
3. Verify tracking in the vertical plane.
 - a. With the transverse arm in its centered (detent) position, adjust the tube within the trunnion rings so that the central ray remains stationary front-to-back throughout the range of vertical travel. Position the table so that this point is at the center of the table image receptor.
 - b. Mark the tube's rotational position within the trunnion rings as "zero".
4. Verify tracking in the horizontal plane.
 - a. This step can only be done after vertical tracking is confirmed.
 - b. Position the tubestand to the 40-inch SID position, angle the beam to the wall, and turn on the collimator lamp.
 - c. Mark the existing centerline of the light field with a piece of masking tape.
 - d. Move the tubestand **back** to the 72-inch SID position, taking note of any movement in the centerline of the light field.
 - e. If the centerline of the light field remains stationary, with the masking tape still within 1/8 inch of the center of the crosshairs, this marks the proper location for the center of the wallstand image receptor.



Note

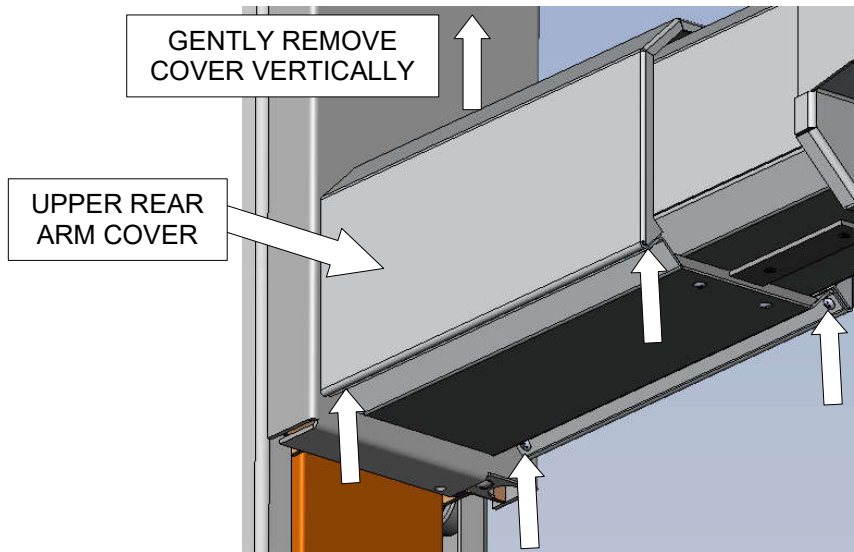
If horizontal tracking is not acceptable, ensure that vertical tracking is still acceptable, as the tube may have shifted within the trunnion. If vertical tracking is still good, adjustment of the transverse arm is likely required.

- f. If the centerline of the light field moves towards the tubestand wall when moving the column from 40 to 72 inch SID, the arm needs to move “outward”. Make the adjustment as described in **Section H** below, and repeat steps “a” through “f” until a stationary centerline is achieved.
- g. If the centerline of the light field moves away from the tubestand wall when moving the column from 40 to 72 inch SID, the arm needs to move “inward”. Make the adjustment as described in **Section H** below), and repeat steps “a” through “g” until a stationary centerline is achieved.

