# QUICK START GUIDE
# HIGH FREQUENCY GENERATORS
## 00210, 02968, L300, L500, L550, 03900, 03901

08538 REV. C

**FOR NEW INSTALLATIONS, FOLLOW PROCEDURES BELOW IN ORDER**

Further documentation at: www.summitindustries.net/docs

## WARNING

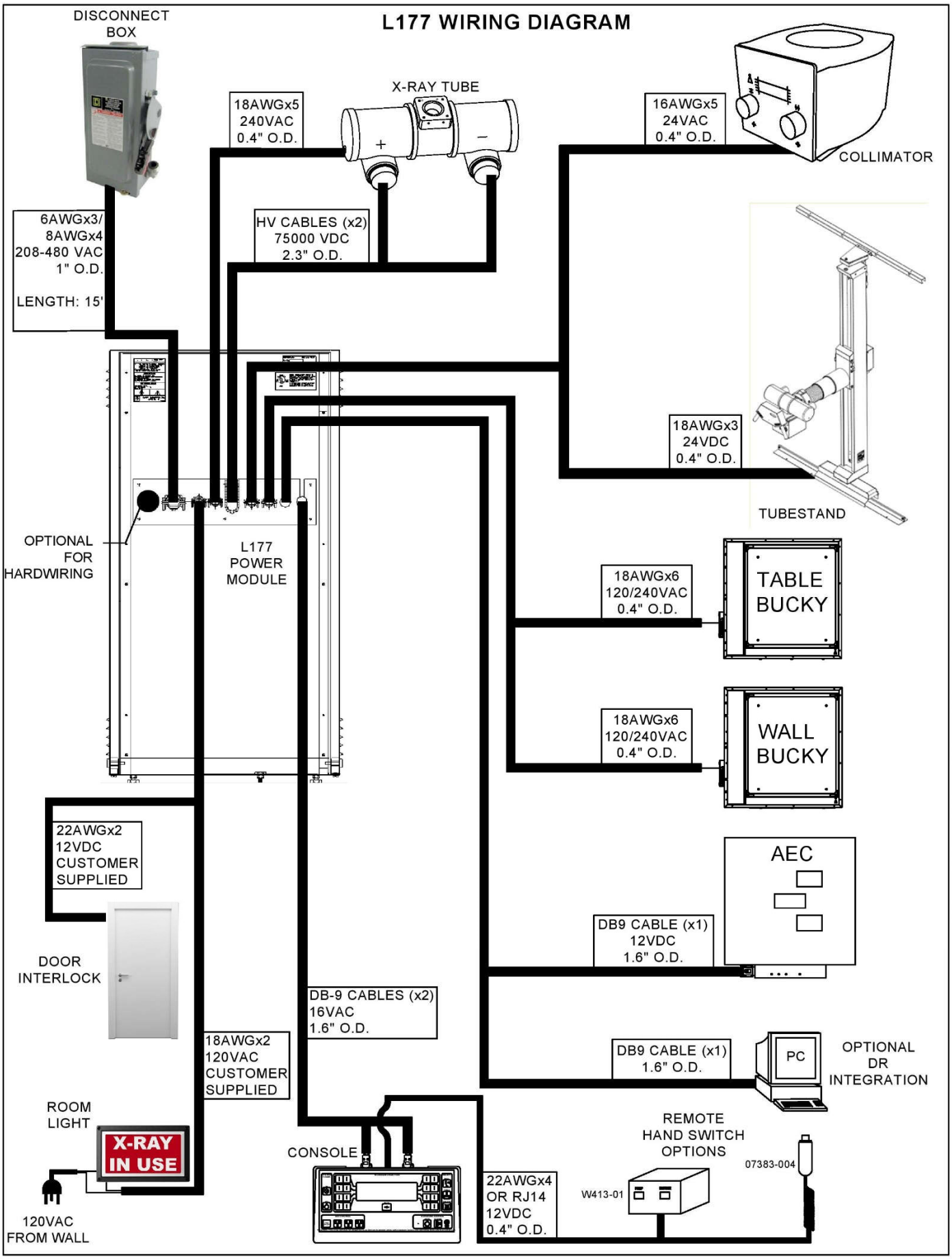
THIS GUIDE IS ONLY TO BE USED BY THOSE FAMILIAR WITH ALL THE SAFETY PRECAUTIONS INDICATED IN THE COMPLETE GENERATOR MANUAL (03003)

MANUFACTURER
SUMMIT INDUSTRIES, LLC
NILES, IL 60714

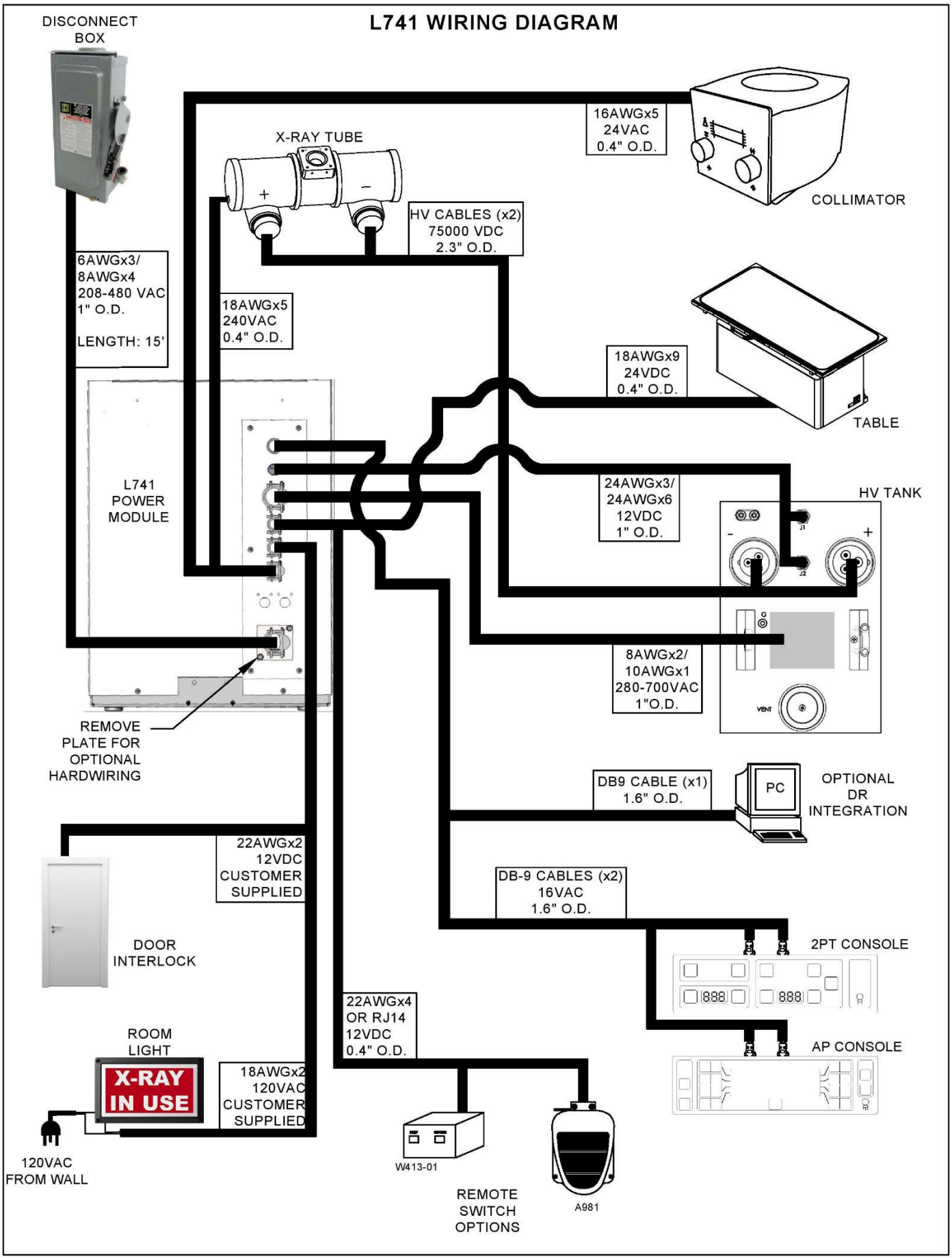
| Rev | Description | ECR | Released |
|---|---|---|---|
| A | Release | 10469 | March 2020 |
| B | Cover Page: Added link to online docs<br>Section 1: Added length to power cables<br>Section 2: Added length to power cables<br>Section 4: Added note to be sure oil is ¾" from top of lid.<br>Changed oil level in HV tank receptacles to 3/8"<br>Added torque spec for studs<br>Section 5: Changed wording form Toshiba to Canon/Toshiba<br>Section 6: Changed wording form Toshiba to Canon/Toshiba<br>Section 7: Changed step 3 Notes. Changed to AC for all collimators<br>Section 12: Added arrows to password sequence<br>Section 16: Added instructions to set date & time<br>Added Roll Angle Display<br>Section 19: Fixed typo. Reguardless to Regardless<br>Added note to step 7 about maintenance intervals<br>Section 20: Added how to retrieve exposure count.<br>Added tech support email<br>Fixed typos. Maintanance to Maintenance. Manufature to Manufacture. | 10668 | December 2020 |
| C | Section 13/14: Step 2 was changed to say what step to refer to for navigation on each line, rather than state it once at the beginning. | 10678 | January 2021 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# Contents

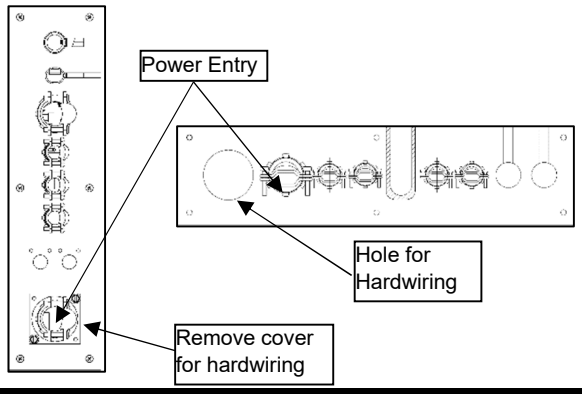
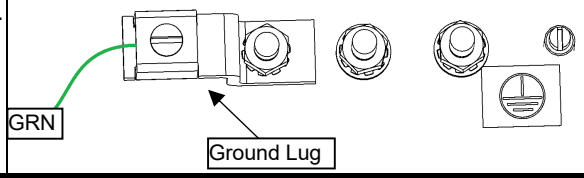
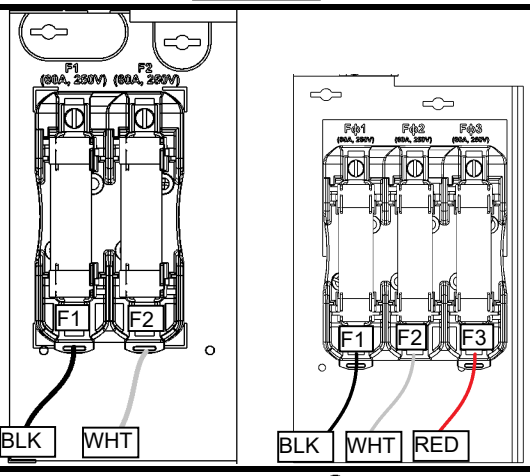
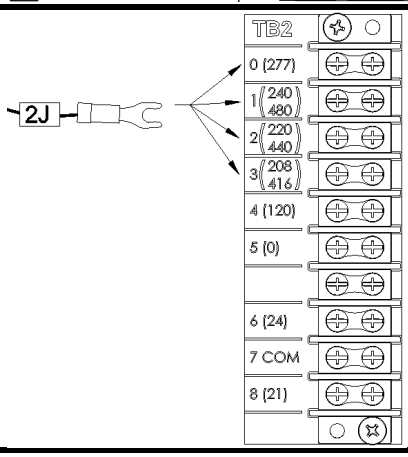
# 1. L177 Wiring Diagram



