ROTATIONAL TUBESTAND WITH TRANSVERSE SLIDE

MODEL S225

INSTALLATION, SERVICE AND OPERATING MANUAL

02271-000 REV N

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INSTALLATION, SERVICE, AND OPERATING MANUAL TEXT REVISION HISTORY

Revision	Description	Release Date
A	RELEASED MANUAL ECR 4389	NOVEMBER 2004
B	ADDED WARNING STATEMENT TO SHEET 7	OCTOBER 2010
C	UPDATES FOR UL	SEPTEMBER 2011
D	UPDATED INSTRUCTIONS & SCHEMATIC	OCTOBER 2011
E	UPDATED: WARNING NOTE ON SHEET 5, GRAPHICS FOR FIG. 1 AND FIG. 2	SEPTEMBER 2012
F	UPDATED GRAPHICS FOR FIG. 1, FIG. 2, AND FIG. 4	JULY 2014
G	ADDED IV BASIC MAINTENANCE	JUNE 2015
H	REMOVED 1B; REPLACED ITEMS IN 1A WITH SYMBOL TABLE	NOVEMBER 2016
J	UPDATED ADDRESS TO NILES, IL ON COVER SHEET; ADDED “INTENDED USE” STATEMENT TO SHEET 5	JUNE 2017
K	ADDED UPPER BEARING ASSEMBLY TEXT WITH A MAX OD HARDWARE TO SHEET 10	ECR 9785 JANUARY 2018
L	Updated Section 4.3 to show procedure with new transverse arm covers.	ECR 10840 SEPTEMBER 2021
M	EP435 – UPDATED IMAGES FOR NEW ANGULATION BOX; UPDATED SECTION 3 FOR NEW HSID ASSEMBLY	ECR 11354 JANUARY 2024
N	CORRECTED BUTTON DESCRIPTIONS FOR LONGITUDINAL LOCK RELEASE AND VERTICAL LOCK RELEASE ON PAGES 30 AND 31.	ECR 11478 AUGUST 2024

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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

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NOTE

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

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WARNING

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

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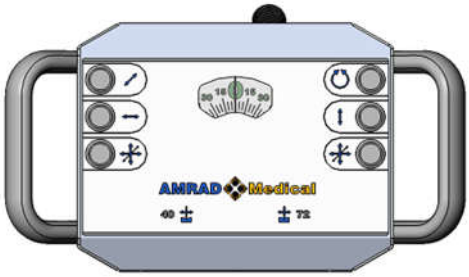
NOTE

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

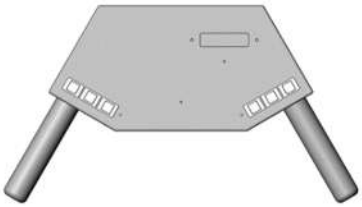
Intended Use

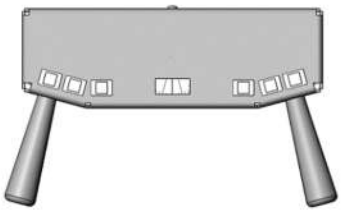
This is an x-ray Tubestand, a mechanical device intended to support and position an x-ray tube and collimator as required for radiographic procedures.

C. ANGULATION BOX VARIATIONS



STANDARD ANGULATION BOX





ALTERNATE ANGULATION BOXES

D. SPECIFICATION SUMMARY TABLE

Electrical Ratings	24VDC, 1.5 A ⎓ (or equivalent)
Maximum Safe Working Load	75 lbs / 34 kilograms
Environmental Conditions	Temperature range for: Transport and Storage: -40° F to +158° F / -40° C to +70° C Use: +50° F to +104° F / +10° C to +40° C Relative Humidity Limits for: Transport and Storage: 10% to 100% Use: 30% to 75% Atmospheric pressure range for: Transport and Storage: 14.67 inHg to 31.30 inHg / 500 hPa to 1060 hPa Use: 20.67 inHg to 31.30 inHg / 700 hPa to 1060 hPa
Information regarding potential EMC interference and advice for avoidance	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	IPXO/Ordinary
Degree of protection against electric shock	Class I, Type B Applied Parts 
Applicable Standards	This X-ray Tubestand complies with the following regulatory and design standards: • UL 60601-1 • CAN/CSA C22.2 No.601.1 • IEC 60601-2-32:1994 • CSA C22.2 No. 601.2.32-98
Safety Label	
Equipment not suitable for use with flammable anesthetic mixture with air or with oxygen or nitrous oxide.	

II. GENERAL INFORMATION

A. IMPORTANT NOTICES

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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. GENERAL SYSTEM DIMENSIONS

NOTES:

1. ONLY WHEN EQUIPPED WITH TRUNNION RINGS.

2. DIMENSION WITH 2" x 6" (1.5" x 5.5" ACTUAL) HEADER.

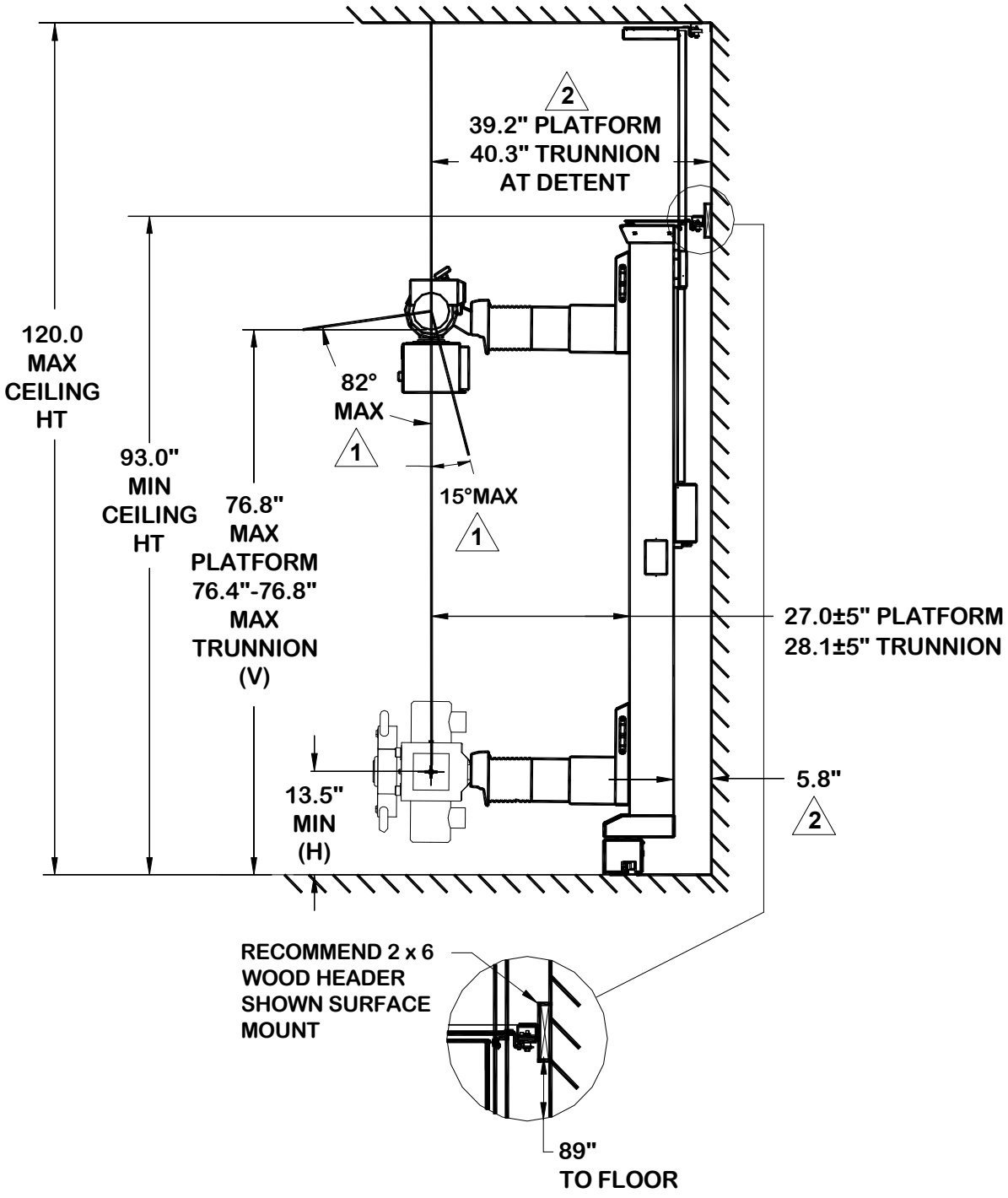

FIGURE 1: MECHANICAL DIMENSIONS

III. INSTALLATION

A. ROOM LAYOUT

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.

