INSTRUCTION TO SERVICE

ITS-60410	DATE 03/10/2022
SECTION:	246- AIR, BRAKE & LEVELLING SYSTEM
WRITTEN BY:	Michael Rooney
SUBJECT:	Replacing dust covers & sealing Smart Rider height sensor to vehicle harness connectors with shrink tube. 60’ Bus w/ front, center & rear axle Smart Rider.
ISSUE:	Dust covers may leak water into height sensor cavity. Connector terminals can corrode due to moisture intrusion.
SUMMARY:	Replace suspect dust covers and height sensors. Apply heat shrink to harness connectors to prevent moisture intrusion.

ITS-60410

Ref. NHTSA Recall No.	Ref. Transport Canada Recall No.
Not Applicable	Not Applicable

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PROCEDURE:

1. Turn the main battery disconnect switch to the “OFF” position.
2. Drain the air from the air system.
3. Raise coach in accordance with the New Flyer Service Manual and install appropriate jack stands to support the vehicle.

FRONT SUSPENSION

4. Use wheel lifts on the front suspension to lift the front suspension slightly to support the weight of the front axle and suspension components.

⚠ **Caution: ALWAYS support the weight of the axle when replacing shock absorbers.**

5. Disconnect the electrical connector that attaches the shock absorber height sensor to the vehicle harness.
   a. Remove clamps used to attach the harness to the under body and set them aside.

      Note: If the harness is bundled and tyrapped around the shock dust cover, the harness must be rerouted when the shock absorber unit is reinstalled.
6. Remove the four nuts retaining the upper shock mounting plate to the chassis bracket.
7. Remove the protective cap from the lower shock mounting nut and remove the nut.

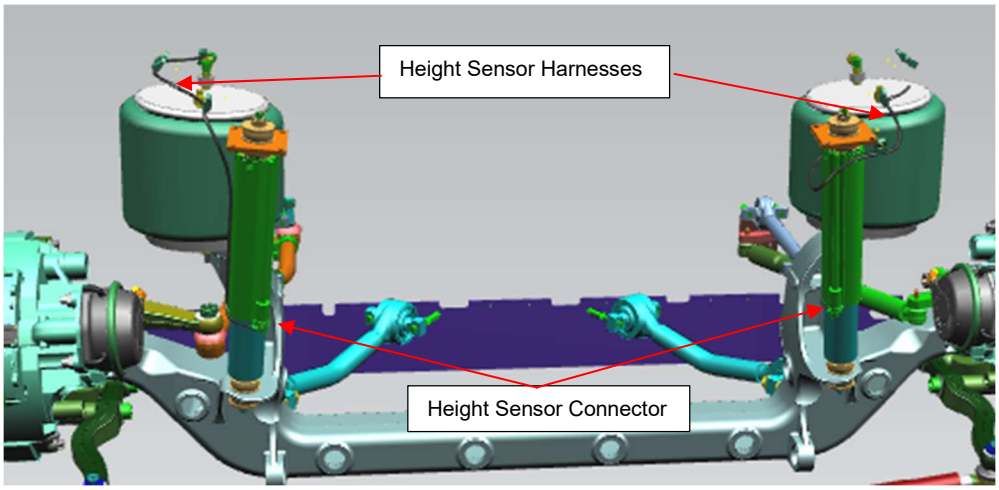

Figure 1: Front Shock Absorbers (Looking towards the front of the vehicle).

8. Remove the clamping plate, rubber bushing and centering ring from the shock stud noting the location and orientation of the parts.
9. Compress the lower shock sufficiently to remove the shock stud from the lower mounting bracket. Remove the remaining rubber bushing from the shock stud.
10. Remove the shock absorber assembly from the vehicle and disassemble the upper mounting components as follows:

a. Remove the protective cap from the upper shock mounting nut and remove the nut.
b. Remove the clamping plate, rubber bushing and centering ring from the shock stud noting the location and orientation of the parts.
c. Remove the mounting plate, rubber bushing and steel sleeve from the shock stud.

11. Take the shock assembly to the work bench and secure the unit in a vice by the upper shock stud with the side of the dust cover containing the sensor channel facing upward.

☞ **NOTE: Use soft jaws in the vice to protect the threads on the upper shock stud from damage.**

12. Using a rubber mallet, apply a sharp blow to the upper end of the dust cover at the square open end of the channel in the dust cover. The dust cover should pop loose from the shock absorber.

Figure 2: Rubber Mallet Use To Release Dust Cover

13. Slide the dust cover and sensor harness off the shock absorber body and set aside.
14. Install a new dust cover/sensor/harness assembly NF P/N 6482203 over the shock body.
    a. Align the square section channel with the magnet on the outside of the shock body and slide the dust cover over the shock body. Center the opening in the top of the dust cover with the grey circular retaining ring below the bushing on the shock stud.

