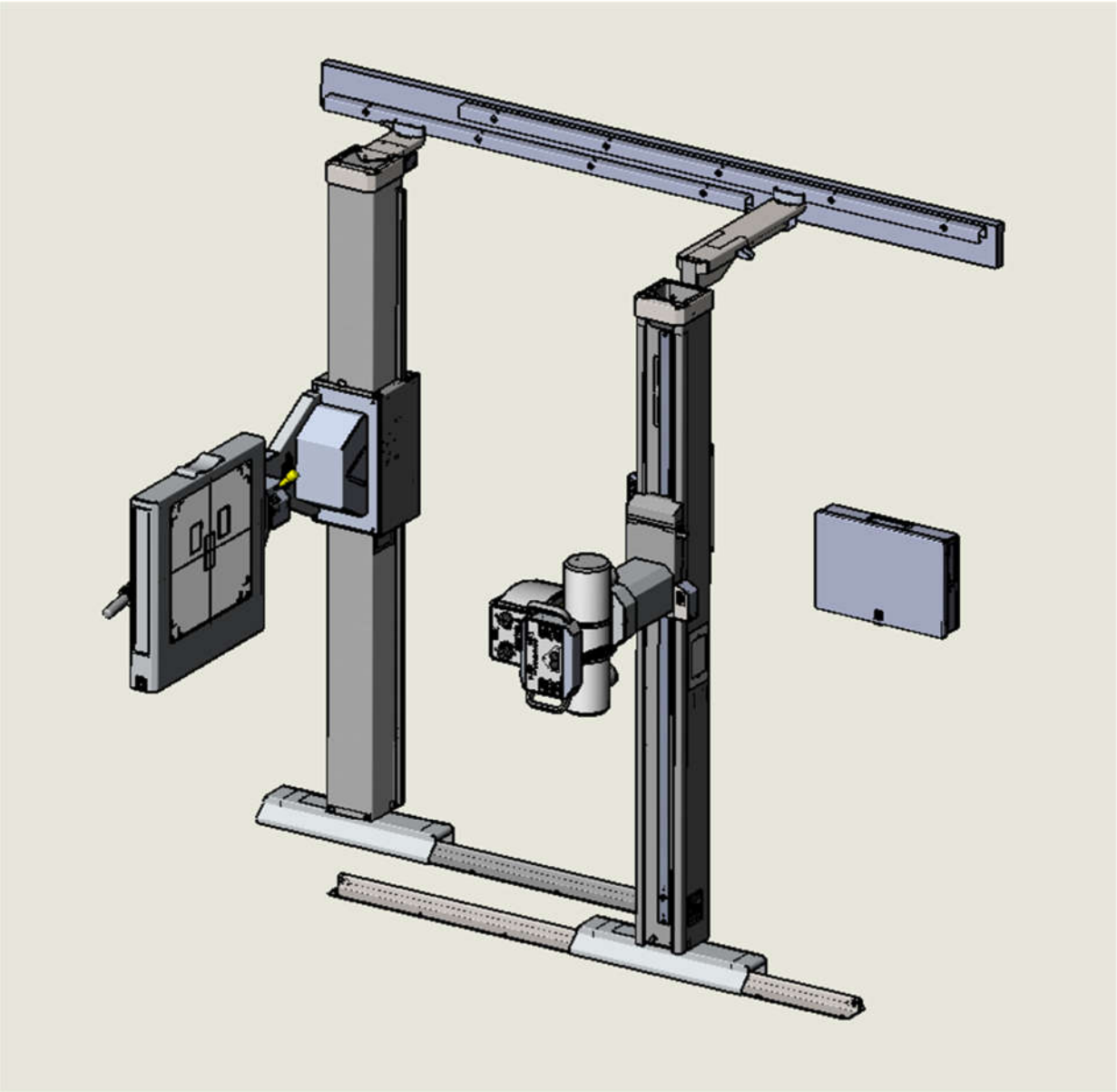
SRS Pocket

Installation and Operation Manual

09375 Rev B



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Revision History

Rev	Description	ECR	Released
A	Production Release	11010	Jun 2022
B	Added torque value to nuts and warning in Section 3.8, sheet 14; Added Blue Loctite to screws in Section 3.18.2 (A), sheet 22.	11619	May 2025

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1. GENERAL INFORMATION

1.1. Introduction

The SRS Pocket is a moveable support device for an x-ray tube and collimator paired with a moveable support device for an x-ray detector. The unit can be used for all general-purpose diagnostic techniques.

This equipment is compatible with certified tube housing assemblies, x-ray controls, x-ray high voltage generators, cassette holders, and beam-limiting devices. The tubestand and wallstand will not affect regulatory compliance of these components when these components are installed, connected, and adjusted in accordance with the applicable manufacturer's instructions and specifications.

1.2. Definition of Symbols Used on the Equipment

Symbol Legend	
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 device 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.
	Safety Label

1.3. Notices/Safety

1.3.1. Service and Operation

CAUTION

THIS MANUAL IS FOR USE BY PERSONNEL QUALIFIED TO INSTALL, MAINTAIN, AND OPERATE THIS EQUIPMENT.

Only qualified personnel should install, maintain, and operate this equipment. Familiarize all operators with how to use the equipment properly. Only qualified service personnel should remove electrical covers.

The manufacturer does not accept responsibility for any of the following:

- Equipment improperly installed, operated, maintained, or repaired.
- Equipment which has been modified in any way.
- Harm to patient or other personnel for any of the above causes.

WARNING

X-RAY EQUIPMENT CAN BE DANGEROUS TO BOTH PATIENT AND OPERATOR UNLESS PROPER SAFETY MEASURES ARE OBSERVED.

All operators of this equipment should be familiar with regulations and recommendations of industry authorities. These can include:

- State Department of Health
- Code of Federal Regulations (21 CFR subchapter J Radiological Health)
- National Council on Radiation Protection and Measurements (NCRP 33 or successor)
- International Commission on Radiological Protection (ICRP 26 or successor)

1.3.2. Radiation Protection

Adequate precautions must be taken to prevent unauthorized or unqualified persons from operating this equipment or exposing themselves or others to its radiation.

All operators of this equipment are to comply with regulations and recommendations of industry authorities (see list, previous section).

The manufacturer, its agents, and representatives do not accept any responsibility for overexposure of patients or personnel to x-ray radiation, including that which is the result of poor operating techniques or procedures.

1.3.3. Servicing the Product

WARNING

REMOVING ACCESS PANELS CAN EXPOSE MOVING PARTS AND HIGH VOLATAGES THAT CAN CAUSE SERIOUS INJURY. DISCONNECT POWER PRIOR TO SERVICING AND WEAR PROTECTIVE EYEWEAR.

Only properly trained and qualified personnel shall access any internal parts of the x-ray equipment.

1.3.4. Intended Use

The SRS S114 is a diagnostic x-ray tube mount intended for use by a qualified/trained physician or technician in general radiographic images of human anatomy for adults and pediatrics in all general-purpose diagnostic procedures in a clinical environment.

The SRS S114 is not intended for mammography, angiography, interventional, or fluoroscopy use.

The SRS J1000 is a mechanical device intended to hold and position an x-ray image receptor during a radiographic procedure.

1.3.5. Attenuation

All included components between the patient and image receptor have been certified to comply with 21 CFR Chapter 1 Subchapter J (§1020.30). For any such components added to the equipment it is the responsibility of the installer to ensure compliance.

1.3.6. Estimated Useful Product Life

This product has an estimated useful life of 15 years from the date of manufacture. Repair costs and technical obsolescence generally prohibit maintaining the equipment beyond that point.

1.3.7. Cleaning

The manufacturer recommends disinfection of the equipment between uses for any surfaces that may come in contact with the patient during a radiographic procedure.

1.4. Specifications

SPECIFICATION SUMMARY TABLE	
Electrical Ratings (Nexus Box)	100-120V 50/60 Hz 0.8A or 200-240V 50/60 Hz 0.4A (Selectable)
Maximum Tube and Collimator Load	75 lbs (34 kg)
Maximum Image Receptor Load	30 lbs (13.6 kg)
Environmental conditions for operation	*Temperature*: 50° F to 104° F (10° C to 40° C) *Relative humidity*: 30% to 75%, non-condensing *Atmospheric pressure*: 70.0–106.0 kPa
Environmental Conditions for transport, storage, and operation	*Temperature*: -4° F to 122° F (-20° C to 50° C) *Relative humidity*: 10% to 100%, non-condensing *Atmospheric pressure*: 50.0–108.0 kPa
Information regarding potential EMC interference and advice for avoidance	• Main 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 (No protection)
Degree of protection against electric shock	Class I, Type B Applied Parts 
Compliant regulatory and design standards	UL 60601-1 CAN/CSA C22.2 No. 601.1, CAN/CSA C22.2 No. 601.2.32-98 X-RAY EQUIPMENT IEC 60601-2-32:1994
Equipment not suitable for use with flammable anesthetic mixture with air or with oxygen or nitrous oxide.	

1.5. Shipment and Handling

Exercise caution when moving and unpacking equipment.

Once delivered, inspect the product for evident and concealed damage. It is the responsibility of the dealer to make all shipping claims as all equipment is shipped FOB from the factory.

If it is necessary to store the product before delivery to the installation site select a dry location with moderate temperatures.

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

2. PRE-INSTALLATION INFORMATION

Due to the weight of the column assemblies, additional personnel may be necessary to safely lift and position them on the floor rails. Each installation site is different--verify that the actual site allows fit and travels of the equipment.

Conventional radiographic room construction should be used. Consult the State Health Department and local building codes for specific radiation shielding requirements.

