

TYPE AVR/AVRV

Counterbalance Adjustment & Installation Guide



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1. Introduction

The AVR counterbalance assembly is designed for multiple configurations to accommodate varying loads associated with interrupting attachments and switch mounting configurations. The assembly has been adjusted at the factory for the application specified on the customers purchase order at the time of shipment.

Field modifications are typically limited to adjusting pre-load; however, if the switch application changes after shipment, the counterbalance configuration may require spring exchange or installation.

NOTE: These configurations may or may not be readily apparent. Depending upon the application, the switch may include counterbalance assemblies on one or both sides of the switch phase. The assembly will also include springs with differing load characteristics dictated by the application. Consult the factory to determine the proper configuration for the switch application.



2. Component Identification

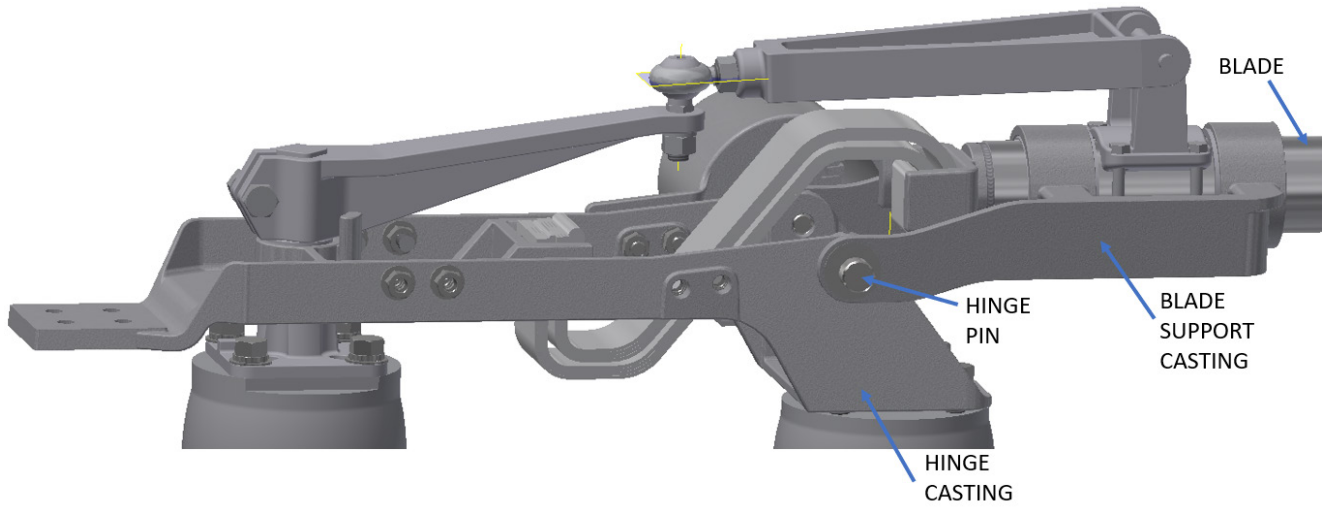


Figure 1. AVR Live Part Components

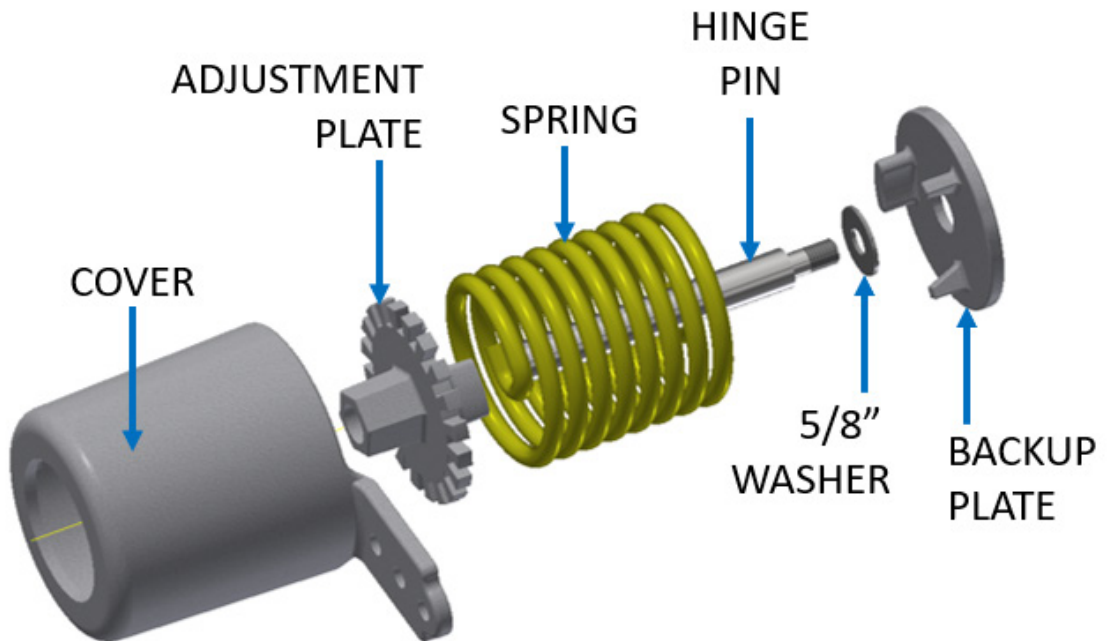


Figure 2. AVR Counterbalance Assembly Components



3. Counterbalance Adjustment

If the switch has the correct counterbalance configuration for the switch application, adjustments can be made to either add additional pre-load or remove pre-load from the counterbalance springs.

