Technical Publication
SM-0521R3

Service Manual

BRS
Basic Radiographic System

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REVISION HISTORY

REVISION	DATE	REASON FOR CHANGE
0	April 22, 2003	First edition
1	30 March, 2004	Installation and dimensions modified.
2	07 May, 2005	Installation improvements.
3	12 Jul, 2005	New schematics and updated photos.

This Document is the English original version, edited and supplied by the manufacturer.

The Revision state of this Document is indicated in the code number shown at the bottom of this page.

ADVISORY SYMBOLS

The following advisory symbols will be used throughout this manual. Their application and meaning are described below.

DANGERS ADVISE OF CONDITIONS OR SITUATIONS THAT IF NOT HEEDED OR AVOIDED WILL CAUSE SERIOUS PERSONAL INJURY OR DEATH.

ADVISE OF CONDITIONS OR SITUATIONS THAT IF NOT HEEDED OR AVOIDED COULD CAUSE SERIOUS PERSONAL INJURY, OR CATASTROPHIC DAMAGE OF EQUIPMENT OR DATA.

Advise of conditions or situations that if not heeded or avoided could cause personal injury or damage to equipment or data.

Note ☞

Alert readers to pertinent facts and conditions. Notes represent information that is important to know but which do not necessarily relate to possible injury or damage to equipment.

SAFETY SYMBOLS

The following safety symbols will be used in the equipment.
Their meaning are described below.

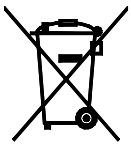
Attention, consult accompanying documents.

Ionizing radiation.

Type B equipment.

Dangerous voltage.

Ground.



This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer or an authorized waste management company for information concerning the decommissioning of your equipment.

TABLE OF CONTENTS

SECTION 1 INTRODUCTION

1.1 TOOLS

The following hand tools are required for the Installation:

- Standard service engineers tool kit.
- Electric drill motor and assorted bits.

1.2 PRE-INSTALLATION CHECKS

Prior to beginning installation it is recommended to inspect the site and verify that the X-ray room complies with requirements such as:

- The maximum dimensions and system movements to plan the minimum space required in the room:

  Maximum Height 2500 mm

  Maximum Width 1550 mm

  Maximum Length 1340 mm

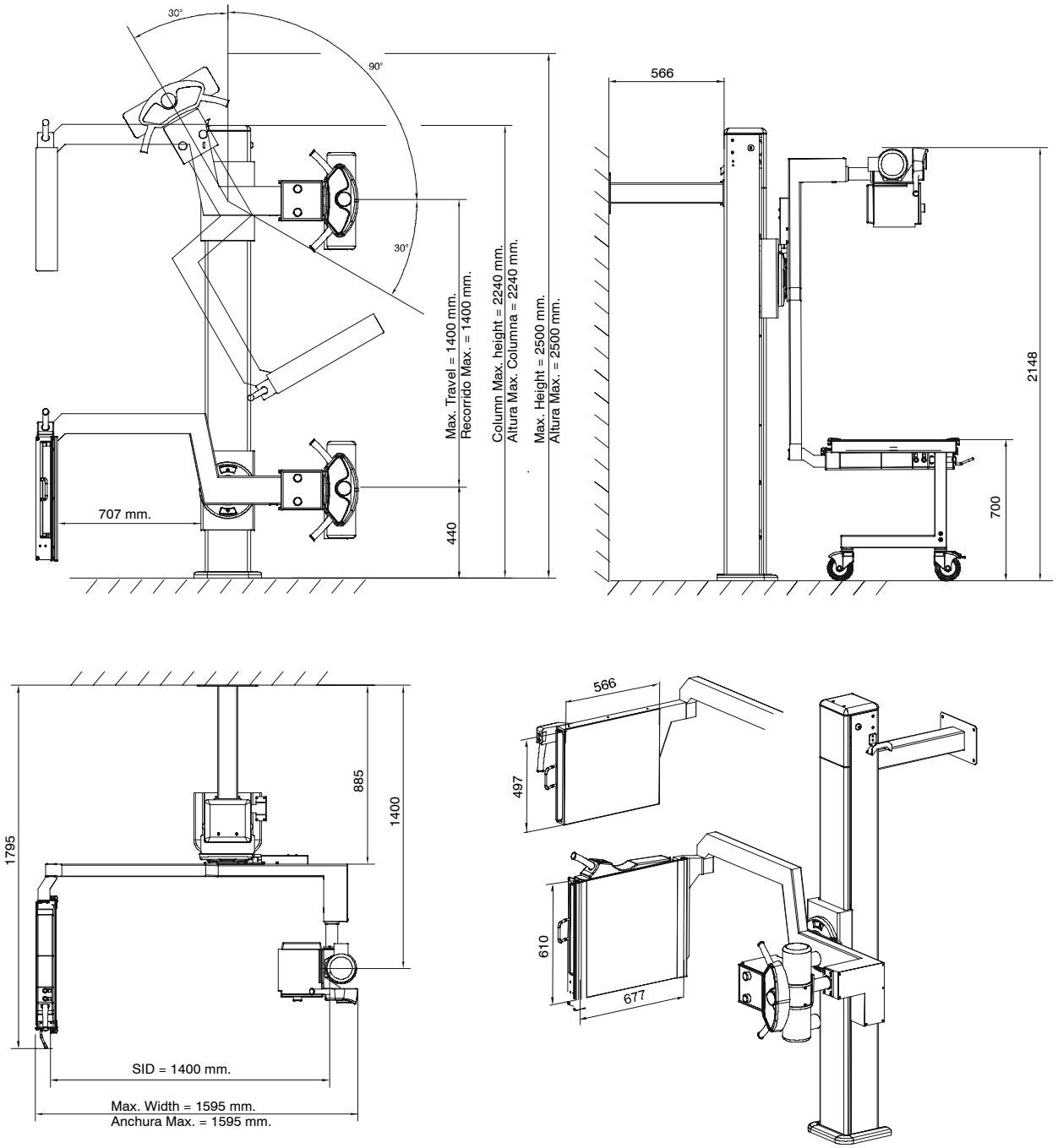
- Conduits and walls are ready to install the System.
- Electricity installation:

  Power Line (for Collimator Lamp): 24 VAC, 50/60 Hz, 6.5 A

  Power Line (for Movement Locks): 24 VDC, 0.2 kVA

ACCORDING TO MDD93/42/CEE, THIS UNIT IS EQUIPPED WITH EMC FILTERS. THE LACK OF THE PROPER GROUNDING MAY PRODUCE ELECTRICAL SHOCK TO THE USER.

Illustration 1-1
Dimensions



(*) Dimensions Subject to change depending on the type of tube

(*) Dimensiones sujetas a cambio dependiendo del tipo de tubo

SECTION 2 UNPACKING

The Unit is shipped in one box to facilitate transport and installation. Upon receipt of the X-ray unit and associated equipment, inspect all shipping containers for signs of damage. If damage is found, notify the carrier or his agent immediately.

1. Place the shipping pallet near its final site in the room and remove all its laterals. Do not discard any packing material such as envelopes, boxes, bags until all parts are accounted for as listed on the packing list.

AT LEAST THREE PEOPLE ARE REQUIRED TO REMOVE ALL HEAVY COMPONENTS FROM THE SHIPPING PALLET.

2. When the equipment is unpacked, check part numbers and serial numbers of each component with its identification labels. Inspect all pieces for visible damages. If any damaged part is found, repair it or order its replacement to prevent unnecessary delay in installation.

3. Verify that all items on the customer order are present.

4. Leave a working area around equipment until its final installation is complete.

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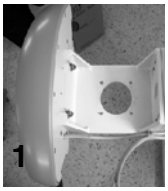
SECTION 3 INSTALLATION

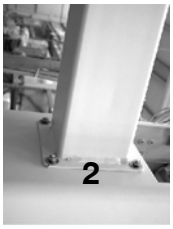
3.1 POSITIONER INSTALLATION OVERVIEW

TICK BOXES WHEN DONE

☐ **1.-** Install the Support of the Tube-Collimator Assembly and the Control panel (in some cases it is factory installed)



☐ **2.-** Install the Wall Support at the back of the Column (the Column laid on the pallet)



☐ **3.-** Drill WALL HOLES and anchor the Wall Support .

☐ **4.-** Install the Collimator and the X-ray tube.

☐ **5.-** Remove the Safety Locking Rod/Central carriage Screw.

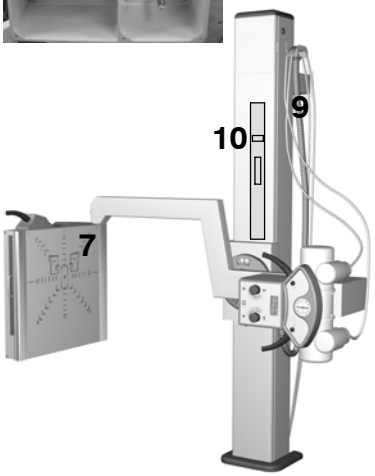
☐ **6.-** Install all the counterweight plates supplied.

☐ **7.-** Install the Oscillating Grid Assembly or Fixed Grid Assembly. (level it)

☐ **8.-** Drill FLOOR HOLES and anchor the unit to the floor.

☐ **9.-** Connect cables (HV, Tube, Stator, Bucky or Grid) and guide them .

☐ **10.-** Check levels on Column, Tube-Collimator Assembly and Receptor Assembly.