2.1. Equipment Dimensions and Layout

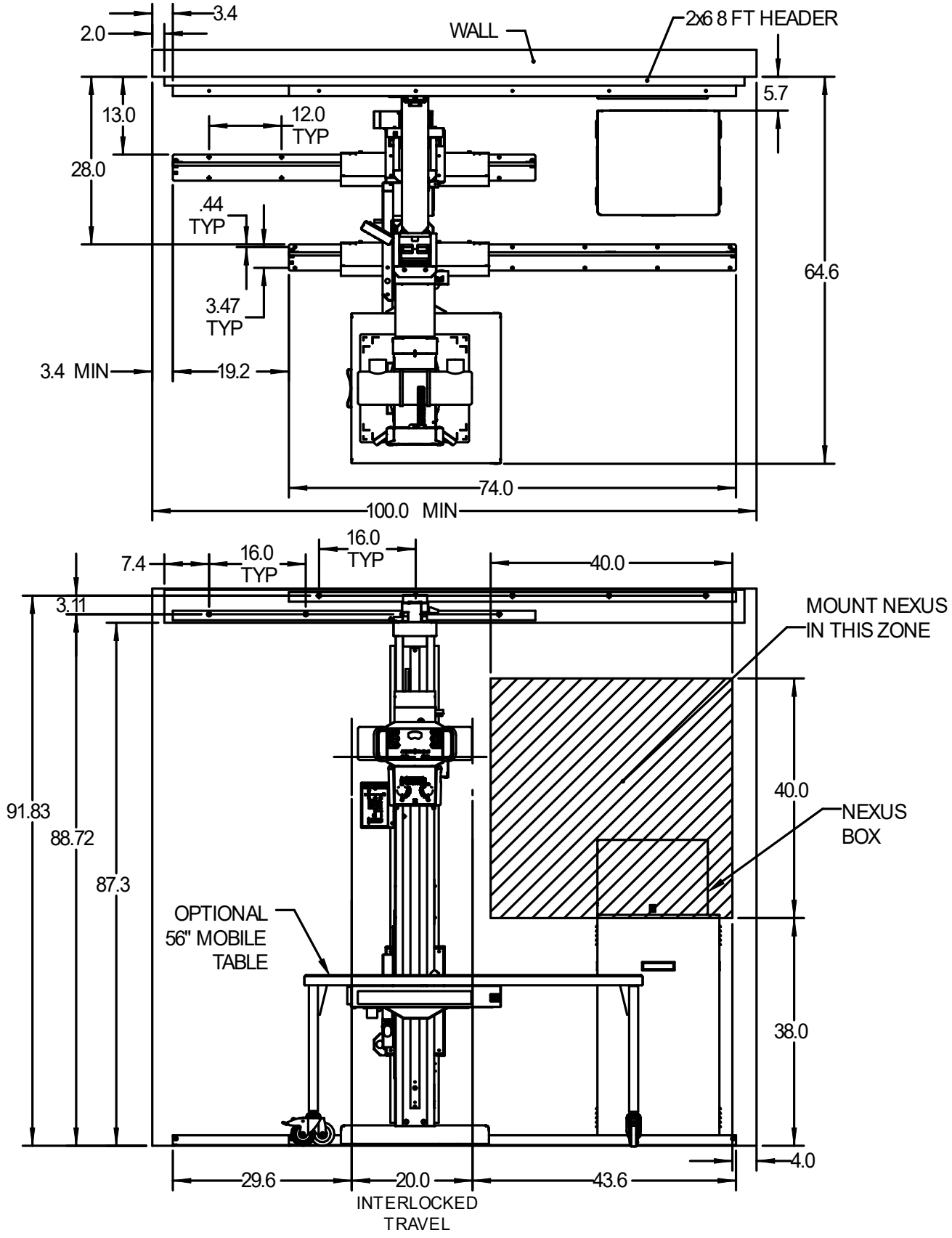

Figure 2-1 Shoot Left Equipment Layout

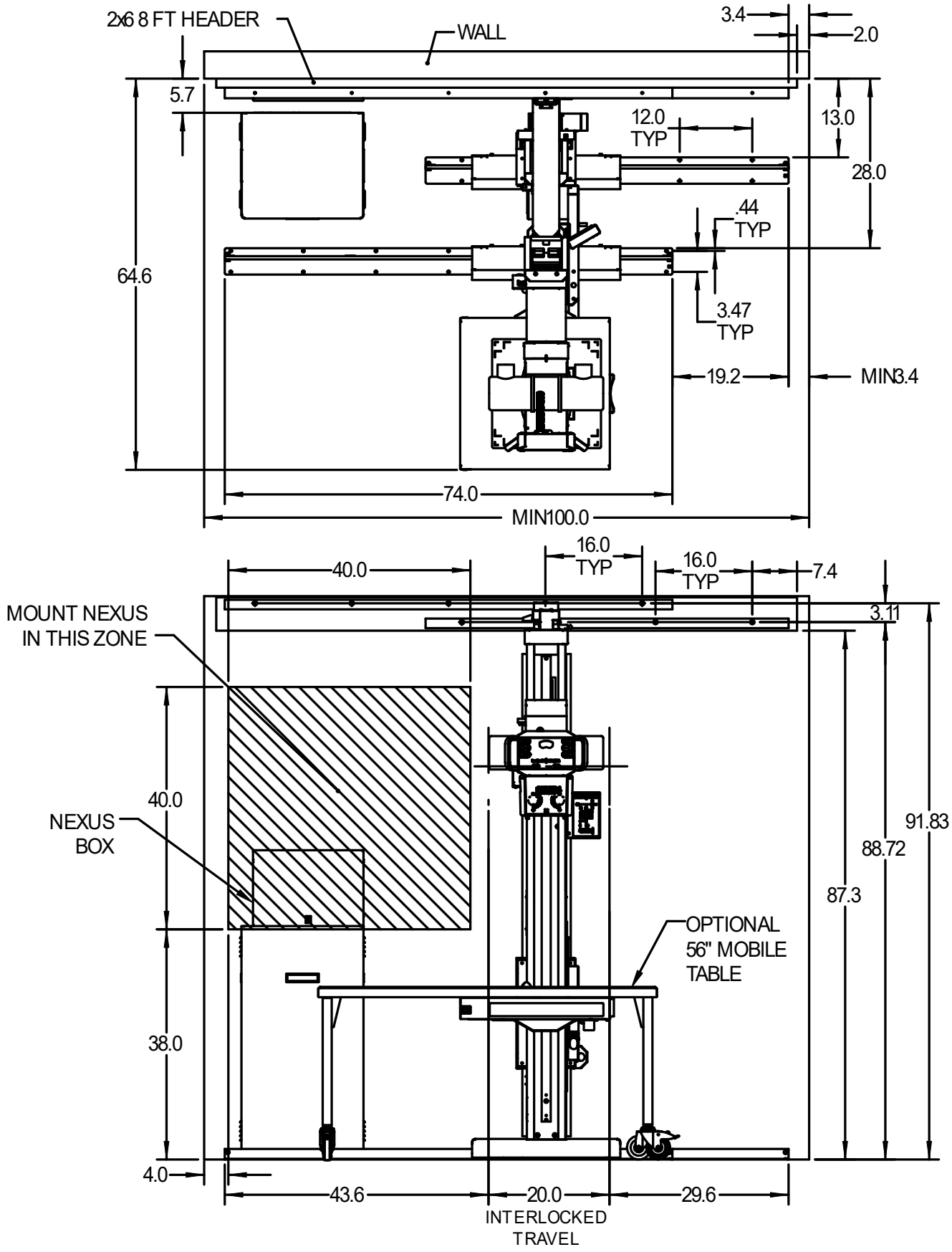

Figure 2-2 Shoot Right Equipment Layout

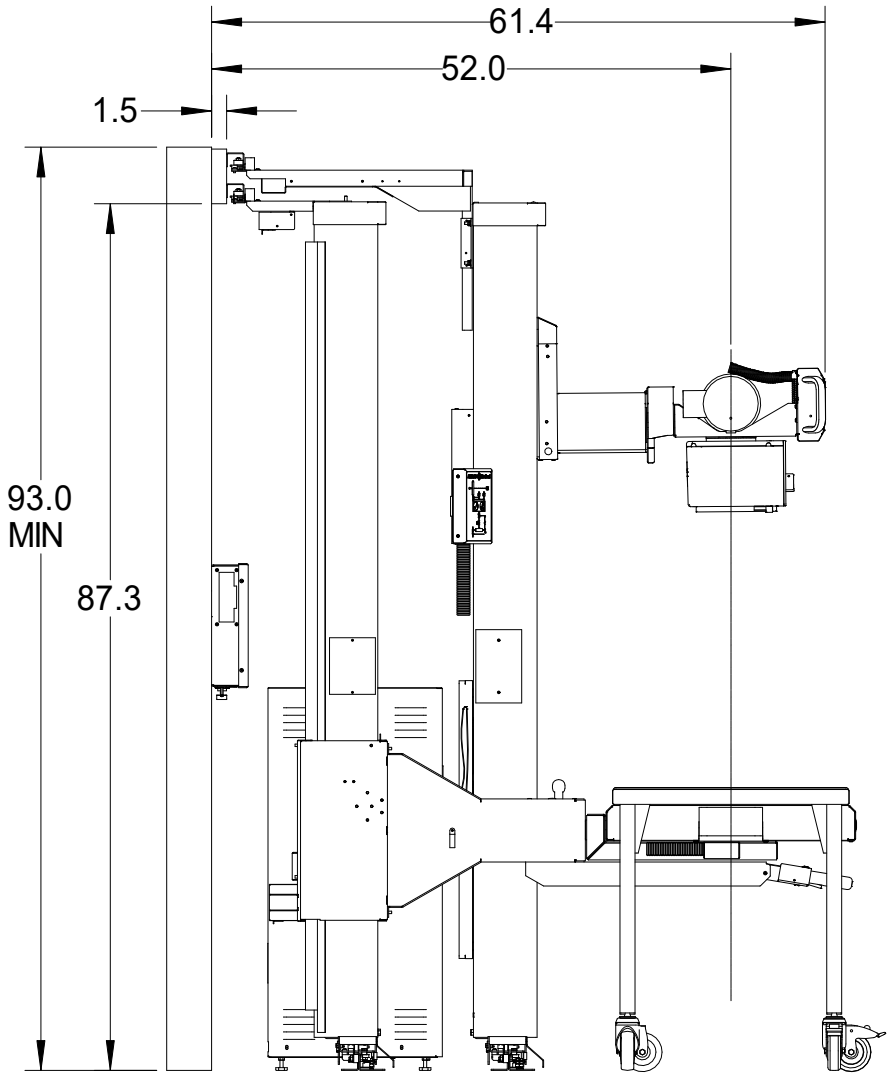

Figure 2-3 General Equipment Dimensions

2.2. Floor Preparation

The floor rails need to be level within ±1/16 laterally (front to back) and longitudinally (left to right). If the floor under the floor rail is very uneven it is recommended to apply a hardening leveler to the floor before installation to avoid a large number or shims and a large gap between the rail and the floor.

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NOTE

For best performance of the devices DO NOT install the lower rails on a compressible surface/material such as carpet with padding.

2.3. Power

The SRS nexus power supply requires 115/230 VAC 50/60 Hz power (See section 1.4 for current requirements). A 20-ft power cable with USA 115VAC wall plug is provided. Be sure there is an outlet available close enough to the installation location.

The Nexus box has a standard IEC320 power inlet. If a non-USA or USA 230 VAC power cord is required it must be sourced by the equipment installer.

2.4. ESD-Sensitive Components

The internal PCB assemblies contain ESD-sensitive components. Wear an anti-static wrist strap connected to earth ground when coming in contact with any PCB or any cable connected to a PCB.

CAUTION

ESD into one of the PCB assemblies or to a cable connected to a PCB could damage the PCB and disable the equipment.

2.5. Unpack and Inventory

Check the hardware received against the order packing list. Confirm presence of all accessories and the angulation box. Call technical support to report any missing or damaged items.

3. 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.

3.1. Position and Mount the Floor Rails

The floor rails are the first components to be installed. Refer to figure 2-1 or 2-2. They must be positioned properly relative to each other and the back wall as well as leveled to achieve proper X-ray beam alignment.

NOTE

The distance of the tubestand rail (74" long, outside) from the back wall is critical.

3.1.1. Anchors/Hardware

Floor mounting screws or anchors are not supplied. Please source appropriate anchors for the flooring material.

3.1.2. Mount the Floor Rails

Position rails properly and drill holes or prepare floor for fasteners selected.

Paper templates for shoot left and shoot right are included with the equipment to assist with floor rail installation. If using at template select, measure, and place the proper distance from the wall and tape in place. Use the template hole locations to drill anchor/mounting holes in the floor.

Insert an anchor or start a screw in each of the holes, but DO NOT tighten yet. Use the shims supplied to level the floor rail in all directions. Tighten enough to hold position at this time but do not fully torque in case adjustments are necessary during component alignment.

3.2. Mount the Wall Rails

Refer to figure 2-1 or 2-2 for proper placement of the wall header and rails. Use appropriate fasteners to secure the upper rails to the wall header. It is important that the wall rails are in the correct position, level, and square in all directions. Shimming may be necessary.

NOTE

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

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NOTE

The vertical height of the wallstand upper rail (60" long, lower of the two) is critical.

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NOTE

The vertical height of the tubestand upper rail (74" long, upper) is not critical because the height of the wall bracket adjusts vertically. It is still very important for the rail to be level.

3.3. Install the SRS J1000 Column

3.3.1. Preparation

The floor car comes factory-assembled to the column with the electrical connections made. Prior to installing the column on the rail detach the magnet and switch assemblies from the floor car by removing their mounting screws. Save hardware to reattach the assemblies after the column is installed on the floor rail.

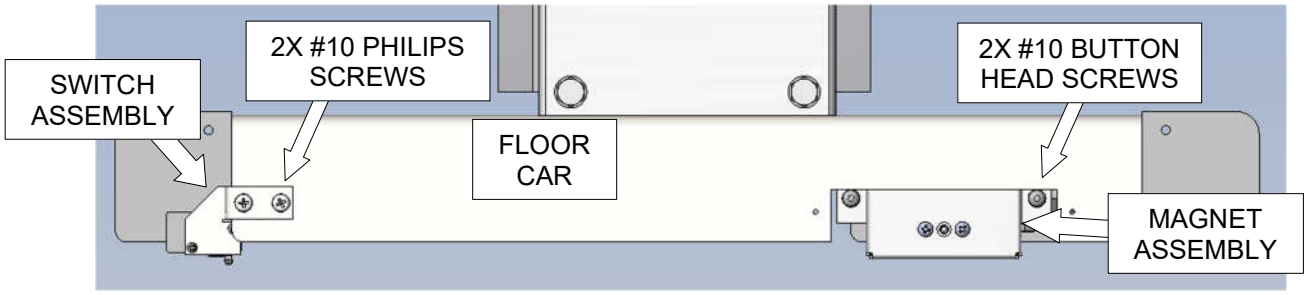

Figure 3-1: Detaching the Magnet and Switch Brackets

CAUTION

Failure to detach the magnet and switch assemblies could result in damage to equipment or the floor when maneuvering the column to install on the floor rail.

3.3.2. Install Column on the Rails

Remove the travel stop from the floor rail on the installation side. Stand the column up and move into position aligned with the floor rail. *Exercise caution with the Nexus (power supply) box to protect it from damage during this process.* Lift the column on the rail side and push to engage the lower bearing assembly (see figure 3-2 for alignment geometry) on the rail. Continue moving the column toward center until the upper bearing assembly engages with the upper rail. Lift again to engage the lower bearings on the outside and roll the column toward rail center.

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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.

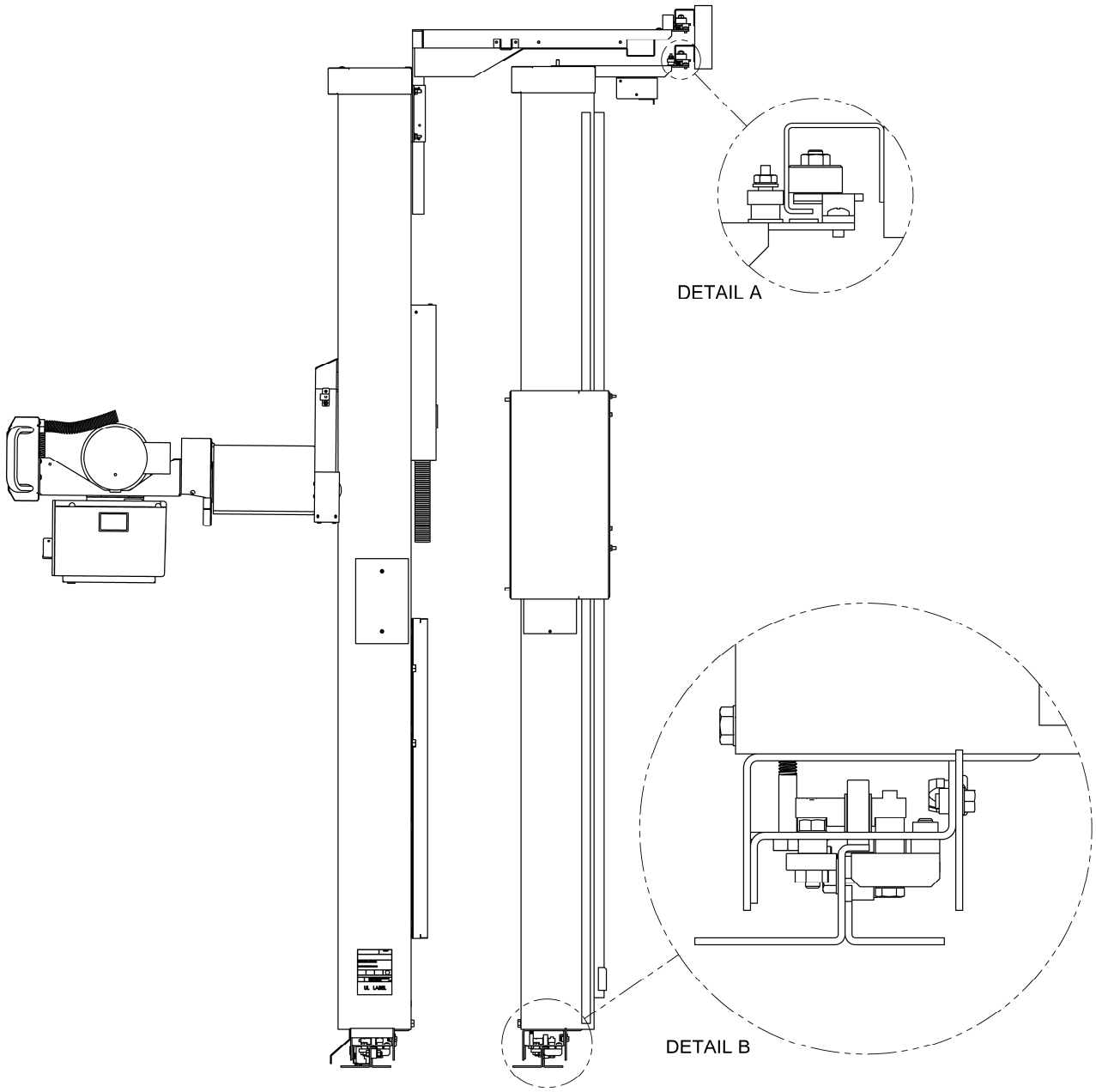

Figure 3-2: Bearing Assembly Engagement with Rails

Reinstall the travel stop removed from the floor rail.

WARNING

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

Once the column is fully and properly engaged to the rails, roll it back and forth along the entire floor rail to verify smooth movement.

Reinstall the horizontal magnet and switch assemblies (figure 3-1), making sure the cable & wires are pushed back up into the floor car and remain clear of the floor rail during operation.

3.4. Install the SRS S114 Column

3.4.1. Preparation

The floor car comes factory-assembled to the column with the electrical connections made. Similar to the SRS J1000, detach the magnet and switch assemblies from the floor car by removing their mounting screws (see figure 3-1 above). Save hardware to reattach the assemblies after the column is installed on the floor rail.

3.4.2. Attach the Wall Arm

Locate the wall arm for the SRS S114. It is shipped detached from the column to facilitate packing. Loosen the 4X mounting screws and nuts holding the clamp assembly to the column. Slide the wall arm assembly down through the clamp assembly. Leave the screws slightly loose until installing the column on the rails.

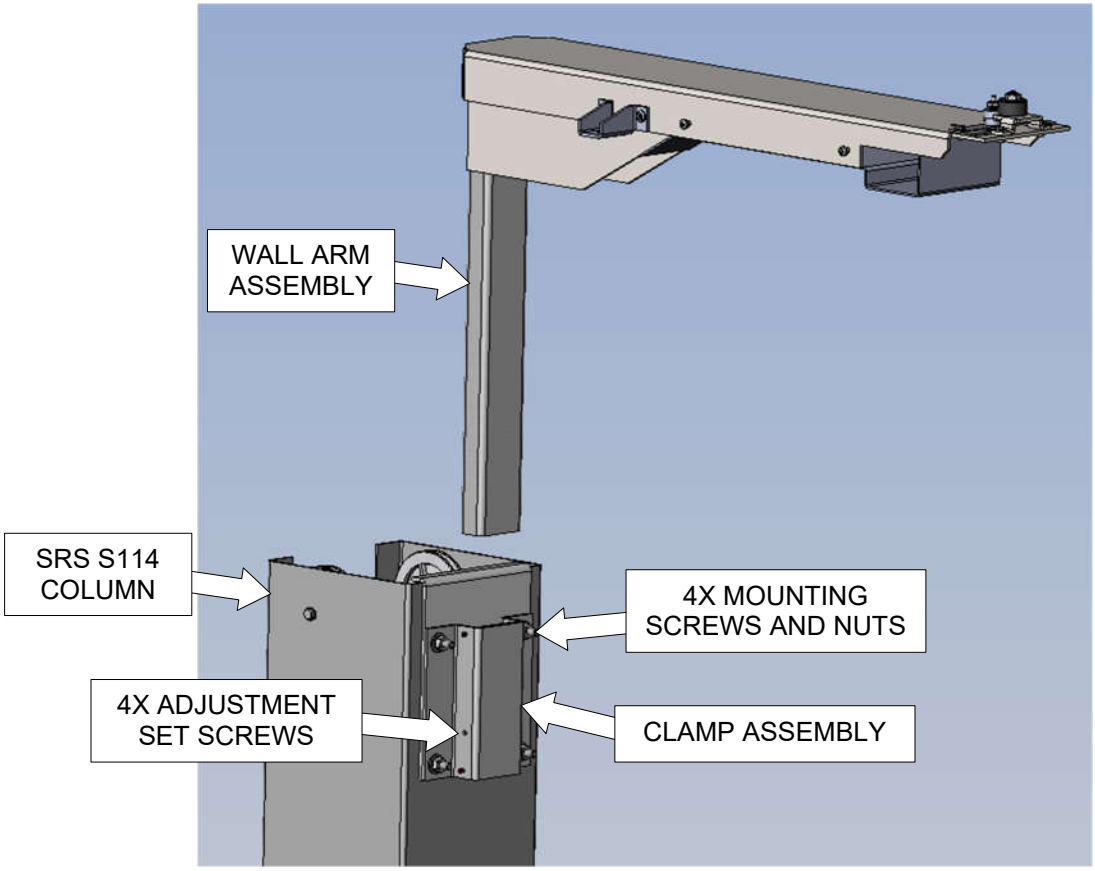

Figure 3-3: Attaching the SRS S114 Wall Arm

3.4.3. Install the Column on the Rails

Remove the travel stop from the floor rail on the installation side. Stand the column up and move into position aligned with the floor rail. Lift the column on the rail side and shift to engage the lower bearing assembly (again see figure 3-2 for alignment geometry). Continue moving the column toward center until the upper bearing assembly engages with the upper rail. Adjust the height of the upper arm assembly if necessary to match the height of the upper rail. Lift again to engage the lower bearings on the outside and roll the column toward rail center. Use the 4X adjustment set screws to make the arm parallel to the column (if necessary). Tighten the 4X mounting screws and nuts once installation is satisfactory.