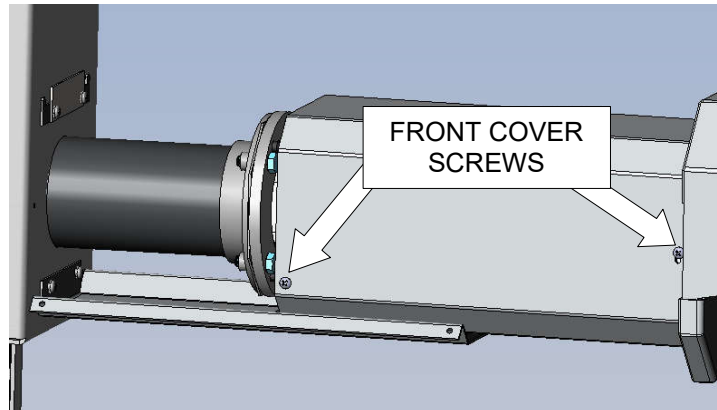
H. Transverse Arm Adjustment

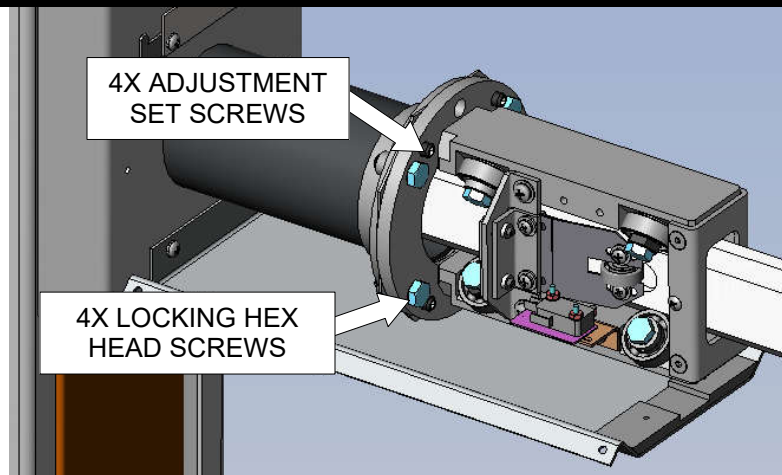
The transverse arm has been leveled at the factory. If adjustment is necessary after tubestand assembly perform the following.

Remove the four attachment screws from the lower corners and lift to remove the upper rear arm cover.



Remove the front cover screws (two each side) and the (upper and lower) front covers.





Loosen all four locking hex head screws to make adjustments

Tighten the lower adjustment set screws to raise the arm (centerline moves out).

Tighten the upper adjustment set screws to lower the arm (centerline moves in)

Tighten the left adjustment screws to move the head to the right (shoot left: centerline moves out; shoot right: in)

Tighten the right adjustment screws to move the head to the left (shoot left: centerline moves in; shoot right: out)

Retighten the four locking hex head screws when adjustments are completed.

I. Vertical Lock Adjustment

Check operation of the vertical lock magnet and adjust if necessary. Remove the upper slide cover to expose the lock assembly. See *figure 15*. With the vertical lock magnet de-energized, tighten or loosen the lock adjustment screw to set the gap between the magnet face and the brake strip. Ideal adjustment is a minimum gap without any dragging across the entire vertical range of motion with the lock de-energized. Reassemble the upper slide cover.

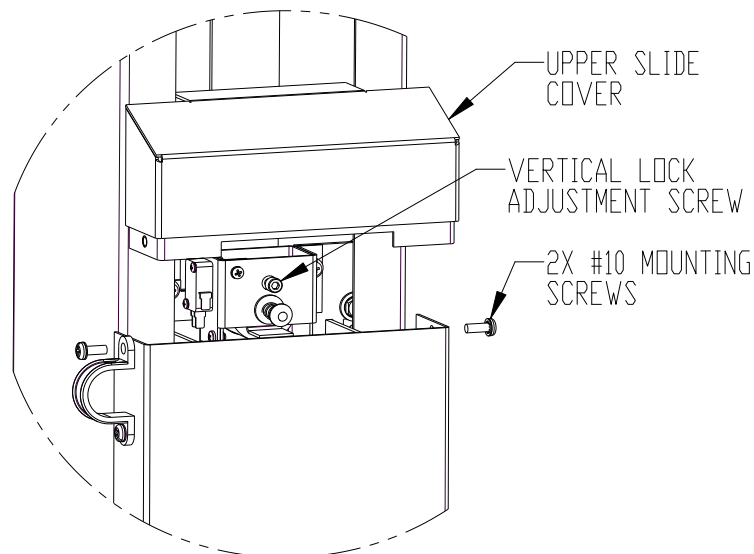


Figure 15: Vertical Lock Adjustment

J. Horizontal Lock Adjustment

Check operation of the horizontal lock magnet and adjust if necessary. Remove the two screws and horizontal lock cover if required. With the horizontal lock magnet de-energized, tighten or loosen the lock adjustment screw (See *figure 16*) to set the gap between the magnet face and the brake strip. Ideal adjustment is a minimum gap without any dragging across the entire range of motion with the lock de-energized. Reassemble the lock cover.

