

## GSX Ball Accelerator Motor Conversion

These instructions describe the procedure to replace the direct drive motor/drum assembly used on GSX ball accelerators with an external motor and V-belt driven rear drum.

### Packaging

**47-277187-230 Repair Kit - 230V GSX Ball Accelerator Drive Ass'y**

**47-277188-400 Repair Kit - 400V GSX Ball Accelerator Drive Ass'y**

- 1 47-036696-009 Belt Drive Assembly
- 1 47-076891-xxx Ball Accelerator Motor w/cable
- 1 11-053912-000 Ball Accelerator - V-Belt
- 1 47-036705-001 Tension Rod - Short
- 1 47-147185-000 Repair Cable - Power
- 6 99-050343-004 Cable Tie

XXX - 230 for 208V/230V Motor  
400 for 380V/400V Motor

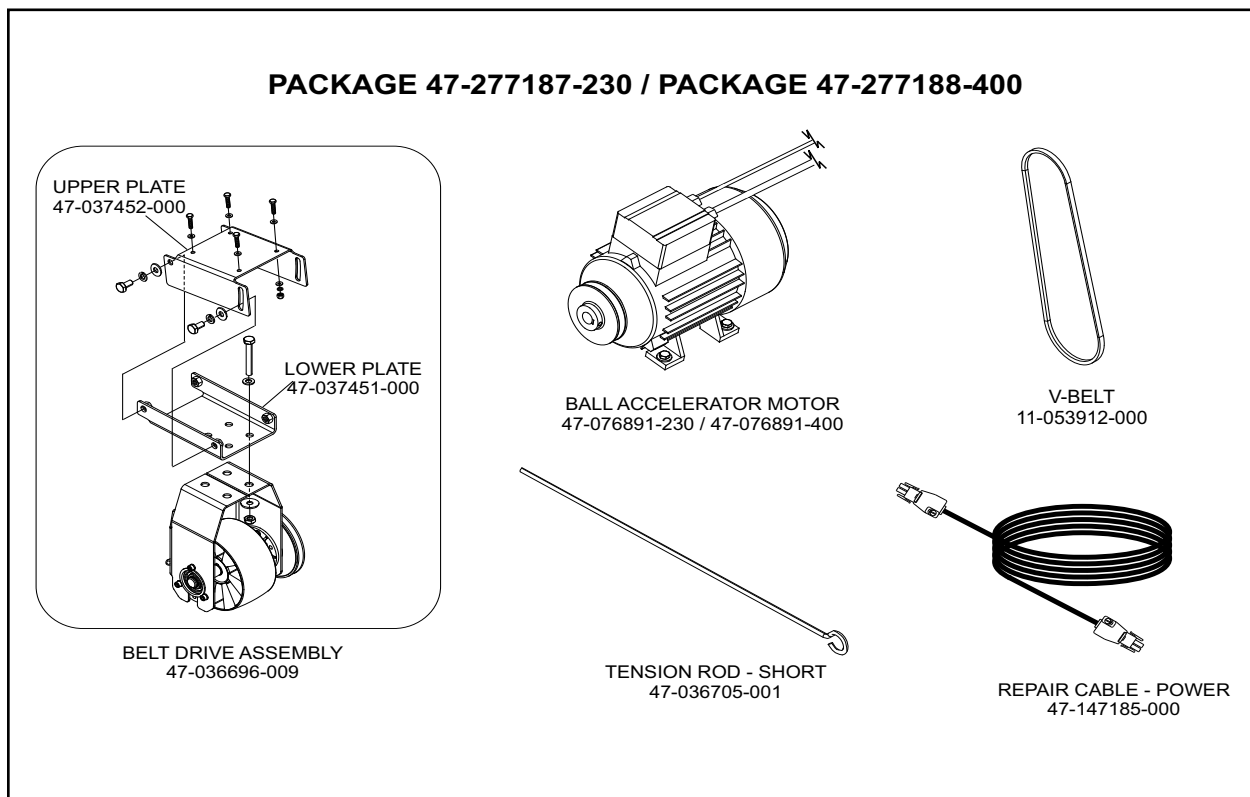


Figure 1. Package Contents

# Overview

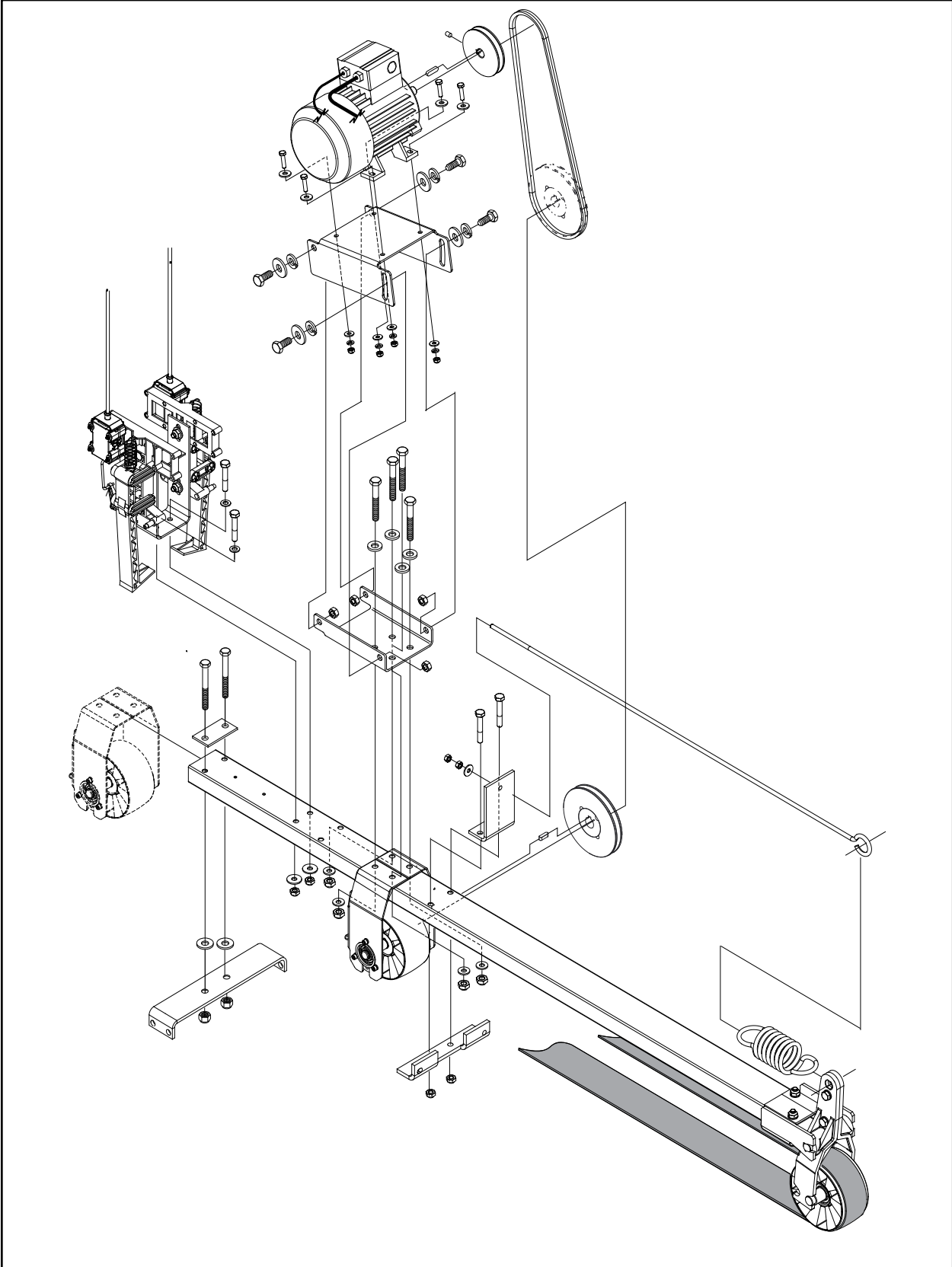


Figure 2. Assembly Overview

## Remove Ball Accelerator From Machine

1. Lower the sweep board on both lanes to prevent bowling balls from entering the pinsetters.
2. Turn the main power switch on the Nexgen box or Safety Controller to the “Off” position and disconnect the cord for the 3-phase incoming power from connector P14 of the Nexgen box.
3. Disconnect the existing Ball Accelerator motor cable from P26, “Ball Accel Power” connector of the Nexgen box