Reinstall the floor car travel stop.

WARNING

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

Once the column is fully and properly engaged to the rails, roll it back and forth along the entire floor rail to verify smooth movement.

Remove the 4X mounting screws holding the hose guide/cover, route the upper hose as shown (note hose exits the opposite side for shoot left orientation) and goes to the Nexus Box. Reinstall the hose guide/cover.

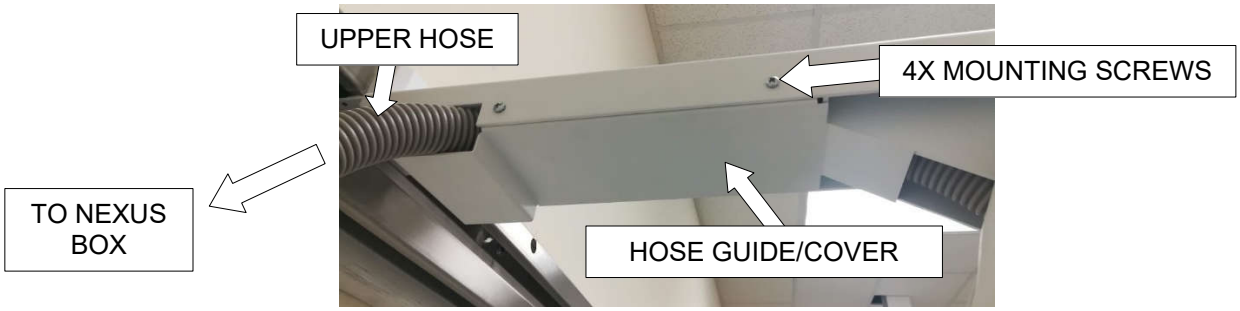

Figure 3-4: Hose Guide/Cover (Shoot Right Orientation Shown)

Reinstall the horizontal magnet and switch assemblies (figure 3-1), making sure the cable & wires are pushed back up into the floor car and remain clear of the floor rail during operation.

3.5. Mount the X-ray Tube and Collimator (SRS S114)

In all applications the tube anode should be up when the tube is aimed at the wallstand. This is conventionally done due to the x-ray tube heel effect.

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. For all mount types, be sure that the lock and potentiometer cables do not get trapped/pinched between the tube port surface and the mounting plate.

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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.

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.

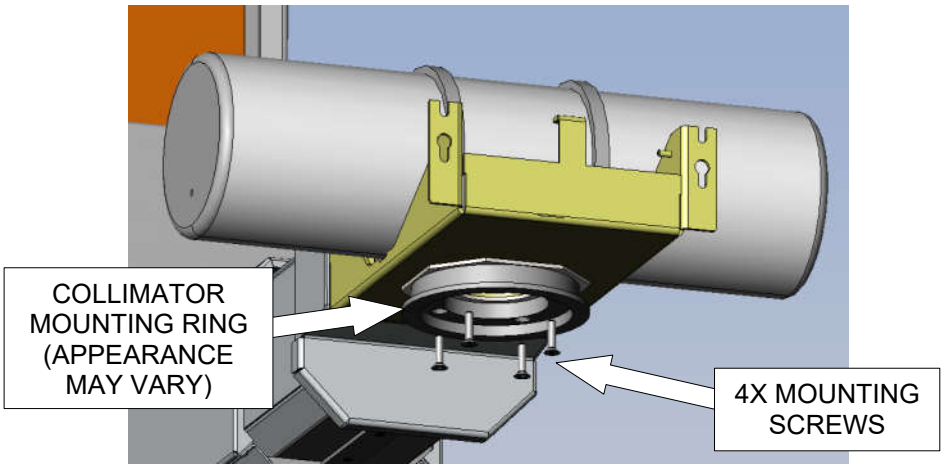

Figure 3-5: Collimator Mounting Ring

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.

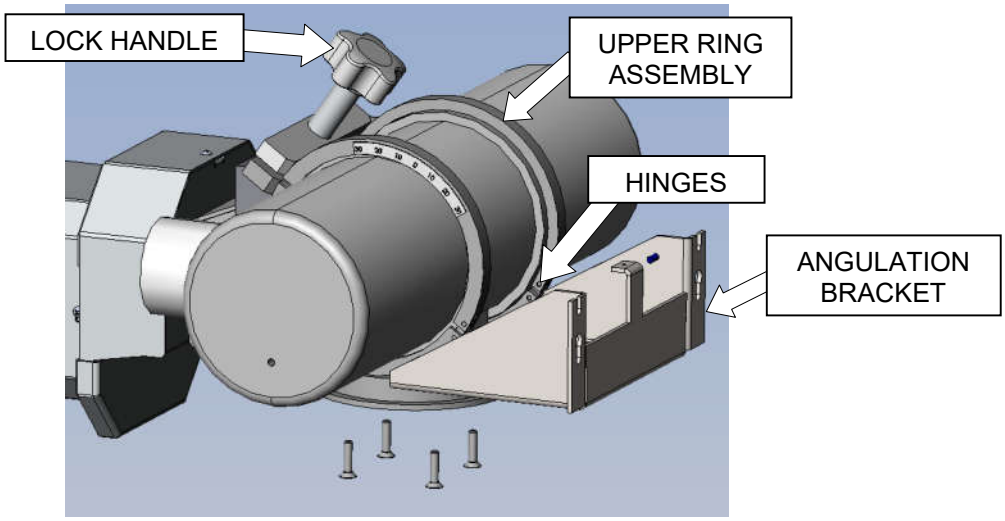

Figure 3-6: Trunnion Assembly (if equipped)

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.

3.6. Install the Angulation Box

Install the angulation box to the mounting plate using the hardware provided.

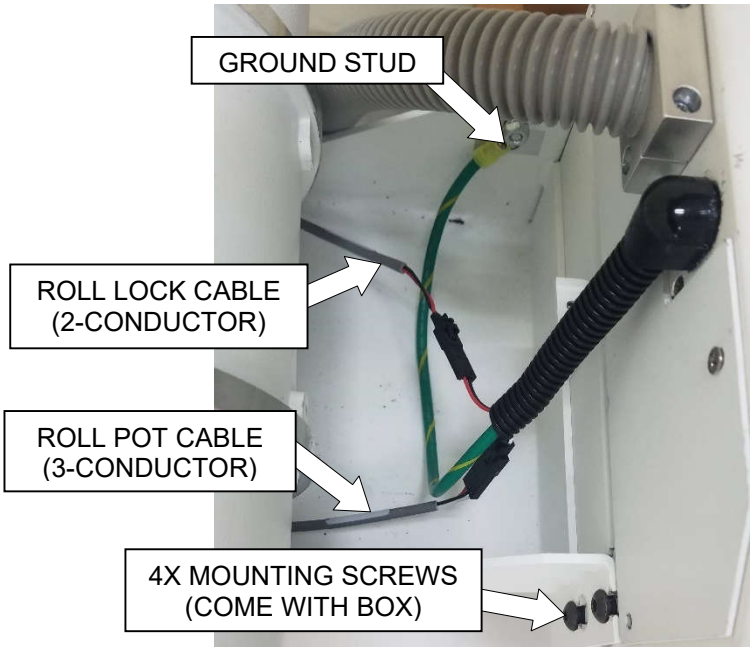

Figure 3-7: Angulation Box Connections

If necessary, insert the roll lock and pot cables under the tube housing beside the port. Connect the roll lock cable (2-conductor) and roll pot cable (3-conductor) to the angulation box. Connect the ground cable to the stud on angulation box mount using the nut provided there.

3.7. Install the High Voltage Cables and Sleeve Kit (SRS S114)

Install the high voltage cables by following the manufacturer's instructions. Also install the tube stator cable at this time.

The collimator cable, stator cable, and high voltage cables will be bundled together and routed to the generator area--locate and install the tubestand cable sleeve kit using included instructions.

3.8. Install the SRS J1000 Arm Assembly

Locate the arm assembly for the SRS J1000. Remove the triangular cover (see figure 3-8).

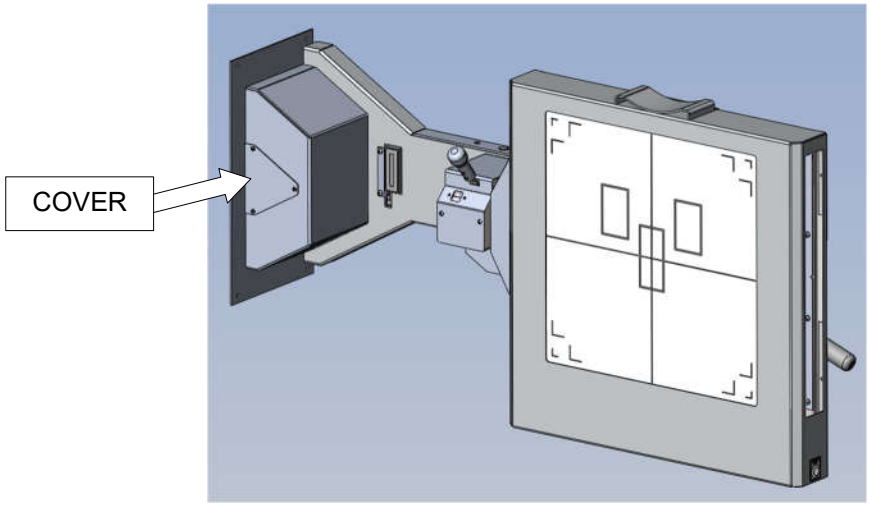

Figure 3-8: SRS J1000 Arm Assembly (Shoot Right Shown)

Remove acorn nuts from the column slide studs. While assembling onto the slide studs, ensure the cables coming from the slide enter the arm compartment. Replace the acorn nuts to secure arm onto carriage. Torque the nuts at 5 ft-lbs. or 60 in-lbs.

WARNING

DO NOT OVER-TORQUE ACORN NUTS, AS THIS CAN BREAK THE STUDS THAT MOUNT THE J1000 ARM ASSEMBLY

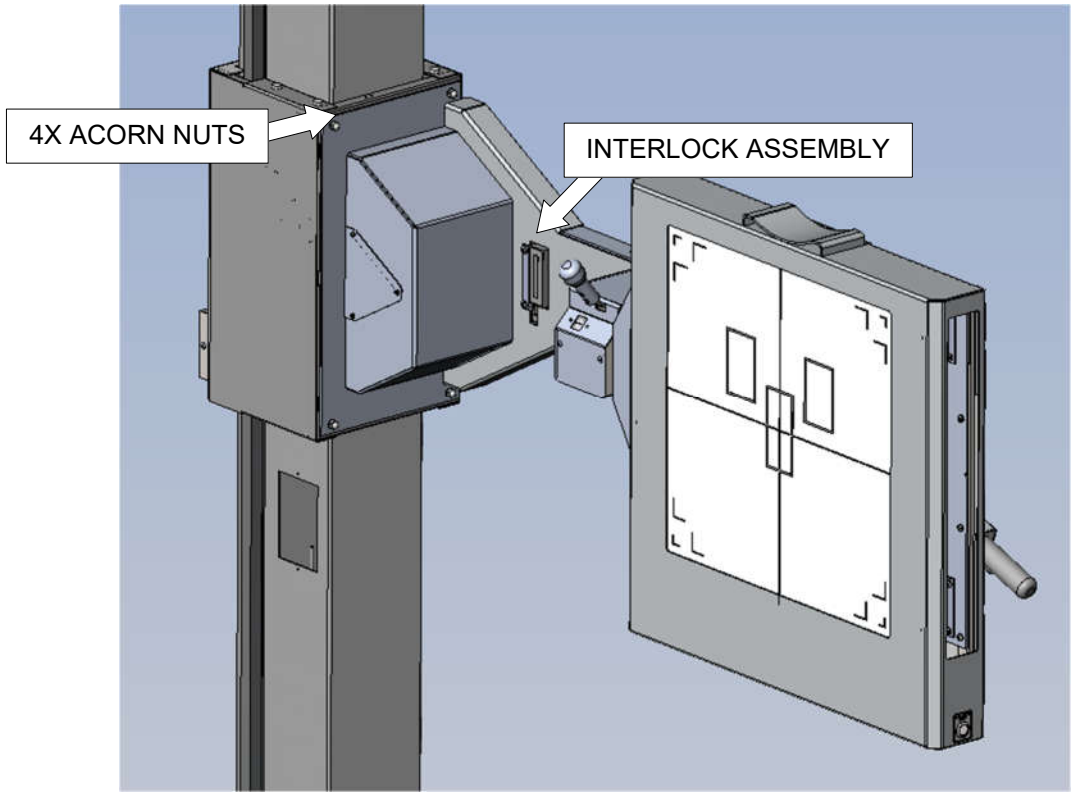

Figure 3-9: Mounting the SRS J1000 Arm; Interlock Assembly

3.9. SRS J1000 Receptor Arm Connections

Remove the interlock assembly, insert cable 09062-046 through the opening, make connections, and reattach (see figures 3-9 and 3-10). The 2-position connector goes to the magnet. For the interlock switch the red conductor push-on goes to NO on the switch, black to COM.

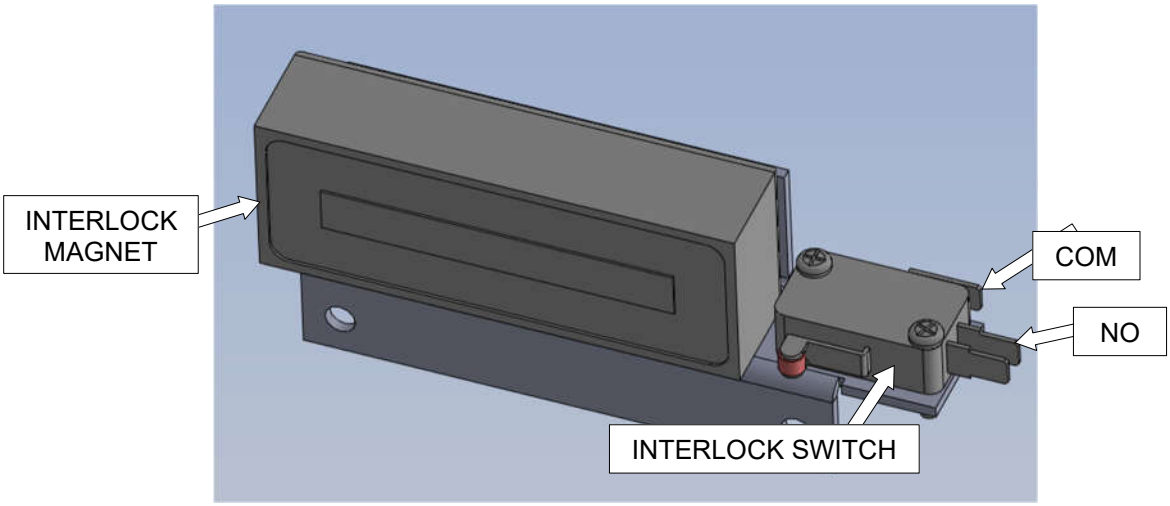

Figure 3-10: Interlock Assembly (Removed)

Following the markings, make the connections of the arm cables to the cables coming from the slide. Once connected, push all of the cables into the arm cavity.

Remove the back cover of the SRS J1000 rear slide box. Loosen the front hose clamp screws, slide the clamp away from the hose hole, and insert (from the front) the cables and hose from the cabinet into the rear slide box.