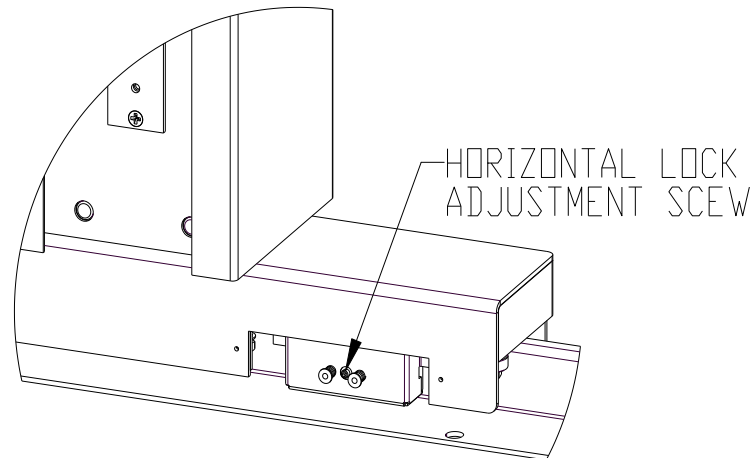


Figure 16: Horizontal Lock Adjustment

K. Upper Roller Adjustment

Adjustment is provided for the clearance between the main roller (inside the rail) and the pinch roller (outside the rail in the front). Check the clearance by holding the angulation box handles and pushing the column toward the wall. Rearward movement of the column should be minimal. Also there should be no drag from this roller across the longitudinal travel (drag indicates that it is too tight).

To adjust, loosen the 2X #6 hex head roller adjustment bracket screws (use a 1/4" socket or box-end wrench). If they are hard to loosen, first loosen the 2X hex cover standoffs mounted on the screws below the plate. Push the bracket and roller toward the rail to decrease the clearance or away to increase. Retighten the screws to secure in place. Exercise care in tightening to avoid over-torquing and damage to the screws or base plate. Be sure to tighten the 2X hex cover standoffs after the pinch roller has been adjusted. See figure 17.

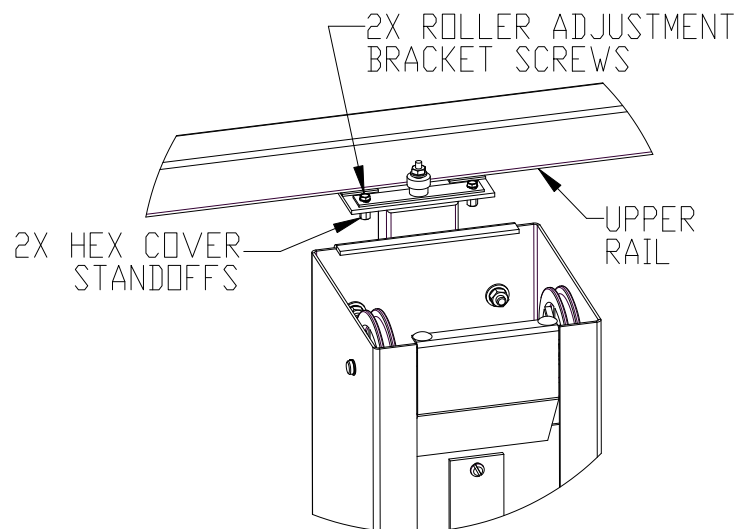


Figure 17: Upper Front Roller Adjustment

L. Lower Bearing Adjustment

Adjustment is provided on the floor car for the clearance between the main horizontal roller (one each side, back side of the rail) and the pinch bearings (one each side, front side of the rail). If adjustment is necessary, rotate the eccentric mount to change the clearance (see figure 18). Tighten securely once appropriately set.