Figure 3: Install Dust Cover & Center Over Grey Retaining Ring.

    b. Using a rubber mallet, apply a sharp blow to the bottom of the dust cover to seat the cover on the grey circular retaining ring. Take care not to hit the height sensor connector.

Figure 4: Using Rubber Mallet To Seat Dust Cover on Retaining Ring.

15. Install the dirt exclusion cover at the top of the dust cover.

Figure 5: Dirt Exclusion Cover.

16. Assemble the upper shock mounting components as follows:
    a. Slide the steel sleeve and rubber bushing onto the shock stud. Ensure that the flat side of the rubber bushing seats against the shock body.
    b. Place the mounting plate onto the rubber bushing ensuring that the mounting plate seats on the pilot diameter of the rubber bushing.
17. Assemble the remaining upper shock mounting components as follows:
    a. Slide the centering ring and rubber bushing onto the shock stud ensuring that the pilot diameter of the rubber bushing seats within the concave side of the centering ring.
    b. Install the clamping plate onto the rubber bushing ensuring that the concave side of the clamping plate seats against the flat side of the rubber bushing.
    c. Install the M16 self-locking nut and torque to 56 Ft lbs using NEVER SEEZ NF P/N 5928660.
    d. Install the protective cap over the lock nut.
18. Align the four holes in the upper shock mount plate with the studs on the chassis mounting bracket.
19. Install four lock nuts NF P/N 203772 and torque the lock nuts to 35 Ft lbs using NEVER SEEZ NF P/N 5928660.
20. Assemble the remaining lower shock mounting components as follows:
    a. Slide the rubber bushing onto the shock stud ensuring that the flat side of the rubber bushing seats against the shock body.
    b. Compress the shock sufficiently to allow the shock stud to enter the lower mounting bracket.

21. Assemble the remaining lower shock mounting components as follows:
    a. Slide the centering ring and rubber bushing onto the shock stud ensuring that the pilot diameter of the rubber bushing seats within the concave side of the centering ring.
    b. Install the clamping plate onto the rubber bushing ensuring that the concave side of the clamping plate seats against the flat side of the rubber bushing.
    c. Clock the dust cover height sensor cavity approx. 30 degrees off the center line of the bus to ensure that the upper mounting plate nuts are not aligned with the end of the height sensor cavity in order to create better clearance and prevent contact between the bolt and the cover.
    d. Install the M16 self-locking nut and torque to 56 Ft lbs using NEVER SEEZ NF P/N 5928660. Take care that the dust cover does not rotate out of position when torqueing the nut.
    e. Install protective cap over the lock nut.

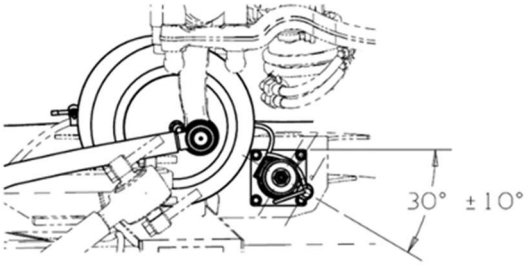

Figure 6A: Street Side Dust Cover Orientation.

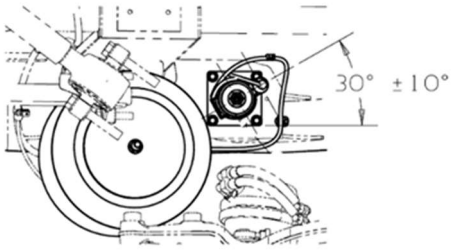

Figure 6B: Curb Side Dust Cover Orientation.

22. Locate the height sensor harness connector on the vehicle electrical harness.
    a) Inspect the terminals and barrels of the connector for corrosion.
    b) If the terminals are lightly corroded, they should be cleaned. If the terminals are heavily corroded the connectors should be replaced. On the vehicle side replacing the harness connector involves splicing a new connector/harness wire NF P/N 691560 into the vehicle harness.