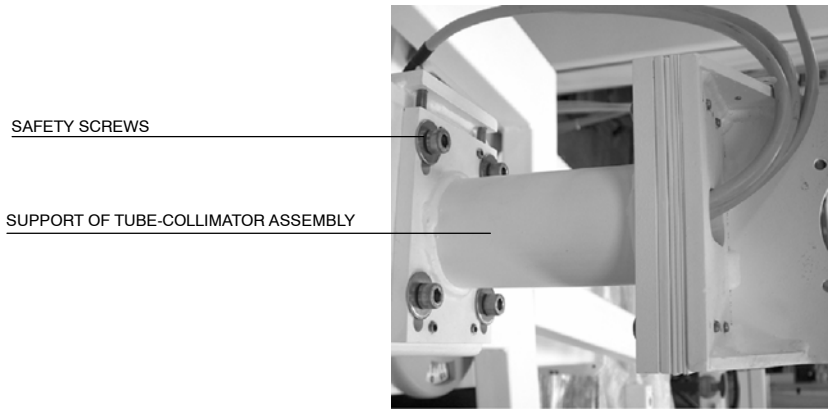
Note ☞ *Perform Installation following the order described below.*

WARNING

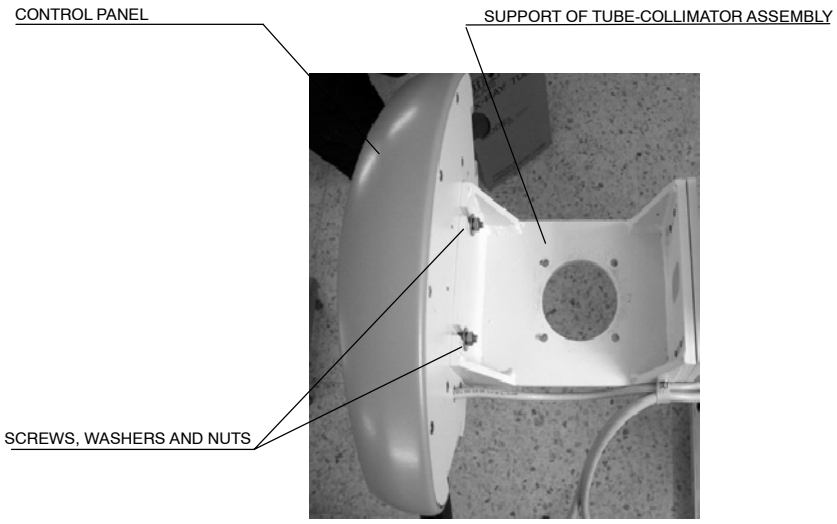
DO NOT REMOVE SAFETY LOCKING ROD FROM THE COUNTERWEIGHT CARRIAGE AND/OR THE CENTRAL CARRIAGE SCREWS (2) BEFORE SPECIFICALLY INSTRUCTED IN THIS DOCUMENT.

Note ☞ *Due to packaging requirements, some Units may not include the Tube Collimator Assembly and the Control panel factory pre-installed. If that is the case, follow steps 1 and 2, if not, go to step 3.*

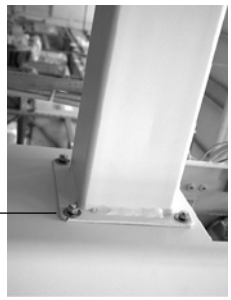
1. Assemble the Support of the Tube-Collimator Assembly to the Upper area of the Swivel Arm using the four Safety Screws installed in the Arm.



2. Assemble the Control Panel in the Support with the two screws, washers and nuts attached to the Control Panel.



3. Assemble the Upper Wall Support to the Column. Lift the Column as much as necessary as to mount the Upper Wall Support in its upper part.



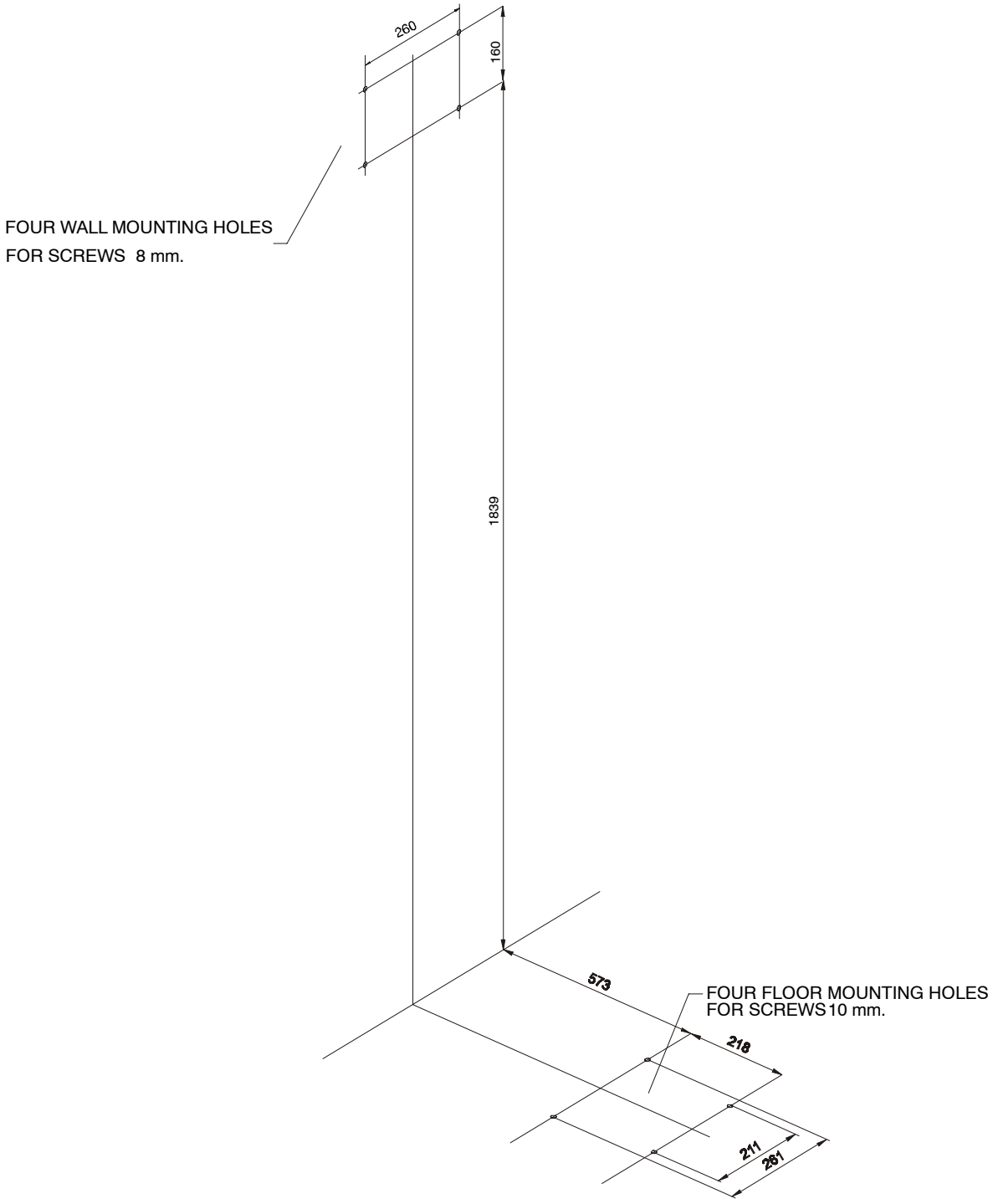
Note ☞ *At least two people are required to perform the next operation.*

4. Position the column against the wall on its final site in the room. While one person is holding up the Column, the other one should level it vertically on both lateral sides and on the front. Also use the leveling screws at the base of the column.

5. Mark its anchoring positions on the wall (not to the floor yet).

Note ☞ *Distances shown on Illustration 3-1 may also be taken as reference to mark the anchoring holes position.*

Illustration 3-1
Drill Template



6. Move the Column and prepare the anchorages.

WARNING

BEFORE ANCHORING THE UNIT, CHECK THAT THE WALL AND THE ANCHORING SYSTEM ARE STRONG ENOUGH (2000 NEWTON TRACTION FORCE) TO ENSURE A SAFE INSTALLATION. SOME NON BRICK WALLS MAY REQUIRE ADDITIONAL ANCHORAGE INSTALLATION.

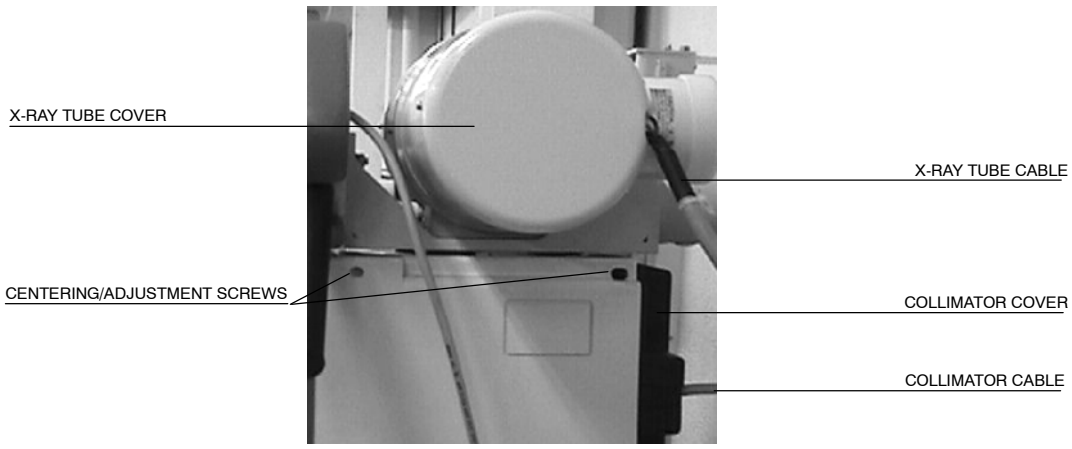
7. Drill holes and anchor the Wall Support. Make sure the Column is firmly anchored and leveled at front, sides and base.

8. Install the X-ray Tube in the Upper Support of the Column using the Collimator Adaptation Ring and its four Safety Screws (Allen).

9. Before installing the Collimator, unscrew the same number of turns the four Centering Adjustment and Safety Screws (Allen) to allow the Collimator installation in the Collimator Adaptation Ring. Adjust the Collimator Blades to their widest setting and carefully install the Collimator centering it with the X-ray Tube window.

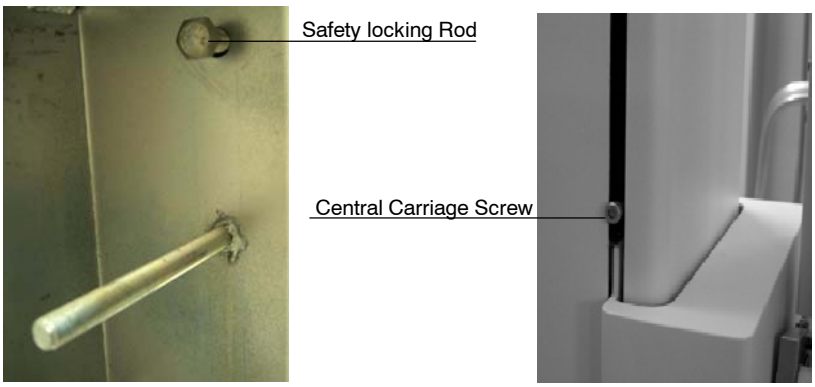
   Tighten carefully the four Centering Adjustment and Safety Screws (Allen) equally (same number of turns) until Collimator is centered and held firmly on the Coupling Ring (support). (*Also, refer to Collimator Manual*).

