InnoVet® VERSA Radiographic System

Installation & Service Manual

Part Number 07169 Rev. D

This manual must remain with the equipment. Consult accompanying documents as applicable.

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Record of Revisions

Revision History

Table 1: Revision History

Rev	Date	ECR No	Reason for Change
A	MAY 2015	8684	Production Release
B	OCT 2015	8827	Added two graphics to Sect. 3.6.3.5
C	JULY, 2017	9607	Updated address to Niles, IL
D	FEB, 2020	10435	Removed Sections 5, 6, and 7 (Troubleshooting, Schematics, and Replacement parts).

1. Safety

1.1. Overview

The proper use of this manual will provide installation, calibration, and operational procedures to prolong the life of this product.

1.1.1. Radiation safety

It is important that everyone associated with x-ray work is familiar with the recommendations of the Department of Health, National Bureau of Standards, and the National Council on Radiation Protection. The control of diagnostic x-ray equipment varies in detail from state to state. However, in general, all of the states adhere strictly to the established recommendations of the NCRP. Prior to operation, be sure that all personnel who are authorized to operate the x-ray system are familiar with the established regulations of the authorities named above. Also, they should be monitored to assure that they conform to the recommendations.

Current sources of information include:

- National Council on Radiation Protection Report No. 33 (Medical X-Ray and Gamma-Ray Protection for Energies up to 10 MEV-Equipment Design and Use).
- National Bureau of Standards Handbook No. 76 (Medical X-Ray Protection up to Three Million Volts). Refer to NCRP Report No. 33.
- Current recommendations of the International Committee on Radiation Protection.

Although x-ray radiation is hazardous, x-ray equipment does not pose any danger when it is properly used. It is the responsibility of all service and operating personnel to be properly informed on the hazards of radiation. Also, those responsible for the system must understand the safety requirements for x-ray operation. Study this manual and the manuals for each component in the system to
become aware of all the safety and operational requirements.

WARNING

This x-ray unit may be dangerous to patient and operator unless safe exposure factors and operating instructions are observed.

CAUTION

Positioning the X-ray tube and Collimator incorrectly could cause the X-ray field to be misaligned with the receptor, resulting in unacceptable images.

1.2. Statement of liability

The Innovet Versa Veterinary device is sold under the understanding and assumption that this product will be installed and maintained by qualified and experienced x-ray service personnel with a basic understanding of general radiographic devices. Installing the Innovet Versa Veterinary device incorrectly could possibly result in damage to the device and/or components connected to the device. The manufacturer does not assume any responsibility for the following:

- Improper hoisting or lifting equipment
- Equipment improperly installed
- Equipment improperly operated and tested
- Equipment improperly maintained or repaired
- Equipment which has been modified or tampered with in any way without written factory approval

The Innovet Versa Veterinary device is only one component of a radiation producing x-ray device. Even though the design features include primary and secondary beam limitation, it is the responsibility of the operator to comply with all radiation safety guidelines. The Innovet Versa Veterinary device is sold with the understanding this device will be operated by trained and experienced x-ray technologists. Manufacturer will not assume any responsibility for the following:

- Over exposure to patient and or operator due to poor techniques and procedures.
- Injury or risk to any person as a result of x-ray exposure.
- Injury or damage due to improperly trained personnel.

Before installing or operating the Innovet Versa Veterinary device carefully read and follow these instructions and save them for future reference. Observe all cautions and warnings.

Opening or modifying any item within the device other than as expressly described in these instructions will void your warranty and can result in unsafe operation.

1.3. Definitions

Table 2: Definitions of various symbols that could be found on the equipment

Symbol	Description
	Alternating current.
	Direct current.
	This symbol identifies a protective earth terminal (ground).
	This warning symbol indicates a potential hazard to operators, service personnel or equipment. It indicates a requirement to refer to the accompanying documentation for details.
	Type B applied part.
	This symbol indicates that you must dispose of the table properly according to local laws and regulations. Because the table contains electronic components, it must be disposed of separately from household waste. When the table reaches its end of life, contact local authorities to learn about disposal and recycling options.
	UL classified/listed/recognized device (Canada and USA)

1.4. Safety conventions (used in this manual)

Specific safety information is listed in this manual in the form of WARNING, CAUTION, and NOTE statements. Pay close attention to these statements - they contain important information on avoiding potential hazards to you or the equipment or direct the user in the performance of a task. The statements and the information they reference are as follows:

1.4.1. Warning statements

- are used to indicate hazards or unsafe practices which COULD result in severe personal injury or death.
- appear in bold type.
- have a triangular symbol with an exclamation point above the text.
- are preceded by the word Warning.
- are always found before the step or piece of information to which they refer to.
- look like the following example:

WARNING

This text will describe special safety precautions to follow in order to avoid unsafe practices that COULD result in severe personal injury or death.

1.4.2. Caution statements

- are used to indicate hazards or unsafe practices which could result in minor personal injury or product or property damage.
- appear in bold type.
- have a triangular symbol with an exclamation point above the text.
- are preceded by the word Caution.
- are always found before the step or piece of information to which they refer to.
- look like the following example:

CAUTION

This text will describe special safety precautions to follow in order to avoid unsafe practices that could result in personal injury or product or property damage.

1.4.3. Note statements

- are used for 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.
- appear in bold type.
- have a hand-pointing symbol above the text.
- are preceded by the word Note.
- are always found before the step or piece of information to which they refer to.
- look like the following example:

☞ **Note**

This text 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.

1.5. Equipment safety guide lines

The following are general safety precautions:

- Do not defeat or bypass built-in equipment safety features.
- Observe all WARNING, and CAUTION statements, stated or implied, in the procedures.
- Follow all safety labels on the equipment.

The following warnings and cautions are specific to the Innovet Versa Veterinary device. Read them carefully - some of them are not obvious to typical equipment use.

1.5.1. ESD (Electro Static Discharge) precaution

CAUTION

The Innovet Versa Veterinary device contains solid state devices which are sensitive to ESD (electro static discharge). When handling the internal electronics take the following precautions to avoid damage from static electricity:

- Use a ground strap whenever handling the digital detector.
- Before touching any electronic circuit boards, ground yourself by touching a grounded piece of metal. This could be a conduit, a plumbing pipe, or a grounded frame.
- Avoid touching all exposed circuitry on circuit boards.

WARNING

All of the components used with a UL classified Innovet Versa veterinary device shall comply with UL 60601 standards.

CAUTION

Make sure no tools or instruments are left on or inside the equipment when the service work is completed.

1.6. Radiation protection

WARNING

X-Rays are dangerous to both operator and others in the vicinity unless established safe exposure procedures are strictly observed.

The useful and scattered beams can produce serious, genetic or potentially fatal bodily injuries to any persons in the surrounding area if used by an unskilled operator. Adequate precautions must always be taken to avoid exposure to the useful beam, as well as to leakage radiation from within the source housing or to scattered radiation resulting from the passage of radiation through matter.

Those authorized to operate, test, participate in or supervise the operation of the equipment must be thoroughly familiar and comply completely with the currently established safe exposure factors and procedures described in publications such as Sub-Chapter J of Title 21 of the Code of Federal Regulations, “Diagnostic x-ray Systems and their Major Components,” and the National Council on Radiation Protection (NCRP) No. 33, “Medical x-ray and Gamma-Ray protection for energies up to 10 MeV-Equipment Design and Use,” as revised or replaced in the future.

Failure to observe these warnings may cause serious, genetic or potentially fatal bodily injuries to the operator or those in the area.
Those working in the immediate area must protect themselves with lead shielding. These items would include but not necessarily be limited to goggles, thyroid shield, apron and gloves with a lead equivalency of not less than 0.5 mm.

Note

The best safety rule for x-ray operators is: “Avoid exposure to the primary beam at all times.”

1.7. Monitoring Personnel

Monitoring of personnel to determine the amount of radiation to which they have been exposed provides a valuable cross-check to determine whether or not safety measures are adequate. The most effective method of determining whether or not the existing protective measures are adequate is the use of instruments to measure the exposure in rads. This measurement should be taken at all locations where the operator or any portion of his body may be during exposure.

A common method of determining whether personnel have been exposed to excessive radiation is the use of film badges. These are x-ray sensitive film enclosed in a badge which incorporates metal filters of varying degrees of transparency to x-ray radiation. Even though this device only measures the radiation which reaches the area of the body on which it is worn, it does furnish an indication of the amount of radiation received.

1.8. Manufacturer's responsibility

Although this equipment incorporates protection against x-ray radiation other than the useful beam, practical design cannot provide complete protection. Equipment design does not compel the operator or his assistants to take adequate precautions. Nor does it prevent the possibility of improper use which results in authorized or unauthorized persons from carelessly, unwisely, or unknowingly exposing themselves or others to direct or secondary radiation. Allow only authorized, properly trained personnel to operate this equipment.

Be certain that all personnel authorized to use the equipment are aware of the danger of excessive exposure to x-ray radiation.

This equipment is sold with the understanding that the manufacturer, its agents, and representatives do not accept any responsibility for over-exposure of patients or personnel to x-ray radiation. Furthermore, the manufacturer does not accept any responsibility for over-exposure of patients or personnel to x-ray radiation generated by this equipment which is a result of poor operating techniques or procedures.

Also, no responsibility will be assumed for any machine that has not been serviced and maintained in accordance with the system technical manual, or which has been modified or tampered with in any way.

1.9. In case of malfunction

If a malfunction is suspected, turn the power OFF at the main line disconnect and have a qualified service engineer inspect the equipment.

WARNING

Never open a component cover, because potentially dangerous voltages are present.

1.10. Safety at installation

WARNING

X-Rays are dangerous to both operator and others in the vicinity unless established safe exposure procedures are strictly observed.

WARNING

Keep fingers clear of the overlapping sections as the float-top moves.

WARNING

Once assembled, make sure the tube arm assembly is securely tightened and will not tilt, rotate or move in any way.

WARNING

There is no access to the interior of the high voltage transformer. This is a sealed unit and opening it in the field without guidance by technical support will void the factory warranty.

WARNING

Parts of the installation procedures require power to be supplied to the unit, extreme care MUST be exercised to insure the safety of service and any other personnel in the area.

CAUTION

Before inserting or removing the external memory card, make sure there is no power to the control console (for APR only).

Though this equipment is built to the highest standards of electrical and mechanical safety, the useful X-ray beam becomes a source of danger in the hands of the unauthorized or unqualified operator. Excessive exposure to x-radiation causes damage to human tissue.

Adequate precautions must be taken to prevent unauthorized or unqualified persons from installing, servicing or operating this equipment or exposing themselves or others to its radiation. Only qualified personnel should install, maintain, and operate this equipment. Only qualified service personnel should remove electrical covers.
Before installation, calibration, and final adjustments, persons qualified and authorized to operate this equipment should be familiar with the Recommendations of the International Commission on Radiological Protection, contained in Annals Number 26 of the ICRP, and with the applicable national and local standards.
The equipment described in this manual will perform reliably when installed, maintained, and operated, in accordance with the instructions of this manual by qualified personnel. This equipment is sold with the understanding that the user assumes sole responsibility for radiation safety and that the manufacturer does not accept any responsibility for the following:

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

We are proud of our products and are confident they will provide many years of useful and enjoyable service.

CAUTION

This manual is for use by personnel qualified to install, calibrate, maintain and service radiographic equipment. Hazardous voltages may be present, and persons unfamiliar with safe operating procedures should not attempt to perform service on this device.

1.11. Safety at installation

Personnel engaged in maintenance activities should exercise normal caution and care while working with electro-mechanical equipment. Verify that the incoming power supply is turned OFF before removing or opening any electrical power panels or covers.

WARNING

Before removing or opening any electrical power panels or covers, verify that the incoming power supply is turned OFF.

WARNING

In the event maintenance procedures require power to be supplied to the unit, extreme care MUST be exercised to insure the safety of service and any other personnel in the area.

Always verify that the equipment is properly grounded before attempting any electrical operation or adjustment.

WARNING

The generator main storage capacitors retain their charge for some time after the unit is turned off. Although the areas where this voltage may be present are covered with a protective layer of Lexan, it is imperative that all service personnel are cognizant of the significant shock hazard the capacitor bank voltage represents. Prior to servicing the power components, ensure that the LED on the Charge Sense PCB is not lit, and verify there is no capacitor bank voltage with a DC voltmeter. Refer to the generator manual for further details.

Certain tests require the production of X-rays. Field personnel should take precautions to ensure their personal safety and the safety of others in close proximity. Minimum precautions are as follows:

- Wear lead aprons
- Personnel remaining in the X-ray room during exposure should be behind a lead shield
- Minimize radiation scatter through doorways, walls and floor.

CAUTION

Make sure no tools or instruments are left on or inside the equipment when the maintenance work is completed.

WARNING

Turn off all electrical power to the table. Also, make sure that power source is locked out and tagged "Equipment Being Serviced" before servicing the generator. You or someone else could get seriously injured if you do not.

1.12. Identification labels

The Innovet Versa Veterinary device components have manufacturing and certification information affixed. The manufacturing label contains:

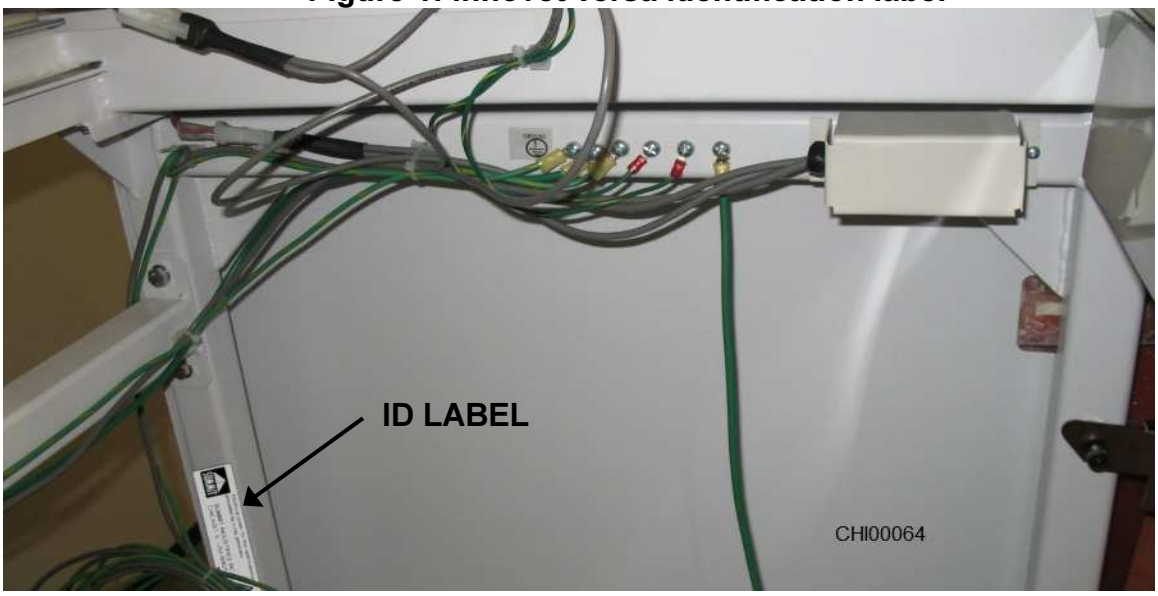
- The place, month, and year of manufacture
- The model number and serial number of the component
- The full name and address of the manufacturer of the component

A label may combine both certification and manufacturing information.

1.12.1. ESD (Electro Static Discharge) precaution

The Innovet Versa Veterinary device identification label is located on the right rear table leg.

Figure 1: Innovet Versa identification label



1.13. ESD precaution

The Innovet Versa Veterinary device contains solid state devices which are sensitive to ESD (electro static discharge).

CAUTION

Always use an anti-static wrist strap when working on electrostatic sensitive devices, such as a digital detector or an electronic circuit board.

Avoid touching all exposed circuitry on circuit boards.

1.14. Radiation protection survey

A radiation protection survey must be made by a qualified expert after every change in equipment or change in operating conditions which might significantly increase the probability of personnel receiving more than the maximum permissible dose equivalent.

1.14.1. Restrictions on Use

WARNING

Do not install components or accessories that were not intended for use by the system. Failure to comply could result in damage to the equipment or injury to personnel.

The user is responsible for ensuring that the application and use of the Innovet Versa device does not compromise the patient contact rating of any equipment used in the vicinity of, or in conjunction with, the system.

CAUTION

Observe all safety precautions recommended by the accessory equipment manufacturer in the user documentation provided with the equipment.

1.15. Common Nomenclature

In this manual, you will often see items referred to by different names, typically shorthand names, or by its basic or general use.

- **2pt:** 2 point generator. Operator selects kVp & mAs directly.
- **APR:** Anatomically PRogrammed - technique factors are provided based on the area of the target (head, chest, etc).
- **Console:** The operator interface for selecting kVp, mAs, APR, etc.
- **Console Cover:** Upper front table cover (with console), operator control panel.
- **Digital Image Receptor:** Camera, receptor, detector or digital detector.
- **ESD:** Electro Static Discharge.
- **Exposure Switch:** External exposure activation switch, commonly referred to as the foot switch, foot treadle, etc.
- **Grid Cabinet:** GC, film cabinet, film tray, grid tray, or carriage.
- **Grid Tracks:** Grid guides.
- **High Voltage Cables:** HV cables.
- **High Voltage Transformer:** HV tank or tank, HV Generator.
- **Integrated X-Ray Generator:** Generator.
- **Legs:** Feet, levellers, foot
- **Longitudinal:** Refers to left to right movement and vice versa (longitudinal, horizontal).
- **Operator Control Console:** Console or Control Console.
- **Power Module:** Two versions - Compact or Tall.
- **PCB or PCBA:** Printed Circuit Board or Printed Circuit Board Assembly.
- **Ramp Interlock Bracket:** This is the bracket that locks the grid cabinet to the tubestand. Common names are interlock, ramp bracket.
- **SID:** Source Image Distance - Distance from the x-ray tube focal spot to pre determined target (often the table top or the film/grid plane).
- **Table Top:** Often referred to as TT.
- **Table Top Panel:** Radiolucent top panel,
- **Transverse:** Refers to front to back movement and vice versa (cross table).
- **Tubestand:** Often referred to as TS or column.
- **Tubestand Base Platform:** Platform or base.
- **Tube Mount Platform:** Landing on tube arm where the x-ray tube mounts, often referred to as the tube platform.
- **Upper Tube Cover:** Housing that hides the x-ray tube and tube arm. Often referred to as the top cover, or top tube cover or upper cover.

