T400 FOUR WAY RADIOGRAPHIC TABLE

USER AND ASSEMBLER MANUAL

MODEL S210

C206-01 REV. R

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INSTALLATION AND SERVICE MANUAL REVISIONS HISTORY

Revision	Pages Affected/Revision Description	Release Date	ECR #
B	INITIAL RELEASE		
C	FILM CABINET LOCK CHANGE	JULY, 2000	1992
D	CREATE MANUAL TEXT	DEC., 2000	2064
E	ADDED COVER SHEET, C233 SCHEMATIC AND C372 DIAGRAM INTO ONE ELEC.FILE	SEPT. , 2003	3319
F	FIGURE 4 REDRAWN	FEB. 2013	7827
G	FIGURES 1, 2, 3, 5 AND 6 REDRAWN. TOS UPDATED	JULY, 2013	8036
H	- CORRECT SPARE PARTS LIST, SHT 3 - UPDATE TABLE TOP INSTALLATION, SHT 6 - CORRECT FIGURE 3 GRAPHIC, SHT 7 - CORRECT NOTE ON SHT 9	OCT., 2013	8107
J	Added grid installation instructions	May, 2014	8359
K	Updated grid installation instruction	July, 2014	8203
L	Added Note to Sheet 6, under Note 8	Aug, 2014	8453
M	UL Certification. Added classification data, ⚠ symbols, linked TOC	Sep, 2015	8818
N	Updated Electrical Block Diagram to show ground wire from Power Supply; Added Grounding Note (Pg. 13)	Aug, 2016	9196
Q	Updated UL Label graphic; Added Symbol Legends Table	Nov. 2016	9266
R	Updated address to Niles, IL; Added generic warning statements to sheet iv.	June, 2017	9584

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I. INTRODUCTION

WARNING

X-ray equipment may be dangerous to both patient and operator unless proper safety measures are observed.

Before operation, persons qualified and authorized to operate this equipment should be familiar with all appropriate safety procedures regarding radiation safety.

Only qualified personnel should install, maintain and operate this equipment.

Only qualified service personnel should remove electrical covers.

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 without written factory authorization.
- Injury or damage resulting from any of the above causes.

Intended Use

This is an x-ray table, a mechanical device intended to support a patient during a radiographic procedure.

Attenuation

All included components between the patient and image receptor have been certified to comply with 21 CFR Chapter 1 Subchapter J (§1020.30).

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.

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

II. USER INFORMATION

II.A Theory of Operation

The Four Way Table is a radiographic table with a movable table top and a movable film cabinet. The film cabinet can be supplied in one of four models listed below (All with optional PBL):

