

7.0 Projector Alignment

Contents

7.1 Projector-to-Screen Alignment.....	7-1
7.2 Arc Lamp Alignment.....	7-2
7.3 Lamp Current Adjustment.....	7-5

7.1 Projector-to-Screen Alignment

Set the projector to the proper distance from the screen as determined by the screen width, and Lens Throw Ratio (*see the Lens Selection section in Chapter 2*). The Lens Dynamics Table (*see Lens Selection*) helps to determine what lens to use for different throw ranges and screen widths.

After obtaining an image on the screen, readjust the tilt mechanism (*see “Tilting the Projection Module” section in Chapter 4*) gently to get the exact desired projector tilt. The maximum projector-to-screen vertical tilt angle is 15°. Tilt angles greater than 15° cause severe keystone error that cannot be corrected.

NOTE: When using the 0.885 lens the maximum projector-to-screen vertical tilt is 5° due to distortion in the lens.

Verify that the projector is centered horizontally on the screen, by the front corners equidistant from the screen (*see Figure 7-1*).

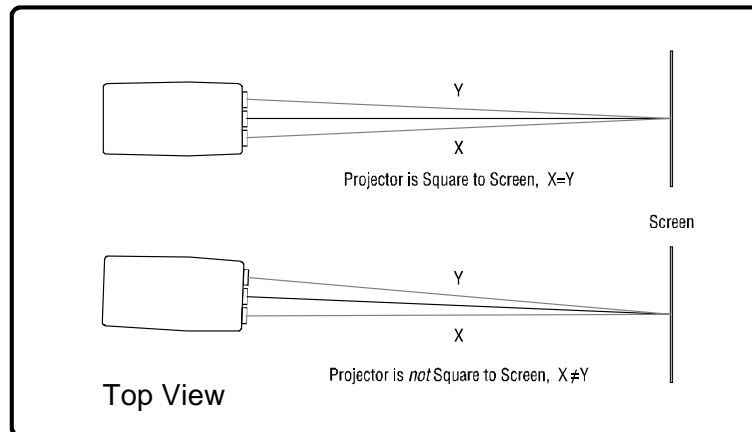


Figure 7-1 Projector should be square to screen.

7.2 Arc Lamp Alignment

Arc Lamp alignment refers to adjusting the X- (Horizontal Centering), Y- (Vertical Centering), and Z- (Lamp Height) axes of the Arc to locate the "hot spot" (brightest place on the screen) to the center of the screen. This provides a relatively uniform brightness across the entire screen. The operator should attempt to obtain a 2:1 (but no more than 3:1) rolloff from screen center to screen edge, and no more than 4:1 from screen center to the 4 screen corners.

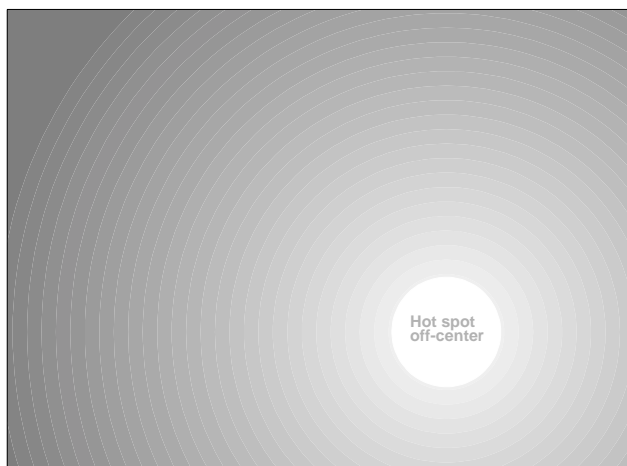


Figure 7-2 Screen showing "hotspot" not centered.

NOTE: Rolloff is the gradual decrease in brightness from the center of the screen to the corners of the screen.

Adjusting the Z-Axis makes the "hot spot" brighter or less bright causing a resulting increase or decrease in rolloff. Adjusting the X or Y axes moves the "hot spot" left/right or up/down with the purpose of centering it to within 5% of center in either direction and leveled brightness in the corners.