Each counterbalance spring that is installed in the factory will have a yellow paint stripe on both the Cover and the Adjustment Plate denoting the initial installation setting.

The following tools will be required:

- 1-5/8" wrench
- Rubber mallet

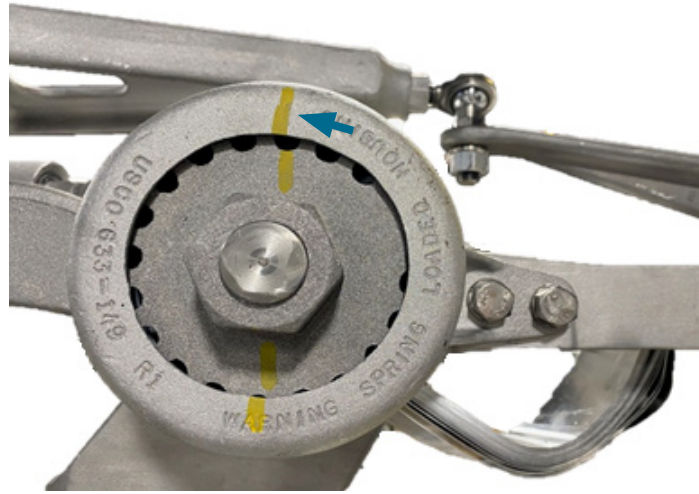


Figure 3. AVR Counterbalance initial installation mark

3.1 Horizontal Configuration

For HORIZONTALLY mounted units the spring loads as the blade closes so always adjust in the OPEN POSITION.

The following steps must be followed for adjustment:

1. Check the switch is in OPEN position.
2. Grip the end of the Adjustment Plate using a 1-5/8" wrench.
3. Depress the Spring and Adjustment Plate by striking the end of the Adjustment Plate with the rubber mallet until the Adjustment Plate is no longer sitting in the tabs of the Cover. Rotate the Adjustment Plate with the wrench to the next position.

NOTE: See Section 3.3, Table 1 for allowable preload notches for each spring.



INCREASE load by rotating toward the hinge. Viewing the phase from the hinge end, increase the load on the right counterbalance spring by rotating the Adjustment Plate counterclockwise (Figure 5). Increase the load on the left counterbalance spring by rotating the Adjustment Plate clockwise (Figure 6).

DECREASE load by rotating toward the jaw. Viewing the phase from the hinge end, decrease the load on the right counterbalance spring by rotating the Adjustment Plate clockwise (Figure 7). Decrease the load on the left counterbalance spring by rotating the Adjustment Plate counterclockwise (Figure 8).