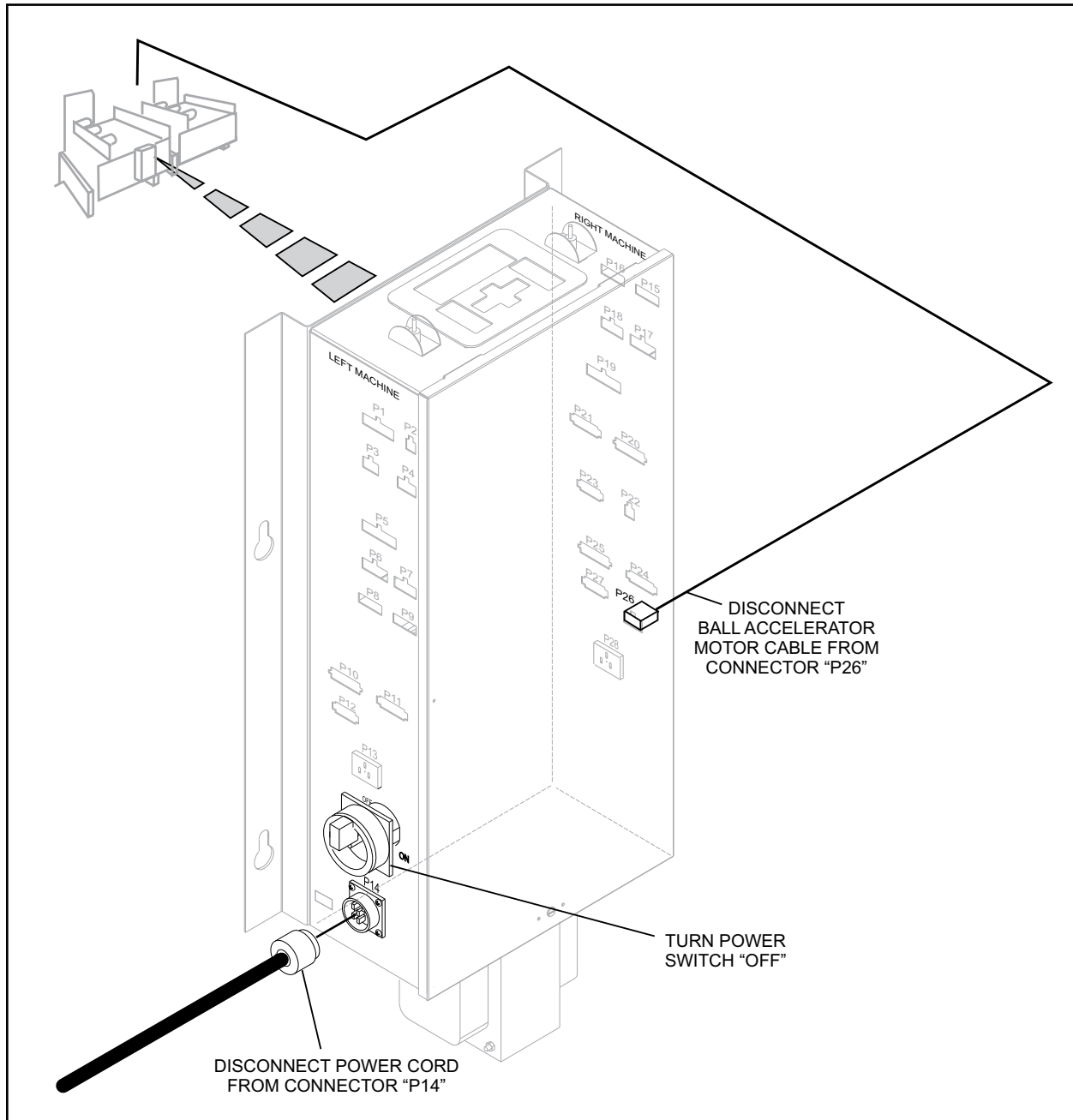


Figure 3. Turn Off Power and Disconnect Power Cables

4. Remove the ball accelerator cable from machine by removing it from the wire channel and feeding it back to the ball accelerator.

5. Remove the ball accelerator assembly.

- a. Label the left and right ball door solenoids connectors (BD) and the motor overload connector (AS) for reference during reinstallation. Disconnect the solenoid and overload cables from the accelerator.
- b. Remove the 4 screws that secure the rear U-bracket to the ball box. Retain mounting hardware for re-installation in step 24c.

**i** *HINT: Remove the pinfeed deflector and bracket as needed to gain access to the mounting screws.*

- c. Slide the accelerator out of the machine by pulling rearward on the accelerator.

**i** *NOTE: The accelerator will drop downward once the front U-bracket is pulled away from the ball box locator pins and support bracket. Make sure not to damage the ball door, locking bolt assemblies or any hardware attached to the ball box when removing the accelerator.*

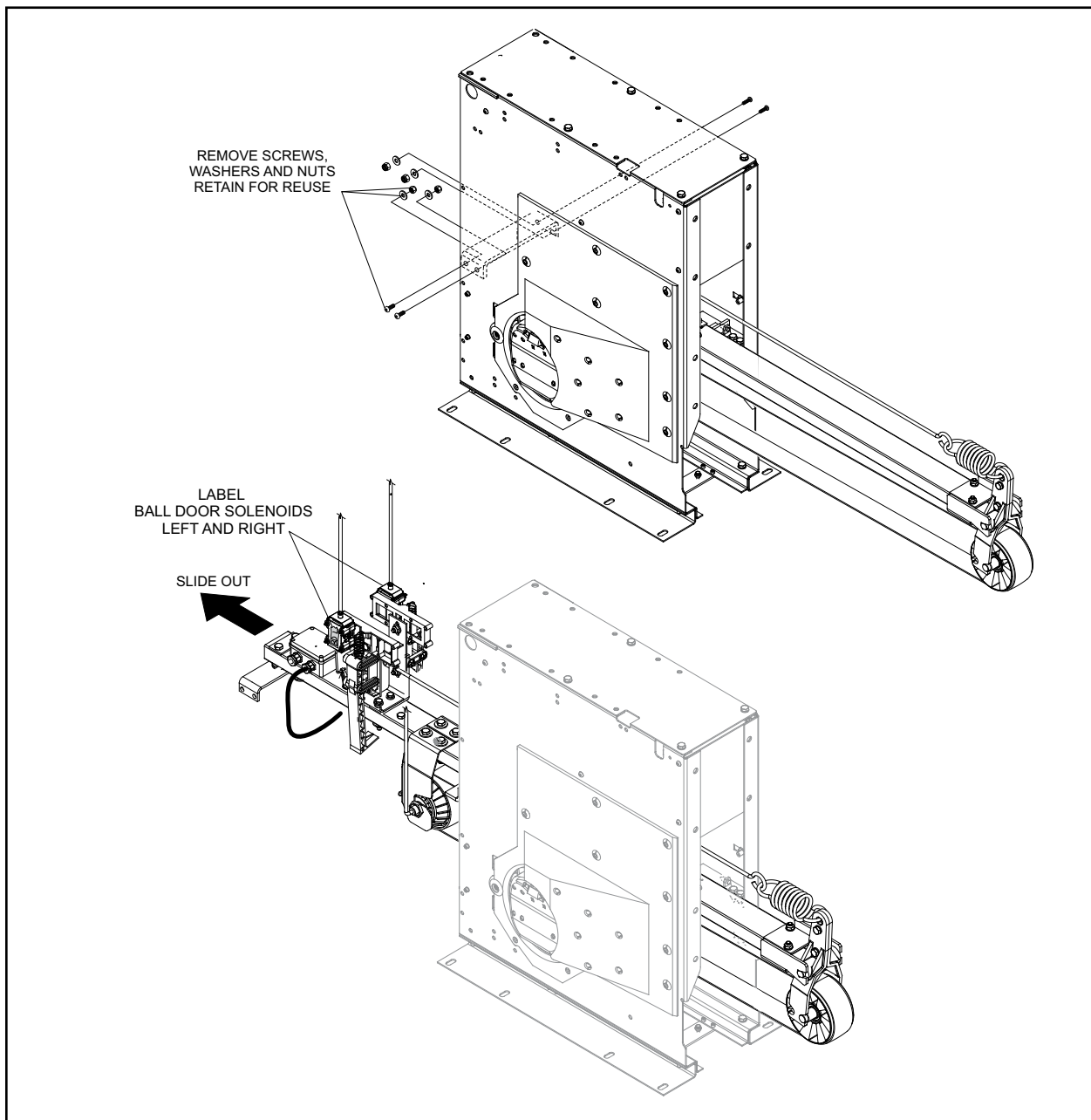
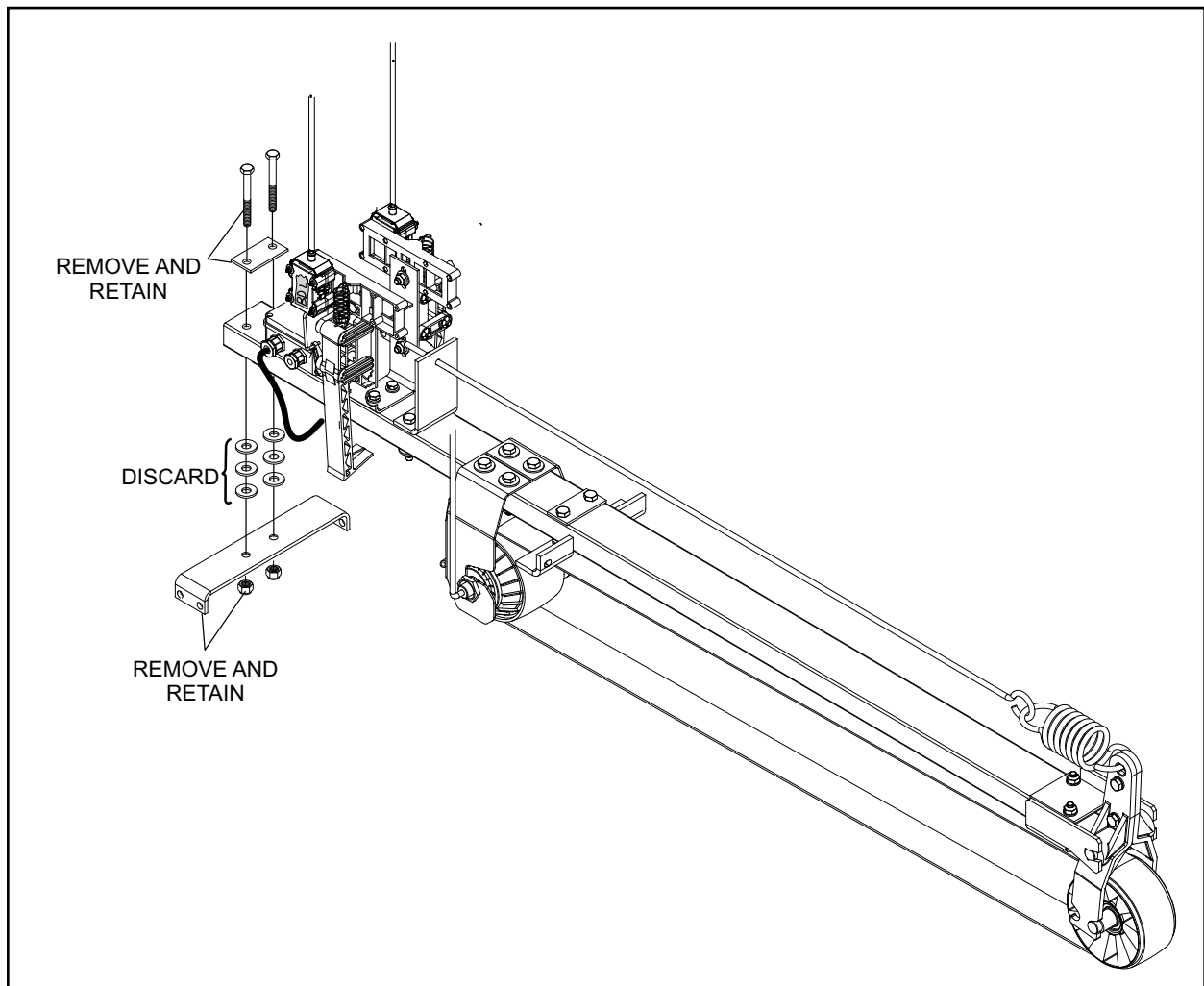


Figure 4. Ball Accelerator Removal

## Disassemble Ball Accelerator

6. Remove the two screws that secure the rear mounting bracket to the accelerator frame. Retain the rear mounting bracket, nuts and screw for re-installation. The six spacer washers, if previously installed, can be discarded.



