

transformer receptacles. Insert the H.V. cable terminals into the appropriate receptacle and screw the cable nut as tightly as possible by hand – Do not use tools for tightening.

10. Ensure that the control's main on/off switch is in the "Off" position and the incoming power safety disconnect is in the "Off" position prior to connecting the line cable.

Route the line cable under the lower tubestand rail and hook up to the safety disconnect. Connect "L1" to one leg of the incoming line power, "L2" to the other incoming leg and "G" to the ground lug.

4.4 PRELIMINARY CALIBRATION

1. Calibration will normally involve only the adjustment of the current and verification of kVp accuracy. It is recommended that the assembler read and understand the information provided with the x-ray tube prior to making any x-ray exposures. Particular attention should be given to:

- a) Pre-warming of the anode
- b) Initial seasoning of the x-ray tube
- c) Single exposure tube ratings
- d) Long time accumulated heat ratings of tube

It is also recommended that measuring equipment be connected into the x-ray system and used to monitor mA and kVp throughout the calibration procedure. This reduces the chances of misleading test data and unnecessary backtracking.

2. Line voltage adjustments:

Terminals on the TB1 are provided for coarse and fine adjustments of line voltage. Measure the line voltage at the disconnect switch and relocate wires marked "LVAC" and "LVAF" to two terminals where the sum of the two terminal markings equal the measured line voltage, ± 2 VAC. For example: If line voltage is 240 VAC, connect "LVAC" to "224" and "LVAF" to "+16."

3. Preset all selector switches.

Prior to turning "on" power, set each selector switch as follows:

Power "On-Off" -- "Off"

kVp major and minor --Fully Counterclockwise

mA selector --300L

Time selector --1/120 sec (1/100 sec for 50Hz units).

4. Disconnect leads marked P1 and P2 from H.V. transformer and insulate with electrical tape. This will prevent accidental production of x-rays during initial check-out. Switch the power safety disconnect switch "On" and then switch the control's "on-off" switch to "On." Observe the following:

mA display reads "-E-"
kVp display is not illuminated at all.
5. While observing the tube filaments through the port of the x-ray tube, verify that the correct filament is lit for each mA station.
6. Depress the foot switch to the 1st stage (Prep), or the "Prep" button on the optional remote switch, and verify anode rotation and filament boost.
7. The kVp meter circuit is factory adjusted, but should be checked to verify its calibration.
 - a) With power "Off" connect an AC voltmeter capable of reading 0-250 VAC across the wipers (center terminals of tap switches) of the kVp selector switches (major and minor). This will allow measurement of the "no-load" primary voltage.
 - b) Turn on power and adjust the kVp selector switches to result in 220 VAC indicated on the voltmeter.
 - c) Compare the kVp meter indications for the mA stations with the values given below:

<u>mA Station</u>	<u>kVp Meter Indication (kVp)</u>
100	114
300	88

Then reset kVp selectors to result in a voltmeter indication of 160 VAC and compare the kVp meter indications for the mA stations with the values given below:

<u>mA Station</u>	<u>kVp Meter Indication (kVp)</u>
100	81
300	53

If the kVp meter indication varies by more than 5 kVp from the values given above, proceed to the kVp calibration procedure.

Switch the disconnect switch to "Off" and reconnect the leads P1 and P2 to the H.V. control.

4.5 mA CALIBRATION

Achieving maximum accuracy of tube current (mA) involves two types of adjustments:

- 1) Overall mA level (bands of filament resistor RX), and
- 2) mA balance throughout the useful kVp range (bands of space charge compensating resistor RSCC)

The leads connected to the resistor bands of RX are marked with numbers which correspond to the mA stations. Moving one of these bands toward the control panel increases the mA for the corresponding mA station.

The leads connected to the bands of RSCC are also marked with numbers which correspond to the mA stations. Moving one of these bands toward the control panel causes a reduction of mA at high kVp levels as compared to low kVp levels for the corresponding mA station. This is commonly referred to as the balance adjustment or space charge compensation.

Due to the method of space charge compensation utilized, normal tracking will result in mA values slightly higher than selected near 80 kVp and mA values equal to one another but slightly lower than selected levels at the high and low ends of the kVp range (125 and 50). See Figure C below for visual presentation of this effect.