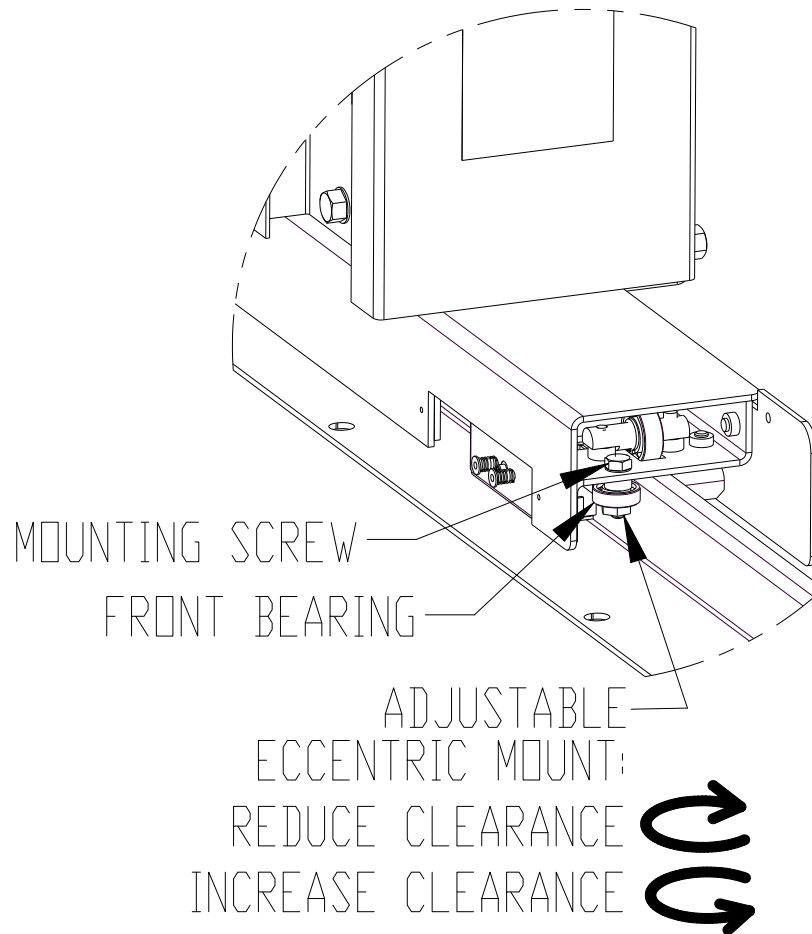


Figure 18: Lower Front Bearing Adjustment

M. Final Level and Alignment Check

Final check the lower and upper rails to confirm that they are parallel and level. Final check the horizontal motions of the column. Make adjustments if necessary to positions and/or shimming. Final check the beam alignment and travel. Adjust the arm, floor car, and/or rails if necessary.

N. Source-to-Image Distance (SID) Labeling

An SID labeling kit is provided, see instructions included there. Horizontal and vertical are provided however vertical SID labeling is only required when a table is present and horizontal SID labeling is only required when a wallstand is present.

O. Source-to-Image Distance (SID) Switches

(PBL EQUIPPED INSTALLATIONS ONLY)

1. Vertical SID switch

If required, A vertical SID switch is available to interface with a PBL collimator. It is mounted on the side of the vertical lock assembly (see *figure 25, p.25*). The vertical SID ramp and screws are shipped in the SID switch kit. Mount it in the position shown in figure 19 using the mounting holes provided.

The vertical SID switch must be actuated when the focal spot is $40'' \pm 2\%$ ($0.8''$) above the image plane within the table. Move the vertical carriage to that location (with the beam vertical and downward), and hold it there. Adjust the actuator ramp on the column so that the switch triggers at this location. Follow the collimator manufacturer's Instructions for SID switch connections.

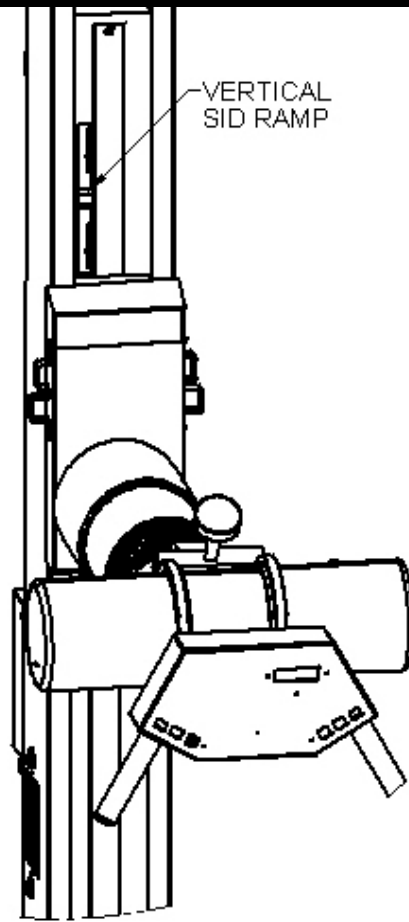


Figure 19: Vertical SID Ramp

2. Horizontal SID switches

Provisions are made for two horizontal SID switches. See installation instructions included in the kit.