1. Bucky Cabinet with AEC.
2. Bucky Cabinet.
3. Grid Cabinet with AEC.
4. Grid Cabinet.

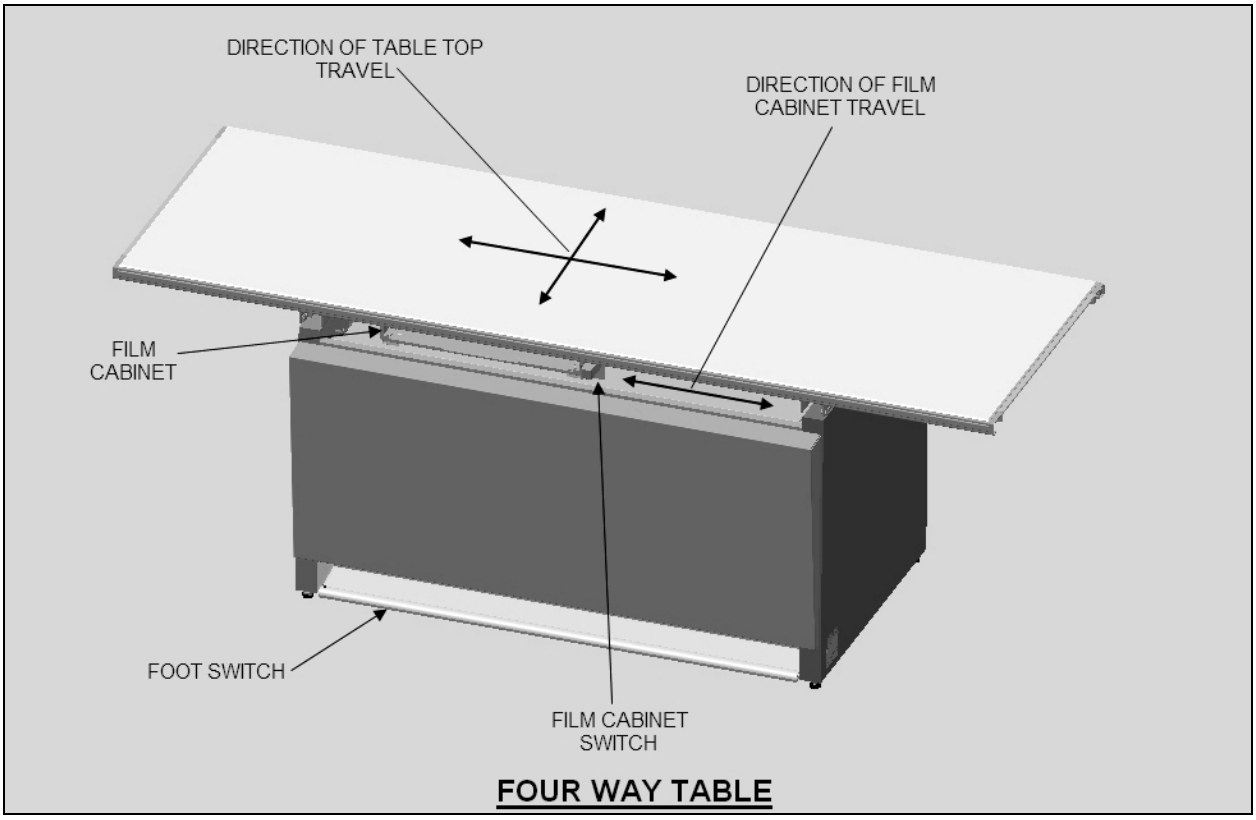


Figure 1

When power is applied to the table, the table top and film cabinet are held in place by sets of electric locks.

TABLE TOP OPERATION

By depressing the footswitch (See Figure 1) the electric locks holding the table top are de-energized and the table top is free to move in the directions shown in Figure 1.

By releasing the footswitch the electric locks are energized and the table top is again locked in position.

WARNING

Care must be taken when operating the table top with a patient on the table.

1. Avoid all sudden movements.
2. Keep patient and operator hands/fingers clear of mechanical pinch points when table top is in motion.

FILM CABINET OPERATION

To release the electric brake securing the film cabinet in position, depress the pushbutton switch on the film cabinet handle (see Figure 1). The film cabinet is free to move laterally.

Releasing the pushbutton switch re-energizes the electric brake and locks the film cabinet in position.

II.B Classification Data

This equipment is not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.

Type of protection against electric shock is Class 1.

Degree of protection against electric shock is Type B.

Degree of protection against the ingress of water is IPXO / ordinary.

The function and intended application of this equipment is general radiography for human use.

Environmental conditions for transport, storage and operation:

Temperature: 40° F to 100° F (10° C to 40° C)
Relative humidity: 5% to 95%, non-condensing
Atmospheric pressure: sea level to 8000 feet (700 – 1100 hPa)

The symbol is used to alert the installer and/or operator of conditions where personal safety or possible equipment damage is a consideration.

The elevator table model S210 draws up to 1.25 Amps at 115V, 50/60 Hz.

II.C Equipment Specifications

Height x Width x Length (inches)

Crated:
Table Top…… 2 ¾" x 31" x 90"
Base…….. 35 ¾" x 32 ½" x 52 ¼"

Uncrated:
Top & Base Assembled……..31 ½" x 30 ½" x 84"

Weight (Lbs)

Crated:
Table Top……100
Base…….430

Uncrated:
Top & Base Assembled……..396

Power Consumption 180W (Max) 120V 50/60Hz…….200

Max Patient Weight (Lbs)……..400

Travel (Inches) From Centered Position
Transverse……±5
Longitudinal……..±16

Film Plane to Table Top Distance (Inches)……(AEC) -3.25
……..(Non-AEC) -2.75

II.D Spare Parts List

Below is a list of spare parts for the Four Way Floating Top Table.

DESCRIPTION	QTY/TABLE	PART NO.
Plug-In Relay, 24 VDC	1	HK40
Open Type Linear Ball Bearing .750 Nominal ID	4	HF67
Footswitch, N.O. Approx. 46 In. Long	1	06671
Holding Magnet 24 VDC 6 Watts (Film Cabinet)	1	HA01
Table Top Bearings 3/8" I.D. x 7/8" O.D. x .28" Thk.	20	HF81
Front Bearings Film Cabinet (Large) 3/8" I.D. x 7/8" O.D. x .22" Thk.	4	HF73
Front Bearings Film Cabinet (Small) 3/16" I.D. x ½" O.D. x .20 Thk.	2	HF72
Rear Bearings Film Cabinet		

11/16" O.D. x 3/16" I.D.	2	HG07
Film Cabinet Pushbutton Switch N.O. Rated at 24VDC	1	HG26
Power Supply 24VDC Output 120V Input	1	L425-00
Fuse 2 Amp 250V	1	HF11
Holding Magnet 24VDC (Table Top)	2	01554-000
Transverse Lock (Right)	1	02081-01
Transverse Lock (Left)	1	02081-02

II.E Maintenance Schedule and Inspection

Safe performance of the four way table requires daily inspection by the user and scheduled service by specifically trained X-ray apparatus service personnel. It is the user's responsibility to select qualified service personnel, or to consult with the factory in the event recommendations are required.

DAILY INSPECTION (USER)

1. Check to see that the electric locks for the table top and film cabinet operate properly.
2. Check to see that the table top moves freely and does not bind.
3. Inspect the table anchoring to ensure that the table is properly secured to the floor.

In the event service is required contact a qualified service person.