2. Pre-installation

2.1. Overview

The x-ray device must be installed and serviced by an authorized Summit dealer. All warranties will be void if such installation or service is performed by persons not authorized by Summit.

Before installing the Innovet Versa veterinary device inspect the x-ray room to verify that it comply with the requirements outlined in this section.

WARNING

All of the components used with a UL classified Innovet Versa veterinary device shall comply with UL 60601 standards.

2.1.1. Personnel required

The installation of this equipment requires two persons. Each person should wear proper safety equipment during the installation.

2.1.2. Regulatory statements

It is the responsibility of the installer to complete and submit any regulatory forms and any other required documentation by the local agency.

All documentation must be submitted in the time frame prescribed by the FDA or local agency.

We are proud of our products and are confident they will provide many years of useful service when installed, adjusted, operated and maintained properly.

2.2. Tools required

2.2.1. Tools for installation

Qty	Item
1	24” step-stool or small ladder
1	Set of socket wrenches (SAE)
1	Set of English (SAE) Allen keys
1	Phillips Screw drivers, #2 and #3
1	Slotted Screw driver
1	Tape measure (minimum 12’)
1	Drill & drill bits (masonry bits if concrete construction)
1	Bubble level
1	Grounding strap, Bystat BWS 3000 or equivalent
1	Standard Plumb Bob
1	Chalk Line
1	3 mm and 4 mm metric hex wrenches
4	Non-oxidizing floor bolts (for mounting table to floor)
4	Rubber pads for ceramic tiles (to be placed on table feet)
1	Side cutter
1	Needle nose pliers
	Tie wraps

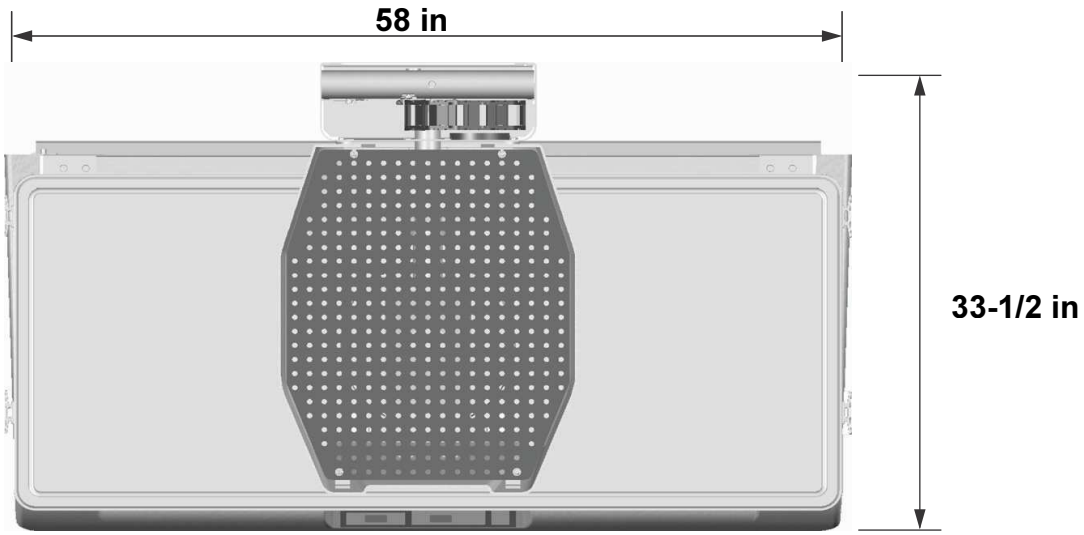
2.3. Space requirements

Note

If there is not enough room to move the table base through doorways etc., please refer to "Table installation" on page 4-17 for instructions on how to remove table top assembly.

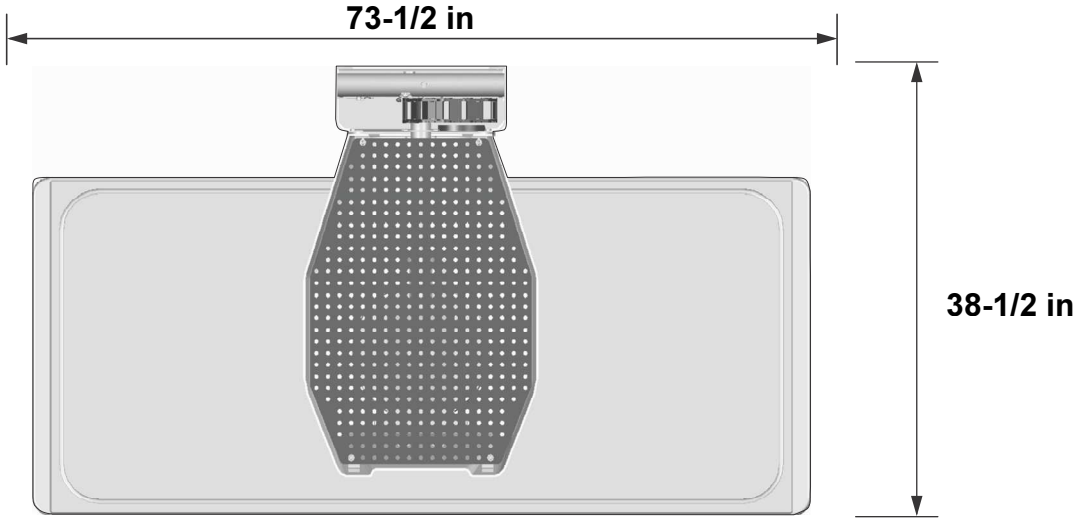
2.3.1. Fixed table top

Figure 2: Minimum space requirements. Fixed table top



2.3.2. 4-way table top

Figure 3: Minimum space requirements. 4-way table top



2.4. Power requirements

Refer to “Specifications” in operator manual for electrical requirements and ratings for the Innovet Versa veterinary device.

2.5. Unpacking

2.5.1. Inspect packages and parts

All boxes and packages need to be inspected at the time of delivery. If there is hidden or concealed damage to the product it is the dealer's responsibility to discover the damage within a reasonable amount of time and contact the shipping company to make a claim. If any damaged parts are discovered, order replacements or repair without delay to avoid delay in installation.

☞ **Note**

Do not dispose of any packing materials until the unit is fully assembled and known to be in good working order.

2.5.2. Uncrating and Unpacking

Before uncrating and unpacking the table and tube stand, move the crates as close to the table’s final location as possible.

☞ **Note**

Keep in mind that you will need approximately 3 feet (1 meter) of clearance from the rear of the table to install the tubestand and tube assembly.

2.5.2.1. Remove the horizontal shipping brace from the front of the table base, just above the two black anodized Allen bolts. Remove any packed components or packing materials from the inside of the table base. Set these aside.

2.5.2.2. Remove the hold-downs that secure the table base to the pallet. Carefully lift the table and position it close to its final location, leaving enough room to have access to the inside of the table base from both front and rear.

2.5.2.3. Inspect packages and parts according to the following information before proceeding with the installation as described in Chapter 4, “Installation”.

2.5.3. Freight policies

All shipments are F.O.B. factory.

To protect your company in the case of concealed damage it is recommended to accept freight "subject to inspection." This will make it easier to file a claim with the shipping company in the case of hidden damage. It is the responsibility of the dealer to file a shipping claim for any freight damage.

2.6. Contents, component identification

The Innovet Versa is shipped in two big boxes on one crate as shown in Figure 3-3. Make sure all parts listed below are included.

Figure 4: Innovet Versa shown without table top panel or shipping crate. Note this is Box 1 (noted below). TS is in Box 2 (not shown).

Box 1 - Table base

- List of components in box 1

Box 2 - Tubestand

- List of components in box 2

3. Installation

3.1. Overview

The installation will be carried out in the following order:

Make sure that the Innovet Versa veterinary device is received in good order and that the site is ready for the installation as described in Chapter 3, “Pre-installation” before starting the installation.

References
Throughout the installation procedure there will be references to the manuals listed below, be sure to locate these manuals and keep them on hand.

- Generator manual
- Collimator manual

☞ **Note**

Before beginning the installation, per instructions on next page, verify the following:
- All hardware is secure
- All internal wiring is secure
- Configuration of the product is correct
- All items on the customer order are included in the system.

3.2. Table base and tubestand installation - fixed tabletop

3.2.1. Table base installation

When the table base is in position ready for installation, start by bringing the table close to level - both left to right and front to back.

3.2.1.1. Carefully unpack the assembly, saving the packing materials until you know you will not need them.

3.2.1.2. In accessory bag, find the six blue and six red U-shaped plastic spacers.

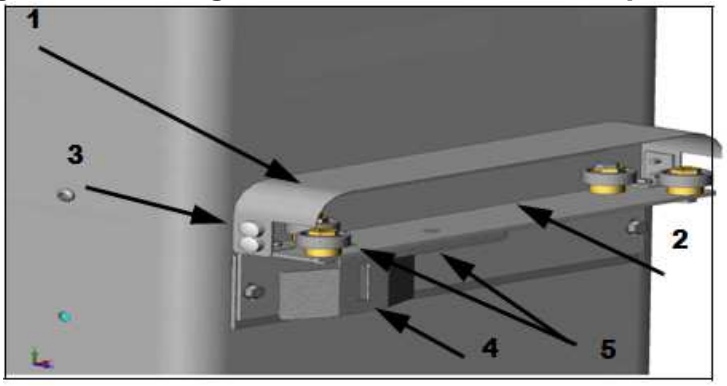
3.2.1.3. When table is level each foot should be fully tightened so that the shoulder of the foot is firmly against either the spacer or the bottom of the table/back rail. Use of the spacers makes each joint of the table base to the leveling feet into a solid, contiguous structure, minimizing any wobbles or table base motion.

3.2.1.4. Gently remove the radiolucent top panel from the frame and set it aside in a safe place. This will make for easier access to the inside of the table base during the installation.

3.2.2. Tubestand installation

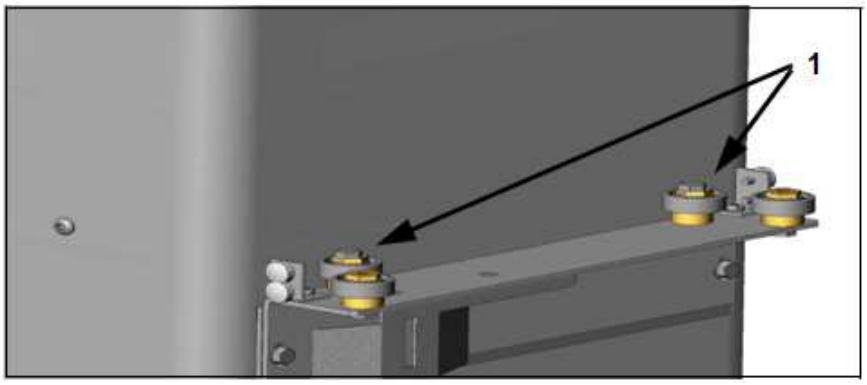
3.2.2.1. Remove the bearing cover (item 1 in figure below) on the bearing bracket (item 2) by removing the four plastic caps (item 3) over screw heads and unscrew the four screws. Remove the interlock ramp bracket by removing the two 1/4 -20 nuts and washers (item 5) securing it. Retain all (item 4) hardware.

Figure 5: Bearing bracket and interlock ramp bracket



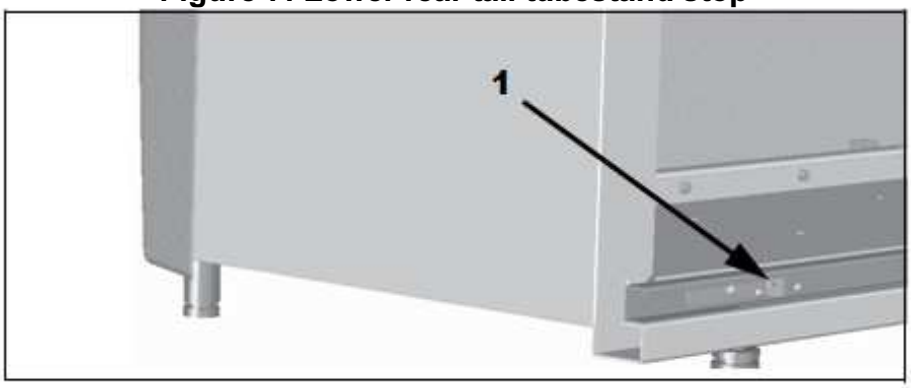
3.2.2.2. The tubestand has two, pre-set, adjustable, eccentric, bushings (item 1 in figure below) at the center of the upper/rearward roller bearings. These may have to be adjusted after final placement and leveling, if necessary, to remove any excess play.

Figure 6: Eccentric bushings



3.2.2.3. Using a flat screwdriver, remove the tubestand stop (item 1 in figure below) from either end of the table's lower rear rail. Retain all hardware.

Figure 7: Lower rear tail tubestand stop



3.2.2.4. Position the tubestand so that it is a few inches from the end of the back rail of the table with the tubestand lower bearings in line with the back rail.

3.2.2.5. Carefully tilt the tubestand away from the table until the elevated tubestand bearing can be pushed into the lower bearing rail.

☞ **Note**

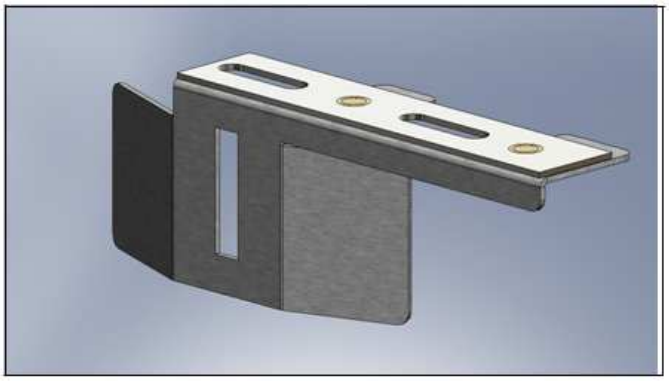
During next step, make sure that the lower bearings does not come back out while straightening the tubestand and that they are fully pushed into the rail.

3.2.2.6. Now straighten the tubestand and push it completely into the upper and lower bearing rails.

3.2.2.7. Reinstall the tubestand stop on the lower rail.

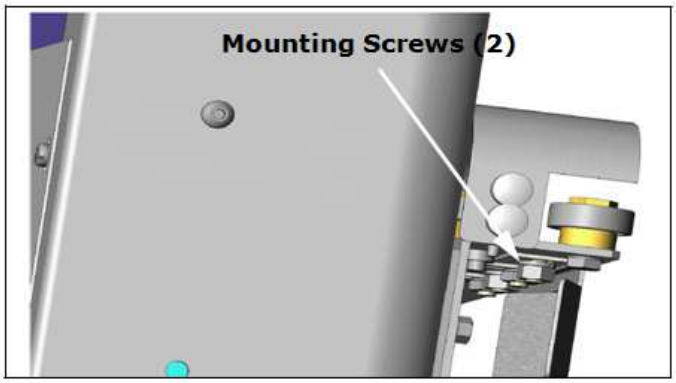
3.2.2.8. Locate the interlock ramp bracket.

Figure 8: Interlock ramp bracket



3.2.2.9. Install the interlock ramp bracket on the bearing bracket using the two 1/4-20 nuts and washers removed in step 1. Make sure to use the slotted holes farthest from the interlock bracket as shown in figure below.

Figure 9: Mounting of interlock ramp bracket to tubestand bearing bracket



3.2.2.10. Level the table. When leveled properly, the tubestand will glide easily from end to end and stay in position without drifting to either side.

3.2.2.11. Adjust the eccentrically mounted bearings (item 1 in Figure 1), if necessary, to eliminate front-to-back play while maintaining smooth action.

☞ **Note**

Clearance between 0.001 and 0.008" gives a satisfying excess play.

3.2.2.12. Install the upper bearing cover. Use the small plastic caps to cover the screw heads.

3.3. Table base and tubestand installation – 4-way float tabletop

3.3.1. Table top removal

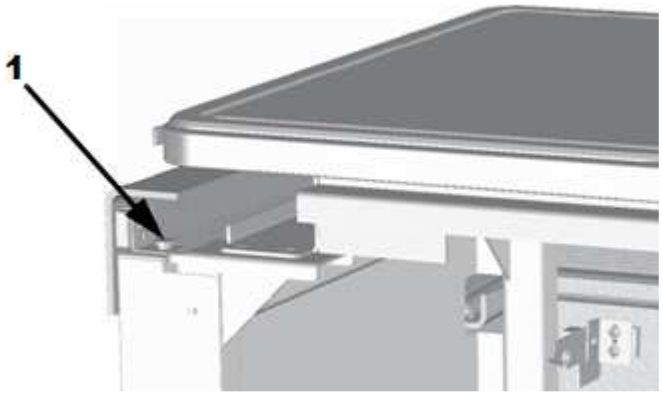
3.3.1.1. If, for any reason during installation, there is not adequate room (doorways) for a fully assembled four-way float top table to move, remove entire table top assembly - the whole table top assembly is disconnected to be lifted straight up. Proceed to next section "Entire table top assembly removal and Remount table top"

3.3.1.2. If you have no problem getting the table into place as it is shipped, skip the next two sections and proceed to "Table base installation".

