



# Specialty Enterprises

MANUFACTURER OF MILLENNIUM ALUMINUM SPRAY BOOMS

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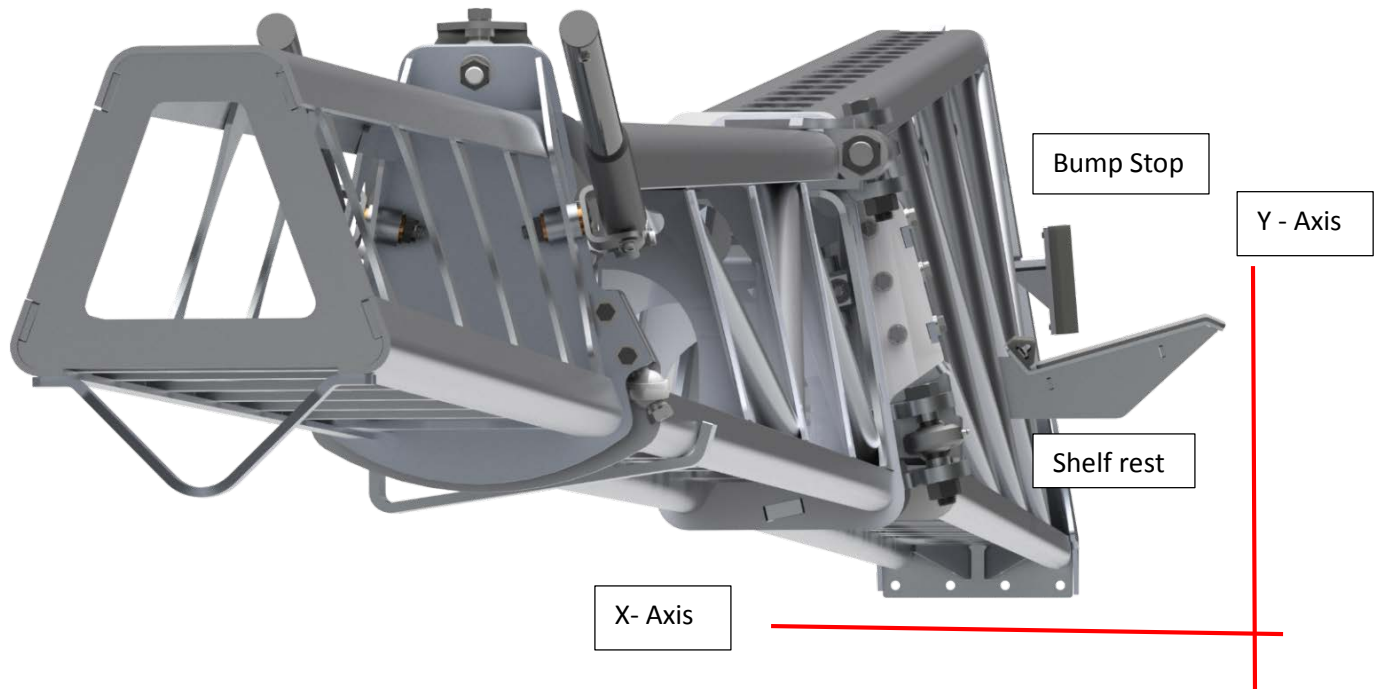
## Boom Adjustment Instructions

**Note:** Call service line at 920.240.5218 with questions or for assistance. We are always happy to help.

**Warning:** Boom maintenance and adjustments require proper Personal Protective Equipment and usual precautions used in the maintenance of heavy equipment involving hydraulics, pinch points, and heavy suspended loads. 2 people are required to perform certain adjustments.

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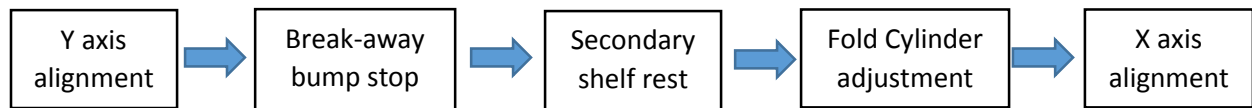


**Introduction:** It is normal for booms to require some slight adjustments after initial installation onto the sprayer.

**Test Drive:** The objective of the test drive is to check that the booms do not have movement at the fold hinge when the booms are completely folded out. This is typically noticeable during turning or going over bumps.