SCHEDULED MAINTENANCE (SERVICE PERSONNEL)

In order to comply with applicable federal and state regulations, the following maintenance schedule must be adhered to:

1. First servicing – 30 days after equipment installation.
2. Subsequent servicing – every 6 months.

Scheduled maintenance should include, but not be limited to, the following checks:

1. Proper equipment grounding.
2. Proper tightness of all mechanical fasteners.
3. Inspection of all electrical connections for proper connection and absence of corrosion.
4. Proper anchoring of table to floor.
5. Proper operation of table top.
6. Inspection of all electric locks for proper operation.

II.F Equipment Compatibility

The four way table is a certifiable, listed component for use in a diagnostic X-ray system. It is designed for use with a tubestand, which is not, in itself, a listed

component. Compliance of the system is dependent upon the compatibility of the table with the beam limiting system.

NOTE: The assembler must verify that:

1. An angulation indicator means is provided to assure perpendicularity between the table and the collimator.

2. An indicator for vertical SID is provided on the tubestand.

III. ASSEMBLER INFORMATION

III.A General Installation

To facilitate shipment of the four way table it is necessary to partially disassemble the table prior to shipment. The table top and base are packed by our shipping department in separate cartons which must be inspected before beginning installation.

If the four way table was purchased on an “FOB Shipping Point” or “Freight Collect” basis, it is the ultimate dealer’s responsibility to check the shipment for completeness against the Bill of Lading. In the event of shortage or damage immediately file a claim with the carrier.

If the four way table was purchased on an “FOB Destination” or “Freight Prepaid” basis, and shortage or damage is found, notify the factory immediately.

Leave the equipment on its skid until it has been moved to the installation site.

⚠ WARNING

Always wear protective glasses when servicing the table.

Do not service the table with the power on. Always unplug the table before servicing the electrical system.

III.B Mechanical Installation and Adjusments

III.B.1 SITE SELECTION

The table location is dictated by office work flow and available space. When deciding on the table location consideration should be given to the working space required and accessibility of the table and related components for servicing. Refer to Figure 2 for minimum suggested clearances for proper table operation.

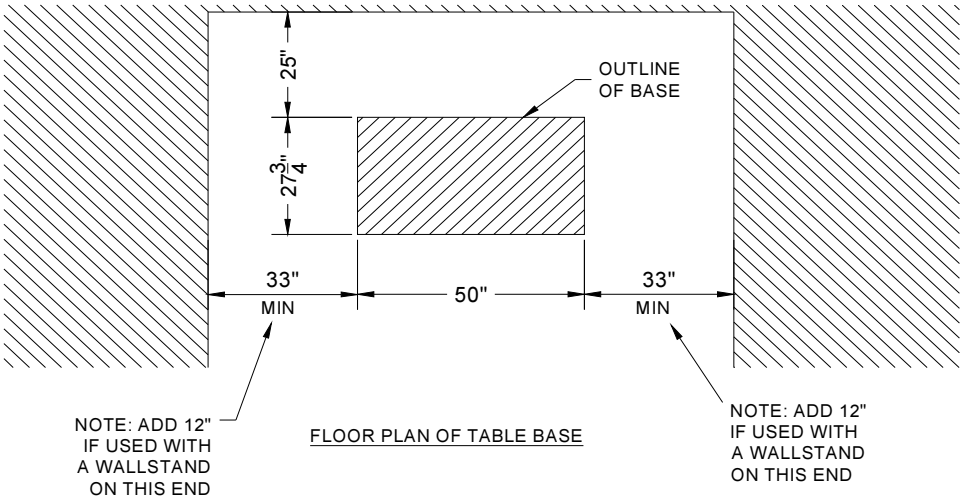


Figure 2

III.B.2 TABLE TOP INSTALLATION

To facilitate shipping, the table top and base are disassembled prior to shipping. To reassemble the table top and base follow the procedure below:

1. Measure the room and determine where there is enough space to slide the top back onto the base.
2. Referring to Figure 3, remove the retaining angles at each end of the table.
3. Disconnect the longitudinal lock assembly from the base by removing the appropriate screws.
4. Slide the table top over the base's bearing assembly. Position the table top so that the retaining angles would be towards the front of the table.
5. With locks off, check for smooth and free movement of the table top over the full transverse and longitudinal travel.
6. With the locks on, check for excessive bearing clearance vertically (by lifting and releasing) and in the transverse direction (by pushing and pulling).
7. If an excess of vertical or transverse motion occurs, adjust the appropriate bearings.
    a) Vertical Bearing Adjustment (Fig. 3 View 'B-B')
    b) Transverse Bearing Adjustment (Fig. 3 View 'A-A')
8. Reinstall retaining angles and longitudinal lock assembly.

Note: It is recommended to apply some form of non-permanent thread locking compound onto the threads of the flat head mounting Screws that attach the Table Top's Longitudinal Locks to the Bearing Module.