3.3.2. Entire table top assembly removal

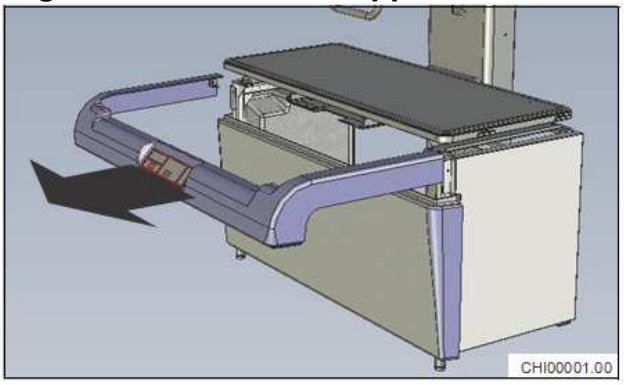
3.3.2.1. At the rear of the table, reach in and remove the thumb screw (item 1 in figure below), one on each side. Retain the screws.

Figure 10: Upper front cover mounting screws



3.3.2.2. Gently, pull upper front cover (item 1 in figure below) out, while making sure not to apply stress to cables and set the upper cover aside.

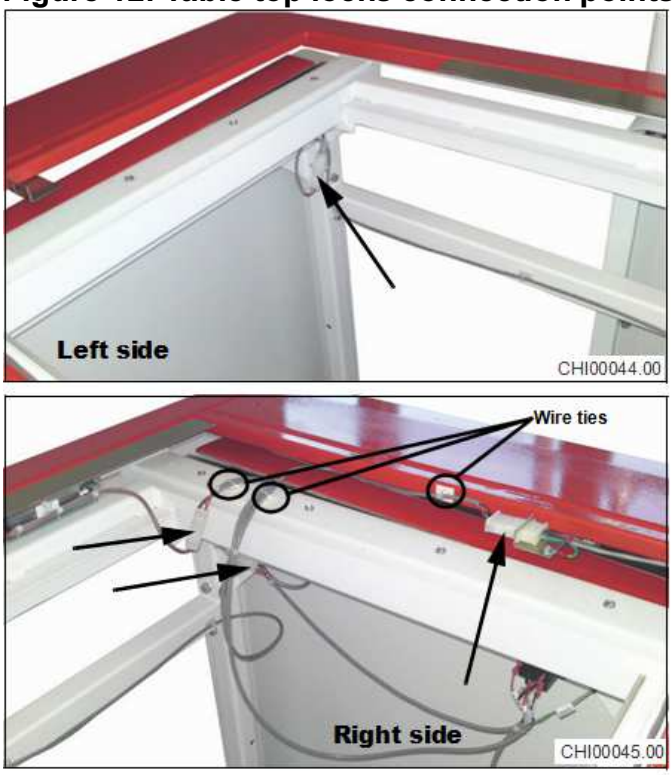
Figure 11: Removal of upper front cover



3.3.2.3. Gently remove the radiolucent top panel from the table top frame and set it aside in a safe place.

3.3.2.4. Disconnect the cables that power the table top locks at connection points, one on the left side and three on the right side, indicated in figure below.

Figure 12: Table top locks connection points

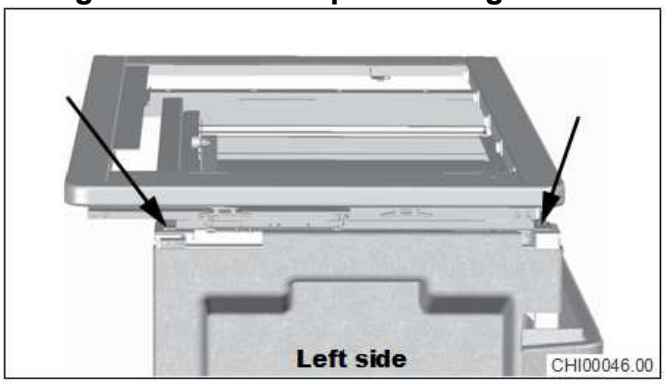


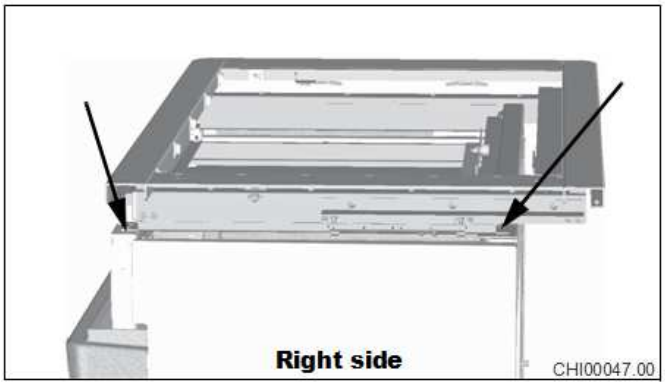
3.3.2.5. Remove ground screw and wire from pillow block here.

3.3.2.6. Cut wire ties as needed to completely disengage cables between the table base and table top.

3.3.2.7. Using the appropriate Allen key, unscrew the eight flat head socket cap screws, two in each corner (indicated in figure below), that secures the entire table top assembly to the table base.

Figure 13: Table top mounting screws





3.3.2.8. Carefully lift the entire table top assembly off and set aside.

3.3.3. Remount entire table top assembly

3.3.3.1. Move the table base close to its final position.

3.3.3.2. Reverse step 3.3.2.4 to remount the entire table top assembly. You do not need to put the covers back at this point.

3.3.4. Table base installation

3.3.4.1. When the table base is in position ready for installation, start by bringing the table close to level - both left to right and front to back.

3.3.4.2. Carefully unpack the assembly, saving the packing materials until you know you will not need them.

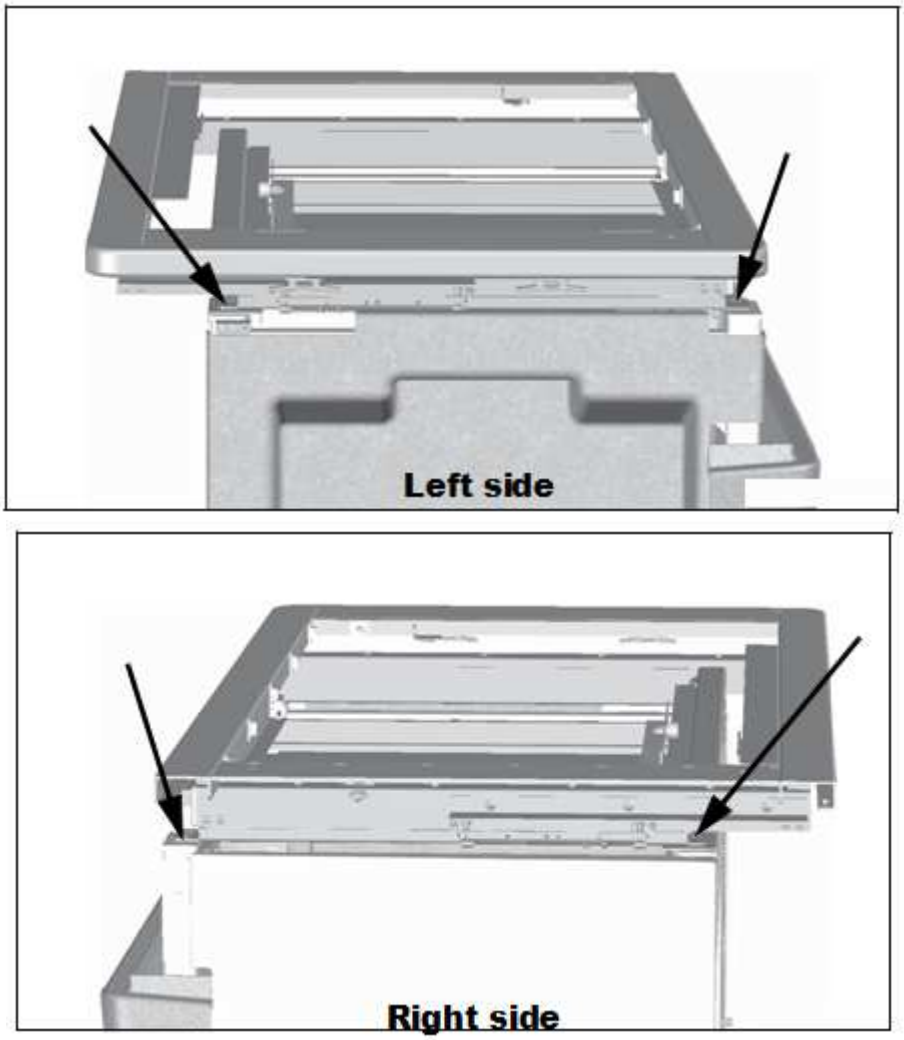
3.3.4.3. In accessory bag, find the six blue and six red U-shaped plastic spacers.

3.3.4.4. When table in level each foot should be fully tightened so that the shoulder of the foot is firmly against either the spacer or the bottom of the table/back rail. Use of the spacers makes each joint of the table base to the leveling feet into a solid, contiguous structure, minimizing any wobbles or table base motion.

3.3.4.5. Gently remove the radiolucent top panel from the frame and set it aside in a safe place. This will make for easier access to the inside of the table base during the installation.

3.3.4.6. The float top assembly has been shipped completely assembled, and can install as a single unit. The bottom section of the float top assembly uses eight flat- head screws to hold it to the table base, two in each corner (1 in). The longitudinal lock assembly is mounted under the rear of the float top assembly.

Figure 14: Float top assembly fittings to the table base



3.3.4.7. Tighten the screws well. Gently move the float top assembly through its range of motion to verify proper operation.

WARNING

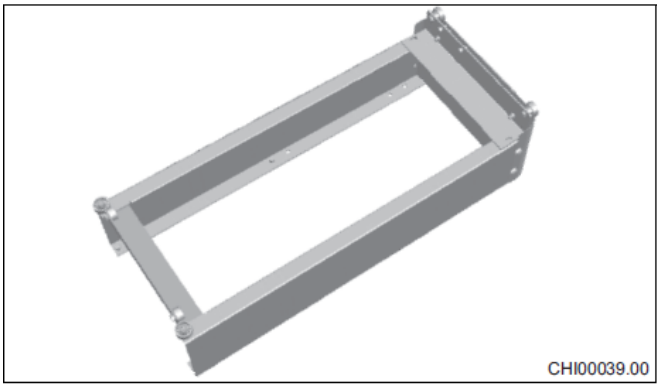
Keep fingers clear of the overlapping sections as the float-top moves.

3.3.5. Tubestand installation

3.3.5.1. To allow for back and forth movement of the table top, a tubestand adapter needs to be mounted to the tubestand.

3.3.5.2. Locate the tubestand adapter box in the tubestand box.

Figure 15: Tubestand adapter box



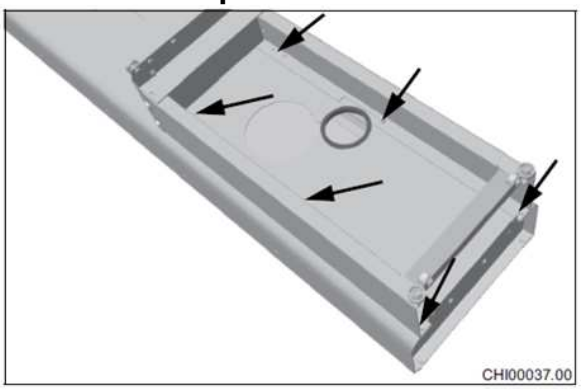
3.3.5.3. Locate a small bag with six 1/4 -20 bolts with washers taped onto the tubestand adapter box.

3.3.5.4. Lay the wallstand down, front side up.

3.3.5.5. Place the tubestand adapter box on the tubestand as shown in figure below.

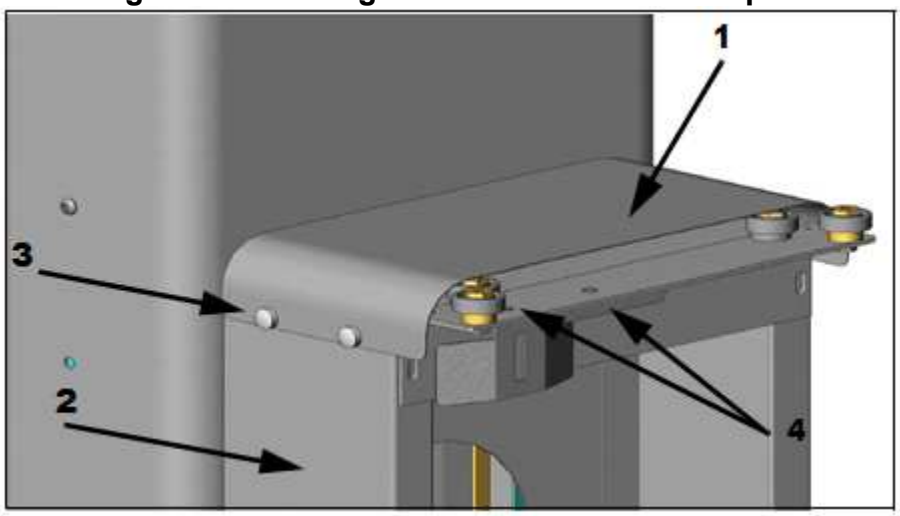
3.3.5.6. Use the six 1/4-20 bolts with washers to mount the tubestand adapter box to the lower part of the tubestand as shown in figure below.

Figure 16: Tubestand adapter box mounted to the tubestand



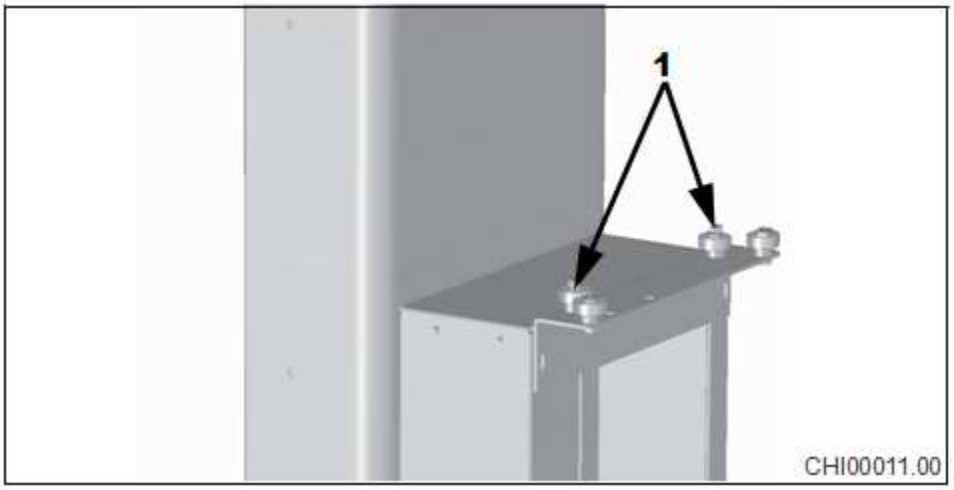
3.3.5.7. Remove the bearing cover (1 in figure below) on the tubestand adapter (item 2) by removing the four plastic caps (item 3) over screw heads and unscrew the four screws. Remove the interlock ramp bracket by removing the two 1/4 - 20 nuts and washers (item 4) securing it. Retain all hardware.

Figure 17: Bearing cover on tubestand adapter



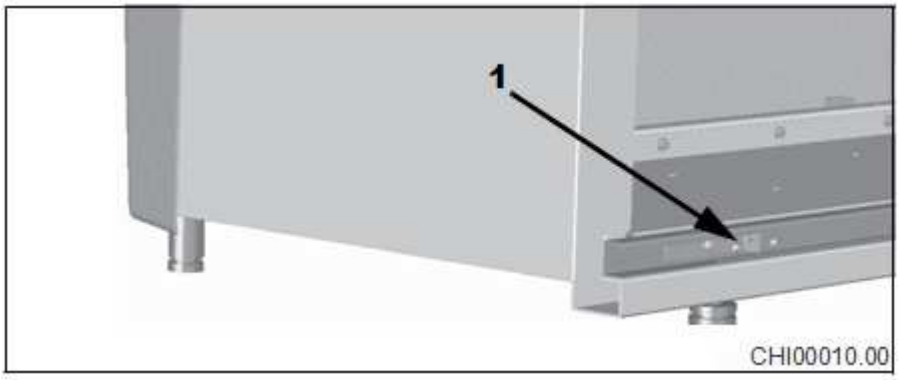
3.3.5.8. The adapter has two, pre-set, adjustable, eccentric, bushings (1 in figure below) at the center of the upper/rearward roller bearings. These may have to be adjusted after final placement and leveling, if necessary, to remove any excess play.

Figure 18: Eccentric bushings



3.3.5.9. Using a flat screwdriver, remove the tubestand stop (1 in figure below) from either end of the table's lower rear rail. Retain all hardware.

Figure 19: Lower rear rail tubestand stop



3.3.5.10. Position the tubestand so that it is a few inches from the end of the back rail of the table with the lower tubestand bearings in line with the back rail.

3.3.5.11. Carefully tilt the tubestand away from the table until the elevated tubestand bearing can be pushed into the lower bearing rail.

☞ **Note**

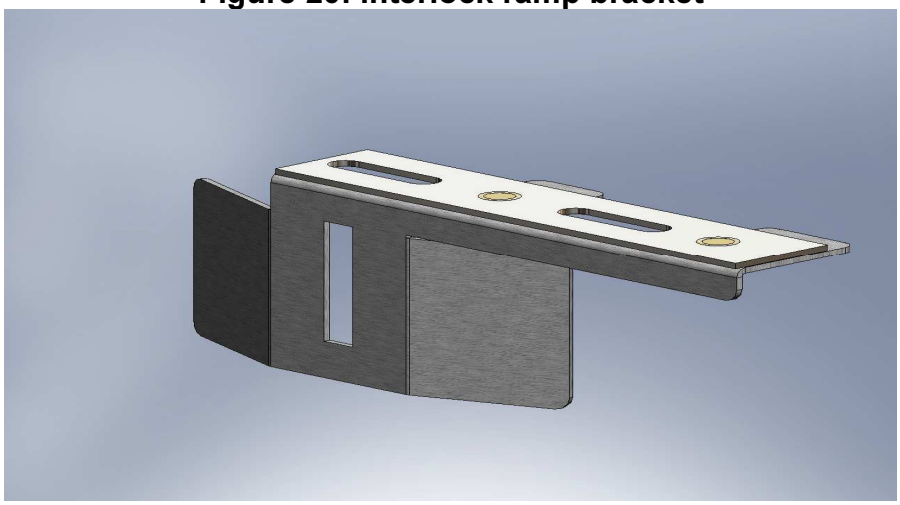
During next step, make sure that the lower bearings does not come back out while straightening the tubestand and that they are fully pushed into the rail.