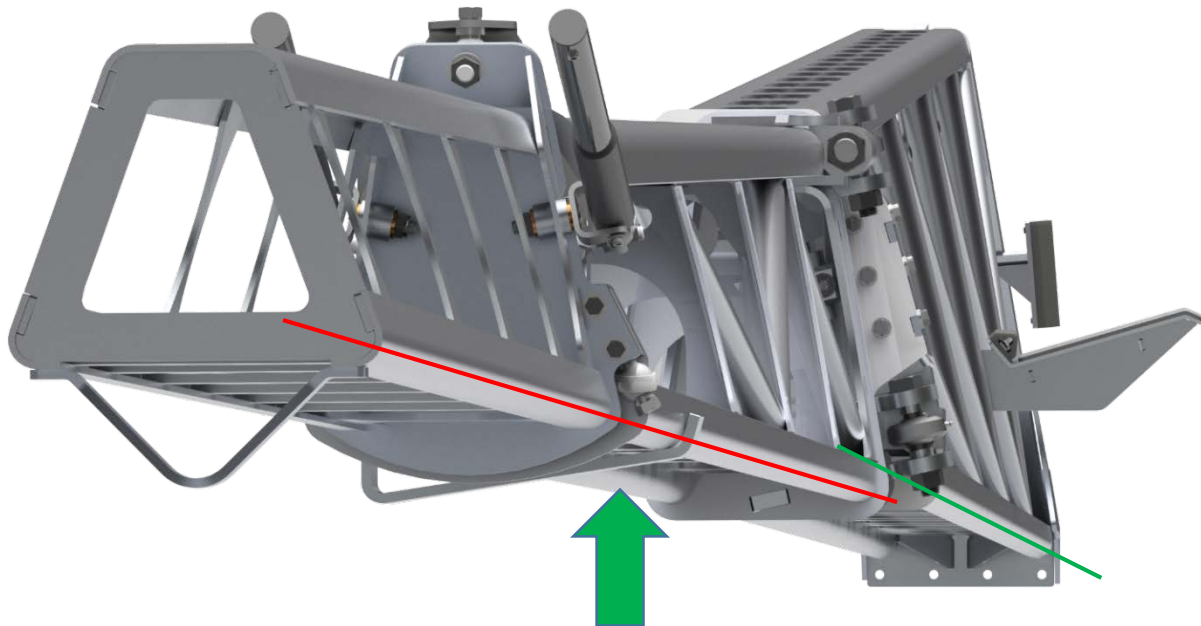
## Boom Adjustments

**Boom Adjustments:** There are 4 main components of boom alignment. The following diagram illustrates the adjustments in sequence.



**Y Axis Alignment:** Proper Y axis alignment is checked with the boom folded out and the primary is sitting level to the ground in a flat area. The best way to check for straightness in the Y direction is to use the bottom rails for reference looking down the side that hinges. An initial slight slant upwards of the secondary and break-away is the factory setting to compensate for some normal downward movement over time.

Figure 1 below is an example of a boom that has settled slightly and needs to have the secondary/breakaway adjusted up using the process described below. See how the red line is sloped down at a different angle from the primary. The frequency of adjustments will depend on field conditions, speed, acceleration/deceleration and sprayer damping characteristics of the center rack.