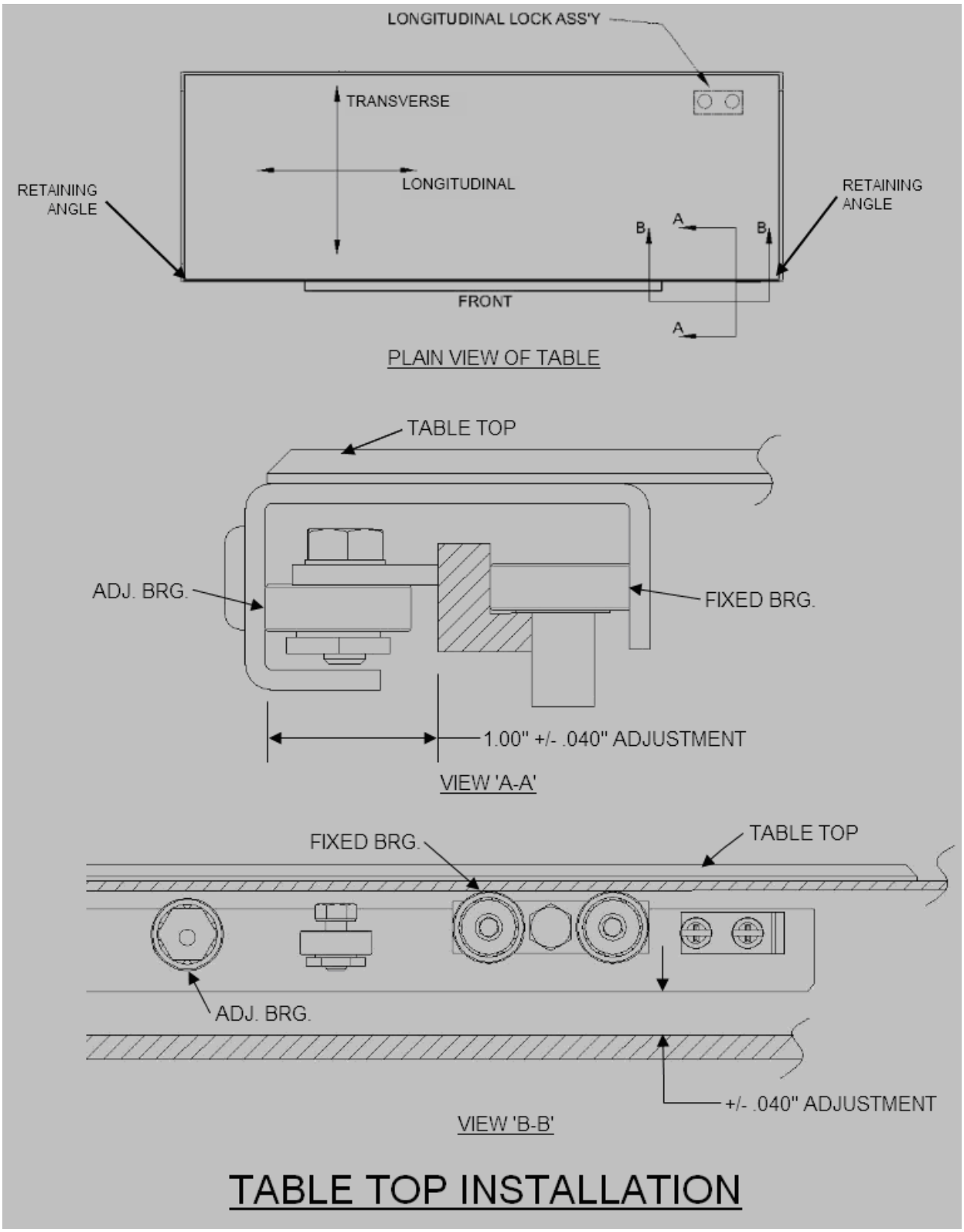

LONGITUDINAL LOCK ASS'Y
TRANSVERSE
LONGITUDINAL
RETAINING ANGLE
RETAINING ANGLE
A
B
B
A
FRONT
PLAIN VIEW OF TABLE
TABLE TOP
ADJ. BRG.
FIXED BRG.
1.00" +/- .040" ADJUSTMENT
VIEW 'A-A'
FIXED BRG.
TABLE TOP
ADJ. BRG.
+/- .040" ADJUSTMENT
VIEW 'B-B'
TABLE TOP INSTALLATION

Figure 3

III.B.3 ANCHORING

To ensure patient safety it is imperative that the four way table is anchored to the floor. Figure 4 below shows the hole pattern for the anchors. Prior to final anchoring, check to make sure that the table base will be parallel to, and the proper distance from, the tubestand floor rail.

If the floor is concrete, secure the table to the floor with 5/16” lead anchors.

If the floor is a material other than concrete, drill holes through the floor and secure with suitable anchors.