P. Covers

1. Column Cap

Slide the column cap over the top of the column (front to back), allowing the tabs on the back of the cover to drop down behind the column housing. See *Figure 20*.

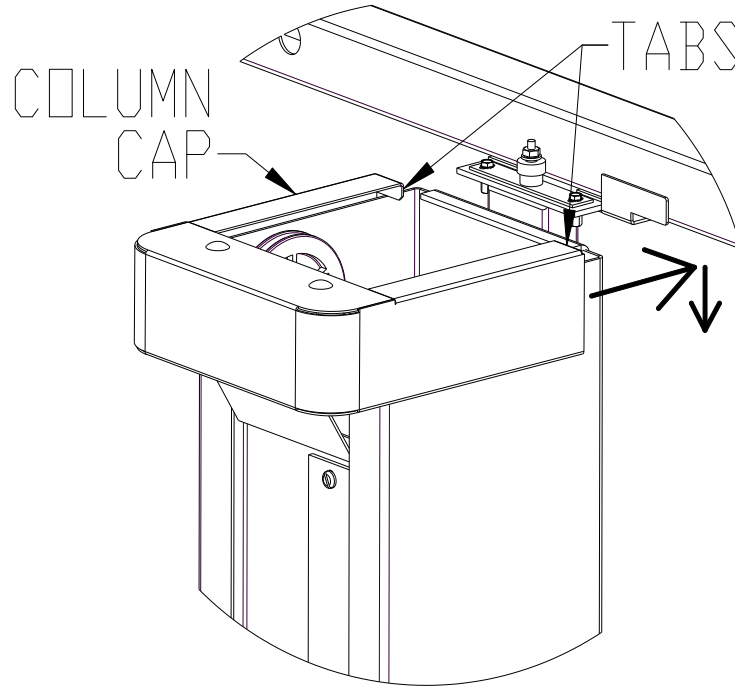


Figure 20: Column Cap Installation

2. Upper Bearing Cover

If the dimension Z shown in Figure 21 (the distance between the bottom of the upper bearing plate and the top of the clamp) is 2.06 or larger, attach the upper bearing cover using the 2X #6 button head screws included there (see Figure 22). If Z is between zero and 2.06, omit the upper cover.