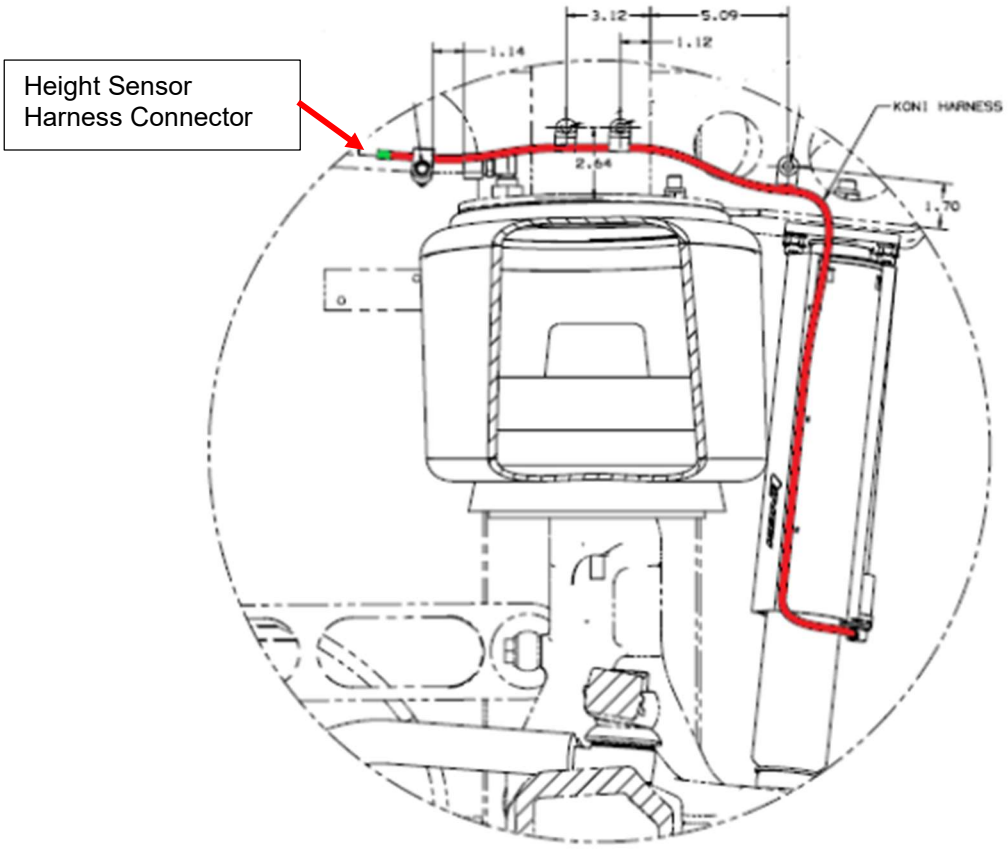

Figure 7: Front Suspension Harness Connector (Street side shown)

23. After ensuring the connector terminals are in good condition, the connector can be plugged into the dust cover harness connector and sealed with shrink tube. Figure 8.
    a) Slip a 2.5” length of shrink tube NF P/N 5940526 over one of the connector halves.
    b) Apply dielectric grease NF P/N 8111767 to the connector terminals.
    c) Join the two halves of the connector and secure the two halves of the connector using the threaded collar.
    d) Center the shrink tube over the electrical connector and carefully heat until tightly secured around the connector.
    e) Secure the heat tube at each end using two tyraps NF P/N 5962614.

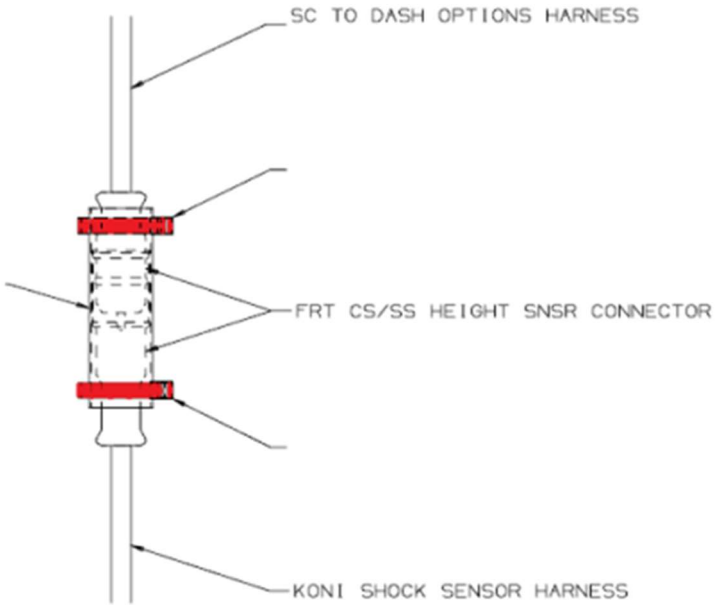

Figure 8: Connector with Shrink Tube & Tyraps.

24. Route and secure the height sensor harness.
    a. Route the shock sensor harness using the existing harness retaining clips. Bundle the remaining vehicle harness length and secure with tie wraps NF P/N 5955945.