## 2. L741 Wiring Diagram

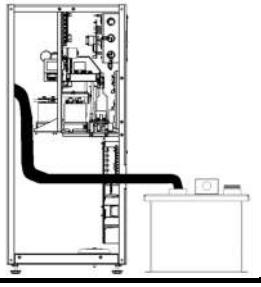
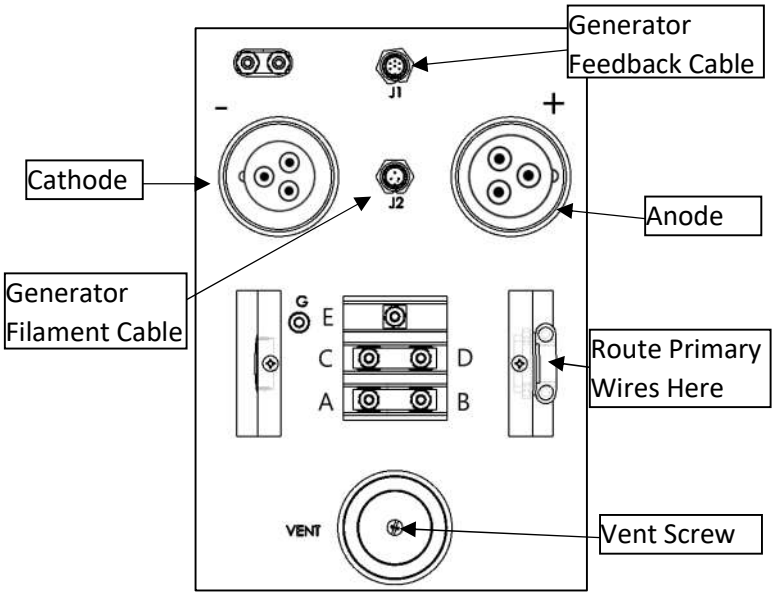
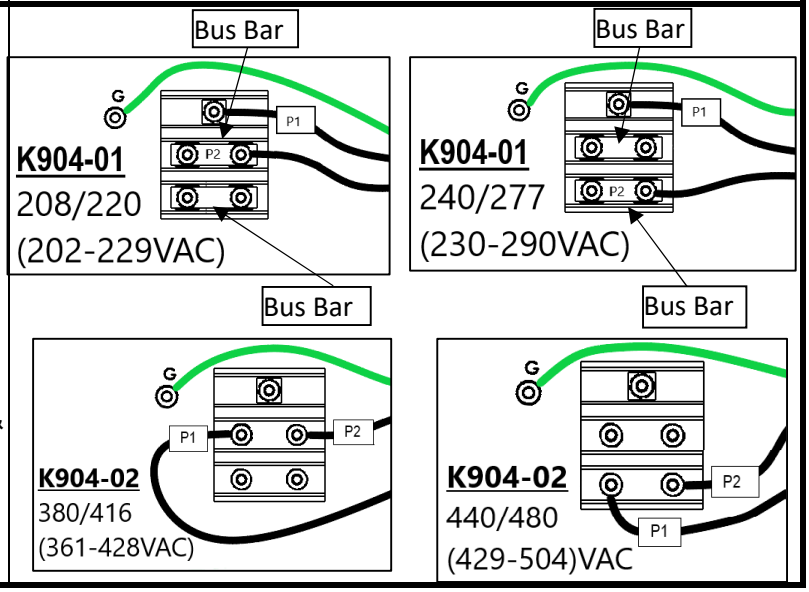


## 3. Incoming Line & Auxiliary Transformer Installation

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>Line Cable Routing</td><td>• Route cables through generator panel where pictured.<br>• (Left image short generator; right image tall generator)<br><br><u>Note:</u><br>- 2” hole on tall generator is for states requiring hardwiring.<br>- Remove plate on short generator for hardwiring.<br> 
</td></tr>
<tr><td>2</td><td>Ground</td><td>• Connect ground to the pictured ground lug in generator.<br> 
</td></tr>
<tr><td>3</td><td>Line Connection to Fuses</td><td>• Connect power to line fuses.<br>• (Left image single phase; right image three phase)<br><br><u>Note:</u><br>- For DELTA transformers connect the high leg (highest voltage measured to ground) to F3.<br> 
</td></tr>
<tr><td>4</td><td>Accessory Transformer</td><td>• Measure line voltage (leg to leg).<br>• Connect wire labeled “2J” to correct terminal on TB2 according to table.<br> 

<table>
<tr><th>Voltage</th><th>Range</th><th>Wire 2J</th></tr>
<tr><td>208</td><td>202-214</td><td>TB2-3</td></tr>
<tr><td>220</td><td>215-229</td><td>TB2-2</td></tr>
<tr><td>240</td><td>230-250</td><td>TB2-1</td></tr>
<tr><td>277</td><td>251-290</td><td>TB2-0</td></tr>
<tr><td>380</td><td>361-398</td><td>TB2-3</td></tr>
<tr><td>416</td><td>399-428</td><td>TB2-3</td></tr>
<tr><td>440</td><td>429-460</td><td>TB2-2</td></tr>
<tr><td>480</td><td>461-504</td><td>TB2-1</td></tr>
</table></td></tr>
<tr><td>5</td><td>Additional Notes</td><td>• Do NOT change any connections to TB1 terminal strip</td></tr>
</table>

## 4. HV Tank Installation

<table>
<tr><th>Step</th><th>Desc.</th><th colspan="3">Procedure</th></tr>
<tr><td>1</td><td>Determine line voltage</td><td>• Measure line voltage (leg to leg).</td><td></td><td>
<table>
<tr><th>Voltage</th><th>Range</th></tr>
<tr><td>208</td><td>202-214</td></tr>
<tr><td>220</td><td>215-229</td></tr>
<tr><td>240</td><td>230-250</td></tr>
<tr><td>277</td><td>251-290</td></tr>
<tr><td>380</td><td>361-398</td></tr>
<tr><td>416</td><td>399-428</td></tr>
<tr><td>440</td><td>429-460</td></tr>
<tr><td>480</td><td>461-504</td></tr>
</table>
</td></tr>
<tr><td>2</td><td>Place Tank</td><td>• For short generators place tank in front of table.<br>• For tall generators place tank in front of power module.</td><td colspan="2">  </td></tr>
<tr><td>3</td><td>Connect HV Cables</td><td>• Remove vent cover. Oil should be 3/4” from the top of the lid.<br>• Fill HV cable receptacles to 3/8” with oil from vent.<br>• Label the cathode cable at both ends. Install anode and cathode cables. Hand tighten collar to secure cables in tank.<br>• Connect kVp feedback cable to J1 and filament feedback cable to J2.<br>• Loosen vent screw and replace vent and cover.</td><td colspan="2"> 
</td></tr>
<tr><td>4</td><td>Connect primary wires</td><td>• Remove cover and connect wires as shown, given the line voltage measured in step one.<br><br>⚠<br>Must torque nuts to 45±5 in-lbs.<br>Excessive torque WILL break brass studs<br><br>• Replace cover and install tank when done.<br><br><u>Note:</u><br>- Verify bus bars are present on 208/220 & 240/277 configurations.</td><td colspan="2"> 
</td></tr>
</table>

# 5. X-Ray Tube & Collimator Mounting Hardware Selection

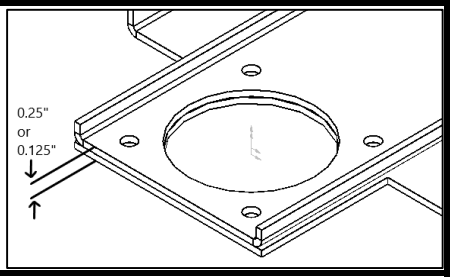
**Step 1 — Determine Focal Length**

- Use the table below to determine the focal length of the x-ray tube (For use in Steps 3 & 4).

| | Canon/Toshiba | | Varian | |
|---|---|---|---|---|
| **Focal Length** | **53mm** | **56mm** | **53mm** | **56mm** |
| **Tube Model** | 7239 | 7254 | Diamond (RAD-13) | Diamond (RAD-8) |
| | 7240 | 7255 | Diamond (RAD-14) | Diamond (RAD-12) |
| | 7242 | 7884 | Diamond (RAD-68) | Sapphire (RAD-44) |
| | 7252 | | Diamond (RAD-74) | Sapphire (RAD-56) |
| | | | | Sapphire (RAD-60) |
| | | | | Sapphire (RAD-92) |

**Step 2 — Angulation Box Mount Thickness**

- Measure the thickness of the angulation box mount. It will be 0.25” or 0.125” (For use in Steps 3&4).




**Step 3 — Spacer Selection**

- Use the table below to choose the appropriate number of **1.6mm spacers** given the x-ray tube focal length, angulation box mount thickness, and collimator being used.

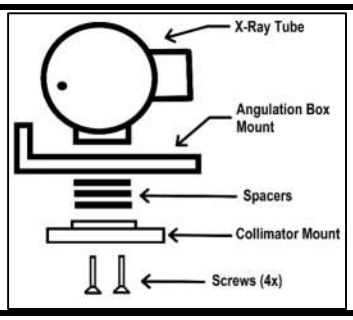
| | 53mm Focus | | 56mm Focus | |
|---|---|---|---|---|
| | **0.125” Mount** | **0.25” Mount** | **0.125” Mount** | **0.25” Mount** |
| **Collimare CML-150** | 4 Spacers (5.8 ± 0.7mm) | 2 Spacers (2.6 ± 0.7mm) | 2 Spacers (2.8 ± 0.5mm) | None |
| **Ralco 108/221** | 2 Spacers (3.8 ± 0.7mm) | None | 1 Spacer | None |
| **Summit G800** | 2 Spacers (2.7 ± 0.6mm) | None | None | None |
| **Summit D800** | 5 Spacers (7.4 ± 0.7mm) | 3 Spacers (4.2 ± 0.7mm) | 3 Spacers (4.2 ± 0.7mm) | 1 Spacer (1.2 ± 0.5mm) |

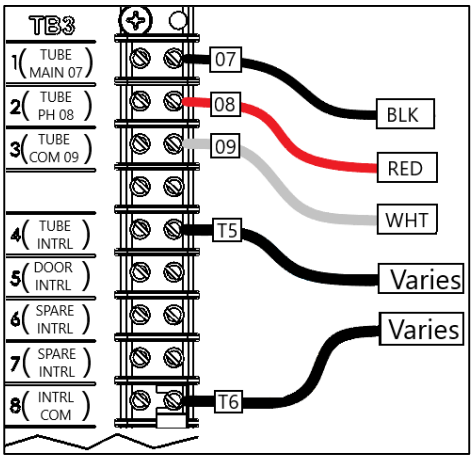
**Step 4 — Screw Selection**

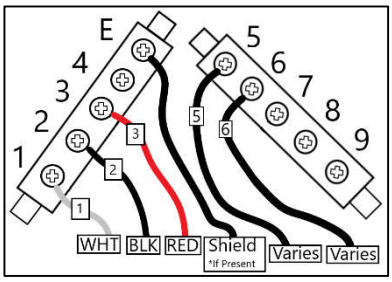
- Choose the appropriate screws using the tables below
  **Note:** Use lock washers with hex and pan head screws