CAUTION! Do not attempt to adjust the reflecting mirror above the Arc Lamp in the Arc Lamp Module. This mirror has been aligned by a laser at the factory. If this mirror were misadjusted, the Arc Lamp Module would have to be returned to the factory for realignment.

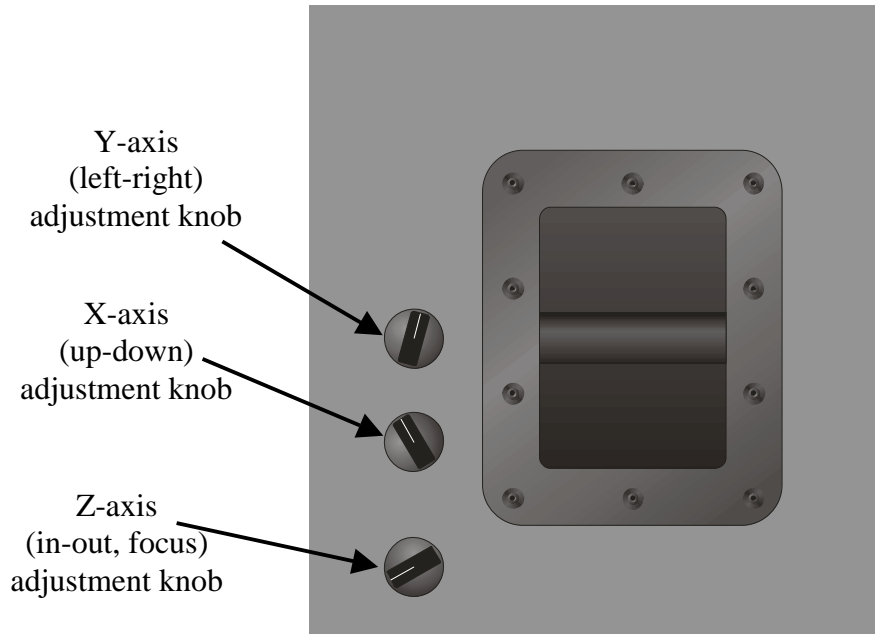


Figure 7-3 Arc Lamp X (horizontal) and Y (vertical) knobs on side panel of Arc Lamp Module.

Tools Needed

Minolta Illumination Meter T-1 (light meter) or equivalent

To adjust the X and Y axes:

1. Connect the AC Power Cord to AC Power source.
2. Toggle the circuit breaker on the front panel to ON.
3. Connect the Tethered Remote to the Terminal-In jack at the rear of the projector (*see the “Terminal or Tethered Remote” section in Chapter 6*).
4. Press both Power keys simultaneously on the Tethered Remote.
5. Wait at least 15 minutes for the projector to warm up prior to making Arc Lamp adjustments.
6. Using the light meter, measure the area around the center of the screen to determine the brightest area (hot spot).

NOTE: The Arc Lamp alignment process is much easier if performed with two people. One person can stand at the screen and take light readings with the light meter while the other person is at the projector adjusting the Arc Lamp.

HINT: For a course adjustment of the X- and Y-axes, remove the green projection lens. A dark spot (from the Arc Lamp) will appear on the screen. Adjust the X- and Y-axes knobs until the dark spot is centered on the screen. Reinstall the green projection lens for the Z-axis adjustment.

7. If this hot spot is not in the center of the screen, the X- or Y-axis knob (or both) must be adjusted to center the hot spot.

8. Turn the X-axis knob clockwise to move the hot spot to the right or counterclockwise to move it to the left.
9. Turn the Y-axis knob clockwise to move the hot spot up and counterclockwise to move it down.

These adjustments are illustrated graphically in Figure 7-4. The operator should take readings with the light meter after each adjustment of the X- or Y-axis knob to ensure that the proper corrections are being made to center the hot spot. Use Figure 7-4 as a guide.