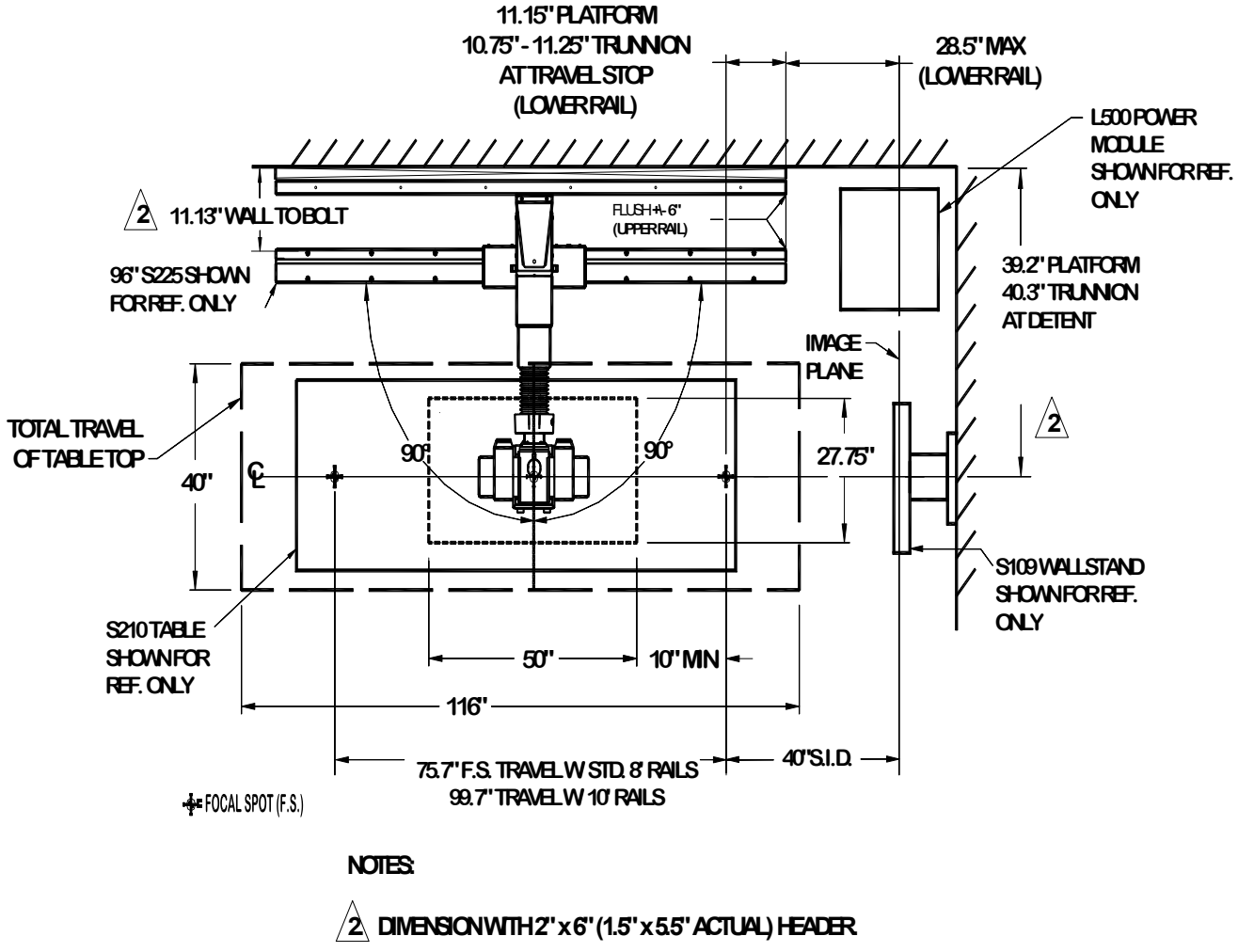

FIGURE 2: PLAN VIEW, INSTALLATION DIMENSIONS

B. RAIL INSTALLATION

WARNING

The ends of the upper rail must be positioned equal to the ends of the lower rail. Offsetting the rail ends can cause tubestand instability and an unsafe condition. The tubestand stop brackets are on the lower rail. Horizontal motion must be limited by the stop brackets to stay within rail length.

In most applications, it is advantageous to first put the floor rail close to the final location, but do not attach it permanently. See ***Figure 3*** below.

Next, secure the upper rail to either the wall or ceiling. The top of the ceiling rail must be between 93 and 119 inches from the finished floor. 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. **To avoid interference with the upper bearing assembly when mounting to the wall, use hardware with a MAX OD of 0.7 inch.**

Finally, secure the floor rail. This is best done once the column has been mounted onto the rails and both column verticality and rail level has been verified. Maintain the critical front-to-rear offset distance from the upper rail as shown in ***Figure 3*** below. The upper rail is shorter than the lower rail, it is intended for the difference to be equal at each end. Shimming might be necessary in two directions; the rail must be level side-to-side as well as front-to-back, and the two rails must be parallel. Place shims as close to the anchoring screws as possible to avoid twisting the rail when the screws are tightened.

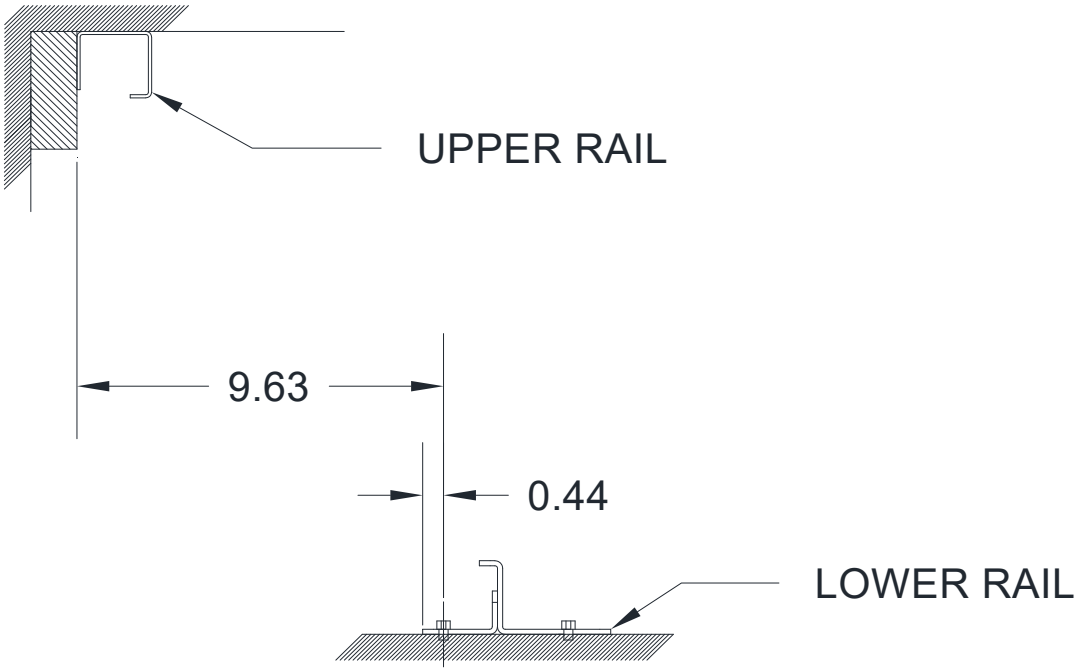

FIGURE 3: RAIL INSTALLATION (dimensions shown in inches)

C. COLUMN PREPARATION

Lift the tubestand out of the box. The assembly is over 180 lbs (82 kg) so plan personnel appropriately. The column is shipped in as complete an assembly state as possible. The upper bearing assembly arrives assembled but not installed on the column (see section D.1 next).

The floor car is slip-fit onto the shaft at the bottom of the column. If the floor car comes off of the column shaft, simply slide it back into place.

Before raising the column remove the travel stops from the rails on the installation side.

D. ERECTING THE COLUMN

1. Loosen the clamp screws on the back of the column at the top. Slide the upper bearing shaft assembly under the clamp in the orientation shown in **figure 4**. Leave it so that it moves freely in the vertical direction to engage the upper rail once the column is in place on the lower rail.
2. Before erecting the column, remove the cap located at the top of the column and remove the shipping brace.
3. Line up floor car with the lower rail. For orientation, the lock cables exit the rear of the floor car.
4. Guide the floor car onto the lower rail. Engagement with the upper rail follows because it is shorter in length than the floor rail.
5. Raise or lower the upper bearing assembly so that the bearings engage the upper rail correctly.
6. Tighten the clamp bolts for the upper bearing adjustment shaft. The tubestand is free standing once both the upper and lower horizontal carriages are properly engaged with the two rails (see **figure 4**).
7. Re-attach the travel stops on upper and lower rails.

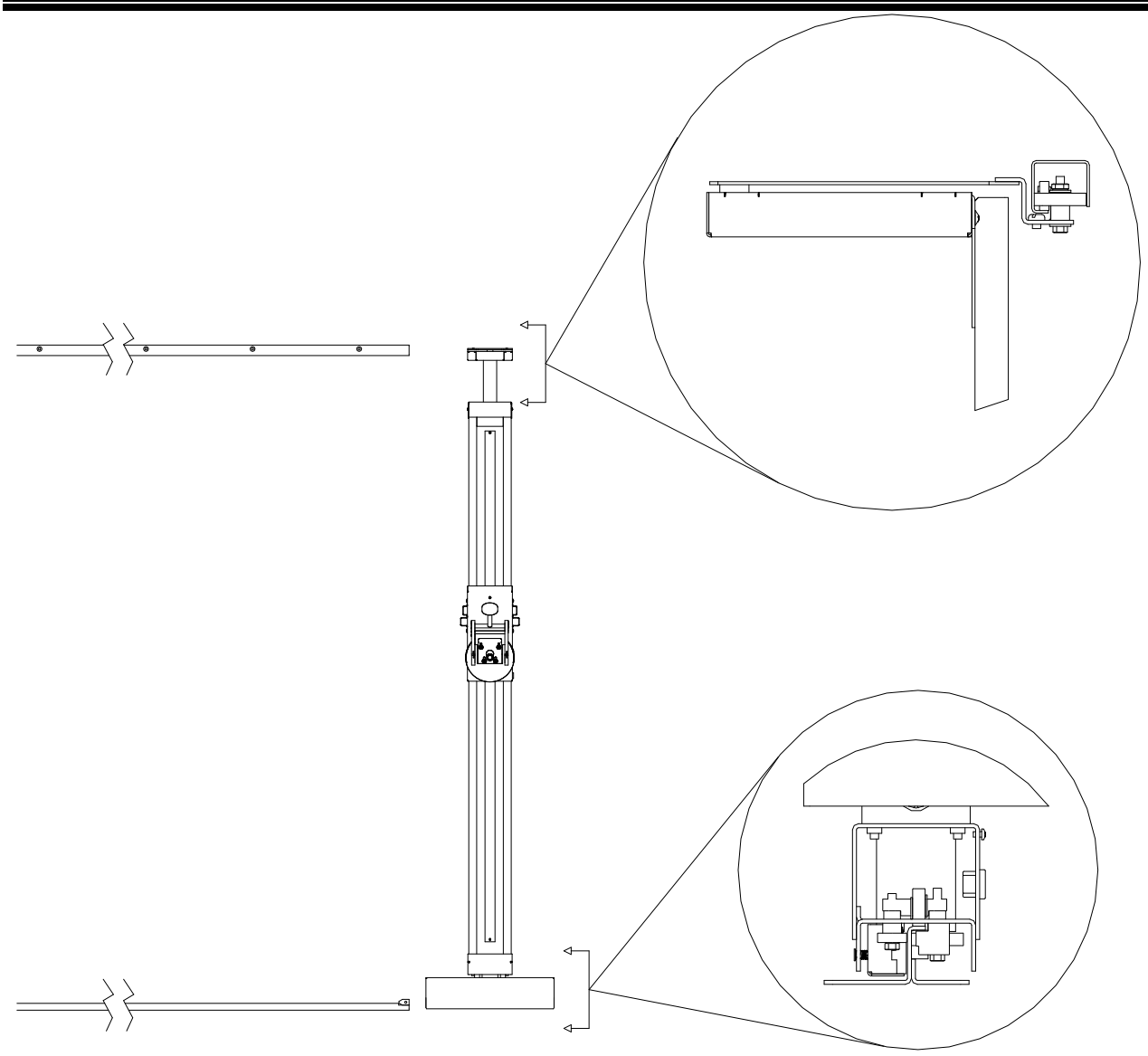

FIGURE 4: ERECTING THE COLUMN

E. MOUNTING X-RAY TUBE, COLLIMATOR, AND ANGULATION BOX

(See ***Figures 5, 6 and 7*** below)

Read the collimator manufacturer's instructions before installing. The number of spacers required will vary depending on the x-ray tube and collimator. The proper dimension between the tube focal spot and collimator mounting surface will be given by the collimator manufacturer. The Summit platform thickness is 0.25 inch (6.4 mm) thick.