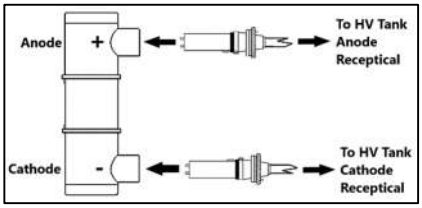
| | Canon/Toshiba | | | | Varian | | | |
|---|---|---|---|---|---|---|---|---|
| | 53mm Focus | | 56 mm Focus | | 53mm Focus | | 56mm Focus | |
| | **0.125" Mount** | **0.25" Mount** | **0.125" Mount** | **0.25" Mount** | **0.125" Mount** | **0.25" Mount** | **0.125" Mount** | **0.25" Mount** |
| **Collimare CML-150** | • M6<br>• Flathead<br>• 30mm | • M6<br>• Flathead<br>• 30mm | • M6<br>• Flathead<br>• 30mm | • M6<br>• Flathead<br>• 30mm | • 1/4-20<br>• Flathead<br>• 1-1/8" | • 1/4-20<br>• Flathead<br>• 1-1/8" | • 1/4-20<br>• Flathead<br>• 1-1/8" | • 1/4-20<br>• Flathead<br>• 1-1/8" |
| **Ralco 108/221** | • M6<br>• Flathead<br>• 30mm | • M6<br>• Flathead<br>• 25mm | • M6<br>• Flathead<br>• 25mm | • M6<br>• Flathead<br>• 25mm | • 1/4-20<br>• Flathead<br>• 1-1/8" | • 1/4-20<br>• Flathead<br>• 1" | • 1/4-20<br>• Flathead<br>• 1" | • 1/4-20<br>• Flathead<br>• 1" |
| **G800** | • M6<br>• Hex Head<br>• 20mm | • M6<br>• Hex Head<br>• 20mm | • M6<br>• Hex Head<br>• 20mm | • M6<br>• Hex Head<br>• 20mm | • 1/4-20<br>• Hex Head<br>• 3/4" | • 1/4-20<br>• Hex Head<br>• 3/4" | • 1/4-20<br>• Hex Head<br>• 3/4" | • 1/4-20<br>• Hex Head<br>• 3/4" |
| **D800** | • M6<br>• Panhead<br>• 30mm | • M6<br>• Panhead<br>• 30mm | • M6<br>• Panhead<br>• 25mm | • M6<br>• Panhead<br>• 25mm | • 1/4-20<br>• Panhead<br>• 1-1/8" | • 1/4-20<br>• Panhead<br>• 1-1/8" | • 1/4-20<br>• Panhead<br>• 1" | • 1/4-20<br>• Panhead<br>• 1" |

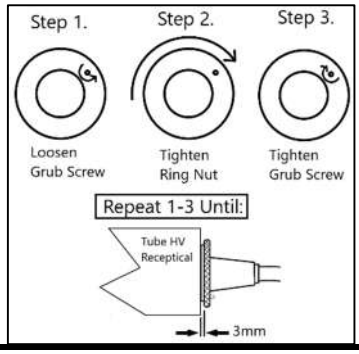
## 6. X-Ray Tube Installation

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>Mounting</td><td>
<ul>
<li>Mount tube with selected hardware as shown</li>
<li>See section 5 for hardware</li>
</ul>


</td></tr>
<tr><td>2</td><td>Connect Stator Cable to Generator</td><td>
<ul>
<li>Connect stator cable to TB3 on generator as shown in the table</li>
</ul>
<table>
<tr><th>Tube (Unshielded CBL)</th><th>Tube (Shielded CBL)</th><th>Power Module</th><th>Function</th></tr>
<tr><td>Black 07</td><td>Black 07</td><td>TB3-1</td><td>Stator Main</td></tr>
<tr><td>Red 08</td><td>Red 08</td><td>TB3-2</td><td>Stator Phase</td></tr>
<tr><td>White 09</td><td>White 09</td><td>TB3-3</td><td>Stator Common</td></tr>
<tr><td>Blue T5</td><td>Green</td><td>TB3-4</td><td>Thermal Switch (NC)</td></tr>
<tr><td>Orange T6</td><td>Orange</td><td>TB3-8</td><td>Thermal Switch Return</td></tr>
<tr><td>N/A</td><td>Blue</td><td>N/A</td><td>Shielding</td></tr>
</table>


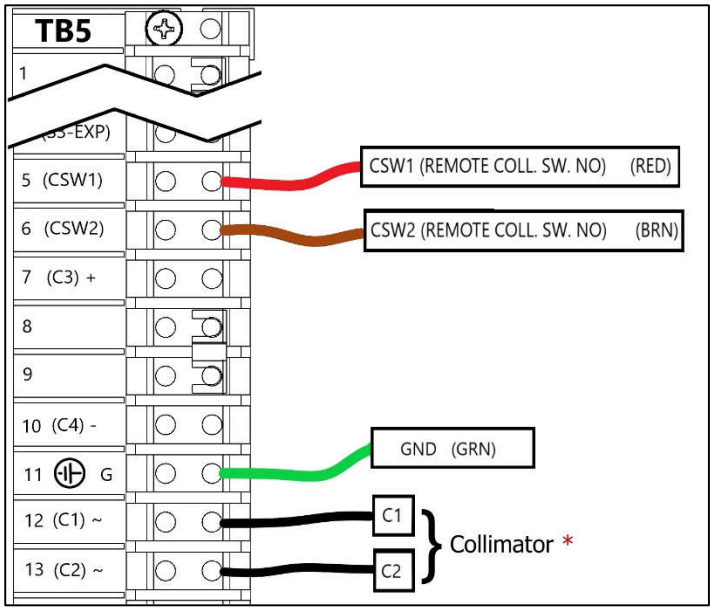
</td></tr>
<tr><td>3</td><td>Connect Stator Cable to Tube (For Toshiba Tubes ONLY)</td><td>
<ul>
<li>Remove x-ray tube end cap.</li>
<li>Connect stator cable as pictured. (Match numbers on cable wires to stamped numbers in tube)</li>
</ul>
<u>Note:</u> Pictured wiring is for Canon/Toshiba tubes


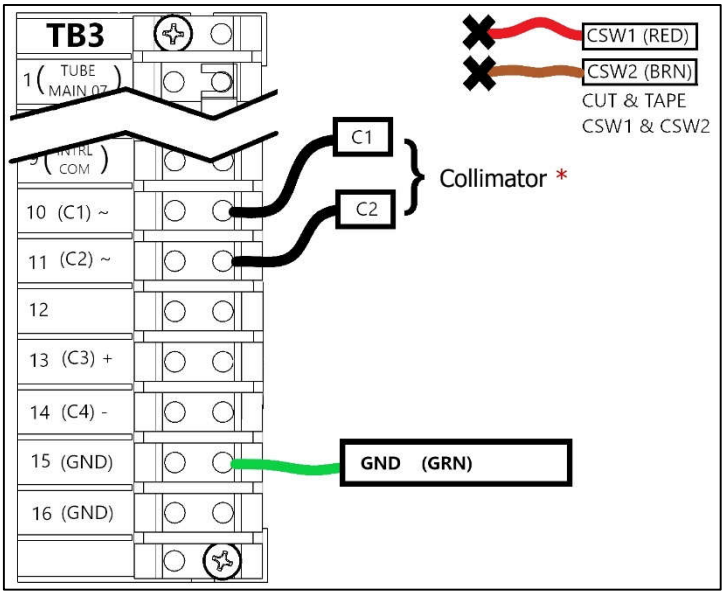
</td></tr>
<tr><td>4</td><td>Insert High Voltage Cables</td><td>
<ul>
<li>Apply 6mm of silicon paste to end of plug as pictured.</li>
<li>Push plug into receptacle on x-ray tube. (Make sure the anode and cathode on x-ray tube correspond to the anode and cathode on HV tank.)</li>
</ul>


</td></tr>
<tr><td>5</td><td>Tighten Ring Nut</td><td>
<ul>
<li>Repeat the pictured process until ring nut flange is 3mm from HV receptacle. (HV cable is fully seated)</li>
<li>After system has been run at max capacity, retighten ring nut and grub screw.</li>
</ul>


</td></tr>
</table>

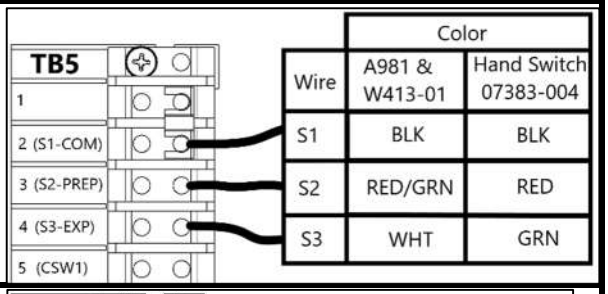
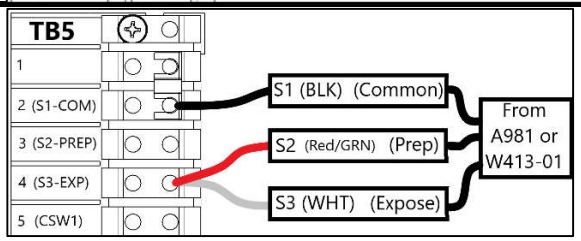
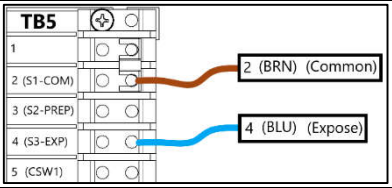
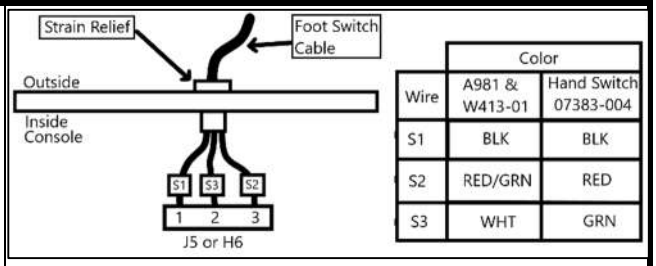
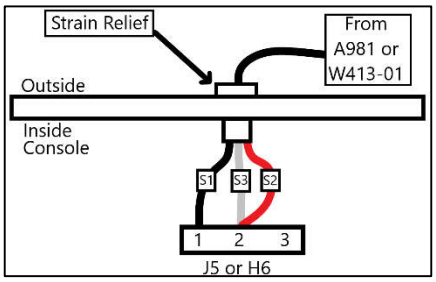
## 7. Collimator Installation

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>Collimator Wiring with TB5</td><td>
• Connect the collimator to TB5 terminal strip as indicated in the table.
<table>
<tr><th>Wire</th><th>Terminal</th></tr>
<tr><td>CSW1</td><td>TB5-5</td></tr>
<tr><td>CSW2</td><td>TB5-6</td></tr>
<tr><td>C1</td><td>TB5-12</td></tr>
<tr><td>C2</td><td>TB5-13</td></tr>
<tr><td>GND</td><td>TB5-11</td></tr>
</table>


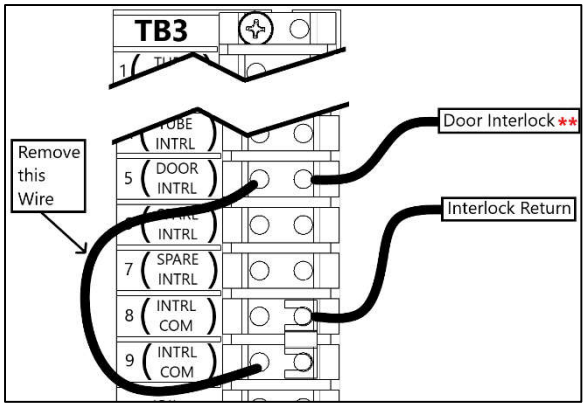
</td></tr>
<tr><td>2</td><td>Collimator Wiring without TB5</td><td>
• Connect the collimator to TB3 terminal strip as indicated in the table.<br>
• Isolate CSW1 & CSW2 wires by cutting off terminals and taping.
<table>
<tr><th>Wire</th><th>Terminal</th></tr>
<tr><td>C1</td><td>TB3-10</td></tr>
<tr><td>C2</td><td>TB3-11</td></tr>
<tr><td>GND</td><td>TB3-15 or TB3-16</td></tr>
</table>