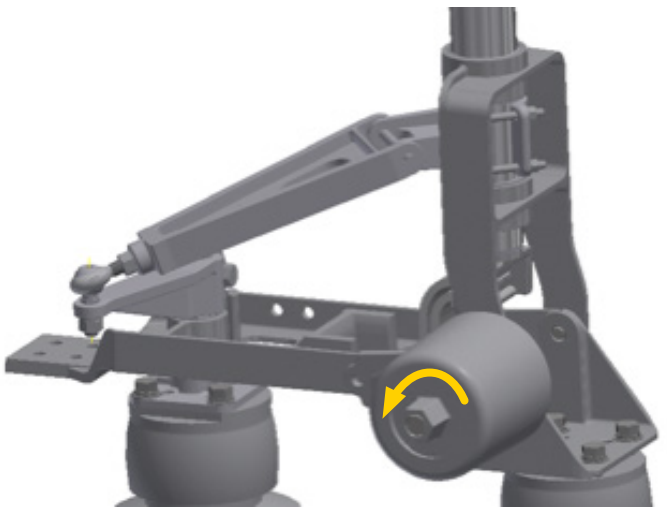


Figure 5. Increase the Load on Right Counterbalance Spring, Horizontal Orientation

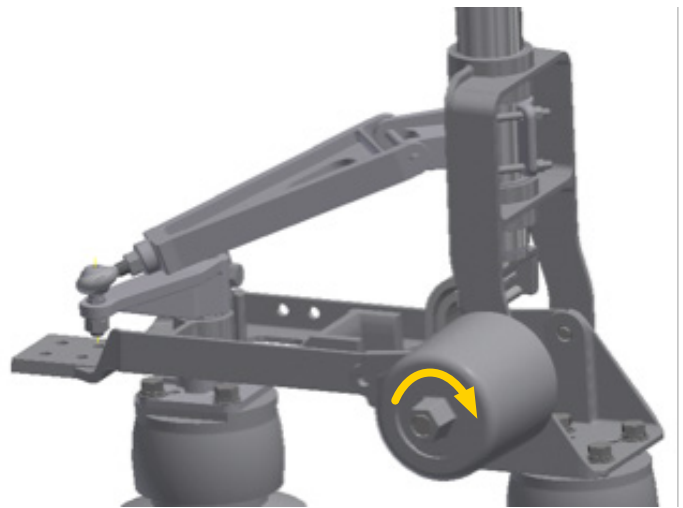


Figure 7. Decrease the Load on Right Counterbalance Spring, Horizontal Orientation

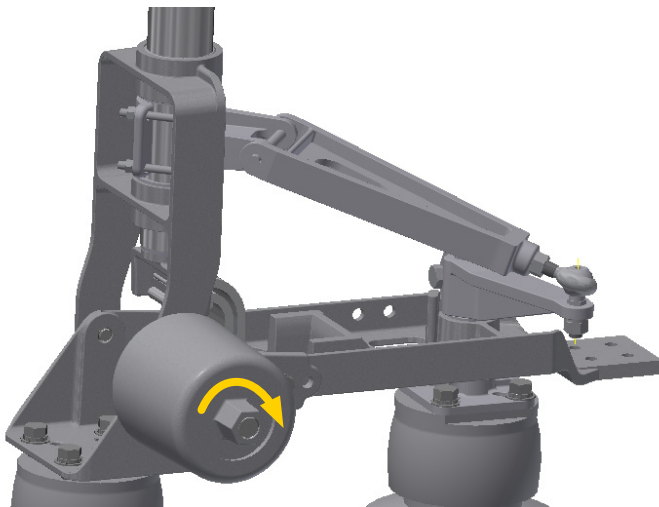


Figure 6. Increase the Load on Left Counterbalance Spring, Horizontal Orientation

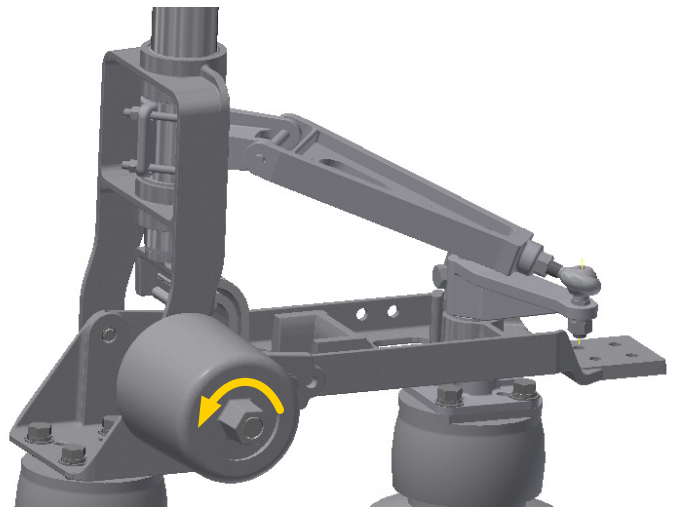


Figure 8. Decrease the Load on Left Counterbalance Spring, Horizontal Orientation



3.2 Vertical Configuration

For VERTICALLY mounted units the spring loads as the blade opens so always adjust in the CLOSED POSITION.