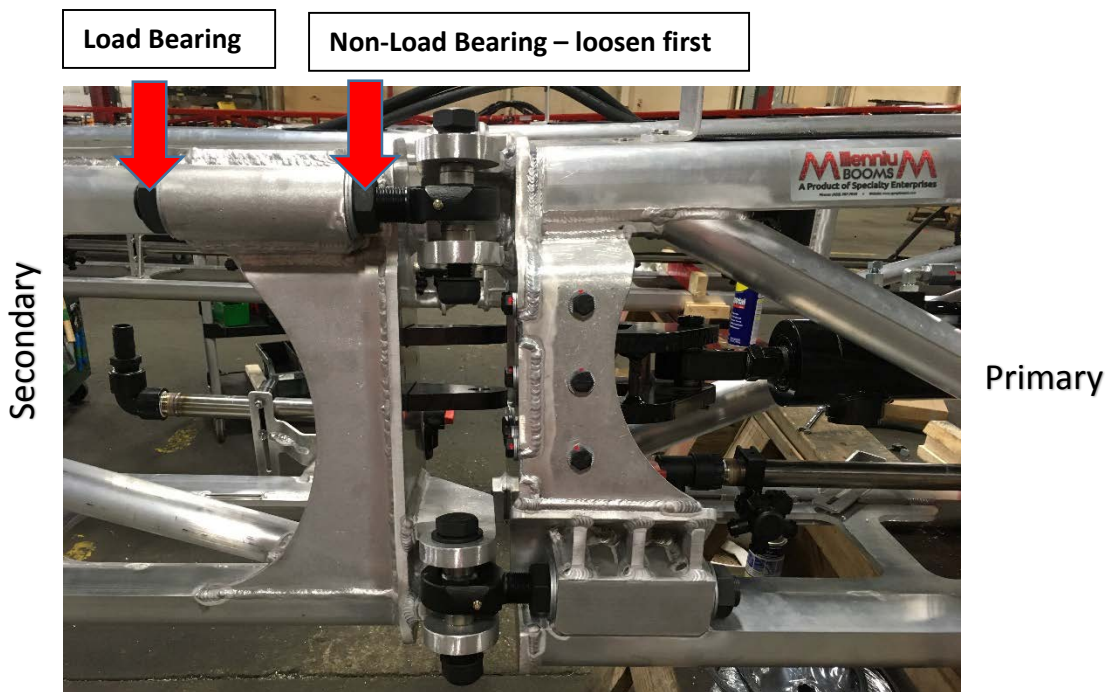


- Y Direction Adjustments are made using the load bearing jam nut on the top rod end located on the secondary at the fold hinge. Begin making adjustments in 1/4 revolutions of the jam nut and fine tune as necessary. Tightening or threading in the outside jam nut will raise the secondary/breakaway. Adjustments are easiest by taking some pressure off of the secondary by first loosening the non-load bearing jam nut and lifting up with a lifting device (figure 2) or lowering the secondary down onto safe and stable structure.

Figure 2: Secondary Lift Point



Figure 3: Secondary Rod End – used for adjusting secondary/breakaway for proper alignment