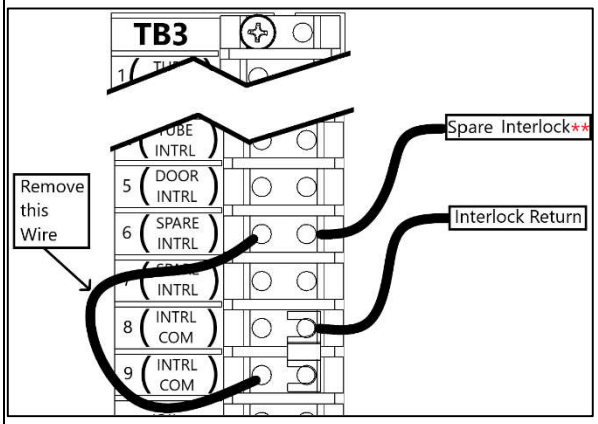
</td></tr>
<tr><td>3</td><td>*Notes</td><td>*Ralco collimators built before 06/2019 have special VAC/VDC/JP1/JP2 settings that will result in damage if not properly set.<br>Consult specific collimator personalization manual that came with the collimator.</td></tr>
<tr><td>4</td><td>Wall stand Collimator Light Switch</td><td>
• See 07723 for connection to Ralco collimator<br>
• See 07889 for connection to Collimare collimator
</td></tr>
</table>

## 8. Exposure Switch Installation

<table>
<tr><th></th><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td rowspan="3">Connection with TB5</td><td>1</td><td>Traditional (2-Position)</td><td>• Connect to TB5<br><table><tr><th>Wire</th><th>Function</th><th>Terminal</th></tr><tr><td>S1</td><td>Common</td><td>TB5-2</td></tr><tr><td>S2</td><td>Prep</td><td>TB5-3</td></tr><tr><td>S3</td><td>Expose</td><td>TB5-4</td></tr></table></td><td> 
</td></tr>
<tr><td>2</td><td>Latching Prep</td><td>• Connect to TB5<br><table><tr><th>Wire</th><th>Function</th><th>Terminal</th></tr><tr><td>S1</td><td>Common</td><td>TB5-2</td></tr><tr><td>S2</td><td>Prep</td><td>TB5-4</td></tr><tr><td>S3</td><td>Expose</td><td>TB5-4</td></tr></table></td><td> 
</td></tr>
<tr><td>3</td><td>Foot Treadle</td><td>• Connect to TB5<br><table><tr><th>Wire</th><th>Function</th><th>Terminal</th></tr><tr><td>2</td><td>Common</td><td>TB5-2</td></tr><tr><td>4</td><td>Prep/Expose</td><td>TB5-4</td></tr></table></td><td> 
</td></tr>
<tr><td rowspan="2">Connection without TB5</td><td>4</td><td>Traditional (2-Position)</td><td>• Connect to J5 or H6 inside console<br><table><tr><th>Wire</th><th>Function</th><th>J5</th><th>H6</th></tr><tr><td>S1</td><td>Common</td><td>J5-1</td><td>H6-1</td></tr><tr><td>S2</td><td>Prep</td><td>J5-3</td><td>H6-3</td></tr><tr><td>S3</td><td>Expose</td><td>J5-2</td><td>H6-2</td></tr></table><u>Note:</u><br>- J5/H6 pin one may be on either the left or right<br>- L460 Consoles mfd before May 2004 require moving shunt from pins 2 & 3 to pins 1 & 2 on header JMP4 & JMP5</td><td> 
</td></tr>
<tr><td>5</td><td>Latching Prep</td><td>• Connect to J5 or H6 inside console<br><table><tr><th>Wire</th><th>Function</th><th>J5</th><th>H6</th></tr><tr><td>S1</td><td>Common</td><td>J5-1</td><td>H6-1</td></tr><tr><td>S2</td><td>Prep</td><td>J5-2</td><td>H6-2</td></tr><tr><td>S3</td><td>Expose</td><td>J5-2</td><td>H6-2</td></tr></table><u>Note:</u><br>- J5/H6 pin one may be on either the left or right<br>- L460 consoles mfd before May 2004 require moving shunt from pins 2 & 3 to pins 1 & 2 on header JMP4 & JMP5</td><td> 
</td></tr>
<tr><td rowspan="3">Setup</td><td>6</td><td><u>Latching Prep</u></td><td>• See section 12 for console navigation & saving<br><u>2PT</u><br>• P38 = 1<br><u>AP</u><br>• XRAY CAL⇒MORE⇒MISC2 ⇒PREP: LATCH</td><td><table><tr><th>Action</th><th>Result</th></tr><tr><td>Press & Release Footswitch</td><td>Goes into prep mode for 20s</td></tr><tr><td>Press again within 20s</td><td>Takes an exposure</td></tr><tr><td>Not pressed within 20s</td><td>Error</td></tr></table></td></tr>
<tr><td>7</td><td><u>Traditional (2 Position)</u></td><td>• See section 12 for console navigation & saving<br><u>2PT</u><br>• P38 = 2<br><u>AP</u><br>• XRAY CA L⇒MORE⇒MISC2⇒PREP: 2-POS</td><td><table><tr><th>Action</th><th>Result</th></tr><tr><td>Press & hold halfway</td><td>Goes into prep mode</td></tr><tr><td>Press all the way</td><td>Takes exposure</td></tr><tr><td>Release</td><td>Exits</td></tr></table></td></tr>
<tr><td>8</td><td><u>Notes</u></td><td colspan="2">• DR Panels: Latching prep only compatible with AED (Automatic Exposure Detection)</td></tr>
</table>

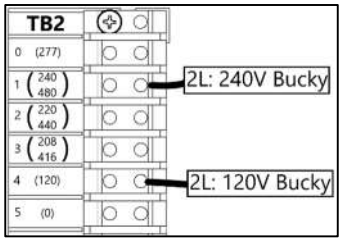
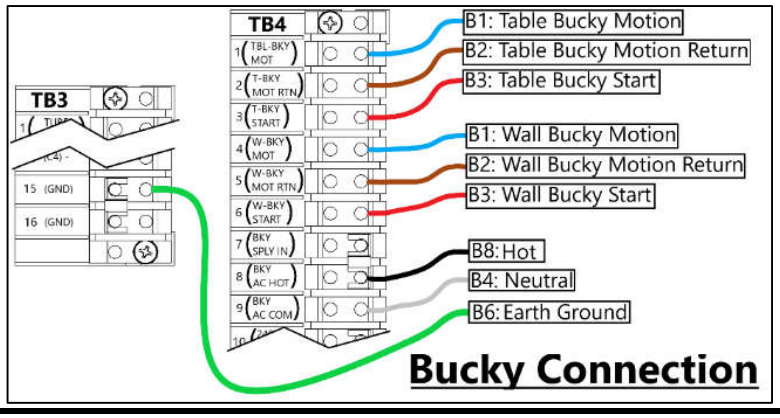
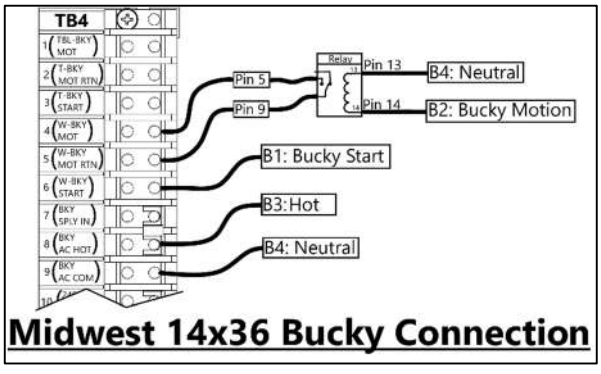
## 9. Door/Spare Interlock & Room Light Installation

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>Door Interlock Hookup</td><td>
• Remove wire shorting TB3-5 to TB3-8/TB3-9<br>
• Connect to TB3
<table>
<tr><th>Function</th><th>Terminal</th></tr>
<tr><td>Door Interlock</td><td>TB3-5</td></tr>
<tr><td>Interlock Return</td><td>TB3-8<br>or<br>TB3-9</td></tr>
</table>


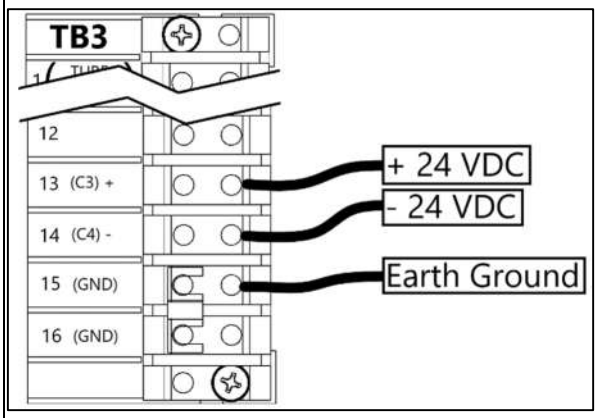
</td></tr>
<tr><td>2</td><td>Spare Interlock Hookup</td><td>
• Remove wire shorting the interlock being used to TB3-8/TB3-9<br>
• Connect to TB3
<table>
<tr><th>Function</th><th>Terminal</th></tr>
<tr><td>Spare Interlock</td><td>TB3-6<br>or<br>TB3-7</td></tr>
<tr><td>Interlock Return</td><td>TB3-8<br>or<br>TB3-9</td></tr>
</table>


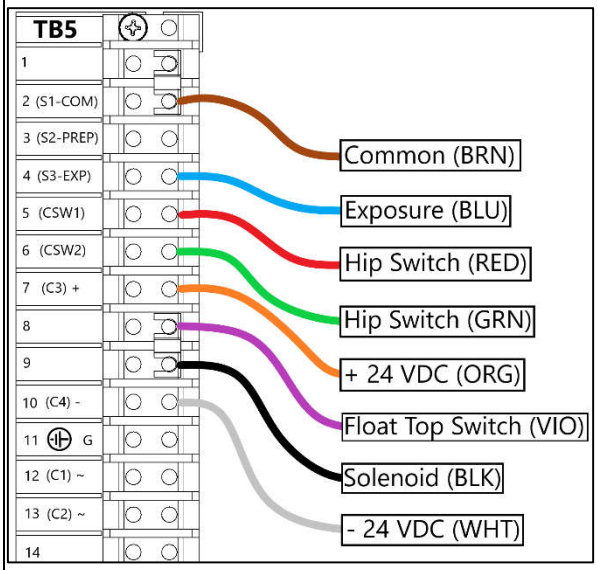
</td></tr>
<tr><td>3</td><td>Room Light</td><td>
• To install room light user MUST order kit 06355-003<br>
• Follow Instruction included with kit to install room light
</td></tr>
<tr><td>4</td><td>Additional Notes</td><td>
• <u>Use isolated contact switch for interlocks</u>**<br>
• TB3-8 & TB3-9 are the same point electrically
</td></tr>
</table>