3.3.5.12. Now straighten the tubestand and push it completely into the upper and lower bearing rails.

3.3.5.13. Reinstall the tubestand stop on the lower rail.

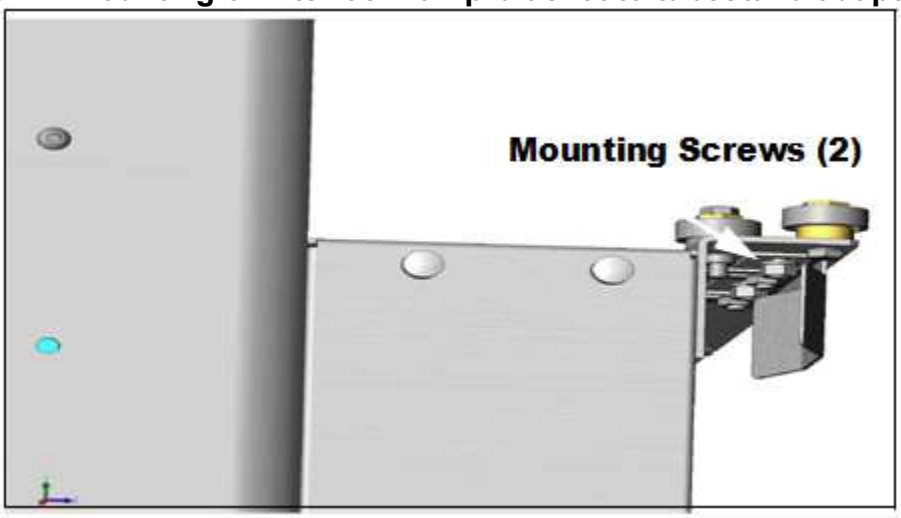
3.3.5.14. Locate the interlock ramp bracket

Figure 20: Interlock ramp bracket



3.3.5.15. Install the interlock ramp bracket on the bearing bracket using the two 1/4-20 nuts and washers removed in step 3.3.5.7. Make sure to mount using the slotted holes closest to the interlock bracket as shown in figure below.

Figure 21: Mounting of interlock ramp bracket to tubestand adapter box



3.3.5.16. Level the table. When leveled properly, the tubestand will glide easily from end to end and stay in position without drifting to either side.

3.3.5.17. Adjust the eccentrically mounted bearings (1 in

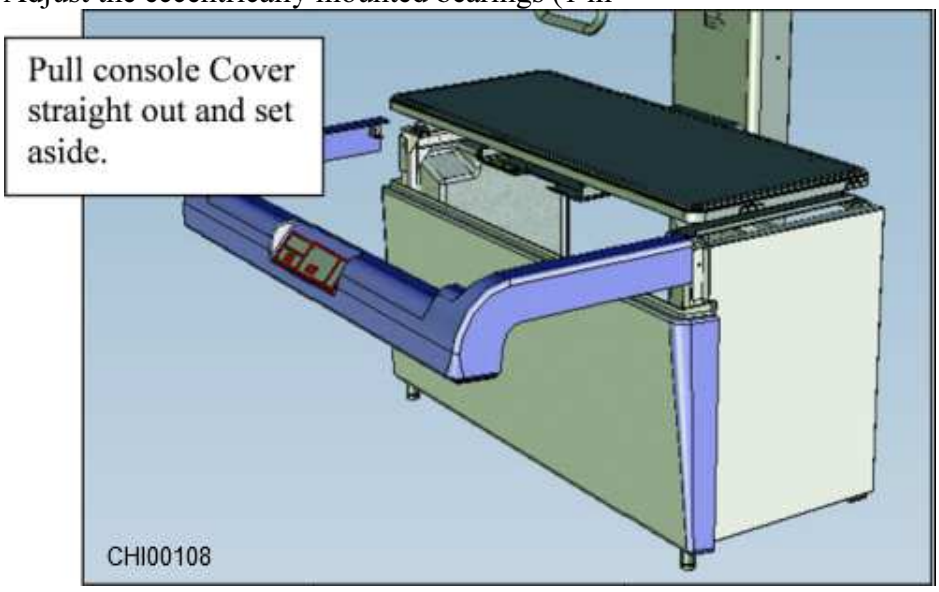


Figure 30), if necessary, to eliminate front-to-back play while maintaining smooth action.

☞ **Note**

Clearance between 0.001 and 0.008" gives a satisfying excess play.

3.3.5.18. Install the upper bearing cover. Use the small plastic caps to cover the screw heads.

3.4. Table base and tubestand installation – fixed tabletop, fixed tubestand

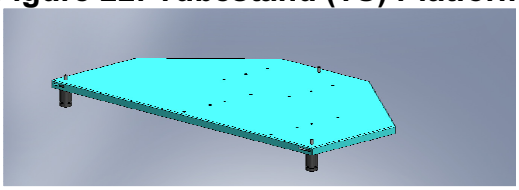
3.4.1. Assemble Tubestand & Platform

3.4.1.1. Determine where the finished Table will be located.

3.4.1.2. Carefully unpack the boxes & examine parts for damage, saving the packing materials until the installation is finished.

3.4.1.3. Place the TS Platform in the area where the finished Table will be located.

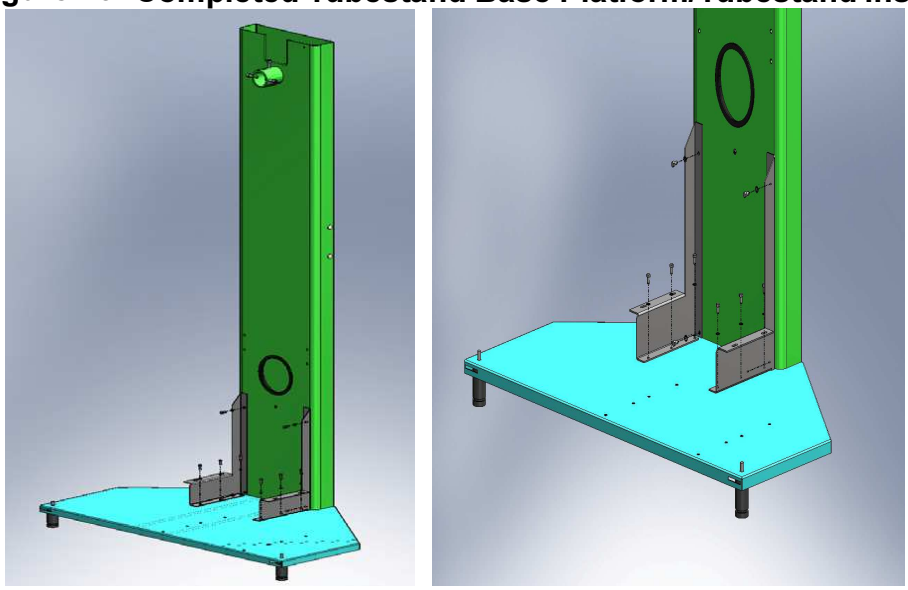
Figure 22: Tubestand (TS) Platform



3.4.1.4. Level the TS Platform by loosening the gray plastic Foot where the Platform is lower than the rest. Insert the appropriate amount of red or blue Spacers between the top of the Foot & the underside of the Platform & tighten the Foot. Repeat as needed until the Platform is level. When done, all three (3) Feet must be tight against the Spacer (if any) & the Platform.

3.4.1.5. Loosely attach the TS Lower Gussets to the front of the TS with four (4) ¼-20 x ½" hex Bolts & Washers, as shown in figures below.

Figure 23: Completed Tubestand Base Platform/Tubestand Installation



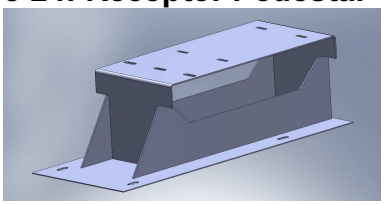
3.4.1.6. Place the TS with Gussets onto the Platform & attach the Gussets to the Platform with six (6) ¼-20 x ½"-long hex Bolts & Washers. Make sure the rear surface of the TS is flush with the rear surface of the Platform & that the front of the TS is perpendicular to the top of the Platform & tighten all ten (10) Bolts. If the Assembly is unstable, place some weight on the top of the Platform to stabilize.

3.4.2. Receptor Installation

This section only covers the mounting/placement of the receptor. For installation/ hook-up see the receptor manual.

3.4.2.1. Locate the Receptor Pedestal

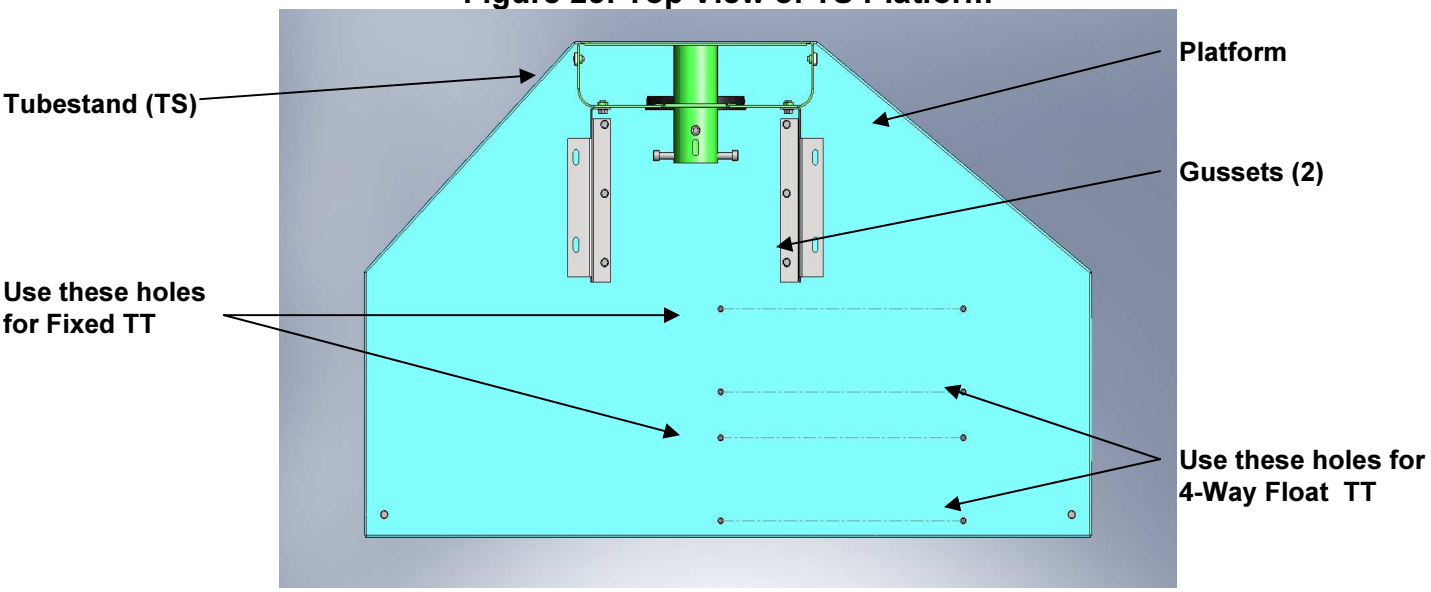
Figure 24: Receptor Pedestal



3.4.2.2. Determine if you are installing a Fixed or 4-way Float Top Table.

3.4.2.3. Identify the appropriate holes in the top surface of the TS Platform for the type of Table Top you are installing (see figure below).

Figure 25: Top View of TS Platform

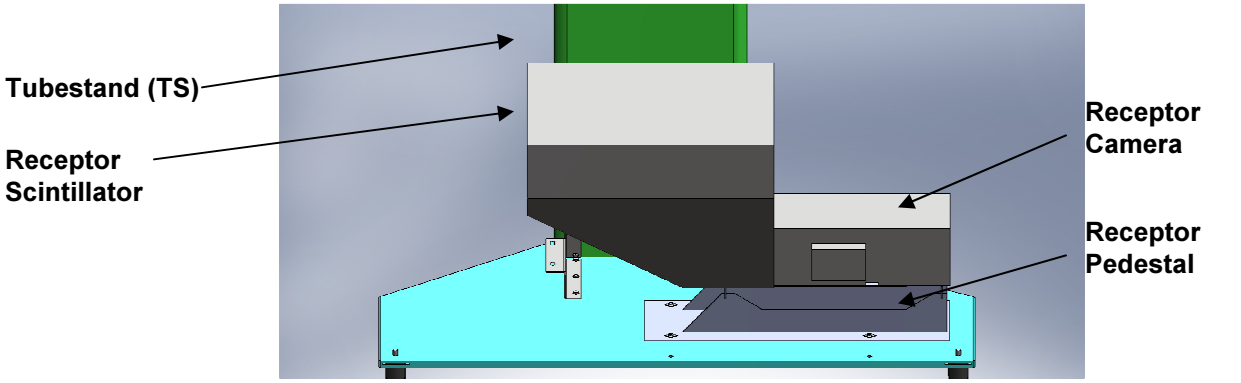


3.4.2.4. Loosely, mount the Receptor Pedestal onto the top of the TS Platform using four (4) ¼”-20 x ½"-long hex Bolts & Washers in the appropriate holes of the Platform (see figure below).

WARNING

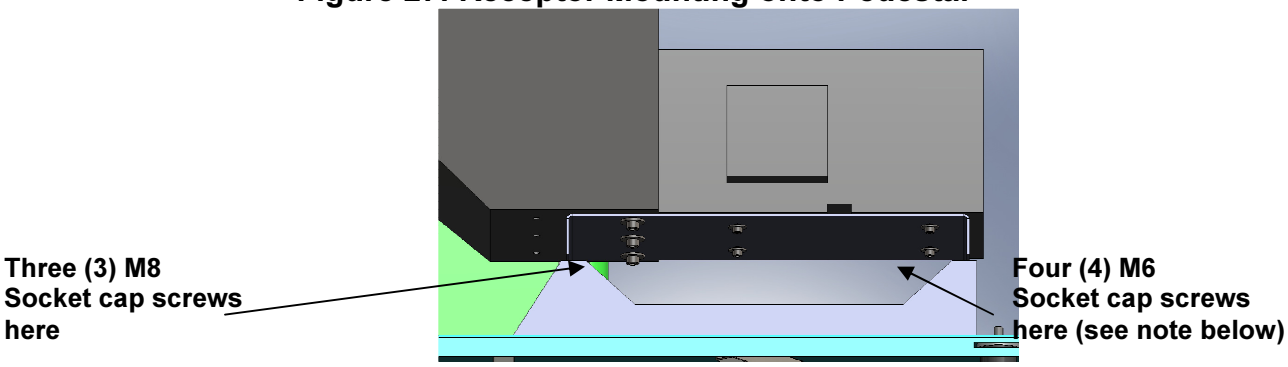
The X-ray sensitive area of the Receptor is called the Scintillator & it is very fragile. Mechanical stress of any kind, especially impacts, are likely to damage the Scintillator making it unusable. Therefore, handle the Receptor with extreme care so as not to stress the Scintillator in any way. It is strongly recommended to place a foam rubber or Styrofoam protector over the Scintillator whenever possible to protect against damage.

Figure 26: Receptor Mounting



3.4.2.5. Carefully, place the Digital Image Receptor onto the Pedestal & loosely attach it using (3) M8 socket cap Screws and washers & four (4) M6 socket cap Screws and Washers (see figure below). The Receptor will be tightened onto the Pedestal after final adjustment positioning.

Figure 27: Receptor Mounting onto Pedestal



Note

Certain receptors may require M8 screws (provided) in this location.

3.4.2.6. Once the receptor is mounted, adjust the feet on the TS Platform as necessary to ensure that the Scintillator is level. See step 3.4.1.4 above.

3.4.3. Table Installation

3.4.3.1. Locate the Table. Gently remove the radiolucent Top Panel from the Table top frame and set it aside in a safe place. Then remove the front console cover. This is accomplished by removing the thumb Screws inside the Cover at the rear of the Table [four (4) hex nuts may be attaching it to the Table, one (1) at each corner from the underside of the Panel], then pulling the console Cover straight out & away from the Table (see figures below). Set this Cover aside in a safe place. Then remove the lower front Cover by lifting the two (2) side latches on the rear surface of the Cover until they disengage the two (2) side pins. This will allow the Cover to tilt out slightly. When this is done, you may then lift the Cover so that it disengages from its Bottom Brackets on the Table frame. Lift to remove the Cover, and set aside in a safe place. This will make for easier access and to see the inside of the Table during the installation process.