The following steps must be followed for adjustment:

1. Check the switch is in CLOSED position.
2. Grip the end of the Adjustment Plate using a 1-5/8" wrench.
3. Depress the Spring and Adjustment Plate by striking the end of the Adjustment Plate with the rubber mallet until the Adjustment Plate is no longer sitting in the tabs of the Cover. Rotate the Adjustment Plate with the wrench to the next position.

NOTE: See Section 3.3, Table 1 for allowable preload notches for each spring.

INCREASE load by rotating toward the jaw. Viewing the phase from the hinge end, increase the load on the right counterbalance spring by rotating the Adjustment Plate clockwise (Figure 9). Increase the load on the left counterbalance spring by rotating the Adjustment Plate counterclockwise (Figure 10).

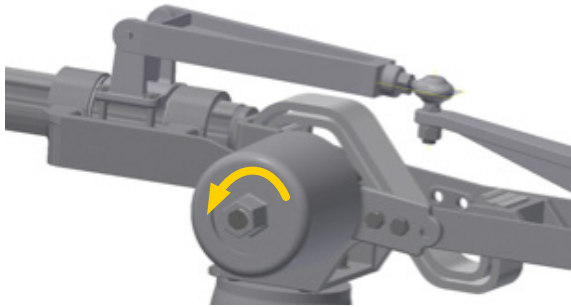


Figure 10. Increase Load on Left Counterbalance Spring, Vertical Orientation

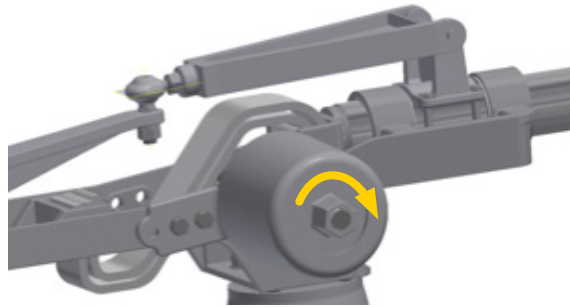


Figure 9. Increase the Load on Right Counterbalance Spring, Vertical Orientation



DECREASE load by rotating toward the hinge. Viewing the phase from the hinge end, decrease the load on the right counterbalance spring by rotating the Adjustment Plate counterclockwise (Figure 11). Decrease the load on the left counterbalance spring by rotating the Adjustment Plate clockwise (Figure 12).

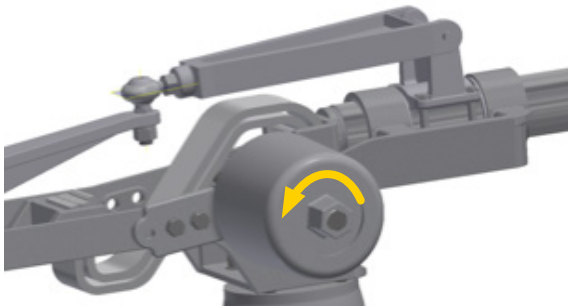


Figure 11. Decrease Load on Right Counterbalance Spring, Vertical Orientation

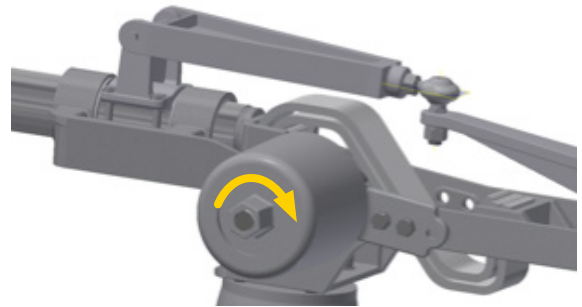


Figure 12. Decrease Load on Left Counterbalance Spring, Vertical Orientation

3.3 Spring Loading Guide

Adjustment notches occur every 18° and the counterbalance assemblies are limited to a maximum of 2 or 3 notches of preload. Table 1 provides the maximum preload notches for each spring.