The platform or trunnion ring assembly is factory-mounted to the transverse arm.

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NOTE

Be sure to use the proper screws to mount the x-ray tube. Refer to the tube manufacturer's installation instructions on mounting screw requirements.

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WARNING

ENSURE THAT THE PLATFORM BRACKET DOES NOT ROTATE BEFORE THE SCREWS ARE IN PLACE AS THE X-RAY TUBE CAN FALL

For platform mount place the tube on top, collimator ring on bottom, and secure with the proper screws. Place spacer(s) between the platform bracket and the collimator mounting ring.

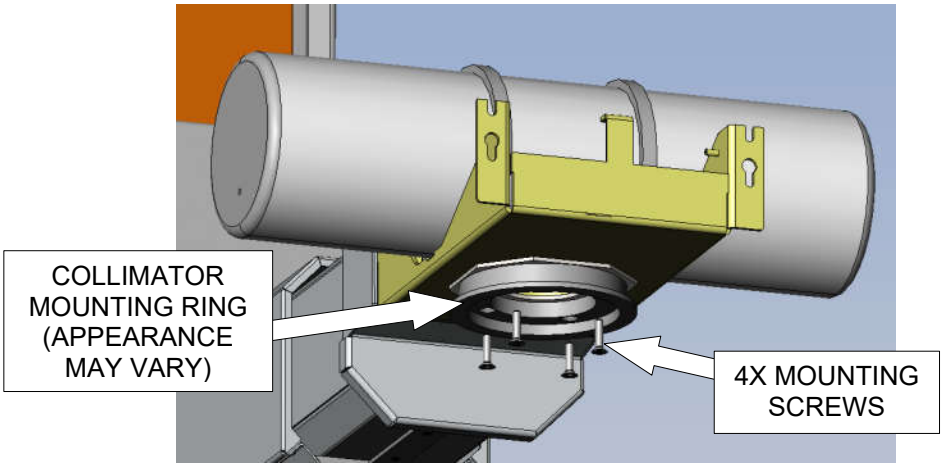


FIGURE 5: COLLIMATOR MOUNTING RING

For trunnion mount, open trunnion ring assembly by removing the lock handle. The upper ring assembly opens via the hinges. Place the tube in lower cradle, close, and replace lock handle. Place the angulation bracket and spacer(s) between the x-ray tube port and the collimator mounting ring.

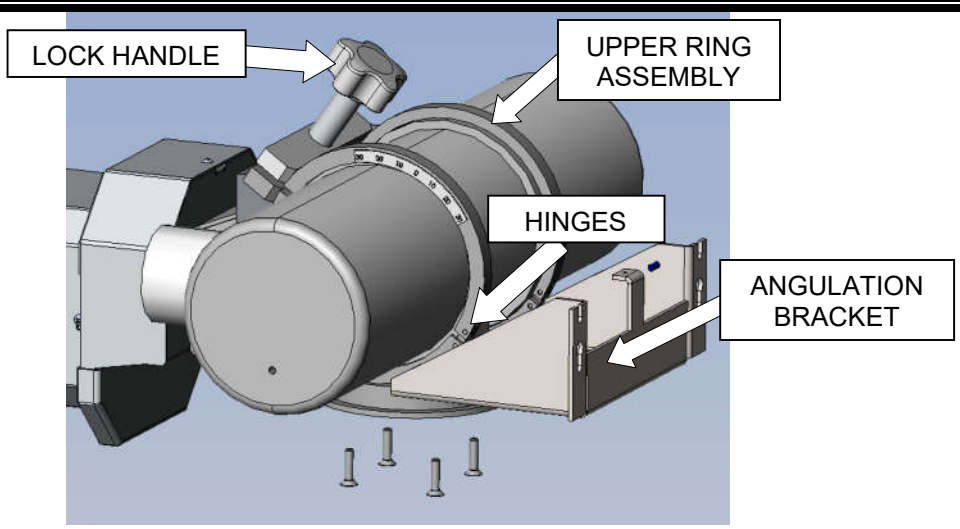


FIGURE 6: TRUNNION ASSEMBLY (IF EQUIPPED)

For all installations now assemble the collimator per the manufacturer's instructions. Connect the collimator cable (shipped with the collimator) according to designations on the cable conductors.

The collimator cable will be routed to the generator area with the high voltage cables and stator cable.

Install the standard angulation box to the mounting plate using the hardware provided with the angulation box. There are four mounting screws to connect the angulation box to the angulation bracket.

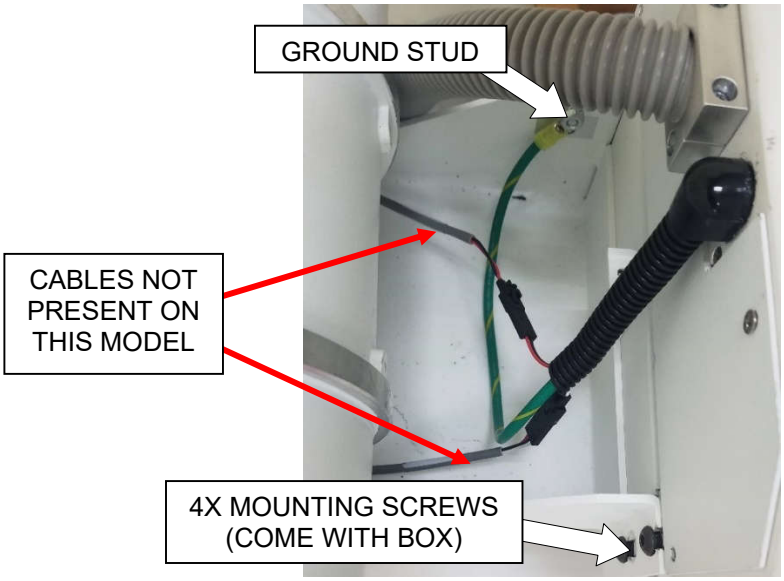
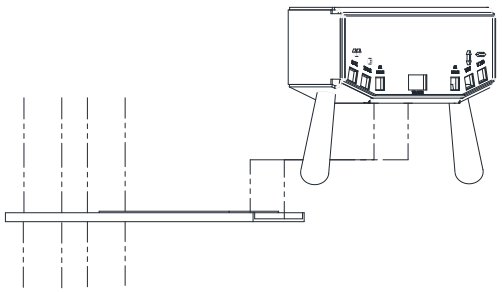


FIGURE 7: ANGULATION BOX CONNECTIONS

The angulation box will have the free end of a ground cable coming from the back. Terminate this to the ground stud located on the angulation box mounting plate with the nut and tooth washer provided there. Place the tooth washer between the ground lug and the plate.

For either **alternate angulation box**, mount angulation box to platform bracket or angulation box bracket with provided hardware. See below image.



F. ELECTRIC LOCK AND GROUND CONNECTIONS

All electrical connections related to the tubestand will be made at the junction box at the rear of the column. The wires and terminal locations are clearly marked. Refer to ***Figure 20***, the electrical diagram part number 09687, for reference as needed.

1. Route the angulation box cable through the cable drape brackets and around to the junction box located at the rear of the column.

2. Remove the junction box cover and route the cable through the strain relief.

3. Wire the angulation box cable ends to the junction box terminal strip locations as marked on the wires and as indicated in ***Figure 20***.

4. In the junction box, attach the 10 AWG ground cable from the angulation box to stud #2 (see ***Figure 8***). Remove the top nut from stud #2, place the cable lug, replace the nut, and tighten.

5. Obtain 24 VDC from either a discrete power supply or an authorized auxiliary power supply point within the generator.
    a. Connect the +24 VDC conductor to TB2-8.
    b. Connect the -24 VDC conductor to TB1-8.
    c. Connect the ground conductor to GND
    d. Connect the green/yellow 10 AWG cable to ground
    e. Refer to ***Figure 20*** Electrical Schematic as needed.

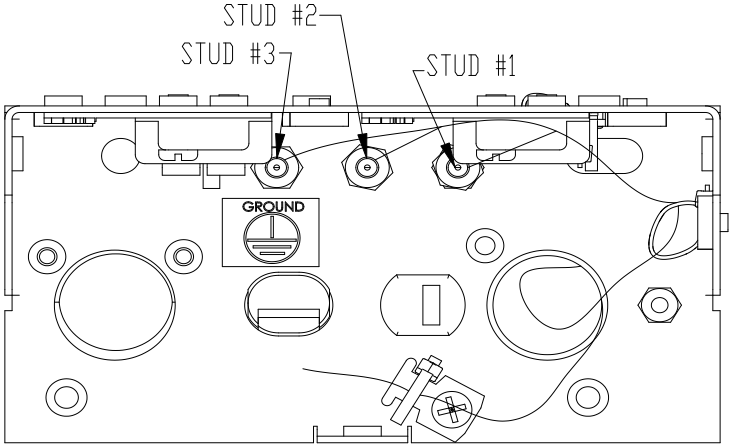


FIGURE 8: TOP VIEW INSIDE OF JUNCTION BOX

G. OTHER WIRING AND CABLE DRAPE

The high voltage, stator, and collimator power cables must be routed from the trunnion assembly 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 from the trunnion assembly (which includes angulation box cable, high voltage, stator and collimator cables) 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 (one each side) provided as shown on ***Figure 9***.