Figure 28: Removing thumb Screws (as seen from rear of Table)

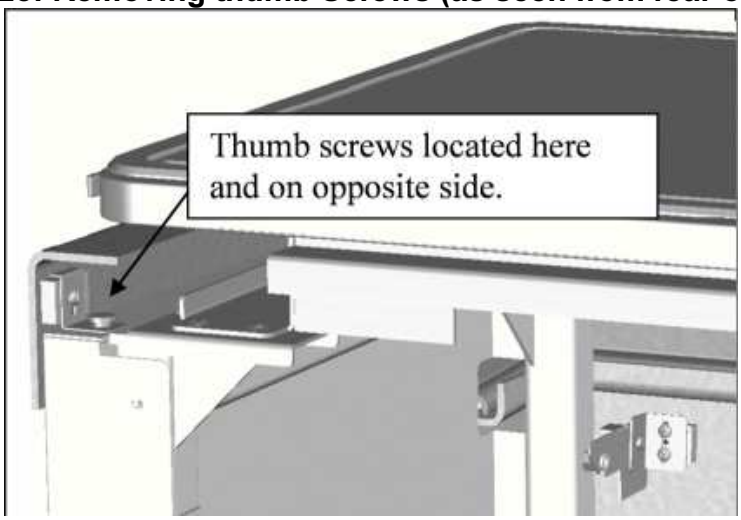


Figure 29: Remove Console Cover

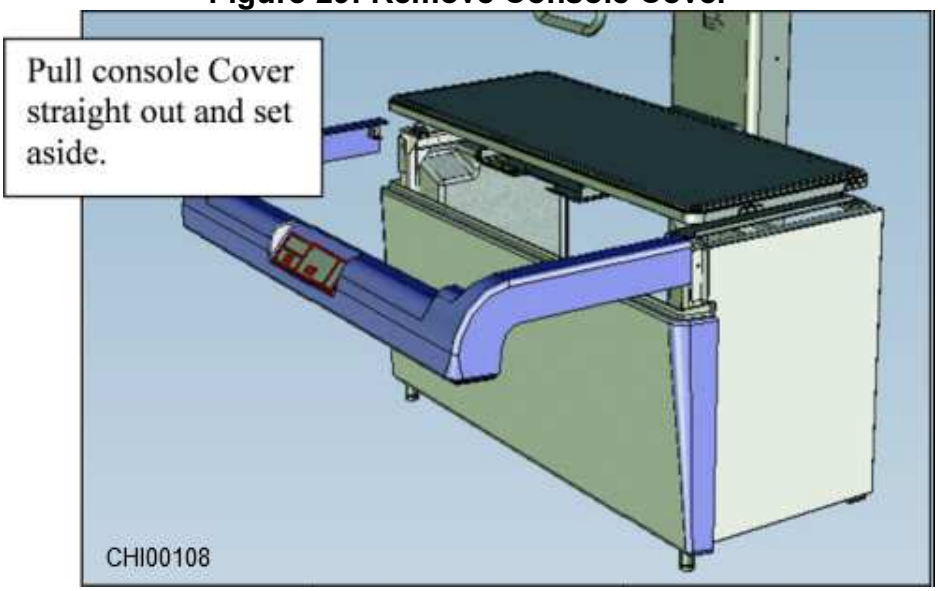
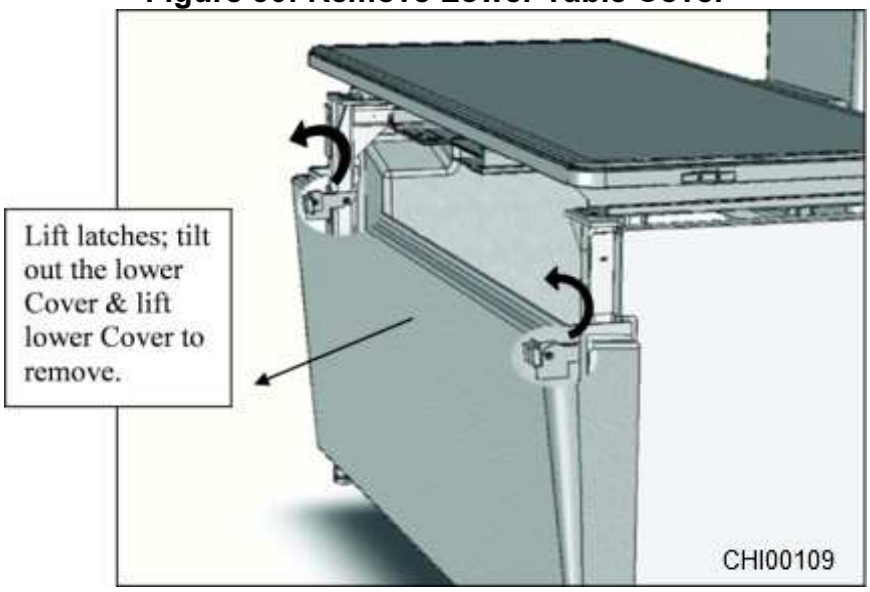
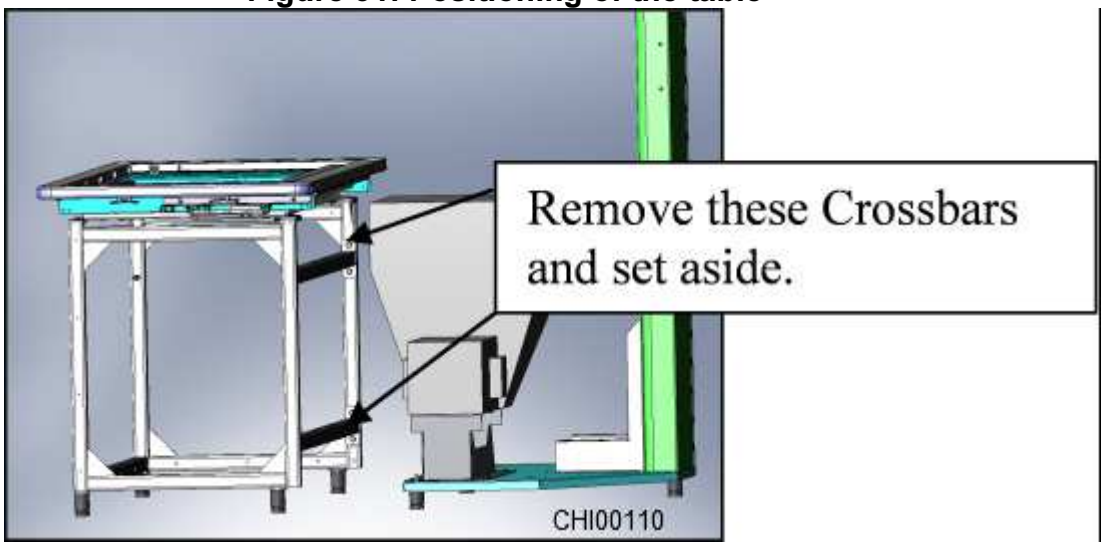


Figure 30: Remove Lower Table Cover



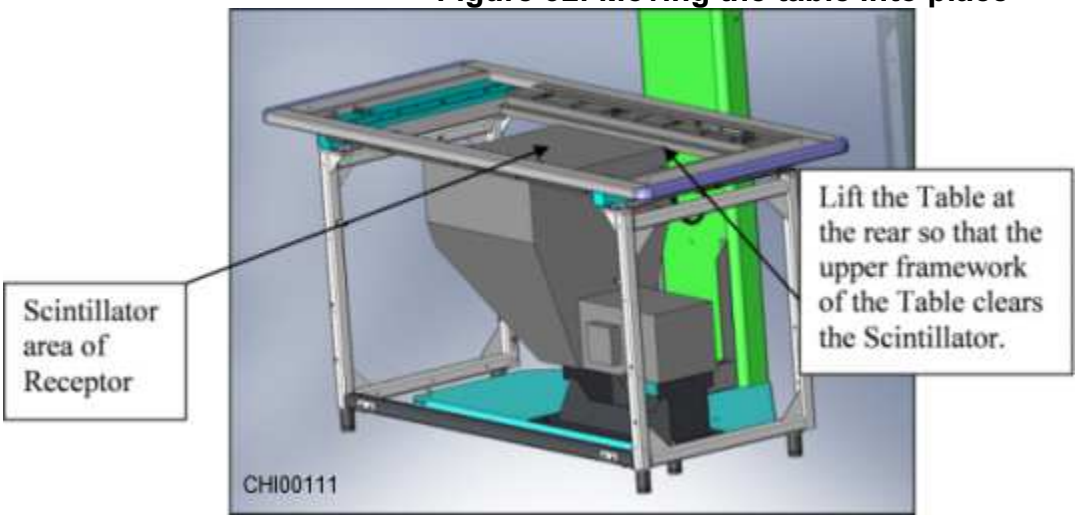
3.4.3.2. Position the Table so that it is in front of the Receptor. Remove the two (2) rear Crossbars on the Table Frame and set aside (see figure below).

Figure 31: Positioning of the table



3.4.3.3. Lift the table a few inches off the ground so that the rear of the Table is well above the Scintillator of the Receptor. While the Table is lifted, move the Table back, making sure that the Table does not come into contact with the Scintillator (See figure below). You may set the Table down once the rear of the Table is clear of the Scintillator.

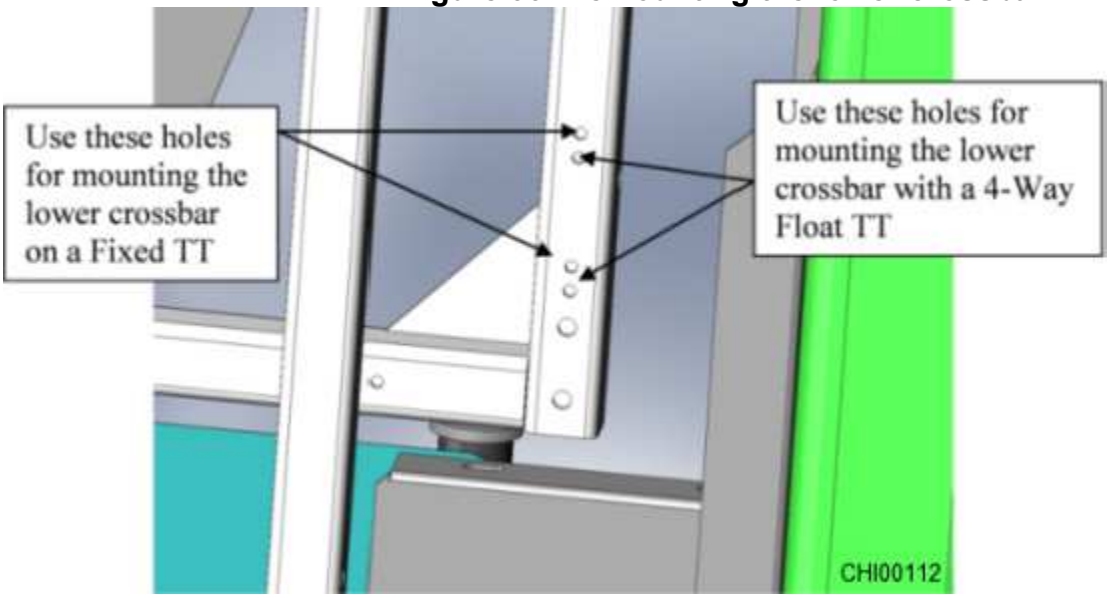
Figure 32: Moving the table into place



3.4.3.4. Reconnect the top Crossbar at the rear of the Table Frame.

3.4.3.5. Reconnect the lower Crossbar at the rear of the Table Frame. Use the lower set of threaded holes for the Crossbar when you have a 4-way Float TT, and the upper holes when you have a Fixed TT (See figure below).

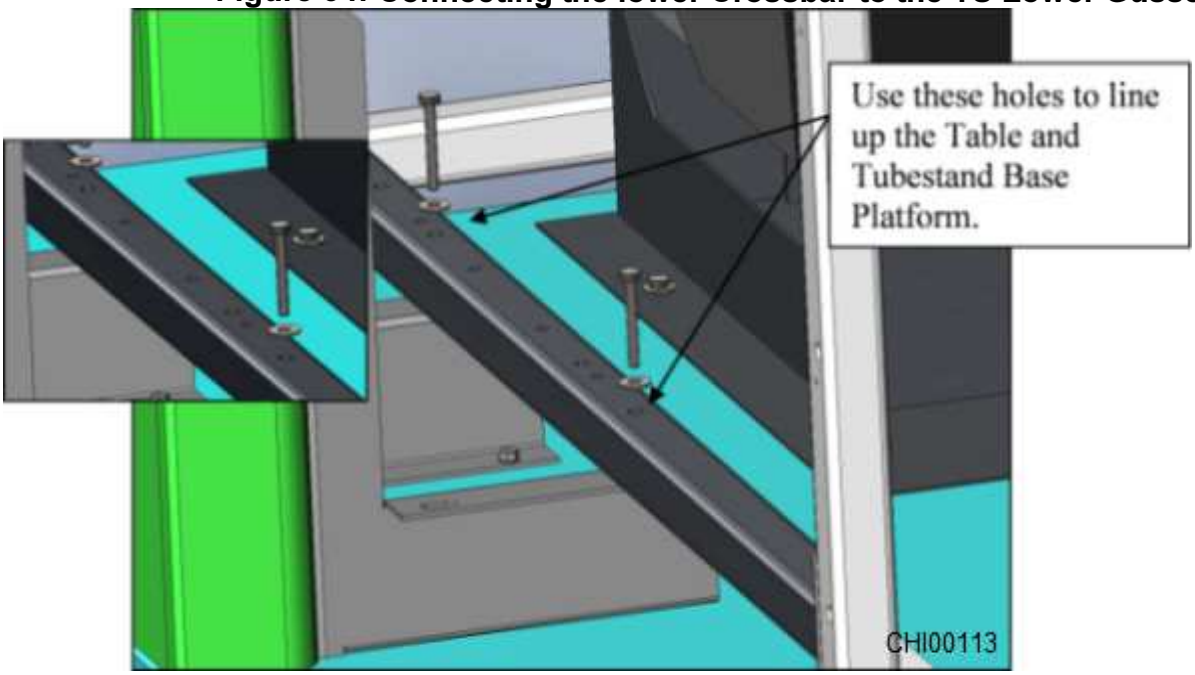
Figure 33: Remounting the lower crossbar



3.4.3.6. Set the height of the Table so that the lower Crossbar rests on the lower TS Gussets. If there is a gap, the gap must no more than 1/16". Once the Table height has been set, level the Table as needed following the same instruction as with the Tubestand Base Platform (see section 3.4.1.4).

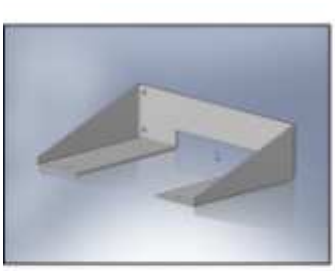
3.4.3.7. Adjust the Table position so that the holes on the bottom rear Crossbar line- up with the slots on the Tubestand Lower Gussets. The Tubestand will be a few inches left of center when looking at it from the front of the Table. Then place in the two (2) ¼"-20 x 2"-long Bolts, Washers, and Nuts. Do not fully tighten the Bolts.

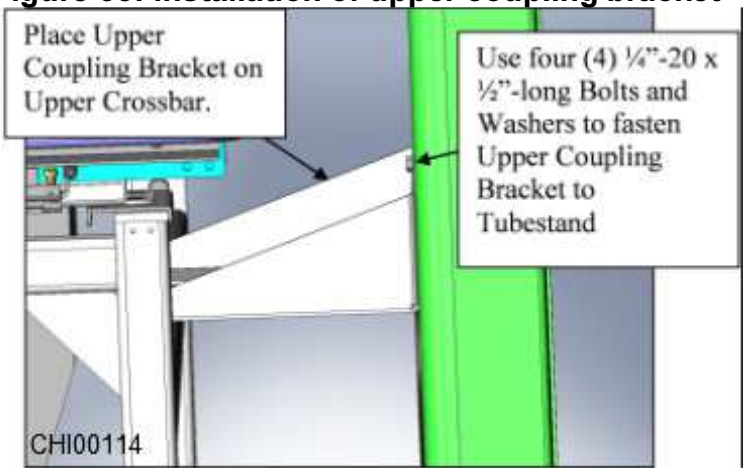
Figure 34: Connecting the lower Crossbar to the TS Lower Gussets



3.4.3.8. Place the Upper Coupling Bracket on top of the Upper Rear Crossbar and against the Tubestand. Use two (2) ¼"-20 x ½"-long Bolts and Washers to connect the Upper Coupling Bracket to the Tubestand (see figure below). Place the Receptor Stabilizing Bracket on top of the Upper Coupling Bracket and line up the two (2) slots on the Receptor Stabilizing Bracket with the holes on the Upper Coupling Bracket and the Upper Rear Crossbar (see figure below). Place two (2) 5/16"-18 x ½"-long Bolts and Washers in and hand tighten.

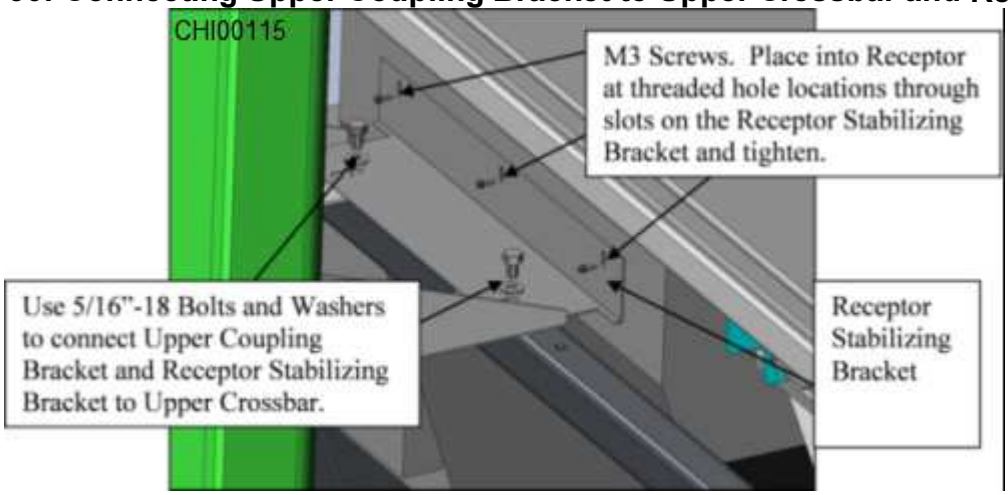
Figure 35: Installation of upper coupling bracket





3.4.3.9. Line up the slots on flange of the Receptor Stabilizing Bracket with the threaded holes of the Receptor. Use three (3) M3 Screws to fasten the Receptor Stabilizing Bracket to the Receptor (see figure below). You may tighten these Screws so that the Receptor Stabilizing Bracket is secure against the Receptor.