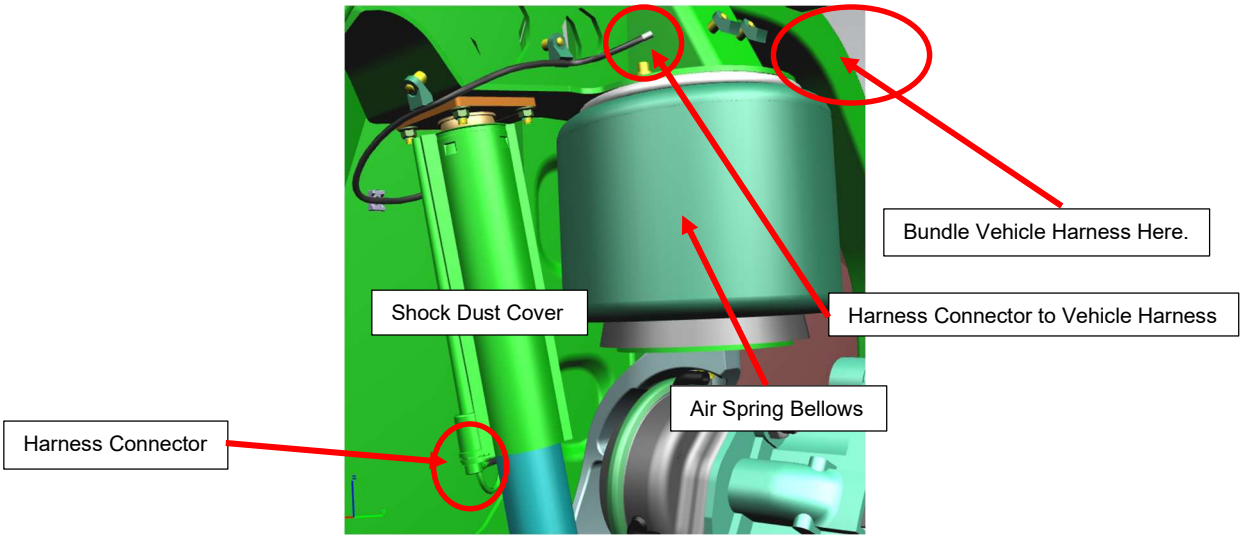

Figure 9: Curbside Shock Sensor Harness Routing.

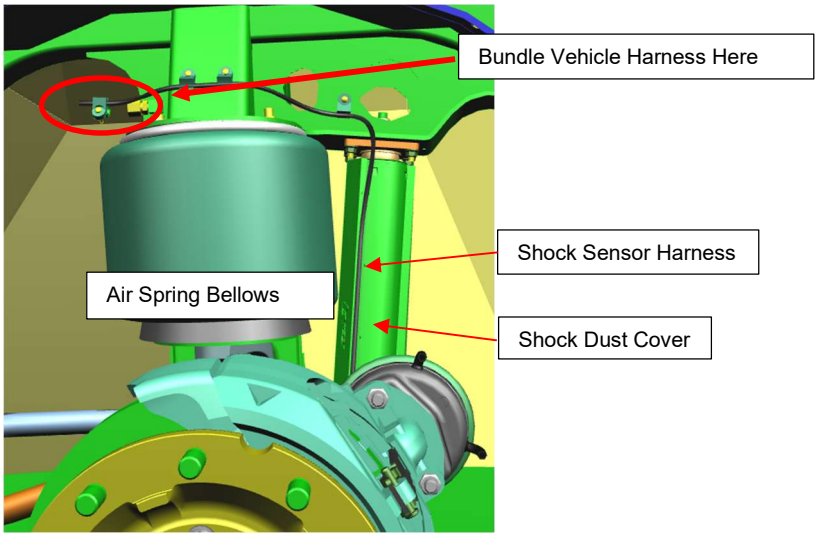

Figure 10: Curbside Shock Sensor Harness Routing.

REAR SUSPENSION

25. Use wheel lifts on the rear suspension to lift the rear suspension slightly to support the weight of the rear axle and suspension components.

⚠ **Caution: ALWAYS support the weight of the axle when replacing shock absorbers.**

26. Locate the height sensor harness wires on the rear set of shock absorbers and remove the hardware that secures the harness wires to the bus. Note the locations of each clip and set them aside for reuse later. Disconnect each of the harnesses at the connectors where they attach to the main vehicle harness.
27. Remove the four nuts retaining the upper shock mounting plate to the chassis bracket on each side. Set the hardware aside for reuse.

Note: The two inboard mounting bolts that retain the air-line support bracket are slightly longer to accommodate the thickness of the bracket. Note the location of these bolts for reassembly.