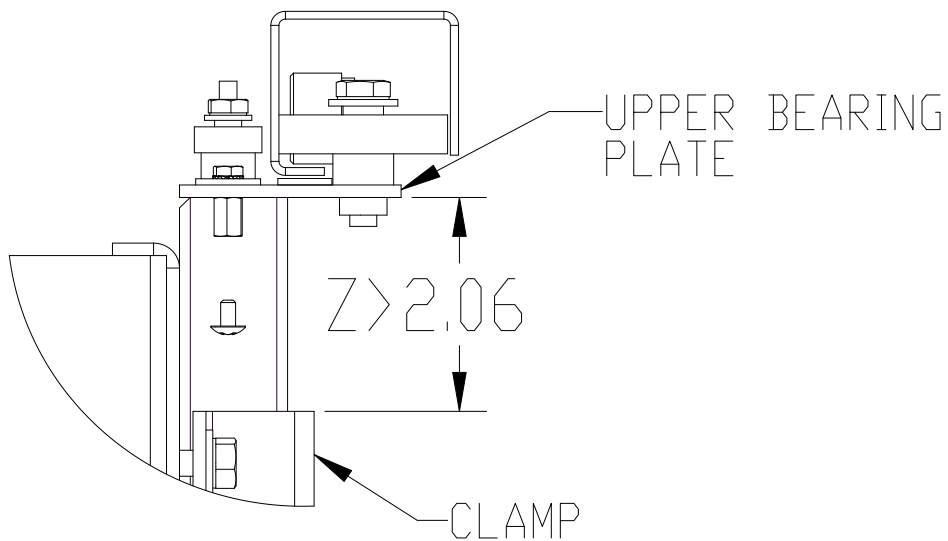


Figure 21: When to Attach the Upper Bearing Cover

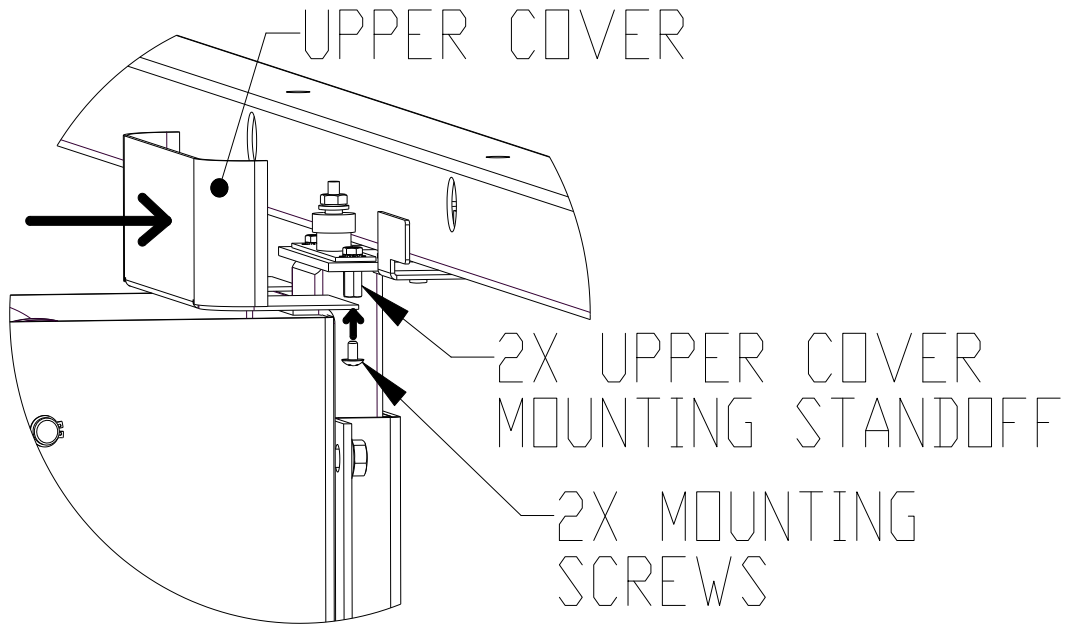


Figure 22: Upper Bearing Cover Installation

3. Floor Car Cover

Install the floor car cover. Tilt the cover down in the front slightly in order to get the front tab under the flanges of the column (see Figure 23).

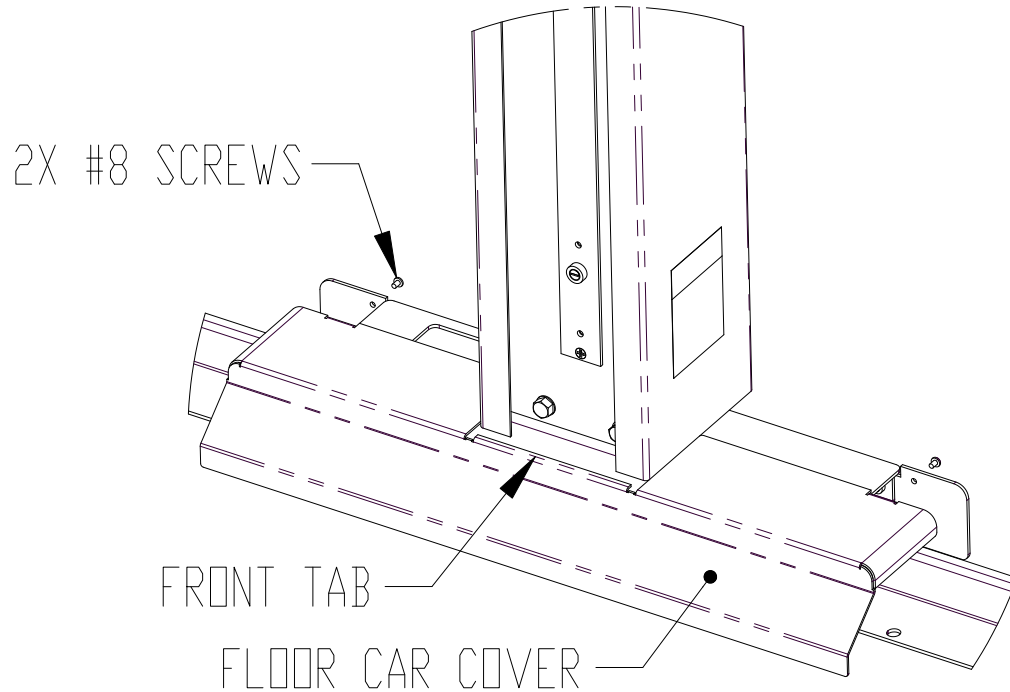


Figure 23: Floor Car Cover Installation

4. Counterweight Access Covers

If not done previously, reinstall the counterweight/trim access covers (see figure 13)