Illustration 3-2
Installation of X-ray Tube and Collimator

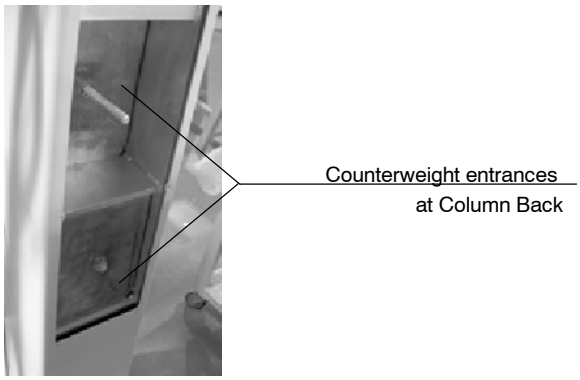


10. Remove the X-ray Tube and Collimator covers and connect the wires from the upper harness to the X-ray Tube and Collimator according to their identification *(refer to 54301065).*

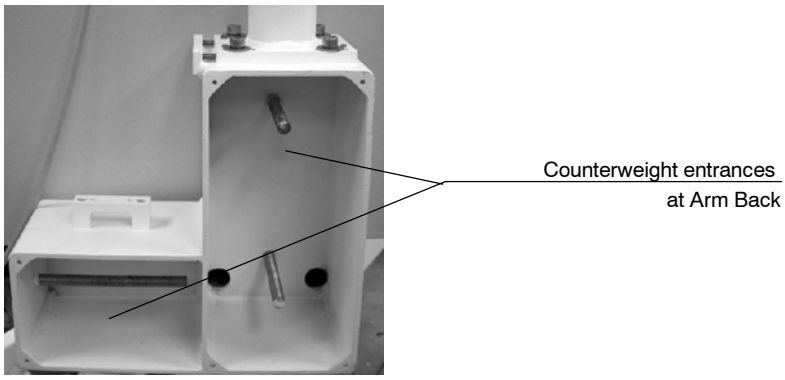
11. Remove now the Safety Locking Rod from the Counterweight Carriage and the Central Carriage Screws (2). The carriage may go down.



12. Add all the counterweigh pieces to both entrances at the back side of the Column and secure them with the provided nuts. The unit is factory counterweighted, so the counterweights provided are to be installed.

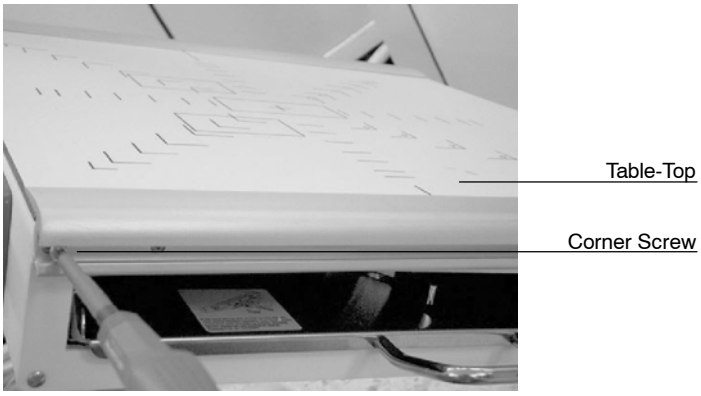


13. Add all the counterweigh pieces to both entrances at the back side of the Arm and secure them with the provided nuts. The unit is factory counterweighted, so all the counterweights provided are to be installed.

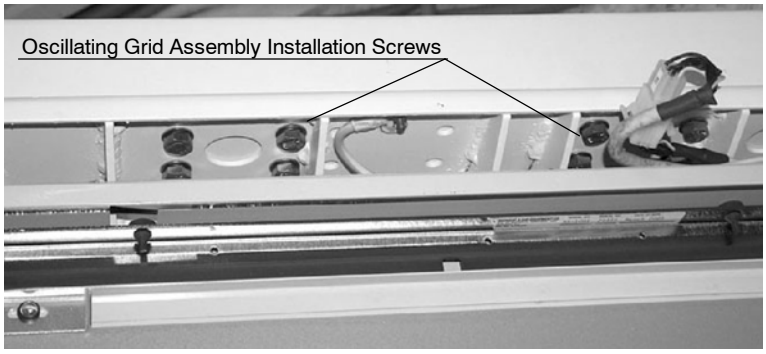


14. Now install the **Oscillating Grid Assembly** or the **Fixed Grid Assembly**. Follow steps 14 to 17 for Oscillating Grid Assembly or steps 18 to 21 for Fixed Grid Assembly.

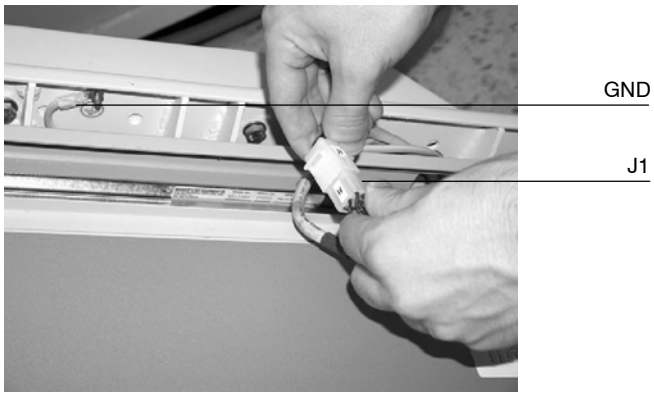
15. Oscillating Grid Assembly installation:Take out Table-Top of the Oscillating Grid Assembly – Four screws at the corner of the Oscillating Grid Assembly.



16. Install the Oscillating Grid Assembly in the Swivel Arm with the 2 sets of screws (4 screws in each set). A set of gauges (included in the package) can be installed for perpendicularity adjustment.



17. Connect J1 (only for Oscillating Grid Assembly with motorized Grid), J2 and GND from the Harness to the Oscillating Grid Assembly.



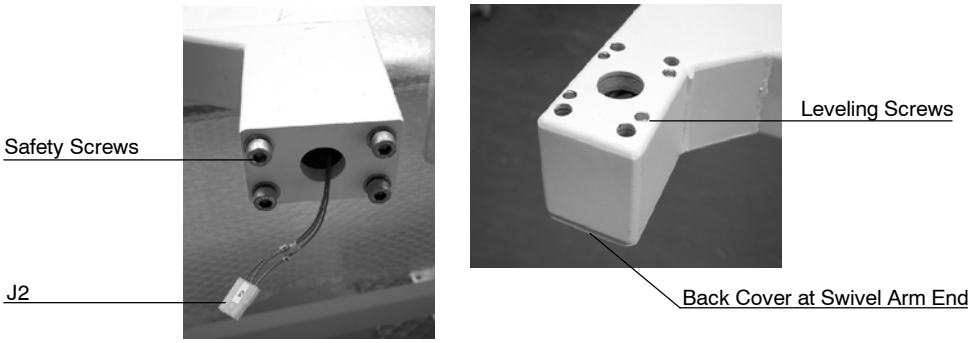
18. Reinstall the Oscillating Grid Assembly Table-top.

19. Fixed Grid Assembly Installation: Remove the Safety Screws installed in the Fixed Grid Assembly.

20. Remove the Back Cover of the Swivel Arm end.

21. Install the Fixed Grid Assembly in the Swivel Arm with the Safety Screws previously removed. (Before connect J2).

22. Level the Assembly with the leveling screws and re-install the Back Cover.



23. Connect the cables from the main harness (Stator, Bucky, Power Line, Collimator and ground (GND) cables routed directly from the Column) to the Generator *(for these connections refer to Interconnection Map 54301065 and also Generator Service Manual).*

24. Connect directly the ground cables (GND) from the Column to the Main ground stud (GND) of the Generator.

25. Connect HV Cables of the X-ray Tube.

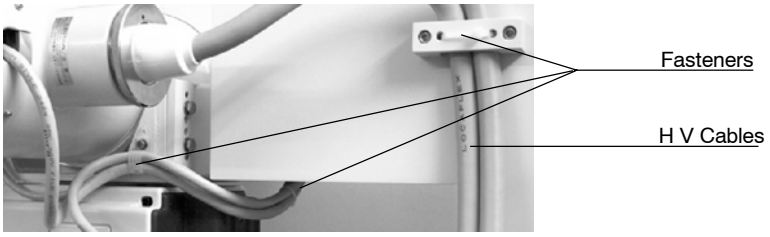
CAUTION

Terminal Pins of HV Cables are extremely delicate and they are easily damaged. Take particular care to handle them carefully. Make sure that they remain straight and that the splits in the pins are open (parallel to sides).

Prepare the High Voltage terminals that will be installed in the X-ray Tube receptacles. Apply Silicone Paste over the entire surface of the Plug including the Pins.

Carefully connect cables to their related receptors of the Tube and fix their nuts tightly.

26. Fasten HV cables to lateral side of Pivoting Arm with the clamp on the carriage of the Tube Collimator Assembly. Give the cable length enough to enable movements of the of Pivoting Arm.



Note ☞ *Tube HV Cables may also be tied up to a ceiling pole to avoid collisions and to easy movements of the system.*

27. Mark and drill the anchoring positions on the floor. Check leveling again in different sides of the unit and correct if necessary before fixing the unit definitely.

28. Anchor the Column to the floor.

Note ☞ *Distances shown on Illustration 3-1 may also be taken as reference to mark the anchoring holes position.*

29. Snap in the decorative base of the Columm (pressing it).

30. Turn the system on and check that all controls and movements operate correctly.

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SECTION 4 ADJUSTMENTS

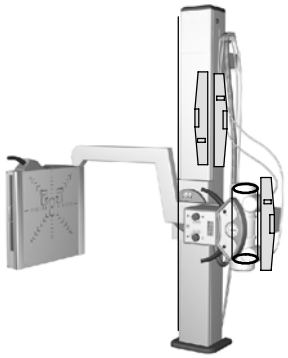
4.1 ADJUSTMENT TOOLS

The following special Tools have been used for adjustment of the X-ray System (these tools are not included with the System):

- Collimator Test Tool (Model RMI 161B9).
- Beam Alignment Test Tool (Model RMI 162A).
- SID Test Stand Tool (Inside Case: RMI Model 175).
- Light Meter (Standard).