*Figure 5. Remove Rear Mounting Bracket*

7. Remove the two screws securing the locking bolt bracket and assembly to the accelerator frame. Retain the locking bolt assembly and mounting hardware for re-installation.

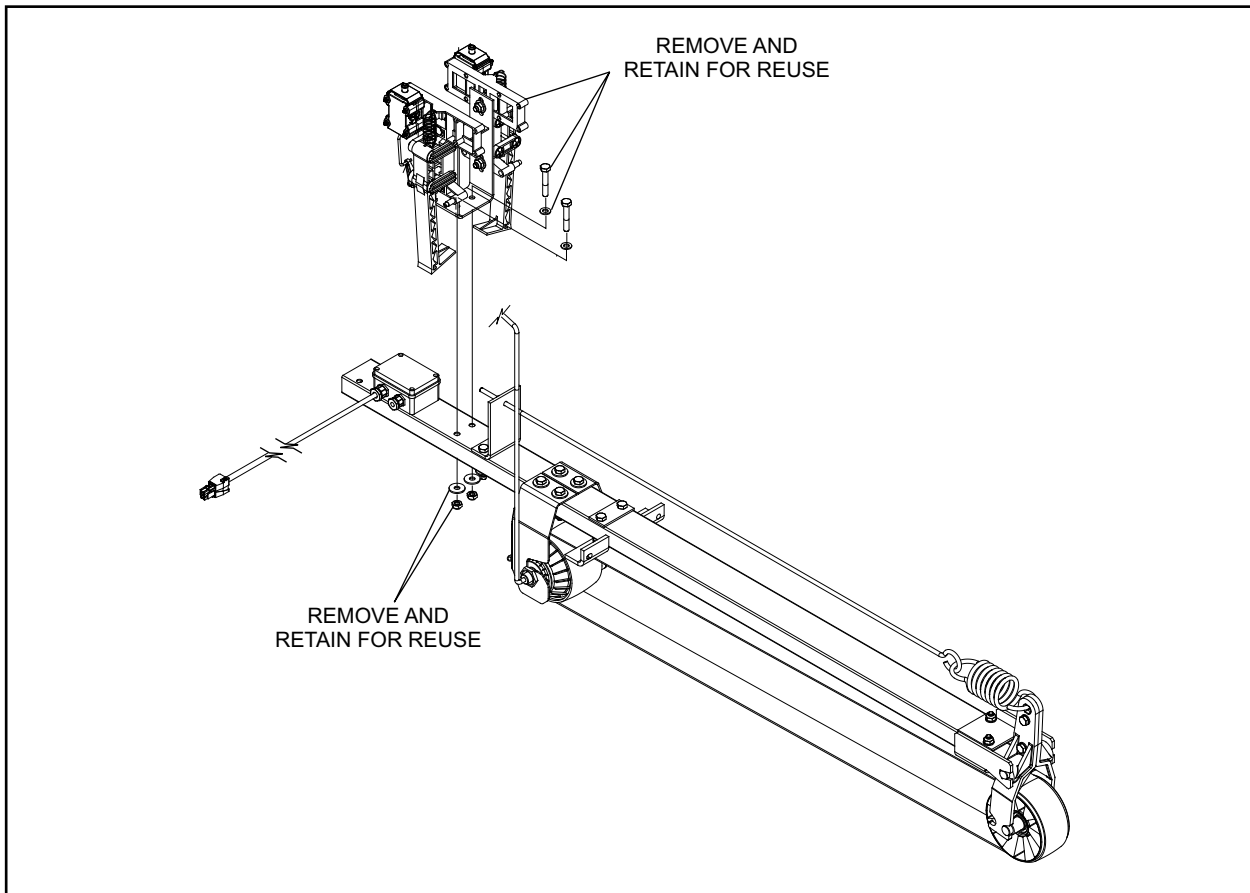


Figure 6. Remove Locking Bolt Assembly

8. Remove the tensioning rod and spring. Retain spring and tension rod adjustment nuts for re-installation.

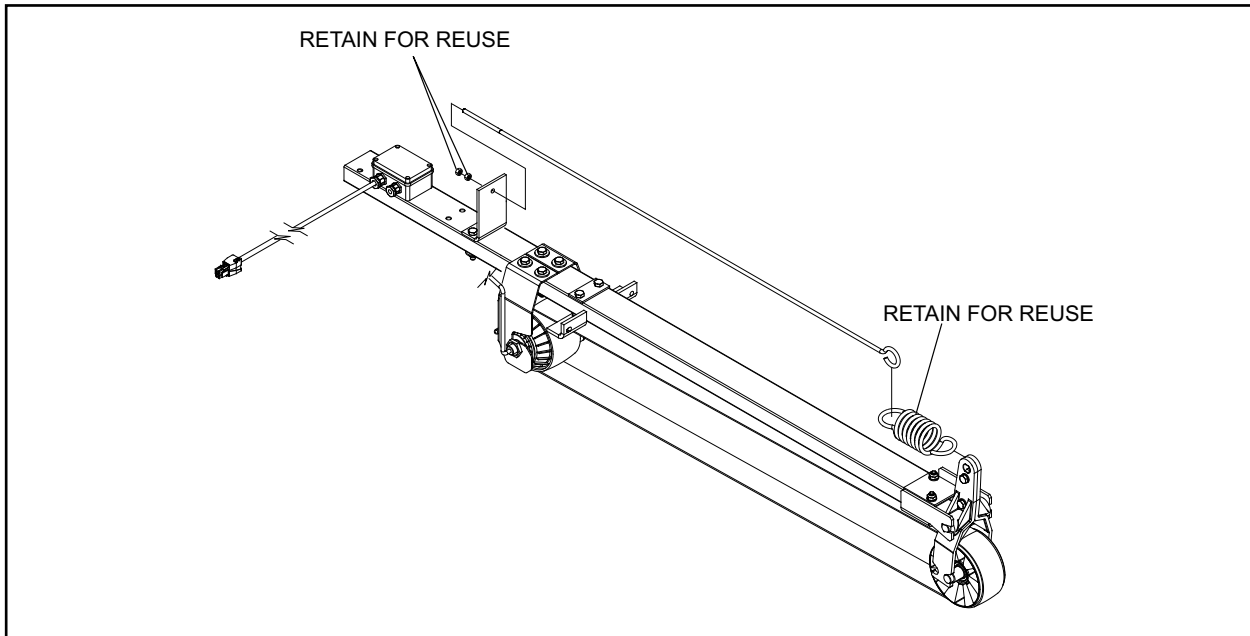


Figure 7. Remove Tension Rod

9. Remove the two screws that secure the tension rod support bracket to the accelerator frame. Retain the bracket for re-installation in step 13.

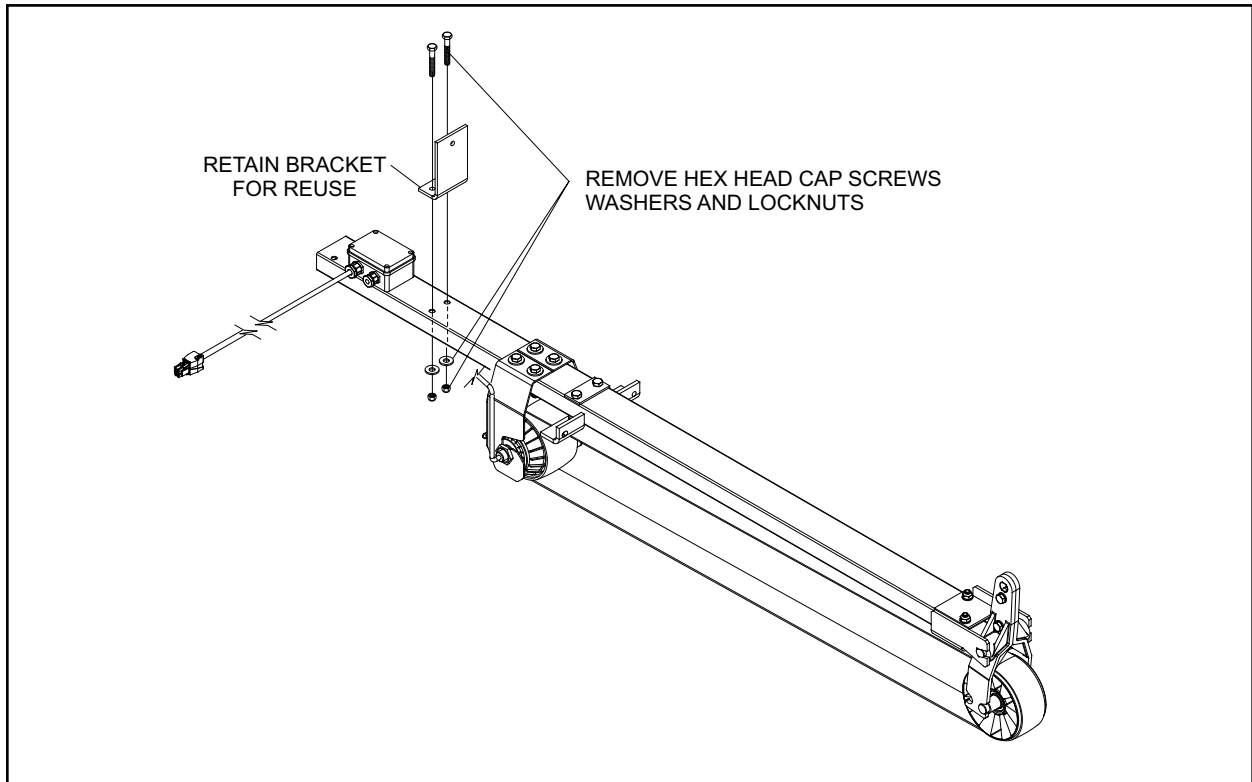


Figure 8. Remove Tension Rod Support Bracket

10. Remove the motor and terminal box.
  - a. Cut any wire ties that secure the motor wiring to the accelerator frame
  - b. Remove the cover from accelerator motor terminal box and the two screws that secure the junction box to the accelerator frame.
  - c. Loosen the two 28 mm nuts that secure the motor to its bracket.
  - d. Remove the motor from its support bracket.