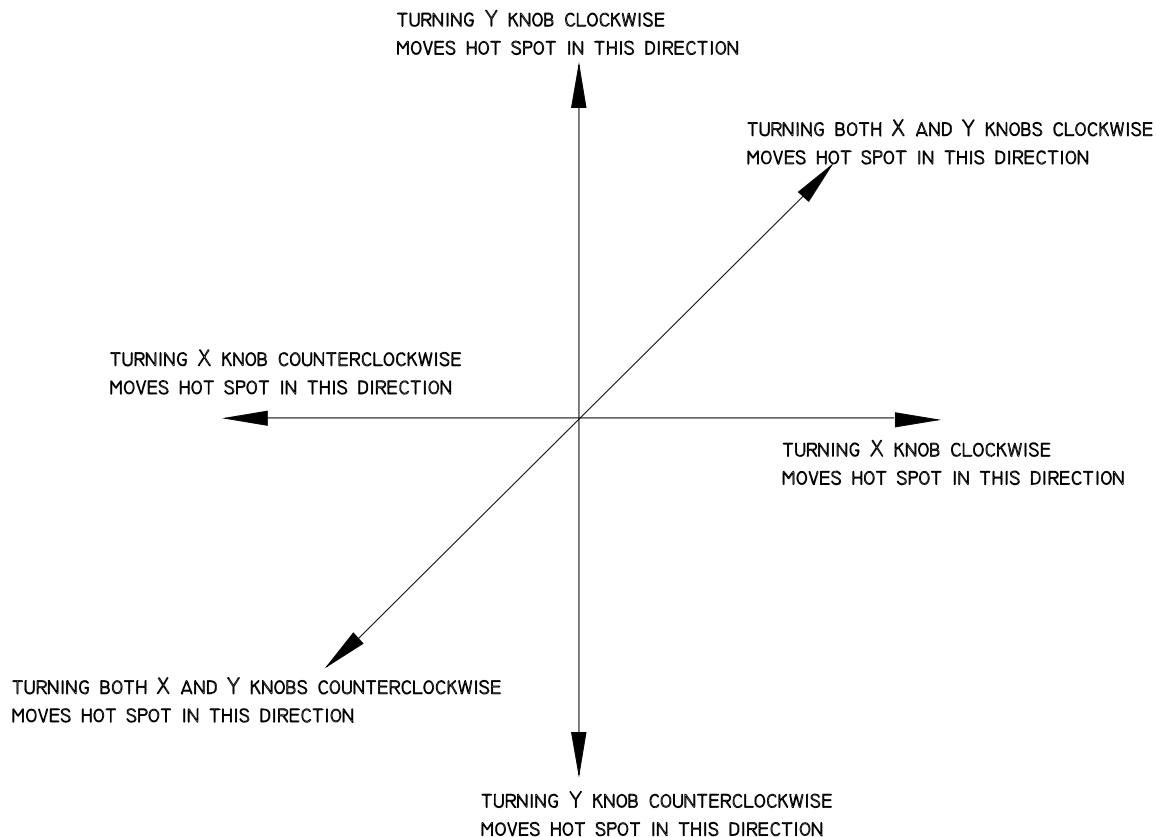


Figure 7-4 Graphical Representation of "Hot Spot" movement on screen.

After the X-axis and Y-axis knobs have been adjusted so that the hot spot is centered on the screen the Z-axis knob must be adjusted for proper rolloff from the screen center to the screen edges and corners.

To adjust the Z-Axis:

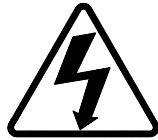
10. Use the light meter and measure the brightness at the screen center.
11. Measure the brightness at the four corners of the screen. They should measure approximately the same brightness. If this is not the case, the X- and/or Y-axis adjustment above should be repeated until all corners measure about the same brightness.

12. If all of the corners measure about the same, calculate the rolloff by dividing the brightness measured at the screen center by the brightness measured at any of the four corners. This should be no more than 4:1 (preferably 3:1). If the rolloff ratio is too high turn the Z-axis knob in a counterclockwise direction to reduce rolloff. If the rolloff ratio is low, turn the Z-axis knob in the clockwise direction.
13. Continue to take readings with the light meter and make adjustments until proper rolloff is obtained.

7.3 Lamp Current Adjustment

The Arc Lamp current is factory-adjusted and should not normally need adjustment however, it should be verified after each installation. If the Arc Lamp current is not between 160-167 amps, it will need to be adjusted. The current is adjusted by moving jumpers on the Arc Lamp Power Supply from one terminal or “tap” to another (see Figure 7-5).