Illustration 4-1
Checkings overview

1 Check /Correct levels of Column and tube

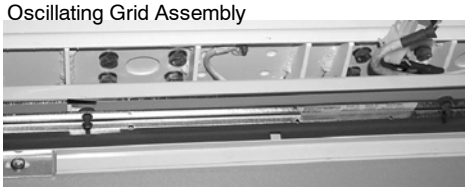


2 Check /Correct levels of Receptor

Fixed Grid Assembly

Leveling Screws

Oscillating Grid Assembly



3 Check / Correct alignment of the light field with the X-ray field

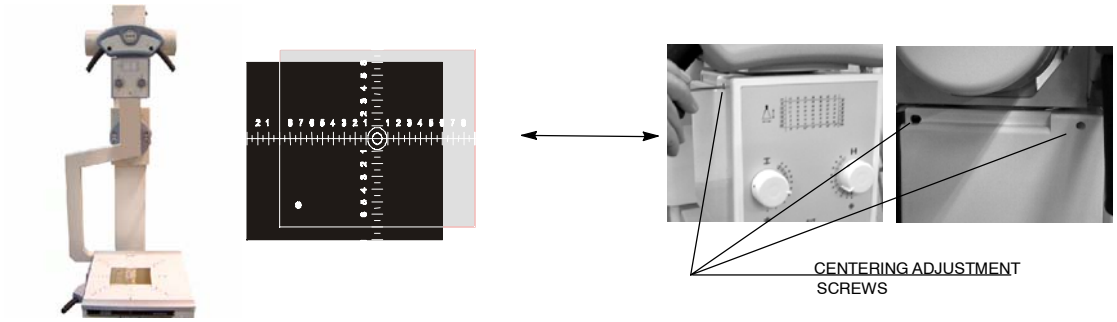
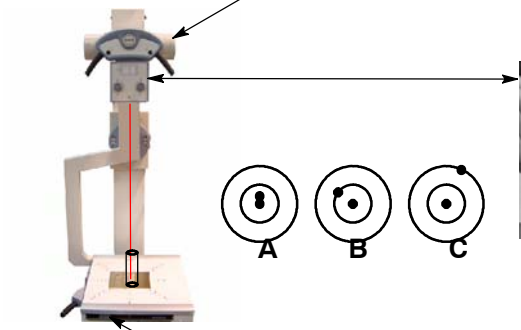
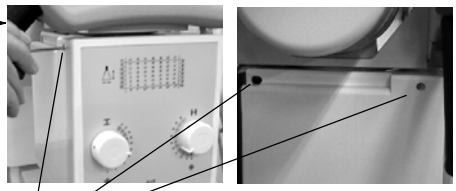


Illustration 3-1 (cont)
Checkings Overview

4 Check / Correct the perpendicular adjustment of the X-Ray Beam with the Image Receptor



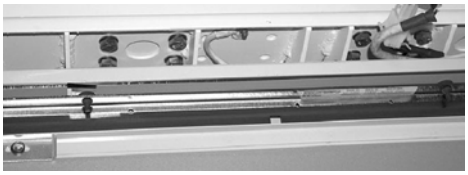


CENTERING ADJUSTMENT SCREWS

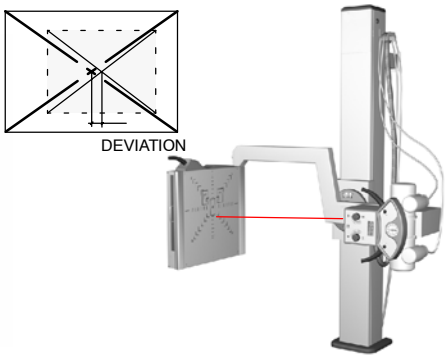
Fixed Grid Assembly

Leveling Screws

Oscillating Grid Assembly



5 Check / Correct centering of X-Ray field and Image Receptor (same adjustments as step 4)

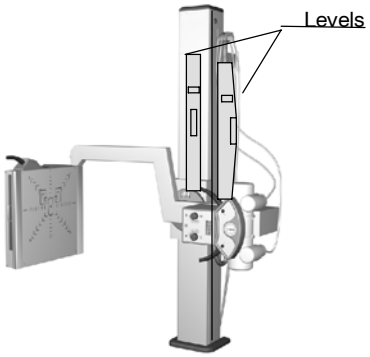


6 Field Size Indicator Test

7 Collimator Lamp Brightness Test

4.2 ALIGNMENT OF X-RAY BEAM

1. Check with a level the vertical/horizontal position of the Column. If necessary, modify the position of the Column with the screws attached to the Base of the Column, a correct installation starts with a good leveling of the column.



2. Check the level of the Tube-Collimator Assembly. The mechanical installation provides a levelled Assembly, anyway check parallelism. If necessary reinstall the Tube-Collimator Assembly. (*Refer to installation section)*.

3. Check the Receptor, first in horizontal position (thorax), then in vertical position (Undertable). If necessary, move up or down the Receptor assembly with the Receptor Assembly leveling screws.

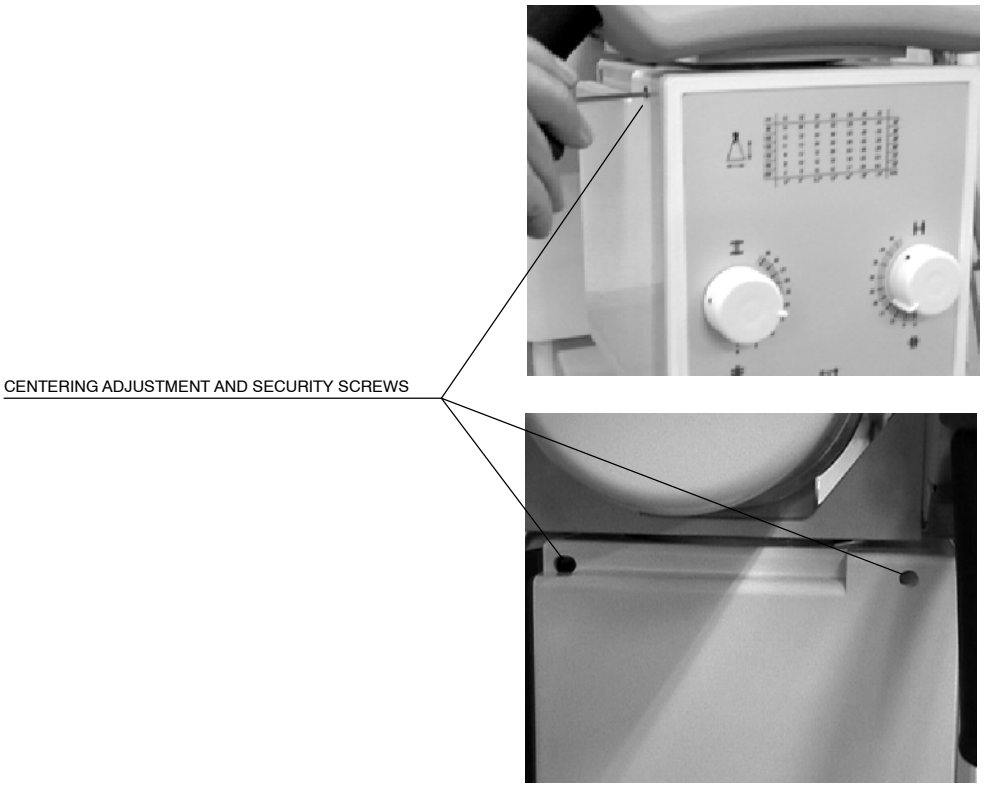
4. Place the Pivoting Arm in vertical position. The Tube-Collimator Assembly has to be perfectly aligned with the Receptor Assembly. Check with a level correct horizontal position of both assemblies.

Illustration 4-2
Vertical Position of Pivoting Arm with Alignment Tools

5. Turn on Collimator light and center the Collimator in relation to the Receptor Table-Top. Horizontal and transversal position of the light axes projected by the Collimator Lamp must be in line with the axes or film sizes marked on the Table-Top.

   If needed, modify Collimator position by carefully unscrewing and screwing the four Centering Adjustment and Safety Screws (Allen) of Collimator.

Illustration 4-3
Collimator Screws



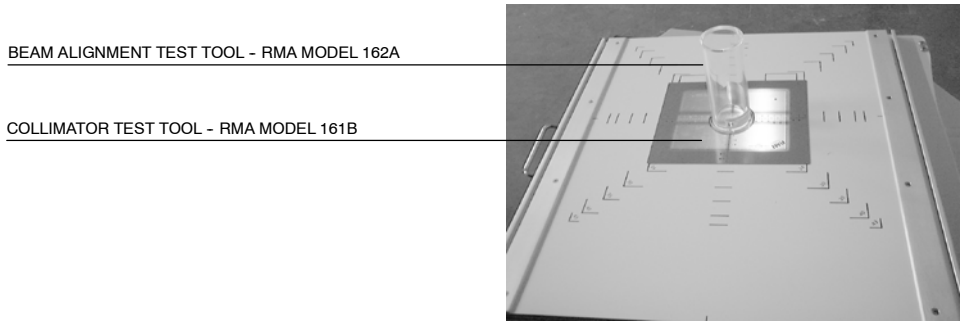
6. Position the Collimator Test Tool (RMI model 161B) on the Receptor Table-Top.

7. Turn on Collimator light and by means of the Collimator Control Knobs, center the Collimator Test Tool with the light axes projected by the Collimator Lamp.

8. Adjust the Light Field of the Collimator Lamp to the rectangle drawn inside the Collimator Test Tool.

9. Place centered the Beam Alignment Test Tool (RMI model 162A) on the Collimator Test Tool.

Illustration 4-4
Alignment Test Tools



10. Load Cassette film Tray with cassette film 24x30 and insert it.

11. Make an exposure at 60 kVp / 5 mAs.

12. Process film and:

    a. Check that the X-ray Field falls just within the image of the inner rectangle of the Collimator Test Tool.

       If an edge of the X-ray Field falls out of the inner rectangle means a misalignment of the Light Field respect to the X-ray Field. The maximum misalignment allowed is 2 % of SID (for SID 1.4m = 2.8 cm tolerance).

       Refer to Section 4.2.1 for alignment of Light Field with X-ray Field.

b. Check that the X-ray Beam is perpendicular to the plane of the Image Receptor. If the Image receptor is parallel to the Table-Top, the perpendicularity of the X-ray Beam can be checked using the Beam Alignment Test Tool with the Collimator Test Tool.

Based on next illustration, the criteria for SID at 1.4 meter is:

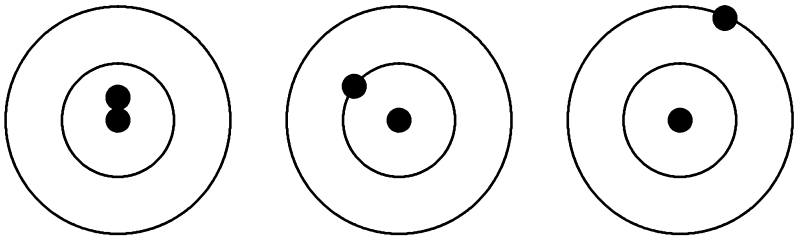
- If the image of the two balls overlap (A) the X-ray Beam is perpendicular to within 0.5°.

- If the image of the top ball (larger shadow) intercepts the first circle (B), the X-ray Beam is about 1.5° away from the perpendicular.