Spring Part Number	Spring Color	Additional Torque per Notch (in-lbs)	Maximum Preload (Notches)
R90001033	Black	48.6	3
R90001037	White	48.6	3
R90001034	Red	102.4	2
R90001038	Green	102.4	2
R90001035	Yellow	207.6	2
R90001039	Orange	207.6	2

Table 1. AVR Counterbalance Spring Preload



4. Counterbalance Installation

If the application of a switch changes, the switch may require existing counterbalance assemblies to be exchanged or new counterbalance assemblies to be added. Consult the factory to determine the correct counterbalance configuration.

The following tools will be required:

- 1/8" allen wrench
- 3/4" wrench
- 1-5/8" wrench
- Channellock pliers
- Rubber mallet

The following steps must be followed for adjustment:

1. Determine the installation orientation of the unit.
 - Horizontally mounted: The switch phase must be open during the installation of the spring.
 - Vertically mounted: The switch phase must be closed during the installation of the spring.
2. Locate the two 1/4" set screws on the top of the AVR hinge casting (Figure 13). Using the 1/8" allen wrench, remove both set screws and set aside.

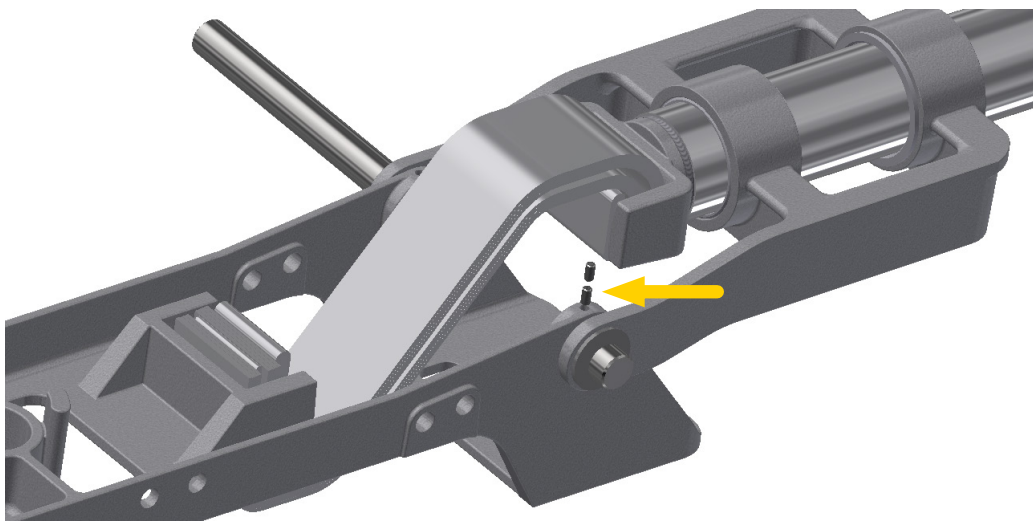


Figure 13. Remove set screws from Hinge Casting

3. Remove the hinge pin by turning counterclockwise by hand or using the Channellock pliers.

NOTE: Between the Support Casting and the Hinge Casting, a stainless steel 5/8" flat washer is installed to prevent galling during operation. Take care not to lose the washer upon removing the hinge pin.



4. Install the new hinge pin and backup plate casting (Figure 14) required for the counterbalance assembly by threading the hinge pin in by hand or with the adjustable wrench. The grooves of the backup plate should fit over the blade support casting.

CAUTION: To prevent the hinge pin from pinching the blade support castings, tighten the hinge pin until the outer 1/2" stainless steel flat washer can no longer spin freely, and then loosen the hinge pin by 1/4 of a turn.