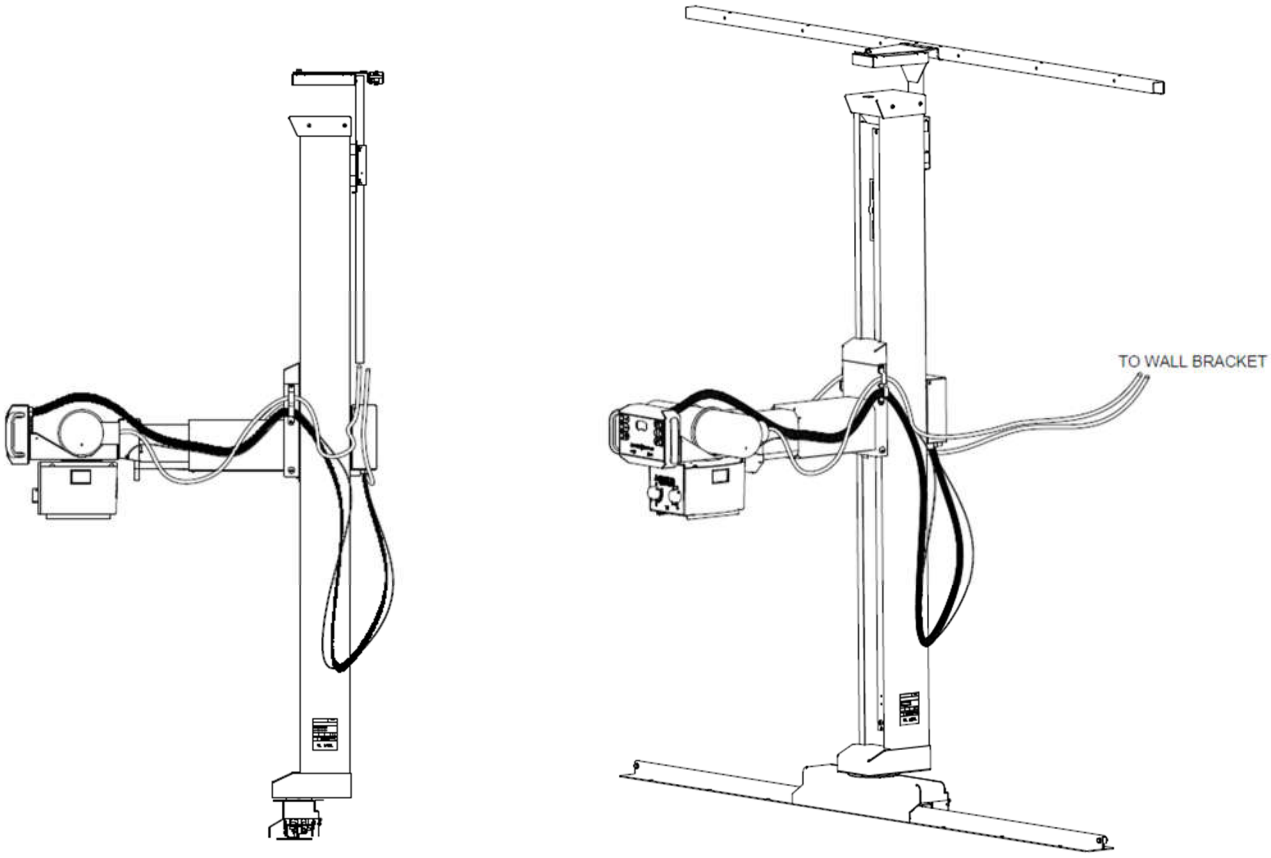


FIGURE 9: CABLE DRAPE

H. RELEASE OF MAIN COUNTERWEIGHT, TRIM WEIGHT ACCESS

Once the tube and collimator are mounted, and all cables are routed from the trunnion assembly to the vertical carriage, it is safe to remove the bolts that hold the main counterweight in place during shipment. Remove the two large bolts immediately above and below the counterweight access panel at the left side of the tubestand to free the main counterweight.

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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 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. Refer to ***Figure 10*** below for visual reference.

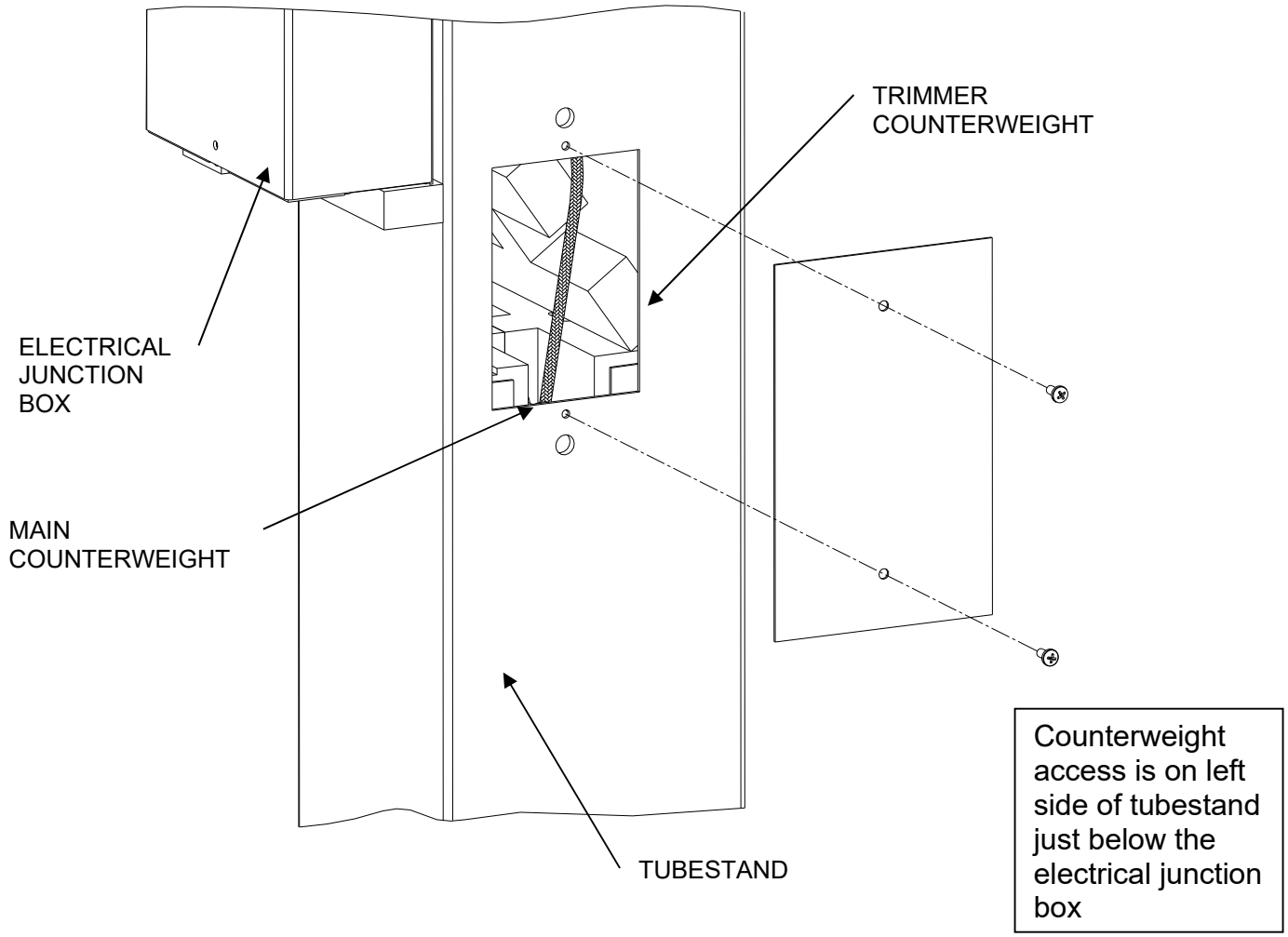

FIGURE 10: ADDING OR SUBSTRACTING COUNTERWEIGHT

I. BEAM ALIGNMENT PROCEDURE, ACCESS TO 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 J** below for a description of access and adjustment to raise or lower the transverse arm.

3. Verify tracking in the vertical plane.
    a. 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.

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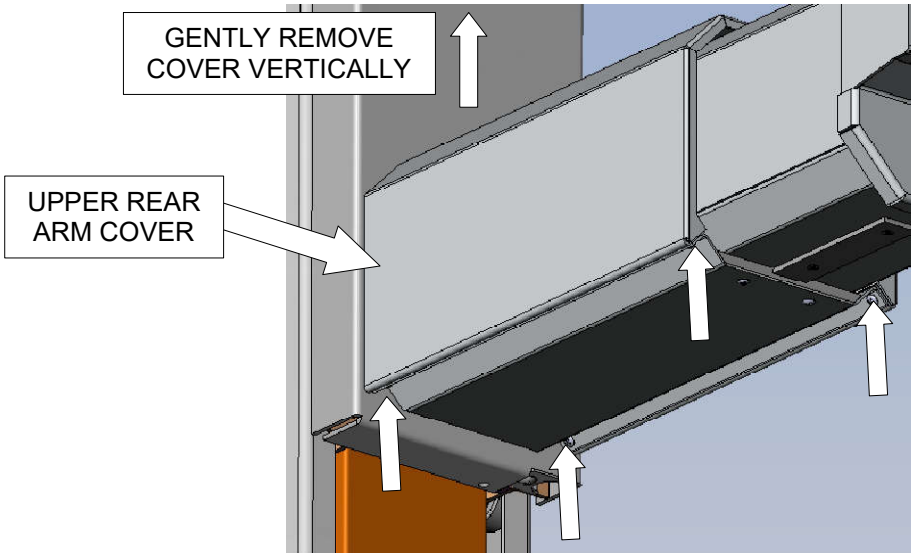
Note

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.