**i** **NOTE:** The motor and associated cabling will not be reused. These parts can be retained as spare parts for other lanes or discarded as desired.

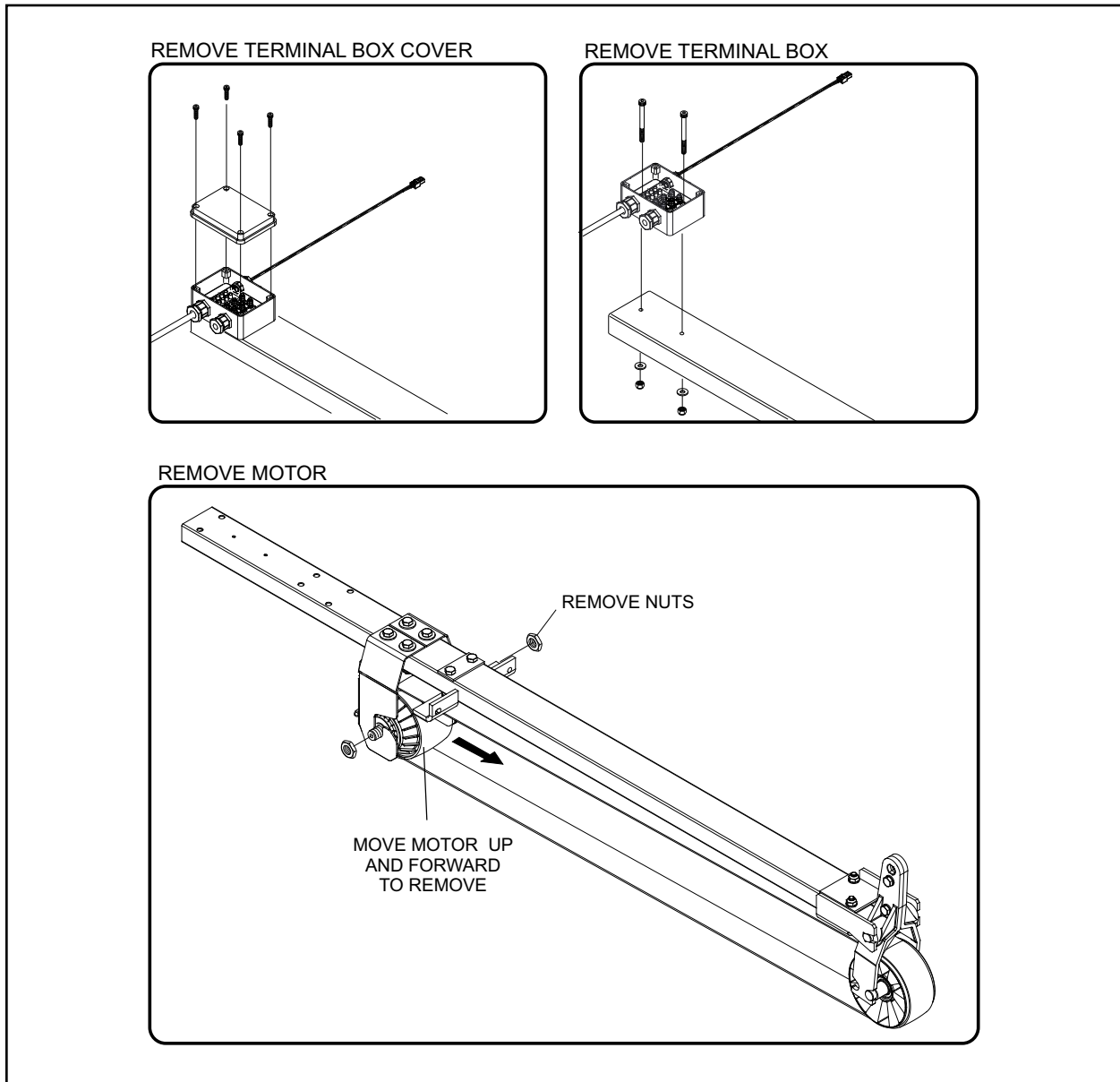


Figure 9. Remove Motor and Terminal Block



11. Remove the four screws that secure the motor support bracket to the accelerator frame. Slide the support bracket off of the accelerator frame. The bracket and mounting hardware will not be re-used.

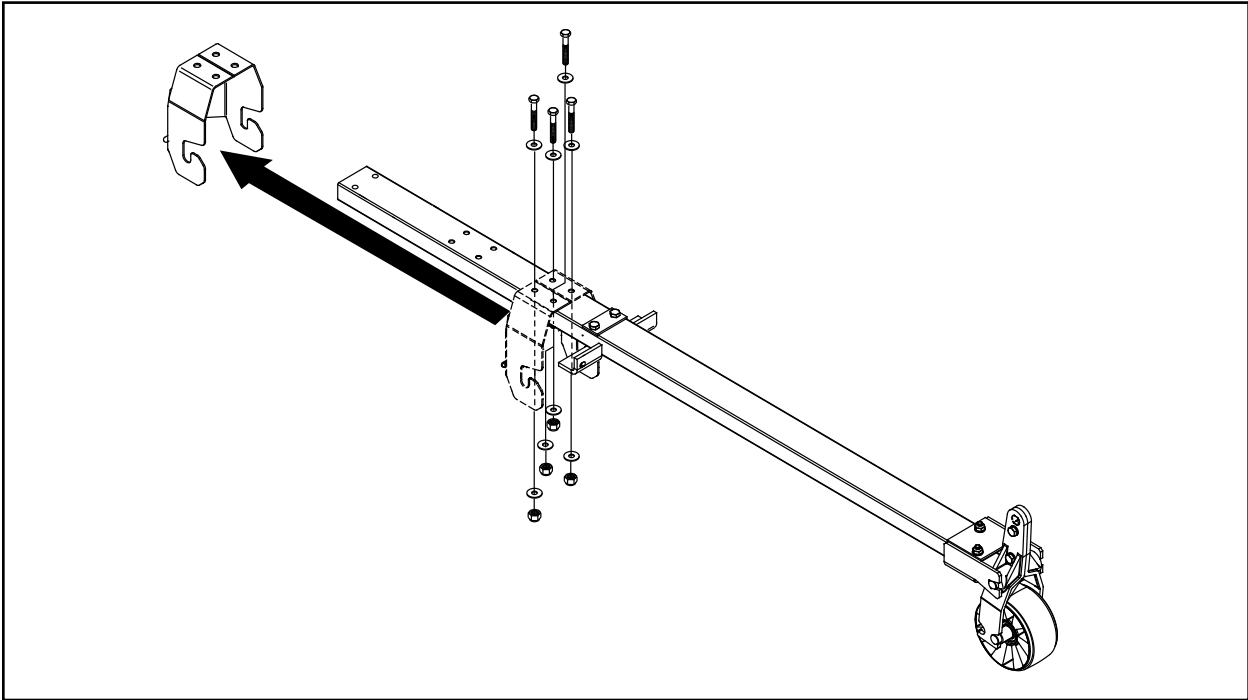


Figure 10. Remove Motor Support Bracket

12. Remove the two screws that secure the front locating bracket to the accelerator frame. Retain the bracket and mounting hardware. The six spacer washers, if previously installed, and the top spacer plate will not be reused and can be discarded.

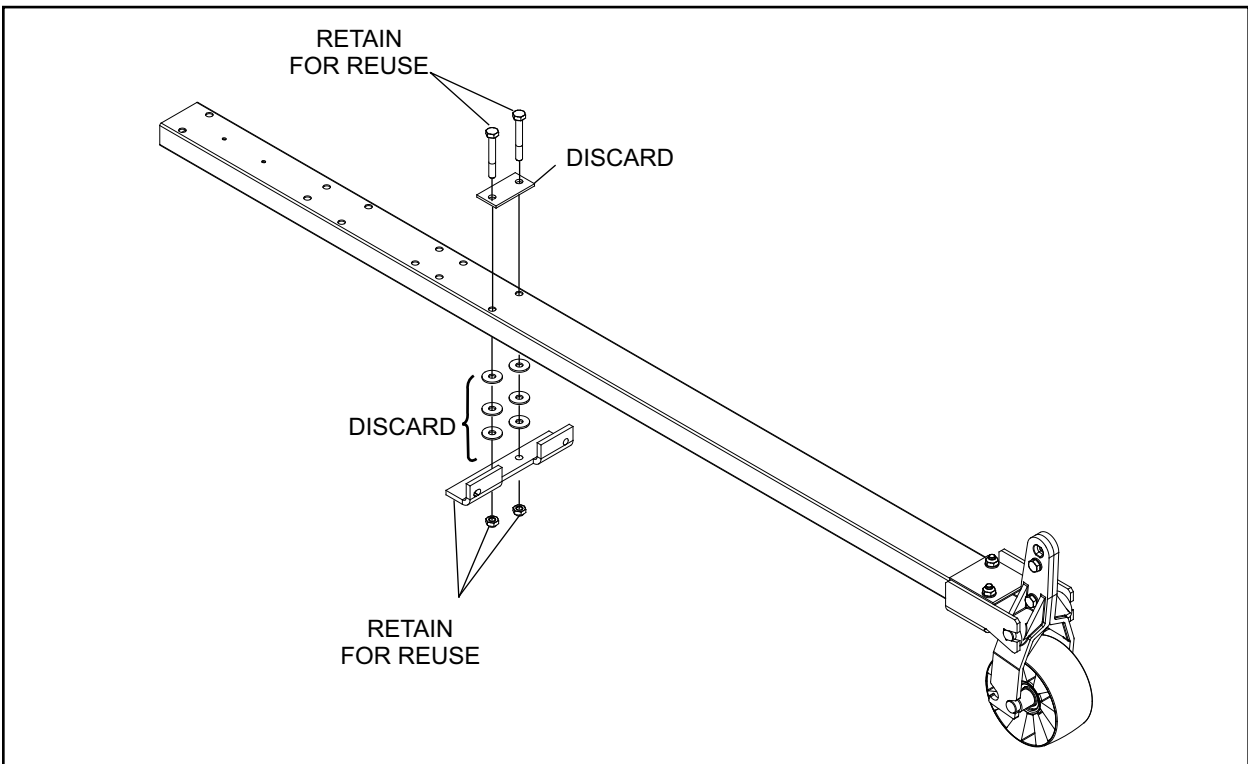


Figure 11. Remove Front Locating Bracket

## Ball Accelerator Re-Assembly

- Using the mounting hardware from step 12, reinstall the front locating bracket (from step 12) and the tension rod support bracket (*step 9*) in the original location of the locating bracket. Refer to *Figure 12*.