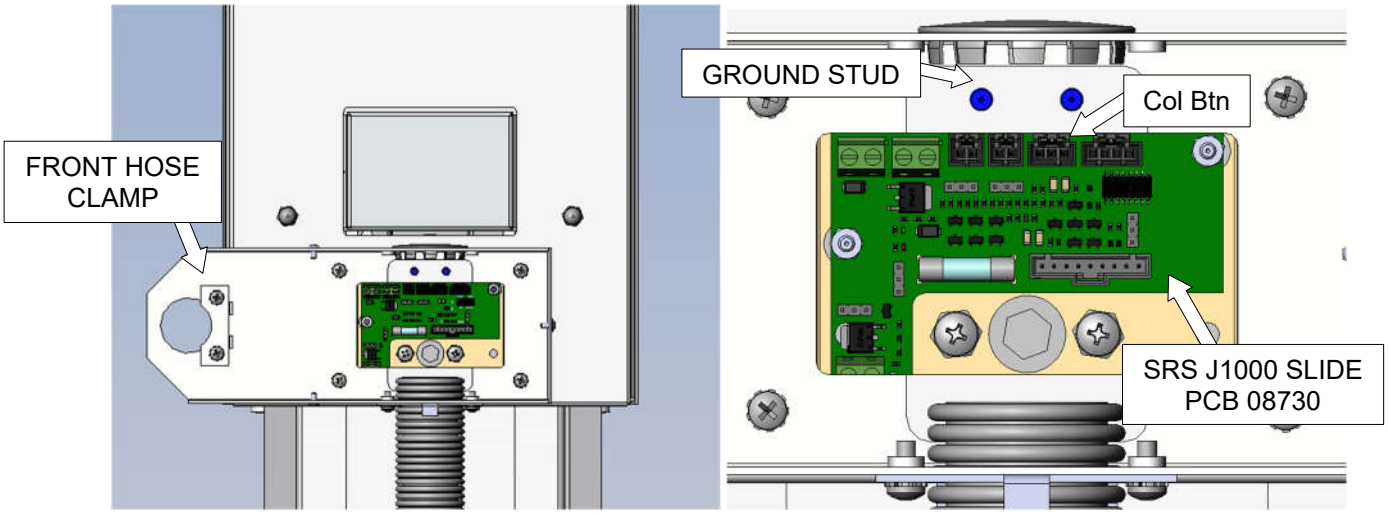

Figure 3-11: Back of SRS J1000 Slide with Cover Removed (Shoot Right)

Connect the incoming ground cable to an unpopulated ground stud (see figure 3-11) using the hardware provided there. To ensure a good connection place a star washer between the ground lug and the paint.

CAUTION

Wear a grounded, anti-static wrist strap when handling any cables that plug into any PCB assembly.

Connect the remote collimator switch cable (end marked “COL BTN”) to the SRS J1000 slide PCB connector labeled “Col Btn” (see figure 3-11).

3.10. SRS J1000 Collimator Light Activation Jumpers

The SRS J1000 PCB can be jumpered to activate the collimator light when either the horizontal or vertical lock release button is pressed. Factory default is no for each (position 2-3).

Change jumper JP2 to 1-2 to trigger collimator light when horizontal button is pressed.

Change jumper JP3 to 1-2 to trigger the collimator light when the vertical trigger is pressed.

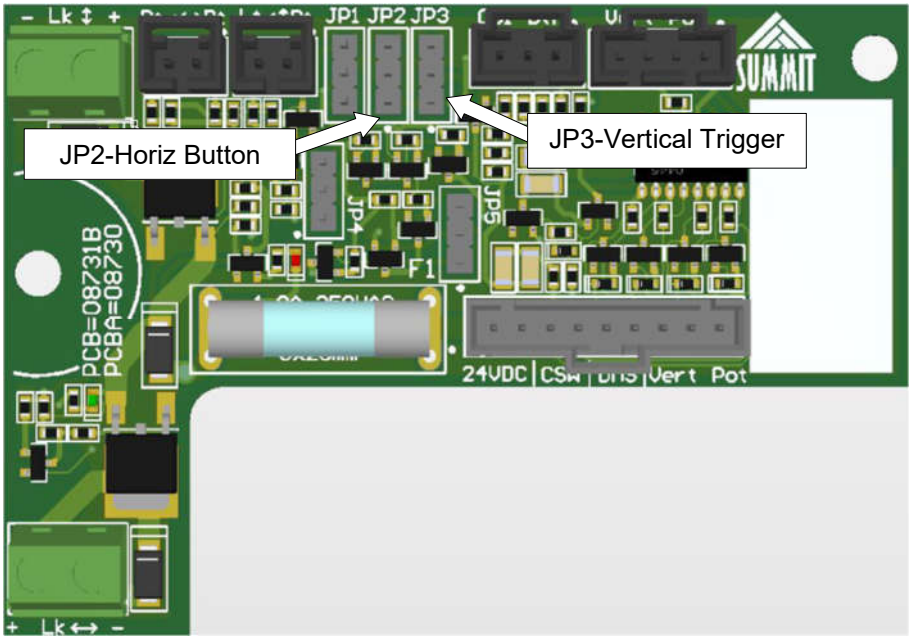

Figure 3-12: SRS J1000 PCB (Rear of Vertical Slide)

When done, replace the SRS J1000 rear slide box cover.

3.11. Mount the Nexus Power Supply Box

The Nexus box ships connected to the SRS J1000 with the end of its hose in the standard entry location. For hose/cable lengths to work properly select a location for the Nexus inside the area indicated in figure 2-1 or 2-2 above.

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NOTE

Depending on room design, connection hoses from the SRS J1000 and SRS S114 can be moved to other entry locations of the Nexus using the included, alternate mounting plates.

3.12. Connect the SRS S114 to the Nexus

The standard Nexus hose entry locations for the SRS are shown in figure 3-13. Make sure the Nexus has no power (cord is unplugged).

For the SRS S114 hose (1" ID) insert the cables into the box through the proper hole in the mounting plate and secure the hose to the box using the clamp inside. Use caution not to damage the PCB during this process.

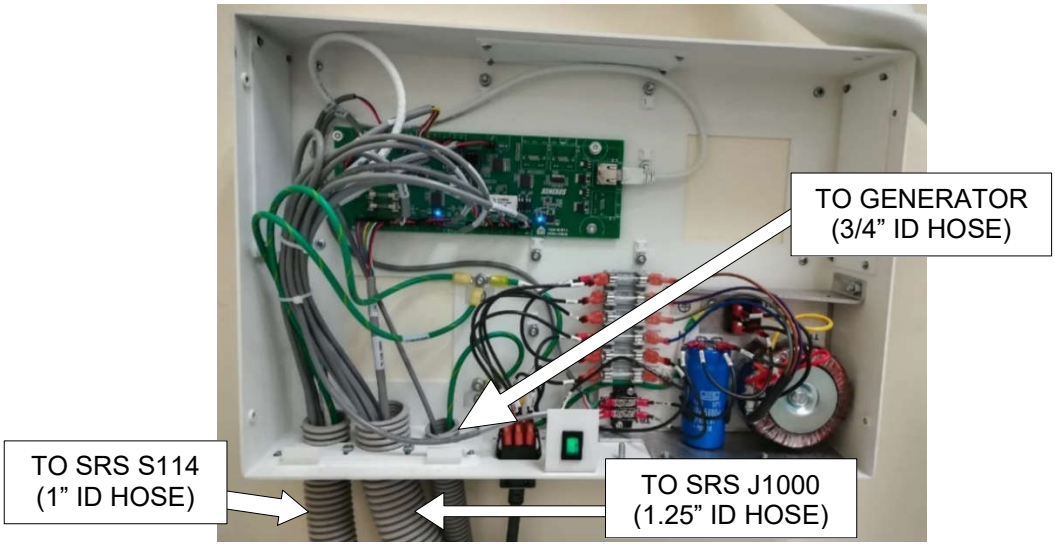

Figure 3-13: Nexus box with Standard Hose Entry, Cover Removed

CAUTION

Wear a grounded, anti-static wrist strap when handling any cables that plug into any PCB assembly.

Once the hose is secured to the Nexus box, route the cables in an approximation of their final places and make connections to the Nexus PCB, power supply, and ground according to the cable markings.

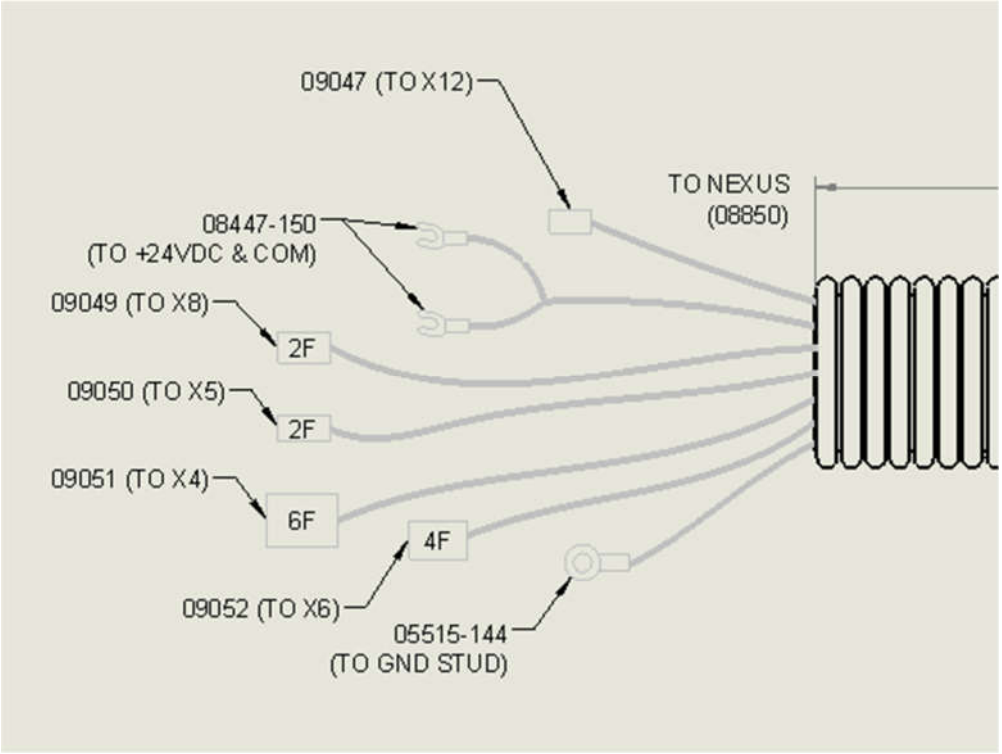

Figure 3-14: SRS S114 Connections to Nexus

Apply zip ties to secure the cables together between the hose inlets and the PCB.

CAUTION

Failure to zip-tie the cables can cause tension to be transferred to the PCB which could damage it.

Apply power and check that the locks engage.

3.13. SRS S114: Release and Trim the Main Counterweight

3.13.1. Shipping Bolts

Check that the vertical lock is on or secure the tube support arm from unintended movement. Add two 10-lb trim weights to the counterweight and then remove the shipping screws (see figure 3-15).

WARNING

WHEN FREEING THE COLUMN COUNTERWEIGHT USE CAUTION AGAINST UNINTENDED MOVEMENT OF THE ARM/SLIDE AND COUNTERWEIGHT

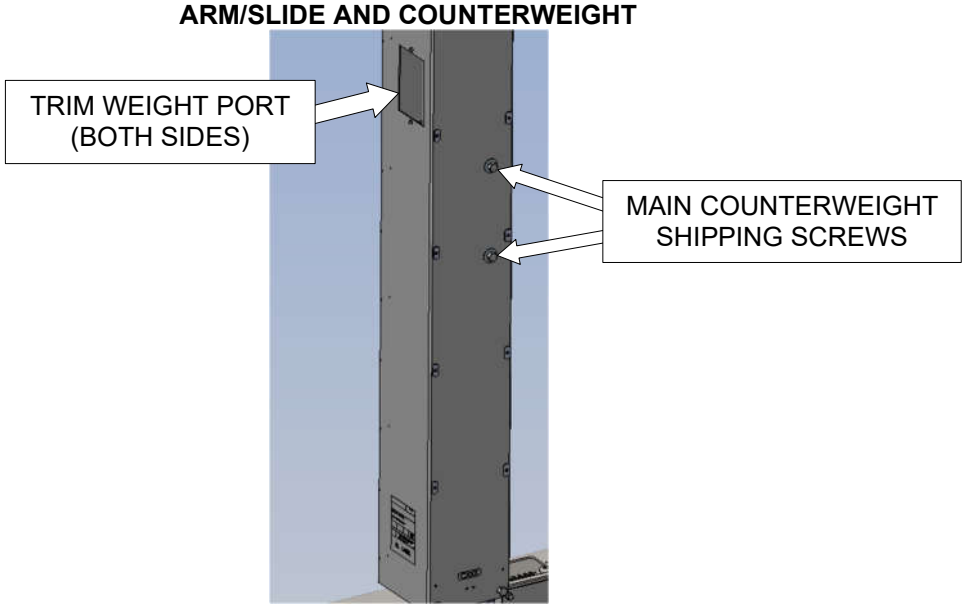

Figure 3-15: SRS S114 Shipping Screws

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NOTE

Consider keeping the counterweight shipping screws as they may be useful for future maintenance procedures

Check the balance of the tubestand by carefully releasing the lock and identifying drift. If the arm drifts down add trim weight. If the arm drifts up remove trim weight. Add or remove trim weights through the side of the column. During tubestand installation once it is no longer necessary to secure the main counterweight with the shipping screws, use the (cosmetic) label attached nearby to cover the holes in the back of the column.

3.14. SRS J1000: Release and Trim the Main Counterweight

With the locks on, remove the counterweight shipping screws from the back of the SRS J1000 column (see figure 3-16).

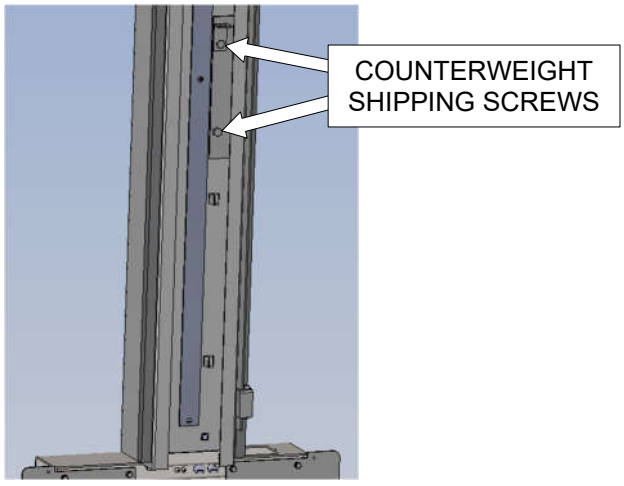


Figure 3-16: SRS J1000 Shipping Screws

Check the balance of the wallstand by (while holding onto the arm) releasing the lock and identifying drift. Adjust counterweight using trim weights included with the component.

3.15. SRS J1000 Vertical Travel Stop

The SRS J1000 vertical travel stop is factory-adjusted to provide clearance to the floor with the cabinet vertical (beam horizontal). Check the clearance to the floor. If adjustment is necessary, loosen the 2X set screws, relocate the travel stop, and then retighten.

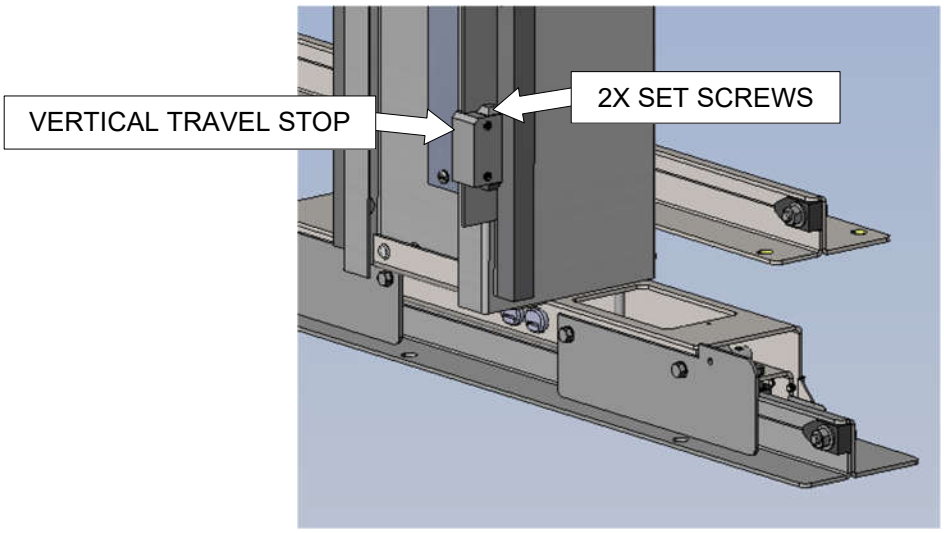


Figure 3-17: SRS SJ1000 Vertical Travel Stop

3.16. SRS S114 Column Leveling and Positioning

Leveling and adjustment of the tubestand and wallstand columns are critical to achieving an aligned system.

Check that the tube, high-voltage cables, and collimator are all installed and the cables draped properly.

Verify again that the floor rail is level in both directions. If necessary, use shims to level the floor rail.

Level the column vertically with small adjustments or shimming to the rail positions (if necessary). At the same time, check that it remains vertical throughout its horizontal travel (floor rail and wall rail parallel to each other).

3.17. SRS S114 Arm Leveling

The SRS S114 arm has been leveled at the factory however if adjustment is necessary after installation perform the following.