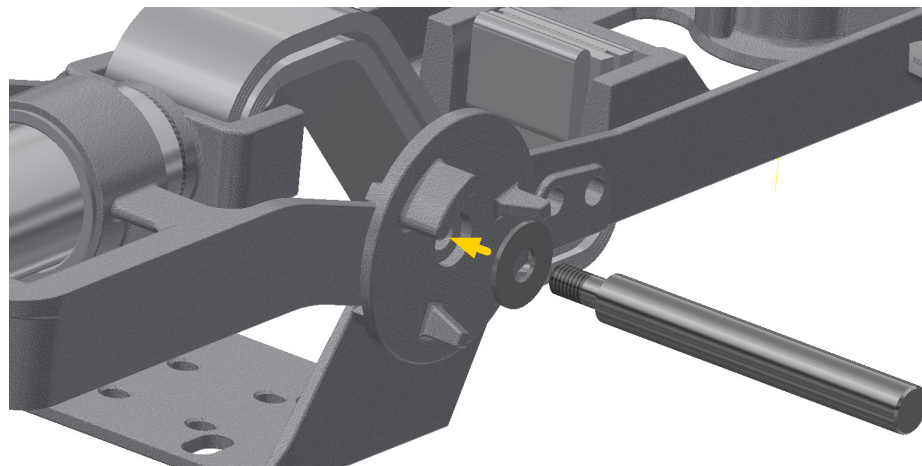


Figure 14. Backup Plate and Hinge pin installation

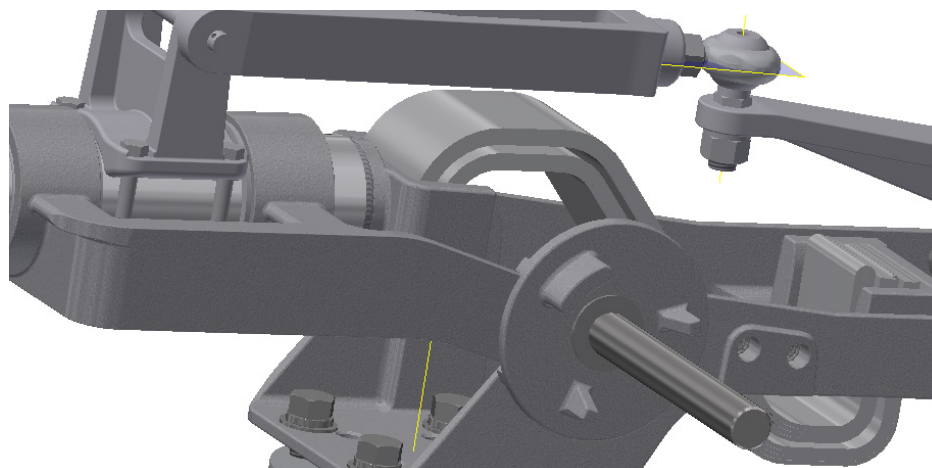


Figure 15. Hinge pin installed

5. Install 1/4" set screws in the hinge casting that were previously removed in Step 2. Install the first until it tightens against the hinge pin. Then install the second set screw to ensure the first remains locked into position.

CAUTION: Failure to re-install set screws could cause the hinge pins to tighten with repeated operation of the switch and prevent the switch from operating correctly.



- Slide the spring over the Backup Plate and Hinge Pin. Align the spring with the three tabs on the Backup Plate.

NOTE: The hook of the spring must go over the large tab on the Backup Plate (Figure 17).