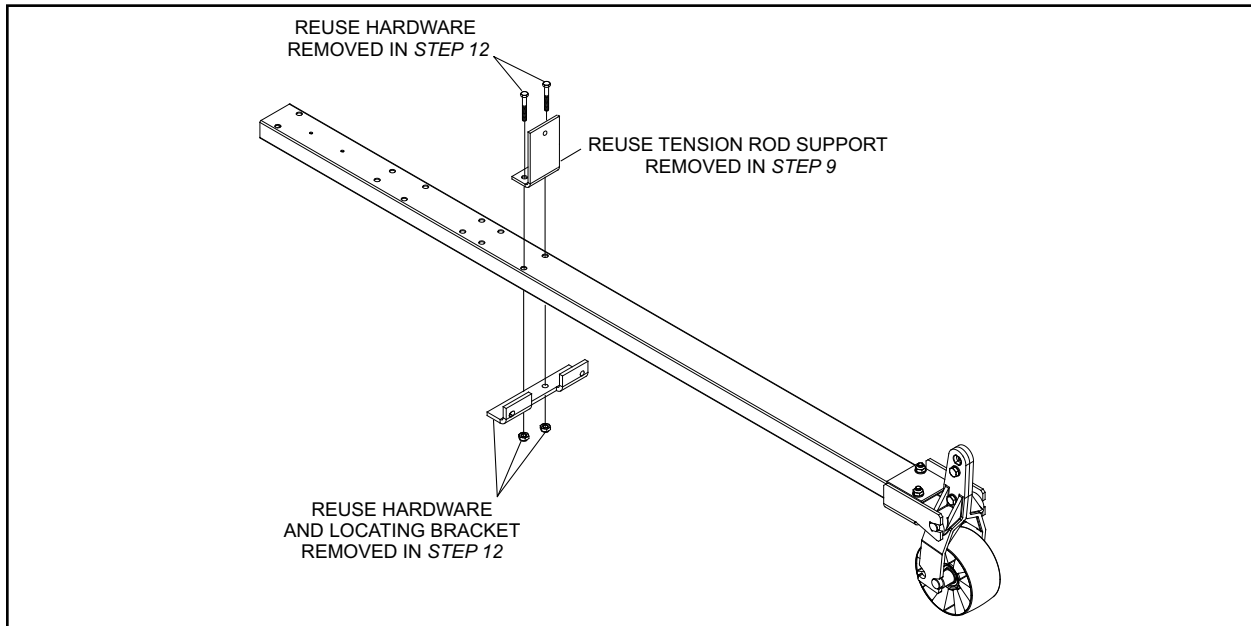


Figure 12. Install Front Locating Bracket and Tension Rod Support Bracket

**i** **NOTE:** The Belt Drive Assembly, P/N 47-036696-009 comes factory assembled. Prior to performing steps 14 - 19, disassemble the Upper and Lower Motor Mounting Plates from the Drum Support Bracket. Retain the mounting hardware for use in steps 14-19.

- Slide the new drum support bracket assembly onto the accelerator frame. Secure the bracket assembly and Lower Motor Mounting Plate to the accelerator using the four new hex head cap screws, washers, and locknuts retained during the disassembly of the Belt Drive Assembly. Refer to *Figure 12*.

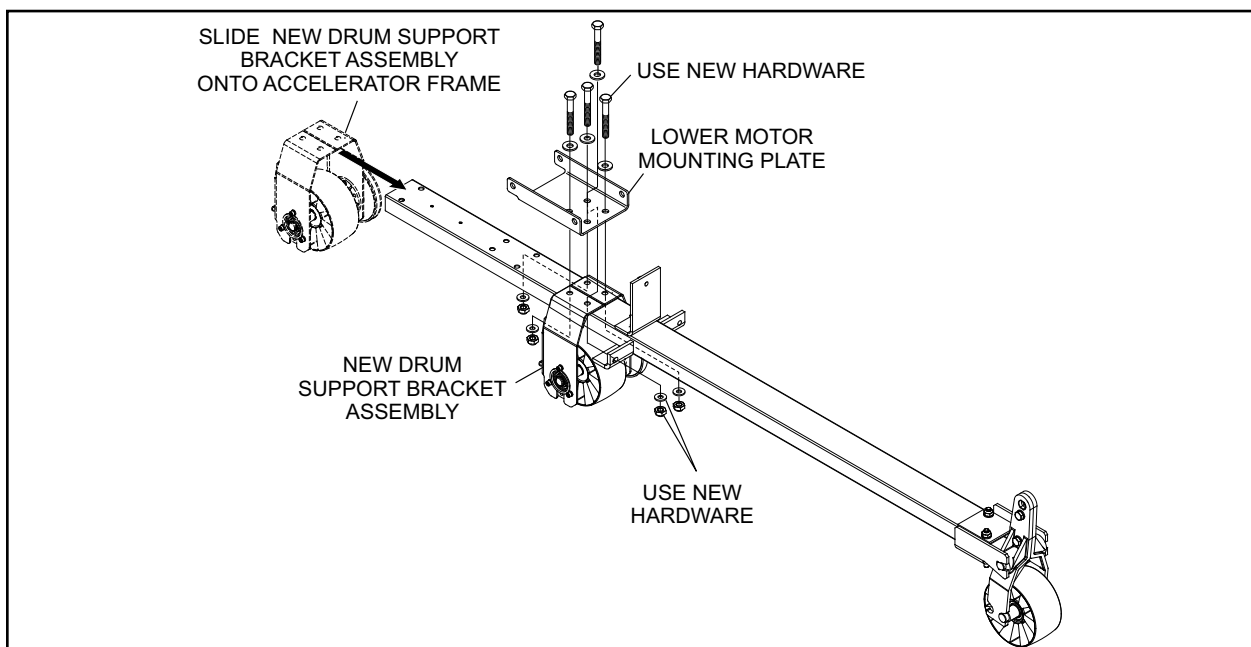


Figure 13. Install New Drum Support Bracket and Motor Lower Mounting Plate

15. Remove 3 screws for bearing retainer (non-pulley side) from the new motor support bracket assembly.
16. Slide rear drum and shaft away from the drum support bracket and install the ball accelerator belt around the drum. Reinstall bearing retainer and secure it with the 3 screws.

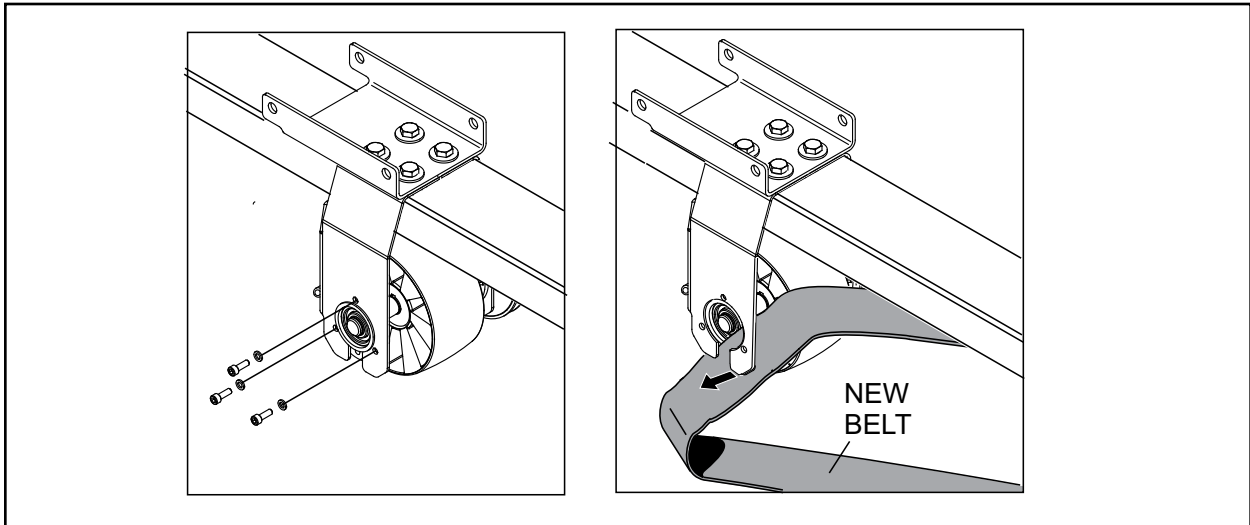


Figure 14. Install Flat Accelerator Belt onto New Drive Drum

17. Install front spring and new tension rod. Make sure the front drum and pivot lever are position securely to the front accelerator frame and accelerator belt is aligned on the middle of both drive drums. Adjust the tension rod so that the string length measures 185 mm.