The lower taps (marked W, X, Y, and Z) are for coarse adjustment and must be moved together. Relocating these taps to the next terminal to the right increases the Arc Lamp current 20-25 amps. The upper taps (marked 1, 2, 3, and 4) are for fine adjustment. These taps must also be moved together and increase the Arc Lamp current 5-7 amps when moved to the next terminal to the right.



WARNING!!! Before removing the Projection Module cabinet covers to move the jumpers, make sure the AC Circuit Breaker is set to OFF and the AC Power plug is disconnected from the AC Power source.

Tools Needed

- Clamp-on type ammeter such as AMPROBE Model AC/DC 1000, Fluke 36 Clamp Meter or equivalent
- Large Flatblade screwdriver
- 10-mm Balldriver Hex-head wrench

To verify Arc Lamp current:

NOTE: Ensure that the projector has been ON for at least 15 minutes prior to measuring Arc Lamp current.

1. Remove the Projection Module front, right access panel on the bottom section using the 10-mm Balldriver Hex-head wrench.
2. Measure the Arc Lamp current around either the white or the black Arc Lamp cable. The Arc Lamp current should be between 160-166 amps.

3. If the current is less than 160 amps, the upper or lower jumper wires on the Arc Lamp Transformer must be relocated to the taps toward the right. If the current is higher than 167 amps, the jumpers must be moved to the left (*see Figure 7-5*).
4. Power OFF the Arc Lamp by entering Ctrl-L if using a computer terminal, and turning the Arc Lamp circuit breaker on Projection Module front panel to OFF. If using the Tethered Remote Control, power OFF the projector by pressing both POWER buttons simultaneously, and turning the Arc Lamp circuit breaker on the Projection Module to OFF.
5. Remove the left side panel (as seen from facing the rear of the Projection Module) using the 10-mm Balldriver Hex-head wrench.

To increase current by 5-7 amps,

6. Disconnect each of the black jumper wires connected to the top terminal blocks marked 1, 2, 3, and 4 using the large Flatblade screwdriver. Reconnect these jumper wires to the next terminal to the right. For example, if the three jumper wires are connected to tap number 3, disconnect each of these three wires, then reconnect each of them to tap number 4. The jumper is one solid wire that necessitates all three connections be moved together. Each move to the right increases the current by about seven amps.
7. If the top jumpers are on number 4 tap and need to be increased, move the jumpers to the number 2 tap and move the tap on the lower terminal blocks (lettered W, X, Y, and Z) to the next tap to the right. For example, if the settings were X-4 (X being the setting of the bottom terminal blocks and 4 being the setting of the upper terminal blocks), the resulting move will be Y-2.

To decrease the current by 5-7 amps,

8. Disconnect each of the black jumper wires connected to the top terminal blocks marked 1, 2, 3, and 4 using the large Flatblade screwdriver. Reconnect these jumper wires to the next terminal to the left. For example, if the three jumper wires are connected to tap number 3, disconnect each of these three wires, and reconnect each of them to tap number 2. The jumper is one solid wire that necessitates all three connections be moved together. Each move to the right decreases the current by about seven amps.

To increase current by 20-25 amps,

9. Disconnect each of the black jumper wires connected to the bottom terminal blocks marked W, X, Y, and Z using the large Flatblade screwdriver. Reconnect these jumper wires to the next terminal to the right. For example, if the three jumper wires are connected to tap X, disconnect each of these three wires, then reconnect each of them to tap Y. **Move ALL jumpers together!** Each move to the right increases the current by about 25 amps.

To decrease current by 20-25 amps,

10. Disconnect each of the black jumper wires connected to the bottom terminal blocks marked W, X, Y, and Z using the large Flatblade screwdriver. Reconnect these jumper wires to the next terminal to the left. For example, if the three jumper wires are connected to tap X, disconnect each of these three wires, and reconnect each of them to tap W. **Move ALL jumpers together!** Each move to the right decreases the current by about seven amps.

NOTE: Perform Step 10 only if the coarse adjustment in Step 8 or 9 was necessary. Before reapplying power move the three black jumper wires on the numbered terminal blocks to tap number 1 on the extreme left. Reapply power and measure the current around one of the Arc Lamp cables (Step 1 above). Move the three black jumper wires at the numbered terminal blocks to the right, one terminal at a time, until the 160-166 amps range is reached.