## 10. Grid & Bucky Installation

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td rowspan="4">1</td><td rowspan="4">Software Setup</td><td>• See Section 12 for console navigation and saving</td></tr>
<tr><td>• Table Setup<br>- <u>2PT:</u> Set P17 (OFF = No Table; 1 = Bucky; 2 = Grid)<br>- <u>AP:</u> XRAY CAL -> PWR MOD SET -> T RECP: (OFF = No Table; BUCKY; GRID)</td></tr>
<tr><td>• Wall Receptor Setup<br>- <u>2PT:</u> Set P18 (OFF = No Wall; 1 = Bucky; 2 = Grid)<br>- <u>AP:</u> XRAY CAL -> PWR MOD SET -> W RECP: (OFF = No Wall; BUCKY; GRID)</td></tr>
<tr><td>• Bucky Start on Expose<br>- <u>2PT:</u> P41 = 16<br>- <u>AP:</u> XRAY CAL ⇒ MORE ⇒ MISC. 2 ⇒ BKY/DGTL: EXP<br>• Bucky Start on Prep<br>- <u>2PT:</u> P41 = 17<br>- <u>AP:</u> XRAY CAL ⇒ MORE ⇒ MISC. 2 ⇒ BKY/DGTL: PREP</td></tr>
<tr><td>2</td><td>Voltage Setup for Bucky</td><td>• Move 2L to TB2-4 for 120V Bucky<br>• Move 2L to TB2-1 for 240V Bucky<br> 
</td></tr>
<tr><td>3</td><td>Standard Bucky Generator Connection</td><td>
<table>
<tr><th><u>Origin</u></th><th><u>Func.</u></th><th><u>Table Bucky Conn.</u></th><th><u>Wall Bucky Conn.</u></th><th><u>Summit J500 Wire Color</u></th><th><u>TWBS-TILT Wire #</u></th></tr>
<tr><td>B1</td><td>Motion</td><td>TB4-1</td><td>TB4-4</td><td>BLU</td><td>12</td></tr>
<tr><td>B2</td><td>Motion Return</td><td>TB4-2</td><td>TB4-5</td><td>BRN</td><td>13</td></tr>
<tr><td>B3</td><td>Start</td><td>TB4-3</td><td>TB4-6</td><td>RED</td><td>11</td></tr>
<tr><td>B4</td><td>Neutral</td><td>TB4-9</td><td>TB4-9</td><td>WHT</td><td>8</td></tr>
<tr><td>B6</td><td>Ground</td><td>TB3-15</td><td>TB3-15</td><td>GRN/YEL</td><td>GRN/YEL</td></tr>
<tr><td>B8</td><td>Hot</td><td>TB4-8</td><td>TB4-8</td><td>BLK</td><td>9,10</td></tr>
</table>

</td></tr>
<tr><td>4</td><td>Midwest 14x36 Bucky Generator Connection</td><td>• MUST use kit 06355-002 to install Midwest 14x36 Bucky. See kit instructions for additional information.
<table>
<tr><th>Origin</th><th>TB4 Connection</th><th>Relay</th></tr>
<tr><td>B1</td><td>TB4-6</td><td>-</td></tr>
<tr><td>B2</td><td>-</td><td>Pin 14</td></tr>
<tr><td>B3</td><td>TB4-8</td><td>-</td></tr>
<tr><td>B4</td><td>TB4-9</td><td>Pin 13</td></tr>
<tr><td>-</td><td>TB4-4</td><td>Pin 5</td></tr>
<tr><td>-</td><td>TB4-5</td><td>Pin 9</td></tr>
</table>

</td></tr>
</table>

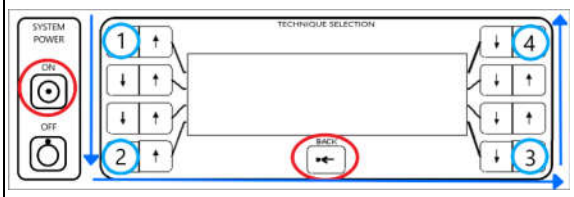
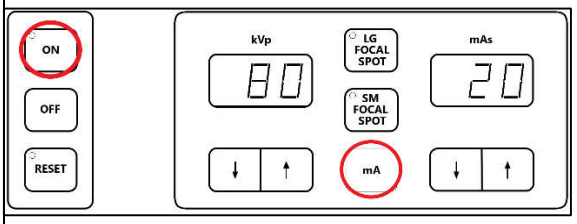
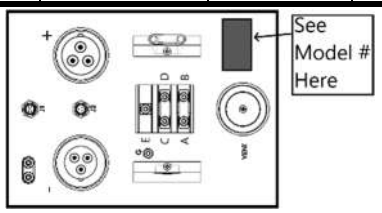
## 11. Accessory Lock Power

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>Electric Lock Connections</td><td>
• Connect 24VDC locks for wall stand or tubestand.<br><br>
<u>Note:</u> Only 24VDC accessories are supported.<br><br>
<table>
<tr><th>Generator</th><th>Cable</th></tr>
<tr><td>TB3-13</td><td>+24VDC</td></tr>
<tr><td>TB3-14</td><td>-24VDC</td></tr>
<tr><td>TB3-15</td><td>Earth Ground</td></tr>
</table>


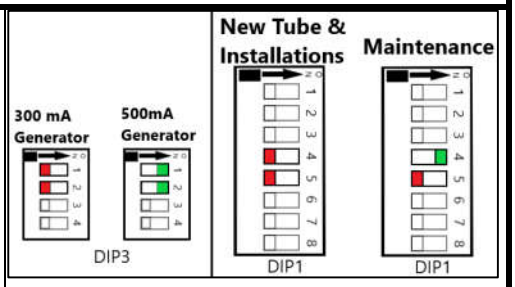
</td></tr>
<tr><td>2</td><td>S305 Table Connections</td><td>
<table>
<tr><th>Generator</th><th>Cable</th></tr>
<tr><td>TB5-2</td><td>Brown</td></tr>
<tr><td>TB5-4</td><td>Blue</td></tr>
<tr><td>TB5-5</td><td>Red</td></tr>
<tr><td>TB5-6</td><td>Green</td></tr>
<tr><td>TB5-7</td><td>Orange</td></tr>
<tr><td>TB5-8</td><td>Violet</td></tr>
<tr><td>TB5-9</td><td>Black</td></tr>
<tr><td>TB5-10</td><td>White</td></tr>
</table>
<u>Note:</u> Ensure there is a jumper between TB5-8 and TB5-9 on the terminal strip


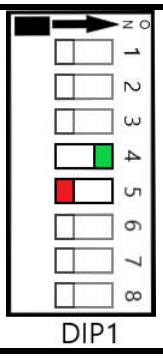
</td></tr>
</table>

## 12. Generator Configuration

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">Enter Calibration Mode</td><td><u>AP</u><br>• Turn off.<br>• Press and hold BACK button.<br>• Press ON button while holding BACK button.<br>• Continue holding the BACK button until console beeps.<br>• Enter XRAY CAL.<br>• Enter password in indicated order (blue circles).</td><td>  </td></tr>
<tr><td><u>2PT</u><br>• Turn off.<br>• Press and hold mA button.<br>• Press ON button while holding mA button.<br>• Continue holding mA button until console beeps.<br><u>Note:</u><br>- ‘P’ number is displayed under kVp<br>- mAs displays value set to ‘P’ number<br>- P# Mode : Hold mA, then press SM Focal Spot<br>- Fil# Mode : Hold mA, then press LG Focal Spot</td><td>  </td></tr>
<tr><td>2</td><td>How to Save</td><td colspan="2"><u>AP</u><br>• After making ANY adjustments press ‘SAVE PAGE’ in bottom right corner. (Long beep heard when successfully saved)<br><u>2PT</u><br>• After making ANY adjustments press ‘SM FOCAL SPOT’ button to save. (Long beep heard when successfully saved)</td></tr>
<tr><td>3</td><td>Select Tube</td><td><u>AP</u><br>• TUBE SETUP⇒TUBE:<br><u>2PT</u><br>• P01:</td><td><table><tr><th>P01 =</th><th>Tube</th></tr><tr><td>1</td><td>Toshiba E7239</td></tr><tr><td>2</td><td>Toshiba E7242</td></tr><tr><td>4</td><td>Toshiba E7252</td></tr></table>*See Installation Manual for additional tubes</td></tr>
<tr><td>4</td><td>Select Line Voltage</td><td><u>AP</u><br>• TUBE SETUP⇒AC LINE VOLTAGE:<br><u>2PT</u><br>• P10:</td><td><table><tr><td>Voltage</td><td>--</td><td>208</td><td>220</td><td>240</td><td>277</td><td>380</td><td>416</td><td>440</td><td>480</td></tr><tr><td>Range</td><td>--</td><td>202-214</td><td>215-229</td><td>230-250</td><td>251-290</td><td>361-398</td><td>399-428</td><td>429-460</td><td>461-504</td></tr></table></td></tr>
<tr><td>5</td><td>Select Line Frequency</td><td><u>AP</u><br>• PWR MOD SET ⇒ LINE FREQ:<br><u>2PT</u><br>• P12:</td><td><table><tr><th colspan="2">Line Frequency (Hz)</th></tr><tr><td>50</td><td>60</td></tr></table></td></tr>
<tr><td>6</td><td>Select Transformer</td><td><u>AP</u><br>• PWR MOD SET ⇒ K904-XX:<br><u>2PT</u><br>• P14:</td><td><table><tr><th colspan="4">K904 HV Tank Version</th></tr><tr><td>--</td><td>-00</td><td>-01</td><td>-02</td></tr></table>  </td></tr>
<tr><td>7</td><td>Exposure Beep Type</td><td><u>AP</u><br>• MORE ⇒ MISC. 2 ⇒ EXP BEEP:<br><u>2PT</u><br>• P40:</td><td><table><tr><th></th><th>Beep During Expose</th><th>Beep After Expose</th></tr><tr><td><u>AP</u></td><td>@EXP</td><td>@END</td></tr><tr><td><u>2PT</u></td><td>1</td><td>2</td></tr></table></td></tr>
<tr><td>8</td><td>Additional Configuration</td><td colspan="2">• See section 10 for Grid & Bucky configuration<br>• See section 8 for exposure switch configuration</td></tr>
</table>

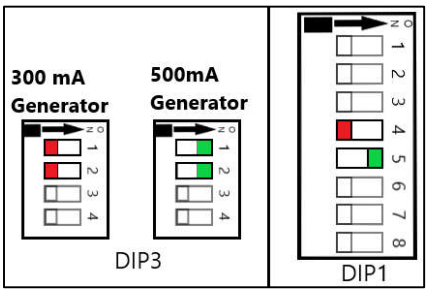
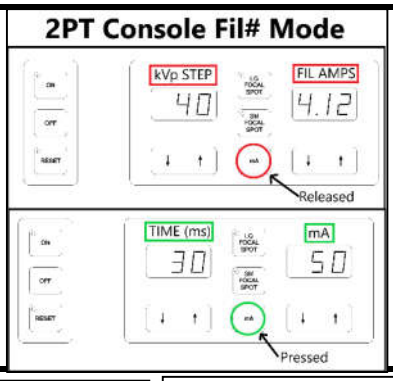
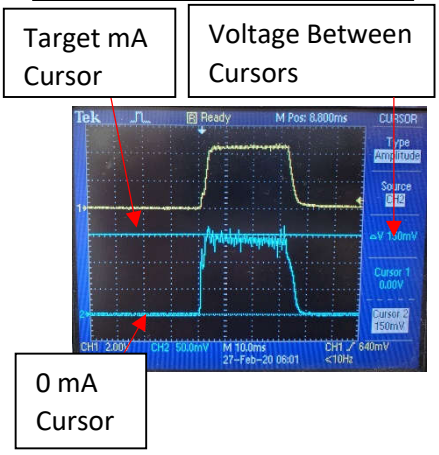
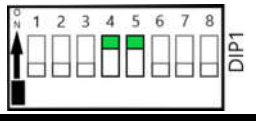
## 13. Auto Calibration

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>Auto CAL Setup</td><td>
• CONFIGURE GENERATOR FIRST (Section 12)<br>
• Close collimator shutters.<br>
• Verify the following DIP switches on Sys. Controller:<br>
- 300mA: DIP3-1 & DIP3-2 to OPEN/OFF/LEFT<br>
- 500mA: DIP3-1 & DIP3-2 to CLOSED/ON/RIGHT<br>
• Set the following DIP switches on Sys. Controller:<br>
- DIP1-5 to OPEN/OFF/LEFT<br>
<u>For New Tube & Installation</u><br>
- DIP1-4 to OPEN/OFF/LEFT<br>
<u>For Maintenance</u><br>
- DIP1-4 to CLOSED/ON/RIGHT