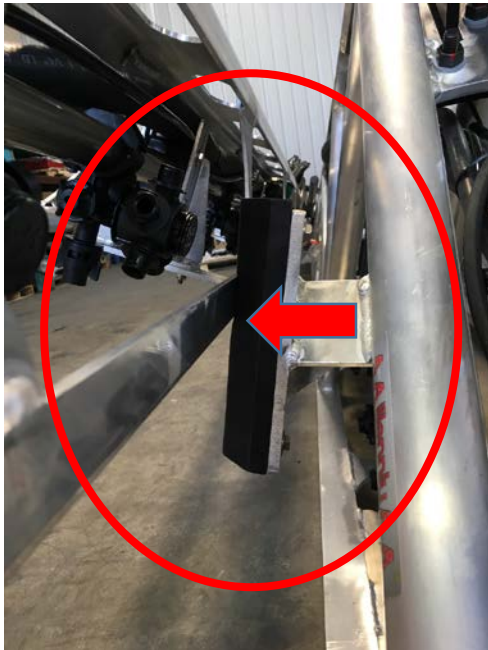


### Y axis adjustment process

- Step 1: Loosen non-load bearing jam nut on secondary rod end approximately ¼” using 1-7/8” wrench.
- Step 2: Take pressure off of load-bearing rod end by either hoisting the secondary several inches using a hoist or forklift or lowering the secondary onto a rest using the sprayer hydraulics. It is best to lift or support the secondary at the end near the breakaway (see figure 2).
- Step 3: Make initial adjustment starting with 1/4 a revolution of the load bearing jam nut on the top rod end. Turning the load bearing jam nut inwards towards the Heim joint will raise the secondary tip and vice-versa.
- Step 4: Remove support device to allow the secondary to hang un-assisted and snug non-load bearing jam nut. Check for straightness in Y direction and repeat steps 2-3 as necessary making smaller adjustments if needed for fine tuning. Tighten non-load bearing jam nut when complete.

**Breakaway Bump Stop:** When the boom is folded the breakaway should make contact near the middle of the bump stop (see figure 4) for most booms (top 1/3 for Rogator C-Series 132’ booms). This is important so as to not have the breakaway bottom rail catch on the top or bottom of the bump stop and get caught which can cause damage the next time the boom is opened. If the breakaway is too high, be sure to check that the secondary shelf rest is not pushing up excessively (see secondary shelf rest adjustment).