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

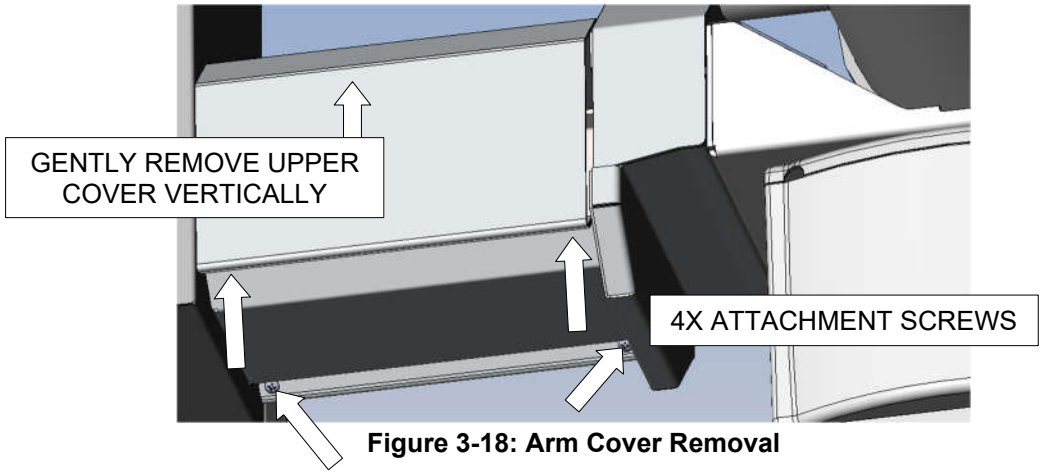


Figure 3-18: Arm Cover Removal

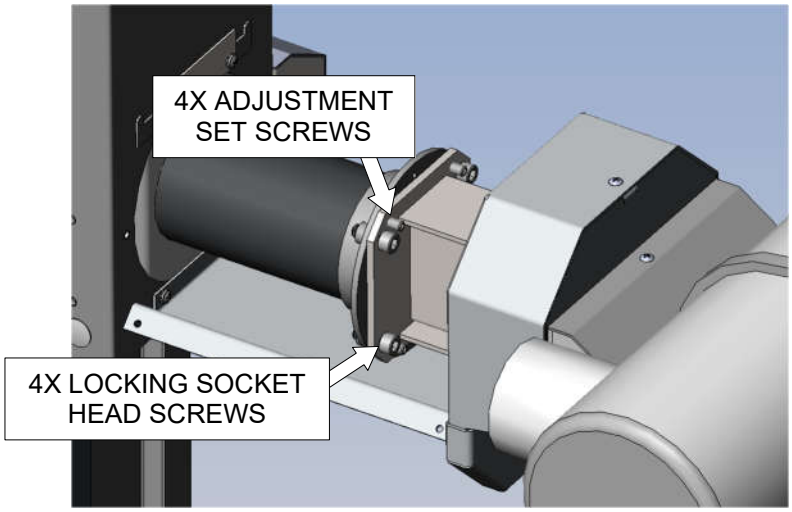


Figure 3-19: Arm Adjustment

Loosen all four locking socket 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.

3.18. SRS J1000 Column Leveling and Receptor Alignment

3.18.1. Column

As with the SRS S114, verify the floor rail is level in both directions and shim if necessary.

Level the column vertically with small adjustments or shimming to the rail positions (if necessary). At the same time, check that it remains vertical throughout its horizontal travel (floor rail and wall rail parallel to each other).

When satisfied with position, level, and alignment of components, tighten down all of the rail fasteners as appropriate for size, type, and engagement material.

3.18.2. Receptor Cabinet Leveling/Alignment

The SRS J1000 receptor cabinet is factory-leveled and -adjusted. If necessary based on the installation there are four adjustments possible (details below).

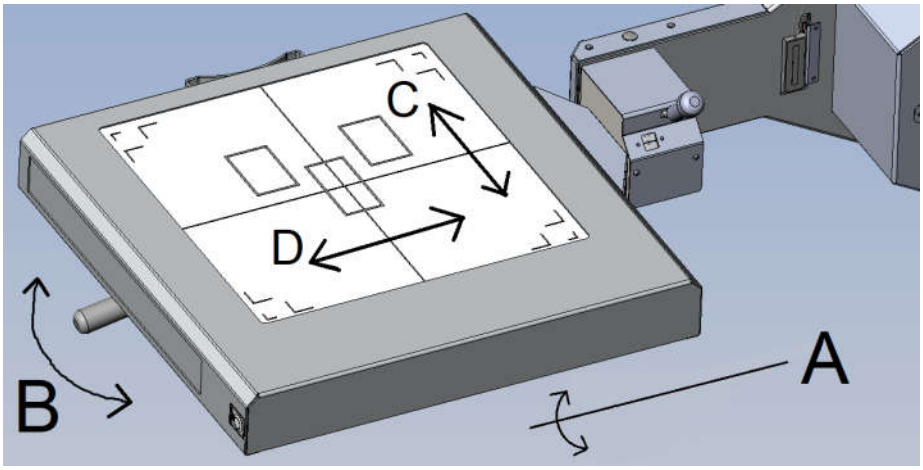


Figure 3-20: Receptor Cabinet Adjustments

(A) Indexer Leveling.

Remove the 2X handle screws and then the handle itself. Remove the 2X indexer cover screws and then the cover itself (see figure 3-21).

Loosening the indexer mounting screws will allow rotational adjustment of the entire indexer and cabinet assembly to level it. Apply Blue Loctite to the indexer mounting screws to prevent the screws from loosening.

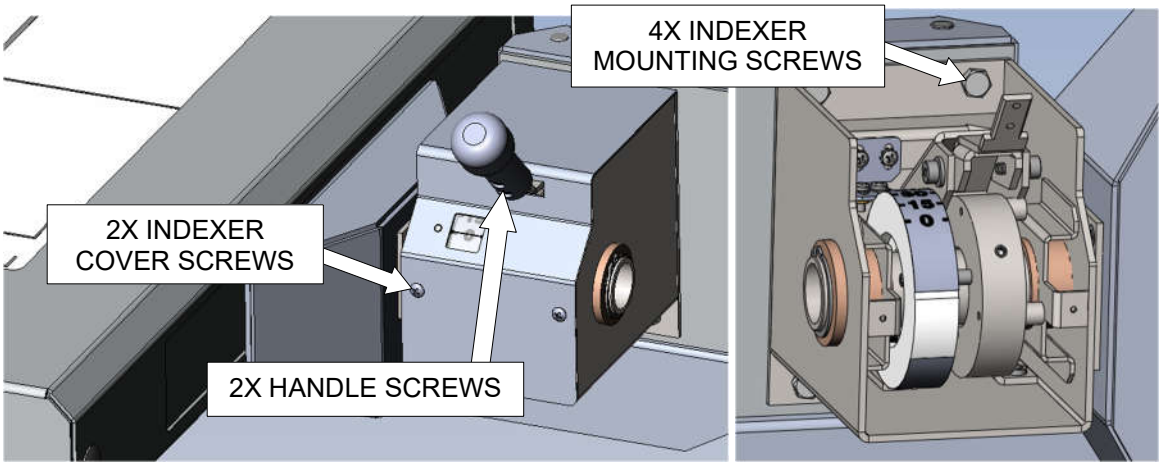


Figure 3-21: Indexer Leveling (if necessary)

(B) Setting Indexer 0/90°.

Place cabinet at 45° in order to access both indexer disc set screws.

If setting with the cabinet vertical (90°):
Loosen the lower screw first. Then rotate the cabinet to 90° and loosen the upper screw, use a level to adjust, then retighten. Rotate the cabinet back to 45° to access the lower screw and tighten.

If setting with the cabinet horizontal (0°):
Loosen the upper screw first, rotate the cabinet to 0° and loosen the lower screw, use a level to adjust, then retighten. Rotate the cabinet back to 45° to access the upper screw and tighten.

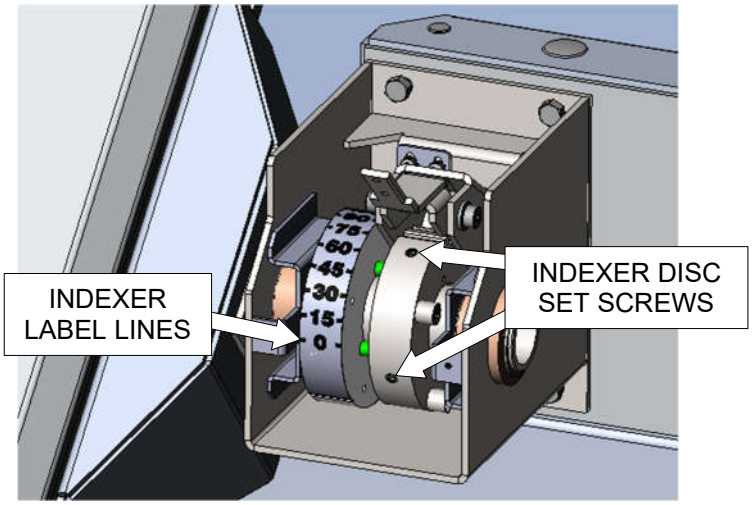


Figure 3-22: Setting Indexer 0/90° (if necessary)

If necessary, Align the window indicator line with the indexer label lines by loosening the 2X window nuts on the rear of the cover assembly, adjusting the window vertically, and then retightening the nuts.

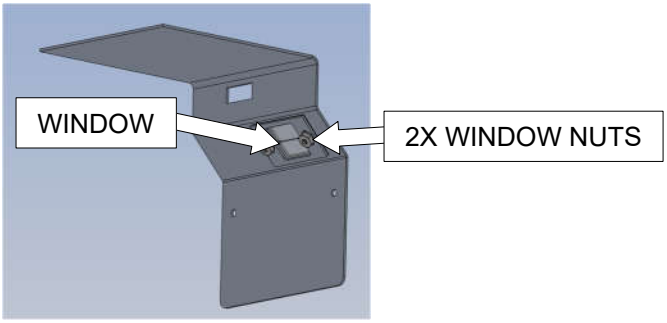


Figure 3-23: Adjusting the Indexer Window Indicator Line

(C) Cabinet Centerline Alignment to Tubestand (Beam Vertical).

Loosen the 4X screws securing the interlock bracket to the back of the tubestand column (See figure 3-24 following). Shift the bracket horizontally to adjust the SRS J1000 column position relative to the SRS S114 column position (moving the cabinet centerline horizontally relative to the tubestand). Apply a level to the bracket surface facing the wallstand in order to ensure consistency of the receptor position over the entire vertical interlock range.

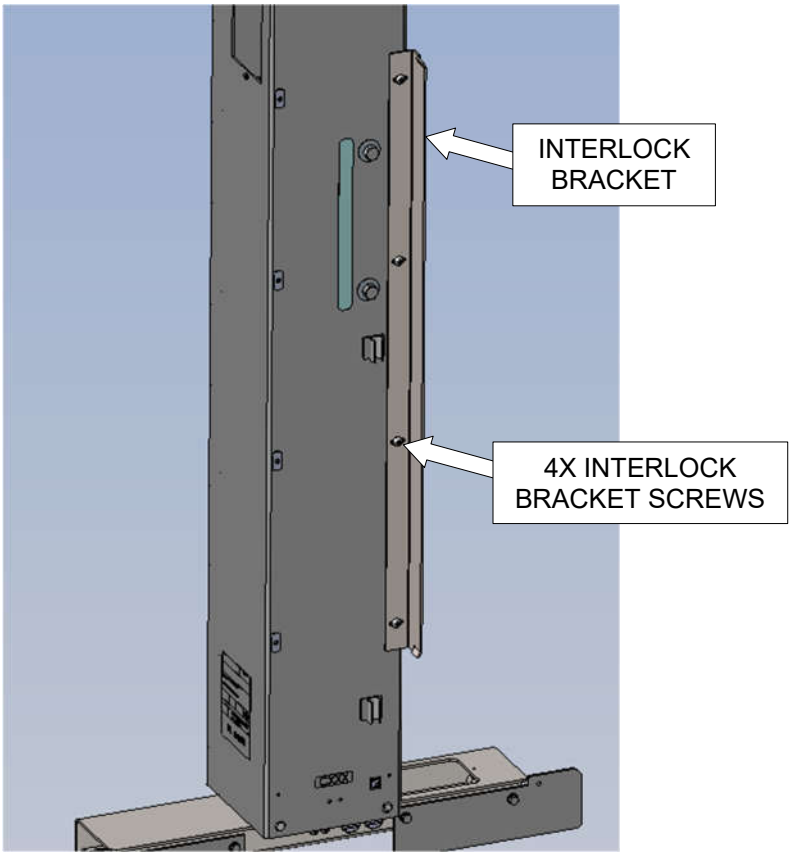


Figure 3-24: Cabinet Centerline Alignment to Tubestand (if necessary)

Retighten the screws when satisfied with the alignment.

(D) Cabinet Centerline Alignment to Tubestand (Beam Vertical and Horizontal).

This can be done (if necessary) with some combination of shimming of the arm or rails to change the position of one or both columns while keeping them level, parallel, and aligned.

At this point tighten any screws that have been loosened during the column leveling and alignment process, including those of the column rails.

3.19. Align the Collimator Light Source to the X-Ray Field

Verify that the x-ray field and light field are coincident. Refer to the collimator manual for details on adjusting the light field to match the x-ray field.

3.20. Install the SID Actuators

The SSD (System Status Display) requires all SID actuators installed to function properly.

3.20.1. SRS J1000 Home Position Actuator

Move the SRS J1000 column all the way to the right for shoot right or left for shoot left setup. Locate the switch mounted on the floor car (left side/front; see figure 3-25). Stick an actuator ramp to the floor rail under the switch arm to activate when the column is in this “home” position.

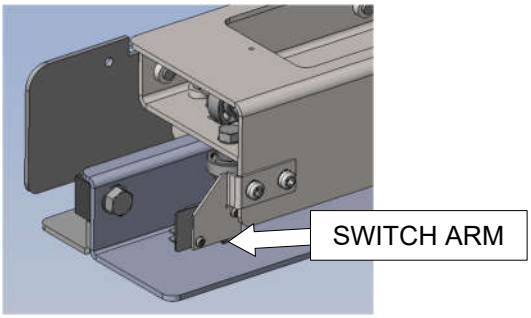


Figure 3-25: SRS J1000 Horizontal Switch

3.20.2. SRS S114 Horizontal SID Actuators

The SRS S114 has two horizontal SID switches in a similar location to the SRS J1000. The default switch assignments are shown below.

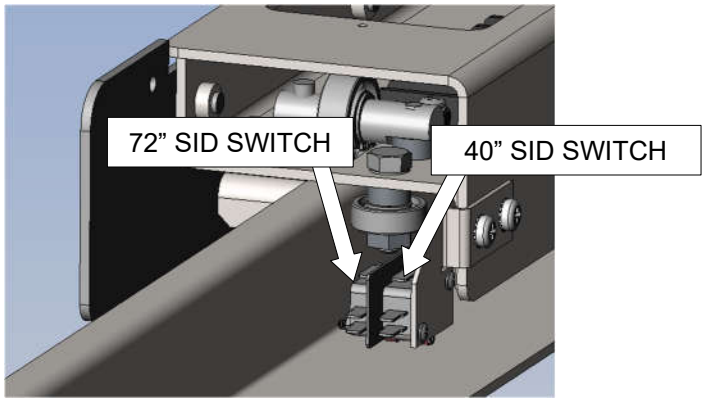


Figure 3-26: SRS S114 Horizontal SID Switches

Place the SRS J1000 in its Home position and the SRS S114 with the x-ray tube focal spot at 40” from the image plane. Stick an actuator ramp (included) to the floor rail under the outside switch arm to activate when the tubestand is placed at 40” SID.

Next place the SRS J1000 in its Home position and the SRS S114 with the x-ray tube focal spot at 72” from the image plane. Stick an actuator ramp to the floor rail under the inside switch arm to activate when the tubestand is placed at 72” SID.

Verify that each ramp is aligned with its appropriate switch.

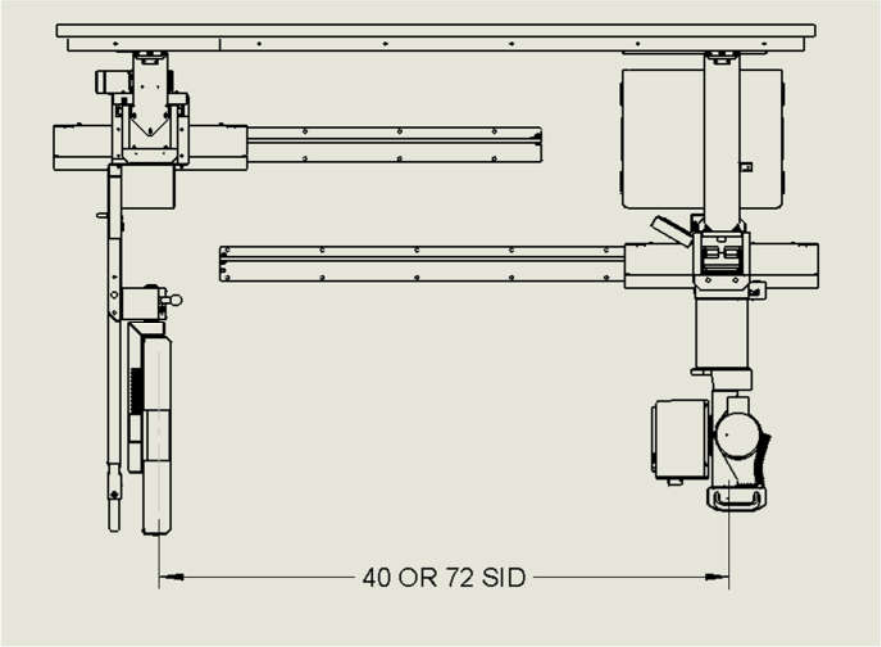


Figure 3-27: SRS S114 SID Actuators (shoot left shown)

3.20.3. SRS J1000 Vertical Working Height Actuator

Locate the wallstand working height switch on the back of the vertical slide (see figure 3-28 in which rear cover is shown transparent). Rotate the cabinet to its horizontal orientation (beam vertical) and place at the desired working height. Apply a switch actuator to the back of the column aside the brake strip so the switch is activated at this location.