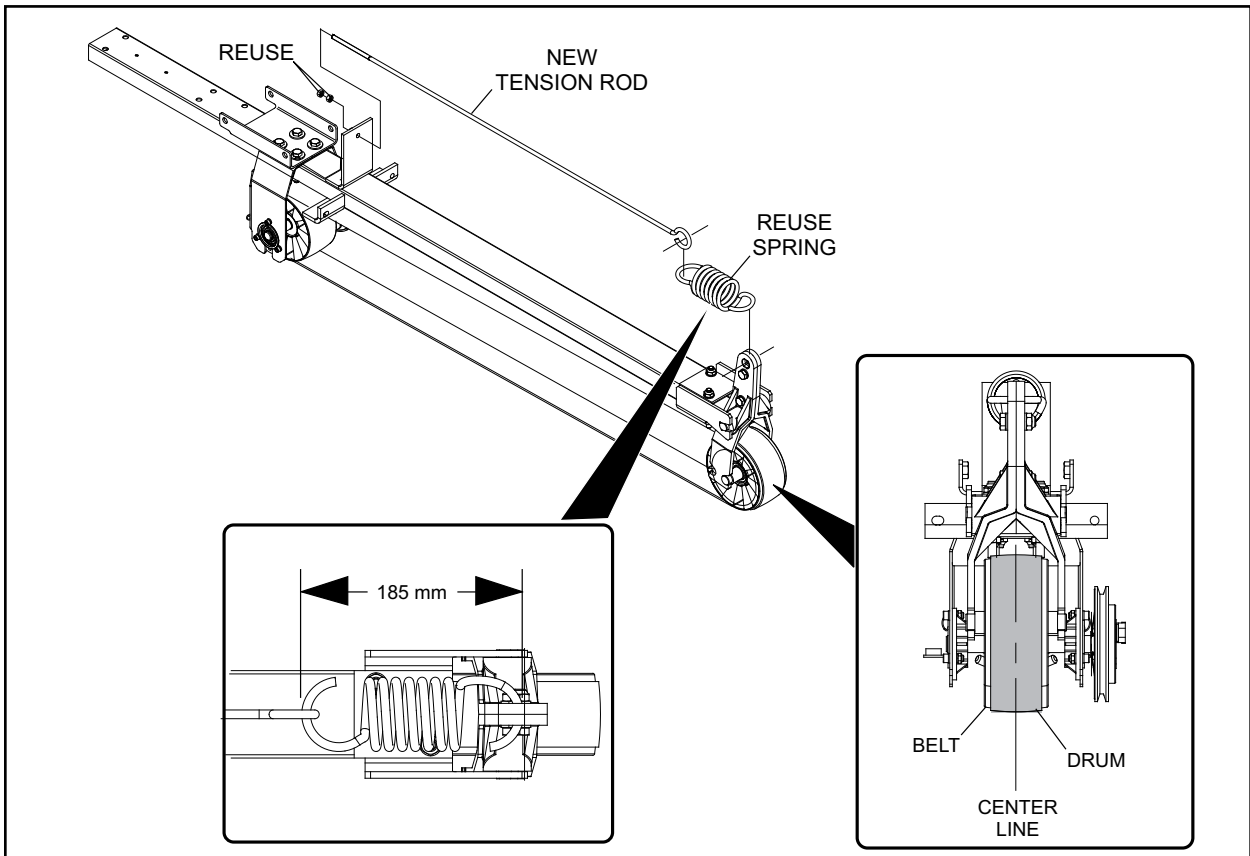


Figure 15. Install Tension Rod and Spring

18. Secure the new accelerator motor to the Upper Mounting Plate using four hex head nut, washers, and locknuts retained during the disassembly of the Belt Drive Assembly.
19. Attach the Upper Mounting Plate and Motor assembly to the Lower Mounting Plate using four hex head screws, washers, lock washers and locknuts retained during the disassembly of the Belt Drive Assembly.

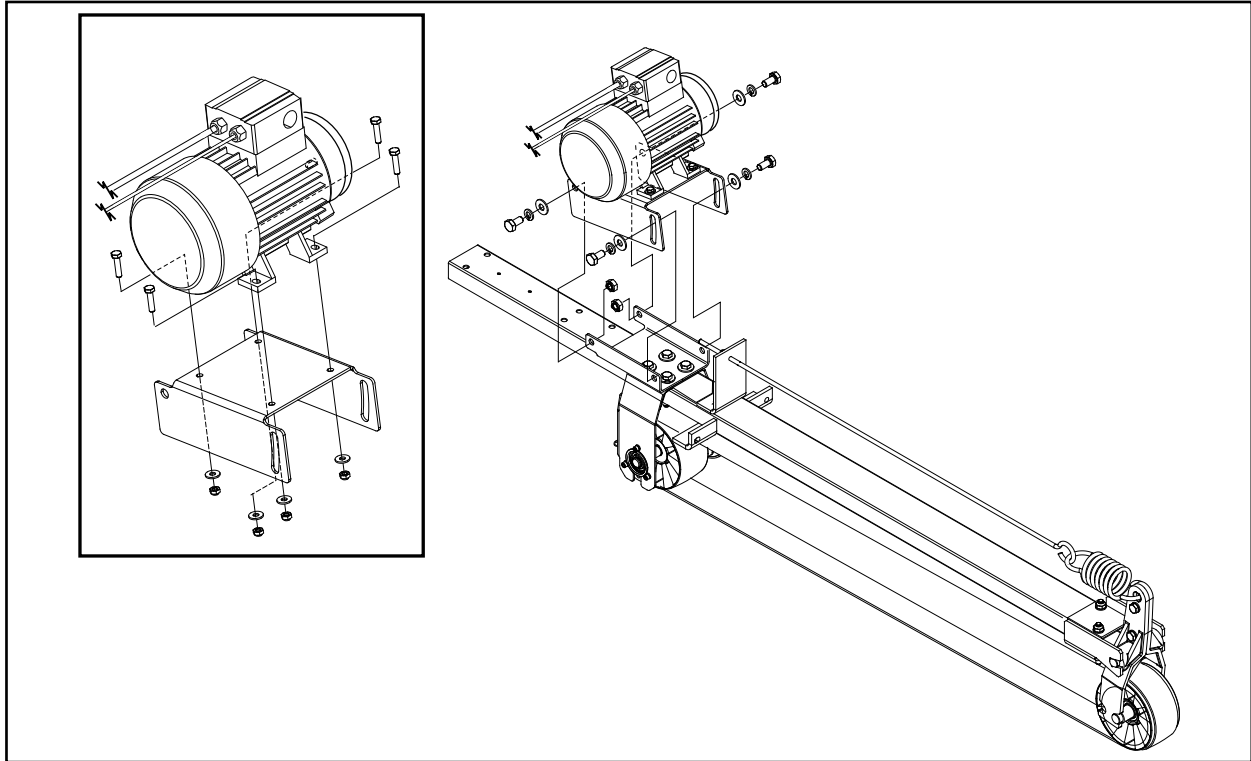


Figure 16. Install Motor and Upper Mounting Plate

20. Verify the V-belt drive pulley on the motor shaft is positioned so that its groove is aligned with the groove on the pulley for the drive drum. Adjust the pulley, as needed, and tighten the set screw on the pulley to secure it to the motor shaft.
21. Install the Drive Belt (V-belt) on the pulleys. Tension the belt by pivoting the Upper Motor Mounting Plate upward and tightening the two screws that secure the upper plate to the lower plate.

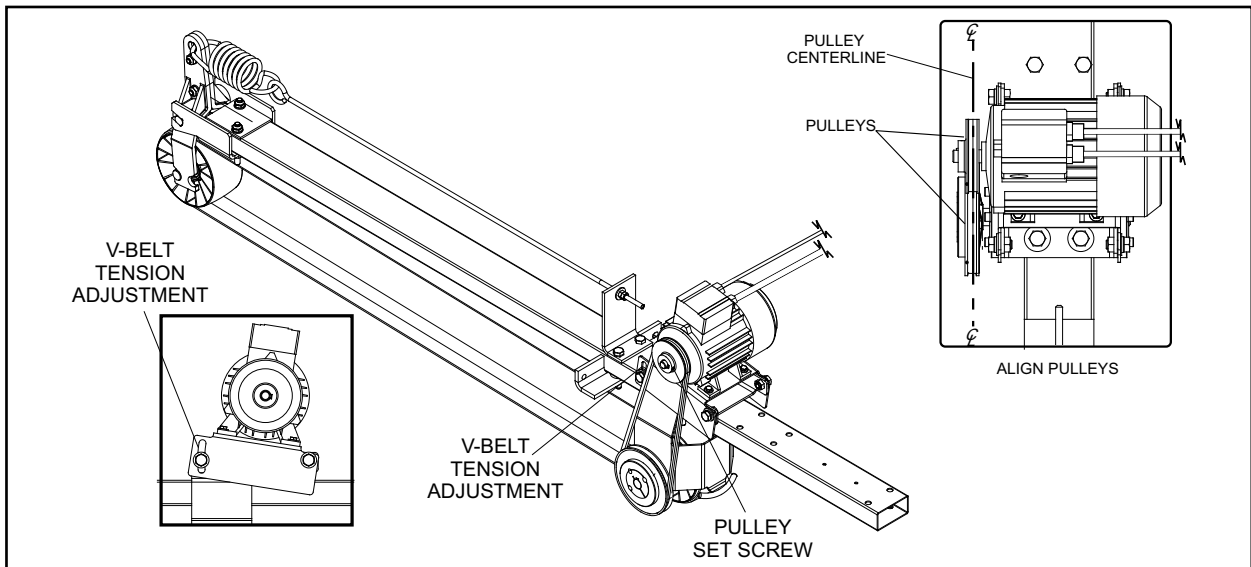
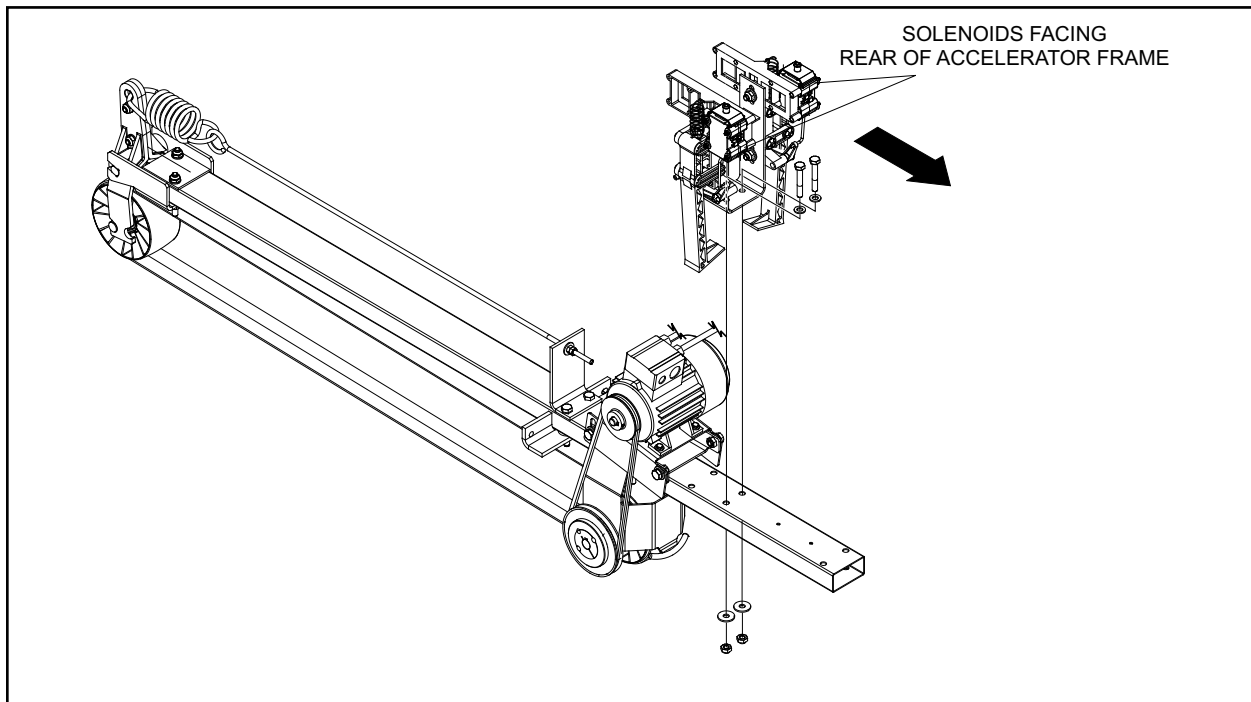