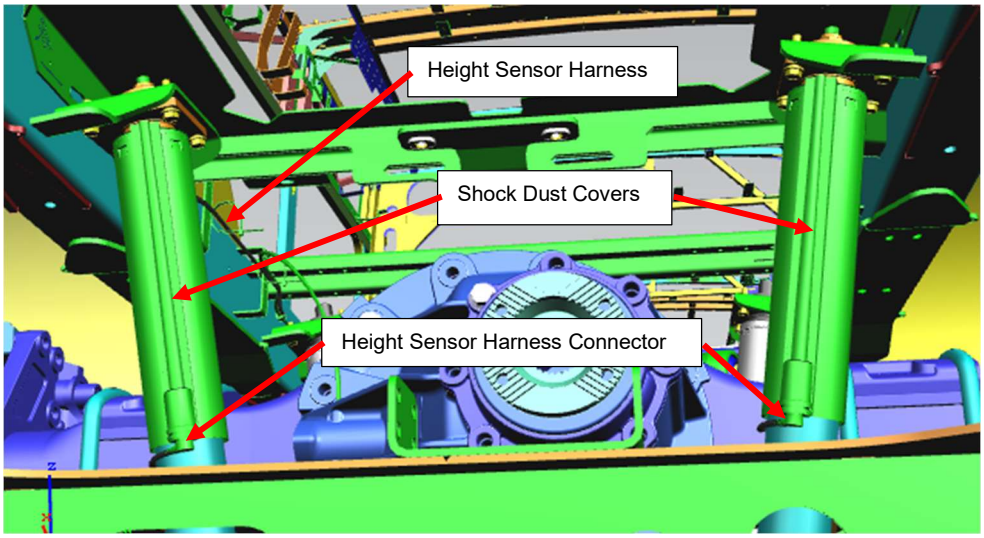

Figure 11: Rear Shock absorbers upper hardware (drive shaft removed for clarity).

28. Remove the protective caps from the lower shock mounting nuts and remove the nuts.
29. Remove the rubber bushings from the shock studs, noting the location and orientation of the parts.
30. Compress the lower shocks sufficiently to remove the shock studs from the lower mounting brackets.
31. Remove the remaining rubber bushings from the shock stud.
32. Remove the shock absorber assemblies from the vehicle.

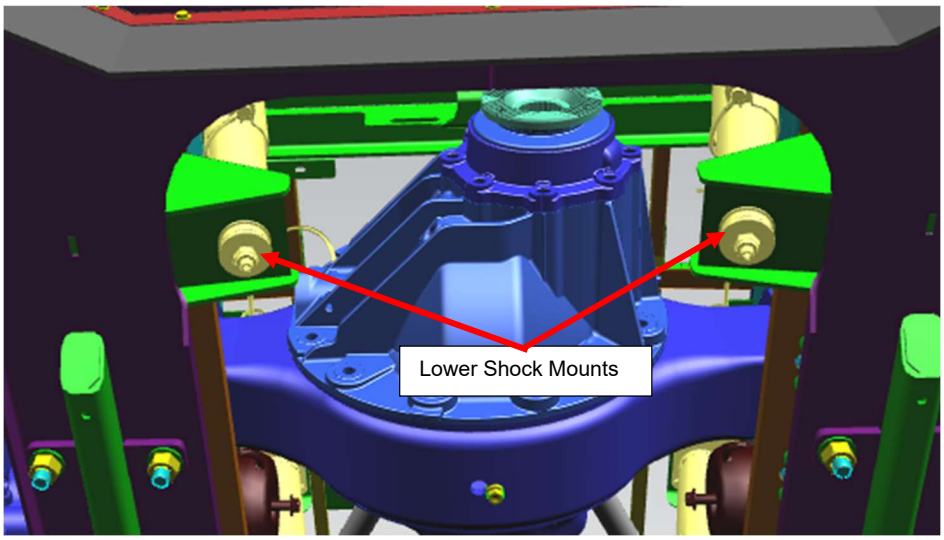

Figure 12: Rear Shock absorbers lower hardware (drive shaft removed for clarity).

33. Take the shock absorbers to the work bench. Procedure for removal and replacement of the dust covers on the rear shocks is the same as for the front shocks. See Steps #10 to #15 for the R&R procedure.

34. Assemble the upper shock mounting components as follows:
    a. Slide the rubber bushing onto the shock stud. Ensure that the flat side of the rubber bushing seats against the dirt excluder.
    b. Place the mounting plate onto the rubber bushing ensuring that the mounting plate seats on the pilot diameter of the rubber bushing.
35. Assemble the remaining upper shock mounting components as follows:
    a. Slide the rubber bushing onto the shock stud ensuring that the pilot diameter of the rubber bushing seats on the mounting plate.
    b. Install the clamping plate onto the rubber bushing ensuring that the concave side of the clamping plate seats against the flat side of the rubber bushing. Install the M16 self-locking nut and torque to 56 Ft – Lbs using Never Seize NF P/N 5928660 on the threads.
    c. Install the protective cap over the lock nut.