</td></tr>
<tr><td>2</td><td>Enter Auto CAL</td><td colspan="2">
<u>AP</u><br>
• Enter Calibration Mode (Follow 12.1, AP)<br>
• Select AUTO CAL<br>
• Press and Hold the expose button. Follow onscreen instructions to start Auto Cal.<br>
<u>2PT</u><br>
• Enter Calibration Mode (Follow 12.1, 2PT)<br>
• Set P44 = A-C (See 12.1, 2PT Note) then Save (12.2, 2PT)<br>
• Enter Fil# Mode (See 12.1, 2PT Note)<br>
• Press and hold expose button until “A-C’ & “---” is shown.<br>
• Release button to start Auto Cal.<br>
<u>Note:</u> - To Exit Auto CAL press and release the expose button during Auto CAL.<br>
- If Auto CAL fails 4 times, do a manual calibration
</td></tr>
<tr><td>3</td><td>Verify Accuracy</td><td>
• Set DIP1-4 to CLOSED/ON/RIGHT<br>
• Leave DIP1-5 on OPEN/OFF/LEFT<br>
• Enter normal RAD mode<br>
• Verify the kVp and mAs accuracy for various kVp and mA stations.
</td><td>


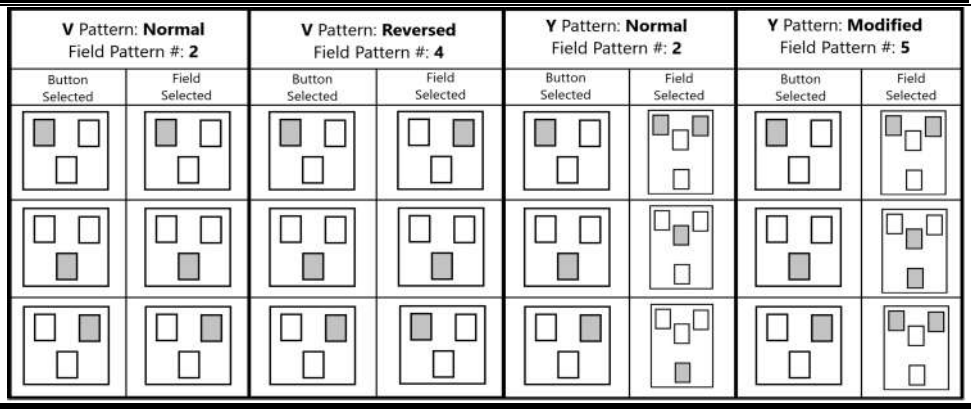
</td></tr>
</table>

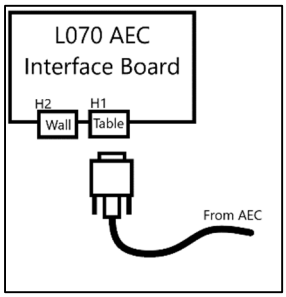
# 14. Manual Calibration

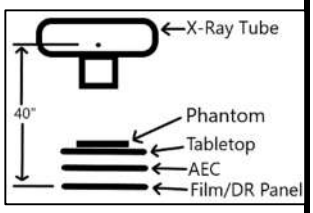
<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>Setup</td><td>
<ul>
<li>CONFIGURE GENERATOR FIRST (See Section 12)</li>
<li>Close collimator shutters.</li>
<li>Verify the following DIP switches on Sys. Controller:
<ul>
<li>300mA: DIP3-1 & DIP3-2 to OPEN/OFF/LEFT</li>
<li>500mA: DIP3-1 & DIP3-2 to CLOSED/ON/RIGHT</li>
</ul></li>
<li>Set the following DIP switches on Sys. Controller:
<ul>
<li>DIP1-5 to CLOSED/ON/RIGHT</li>
<li>DIP1-4 to OPEN/OFF/LEFT</li>
</ul></li>
<li>Connect Oscilloscope to main control board (06770):</li>
</ul>
<table>
<tr><th colspan="6"></th><th colspan="3">Trigger</th></tr>
<tr><th>CH1</th><th>CH2</th><th>Time</th><th>Type</th><th>Source</th><th>Slope</th><th>Mode</th><th>Coupling</th><th>Probe</th></tr>
<tr><td>TP8 (kVp)</td><td>TP9 (mA)</td><td>10ms</td><td>Edge</td><td>CH1</td><td>Rising</td><td>Normal</td><td>DC</td><td>x1/x10</td></tr>
</table>
</td><td> 
</td></tr>
<tr><td>2</td><td>Enter Power Mod Calibration</td><td>
<u>AP:</u>
<ul>
<li>Enter Calibration Mode (Follow 12.1, AP)</li>
<li>XRAY CAL ⇒ PWR MOD CAL</li>
<li>Set TIME to 30ms</li>
</ul>
<u>2PT:</u>
<ul>
<li>Enter Calibration Mode</li>
<li>Enter Fil# Mode (See 12.1, 2PT Note)</li>
<li>While holding mA button adjust time to 30ms.</li>
</ul>
</td><td> 
</td></tr>
<tr><td>3</td><td>Adjust Filament Current</td><td>
<ul>
<li>Set technique to lowest kVp and mA.</li>
<li>Set two horizontal cursors on CH2 to indicate 0 mA & target mA</li>
<li>Take exposure.</li>
<li>Adjust FIL AMPS (filament current) until mA leading edge is overlapping the cursor (*Save after each change before taking next exposure. See 12.2)</li>
<li>Continue for all techniques in the order indicated in Fil# table at the bottom of this page. Fill in table with filament numbers.</li>
</ul>
<u>Note:</u> - Not all kVp and mA combinations will be on all generators<br>- Table below shows target voltages at TP9 given target mA
<table>
<tr><th><u>TP9 Volts</u></th><th>25 mA</th><th>50 mA</th><th>75 mA</th><th>100 mA</th><th>150 mA</th><th>200 mA</th><th>250 mA</th><th>300 mA</th><th>350 mA</th><th>400 mA</th><th>450 mA</th><th>500 mA</th></tr>
<tr><td>300 mA Gen.</td><td>0.25V</td><td>0.5V</td><td>0.75V</td><td>1V</td><td>1.5V</td><td>2V</td><td>2.5V</td><td>3V</td><td>3.5V</td><td>4V</td><td>4.5V</td><td>5V</td></tr>
<tr><td>500 mA Gen.</td><td>0.17V</td><td>0.33V</td><td>0.5V</td><td>0.67V</td><td>1V</td><td>1.33V</td><td>1.67V</td><td>2V</td><td>2.33V</td><td>2.67V</td><td>3V</td><td>3.33V</td></tr>
</table>
</td><td> 
</td></tr>
<tr><td>4</td><td>Verify Accuracy</td><td>
<ul>
<li>Enter normal RAD mode.</li>
<li>Set DIP1-4 to CLOSED/ON/RIGHT</li>
<li>Leave DIP1-5 on CLOSED/ON/RIGHT</li>
<li>Verify the kVp and mAs accuracy for various kVp and mA stations</li>
</ul>
</td><td> 
</td></tr>
</table>

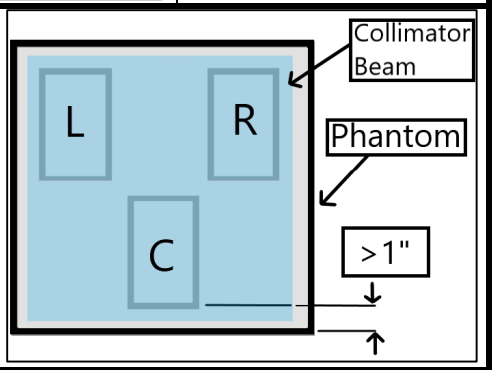
| 500 mA Gen. | N/A | 50 mA | N/A | 100 mA | N/A | N/A | 200 mA | N/A | 300 mA | 350 mA | 400 mA | 450 mA | 500mA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **300 mA Gen.** | **25 mA** | **50 mA** | **75 mA** | **100 mA (SM)** | **100 mA (LG)** | **150 mA** | **200 mA** | **250 mA** | **300 mA** | **N/A** | **N/A** | **N/A** | **N/A** |
| **40kVp** | 1 | 7 | 13 | 19 | 25 | 31 | 37 | 43 | 49 | 55 | 61 | 67 | 73 |
| **50kVp** | 2 | 8 | 14 | 20 | 26 | 32 | 38 | 44 | 50 | 56 | 62 | 68 | 74 |
| **70kVp** | 3 | 9 | 15 | 21 | 27 | 33 | 39 | 45 | 51 | 57 | 63 | 69 | 75 |
| **90kVp** | 4 | 10 | 16 | 22 | 28 | 34 | 40 | 46 | 52 | 58 | 64 | 70 | 76 |
| **110kVp** | 5 | 11 | 17 | 23 | 29 | 35 | 41 | 47 | 53 | 59 | 65 | 71 | 77 |
| **125kVp** | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 | 78 |

# 15. AEC Installation

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>Phantom</td><td>Aluminum: 12x12x5/8” Water: 12x12x4-1/2”</td></tr>
<tr><td>2</td><td>AEC Setup</td><td>
• Connect AEC to H1 or H2 on L070. Do NOT connect to H3 or H4<br>
<u>Note:</u> See Section 12 for console navigation and saving
<table>
<tr><th></th><th>AP Wall</th><th>AP Table</th><th>2Pt Wall</th><th>2Pt Tbl</th></tr>
<tr><td>Enable/Disable</td><td>XRAY CAL ⇒ AEC WALL SET⇒AEC:</td><td>XRAY CAL ⇒ AEC TBL SET⇒AEC:</td><td>P25 = 1/OFF</td><td>P19 = 1/OFF</td></tr>
<tr><td>Field Pattern</td><td>XRAY CAL⇒ AEC WALL SET⇒FIELD PAT:</td><td>XRAY CAL⇒ AEC TBL SET⇒FIELD PAT:</td><td>P26 =</td><td>P20 =</td></tr>
</table>


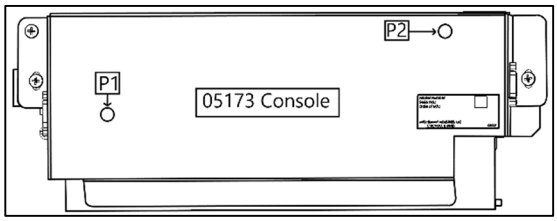


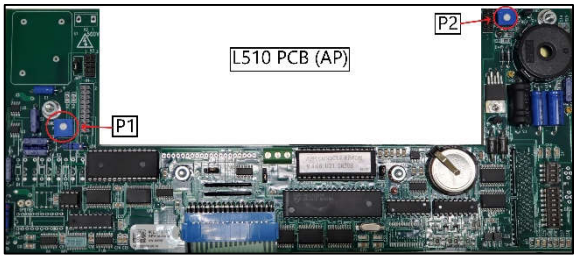


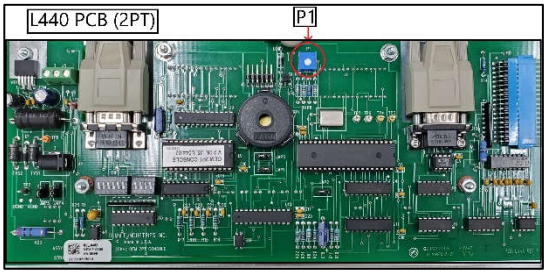
*<u>HVL</u><br>
System Tested: 2.9mm@70kVp<br>
FDA Std: 2.9mm@80kVp
</td></tr>
<tr><td>3</td><td>Verify Balanced Chambers</td><td>
• Ensure grid is centered (Or fields won’t balance)<br>
• Place phantom over all three chambers<br>
• Collimate beam to be within phantom, but covering all chambers<br>
• Set technique to 70kVp and 300 mA (Lg) @ 40” SID<br>
• Enable center chamber, and disable the others<br>
• Take exposure for each chamber and record mAs<br>
Chamber C: _____<br>
(0.95 x ChamberC) ≤ Chamber L: _____ ≤ (1.05 x ChamberC)<br>
(0.95 x ChamberC) ≤ Chamber R: _____ ≤ (1.05 x ChamberC)<br>
<u>Note:</u> If unbalanced: If pots available, balance chambers.<br>
Else, replace preamp or chamber.