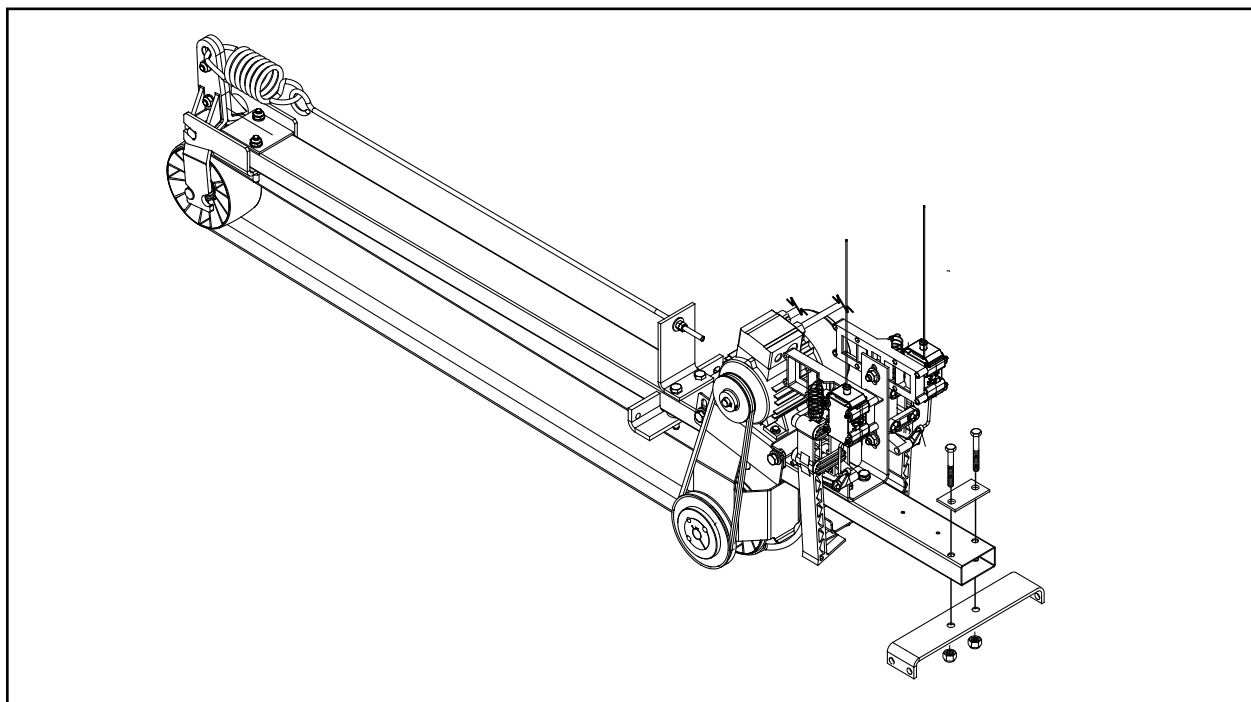
Figure 17. Align Drive Pulleys and Install V-Belt

22. Reinstall the Locking Bolt Assembly removed in *step 7*. Make sure that the solenoids on the assembly are facing toward the rear of the accelerator frame.



*Figure 18. Install Locking Bolt Assembly and Rear Mounting Bracket*

23. Reinstall the rear mounting bracket removed in *step 6*. Do not reinstall the spacer washers if they were present during disassembly.



*Figure 19 Install Locking Bolt Assembly and Rear Mounting Bracket*

24. Remove the motor terminal block cover to verify it is wired for proper voltage input, IE 208, 230, 380. Refer to *Figure 18*. Re-install cover when complete.

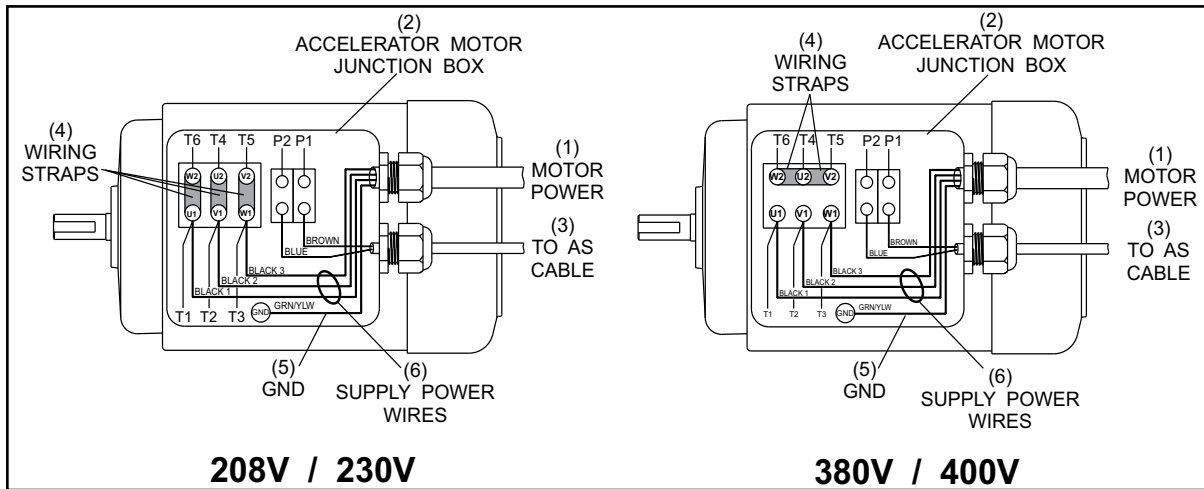


Figure 20. Accelerator Motor Wiring.

## Install Ball Accelerator In Machine

- 24 Reinstall the ball accelerator into the ball box.
- Lift the accelerator into position between the kickbacks being careful not to damage the ball door assemblies or the red colored E-Jot fasteners located on the ball box.
  - Slide the accelerator forward towards the foul line so that the locator pins on the ball box front support bracket are fully inserted in the holes in the accelerator's front locator bracket and the mounting holes in the rear bracket and ball box are aligned.
  - Secure the accelerator rear U-bracket to the ball box using the hardware from step 5b.
25. Inspect the clearance between the ball accelerator drive pulleys and the adjacent red colored E-Jot fastener nut. If the clearance between the two components is less than 13mm (1/2"), remove the Torx screw and E-Jot fastener from the ball box.

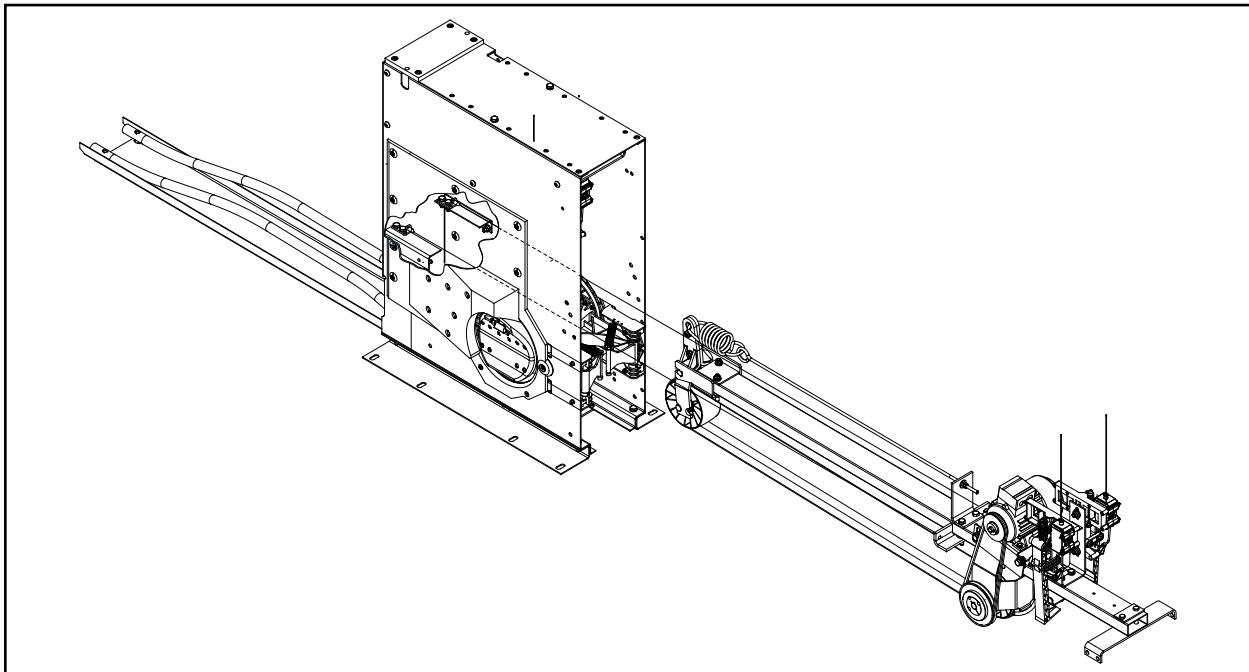


Figure 21. Remove Torx Screw and E-Jot Nut As Needed

26. Connected the ball door solenoid and motor overload cables.
  - a. Attach the left and right ball door solenoids connectors (BD) to the appropriate solenoids on the locking bolt assembly.
  - b. Attach the motor overload cable (AS) to the 2 conductor connector of the accelerator motor.