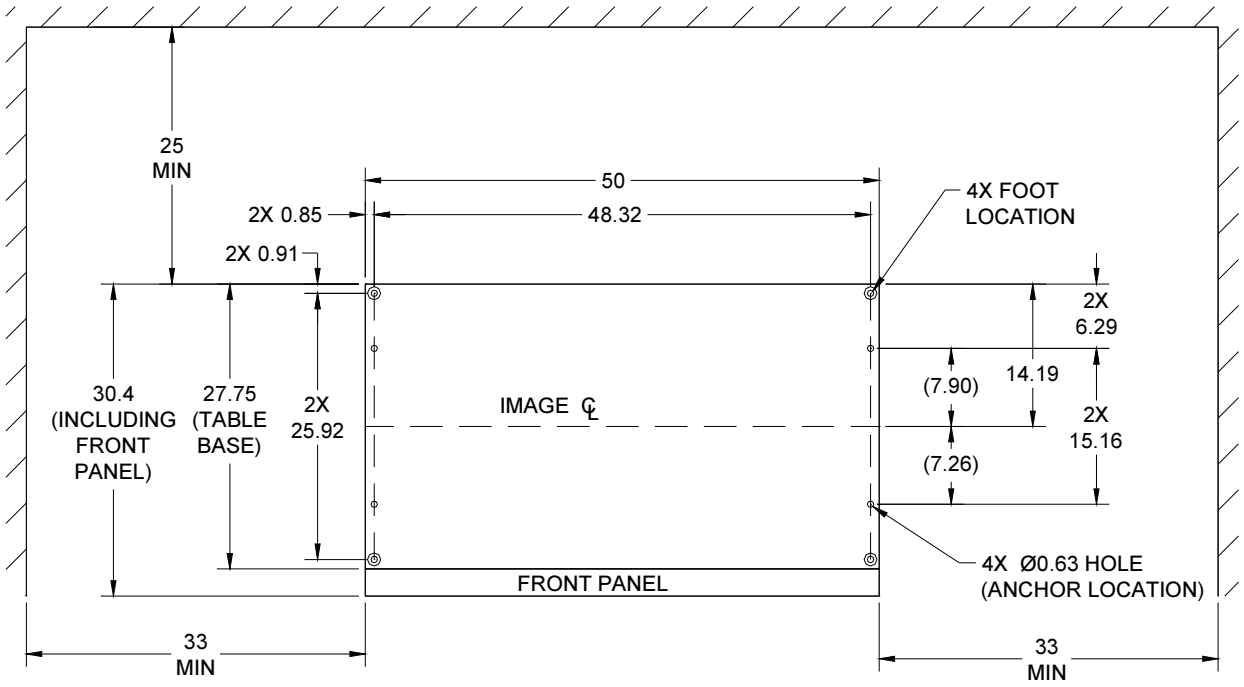


Figure 4: ANCHOR PATTERN

III.B.4 FILM CABINET LOCK ADJUSTMENTS

NOTE: There is one dual-magnetic lock for longitudinal table top motion, two solenoid-activated transverse locks, and one magnetic film cabinet lock. The longitudinal and transverse locks are not adjustable. If adjustment is required for the film cabinet lock,

1. Loosen lock nuts on adjustment screws.
2. Turn screws either clockwise or counter clockwise to raise or lower magnet.
3. The magnet should be as close to the brake strip as possible without touching or creating a drag.
4. Move the film cabinet in both directions to ensure smooth travel.