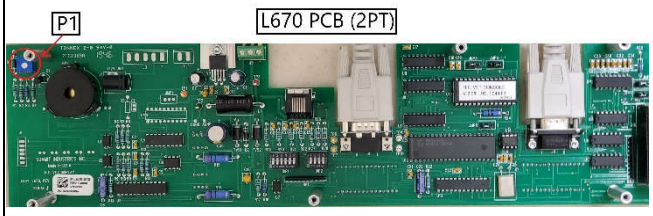
</td></tr>
<tr><td>4</td><td>Adjust Master Gain Pot</td><td>
• Leave physical setup from step 3<br>
• Set the following target voltages in wall/table P# settings
<table>
<tr><th rowspan="2">kV</th><th colspan="2">Target Voltage</th><th colspan="2">P#</th><th rowspan="2">AP</th></tr>
<tr><th>DR</th><th>Film</th><th>Table</th><th>Wall</th></tr>
<tr><td>50</td><td>2.6</td><td>2.6</td><td>P21</td><td>P27</td><td rowspan="4">XRAY CAL ⇒ AEC TBL SET ⇒<br>XRAY CAL ⇒ AEC WALL SET ⇒</td></tr>
<tr><td>70</td><td>1.6</td><td>1.6</td><td>P22</td><td>P28</td></tr>
<tr><td>100</td><td>1.2</td><td>1.2</td><td>P23</td><td>P29</td></tr>
<tr><td>125</td><td>1.0</td><td>0.7</td><td>P24</td><td>P30</td></tr>
</table>
• Set technique to 50kVp and 300mA (Lg) @ 40” SID<br>
• Enable ONLY center chamber<br>
• If available, place Dosimeter probe at film plane<br>
• Adjust preamp master gain pot until desired density (gray level) is achieved (~5.7mR (50µGy) & ~300mAs)
<table>
<tr><th>14-Bit DR Panel</th><th>16-Bit DR Panel</th><th>Film</th></tr>
<tr><td>~7000 Counts</td><td>~30,000 Counts</td><td>1.0</td></tr>
</table>
<u>Note:</u> Give 2 minutes between exposures with DR panel (to allow phosphorus to dim)
</td></tr>
<tr><td>5</td><td>kVp Comp.</td><td>
• Adjust the kV target voltages for the techniques below until desired film density is reached.
<table>
<tr><th>kVp</th><th>mA</th></tr>
<tr><td>70</td><td>300 (Lg)</td></tr>
<tr><td>100</td><td>50 (Sm)</td></tr>
<tr><td>125</td><td>50 (Sm)</td></tr>
</table>
$target_{voltage} = \left(\frac{Desired\_Density}{Measured\_Density}\right) \times Initial\_target_{voltage}$<br>
<u>Note:</u> Give 2 minutes between exposures with DR panel (to allow phosphorus to dim)
</td></tr>
<tr><td>6</td><td>Disclaimer</td><td>
• It is the FSE’s responsibility to comply with all applicable standards.<br>
Ex: Abdomen (KUB) for a 23cm patient, exposure limit ≤450mR (3,946µGy) (Per 289.227(j) Texas)
</td></tr>
</table>

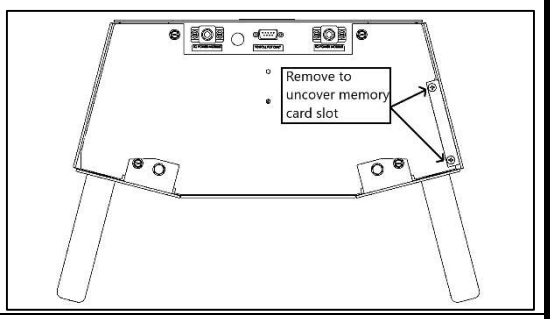
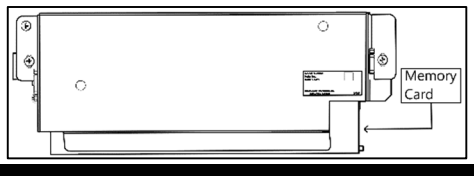
# 16. Console Volume, Brightness, Memory Card Slot Locations, Date/Time, & Roll Angle Display

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>Console Pot Locations</td><td>
<u>AP</u><br>
<u>Beep Tone Volume</u><br>
• Adjust P2 on console<br><br>
<u>LCD Contrast/Brightness</u><br>
• Adjust P1 on Console<br><br>
<u>Note:</u> The 05173 console can be adjusted through access holes on back of console as shown.<br>


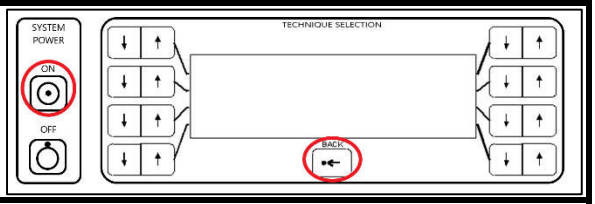
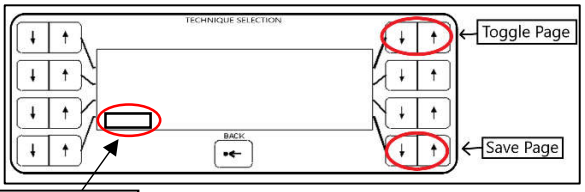
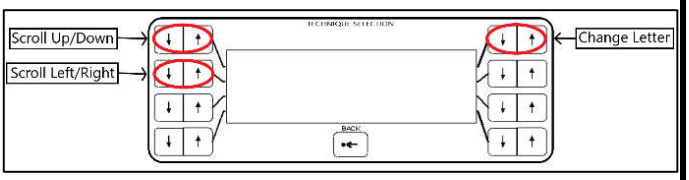
<br><br>
<u>2PT</u><br>
<u>Beep Tone Volume</u><br>
• Adjust P1 (pot) on console<br><br>
<u>Note:</u> The 2PT console can use either the L440 or L670 PCB Board




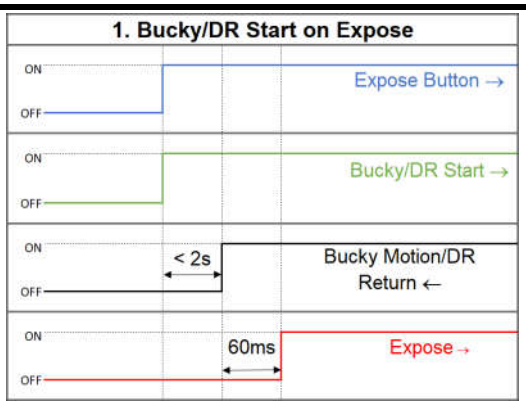


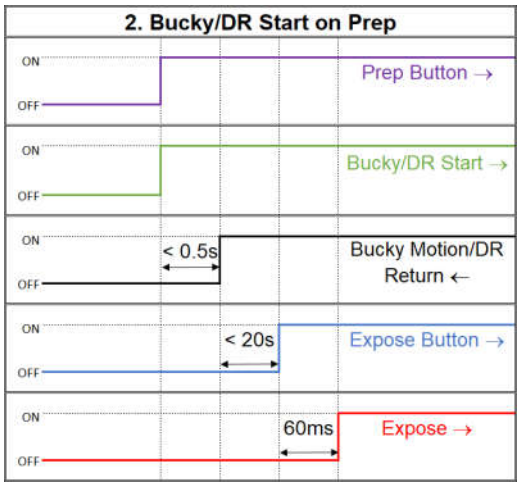
</td></tr>
<tr><td>3</td><td>Memory Card Slot Location</td><td>
<table>
<tr><th>Console</th><th>Memory Card Location</th></tr>
<tr><td>L501</td><td>Slot on side of console</td></tr>
<tr><td>01371-000-004</td><td>Slot on bottom of console</td></tr>
<tr><td>01371-007</td><td>Behind cover on side of console<br> 
</td></tr>
<tr><td>05173</td><td>Back of console<br> 
</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>Date & Time</td><td>
• Turn off console<br>
• Press and hold BACK button<br>
• While holding BACK button press ON button<br>
• Press SET DATE & TIME
</td></tr>
<tr><td>5</td><td>Roll Angle Display Enable</td><td>
• To enable Roll Angle Display: P39 = 2<br>
• To disable Roll Angle Display: P39 = 1<br><br>
<u>Note:</u> See section 12 for console navigation
</td></tr>
</table>

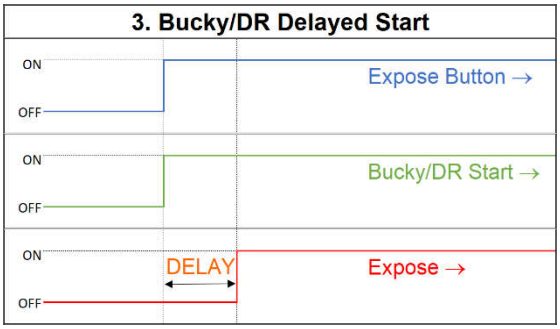
# 17. AP Technique Editor

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>Enter EDIT AP MODE</td><td>• Turn off then press and hold BACK button.<br>• Press ON button while holding BACK button.<br>• Continue holding BACK button until console beeps. (CAL BOOTUP screen now seen)<br>• Enter EDIT AP MODE<br><u>Note:</u> See Section 12 for saving<br>  </td></tr>
<tr><td>2</td><td>Region & View</td><td>• Use arrow button to select anatomical region<br>• Use arrow button to select the radiographic view</td></tr>
<tr><td>3</td><td>Edit Technique View</td><td><u>Note:</u><br>➢ Toggle page using upper right arrows.<br>➢ Page indicated in lower left corner.<br>➢ Must do this step in order.<br>➢ Blank programming table: 08178<br>➢ Example table 300mA: 03299-001<br>➢ Example table 500mA: 03299-006<br>CM START pg:<br>1. CM START = minimum patient thickness<br>CM STEP pg:<br>2. ** $CM\ STEP = \frac{Max\ Thickness - Min\ Thickness}{8}$<br>CM pg:<br>3. Set kVp and mAs given CM (patient thickness)<br>4. Set kVp and mAs for all nine CM thicknesses<br>CM START pg:<br>5. Use arrow buttons to adjust:<br>- Focal Spot (LG or SM)<br>- SID<br>- F/S (Film Screen Speed)<br>6. Select default receptor using the receptor buttons on right side of console<br>7. Select AEC on/off using AEC control buttons<br>  <br><u>Page:</u><br>CM START<br>CM<br>CM STEP<br><u>EXAMPLE: Default Lumbar Sp</u><br>Min Thickness (CM START)<br>SID<br>Receptor<br>Focal Spot<br>AEC<br>Max Thickness<br>Region Name: Lumbar Sp<br>Hip | SID 40 | Table Bky | Lg Focal | AEC: On<br>cm: 12 16 20 24 28 32 36 40 44<br>kVp: 65 70 73 73 77 77 80 82 82<br>mAs: 5 9 15 26 40 60 80 80 100<br>Step<br>** $CM\ STEP = \frac{44 - 12}{8} = 4$</td></tr>
<tr><td>4</td><td>Rename Techniques</td><td>• Enter CAL BOOTUP (See step 1)<br>• Select RENAME TECH<br>• Choose to edit main menu or views for a region under MODIFY<br>• ENTER MOD. SCREEN<br>• Use SCROLL DN/UP to move cursor up and down<br>• Use SCROLL LT/RT to move cursor left and right<br>• Change letter with CHANGE ALPHA arrows<br>  </td></tr>
<tr><td>5</td><td>AP Technique Storage</td><td><u>Enter Memory Function</u><br>• Power off console, then insert memory card into slot (See section 16 for slot location)<br>• Power on then enter CAL BOOTUP (See step 1)<br>• Enter MEMORY FUNC.<br><u>Memory Storage</u><br>• Press CONS TO CARD<br>• Select YES to copy AP information to memory card.<br>• Select NO to exit screen without saving<br><u>Memory Retrieval</u><br>• Press CARD TO CONS<br>• Select YES to copy memory card AP information to console<br>• Select NO to exit screen without saving</td></tr>
<tr><td>6</td><td>Exit</td><td>• Exit by rebooting or pressing BACK button to CAL BOOTUP screen and pressing EXIT TO RAD.<br><u>Note:</u> In normal AP mode the 5th CM thickness is shown as default</td></tr>
</table>