- If the image of the top ball (larger shadow) intercepts the second circle (C), the X-ray Beam is about 3° away from the perpendicular.

In cases (A) and (B) perpendicularity is within tolerance for SID at 1 meter (top ball is within or intercepting the first circle). The third case (C) needs readjustment.

Refer to Section 4.2.2 for perpendicularity adjustment.



c. Check that the X-ray Beam is properly centered with the Image Receptor. To determine the center of the Image Receptor, draw diagonal lines from corner to corner of the X-ray Film. (Alternately, the film can be folded in half and creased at the center). The two lines will cross in the center of the Image Receptor (film). Then draw diagonal lines from the corners of the imaged X-ray Field.

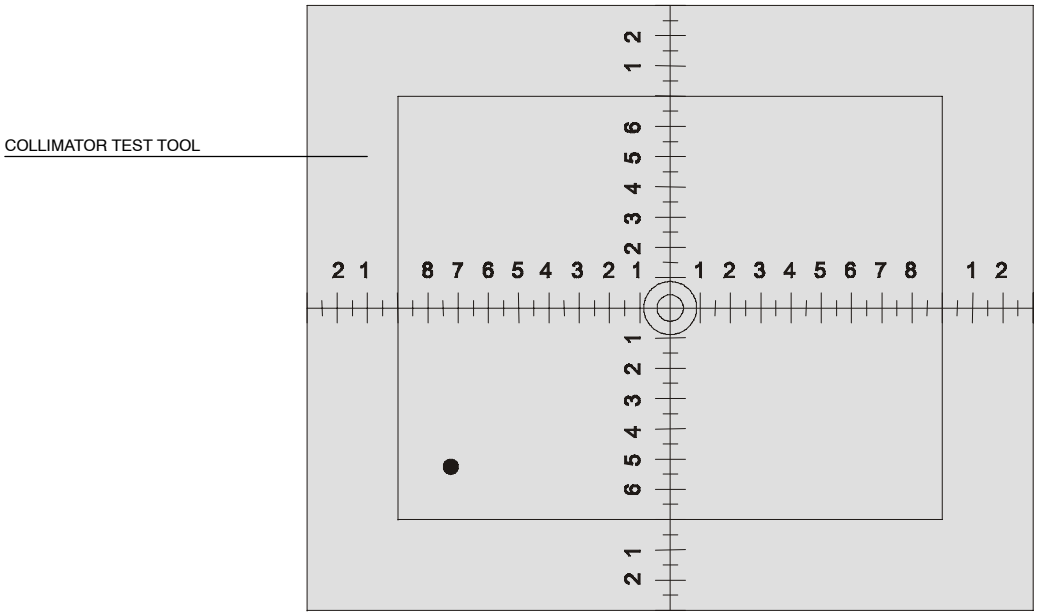
If the center of the X-ray Field and Image Receptor is the same, the diagonals of both sets of lines should cross at the same point. The maximum misalignment allowed is 2 % of SID (for SID 1.4m = 2.8 cm tolerance).

Refer to Section 4.2.3 for centering of X-ray Field and Image Receptor.

4.2.1 ALIGNMENT OF LIGHT FIELD WITH X-RAY FIELD

1. Place the Pivoting Arm in vertical position. The Tube-Collimator Assembly has to be perfectly aligned with the Receptor Assembly. Check with a level correct horizontal position of both assemblies.

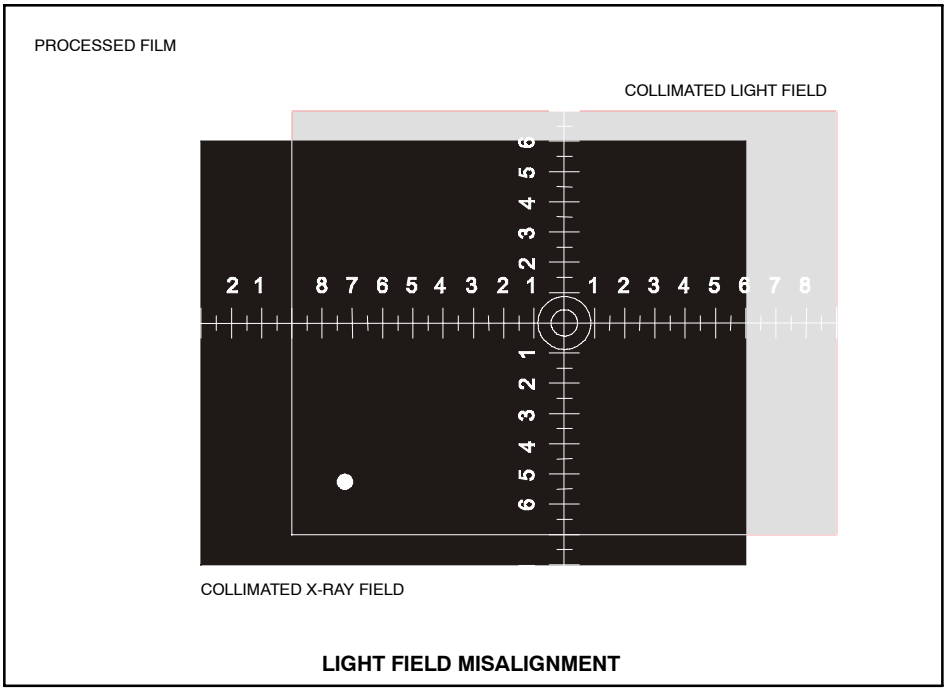
2. Position the Collimator Test Tool (RMI model 161B) on the Receptor Table-Top.



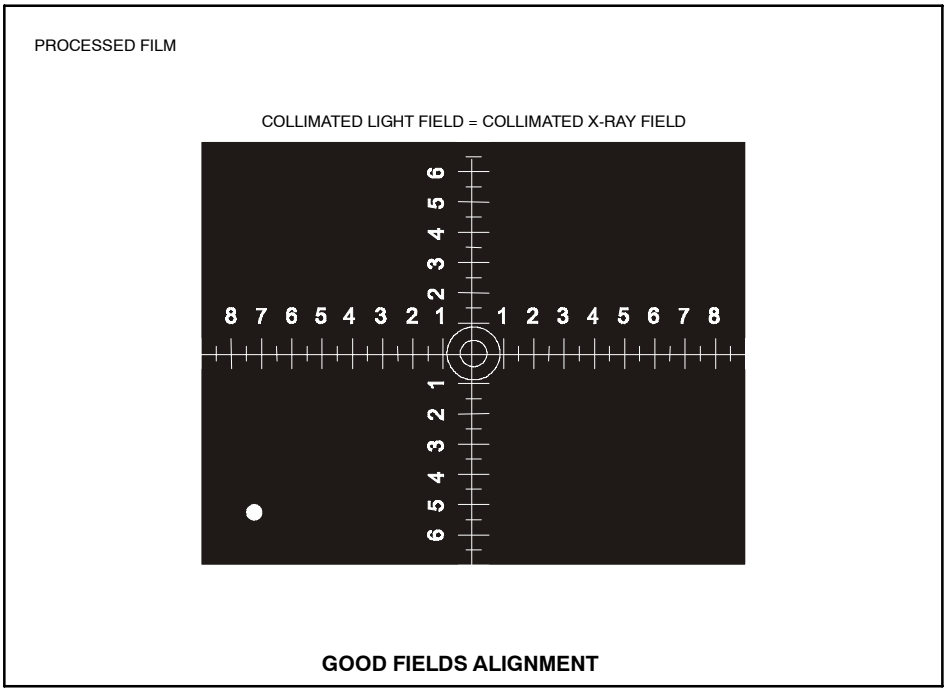
3. Turn on Collimator light and center the Collimator Test Tool with the light axes projected by the Collimator Lamp.

4. Adjust the Light Field of the Collimator Lamp to the rectangle drawn inside the Collimator Test Tool.

5. Check on the processed film the adjustment required to meet the Light Field with the X-ray Field. Identify the deviation on the axes imaged on the film.



LIGHT FIELD MISALIGNMENT



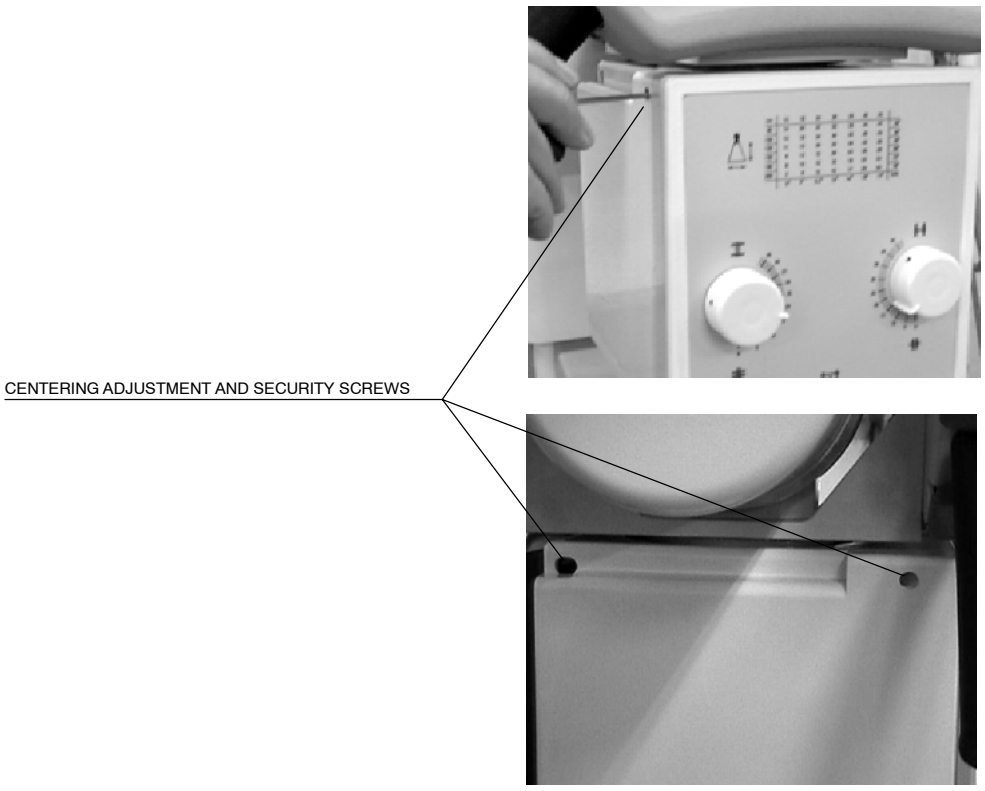
GOOD FIELDS ALIGNMENT

6. Do not remove the Collimator Test Tool from its original position and adjust the Light Field by moving the Collimator Unit and/or the Collimator Lamp.

   a. Collimator Lamp must be ON during Light Field adjustment.

   b. Modify Collimator position by carefully unscrewing and screwing the four Centering Adjustment and Safety Screws (Allen) until the Light Field coincides with the axes reference imaged (numbers and dots) on the processed film.