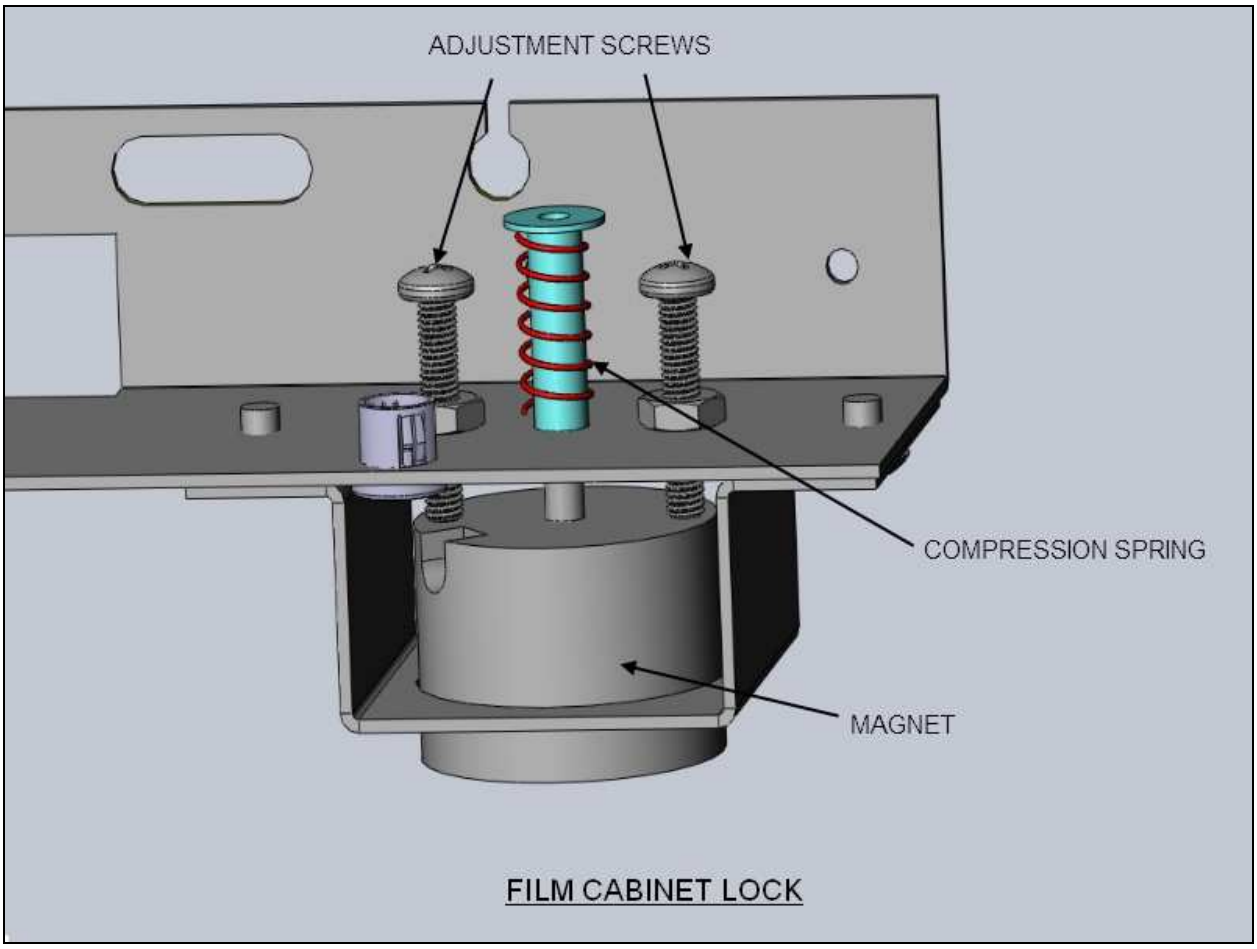


Figure 5

III.B.5 GRID INSTALLATION

Some table configurations come with the grid and cassette tray packed in a separate box. If this is the case, perform the following:

Locate the box labeled "*Attention Installation Personnel Grid and Tray for Table Are Packed Inside."* To install the grid use the following procedure:

If the table has a grid cabinet (no bucky) without AEC:

1. Remove grid from grid packaging and place on a flat surface, tube side down and the center line running from right to left.
2. Remove the top cover from the grid cabinet, mounted in the table. Detach the mating portions of the Velcro strips (the strips with the release paper still attached) from the Velcro strips already on the grid cabinet.
3. Install on the grid the Velcro strips removed in step 2. Place one strip on the bottom edge and one on the top edge of the grid. Both should be approximately 1/16" from the edge and should run the full length of the grid
4. Position the grid so that the Velcro strips on the grid match with the mating velcro strips already installed in the grid cabinet.

5. Important Step: Ensure that the center line of the grid is in line with the center line of the image receptor and press down slightly on the two edges of the grid to insure proper engagement of the Velcro strips.
6. Reinstall the grid cabinet cover.

If the table has a grid cabinet with AEC, or a bucky (with or without AEC):

1. Remove the top cover from the grid cabinet, mounted in the table.
2. Remove the four L-shaped grid retaining clips at the corners of the grid frame of the cabinet.
3. Remove grid from grid packaging.
4. Position the grid so that it is approximately centered within the grid frame of the cabinet.
5. Important Step: Ensure that the center line of the grid is in line with the center line of the grid frame.
6. Reinstall the grid retaining clips. The interior 'L" of the clips should frame the outer corners of the grid, with only the small tabs on the legs of the clips contacting the grid to hold it in place.
7. Reinstall the grid cabinet cover.

III.C Electrical Installation

III.C.1 TRANSFORMER INSTALLATION (OPTIONAL)

To conserve space, the high voltage transformer can be located inside the four way table. The procedure for doing so is as follows:

1. Refer to Figure 6 and remove the two front panel retaining screws.
2. Remove the front panel by lifting the panel up over the retaining hooks and then away from the table.
3. Referring again to the figure, remove the top access panel by removing the retaining screws and lifting the panel out of place.
4. Remove the screws for the footswitch plate. Swing the footswitch plate away from the table. **Caution:** The footswitch terminal wires are still connected to the table. Be careful not to damage these wires when working with the footswitch plate.
5. Position the high voltage transformer inside the table so that the transformer terminals are accessible.
6. Replace the top access panel.
7. Replace the footswitch and check to see that the terminal wires are secure.
8. Replace front panel.