Figure 36: Connecting Upper Coupling Bracket to Upper Crossbar and Receptor



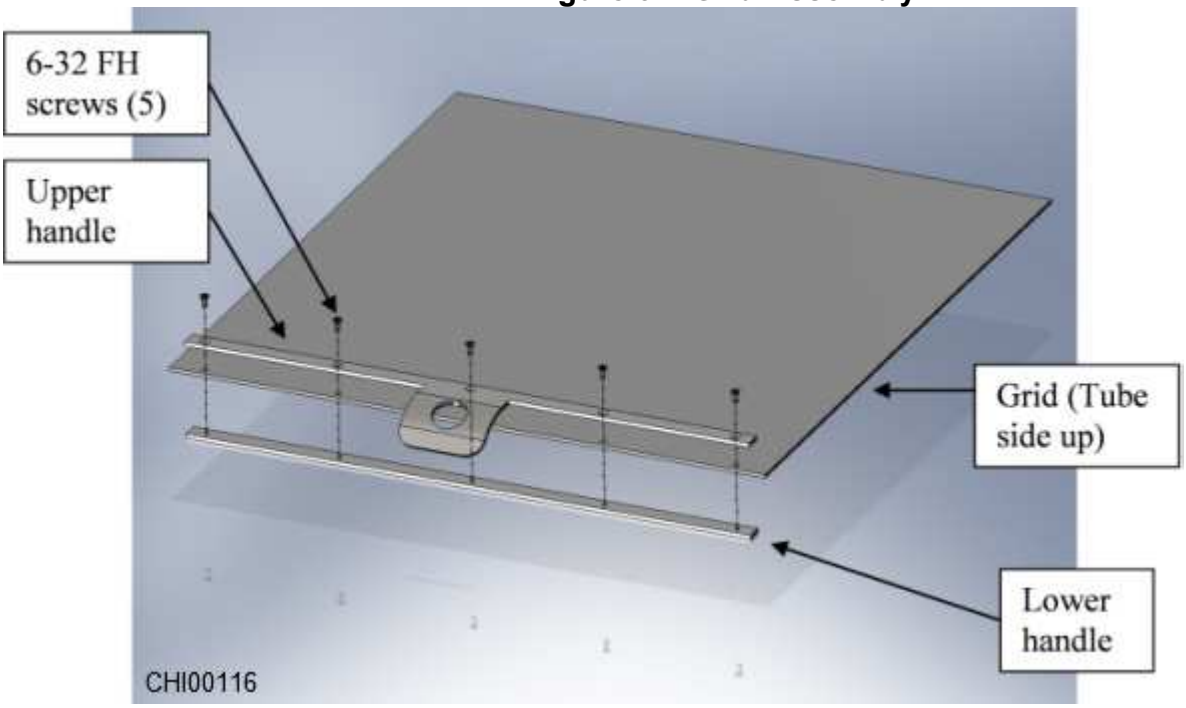
3.4.3.10. Check to see that the Table and Receptor are each level. Also, verify that the center of the Scintillator is 14.5" in front of the Tubestand (Fixed TT) or 19" in front of the Tubestand (4-Way Float TT). You may then tighten the seven (7) socket cap Screws connecting the Receptor to the Receptor Pedestal. You may tighten all remaining Bolts except for the four (4) ¼"-20 x ½"-long Bolts connecting the Pedestal to the Tubestand Base Platform. These Bolts will be tightened after the X-ray Tube and the Scintillator have been aligned.

3.4.4. Grid and grid track installation (optional)

3.4.4.1. Grid Assembly

3.4.4.1.1. Take the supplied Grid and place it between the Grid Handle top and bottom, using the holes on each to locate proper position. Use the supplied flat head Screws to secure the Grid Handle parts to the Grid.

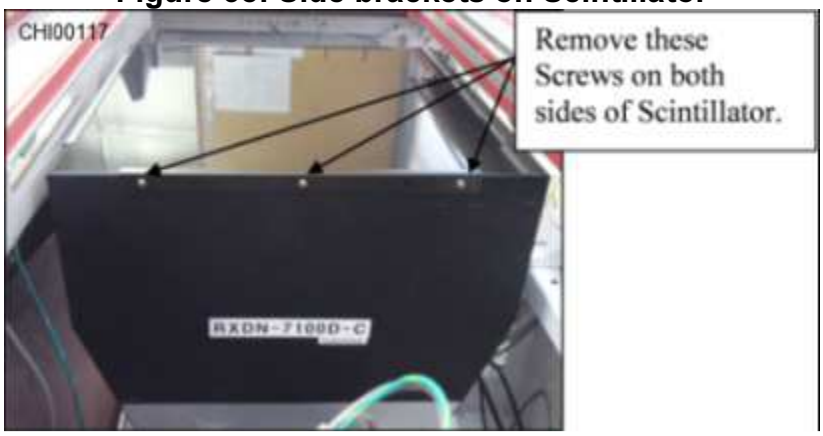
Figure 37: Grid Assembly



3.4.4.2. Grid Track

3.4.4.2.1. Remove the Screws holding the side Brackets on the Scintillator (see figure below).

Figure 38: Side brackets on Scintillator



3.4.4.2.2. Place the Grid Tracks & Brackets over the existing Brackets, locating the slots with the holes. Be sure that the guide slot on the Grid Track is on the inside, facing the center of the Scintillator. Use the Screws that were earlier removed to fasten the Grid Tracks to the Scintillator (See figure below).

Figure 39: Grid track

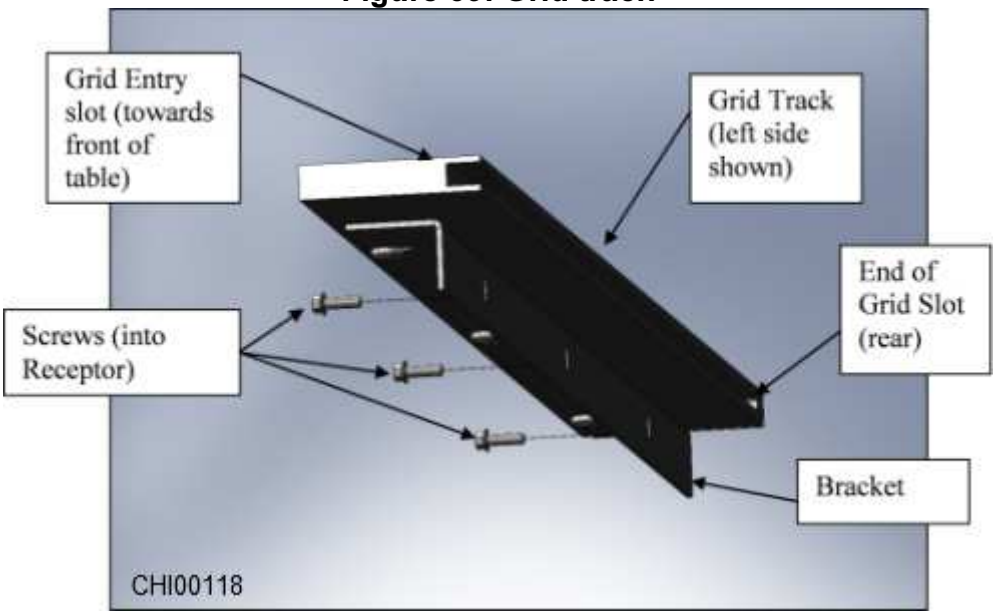
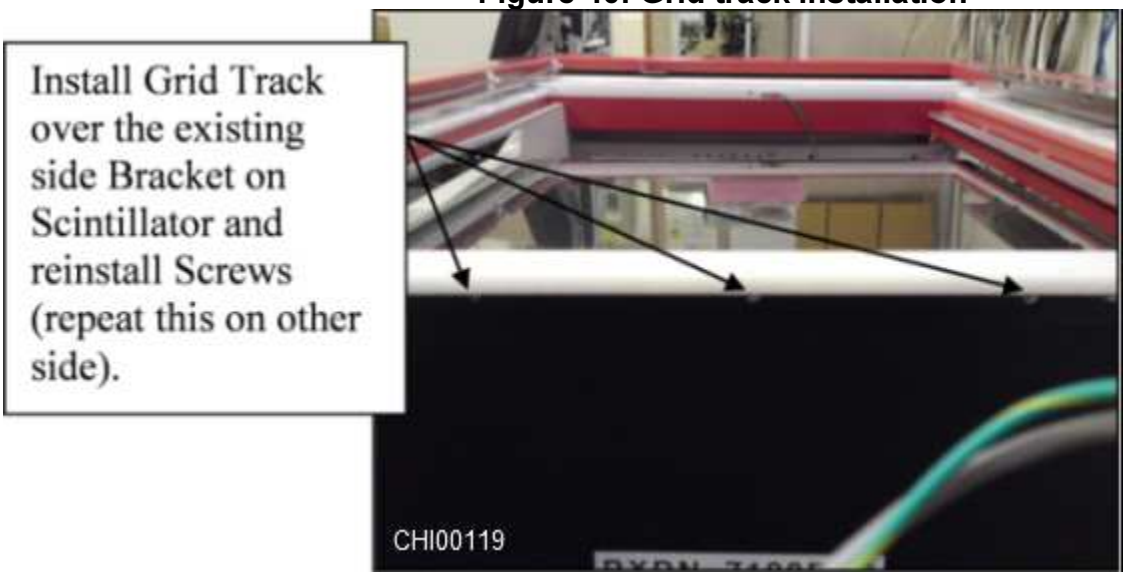


Figure 40: Grid track installation

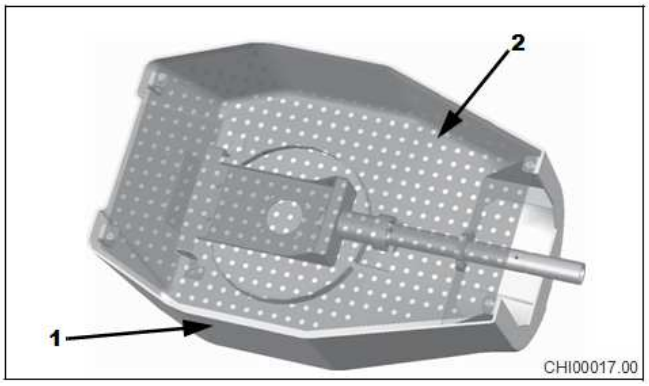


3.4.4.2.3. Install grid into Table by sliding the Grid into the Grid Tracks. Grid will stop with its center aligned to the center of the Receptor.

3.5. Tube Arm Installation

The tube arm is shipped with the tube cover (1 in figure below) and perforated top cover (2) mounted to it. In order to install the tube arm and mount x-ray tube and collimator, the tube cover and perforated top cover must be removed.

Figure 41: Complete tube cover assembly with tube arm Aasembly (top cover is made transparent for clarity)



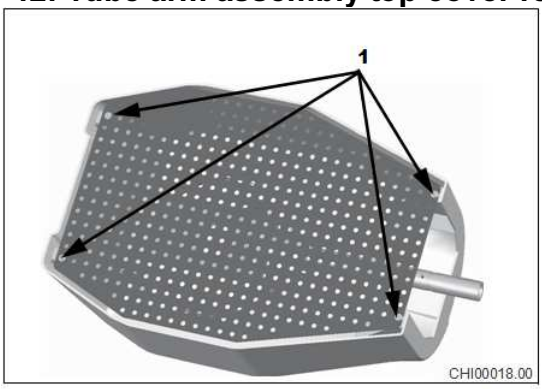
Note

For this part of the installation the table top panel can be put back on the table top frame to make installation of the complete tube cover assembly with tube arm assembly easier. To avoid scratches or other damages to the surface, place card board or similar on top of the panel.

3.5.1. Locate the complete tube cover assembly with tube arm assembly and place it on a bench or on the floor, make sure the supporting surface will not scratch the surface of the tube cover.

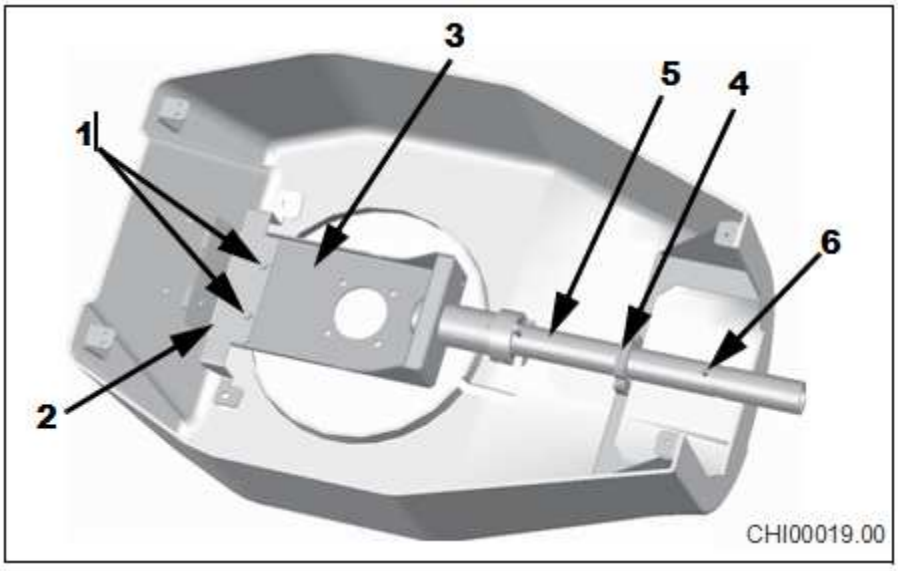
3.5.2. Unscrew the four (4) Screws (1 in figure below) and remove the perforated top cover. Retain all hardware.

Figure 42: Tube arm assembly top cover removal



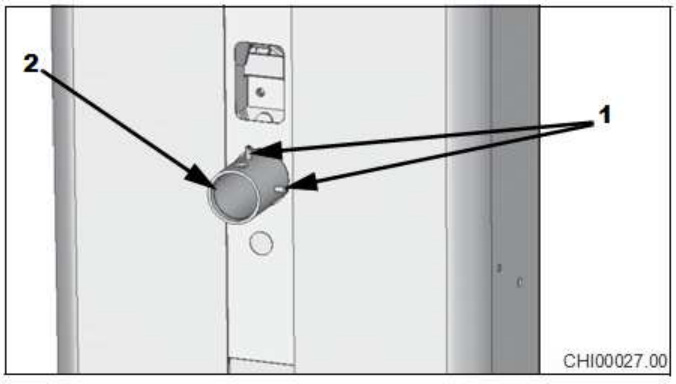
3.5.3. Unscrew the two bolts (1 in figure below) holding the cover mounting bracket (2) to the tube mount platform (3) and the two socket cap screws holding the clamp (4). Retain all hardware.

Figure 43: Tube arm assembly top cover details



3.5.4. Loosen two (three on **fixed** tubestand) set screws (1 in figure below) on the tube arm socket (2) to allow clearance for the tube arm to be put in place.

Figure 44: Tube arm socket & set screws



3.5.5. Take the tube arm assembly (item 5 in Figure 43) out of the tube cover assembly.

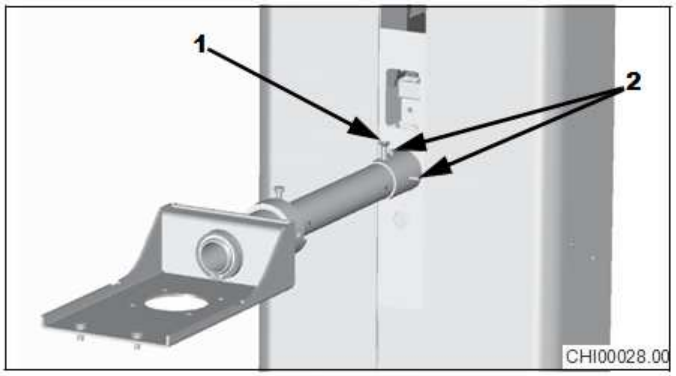
3.5.6. Unscrew and retain the retaining Screw (item 6 in Figure 43) from the tube arm.

3.5.7. Mount tube arm (**adjustable** tubestand only):

3.5.7.1. Insert the tube arm into the tube arm socket (item 2 in Figure 44) as far as it goes.

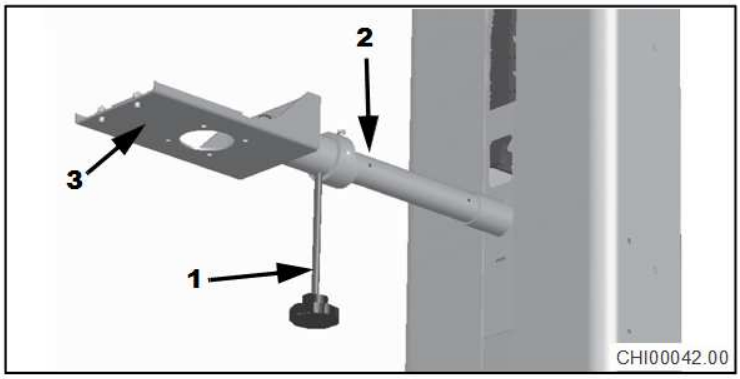
3.5.7.2. Fix the tube arm in place with the retaining screw (item 1 in figure below). Completely tighten the retaining screw and the two (item 2 in figure below) set Screws.

Figure 45: Tube arm in place in tube arm socket on tubestand



3.5.7.3. Locate the angulation lock knob (1 in figure below) and insert it into the bottom of the tube arm (2) just in front of the tube roll limit collar.

3.5.7.4. Set the angulation to 0° (beam down), tube mount platform (item 3 in figure below) in horizontal position. Tighten the lock knob to prevent the tube mount platform from rotating during the tube assembly.