**Figure 4: Breakaway bump stop**

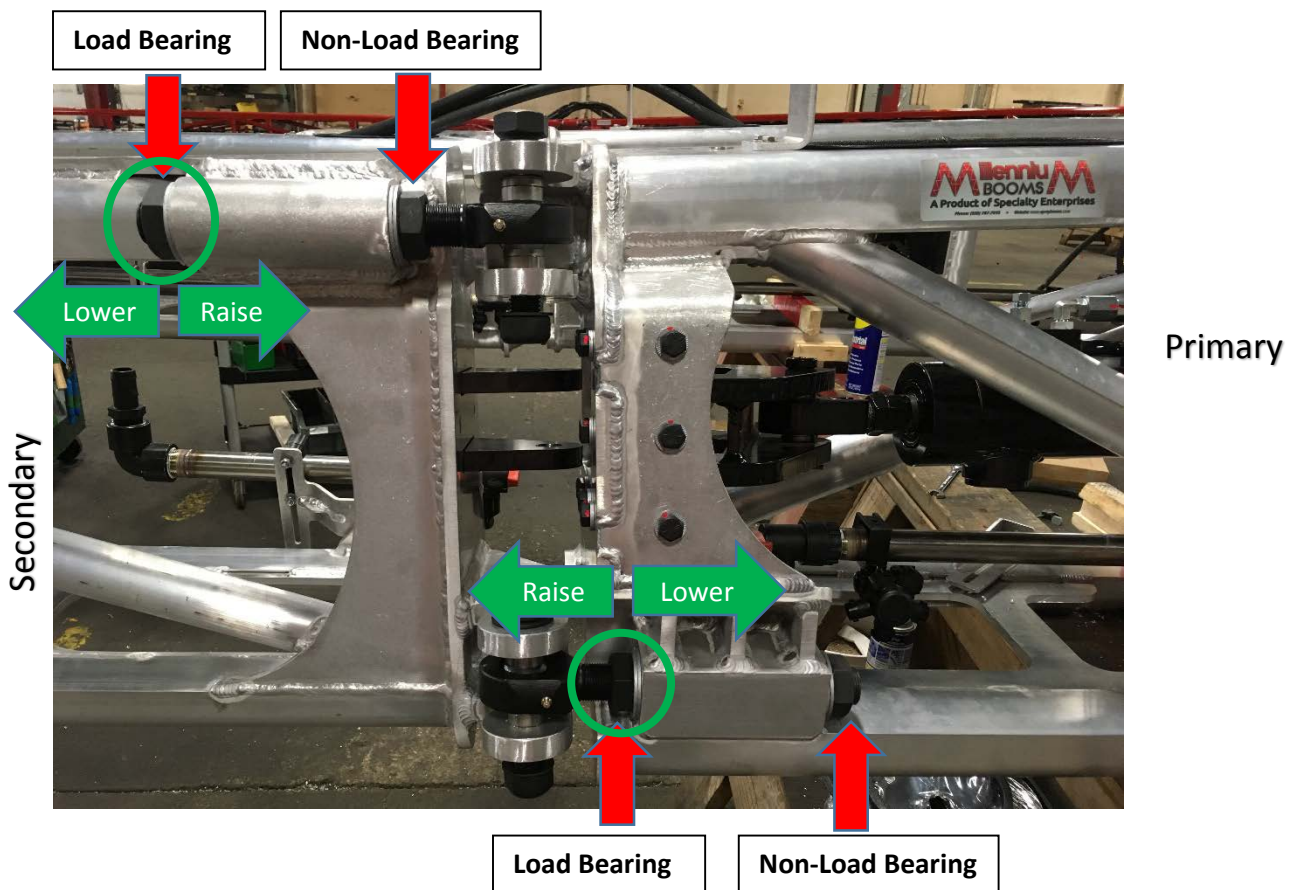


### Raising/Lowering breakaway bump stop contact position



If the breakaway is not in the proper location on the breakaway bump stop (figure 4), the position can be raised or lowered by adjusting the 2 rod ends that make up the Heim joint at the primary/secondary fold. To raise the breakaway to contact the bump stop in a higher position, it is necessary to bring the entire secondary end plate closer to the primary end plate by adjusting both the primary and secondary rod ends in an equal amount (keeping plates parallel). The opposite is true to lower the contact location of the bump stop, where now the objective is to move the secondary end plate away from the primary end plate. The adjustment process is similar to that described for the Y axis adjustments, only now both the load bearing jam nuts need to be adjusted an equal amount so the Y axis alignment is not impacted. If care is not taken to adjust the jam nuts an equal amount it may be necessary to re-adjust the Y axis. It is helpful to mark the starting position of both load bearing jam nuts with masking tape and a marker.

**Figure 5: Rod Ends** – Green arrows show direction of Jam Nut travel to lower or raise breakaway contact position with bump stop.



**Breakaway boom stop position adjustment process**

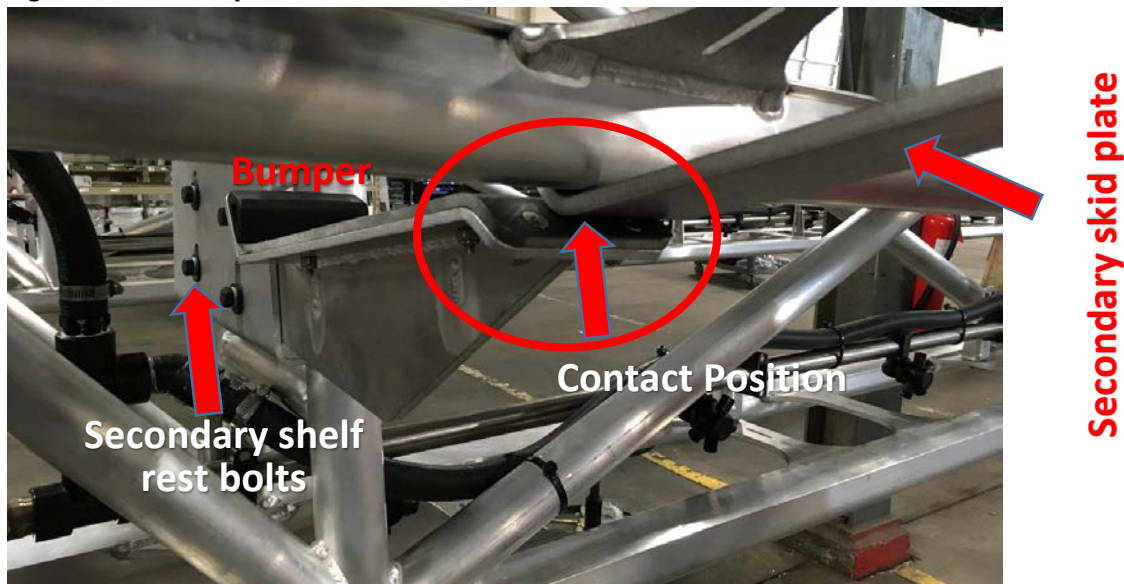
- Step 1: If the breakaway contact position with the bump stop will need to be adjusted it will be necessary to adjust the shelf rest as well. Prior to adjusting the rod ends, first loosen the shelf rest bracket so it is not making contact with the shelf rest.
- Step 2: Loosen both non-load bearing jam nuts on secondary rod end and the primary rod end by approximately 1/4".