1. Shock Absorber Assembly
2. Bushing, Rubber
3. Bushing, Rubber
4. Nut, Hex Locking
5. Cap
6. Bolt, Hex 3/8" x 1 1/4" Lg
7. Washer, Flat Hardened
8. Bolt, Hex 3/8" x 1 1/2" Lg
9. Plate, Shock Mount

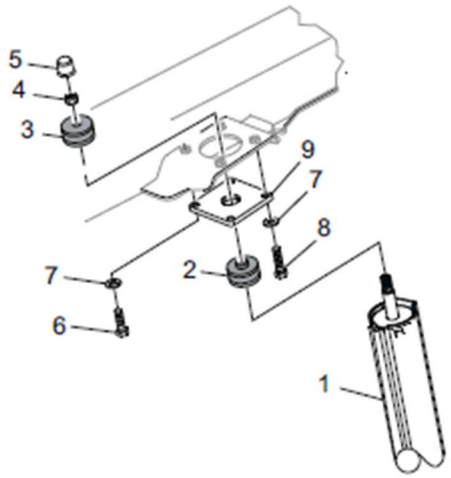

Figure 13: Rear Shock absorbers Upper hardware detail.

36. Align the four holes in the upper shock mount plate with the welded nuts on the chassis mounting bracket.
37. Position the air line support bracket over the two holes on the inboard side of the mount plate.
38. Install the four bolts and washers and torque to 23 Ft Lbs using Never Seize NF P/N 5928660 on the threads.

    Note: The two inboard mounting bolts that retain the air-line support bracket are slightly longer to accommodate the thickness of the bracket. Ensure that the two longer bolts are installed at the bracket location.

39. Assemble the lower shock mounting components as follows:
    a. Slide the rubber bushing and shock mount plate onto the shock stud ensuring that the flat side of the rubber bushing seats against the shock body.
    b. Compress the shock sufficiently to allow the shock stud to enter the lower mounting bracket.

40. Assemble the remaining lower shock mounting components as follows:
    a. Slide the centering ring and rubber bushing onto the shock stud ensuring that the pilot diameter of the rubber bushing seats within the concave side of the centering ring.
    b. Install the clamping plate onto the rubber bushing ensuring that the concave side of the clamping plate seats against the flat side of the rubber bushing.
    c. Clock the dust covers on the shock absorbers so that the molded plug on the sensor harness faces the rear of the vehicle as seen in Figure 9.
    d. Install the M16 self-locking nut and torque to 56 Ft -Lbs using Never Seize NF P/N 5928660 on the threads. Ensure that the dust cover does not rotate when the M16 nut is torqued.
    e. Install the protective cap over the lock nut.

1. Shock Absorber Assembly
2. Bushing, Rubber
3. Plate, Shock Mount
4. Bushing, Rubber
5. Nut, Hex Locking M16x 1.5"
6. Cap

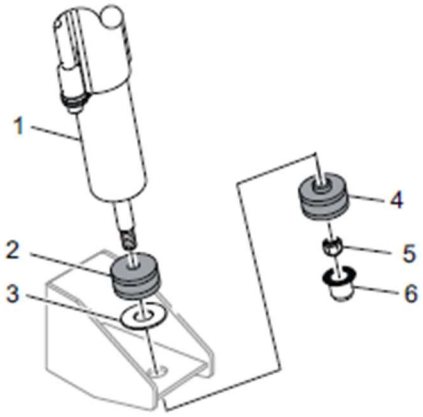

Figure 14: Rear Shock absorbers Lower hardware detail.