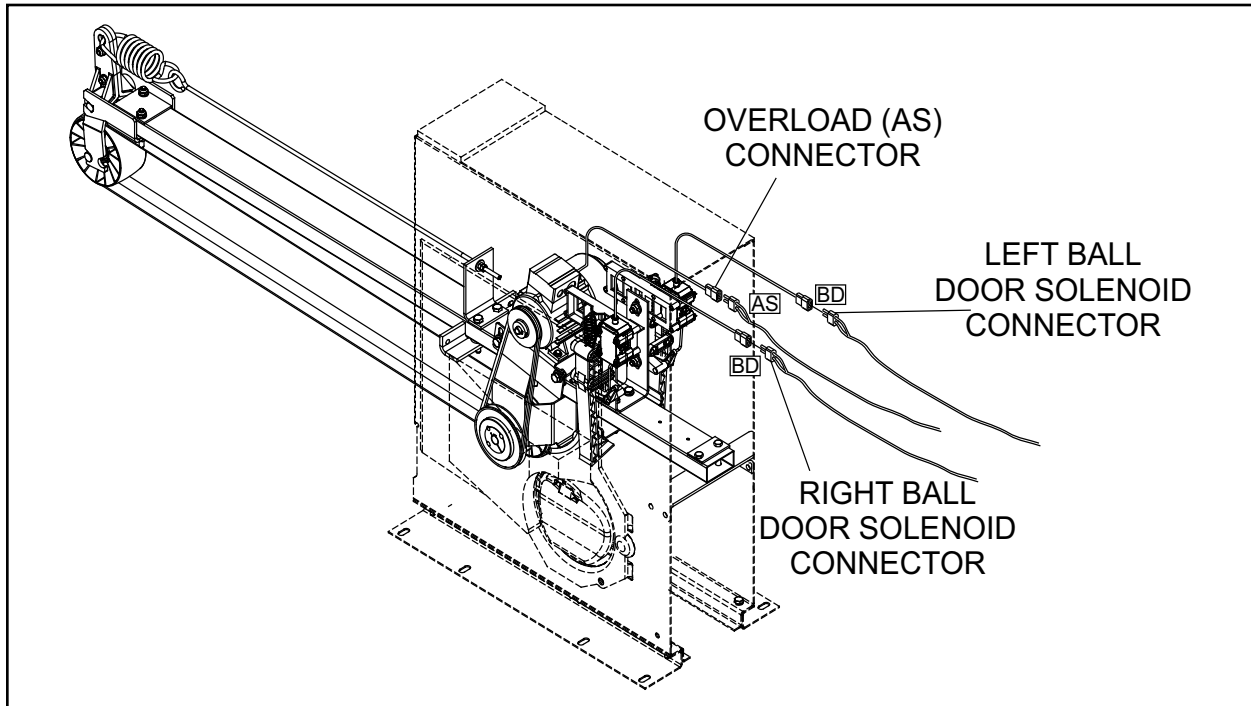


Figure 22. Connect Ball Door Locking Solenoid and Motor Overload Cables

27. Install the new the ball accelerator power cable, P/N 47-147185-000.
  - a. Connect the power cable to P26, “Ball Accel Power” connector on the Nexgen box.
  - b. Route the cable through the pinsetter’s wire channel to the ball accelerator motor.
  - c. Connect the power cable to the external power cable on the accelerator motor.

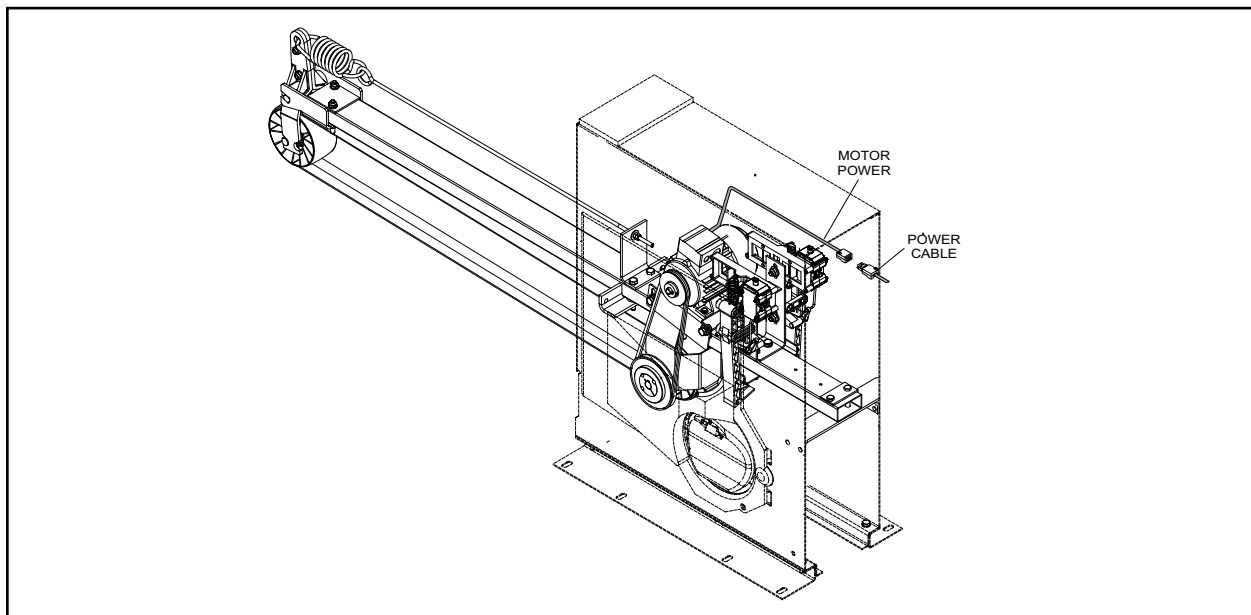


Figure 23. Route and Connect Ball Accelerator Power Cable

28. Reapply power to the Nexgen.
29. Using the Motor Mode of the Nexgen screen, verify the ball accelerator motor and flat belt turn with the proper rotation. If the motor and belt are running backward, swap any two of the three supply power wires at the motor terminal block. This will reverse the direction of the motor shaft.



**WARNING: Never swap the ground (earth) wire with one of the supply wires.**

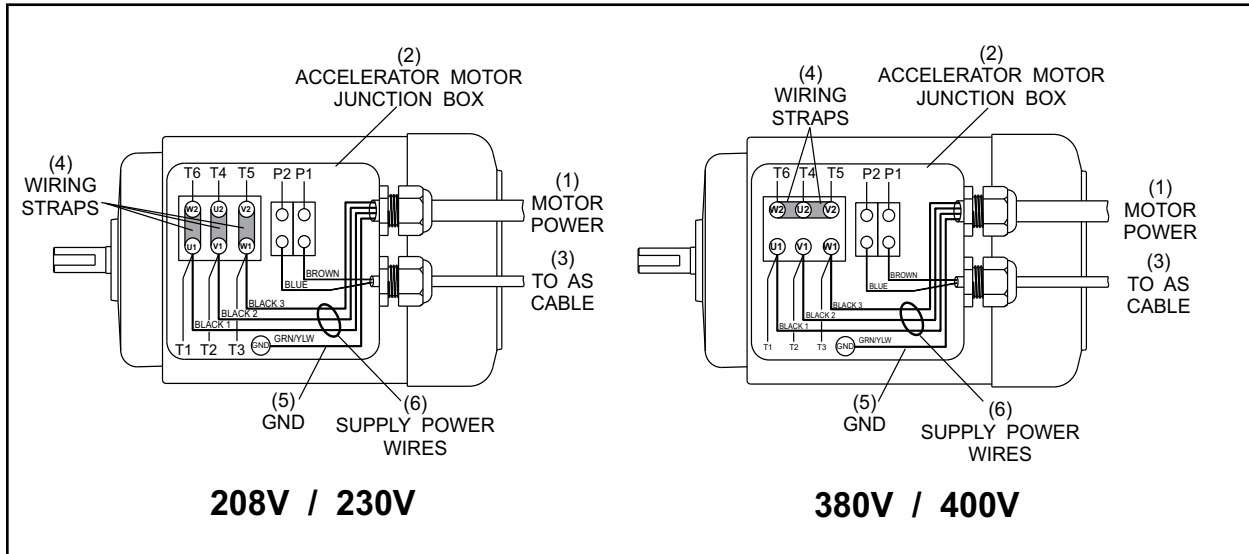


Figure 24. Accelerator Motor Wiring.

30. Reinstall and adjust the pinfeed defectors if previously removed.
31. Bowl on the lane pair to verify balls return properly to the bowler.
32. Finalize the installation by using the supplied wire ties to secure the accelerator cables, as needed, to prevent cable damage.