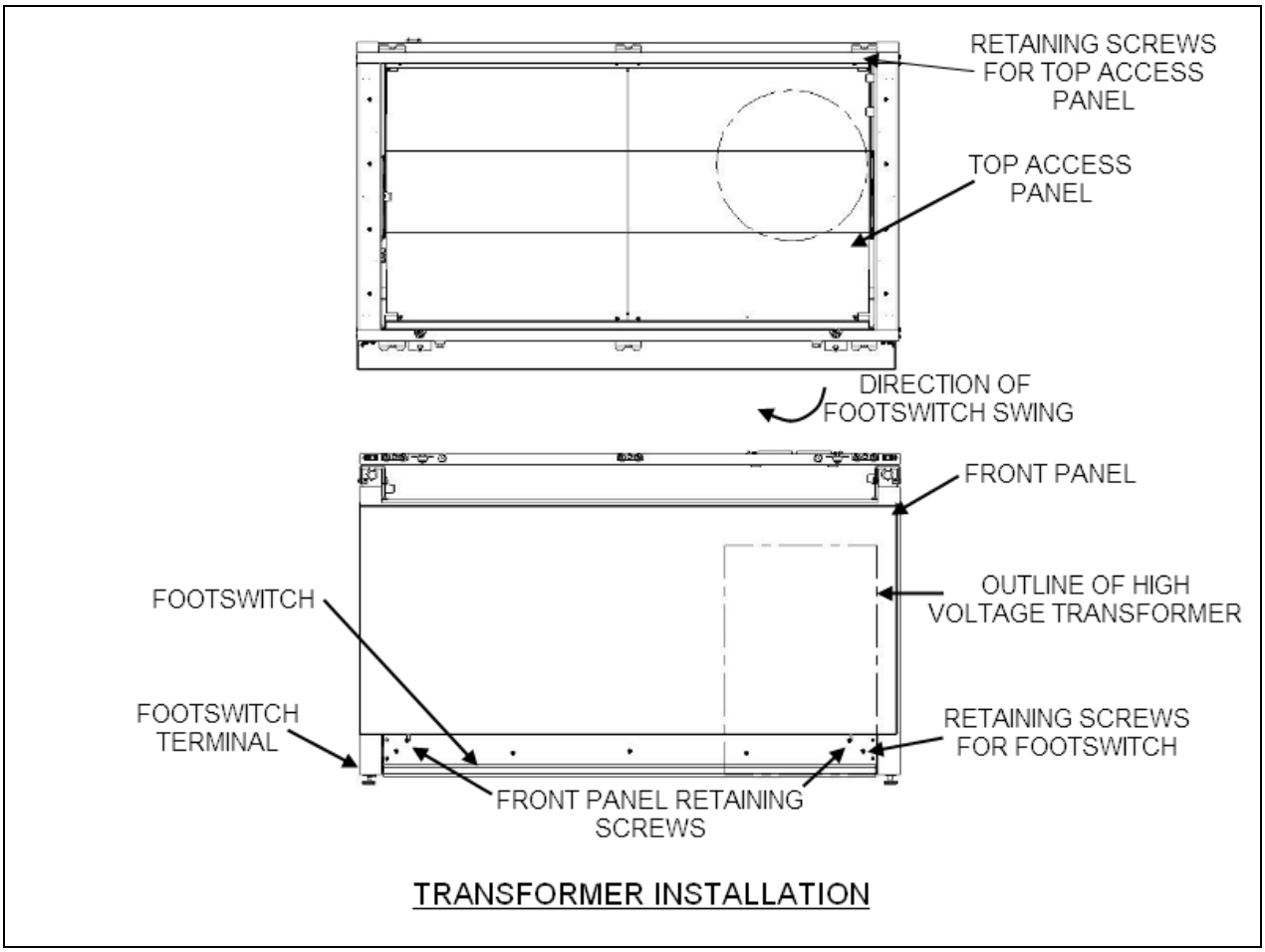


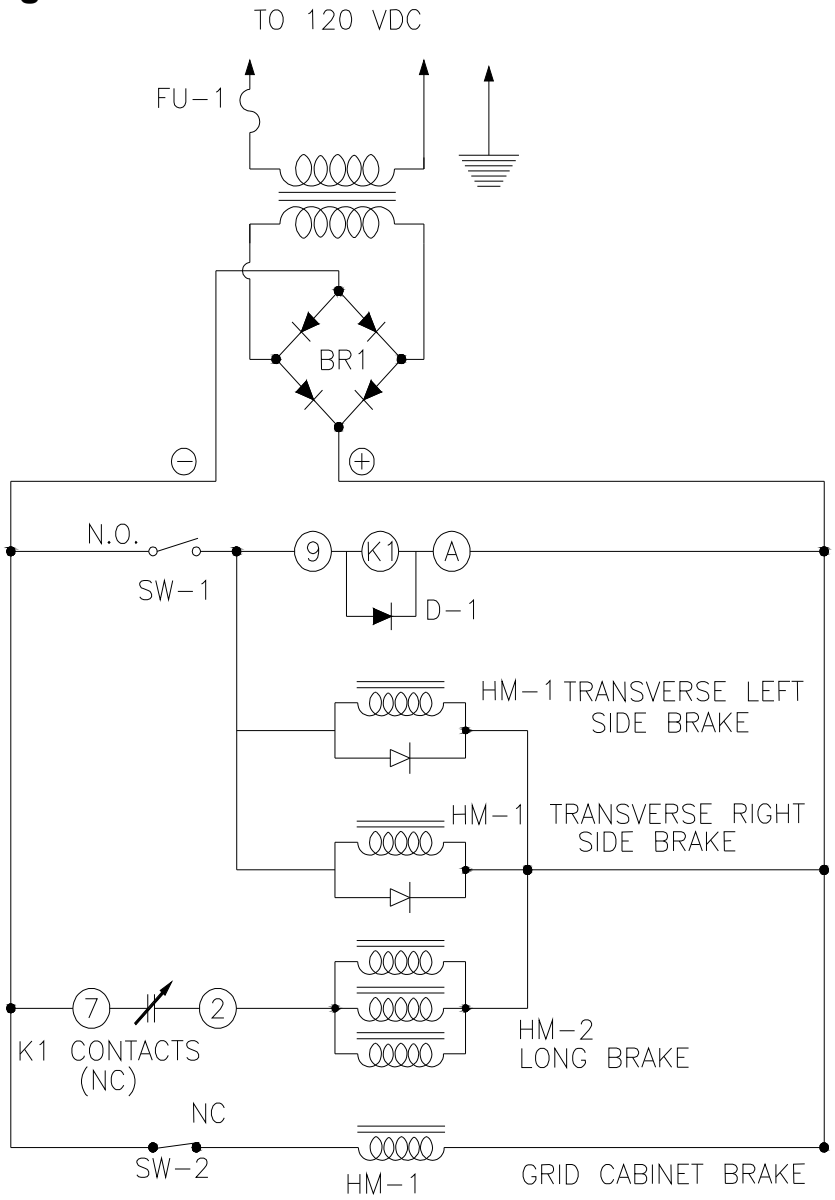
Figure 6

III.C.2 PBL COLLIMATOR KIT INSTALLATION (OPTIONAL)