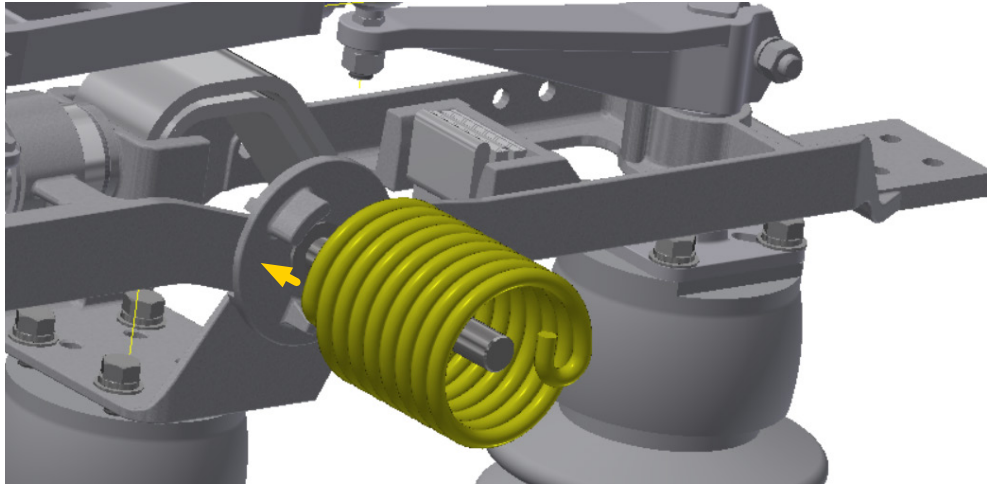


Figure 16. Spring Installation

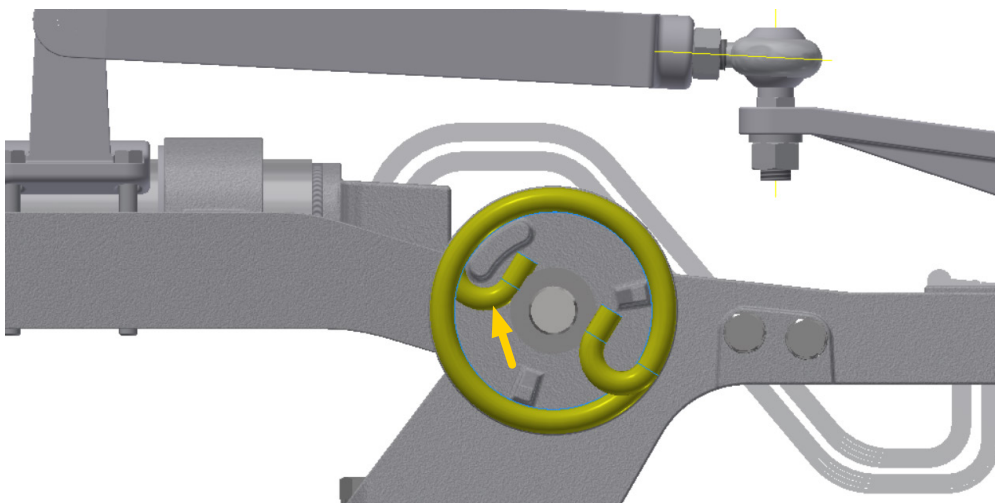


Figure 17. Spring hook installation

- Slide the Adjustment Plate over the Hinge Pin and spring. Align the three tabs on the Adjustment Plate with the spring (Figure 18).

NOTE: The hook of the spring must go over the large tab on the Adjustment Plate.



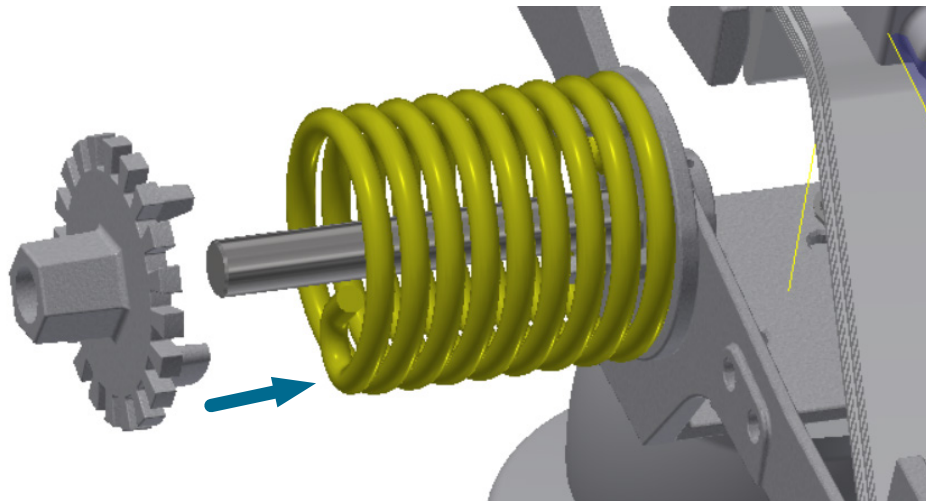


Figure 18. Spring alignment in Cover

8. Slide the Cover over the assembly, aligning the first two holes on the mounting tab to the threaded holes in the Hinge (Figure 19).