Illustration 4-5
Collimator Screws



   c. If adjustment is still necessary, modify position of Collimator Lamp (*refer to Collimator Manual*).

7. Repeat exposure and procedure until the result is satisfactory. The maximum misalignment allowed is 2 % of SID (for SID 1.4m = 2.8 cm of tolerance).

4.2.2 PERPENDICULARITY ADJUSTMENT OF X-RAY BEAM WITH IMAGE RECEPTOR

In case that perpendicularity is out of tolerance (top ball is out of first circle), adjust perpendicularity as follows:

1. Place the Pivoting Arm in vertical position. The Tube-Collimator Assembly has to be perfectly aligned with the Receptor Assembly. Check with a level correct horizontal position of both assemblies.

   The Receptor Assembly is factory adjusted (slightly up) and it is recommended do not perform any additional correction. During procedure, it must be horizontally placed at 0^{o} (check position with a level and with its indicator plate).

2. Position the Collimator Test Tool (RMI model 161B) on the Receptor Table-Top.

3. Turn on Collimator light and center the Collimator Test Tool with the light axes projected by the Collimator Lamp.

4. Place centered the Beam Alignment Test Tool (RMI model 162A) on the Collimator Test Tool and observe if shadow of the Beam Alignment Test Tool is projected in equal proportion around it.

5. Check on the processed film the adjustment required to center the top ball mark. Shadow around the Beam Alignment Test Tool can also help to make a first correction.

6. Loosen slightly the four Safety Screws (Allen M8) of the Tube-Collimator Assembly. If required, perform the following adjustments:

   - For horizontal correction move horizontally the Tube-Collimator Assembly before tightening the four Safety Screws.

   - For vertical correction loosen or tighten carefully the four Leveling Screws (Allen M6) of the Tube-Collimator Assembly before tightening the four Safety Screws.

7. Repeat exposure and procedure until the result is satisfactory (top ball must be inside of the first circle).

Illustration 4-6
Adjustments in the Tube-Collimator Assembly

1.- Leveling Screws: The Tube-Collimator Assy. moves slightly up or down from one side.

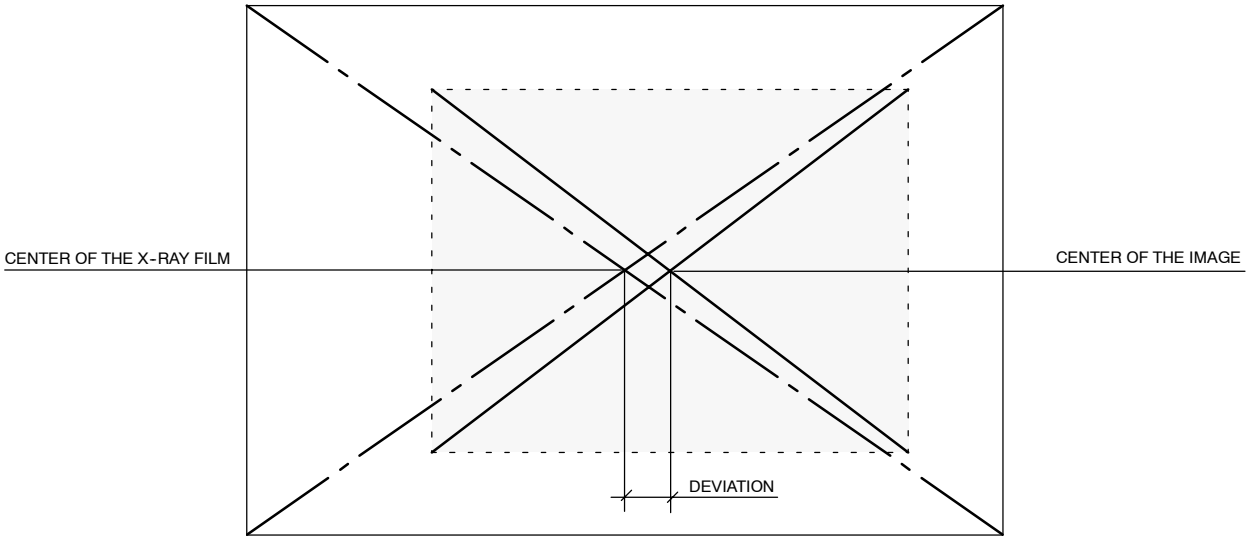
2.- Positioning screws and Fixing Screws:

2a: Loose first the Fixing Screws, then adjust the tube-collimator with the positioning screws
2b: then tighten the Fixing Screws.

3.- Shims (factory installed/adjusted, and extra units included in package). These plates can be added or removed in order to extend/reduce the length of the Tube-Collimator Assembly -.

4.2.3 CENTERING OF X-RAY FIELD AND IMAGE RECEPTOR RECEPTOR ASSEMBLY

The error between centers of the X-ray Field and the Image Receptor should not be greater than 2% of the SID. (for SID 1.4m = 2.8 cm tolerance).



If the deviation is greater than 2% of SID, perform the following procedure:

1. Check on the processed film the correction required for centering the X-ray Field with the Image Receptor. Adjustments will be performed as the same way described for Perpendicularity correction, so only re-adjust it if really is necessary.

Centering adjustments may affect to perpendicularity corrections.

2. Repeat exposure and check centering until the result is satisfactory (centers position are within tolerance).

4.3 FIELD SIZE INDICATOR TEST

Note ☞ *Before starting with the Field Size Indicator Test, the Alignment of X-Ray Beam Test, the Alignment of Light Field with X-Ray Field Test and the SID Indicator Test should be performed.*

1. Place the Pivoting Arm in vertical position. The Tube-Collimator Assembly has to be perfectly aligned with the Receptor Assembly. Check with a level correct horizontal position of both assemblies.

2. Open the Collimator blades to set a Field Size of 24 x 30 cm for SID 1,4 m.

3. Turn on the Collimator Light and center the Collimator in relation to the Receptor Table-Top. Horizontal and transversal position of the light axes projected by the Collimator Lamp must be in line with the axes or Film Size marked on the Table-Top.

4. Load on the Cassette Film Tray with a Cassette Film of 35 x 43 cm centered and insert it.

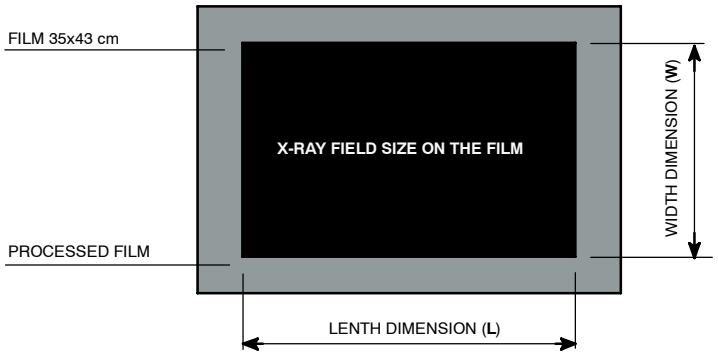
5. Make an exposure at 60kVp, 1mAs.

6. Process film and check the following measurements known (*refer to Illustration 4-7*):

   a. Measure the length of the X-ray Field on the Processed Film (identified as **L**)

   b. Measure the width of the X-ray Field on the Processed Film (Identified as **W)**

Illustration 4-7
X-ray Field Size



7. With the measurements obtained and according to the field size indication selected, the results should be:

   - Length dimension (**L**) = 300 mm
   - Width dimension (**W**) = 240 mm

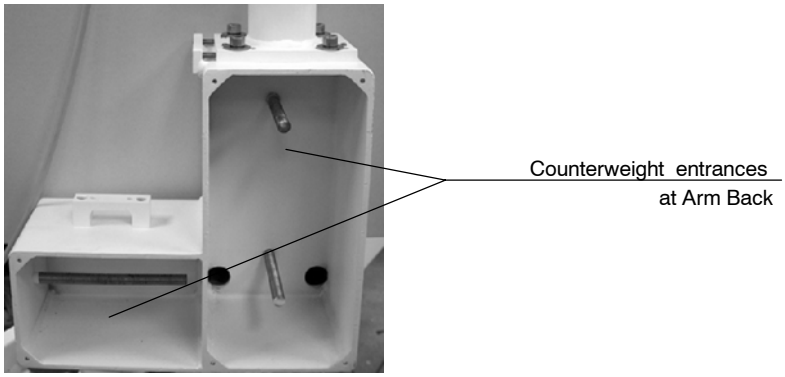
8. The difference between the indicated Field Size and the obtained Field Size may not exceed 1.5 % (rejection limit) of the SID in either direction. Therefore the deviation in any direction should not be higher than 21 mm (rejection limit) for SID at 1.4 meter.

9. If the deviation of Field Size Indication is out acceptance limits, it is necessary to readjust the index of Collimator Blades Control Knobs. For that, loosen each Collimator Control Knob and position it according to deviation. Repeat the complete tests until the X-Ray Field Size selected (24 x 30 cm) is obtained.

4.4 X-RAY TUBE OR COLLIMATOR REPLACEMENT

Note ☞ *This section only applies to systems where the X-ray Tube or the Collimator has to be replaced by a new different X-ray Tube or Collimator (different weight) or when the Swivel arm is not vertically balanced.*

1. Place swivel Arm in horizontal position.
2. Remove the top cover of the Tube-Collimator Assembly Support.
3. Add or remove counterweight plates until the Arm is balanced.