☞ **Note**

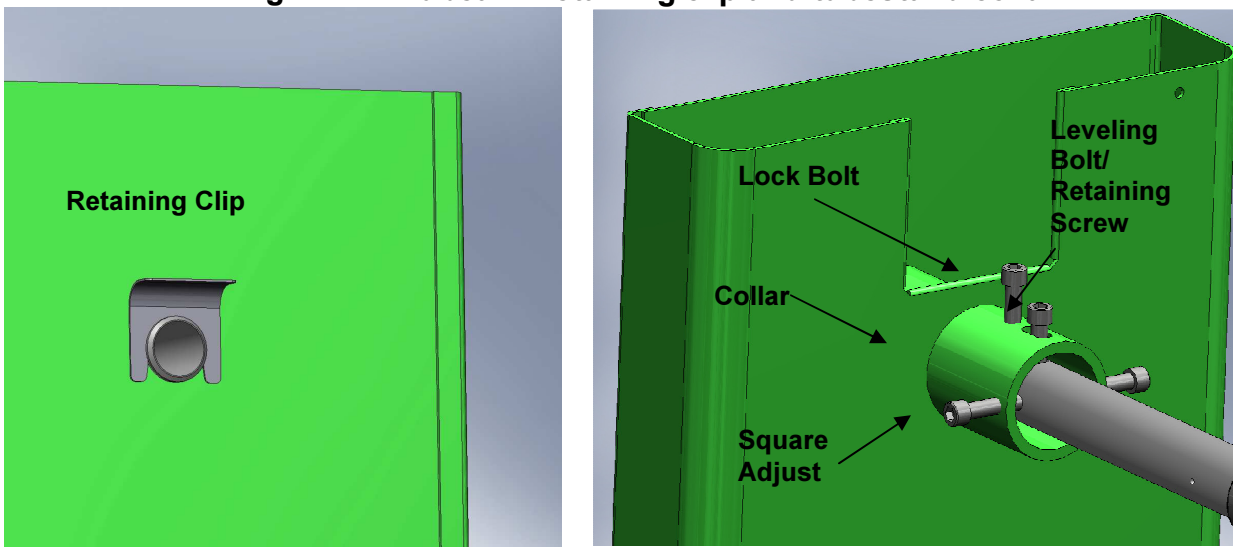
Vertical adjustment of the tube arm will be done when the whole tube assembly is mounted.

3.5.8. Mount tube arm (**fixed** tubestand only):

3.5.8.1. Remove the retaining clip (see figure on left below) at the end of the tube arm.

3.5.8.2. Loosen the bolts (square adjust and lock bolts) inside the tubestand collar (see figure on right below) to allow clearance for the tube arm. Insert the tube arm into the front of the collar and through the hole in the back of the tubestand. Install the retaining clip and verify that the tube arm is captured in the tubestand (see figures below).

Figure 46: Tubearm retaining clip and tubestand collar



3.5.8.3. Thread the tube arm leveling bolt/retaining screw into the tapped hole on the top of the tube arm. Adjust until the tube arm is slightly higher than level.

3.5.8.4. Using a square, adjust the "square adjust" bolts to square the tube arm in the horizontal plane, making it perpendicular to the tubestand. Be sure both bolts are tight to the arm when finished.

3.5.8.5. Tighten the lock bolt.

☞ **Note**

Final vertical adjustment of the Tube Arm will be done when the whole Tube Assembly is mounted.

3.6. X-ray Tube, Tube Cover & Collimator Installation

The following instructions apply to the Innovet Versa being equipped with a Toshiba tube and the Summit manufactured G800 collimator. If you are installing other components, contact Summit Technical Support for additional instructions.

For this part of the installation you will need the Collimator manual at hand.

Note

The collimator spacers will be mounted below the Tube Mount Platform.

Note

When using the standard Tube and Collimator, 3/16" Spacers will achieve the proper field-size coincidence. Please refer to Collimator manual for spacing instructions.

Note

The stator cable is pre-routed through the tubestand along with the collimator and HV-cables. The stator cable must be re-connected to the terminal block on the anode side of the tube before the tube cover is put back on. Do this after the tube is mounted to the tube mount platform.

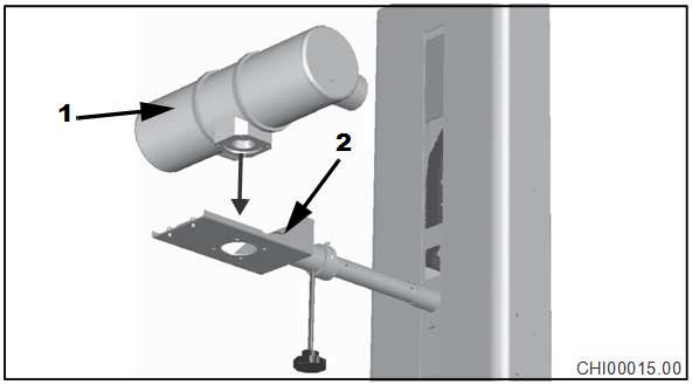
WARNING

Make sure the tube arm assembly is securely tightened and will not tilt, rotate or move in any way.

3.6.1. X-ray Tube Installation

3.6.1.1. Place the Tube (item 1 in figure below) onto the tube mount platform (item 2) with the HV terminals facing the tubestand.

Figure 47: X-ray tube assembly overview

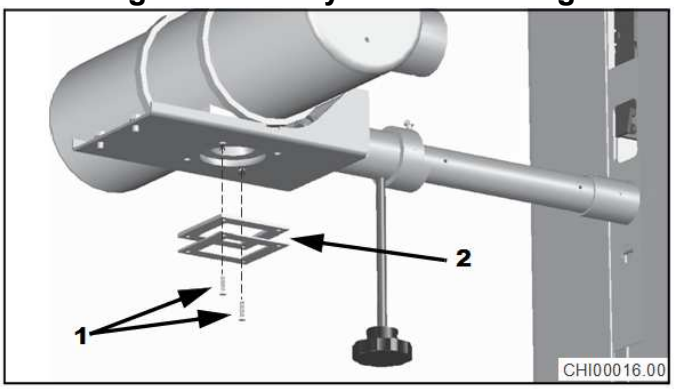


WARNING

Toshiba X-ray Tubes require M6 metric fasteners to attach the Collimator to the Tube Port. Using English ¼"-20 fasteners will damage the threaded holes of the Tube housing & will not be covered under warranty. Also, verify that there are at least three (3) full threads of engagement between the mounting Bolts & the Port of the Tube housing.

3.6.1.2. Insert the Hex Head, metric Tube Mounting Bolts (item 1 in figure below) through opposing holes in the Spacers (item 2); then through the right-front and left-rear holes of the tube mount platform. Finger-tighten into the tapped tube mounting flange holes.

Figure 48: X-ray Tube Mounting



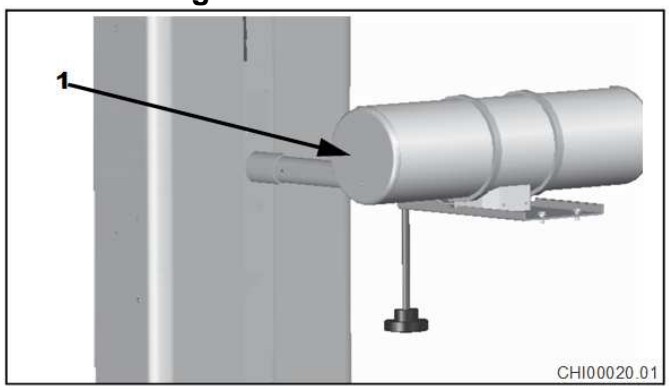
Note

Use only the two tapped mounting holes on the tube-mounting-flange that are toward you on the right, and away from you on the left as you face the front of the table, as shown in figure above.

3.6.1.3. Remove the anode side cover (see figure below) of x-ray tube to access terminal block

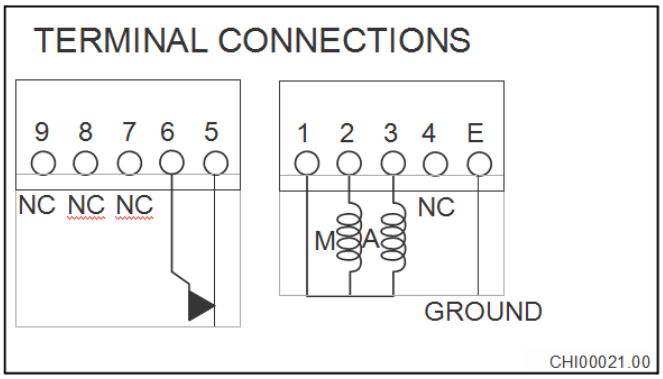
for the stator cable. Retain all hardware.

Figure 49: Stator cover



3.6.1.4. Connect the stator cable per the figure below.

Figure 50: Stator connections



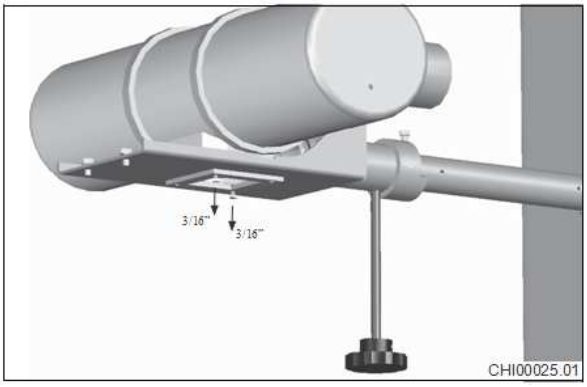
E	Earth terminal
NC	Non-connection
M	Main winding of the stator
A	Aux. winding of the stator

3.6.1.5. Re-mount the anode side cover to the x-ray tube housing.

3.6.2. Collimator Installation

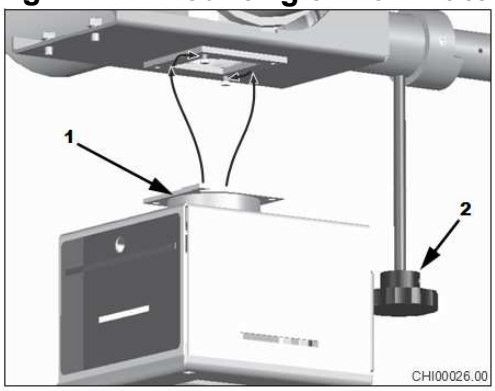
3.6.2.1. Using a metric 10 mm open-end or box wrench, back off the two tube mounting bolts (see figure below) approximately 3/16", or just enough to allow the thickness of the collimator mounting flange.

Figure 51: Prepare Tube Mounting Bolts under Tube Mount Platform



3.6.2.2. Raise the collimator and maneuver it so that the slotted holes of the collimator mounting flange (item 1 in figure below) will align with the two loosened bolts under the spacers when the flange is flush to the spacer.

Figure 52: Mounting of Collimator



3.6.2.3. Turn the collimator so that the flange engages the bolts and reveal the other two tapped holes on the tube mount flange. Use the remaining two, metric, tube mounting bolts and lock washers to securing the collimator in place.

3.6.2.4. Tighten all four (4) Bolts.

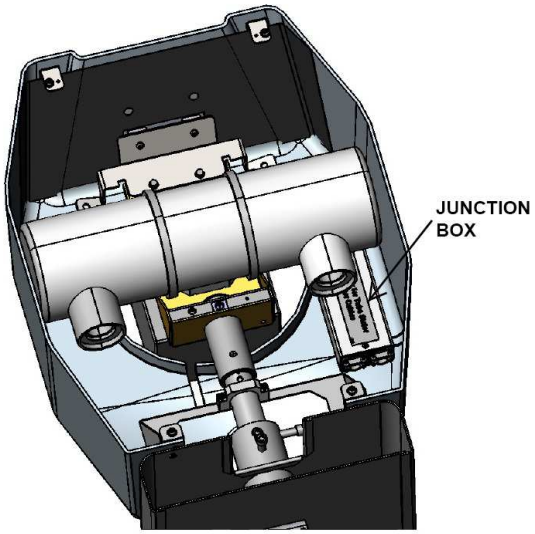
3.6.3. Tube/collimator cable connections

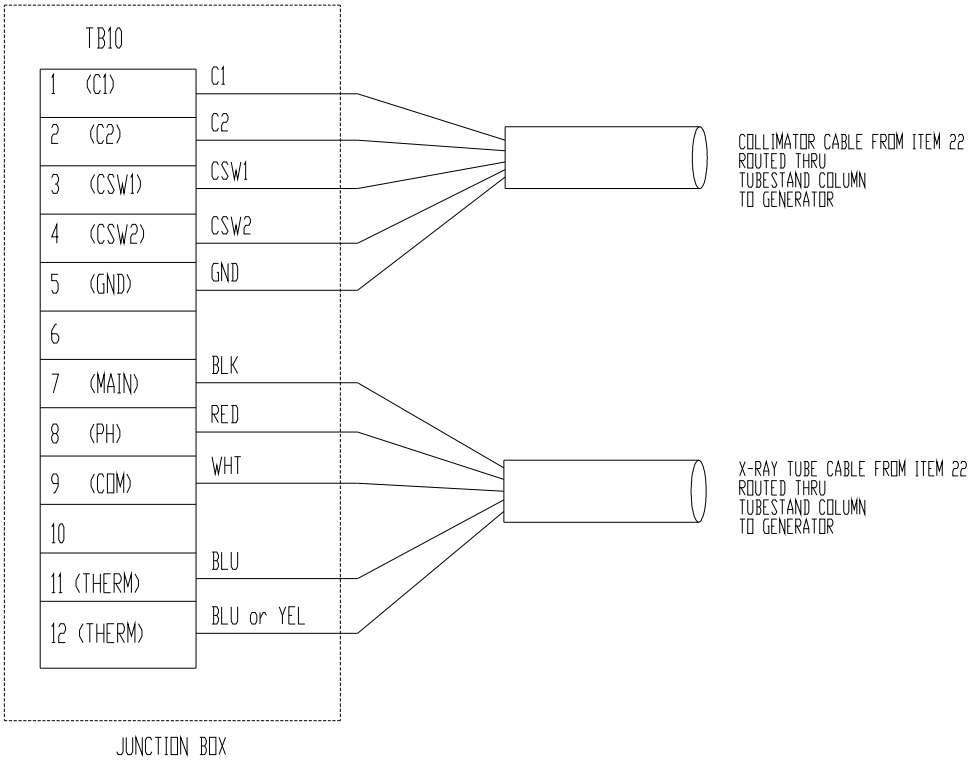
3.6.3.1. Connect HV cables per instructions below. Be sure to use vapor proof compound (provided) as described in the instructions for the HV Cables.

3.6.3.2. Connect the HV cable marked “C” (or “-“) to the cathode socket on the tube, using proper procedure.

3.6.3.3. Connect the HV cable marked “A” (or “+“) to the anode socket on the tube, using proper procedure.

3.6.3.4. Connect the collimator cable from collimator and tube stator cable to the terminal strip in the junction box.





3.6.3.5. Cable Routing (for **fixed** tubestand only)

3.6.3.5.1. Route the two (2) HV Cables, the tube stator cable & the collimator cable over the top of the TS, down through the TS & out through the 6"- hole bushing on the front of the TS bringing them out to the inside of the table base. Route these cables out of the table base & into the generator's power module. Connect these cables to the generator according to instructions in the generator manual.

3.6.3.5.2. Drape the cables neatly, leaving slack in the collimator cable to allow +90° of swivel. Use nylon cable ties to bundle the cables & keep them organized & safe from sharp edges or other hazards.

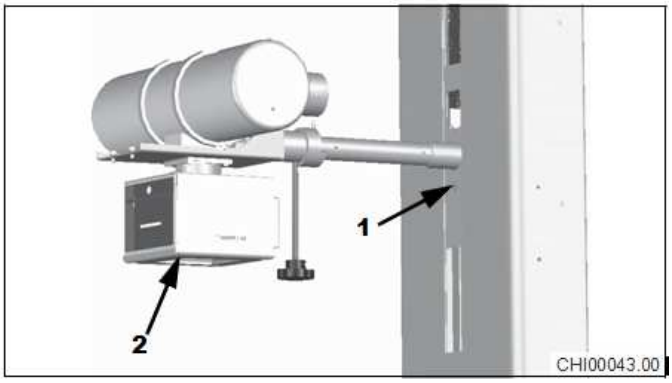
3.6.3.6. Use cable ties to provide strain relief for the cabling in the tube cover.

3.6.3.7. Provide sufficient slack in all the cables to allow for full collimator swivel and tube angulation (± 50°).

3.6.4. Vertical adjustment of tube arm (adjustable tubestand only)

3.6.4.1. Adjust the tube arm vertically using an Allen key for the adjustment set screw (1) and a bubble level underneath the collimator (2).

Figure 53: Tube arm vertical adjustment screw



3.6.5. Tube Cover Mounting

3.6.5.1. Remove angulation lock knob (adjustable tubestand only)

CAUTION

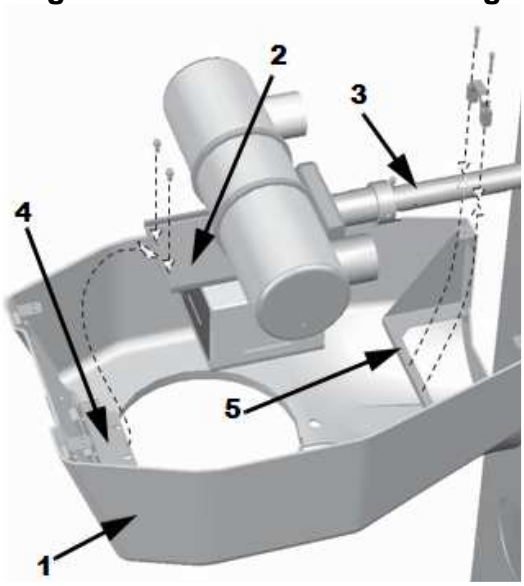
The following procedure requires the angulation lock knob to be removed for a few steps. Be careful not to accidently tilt the tube/ collimator assembly during these steps.

3.6.5.1.1. Unscrew and retain the two bolts ad washers from the front of the tube mount platform.

3.6.5.1.2. Carefully remove the angulation lock knob (item 2 in Figure 52) to allow for the tube cover (item 1 in figure below) to be mounted to the tube mount platform (item 2 in figure below) and the tube arm.