- Step 3: Take pressure off of rod ends by hoisting the secondary several inches using a hoist/forklift or lowering the secondary onto a rest using the sprayer hydraulics. It is best to lift or support the secondary at the end near the breakaway (see figure 2).
- Step 4: Mark starting position of load bearing jam nuts. Note: 1 full revolution of each jam nut will equal approximately 3" of boom tip travel. Make initial adjustment starting with ½ a revolution of both load bearing jam nuts in the appropriate direction to either lower or raise (see figure 6).
- Step 5: Remove support device to allow the secondary to hang un-assisted. Snug up the non-load bearing jam nuts to prevent the rod ends from slipping. Fold up the boom to check for proper position of the breakaway on the bump stop. Set position about 1/8" lower than final desired position as setting final shelf rest position will slightly raise where the breakaway contacts the bump stop. Repeat steps 2-4 as necessary until proper position is attained. Tighten non-load bearing jam nut when complete.

### Secondary Shelf Rest:

The secondary shelf rest should be adjusted such that upon folding the boom closed the skid plate on the secondary makes contact with the front lip of the shelf rest just above the 2 stainless bolt heads used to fasten the UHMW (figure 6). The secondary should gently bump the front lip of the shelf rest and slide easily along the shelf rest and into the cushioned bumper in the final closed position. The initial contact with the front lip is important to deflect energy and slow down the boom when closing. The height of the shelf rest and angle can be adjusted using the 4 mounting bolts on the secondary shelf rest. If the boom has problems closing and opening off of the shelf rest, the height and angle will need to be adjusted so that the secondary skid plate both makes contact with the front lip and slides easily on the shelf rest. The fold hinge design does not have favorable mechanical advantage when fully closed so it is important to have the shelf rest bracket adjusted appropriately.

**Figure 6: Secondary shelf rest**



- Step 1: Open booms slightly from closed position. Have second person hold secondary away from primary to allow other person to position shelf rest. Set position such that the secondary skid plate makes initial contact with the lip on the shelf rest just above the 2 stainless bolts as show in figure 6. Tighten shelf rest and slide secondary onto shelf rest.
- Step 2: Open and close the booms just enough to observe how the skid plate is making contact with the shelf rest. The secondary should slide easily into the cushioned bumper with the shelf rest providing some light resistance. Adjust the angle of shelf rest so that the secondary slides easily into the cushioned bumper. It is common that between 1/2" and a 1.5" gap will exist between the shelf rest lip and skid plate once proper adjustment is attained. Too shallow of angle may result in the hydraulic cylinder struggling to get the secondary off of the shelf rest. Too steep of an angle may result in the secondary sliding off the shelf bracket during abrupt high speed turns.