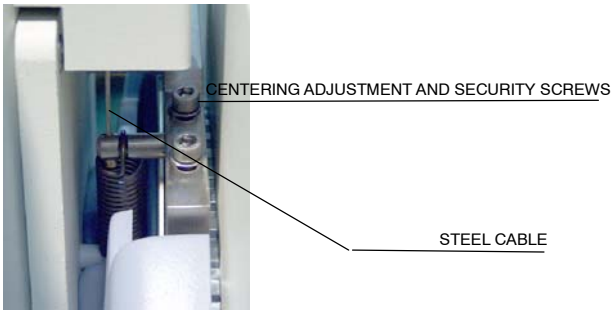


4. Re-install the top cover.

4.5 ADJUSTMENT OF ROTATION PLATE

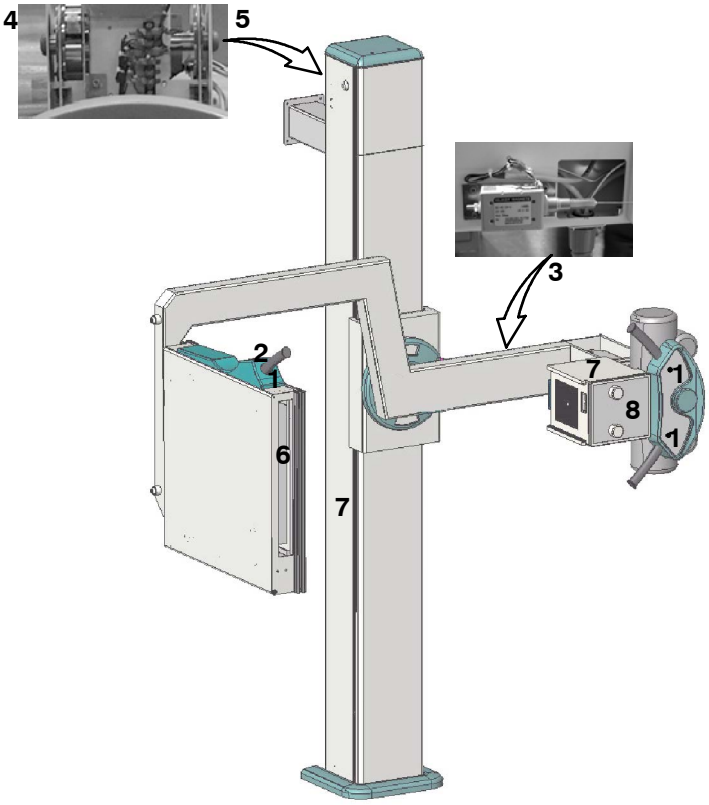
Note ☞ *This section only applies to systems where the rotation plate does not match with the real angle.*

1. Place swivel Arm in horizontal position.
2. Loose Safety Screws and adjust correct angle with a level.
3. Tighten Safety Screws.



SECTION 5 RENEWAL PARTS

Item	Designation	Qty	FRU	Rep	Mfg. Ref.	Second Ref.	Remarks
	Positioner						
1	Switch button (black)	3	2	N	50613013		
2	Handle	3	2	Y	S02.05.012		
3	Solenoid 24 VDC	1	1	Y	52301006		
4	Electrobrake 24 - 35 VDC (positive)	5	1	N	52301011		
5	Basic Mill. Control PCB	1	1	Y	A3510-03		
6	Bucky Midwest	1	1	Y	6685-01		
7	Collimator	1	2	N	6693-06		
8	Lamp (Collimator)	1	2	N	54203005		



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SECTION 6 MAINTENANCE

The Optima BRS has been designed as a long term X-ray positioner with minimum maintenance.

The mechanical parts of the Optima BRS require a yearly basis service maintenance from the installation date in the following way:

Visual Check: Covers, Pushbuttons, Table-top, Receptor Assembly, Steel Cables appareance (from the Column Slot side), connectors and electrical cables.

Functional Check: Push-buttons, movements of the carriage and arm, cassette tray, perform an exposure and check correct alignment of film, Collimator and Collimator light (refer to Section 4).

Yearly Functional Check	
ITEM	ACTION
Push-buttons	Visual Check, correct contact and corresponding movement.
Movement of Carriage	Check complete travel of carriage, it should be soft and noiseless
Movement of Arm	Check complete angle travel of the Arm, it should be soft and noiseless.
Both Steel Cables	Move carriage to the lowest position and check appareance of both steel cables from the side slot of the column. Check connection plate and disassembly top cover to check the whole cable travel. They should be in without stranded or broken hairs.
Cassette Tray	Check correct positioning inside Receptor assembly, correct clamping of film.
Collimator and Tube	Refer to Section 4 in this Manual and Generator maintenance Section.

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SECTION 7 INTERCONNECTION MAPS

Refer to the following maps for details of the wire connections.

- Optima BRS-Who interconnections 54301083
- BRS System IM-339

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GENERADOR COMPACT (COMPACT GENERATOR)

Tarjeta Frenos (Locks Board) — TB7: 5, 6, 4, 3

NOTA.- Para modelos de Generador Alto, conectar el Cable Alimentación a la regleta TS1 (+24 VDC aTS1-31, 0 VDC a TS1-32, 24 VAC a TS1-19, y 0 VAC a TS1-20).
NOTE.- For Tall Generator models, connect the Supply Cable to terminal strip TS1 (+24 VDC to TS1-31, 0 VDC to TS1-32, 24 VAC to TS1-19, and 0 VAC to TS1-20)

Manguera Alimentación Frenos (Locks Supply Cable) A7622-XX

+24 VDC
0 VDC
0 V
24 V

GND Cable

to Generator (see sheet 2)

Bucky Cable (A3343-01)

TS1: 1, 2, 3, 4, 5, 6

CR2 1N4007 — VERT LOCK

Connection Cable (A6773-01)

J1 — **Optima Bucky Cable (A3342-01)** — **Bucky** — **BUCKY PANEL**

J2 — **Bucky Panel Cable (A7655-01)** — VERTICAL, ROTATION

Vert/Rot Cable (A7654-01)

Manguera Colimador (Collimator Cable) A3111-XX

BASIC MIL CONTROL board (A3510-03-rev. A)

K1 LONG — SET W1-B — R1 511 — CR1 1N4007 — C1 100 uF 35V — CR2 1N4148 — CR3 1N4148

K2 VERT — W1 (B, A) — R2 511 — CR4 1N4007 — C2 100 uF 35V — CR5 1N4148 — CR6 1N4148

K3 ROT — R3 160 2w — CR7 1N4007 — C3 100 uF 35V — CR8 1N4148 — CR9 1N4148

K4 TELESCOPIC — R4 511 — CR10 1N4007 — C4 100 uF 35V

J2 — +24V — 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

R6, 1K
R7, 1K
R8, 1K

TP2 +24V — R5 1K — +24V — C5 470 uF 50V — TP1 GND

J1 — 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

ROT SOLENOID — CR1 1N5408

Solenoid Cable (A7621-01)

Control Cable (A7620-01)

+24 VDC
ROT SOLENOID
GND
VERTICAL CONTROL
ROTATION CONTROL

TS4: 5, 3, 4, 1, 2 — **COLUMN PANEL**

Collimator Panel Cable (A7653-01)

TS2: 1, 2, 3, 4 — VERTICAL, ROTATION — **COLLIMATOR PANEL**

COLIMADOR Ralco
(Ralco Collimator)

TIMER — LAMP — 1, 4, 2, 6, 3, 5 — SW — 24 V — 0 V

REV	DESCRIPTION	ISSUED BY	DATE

	NAME	DATE
DRAWING	F.GARCIA	01/01/04
REVISED	A.DIAZ	16/03/04

SHEET / OF: 1/2

54301083

REV

SEDECAL

INTERCONEXIONES OPTIMA BRS-WHO (OPTIMA BRS-WHO INTERCONNECTIONS)

Usar la Manguera Cámara Ionización A3234-02 cuando no se utiliza la tarjeta AEC ADAPTATION.
Ver esquema I/F-003 para interconexiones.
(Use Ion Chamber Cable A3234-02 when the AEC ADAPTATION Board is not used. See I/F-003 schematic for interconnections)

Tarjeta AEC ADAPTATION (AEC ADAPTATION Board)

Conector IC puede ser J1, J2, o J3, dependiendo de la Cámara Ionización seleccionada.
(Connector IC could be J1, J2, or J3, depending on the Ion Chamber selected)

J5

MANGUERA CAMARA IONIZACION (ION CHAMBER CABLE) (A3253-XX)

1	Shield
2	FLD1 DR (LEFT)
3	FLD2 DR (CENTER)
4	STRT DR (RESET)
5	IC OUTPUT
6	FLD3 DR (RIGHT)
7	-12 VDC
8	+12 VDC
9	GND
	Shield

OPTIMA BRS

CAMARA IONIZACION (ION CHAMBER)

Shield	1
FLD1 DR (LEFT)	2
FLD2 DR (CENTER)	3
STRT DR (RESET)	4
IC OUTPUT	5
FLD3 DR (RIGHT)	6
-12 VDC	7
+12 VDC	8
GND	9
Shield	

ARMARIO GENERADOR (GENERATOR CABINET)

TS1

MANGUERA BUCKY (BUCKY CABLE) (A3343-01)

5	BUCKY 1 MOTION	1
6	BUCKY 1 MOTION RTN	2
4	BUCKY 1 DR	3
1	115/220 VAC	4
3	0 VAC	5
2	GND	6
7		

Añadir Puente (Add Jumper)

J1

Cable Bucky Optima (Optima Bucky Cable) (A3342-01)

Bucky

1	∅
2	∅
3	∅
4	∅
8	∅
6	∅

Nota.- Este plano es aplicable cuando se utilize el bucky y/o la cámara ionización.
Note.- This drawing is applicable when using the bucky and/or the ion chamber.