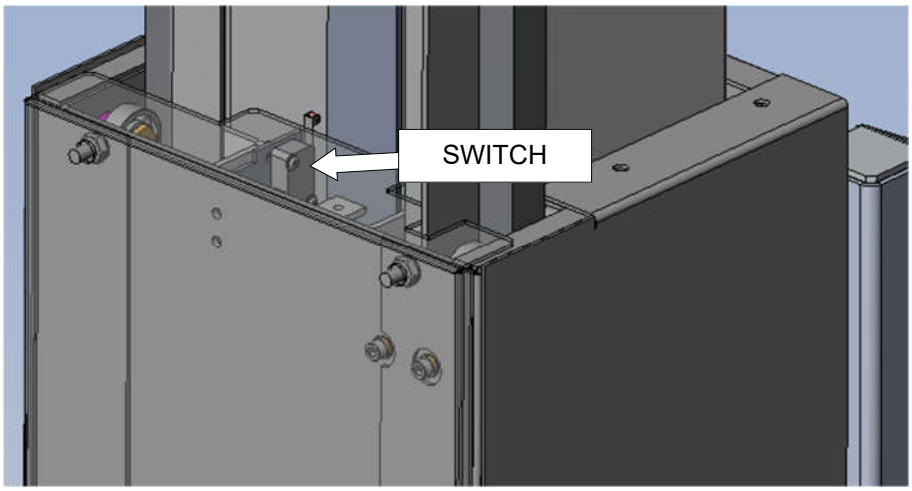


Figure 3-28: SRS J1000 Vertical Working Height Switch

☞

NOTE

If using a mobile table, set the SRS J1000 vertical working height so that the mobile table has clearance to be placed over the receptor cabinet.

3.20.4. SRS S114 Vertical SID Actuator

The SRS S114 Vertical 40” SID actuator comes attached to the column. Loosen the lower actuator mounting screw first. Relocate the tubestand arm to place the x-ray focal spot at 40” SID above the image plane. Then loosen the upper actuator screw and adjust the ramp vertically to activate the switch at that location. Retighten the upper screw, then move the arm down to re-expose the lower screw and retighten.

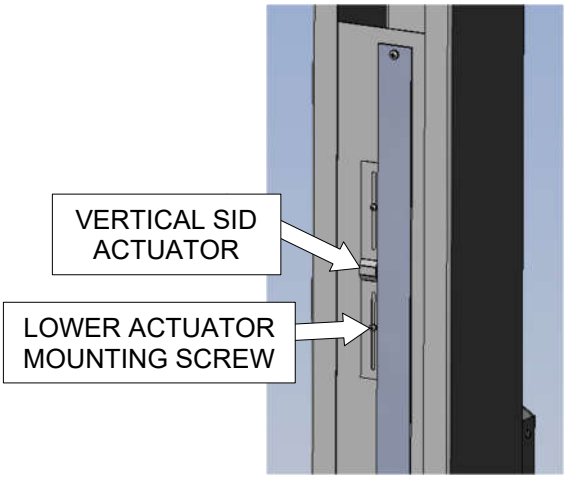


Figure 3-29: SRS S114 Vertical SID Actuator

3.21. Lock Adjustments

3.21.1. SRS S114 Vertical Lock

Check operation of the vertical lock magnet and adjust if necessary. Remove the upper slide cover to access the lock assembly (see figure 3-29). 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.

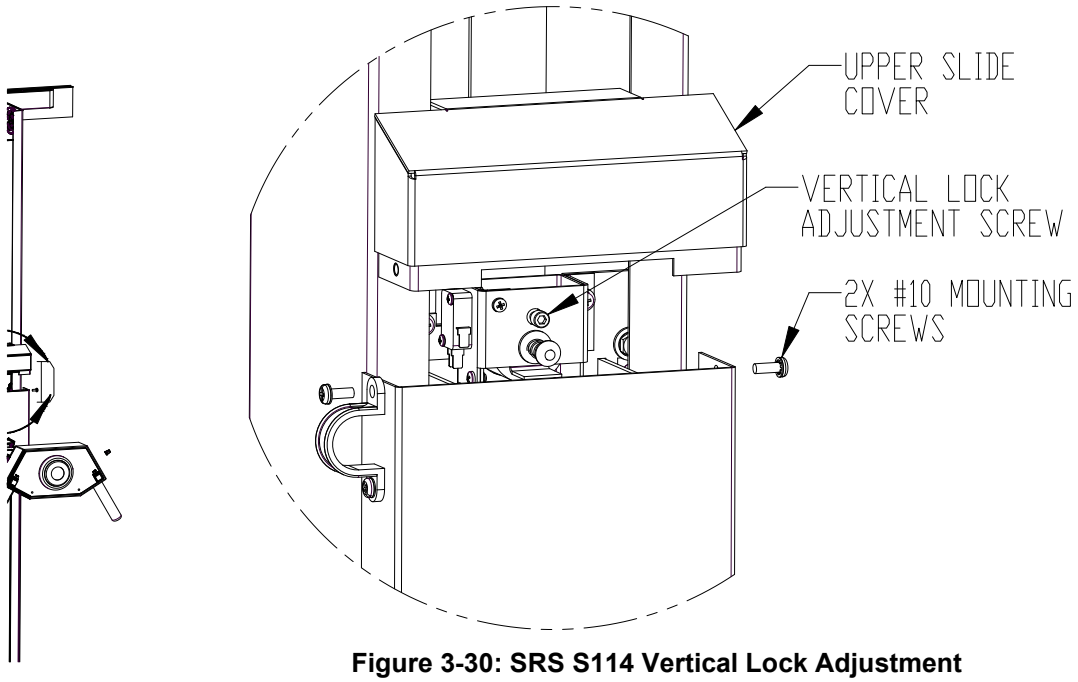


Figure 3-30: SRS S114 Vertical Lock Adjustment

3.21.2. SRS S114 or J1000 Horizontal Lock

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 3-31) 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.

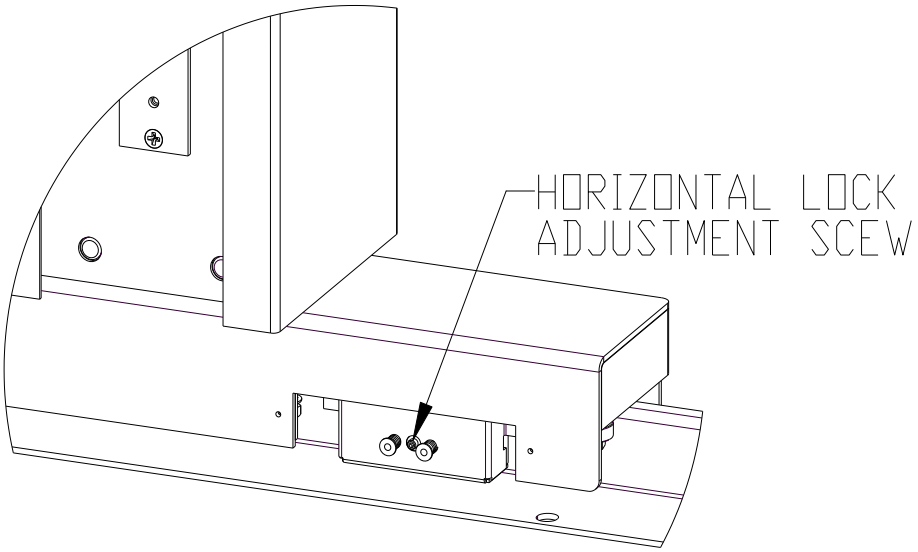


Figure 3-31: Horizontal Lock Adjustment

3.21.3. SRS J1000 Vertical Lock

Check operation of the vertical lock magnet and adjust if necessary. Remove the 4X acorn nuts holding the large slide cover at the rear of the vertical slide.

Figure 3-32: Accessing the SRS J1000 Vertical Locks

Move the cover (with the hoses attached) slightly to the side to access the pair of vertical lock magnets.

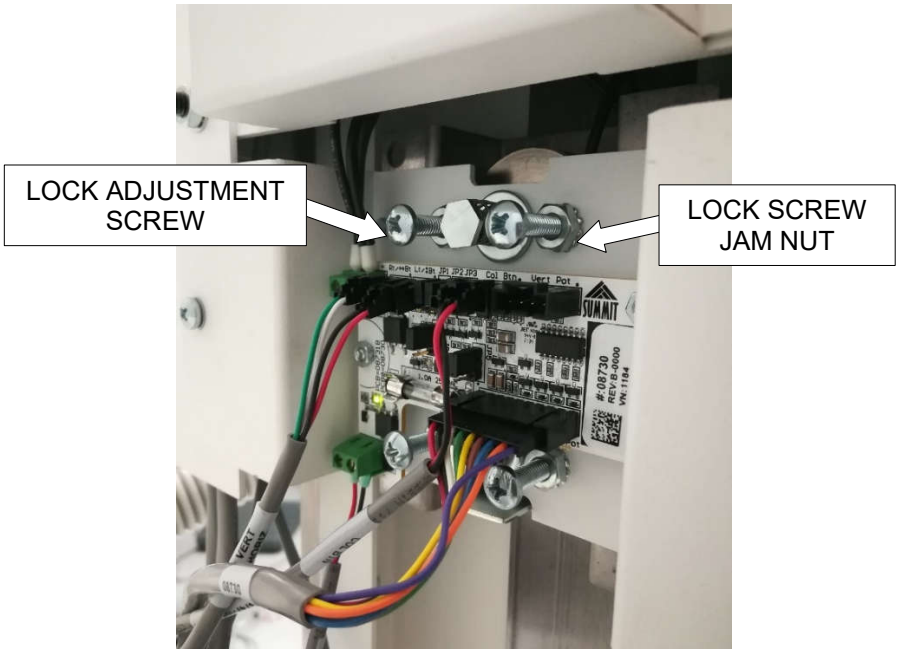


Figure 3-33: SRS J1000 Vertical Lock Adjustment

For each vertical lock magnet, when de-energized use the lock adjustment screws to set the gap between the magnet face and the brake strip. If necessary, loosen the lock screw jam nut before moving the lock adjustment screw. Ideal adjustment is a minimum gap without any dragging across the entire vertical range of motion with the lock de-energized. Lock the screws in place with the lock screw jam nuts and reassemble the rear slide cover.

3.22. Angulation Dial Zero Adjustment

Verify that the line in the window of the angulation box lines up with the 0° mark of the angulation dial when the collimator is pointing straight down. If not, adjust the clear window of the angulation box by removing the upper back cover of the angulation box and loosening the window nut shown in below, lining the window up with the 0° mark, and then tightening the nut.

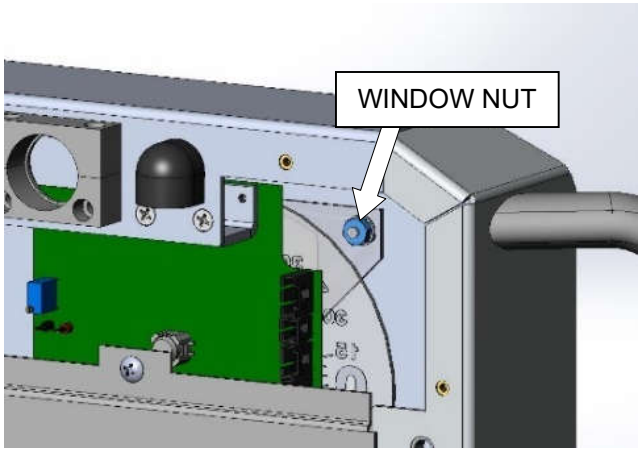


Figure 3-34: Angulation Dial Zero Adjustment

3.23. Angulation Dial Backlight Adjustment

To change the brightness of the LED backlight for the dial, locate the trim pot on the LED Backlight PCB seen below. Turn the pot clockwise to brighten the backlight or turn counter-clockwise to dim the backlight.

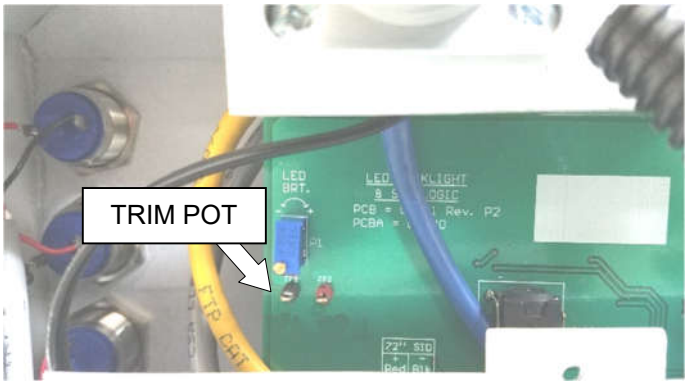


Figure 3-35: Angulation Dial Backlight Adjustment

3.24. Optical Sensor (SRS J1000 Cabinet Rotation) Adjustment

The optical sensors (in the indexer assembly) are set at the factory and should not need to be adjusted. Adjust them only if the SSD green “Check Indicator” and amber “Tilt LED Indicator” lights are not working as expected upon cabinet rotation (see figure 6-1 below for operation).

Find the optical sensors (see figure 3-36) by removing the indexer cover (see figure 3-21 above). There are two adjustments for the sensors, vertical (up and down) and horizontal (back and forward). Loosen the screws shown in the figure 3-36 to allow the movement indicated. For best results perform only one of the directional adjustments at a time. Move the optical sensors while checking if the SSD indicators are working properly in each indexer position. Continue until proper indicator operation is achieved.