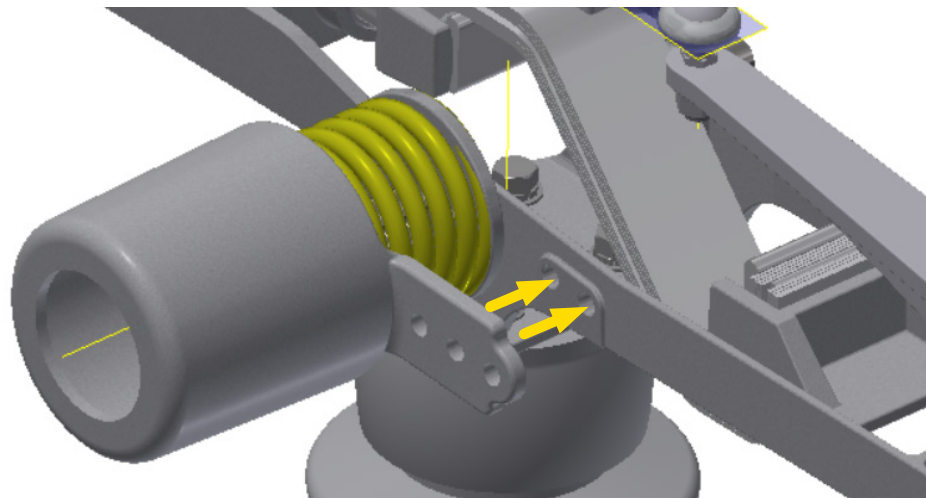


Figure 19. Spring Cover Installation

9. Check to ensure the Adjustment Plate is seated on the tabs inside the Cover. The visible face of the Adjustment Plate will be flush against the Cover.
10. Assemble the counterbalance assembly Cover to the Hinge Casting using two 1/2"-13 x 1" stainless steel bolts and 1/2" stainless steel lock washers. Slight compression of the spring will be required.



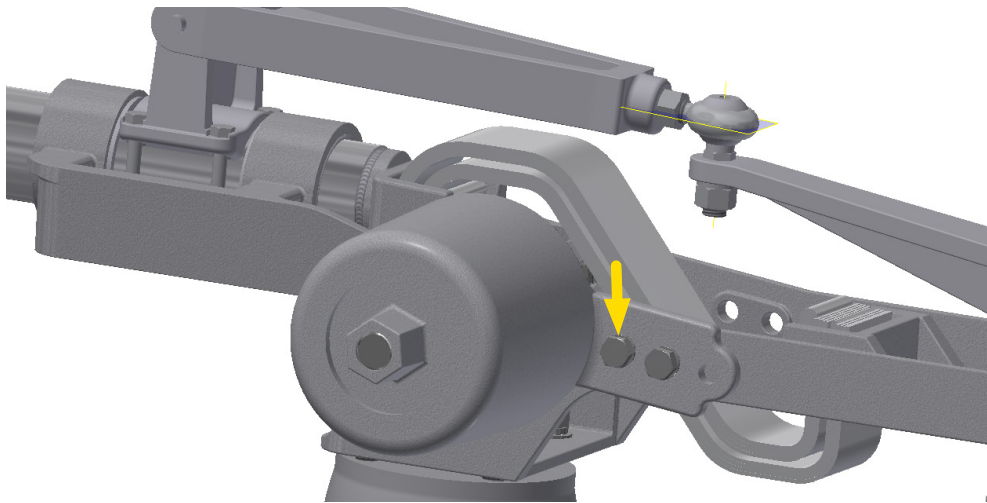


Figure 20. Counterbalance Assembly installation

11. Mark the initial installation point of the Adjustment Plate by putting a mark across the Adjustment Plate and Cover (Figure 21).

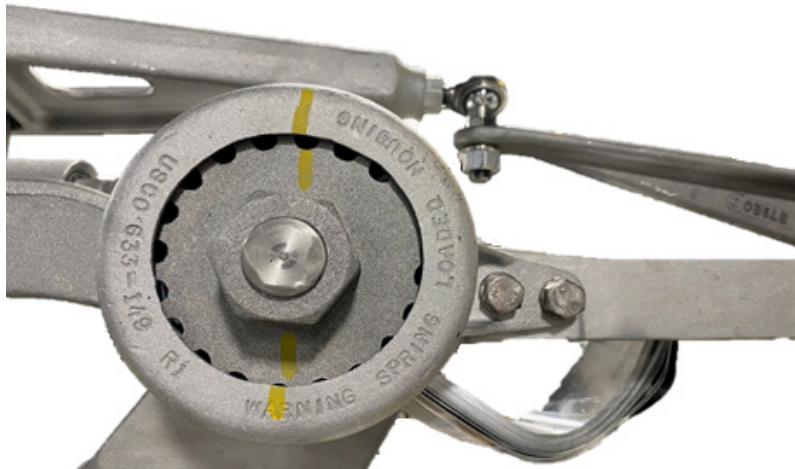


Figure 21. AVR Counterbalance initial installation mark

12. Repeat steps for opposite side, if required.
13. Confirm operation of switch. If additional pre-load is required on the counterbalance spring, see Section 2: Counterbalance Adjustment.

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