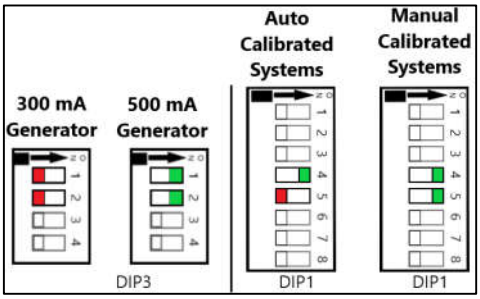
## 18. DR Installation

<table>
<tr><th>Step</th><th>Desc.</th><th>Procedure</th></tr>
<tr><td>1</td><td>DR Integration Kit</td><td>• For integrating generator to Acquisition Work Station order kit 06751
<table>
<tr><th>06751-001</th><th>06751-002</th></tr>
<tr><td>Kit</td><td>Kit w/Hand switch</td></tr>
</table></td></tr>
<tr><td>2</td><td>Max Exposure Time</td><td><u>Notes:</u><br>- Determine DR panel max exposure time from datasheets<br>- See Section 12 for console navigation and saving<br>AP<br>• XRAY CAL ⇒ MORE ⇒ MISC. 1 ⇒ MAX EXP. TIME (s): (0.5s to 5.0s)<br>2PT<br>• P09 = (0.5s to 5.0s)</td></tr>
<tr><td>3</td><td>Bucky/ Digital Trigger</td><td><u>AED (Automatic Exposure Detection)</u><br><u>AP:</u><br><u>1. Start on Expose</u><br>• XRAY CAL ⇒ MORE ⇒ MISC. 2 ⇒ BKY/DGTL: EXP<br><br><u>2PT:</u><br><u>1. Start on Expose</u><br>• P41 = 16<br><br><u>Non-AED</u><br><u>AP:</u><br><u>1. Start on Expose</u><br>• XRAY CAL ⇒ MORE ⇒ MISC. 2 ⇒ BKY/DGTL: EXP<br><br><u>2. Start on Prep</u><br>• XRAY CAL ⇒ MORE ⇒ MISC. 2 ⇒ BKY/DGTL: PREP<br><br><u>3. Delay Start ( 0.7s Typical )</u><br>• XRAY CAL ⇒ MORE ⇒ MISC. 2 ⇒ BKY/DGTL: DELAY<br><br><u>2PT:</u><br><u>1. Start on Expose</u><br>• P41 = 16<br><br><u>2. Start on Prep</u><br>• P41 = 17<br><br><u>3. Delay Start ( 0.7s Typical )</u><br>• P41 = DELAY<br><br>
<table>
<tr><td>P41 =</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr>
<tr><td>Time (s)</td><td>0.1</td><td>0.2</td><td>0.3</td><td>0.4</td><td>0.5</td><td>0.6</td><td>0.7</td><td>0.8</td></tr>
</table>
<table>
<tr><td>P41 =</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td></tr>
<tr><td>Time (s)</td><td>0.9</td><td>1.0</td><td>1.1</td><td>1.2</td><td>1.3</td><td>1.4</td><td>1.5</td></tr>
</table>
<u>Note:</u> Determine DELAY from manufacturers recommendations.<br><br>1. Bucky/DR Start on Expose<br> 

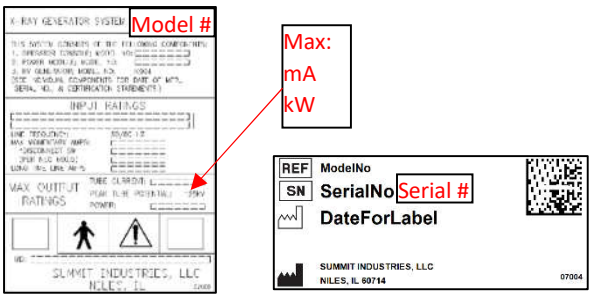
<br>2. Bucky/DR Start on Prep<br> 

<br>3. Bucky/DR Delayed Start<br> 
</td></tr>
<tr><td>4</td><td>Table Top Bucky</td><td><u>Notes:</u><br>- This setting leaves table Bucky on when table top receptor selected.<br>- For Non-AED Only<br><u>AP</u><br>• XRAY CAL ⇒ MORE ⇒ MISC. 2 ⇒ DGT-TTOP: (ON; OFF)<br><u>2PT</u><br>• P15 = (OFF; 1 = Enabled)</td></tr>
</table>

## 19. Verification

<table>
<tr><th>Step</th><th>Desc.</th><th>Information</th></tr>
<tr><td>1</td><td>Verify DIP Switches</td><td> 
</td></tr>
<tr><td>2</td><td>Note Power Settings</td><td><u>2Pt</u><br>• Record value at P36: _____<br>• Record value at P02: _____<br><u>AP</u><br>• Record value at XRAY CAL ⇒ MORE ⇒ VIEW AC DATA ⇒ SYSTEM kW: _____<br>• Record value at XRAY CAL ⇒ PWR MOD SET ⇒ kW LIMIT: _____</td></tr>
<tr><td>3</td><td>Check kV</td><td>• Connect VDC meter to TP8 & TP2<br>• Set meter to MAX mode and range to 0.000VDC<br>• Record voltage with the following exposure: 50kV, 15mAs, & 50mA<br>1.43V ≤ _____ ≤ 1.57V<br>• Record voltage with the following exposure: 110kV, 15mAs, & 50mA<br>3.14V ≤ _____ ≤ 3.46V</td></tr>
<tr><td>4</td><td>Check mA on Board</td><td>• Connect VDC meter to TP9 & TP2<br>• Set meter to MAX mode and range to 0.000VDC<br>• Record voltage with the following exposure: 50kV, ≥75mAs, & 300mA<br>300mA Generator: 2.70V ≤ _____ ≤ 3.30V<br>500mA Generator: 1.80V ≤ _____ ≤ 2.20V</td></tr>
<tr><td>5</td><td>Check mA on Tank</td><td>• Remove brass jumper between banana plugs on HV tank<br>• Connect an AmpDC meter to banana plugs<br>• Set meter to MAX mode and range to 0.000VDC<br>• Record current (amps) with the following exposure: 50kV, ≥75mAs, & 300mA<br>0.270A ≤ _____ ≤ 0.330A<br>• Remove meter and replace jumper</td></tr>
<tr><td>6</td><td>Line Drop</td><td>• Shut off circuit breaker to generator<br>• Connect VAC meter to F1 & F2 (Main Fuses)<br>• Set meter range to 0.000VDC<br>• Turn on circuit breaker<br>• Record the idle VAC:_____ ($Idle_{VAC}$)<br>• Set meter to MIN mode<br>• Record min VAC for the one of the following exposures given the generator: _____ ($Min_{VAC}$)
<table>
<tr><th>Generator</th><th>kV</th><th>mA</th><th>mAs</th></tr>
<tr><td>20kW</td><td>66</td><td>300</td><td>≥75</td></tr>
<tr><td>30kW</td><td>100</td><td>300</td><td>≥75</td></tr>
<tr><td>40/42kW</td><td>125</td><td>300</td><td>≥75</td></tr>
<tr><td>50/52kW</td><td>125</td><td>400</td><td>100</td></tr>
</table>
• Calculate the % Line Drop<br>$\%Line_{Drop} = \frac{Idle_{VAC} - Min_{VAC}}{Idle_{VAC}} \times 100 =$ _____ ≤ 10%</td></tr>
<tr><td>7</td><td>Notes</td><td>• Generator must be seasoned on a weekly basis regardless of use, per service manual.<br>• Perform radiation conformance testing as stated in section 7 of the generator service manual (03003).<br>• Per section 8 of the generator service manual (03003), routine maintenance must be performed 30 to 60 days after initial installation, and every six months thereafter.<br>• Leave copy of section 7 conformance data with end user in case of regulatory physicist audit.</td></tr>
</table>

## 20. Troubleshooting Data Gathering

| Step | Desc. | Information |
|---|---|---|
| 1 | Directions | • Fill out the following information before contacting technical support.<br>• Include this completed document and all requested photos in email.<br>• Tech Support Email: tscalls@summitindustries.net |
| 2 | Site Info | • Date of Visit (MM/DD/YYYY): ____/____/_____<br>• Name of Site: _____<br>• City & State of Site: _____<br>• Name of Main User: _____ |
| 3 | Field Service Engineer Info | • FSE: _____<br>• FSE Company: _____<br>• Contact Cell Phone: _____<br>• Contact Email: _____ |
| 4 | Reason for Service Visit | • Service Type (Check One):<br>☐Installation; ☐Upgrade; ☐Site Move; ☐Regular Maintenance; ☐User Complaint<br>• Is issue: ☐Repeatable or ☐Intermittent? (Check One)<br>• Error Code E:_____<br>• When does error occur?<br>☐RAD Mode; ☐Configuration Mode; ☐ Auto Cal. Mode; ☐Other: _____<br>• What technique causes error?<br>kV:_____ mAs:_____ mA:_____<br>• Record the following P#'s:<br>P01:____ P10:____ P14:____ P33:____ P34:____ P35:____ P36:____ P37:____<br>• Exposre Count<br>AP: MANUAL 2-PT ⇒ EXP COUNT: _____<br>2-PT: - Press & Hold mA<br>- Press & Release sm FS<br>- Release mA: C_____<br>• Describe the issue below: |
| 5 | Generator Info (See Labels) | • Model Prefix: ☐L300; ☐L500; ☐L550; ☐00210; ☐02968; ☐03900; ☐03901; ☐Other:_____<br>• Model Suffix (Dash Number): _____<br>• Serial #: _____<br>• Max mA: ☐300; ☐ 500<br>• Max kW: ☐20; ☐30; ☐40; ☐42; ☐50; ☐52<br>• Software Version (Viewed on Startup):<br>- Controller (kV display of 2Pt on startup): X.XX:_____<br>- Console (mAs display of 2Pt on startup): X.XX:_____<br>• HV Tank K904: ☐-00 ☐-01 ☐-02<br>  |
| 6 | X-Ray Tube Info | • Make: ☐Toshiba; ☐Varian; ☐Other:_____<br>• Model #: _____<br>• Serial #: _____<br>• Date of Manufacture (MM/DD/YYYY): ____/____/_____ |
| 7 | Site Line Voltage | • VAC from F1 to F2: _____<br>• VAC from F1 to Ground: _____<br>• VAC from F2 to Ground: _____<br>• VAC from F3 to Ground: _____ |
| 8 | Pictures | • Attach pictures of the following:<br>- TB1 Wiring<br>- TB2 Wiring<br>- HV tank wiring of P1 and P2 |