11. Make sure all the tap screws are tight Turn the Arc Lamp Power Supply circuit breaker on the front panel to ON.
12. Power ON the Arc Lamp by entering Ctrl-L if using a computer terminal. If using the Tethered Remote Control, power ON the projector by pressing both POWER buttons simultaneously.
13. Remeasure the Arc Lamp current. Repeat the adjustment process as needed to obtain a current that is between 160-167 amps.
14. Install the Projection Module cover panel.



CAUTION! When the Main AC Circuit Breaker is powered OFF, power to the cooling fans is also shut off. Always allow the cooling fans to run long enough to cool the Arc Lamp before powering OFF the Main AC Breaker.



CAUTION! Do not adjust the Arc Lamp current above 167 amps. Damage to the equipment could result.

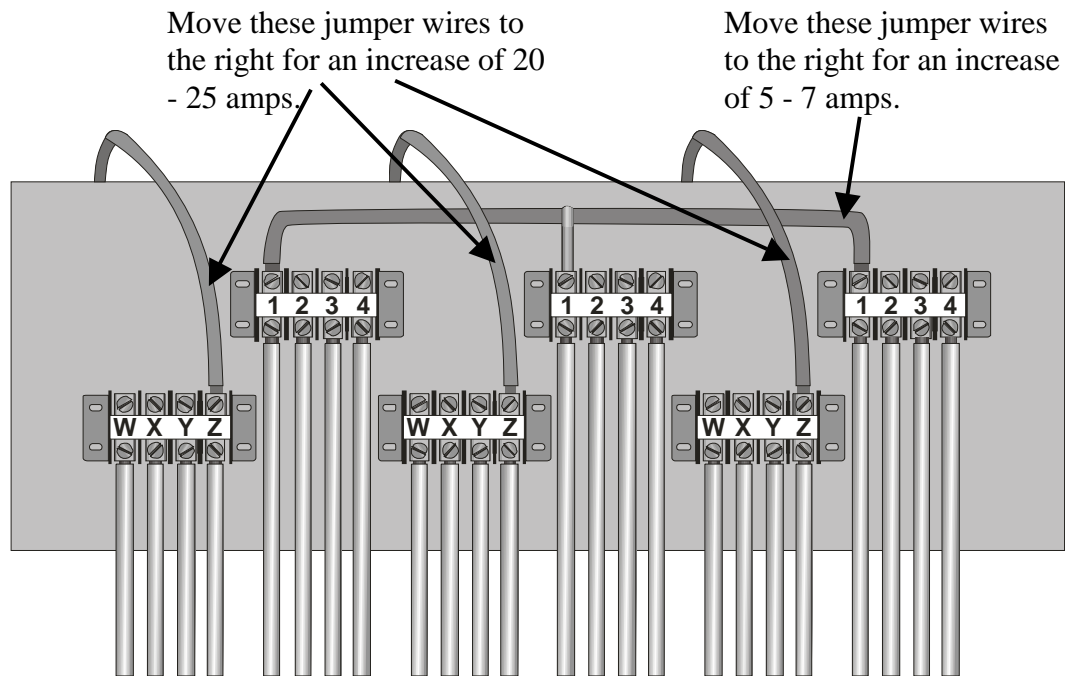
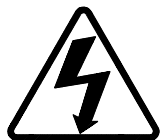


Figure 7-5 Current Adjustment Terminal Blocks on the Arc Lamp Power Supply Transformer.



WARNING!!! The “taps” can vibrate loose during shipping. Check each tap to ensure that **all** the “tap” connections are tight after making Arc Lamp current adjustments.

Table 7-1 Transformer tap settings for measured input voltages (measured).

	Domestic	European	Japan
187 V	Z3		N/A
195 V	Z2		
202 V	Y4		
208 V	Y3		
218 V	Y2		
342 V		Z2	
355 V		Y4	
370 V		Y3	
385 V		Y2	
400 V		X4	
414 V		X3	
428 V		X2	▼
442 V		X1	N/A

The projector is now ready to begin the setup procedures covered in the ILA[®]-12K Operator's Manual.