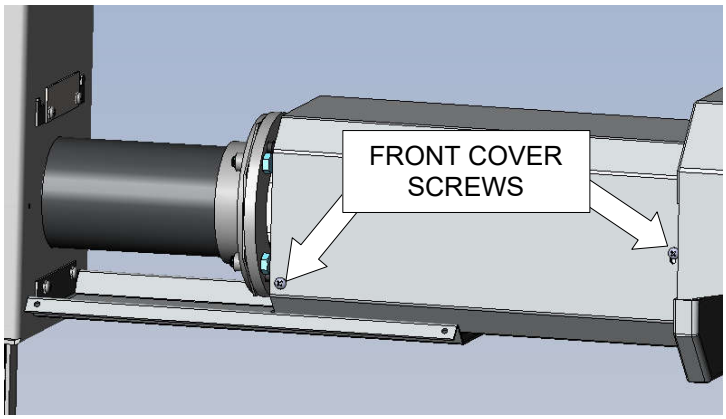
    f. If the centerline of the light field moves towards the tubestand wall when moving the column from 40 to 72-inch SID, the arm needs to move "outward". Make the adjustment as described in **Section J** below, and repeat steps "a" through "f" until a stationary centerline is achieved.
    g. If the centerline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

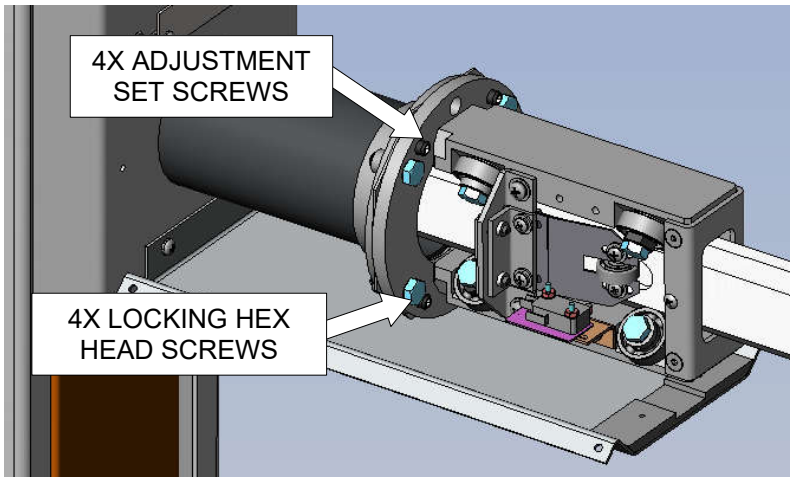
J. TRANSVERSE ARM ADJUSTMENT

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.

K. SOURCE-TO-IMAGE DISTANCE (SID) LABELING

1. Vertical SID Labeling

Install the pointer as shown in ***Figure 11*** with two each #6 screws and lock washers.

Move the vertical carriage to achieve 40” from the table top plane to the focal spot (see ***Figure 12b***). Install the vertical SID label titled “TABLE TOP” aligned with the pointer as shown in Figure 1. Move the vertical carriage to achieve 40” distance from the horizontal bucky image plane to the focal spot (see ***Figure 12a***). Install the vertical SID label titled “IMAGE (GRID)” aligned with the pointer.

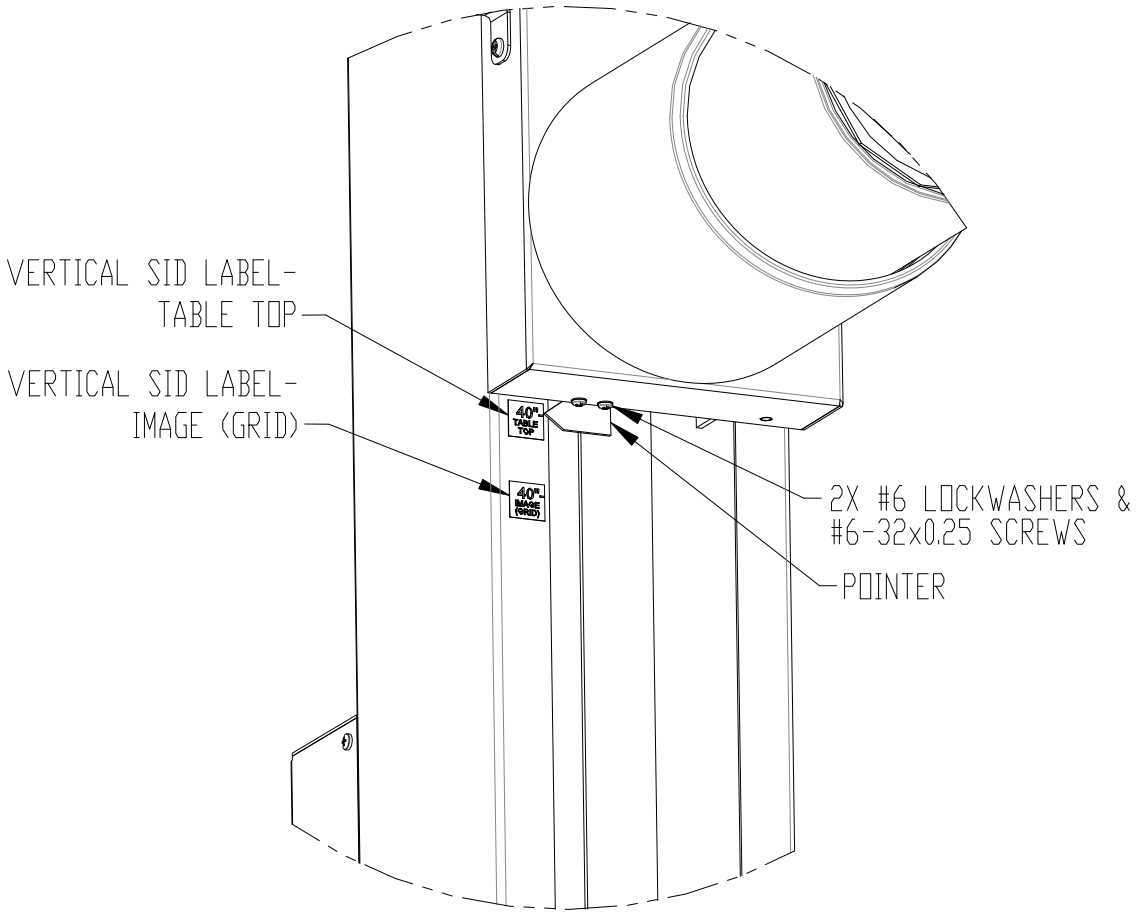


FIGURE 11

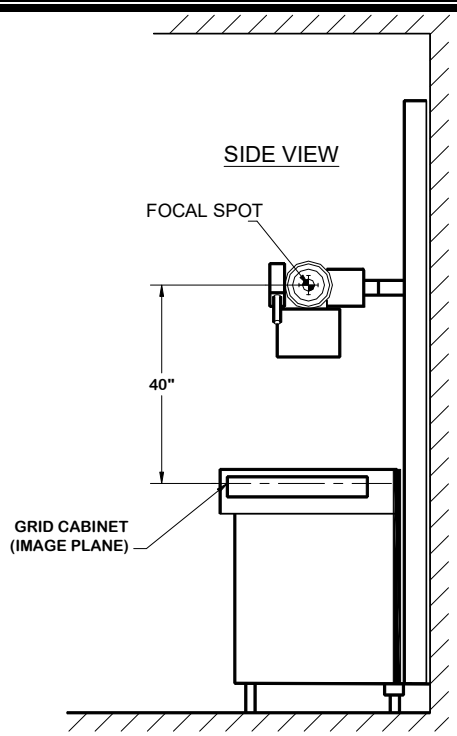


FIGURE 12A

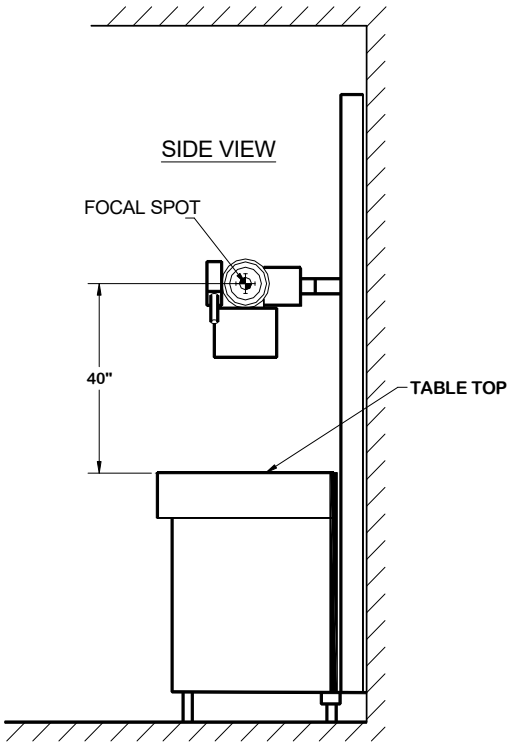


FIGURE 12B

2. Horizontal SID Labeling

Install the pointer plate on the desired side (see ***Figures 13 and 14***) to the tapped holes on the upper pivot bracket using two each #6 screws and lock washers provided. Apply arrow label to the plate pointing upward as shown. Note the plate position adjusts vertically so start with screws centered on the slots.

Position the tubestand horizontally to achieve 40” between the vertical wallstand bucky image plane and the tube focal spot (see ***Figure 15***). Apply the horizontal SID label “40” to the upper rail aligned with the arrow label. Position the tubestand horizontally to achieve 72” between the vertical wallstand bucky image plane and the tube focal spot. Apply the “72” label to the upper rail aligned with the arrow label.

Note 40” and 72” are most common. 36” and 48” labels are also provided. Repeat the above procedure using these distances if labeling is desired at these locations.

Make final adjustments to the arrow bracket height for visibility from the operator’s position.