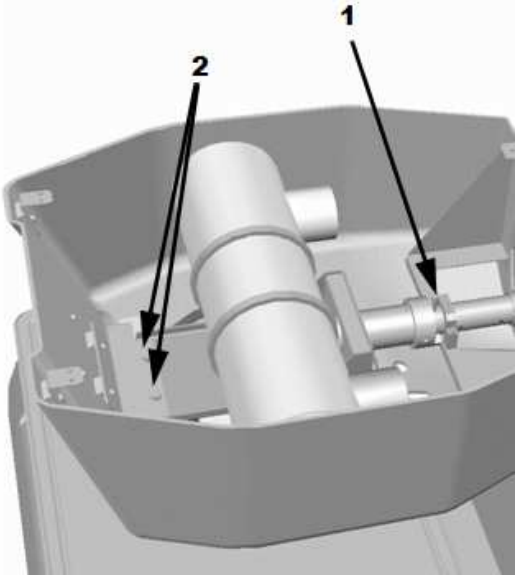
3.6.5.2. Carefully raise the tube cover (item 1 in figure below) so that the cover mounting bracket (item 2) and the bottom part of the rear bracket (item 5) fits up against the tube arm (item 3).

Figure 54: Tube cover mounting



3.6.5.3. While still supporting the tube cover, remount the clamp (see figure below) to the rear bracket and finger-tighten the bolts; then insert the two bolts and two washers (2) through the cover mounting bracket into the tube mount bracket and finger-tighten the bolts.

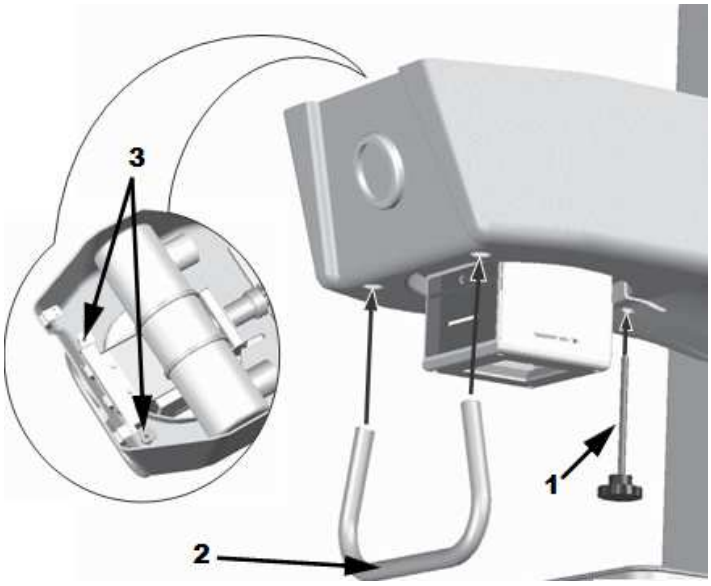
Figure 55: Tube cover mounted to tube arm assembly



3.6.5.4. Reinstall angulation lock knob (**adjustable** tubestand only)

3.6.5.4.1. Reinstall the angulation lock knob (item 1 in figure below) through the hole in the tube cover and into the bottom of the tube mount. Then install the handle bar (item 2) by first unscrewing the mounting bolts from the handle bar, place the handle bar in position and install the bolts (item3), from above, through the cover mounting bracket.

Figure 56: Re-installing angulation lock knob and mounting of the handle bar

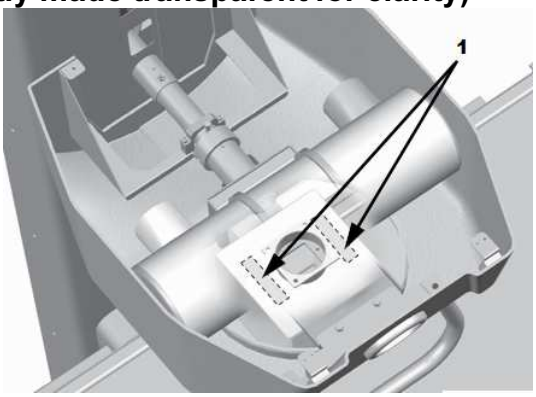


3.6.5.5. Tighten all bolts and screws holding the tube arm assembly and tube cover.

3.6.5.6. Install the two Collimator disc halves by first locating the two strips of velcro tape and the two halves that build the collimator disc.

3.6.5.7. Remove the adhesive protection on one side of each velcro strip and apply one piece of velcro on each side (item 1 in figure below) on top of the collimator.

Figure 57: Velcro is used to attach the collimator cover to the collimator (tube partly made transparent for clarity)



3.6.5.8. Remove the remaining adhesive protections and place the half-moon shaped cover from the top on each side of the collimator. Keep pressure for a few seconds so that the adhesive sticks to the covers.

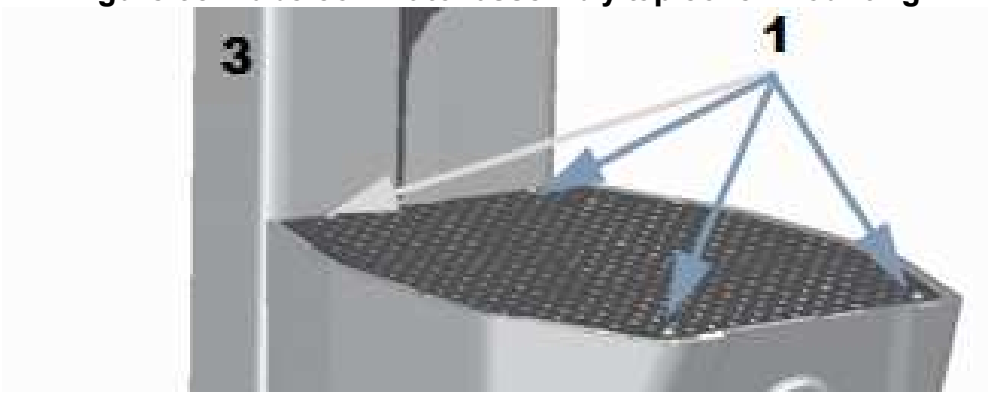
3.6.5.9. Use enclosed cable ties to provide strain relief for the cabling in the tube cover.

3.6.5.10. Provide sufficient slack in all the cables to allow for full collimator swivel and tube angulation (± 50°).

3.6.5.11. Make sure there are no tools left inside the Tube Cover and that all Cables are correctly connected.

3.6.5.12. Re-install the perforated top cover using the retained screws and washers (1 in figure below).

Figure 58: Tube/collimator assembly top cover mounting



3.7. Table & TS Location

3.7.1. Position the table and tubestand into the final location.

3.7.2. Secure table to floor using floor using the four clamps (1 in Figure 4-37) provided with the feet. Slide the clamp into the notch at the base of each foot, turn at 45º to the table and secure with a lag screw to the floor.

Figure 59: Foot clamp for securing table to floor

3.8. Generator Installation

3.8.1. Remove the power module cover and calibrate the generator (refer to Generator manual).

3.8.2. Connect the table power cable (#22 & ground lead) to the generator 24VDC (for four-way table top).

3.8.3. Dress the power module cables while it is on the floor to insure that it can be removed for future preventative maintenance visits without having to cut cable ties.

3.8.4. Remount the power module cover

3.8.5. Position the generator.

3.8.5.1. Install the HV tank under the table (see the figure below).

3.8.5.2. If space allows, place the power module inside the table (see the figure below) as well. If the power module is a tall boy, the power module will need to be placed outside of table (refer to TDS for optimal locale).

Figure 60: High voltage transformer and power module in place inside table base (cable connections not shown in this figure)

3.8.6. Verify table top lock operation (four-way table top only).

3.9. Accessory Exposure Switch Installation

3.9.1. The operator console, also known as the upper front cover, has a three-way modular jack splitter pre-installed and located on the back of the display. You can connect up to three exposure switches on this operator console (see figures below).

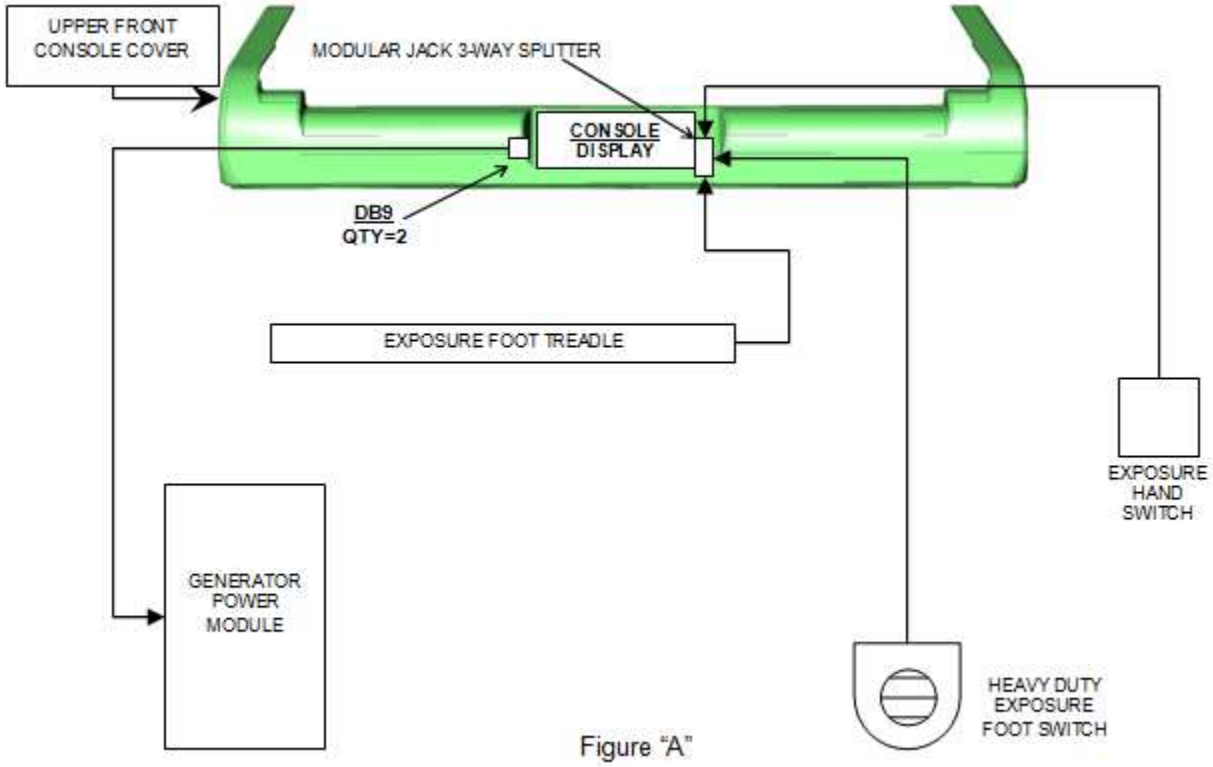
3.9.2. Connect the (2) DB9 cables to the generator power module.

Figure 61: Splitter position

Rear of 2PT console

Rear of AP console

Figure 62: Three-way Splitter Connection Map



3.10. Digital Receptor Calibration

3.10.1. If digital receptor was installed, connect PC, monitor, PS, USB, etc.

3.10.2. Configure and calibrate the receptor, (refer to receptor manual).

3.10.3. Dress the cables can to ensure that the receptor and accessories can be removed for future preventative maintenance visits without having to cut cable ties.

3.11. Final Mechanical Adjustments

3.11.1. Verification of x-ray to light field coincidence

3.11.1.1. Refer to specific instructions in the collimator manual to verify the coincidence of x-ray to light field.

3.11.2. Verification of x-ray to image receptor alignment

3.11.2.1. Any left-to-right adjustment required for coincidence between the central ray and the center of the image receptor can be achieved by adjusting the grid cabinet-to-tubestand interlock bracket, located on the lower front surface of the tubestand.

3.11.2.2. Any front-to-back adjustment of the central ray necessary (after the arm has been leveled) can be achieved by raising or lowering the tube arm.

3.12. Remount covers

3.12.1. Install the lower front cover by slipping the two tabs on the bottom into the slots on the front of the table. Then push the top of the panel in until the hooks engage and lock onto the Allen-style bolts on the inside edges of the table base.

3.12.2. Install the table base's upper front cover (some units may contain an operator console in this cover) by sliding the "arms" of it over the lower panel and beneath the table-top. It will attach to the back of the table base, just outside of the brake strip, with the two screws retained in the rear of the cover.

3.13. Train Personnel

3.13.1. Train personnel on operation of table, tubestand, generator, receptor, etc.

4. Scheduled Maintenance

4.1. Overview

The following schedule of maintenance for the Innovet Versa veterinary device 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 service personnel authorized by Summit Industries. Frequency of the service should be 30 days after installation and every sixth months thereafter unless indicated otherwise by local codes and regulations.

It is the responsibility of the equipment owner to see that this maintenance is performed as scheduled to meet warranty obligations. The installing dealer or other factory authorized service organization will be able to perform this maintenance.

4.1.1. Safety at maintenance

Personnel engaged in maintenance activities should exercise normal caution and care while working with electro-mechanical equipment. Verify that the incoming power supply is turned OFF before removing or opening any electrical power panels or covers.

Always verify that the equipment is properly grounded before attempting any electrical operation or adjustment.

WARNING

Before removing or opening any electrical power panels or covers, verify that the incoming power supply is turned OFF.

WARNING

In the event maintenance procedures require power to be supplied to the unit, extreme care MUST be exercised to insure the safety of service and any other personnel in the area.

WARNING

The main storage capacitors retain their charge for some time after the unit is turned off. Although the areas where this voltage may be present are covered with a protective layer of Lexan, it is imperative that all service personnel are cognizant of the significant shock hazard the capacitor bank voltage represents. Prior to servicing the power components, ensure that the LED on the Charge Sense PCB is not lit, and verify there is no capacitor bank voltage with a DC voltmeter. Refer to the generator manual for further details.

Certain tests require the production of X-rays. Field personnel should take precautions to ensure their personal safety and the safety of others in close proximity. Minimum precautions are as follows:

- Wear lead aprons
- Personnel remaining in the X-ray room during exposure should be behind a lead shield
- Minimize radiation scatter through doorways, walls and floor.

4.1.2. Tools Required

Table 3: Tools that may be required

Tools
medium flat screw driver
phillips screw driver
set of open end-wrenches
set of hex wrencehs
leveler
cotton ball

4.2. Maintenance Schedule

Note

Due to varying operating conditions, the procedures listed below may have to be performed at greater or lesser intervals. You may have to adjust intervals according to your equipment's performance.

CAUTION

Make sure no tools or instruments are left on or inside the equipment when the maintenance work is completed.

WARNING

Always use an anti-static wrist strap when working on electrostatic sensitive devices.

WARNING

Turn off all electrical power to the table. Also, make sure that power source is locked out and tagged "Equipment Being Serviced" before servicing the generator. You or someone else could get seriously injured if you do not.

Table 4: Maintenance Schedule

Maintenance	Interval	Instructions
SYSTEM		
Cleaning	30 to 60 days after the initial installation and every six months thereafter.	Never use anything other than mild soap and water to clean plastic surfaces. Other cleaners may damage the plastic. Never use any corrosive, solvent, or abrasive detergents or polishes. Ensure that no water or other liquid can enter any equipment. This precaution prevents short circuits and corrosion foaming on components. Methods of disinfecting used must conform to legal regulations and guidelines regarding disinfecting and explosion protection. If disinfectants are used which form explosive mixtures of gases, these gases must have evaporated before switching ON the equipment again. Disinfecting by spraying is not recommended because the disinfectant may enter the x-ray equipment. If room disinfecting is done with an atomizer, it is recommended that the equipment be switched OFF, allowed to cool down and be covered with a plastic sheet. When the disinfectant mist has subsided, the plastic sheet may be removed and the equipment may be disinfected by hand

Maintenance	Interval	Instructions
		wiping.
Check fasteners and bearings	30 to 60 days after the initial installation and every six months thereafter.	Check each exposed fastener for tightness and tighten as needed.
Level table top	30 to 60 days after the initial installation and every twelve months thereafter.	Maintenance instructions...
Check electrical cables	30 to 60 days after the initial installation and every twelve months thereafter.	Inspect all accessible cables for fraying or abrasion. Replace if necessary.
Inspect connections	30 to 60 days after the initial installation and every twelve months thereafter.	1. Remove the front panel from the table base. 2. Inspect for loose or corroded connections. Refit or replace if needed.
X-RAY TUBE/COLLIMATOR ASSEMBLY- see individual manuals		
TUBESTAND		
Verify set-screws are securely holding tubearm.	30 to 60 days after the initial installation and every twelve months thereafter.	Maintenance instructions...
Inspect counterweight cables for fraying or damage.	30 to 60 days after the initial installation and every six months thereafter.	1. Move the tube assembly to its lowest??? position 2. Remove the covers on the back of the tubestand. 3. Run a cotton ball up and down the length of the three??? counterweight cables on the back of the tubestand column. Repeat the procedure with the tube assembly in its top??? position. 4. Re-mount the covers on the back of the tubestand.
Inspect all tubestand move- ments for binding or interfer- ence.	30 to 60 days after the initial installation and every twelve months thereafter.	Maintenance instructions...
IMAGE RECEPTOR - see receptor manual		
Inspect lead wrapping on inside of film bin for nicks or cuts.	30 to 60 days after the initial installation and every twelve months thereafter.	Maintenance instructions...
Inspect joints for any openings.	30 to 60 days after the initial installation and every twelve months thereafter.	Maintenance instructions...
Verify overall radiation protec- tion by placing a loaded cas- sette into the bin and exposing the bin to a direct beam expo- sure.	30 to 60 days after the initial installation and every twelve months thereafter.	Maintenance instructions...
Verify free travel of image receptor unit, and tube stand interlock function.	30 to 60 days after the initial installation and every twelve months thereafter.	Maintenance instructions...

Notes