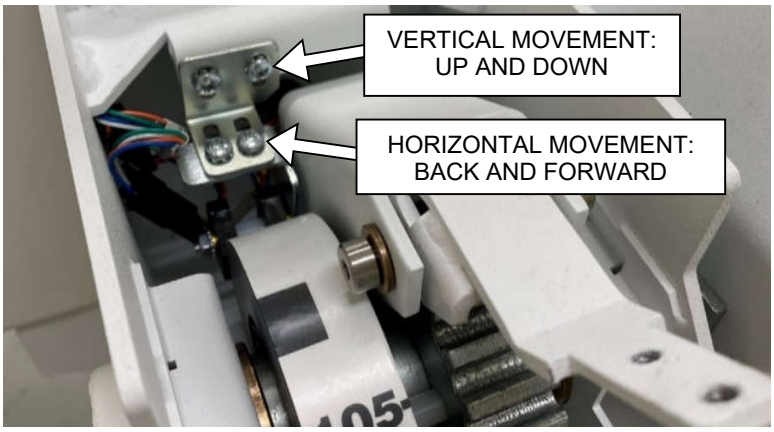
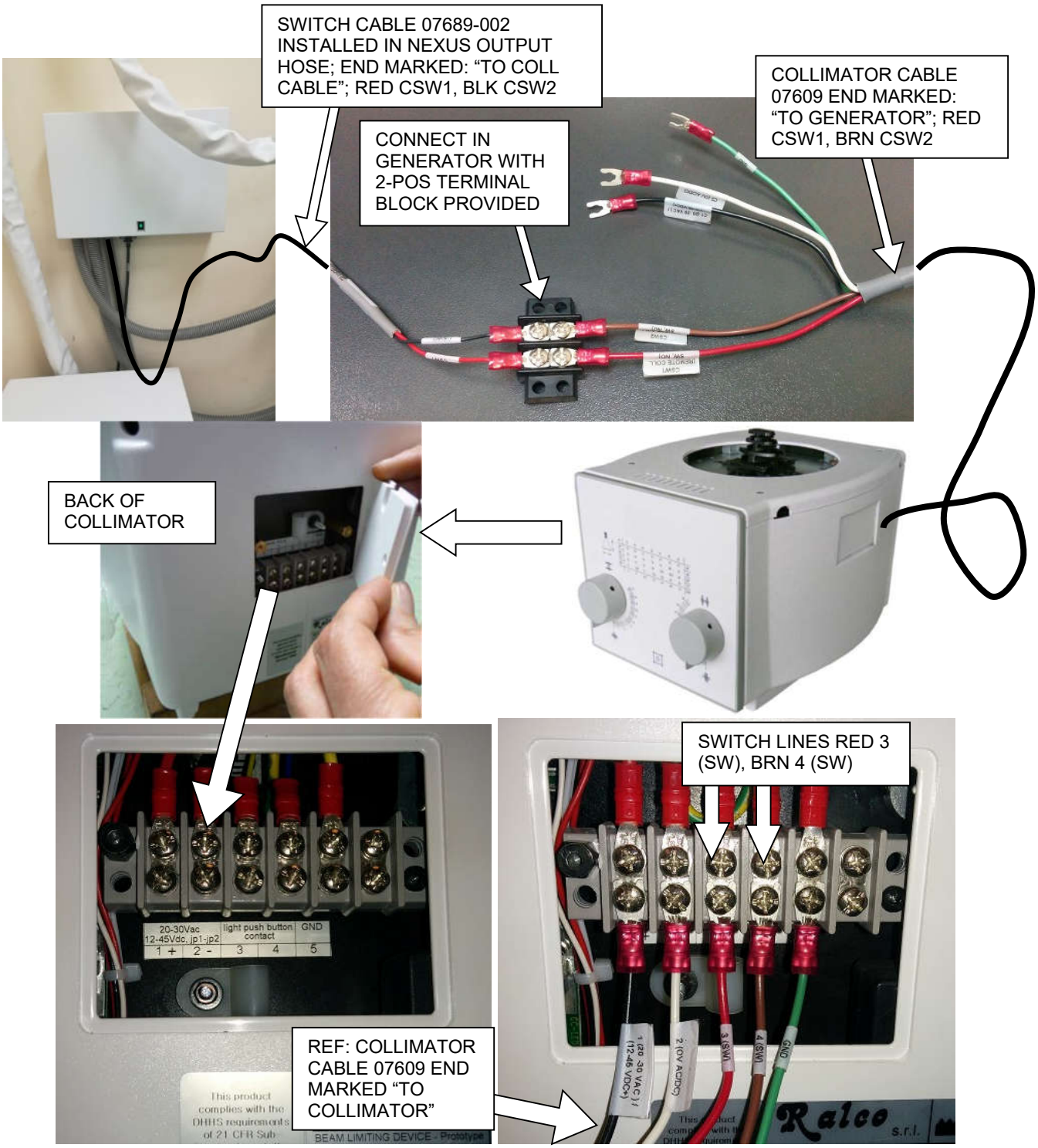


Figure 3-36: Optical Sensor Adjustment

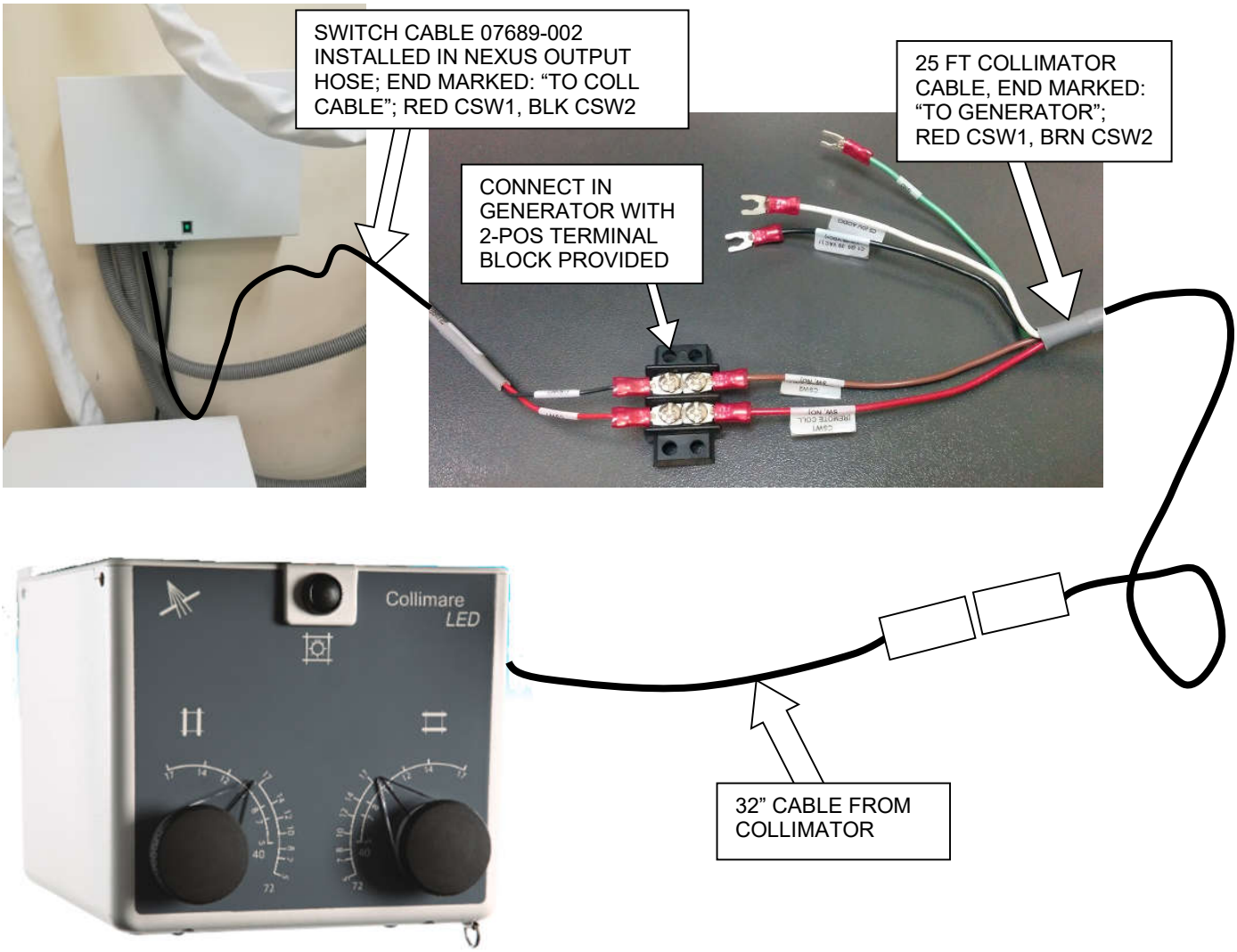
3.25. Connecting the Remote Collimator Light Switch

The remote collimator light switch from the cabinet was connected previously to the slide PCB (see section 3.9). From there it travels to the Nexus box where it exits in the ¾" ID hose to the generator area.

3.25.1. Ralco Collimator



3.25.2. Collimare Collimator



3.26. Horizontal and Vertical SID labeling

As a failsafe the horizontal and vertical SID labels are included and should be installed. Please see instructions for SID labeling included with individual kits for the SRS J1000 and SRS S114.

3.27. Install Covers and Column Caps

3.27.1. SRS J1000 Arm Cover

If not done already, reinstall the triangle-shaped cover removed in section 3.8.

3.27.2. Trim Weight Access Covers

Perform a final check of the trim and if satisfied install the two access covers (one each side).

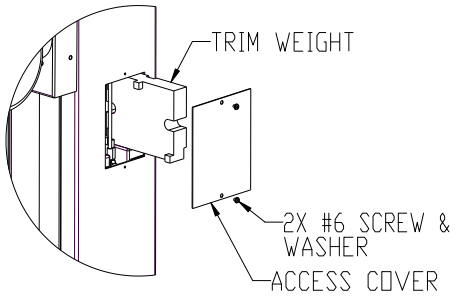


Figure 3-37: Trim Weight Access Cover

3.27.3. Floor Car Covers

Install the floor car covers. SRS J1000 column appearance is different than shown but cover installs in the same manner.

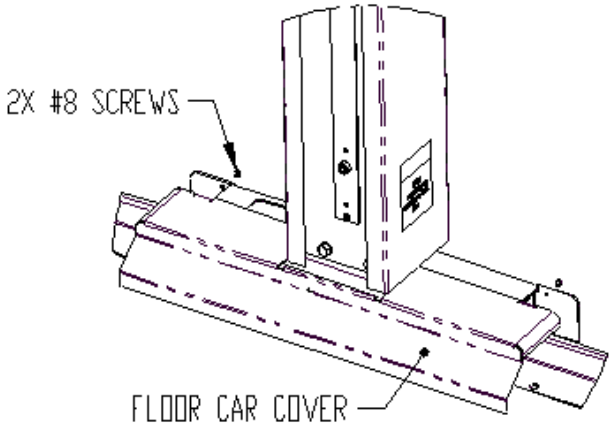


Figure 3-38: Floor Car Covers

3.27.4. Upper Bearing Covers

Install an upper bearing cover on each upper bearing assembly, for the SRS J1000 it installs similarly to the SRS S114 shown.

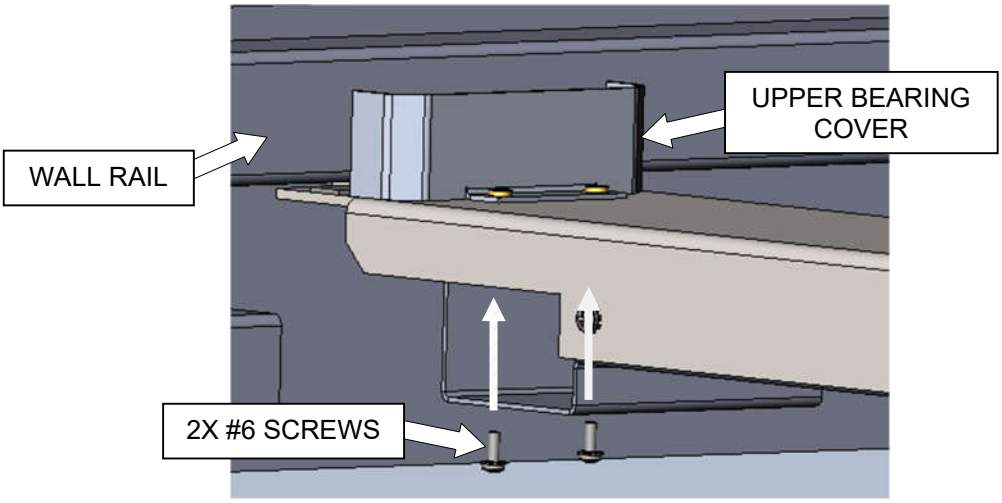


Figure 3-39: SRS S114 Upper Bearing Cover

3.27.5. Column Caps

Slide each 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. The SRS J1000 cap attaches similarly but does not have the flap.

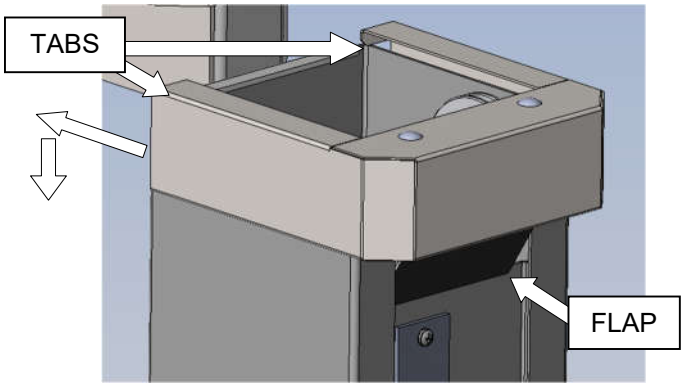


Figure 3-40: SRS S114 Column Cap

4. RECOMMENDED MAINTENANCE

The following scheduled 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.

4.1. Tubestand (SRS S114)

Inspect counterweight cables for fraying, damage, or wear. Check compression sleeves and eyelets for damage or wear. Check that pulleys and pulley mounts are secure and undamaged. Check that all cable attachment points are secure.

WARNING

INSPECTION AND MAINTENANCE OF THE ENTIRE COUNTERWEIGHT CABLE SYSTEM IS CRITICAL FOR CONTINUED SAFE OPERATION

Thoroughly clean the stainless steel brake strip.

Thoroughly clean the two hardened steel bearing tracks (see figure in 3.2.2). After cleaning apply a protective film of oil to each track. **DO NOT** oil the stainless steel brake strip.

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

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

Check all fasteners for tightness including the floor rail fasteners and tube arm screws.

Verify the travel stops are in good, functional condition.

Verify that all the locks are working properly.

Check all SID displays and markers. Recalibrate electronic SID if necessary.

Inspect cabling/wiring for damage.

4.2. Wallstand (SRS J1000)

Inspect counterweight cables for fraying, damage, or wear. Check compression sleeves and eyelets for damage or wear. Check that pulleys and pulley mounts are secure and undamaged. Check that all cable attachment points are secure.

WARNING

INSPECTION AND MAINTENANCE OF THE ENTIRE COUNTERWEIGHT CABLE SYSTEM IS CRITICAL FOR CONTINUED SAFE OPERATION

Clean exterior of the assembly, inspecting for damage and missing hardware.

Verify smooth vertical travel along the entire vertical range; check all bearings for proper operation.

Verify the travel stops are in good functional condition.

Check all fasteners for tightness including the floor and wall mounts.

Verify proper operation of the lock release switch and handle and proper function of the locks.

Inspect all cable connections and cable strain reliefs. All connections should be tight and secure. Inspect exposed cabling for damage.

Verify counterweight access covers are secure.

4.3. System Status Display (SSD)

Verify proper indicator light logic for all displayed options/orientations: beam vertical 40 SID, beam horizontal 40 and 72 SID.

4.4. Collimator

Verify accuracy of field size knob indication to actual x-ray field size.

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

Check lamp ON time / auto OFF function.

Inspect collimator cable for fraying or damage.

Refer to the collimator manual for other recommended maintenance.

4.5. 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.

Refer to the x-ray tube manufacturer for other recommended maintenance.

4.6. Generator

See generator manual for recommended maintenance items.

5. DIAGNOSTICS

The junction box PCB features an MDI (Meterless Diagnostic Interface).
See the following tables for error codes that will be displayed on the **PCB** in response to a failure.

5.1. S114 Tubestand Error Code Table

ERR. CODE	LED 1 2 3 4	DESCRIPTION
E01-TS	□□□■	ROLL LOCK SHORT
E02-TS	□□■□	VERTICAL LOCK SHORT
E03-TS	□□■■	LONGITUDINAL LOCK SHORT
E04-TS	□■□□	SEE NOTE 1
E05-TS	□■□■	ROLL LOCK OPEN
E06-TS	□■■□	VERTICAL LOCK OPEN
E07-TS	□■■■	LONGITUDINAL LOCK OPEN
E08-TS	■□□□	SEE NOTE 1
E09-TS	■□□■	JUNCTION BOX PCB, Q17 SHORT
E10-TS	■□■□	JUNCTION BOX PCB, Q3 SHORT
E11-TS	■□■■	JUNCTION BOX PCB, Q21 SHORT
E12-TS	■■□□	JUNCTION BOX PCB, Q27 SHORT
E13-TS	■■□■	POWER SUPPLY, 24V OUT OF RANGE
E16-TS	1□□□	ALL LOCK BUTTON
E17-TS	1□□■	ROLL LOCK BUTTON
E18-TS	1□■□	VERTICAL LOCK BUTTON
E19-TS	1□■■	LONGITUDINAL LOCK BUTTON
E20-TS	1■□□	SEE NOTE 1
E21-TS	1■□■	ROLL POT

KEY

□ LED OFF	1 BLINK ONCE
■ LED ON	2 BLINK TWICE

NOTE 1: Please contact Summit Industries, LLC technical service for assistance.

5.2. Nexus PCB Error Code Table

ERR. CODE	LED 1 2 3 4	DESCRIPTION
E01-TS	□□□■	INTERLOCK MAGNET SHORT
E02-TS	□□■□	INTERLOCK MAGNET LOCK
E03-TS	□□■■	LED CONFIGURATION REGISTERS DO NOT MATCH THEIT DEFINITION
E04-TS	□■□□	OPTO SENSOR ERROR
E05-TS	□■□■	MAIN BOARD EXPANDERS CONFIGURATION REGISTERS DO NOT MATCH THEIR DEFINITION
E06-TS	□■■□	VERTICAL LOCK BUTTON SHORT
E07-TS	□■■■	HORIZONTAL LOCK BUTTON SHORT

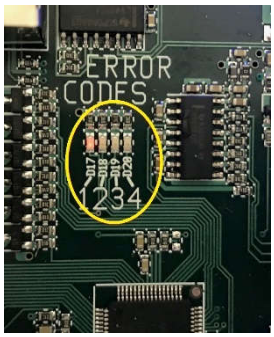
KEY

□ LED OFF
■ LED ON

5.3. Error Code Location

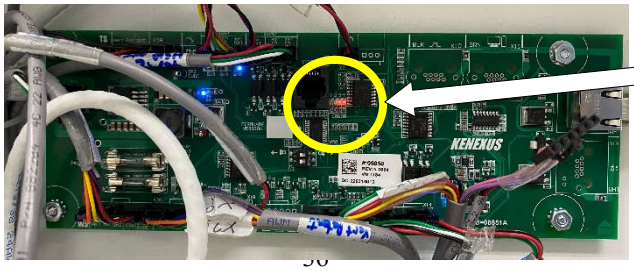
5.3.1. SRS S114 Tubestand

The error codes can be found on the designated LEDs located on the Junction Box Board 08210. This board is placed on the back of the SRS S114 tubestand column.