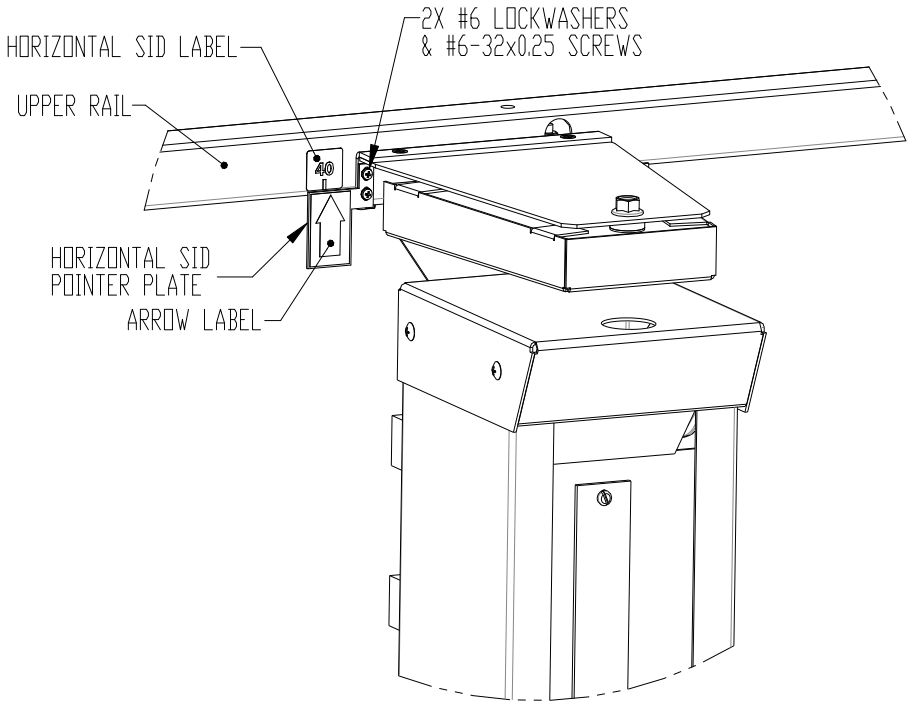


FIGURE 13

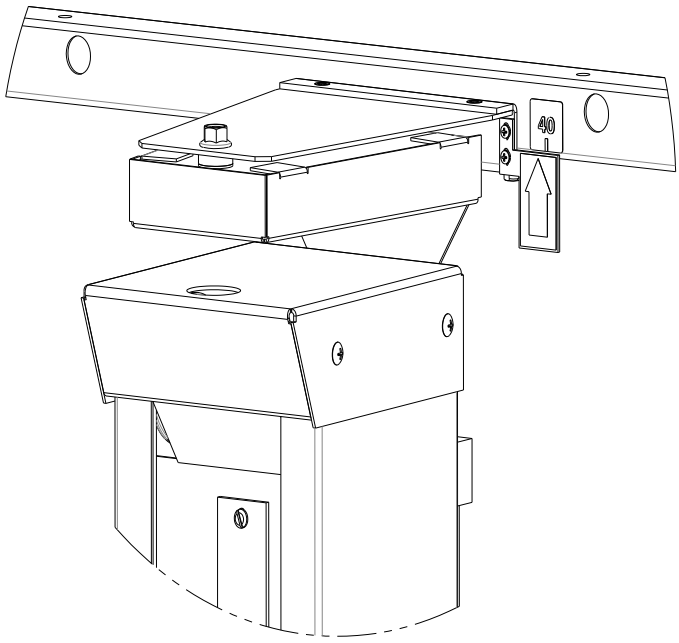


FIGURE 14

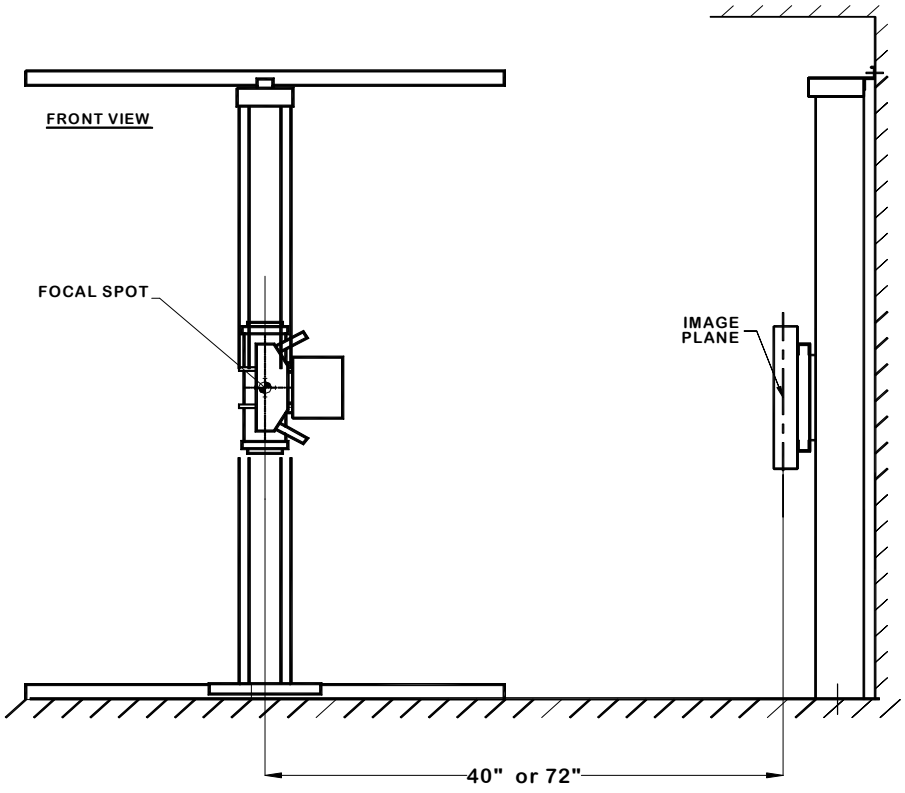


FIGURE 15

L. SOURCE-TO-IMAGE DISTANCE (SID) SWITCHES

THIS SECTION IS NOT APPLICABLE FOR THE ALTERNATE ANGULATION BOXES

1. Vertical SID switch

The vertical SID switch must be actuated when the focal spot is 40" ± 2% (0.8") above the image plane within the table. The tube stand comes equipped with a switch that lights an SID indicator on the angulation box. 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 (mounted on the slide assembly) triggers at this location (see ***Figure 16***).

If the switch does not properly actuate as it travels over the ramp, adjust the distance between the switch and ramp using the screws that fasten the switch to the vertical lock magnet.

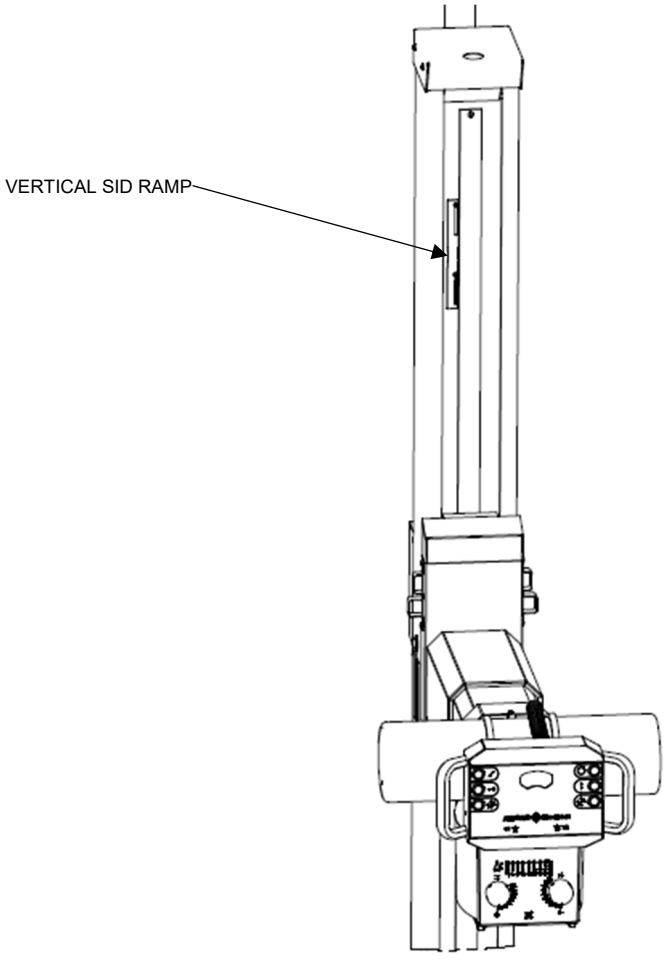
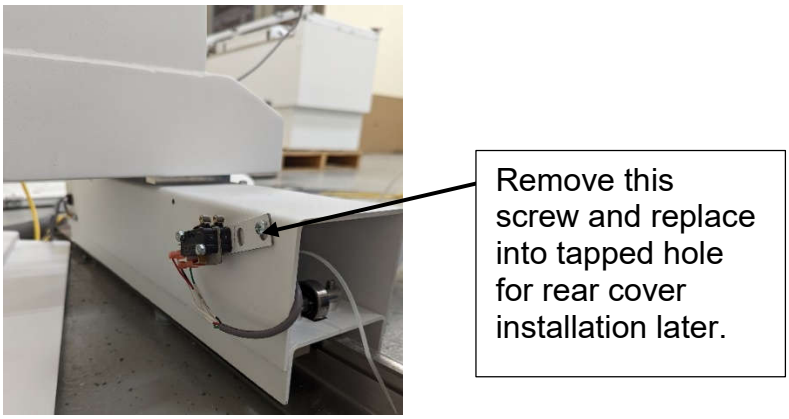


FIGURE 16: VERTICAL SID RAMP

2. Horizontal SID Switches

The switch assembly contains two horizontal SID switches.

Remove switch assembly from its shipping position on the back of the floor car (see image below), and place at the front of the floor car with the two screws stored in the switch mounting holes (see ***Figure 17)***.