41. Route the height sensor harnesses forward to the connector on the vehicle harness.

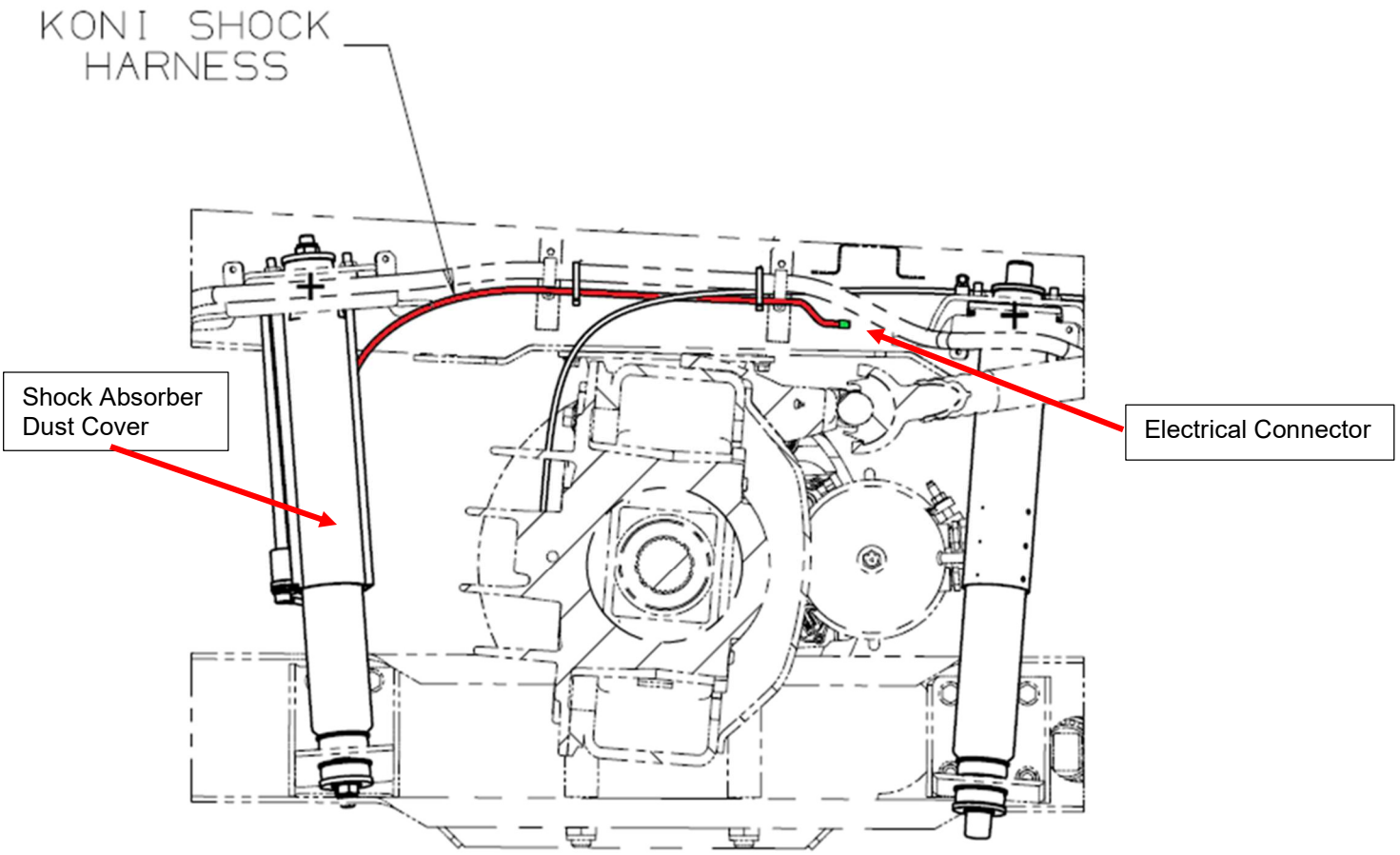

Figure 15: Rear Suspension Harness Connector looking from the inside outward. (Street side shown)

42. Inspect the height sensor harness connector on the vehicle side of the harness.
    a) Inspect the terminals and barrels of the connector for corrosion.
    b) If the terminals are lightly corroded, they should be cleaned. If the terminals are heavily corroded the connectors should be replaced. On the vehicle side replacing the harness connector involves splicing a new connector/harness wire NF P/N 691560 into the vehicle harness.
43. After ensuring the connector terminals are in good condition, they may be sealed with shrink tube. Figure 8.
    a) Slip a 2.5” length of shrink tube NF P/N 5940526 over one of the connector halves.
    b) Apply dielectric grease NF P/N 8111767 to the connector terminals.
    c) Join the two halves of the connector and secure the two halves of the connector using the threaded collar.
    d) Center the shrink tube over the electrical connector and carefully heat until tightly secured around the connector.
    e) Secure the heat tube at each end using two tyraps NF P/N 5962614.

44. Secure the harness to the structure using the original hardware.
45. Repeat the inspection and shrink tube process on the other side of the rear suspension.

CENTER SUSPENSION

46. Use wheel lifts on the Center suspension to lift the rear suspension slightly to support the weight of the center axle and suspension components.

⚠ **Caution: ALWAYS support the weight of the axle when replacing shock absorbers.**

47. Locate the height sensor harness wires on the rear set of shock absorbers and remove the hardware that secures the harness wires to the bus. Note the locations of each clip and set them aside for reuse later. Disconnect each of the harnesses at the connectors where they attach to the main vehicle harness.
48. Remove the four nuts retaining the upper shock mounting plate to the chassis bracket on each side. Set the hardware aside for reuse.