General purpose radiographic systems include a positive beam limiting collimator. To conserve space, the PBL junction box (or kit) can be installed underneath the four way table. To install the PVL kit use the following procedure:

1. Remove the four way table front panel.
2. Remove the PBL kit front panel.
3. Secure the PBL kit to the inside of the four way table panel.
4. Replace the PBL kit front panel.
5. Replace the four way table front panel.

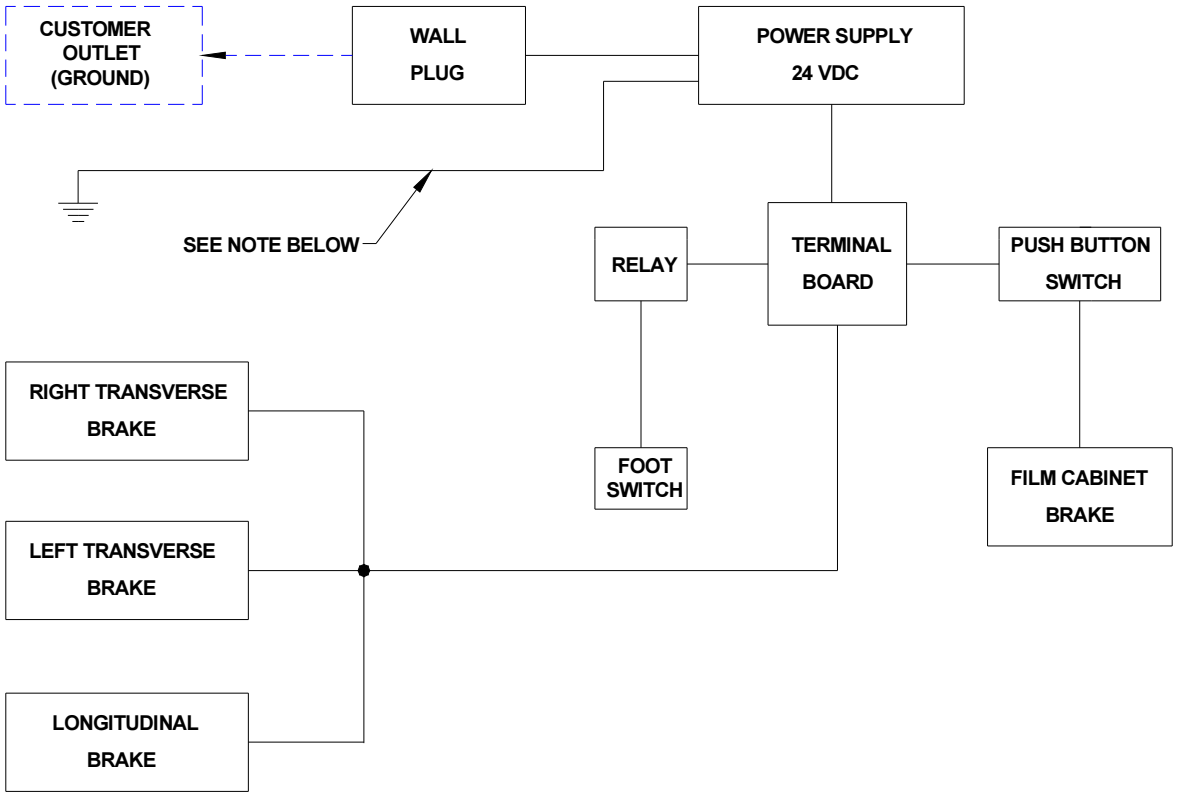
IV. Drawings



ITEM	DESCRIPTION
BR1	RECT. BRIDGE, FULL WAVE, 10A, 600 PIV
HM-2	HOLDING MAGNET 24 VDC, 1.5W
D-1	DIODE 1N5061
HM-1	HOLDING MAGNET 24V DC, 1.5W
K1	RELAY 24V COIL N.C CONTACT
SW-2	PUSH BUTTON SW. N.C. MOMENTARY CONTACT
SW-1	CONTINOUS STRIP SWITCH N. O.
PS-1	POWER SUPPLY 120 VAC IN. 24 VDC, 1.2 A OUT.
FU-1	FUSE 1.25 A, 250 V
PL-1	PLUG 125 V, 15 A

IV.A Electrical Schematic

ELECTRICAL BLOCK DIAGRAM
(4-WAY TABLE)



NOTE

TO ENSURE PROPER GROUNDING AND REGULATORY COMPLIANCE THE SUPPLIED INCOMING GREEN/YELLOW WIRE MUST BE CONNECTED TO EARTH GROUND.

IV.B Electrical Block Diagram