With the beam horizontal, measure the appropriate distance (both 40 and 72 inches) from focal spot to image plane in the wall receptor. The inside switch (closer to the wall) will trigger the 40” SID, and the outside will trigger 72” SID. Secure each actuator ramp to the floor rail in the path of the selected switch so that it is actuated at the measured distance (see ***Figure 17)***.

Confirm the correct angulation box lights turn on when the switches roll over the ramps for 40-inch SID and 72-inch SID. If switches do not actuate over the ramps properly, adjust the height through the screws connecting the switch assembly to the floor car.

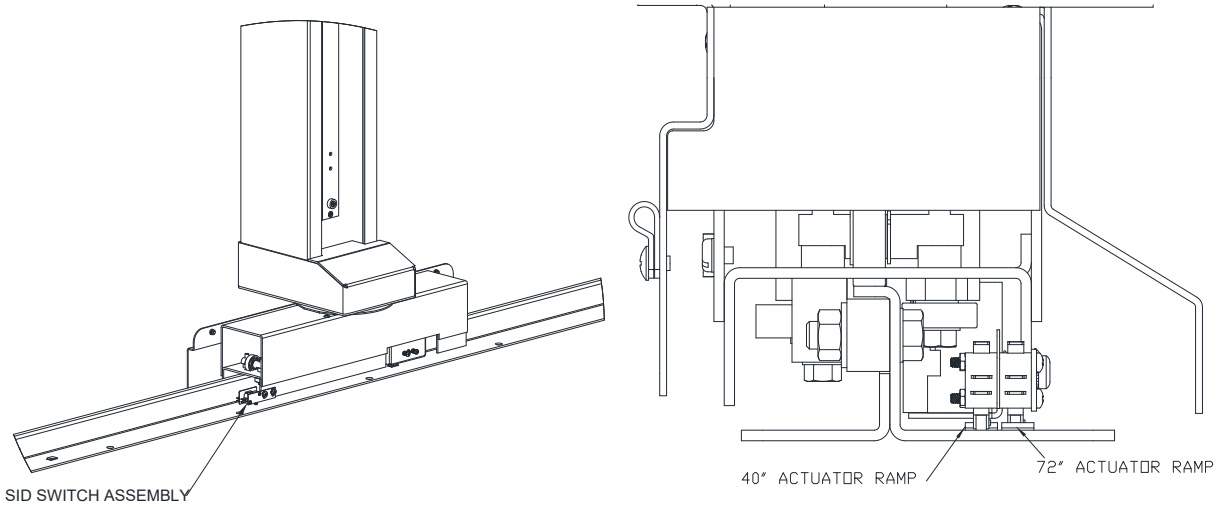


FIGURE 17: INSTALLATION OF HORIZONTAL SID SWITCHES AND ACTUATORS

M. FLOOR CAR COVER INSTALLATION

1. Rear Cover

Remove four mounting screws from the rear of the floor car (see ***Figure 18***) and use to secure the rear cover in place. Remove the screw securing the p-clamp shown, route the cables terminating at the floor car through the clamp, and replace the screw. Adjust the rotational position of the clamp and tighten the screw.

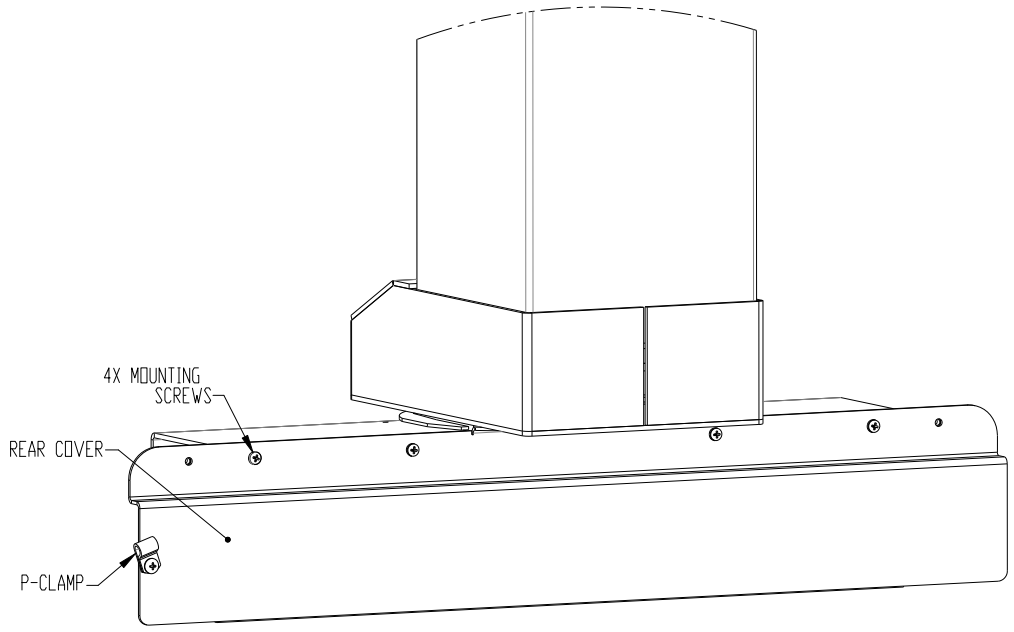


FIGURE 18: INSTALLATION OF REAR FLOOR CAR COVER

2. Front Cover

Remove the two mounting screws from the top of the floor car (see ***Figure 19***). This will require rotating the column approximately 30º in each direction for access. Remove the two screws from the back side of the front cover itself. Slide the front cover between the floor car and the column front to back, centering the opening on the column. Replace the top screws to secure in place, again rotating the column 30º in each direction for access to the top mounting holes. Replace the rear screws, attaching the front cover to the rear cover.

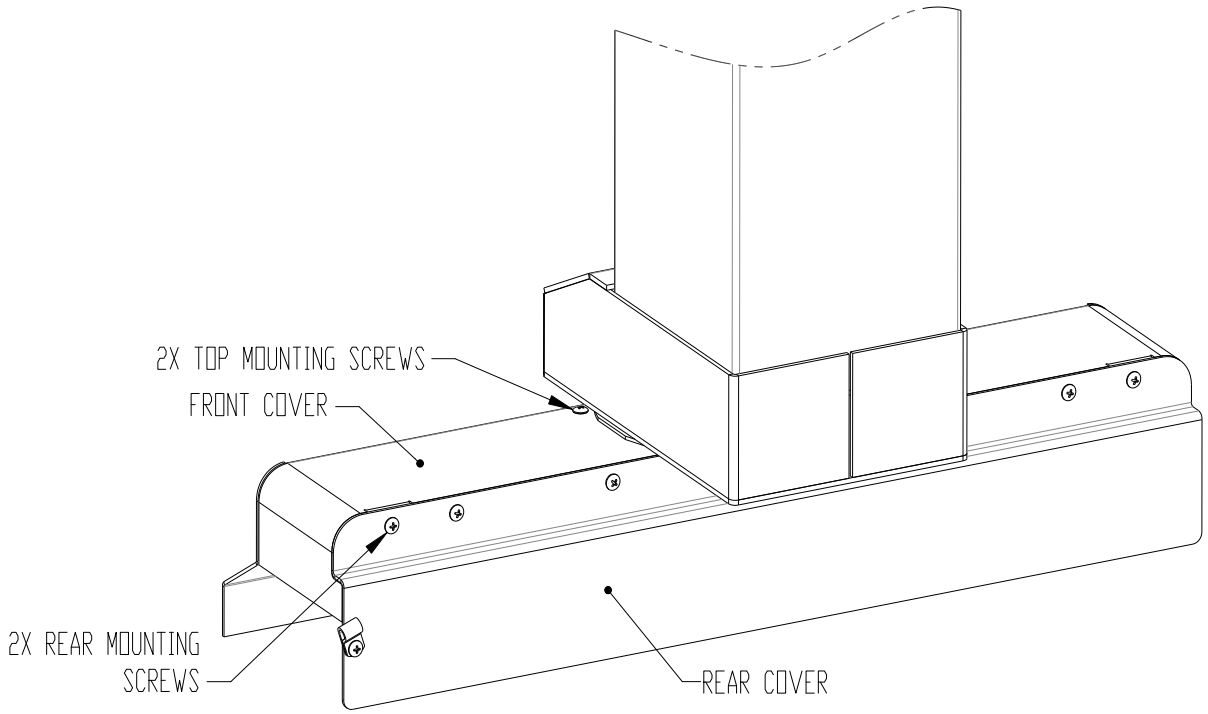


FIGURE 19: INSTALLATION OF FRONT FLOOR CAR COVER

IV. BASIC MAINTENANCE

The following schedule of maintenance is required for safety of operation, continued ease of use, and continued long life of the product.

The maintenance program should be performed only by qualified and authorized service personnel. Frequency of the service should be 30 days after installation and annually thereafter unless indicated otherwise by local codes and regulations.

A. TUBESTAND

Check alignment (x-ray beam to film or receptor).

Inspect counterweight cables for fraying, damage, or wear.

Inspect all tubestand movements for binding or interference, check all bearings for proper operation.

Check all fasteners for tightness including the floor rail fasteners, wall/ceiling rail fasteners, and tubearm screws.

Verify the travel stops are in good functional condition.

Verify the locks are working properly.

Check the SID markers as required.

Inspect cabling for damage.

B. COLLIMATOR

Verify accuracy of field size.

Verify accuracy of light field to x-ray field alignment.

Check lamp on-off switch for proper operation.

Inspect collimator cable for fraying or damage.

C. X-RAY TUBE

Inspect the housing for possible oil leakage.

Assure that the housing is tightly fastened to the tube mount and collimator.

Inspect stator cable for fraying or damage.

Inspect high voltage cable ends for carbon tracking. Clean and re-grease HV Cable ends annually.