REV	DESCRIPTION	ISSUED BY	DATE

	NAME	DATE
DRAWING	F.GARCIA	01/01/04
REVISED	A.DIAZ	16/03/04

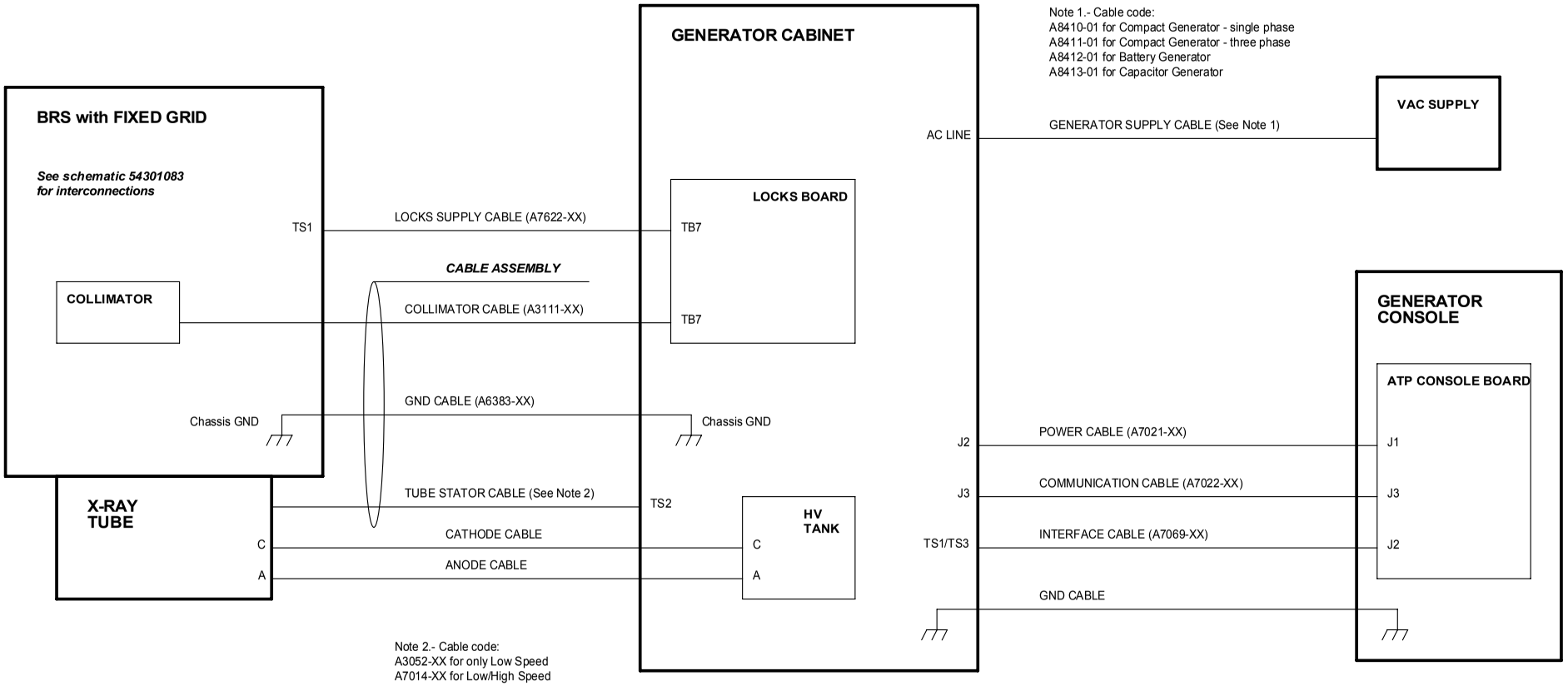
SHEET / OF: 2/2

SEDECAL

54301083

REV

INTERCONEXIONES OPTIMA BRS-WHO
(OPTIMA BRS-WHO INTERCONNECTIONS)



THIS SHEET ONLY APPLIES TO BRS with FIXED GRID

REV	DESCRIPTION	ISSUED BY	DATE

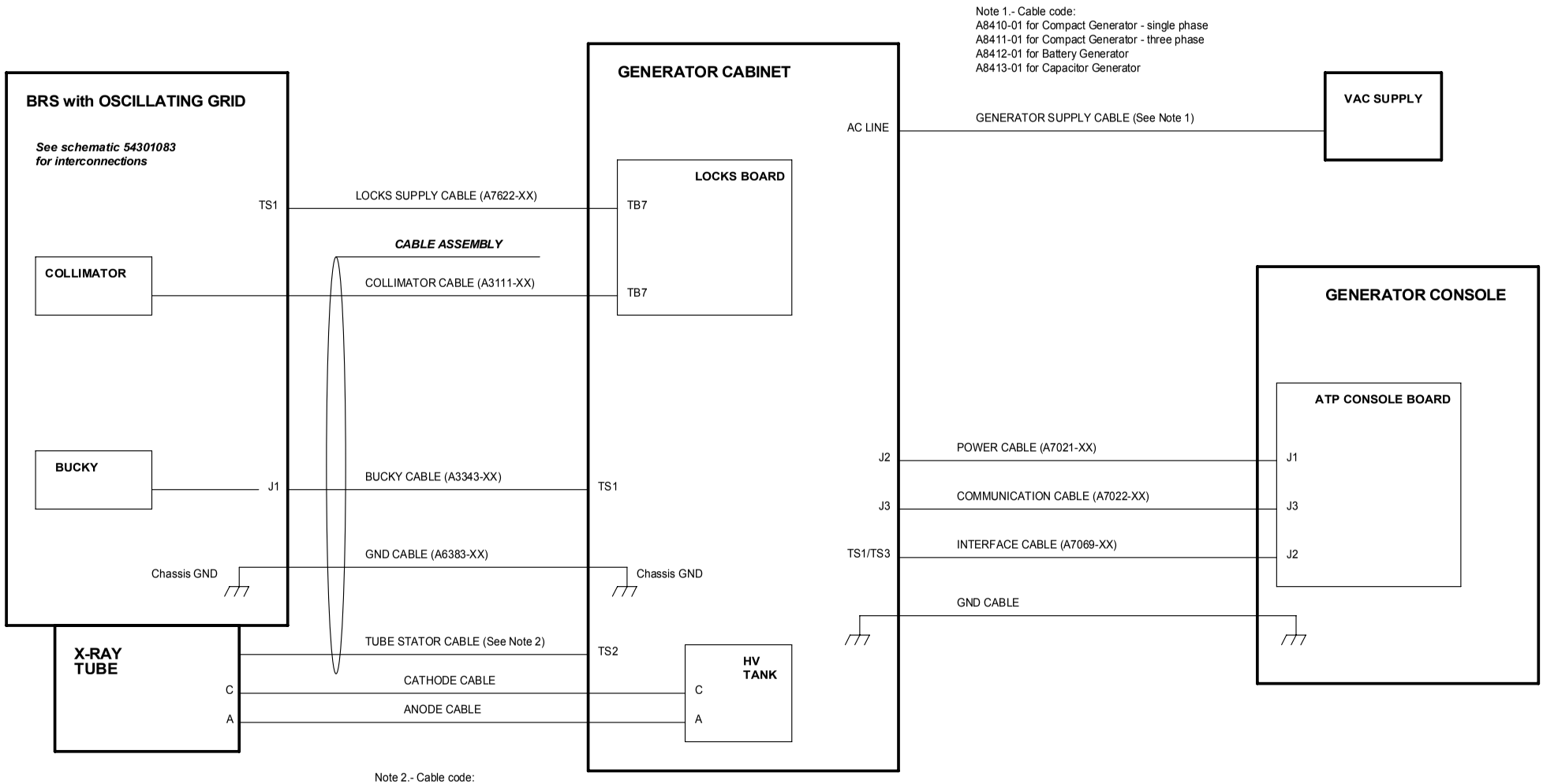
	NAME	DATE	SHEET / OF
DRAWING	F.GARCIA	07/07/05	1/3
REVISED	A.DIAZ	07/07/05	

SEDECAL

IM - 339

REV

BRS SYSTEM



THIS SHEET ONLY APPLIES TO BRS with OSCILLATING GRID

REV	DESCRIPTION	ISSUED BY	DATE

	NAME	DATE	SHEET / OF
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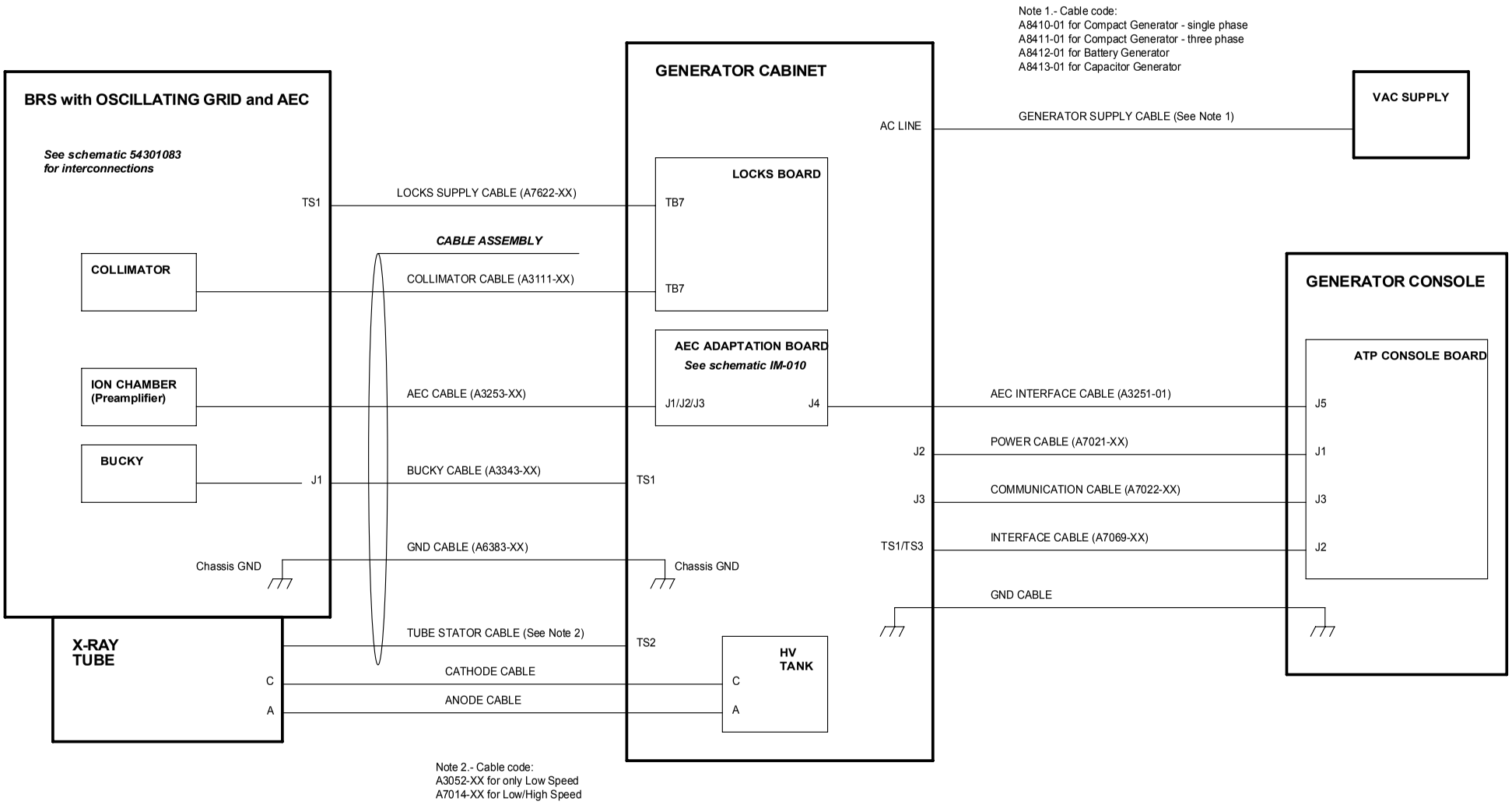
REVISED	A.DIAZ	07/07/05	

SEDECAL

IM - 339

REV

BRS SYSTEM



THIS SHEET ONLY APPLIES TO BRS with OSCILLATING GRID and AEC

REV	DESCRIPTION	ISSUED BY	DATE

	NAME	DATE	SHEET / OF
DRAWING	F.GARCIA	07/07/05	3/3
REVISED	A.DIAZ	07/07/05	

SEDECAL

IM - 339

REV

BRS SYSTEM