IV. ELECTRICAL SCHEMATIC FOR THE S114 TUBESTAND

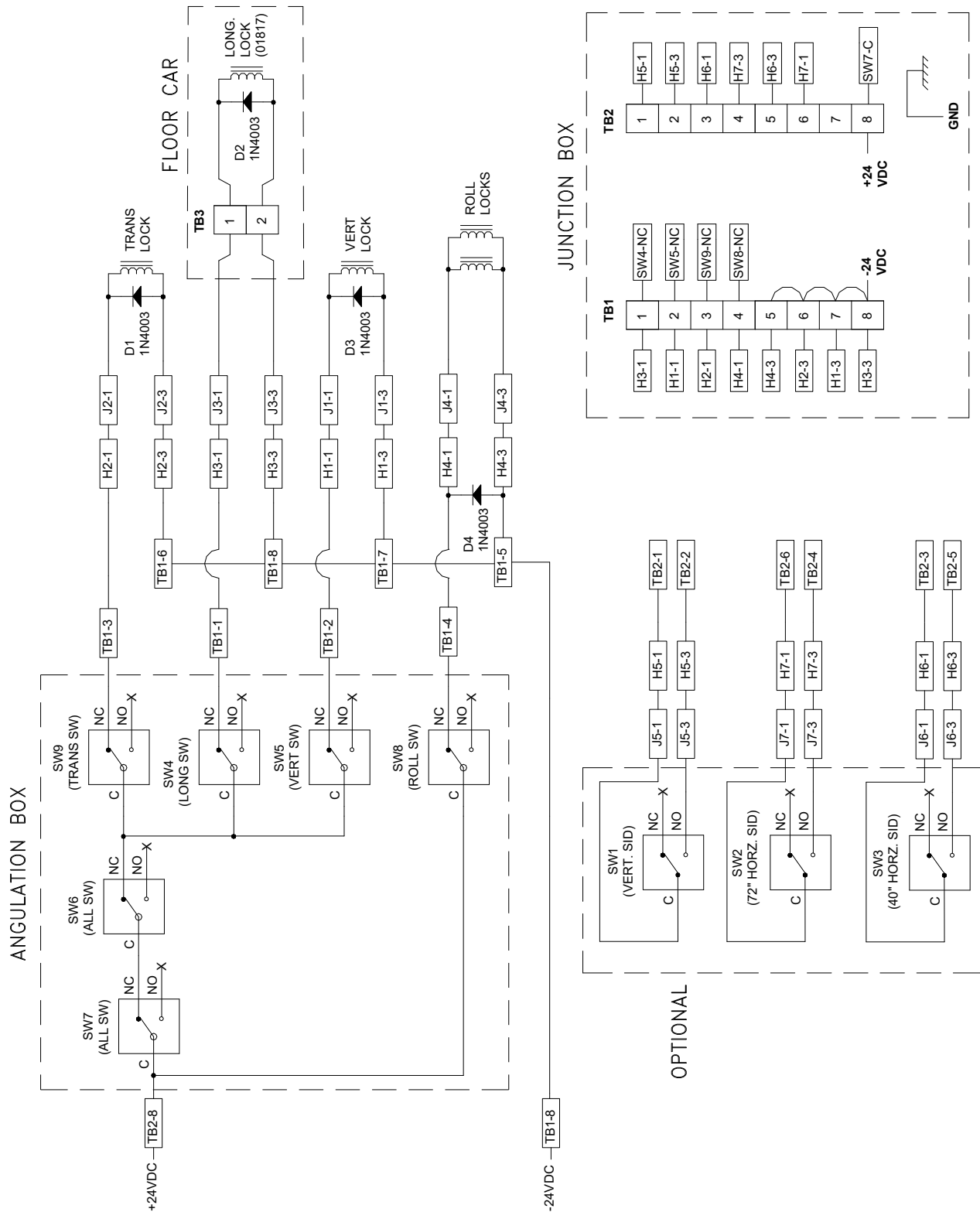


Figure 24: Electrical Schematic

V. REPLACEMENT OF THE VERTICAL LOCK MAGNET ASSEMBLY

To replace the vertical lock magnet assembly remove the two cover mounting screws (see *figure 