V. ELECTRICAL SCHEMATIC FOR S225 TUBESTAND

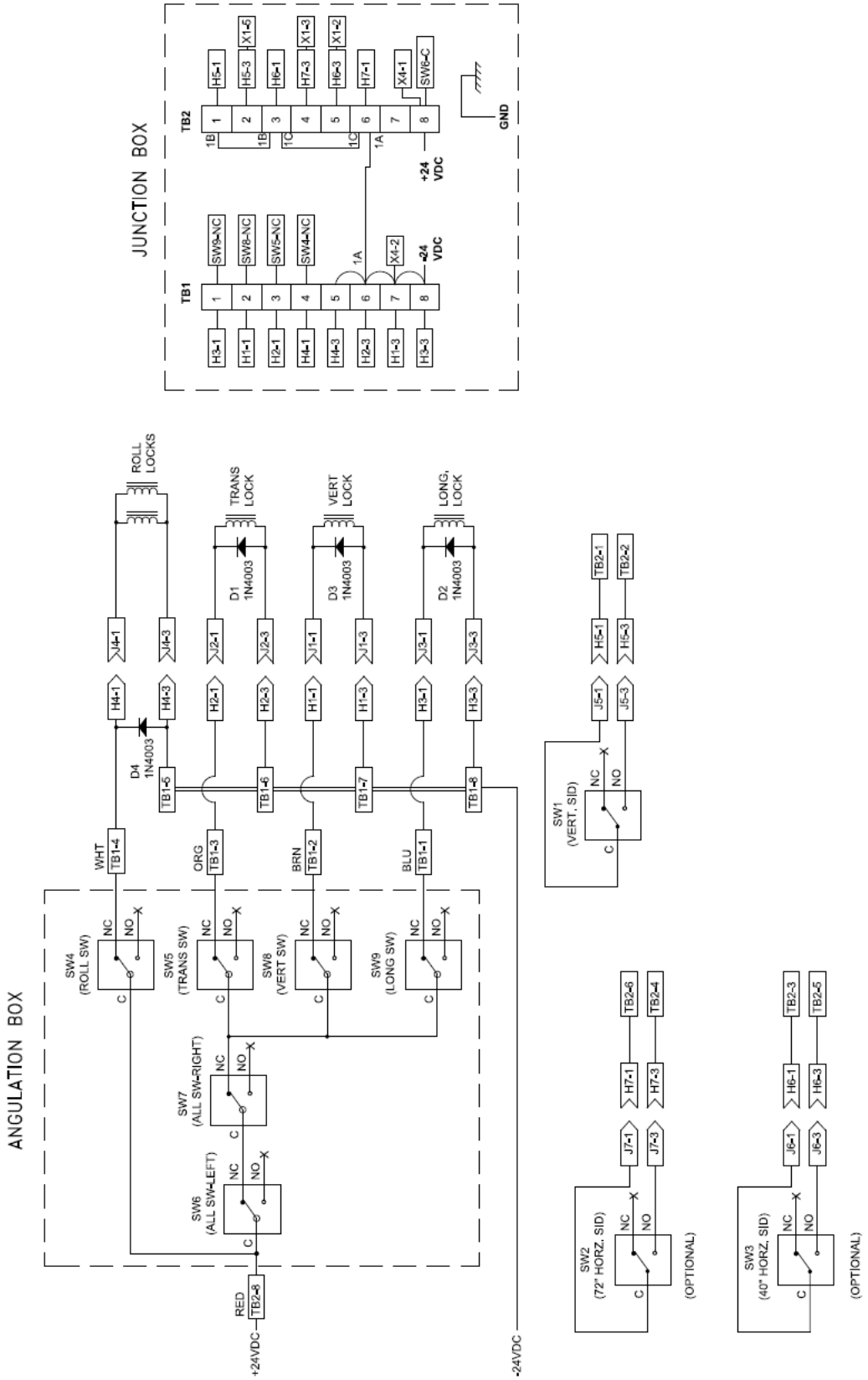


FIGURE 20: ELECTRICAL SCHEMATIC

VI. REPLACEMENT OF THE VERTICAL LOCK MAGNET ASSEMBLY

To replace the vertical lock magnet assembly, remove the two cover mounting screws (see ***Figure 21***) 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.

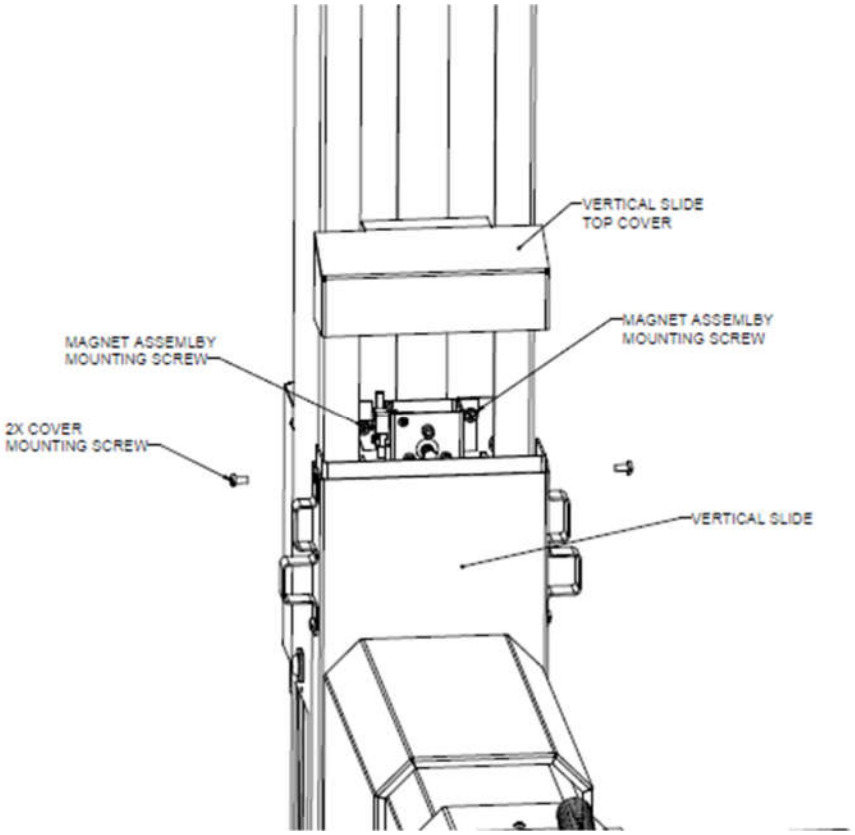
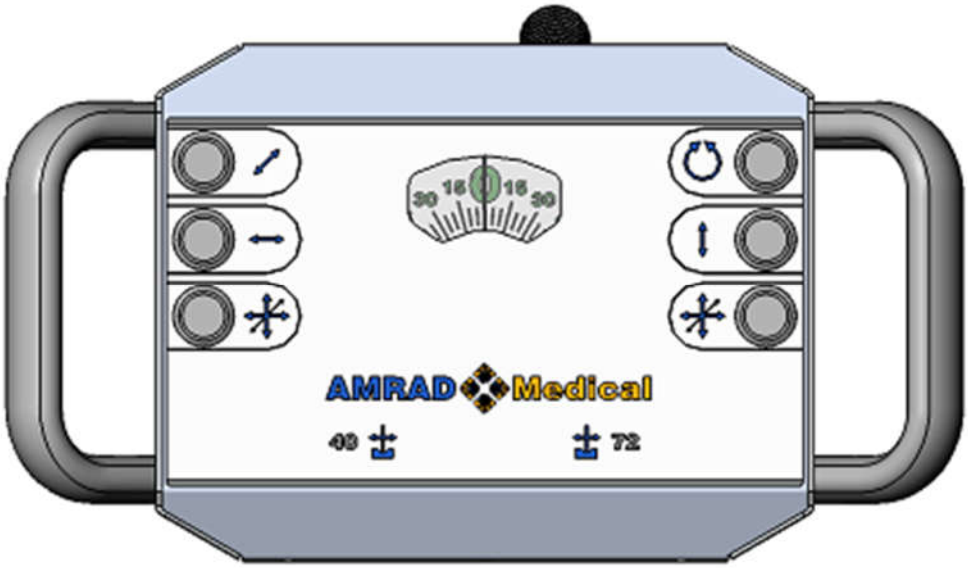


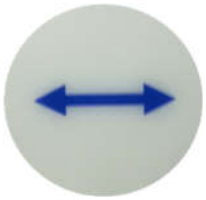
FIGURE 21: VERTICAL LOCK MAGNET ASSEMBLY

VII. OPERATION

A. BUTTONS AND DISPLAY INDICATORS



Buttons

Symbol	Name	Description
	**Longitudinal Lock Release**	Depress this button to release only the longitudinal lock and move the tubestand horizontally. Release to lock.
	**Transverse Lock Release**	Depress this button to release only the transverse lock and move the tube in and out. Release to lock.
	**All Lock Release**	Depress this button to release all electromagnetic locks that secure all Tube Stand motions (except the “ROLL” motion). The x-ray tube may now be moved in any direction, including vertical. Release the switch to re-engage all locks.
	**Roll Lock Release**	Roll is rotation of the tube about the arm axis. Depress the button to release the lock and roll the x-ray tube to the desired position. Mechanical detents are provided at 0° and at 90° increments. Release to lock.

Symbol	Name	Description
	**Vertical Lock Release**	Depress this button to release only the vertical lock and move the tube up or down. Release to lock.

Display Indicators

	**40” Horizontal/ Vertical SID Indicator**	Illuminates when the x-ray tube head is rotated to face the wallstand and the focal spot is 40” from the image plane.
	**72” Horizontal SID Indicator**	Illuminates when the x-ray tube head is rotated to face the wallstand and the focal spot is 72” from the image plane.
	**Dial Indicator**	Displays the relative angle at which the collimator is to the table top or wallstand.

B. CROSS TABLE SHOT INSTRUCTIONS

FIGURE 22: EXAMPLE OF TUBESTAND POSITIONING FOR CROSS TABLE EXPOSURES

For right hip (as shown):

Roll the tube clockwise 90º so that the beam is horizontal. Loosen the trunnion mount and turn the tube to its maximum (15º) towards the tubestand. Rotate the tubestand counterclockwise until the desired angle is achieved. Position the tube vertically.

For left hip (not shown):

The patient should be positioned opposite from the position shown in ***Figure 22***.
Roll the tube counterclockwise 90º so that the beam is horizontal. Loosen the trunnion mount and turn the tube to its maximum (15º) towards the tubestand. Rotate the tubestand clockwise until the desired angle is achieved. Position the tube vertically.