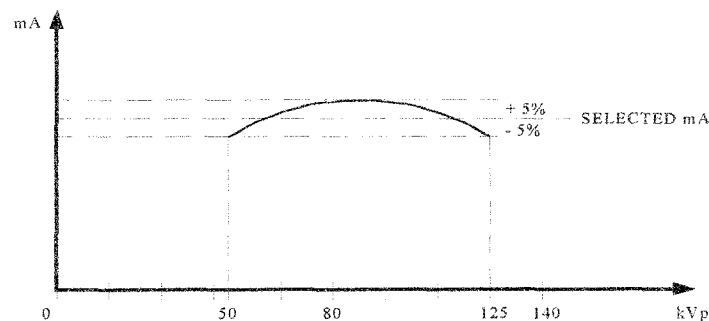


FIGURE C

Connect a Dynalyzer or an mA meter to perform the following procedure. A mA meter can be inserted into the circuit by removing the jumper between TB4-“MA-” and TB4-“MA+” and connecting the meter to those terminals. Replace jumper after removing meter.

1. Select 100 mA and 80 kVp.
2. Adjust the band of RX marked 100A to produce approximately 105 mA (moving the band toward the control panel increases mA).
3. Select 50 kVp and note the mA produced.

4. Select 120 kVp and note the mA produced.
5. If the mA at 120 kVp is higher than the mA at 50 kVp, move the band of RSCC marked 100 toward control panel. If lower, move the band away from control panel.
6. Repeat steps (1) through (5) until no further adjustments are necessary.
7. Check mA tracking from 50 to 120 kVp and fine tune as required. The unit is capable, but fine tuning, to track within $\pm 5\%$ of selected value.
8. Repeat steps (1) through (7) for the 300 mA station substituting 312 mA for 105 mA, band 300A for 100A and band 300 for 100.

4.6 kVp CALIBRATION

This x-ray control comes equipped with an adjustable circuit used to compensate the kVp meter for loading effects. This circuit is identified as "kVp Meter Compensation Circuit." Its adjustment consists of:

- (2) Independent offset pots
- (2) Independent slope pots.

These adjustment pots are mounted on the E860, kVp, mAs and Interlock PCB which is mounted inside the control on the electrical chassis.

4.6.1 WITH A MEANS TO MEASURE ACTUAL kVp

Note: In order to make a valid comparison between the measured peak tube potential (kVp) and the kVp meter's pre-read indication, the tube current must be calibrated accurately. Failure to do so will result in an erroneous determination of kVp accuracy.

A. 100 mA STATION

- 1) Select 100 mA and 50 kVp. While monitoring mA and kVp output, compare the measured kVp meter's pre-read indication.
- 2) Adjust the 100 mA offset pot, P3, until the kVp meter's pre-read indication matches the measured kVp output.
- 3) Select 120 kVp. Make an x-ray exposure and adjust the slope pot "P1" until the kVp meter's pre-read indication matches the measured kVp output. Repeat steps 1, 2, and 3 above until no further adjustments are necessary.
- 4) Check final kVp meter tracking over the entire kVp range. Under normal conditions the kVp meter's indication will not deviate from the measured kVp output by more than 5 kVp.

B. 300 mA STATION

- 1) Select 300 mA and 50 kVp. While monitoring mA and kVp output, compare the measured kVp to the kVp meter's pre-read indication.
- 2) Adjust the 300 mA offset pot, P4, until the kVp meter's pre-read indication matches the measured kVp output.
- 3) Select 120 kVp. Make an x-ray exposure and adjust the slope pot "P2" until the kVp meter's pre-read indication matches the measured kVp output. Repeat steps 1, 2, and 3 above until no further adjustments are necessary.
- 4) Check final kVp meter tracking over the entire kVp range. Under normal conditions the kVp meter's indication will not deviate from the measured kVp output by more than 5 kVp.

4.6.2 WITHOUT A MEANS TO MEASURE ACTUAL kVp

A. 100 mA STATION

- 1) Connect an AC voltmeter capable of measuring 0-300 VAC to the common terminals of the minor and major kVp tap switches.
- 2) Select 100 mA and adjust kVp tap switches to give you a reading of 105 VAC.
- 3) Adjust the 100 mA offset pot, P3, until the kVp meter reads 50 kVp.
- 4) Adjust the kVp tap switches to give you a reading of 230 VAC.
- 5) Adjust the 100 mA slope pot, P1, until the kVp meter reads 120 kVp.
- 6) Repeat steps 2 through 5 until no further adjustments are required.

B. 300 mA STATION

- 1) Connect an AC voltmeter capable of measuring 0-300 VAC to the common terminals of the minor and major kVp tap switches
- 2) Select 300 mA and adjust kVp tap switches to give you a reading of 155 VAC.
- 3) Adjust the 300 mA offset pot, P4, until the kVp meter reads 50 kVp.
- 4) Adjust the kVp tap switches to give you a reading of 277 VAC.
- 5) Adjust the 300 mA slope pot, P2, until the kVp meter reads 120 kVp.