5.3.2. Nexus board

The error codes can be found on the designated LEDs located on the Nexus board, located inside the nexus box.



5.4. Fuses

The SRS fuses can be located in two different areas: in the Nexus box and the J1000 wallstand. Fuses in this equipment are used on power lines--if all the connections are correctly made and the SRS is powered on but any component is not getting power, fuses should be checked first.

5.4.1. Nexus Box Fuses

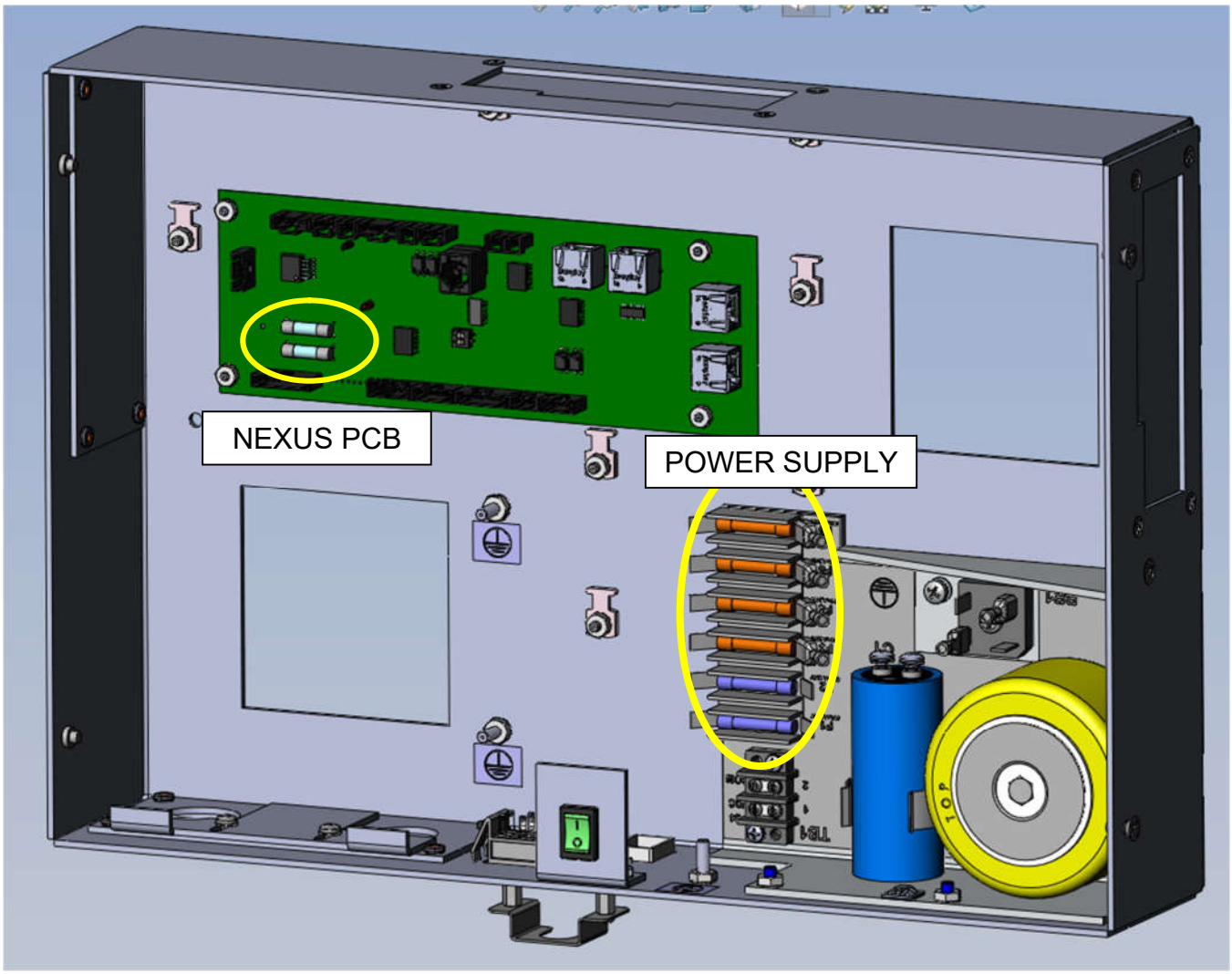


Figure 5-1: Nexus Box Fuses

Power Supply Fuse Values:
F1-F2 = 800 mA, 250 V, SLO-BLO, 3AB/3AG
F3-F6 = 400 mA, 250 V, SLO-BLO, 3AB/3AG

Nexus Board Fuse Values:
F1 = 3 A, 250 V, SLO-BLO, 5x20mm
F2 = 2 A, 250 V, SLO-BLO, 5x20mm

5.4.2. SRS J1000 Fuse

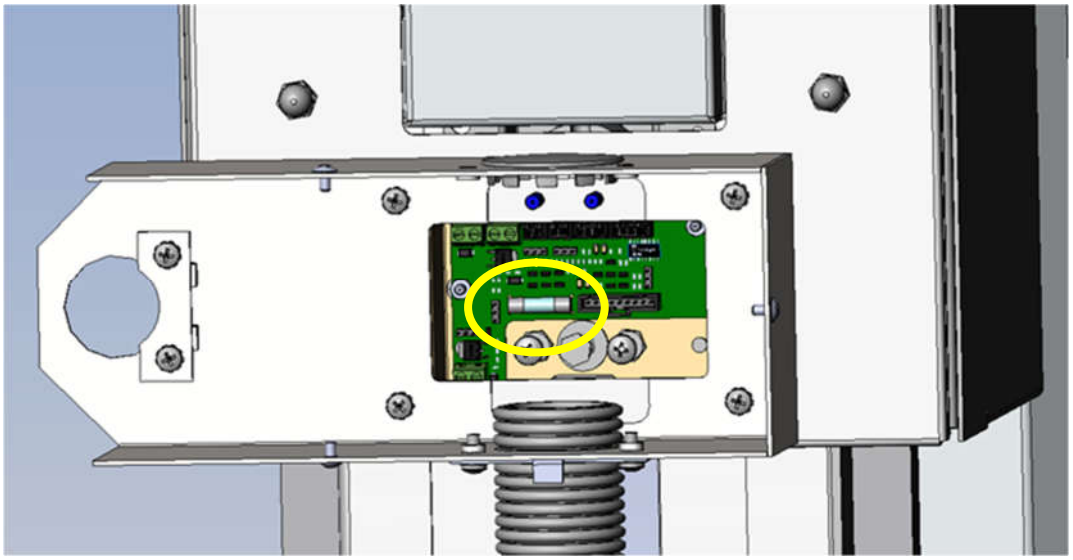


Figure 5-2: SRS J1000 Fuse

J1000 Fuse Value:
F1 = 1 A, 250 V, SLO-BLO, 5x20mm

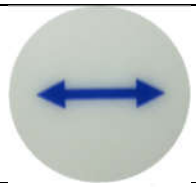
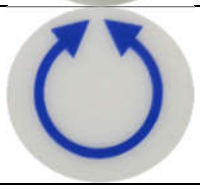
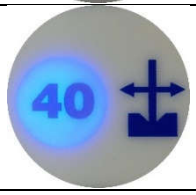
6. OPERATION

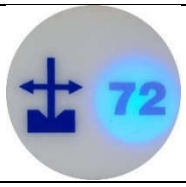
The SRS is a compact, versatile, single-receptor system that is designed for simple user control. It consists of the SRS J1000 (wallstand with receptor cabinet) and SRS S114 (tubestand) with individual position and orientation controls.

It features an electric interlock between tubestand and wallstand in beam-vertical orientation. With the arms positioned correctly, move the columns together horizontally until they contact—the interlock will automatically engage. When the columns are interlocked the wallstand is a slave to the tubestand for horizontal motion.

The system is capable of shooting vertical 40-inch SID (source-to-image distance), horizontal 40- and 72-inch SID, and angled-beam shots, as well as cross-table x-rays with optional mobile table. Positioning of the components into these configurations is simplified by the SSD (System Status Display).

6.1. SRS S114 Buttons and Display Indicators

Symbol or photo	Name	Description
	**Longitudinal Lock Release**	Depress this button to release only the longitudinal lock and move the tubestand horizontally. Release to lock. Longitudinal and vertical lock buttons swap function between beam vertical and horizontal to keep arrows pointing in the direction of operation.
	**Interlock Release**	Depress this button and the all-lock release button to release the electromagnetic lock securing the J1000 and the S114 together when they are interlocked. Move the S114 away from the J1000 before releasing the buttons so that the magnetic lock does not re-engage.
	**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.
	**Vertical Lock Release**	Depress this button to release only the vertical lock and move the tube up or down. Release to lock. Longitudinal and vertical lock buttons swap function between beam vertical and horizontal to keep arrows pointing in the direction of operation.
	**Dial Indicator**	Displays the relative angle at which the collimator is to the table top or wallstand.
	**40” Horizontal or Vertical SID Indicator**	Illuminates when the x-ray tube head is rotated to face horizontally or vertically 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.

6.2. SRS J1000 Buttons and Operation

The SRS J1000 is designed to move vertically as well as horizontally. It can be interlocked to the SRS S114 when in cabinet horizontal position to maintain precise alignment for vertical beam shots. The SRS J1000 has a rotation indexer that shows the cabinet angle, having a range of 0º (cabinet horizontal) to 105º (past vertical). The SRS J1000 cabinet also has a button to remotely switch the collimator light on or off.

Operator Control	Name	Description
	**Indexer lever**	Depress this lever and hold to tilt the cabinet between 0º to 105º with detents in 15º increments. Release the lever to lock in a detent. Adjacent to the lever there is an analog display showing the current angle of the cabinet. Indicated 0º is for vertical beam shots (cabinet is parallel to the ground) and 90º is for horizontal beam shots (cabinet is perpendicular to the ground).
	**Vertical Lock Release**	Depress this trigger to release the vertical lock of the SRS J1000 and move the cabinet upwards or downwards. Release the trigger to re-engage the vertical lock.
	**Horizontal Lock Release**	Depress this button to release the horizontal lock of the SRS J1000 and move the cabinet left or right. Release the trigger in order to re-engage the horizontal lock.
	**Remote Collimator Light Switch**	Depress this button located on the side of the cabinet to switch the collimator field light on or off.

The System Status Display (SSD) shows position/orientation information for the SRS J1000:

- SRS J1000 cabinet is horizontal (beam vertical) and it working height position.
- SRS J1000 cabinet is vertical (beam horizontal) and at its home position (completely to the left for shoot left equipment to the right for shoot right).
- SRS J1000 is in a different position than horizontal and vertical.

6.3. Display indicators on System Status Display (SSD)

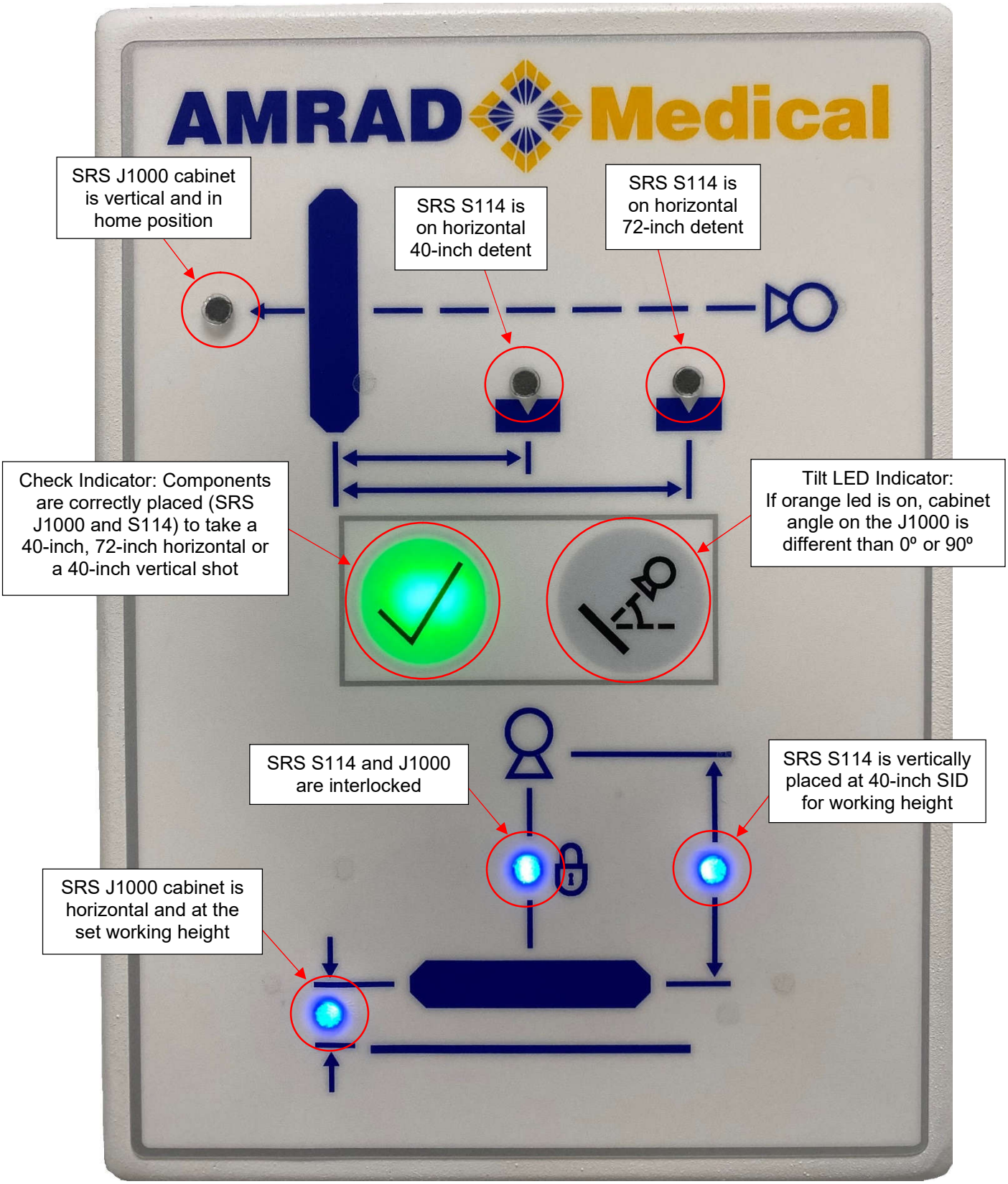
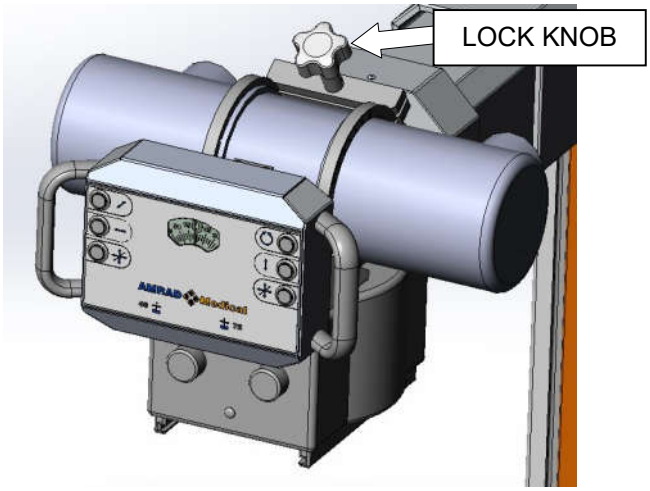


Figure 6-1: SRS System Status Display (Shoot Left Shown)

6.4. Tube Trunnion Mount (optional)

Trunnion rings allow the x-ray tube to rotate about its horizontal (long) axis. To do this, loosen the lock knob. Set the angle using the scale mounted on the trunnion ring assembly. Re-tighten the lock knob.



CAUTION

TO PREVENT TUBE DRIFT AND A POTENTIALLY UNUSABLE RADIOGRAPH, ALWAYS LOCK THE TRUNNION ASSEMBLY BEFORE TAKING AN EXPOSURE