23*) and lift out the vertical slide top cover, exposing the magnet assembly. Remove the two magnet assembly mounting screws, unplug the wire harness, and remove the assembly. To reinstall reverse the above instructions.

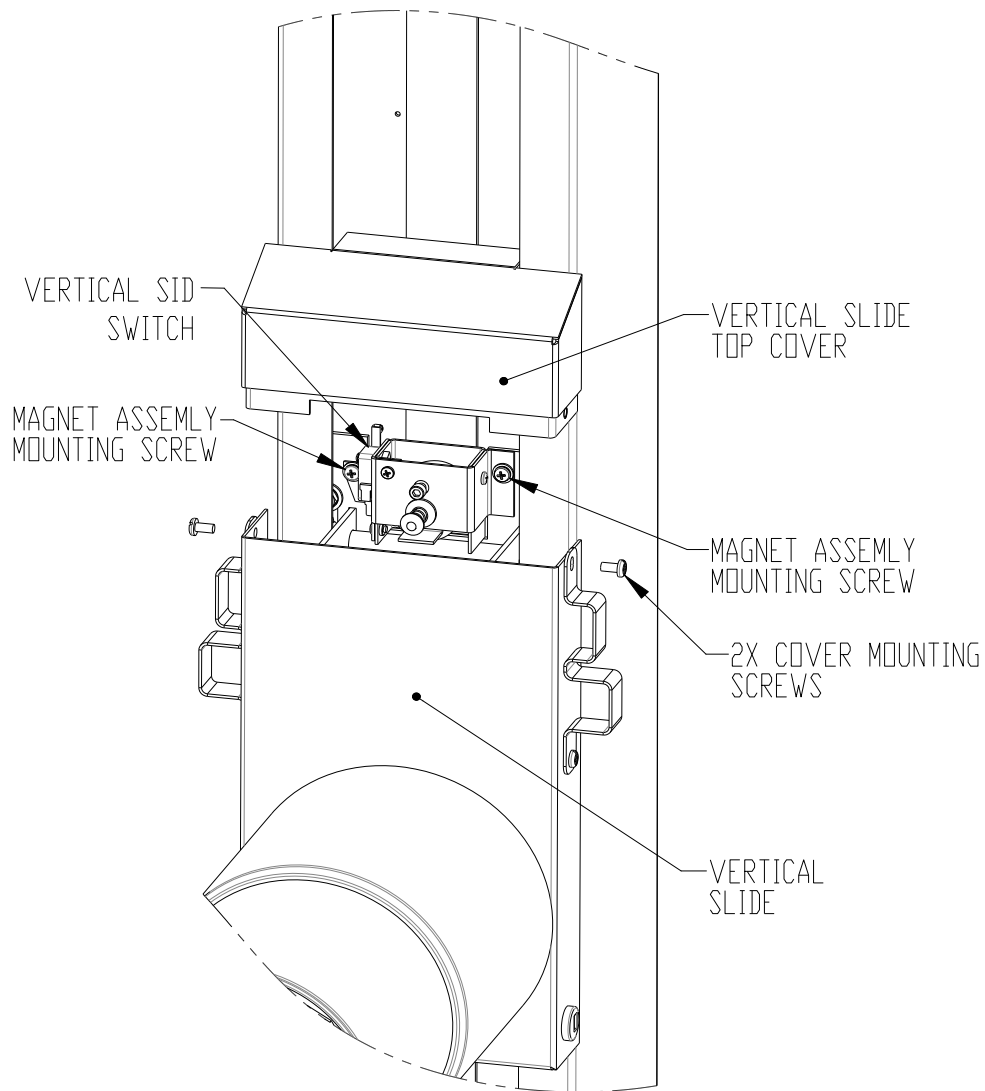


Figure 25