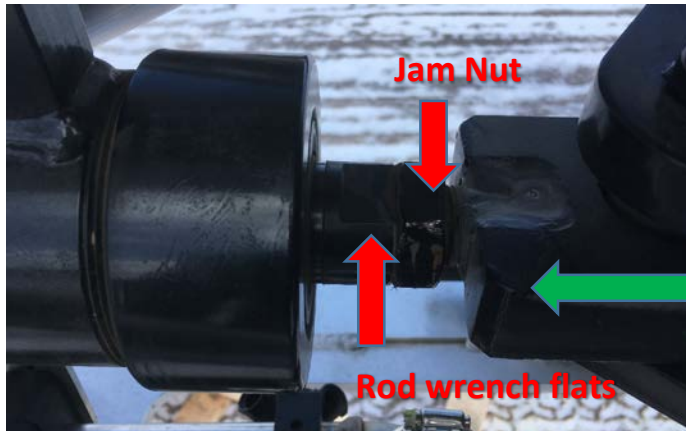
**Figure 7: Shelf rest final position**





**Primary/Secondary Fold Cylinder Adjustment:** It is important to maintain the fold cylinder so that it retracts sufficiently to pull the boom tight and keep the secondary/primary fold firmly together. If movement is observed during operation, it is necessary to adjust. There are two adjustments that can be made to allow the cylinder to retract and tighten the fold hinge. The two methods are to (1) thread the cylinder clevis further into the cylinder rod (figure 8 – easiest method), or (2) adjust the double ended Heim joint that connects the hinge arm to the secondary hinge plates so that it is shorter.

**Figure 8: Fold Cylinder Adjustment Method 1**



Thread clevis into cylinder if additional retraction is needed to keep boom tight.

- Step 1: Loosen jam nut on cylinder clevis, then utilize 60 degree offset wrench to turn cylinder rod such that clevis threads further into cylinder rod.
- Step 2: Push on secondary to in direction of fold to verify there is not movement at the primary/secondary hinge point. Adjust as necessary and tighten jam nut.

**Figure 9: Method 2 – Fold Cylinder Adjustment Method 2 - Double Heim Joint**



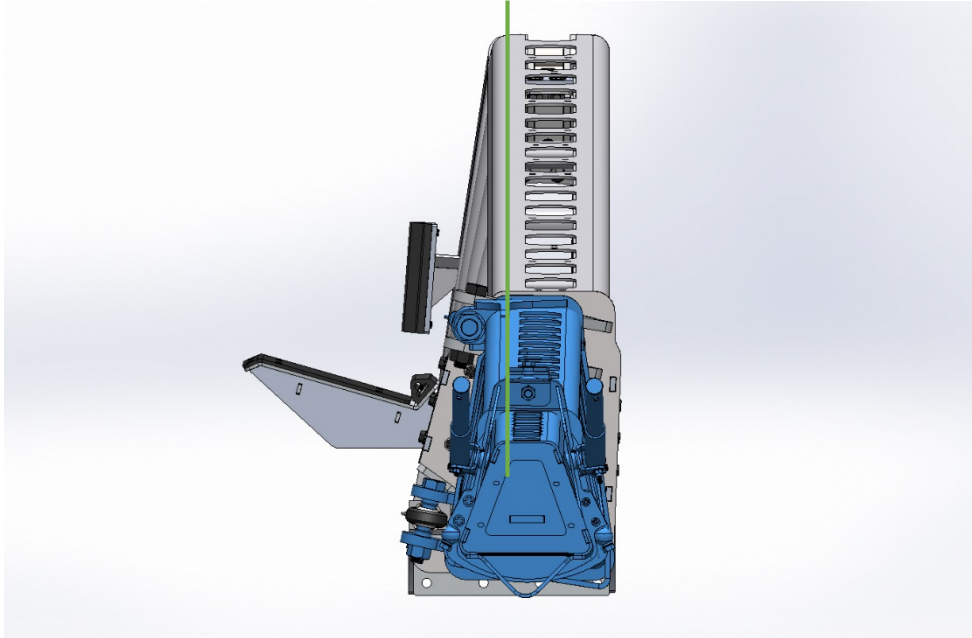
Remove 1" pin and spacers and thread rod end into cylinder if additional retraction is needed to keep boom tight.



## X Axis Alignment

- The best way to check for straightness in the X direction is to look use the top cap edge on the side of the boom that has the hinge brackets.

**Figure 10: X Axis Straightness**



- Utilize the stop bolts mounted on the secondary to make necessary adjustments to straighten the boom. Both to top and bottom stop bolts should make contact. In Figure 11 below you can see where the top stop bolt needs to be adjusted out until contact is made. Both stop bolts should make even contact when the boom is straight.

**Figure 11: Stop Bolts**