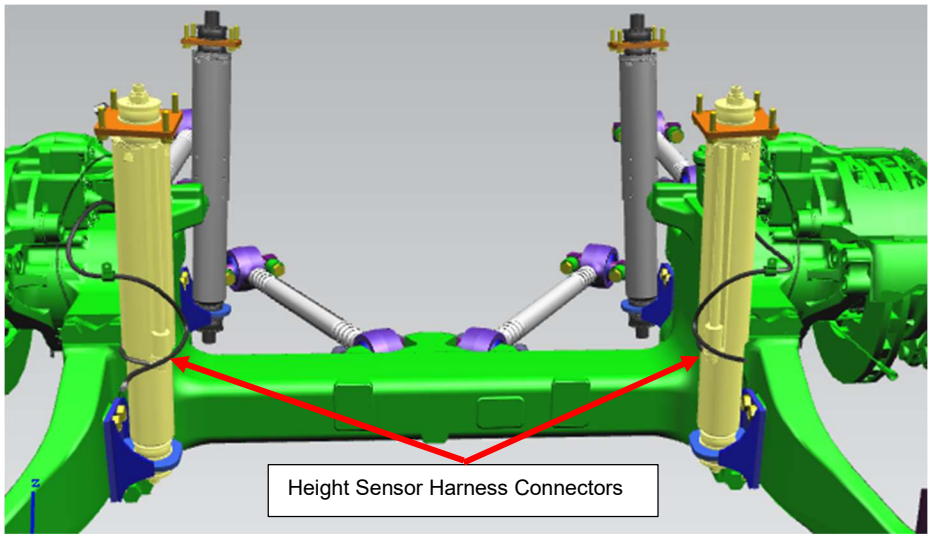

Figure 16: Center Axle Shock absorber installation (view from rear).

49. Remove the protective caps from the lower shock mounting nuts and remove the nuts.
50. Remove the rubber bushings from the shock studs, noting the location and orientation of the parts.
51. Compress the lower shocks sufficiently to remove the shock studs from the lower mounting brackets. Remove the remaining rubber bushings from the shock stud.
52. Remove the shock absorber assemblies from the vehicle.
53. Take the shock absorbers to the work bench. Removal and replacement of the dust covers on the rear shocks is the same as the procedure for the front shocks. See Steps #10 to #15 for the R&R procedure.

54. Assemble the upper shock mounting components as follows:
    a. Slide the rubber bushing onto the shock stud. Ensure that the flat side of the rubber bushing seats against the dirt excluder.
    b. Place the mounting plate onto the rubber bushing ensuring that the mounting plate seats on the pilot diameter of the rubber bushing.
55. Assemble the remaining upper shock mounting components as follows:
    a. Slide the rubber bushing onto the shock stud ensuring that the pilot diameter of the rubber bushing seats on the mounting plate.
    b. Install the clamping plate onto the rubber bushing ensuring that the concave side of the clamping plate seats against the flat side of the rubber bushing. Install the M16 self-locking nut and torque to 56 Ft – Lbs using Never Seize NF P/N 5928660 on the threads.
    c. Install the protective cap over the lock nut.

1. Shock Absorber Assembly
2. Bushing, Rubber
3. Bushing, Rubber
4. Nut, Hex Locking
5. Cap
6. Bolt, Hex 3/8" x 1 1/4" Lg
7. Washer, Flat Hardened
8. Bolt, Hex 3/8" x 1 1/2" Lg
9. Plate, Shock Mount

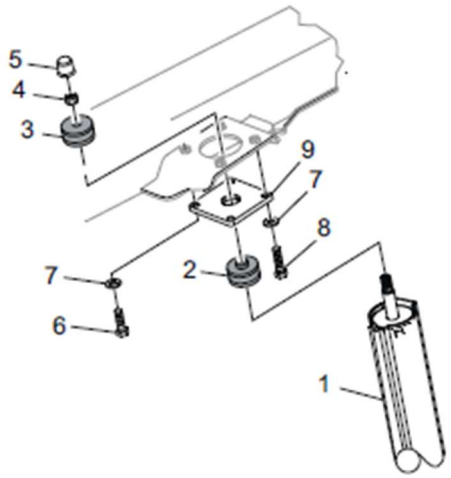

Figure 17: Shock absorbers Upper hardware detail.

56. Align the four holes in the upper shock mount plate with the welded nuts on the chassis mounting bracket.
57. Install the four bolts and washers and torque to 23 Ft Lbs using Never Seize NF P/N 5928660 on the threads.
58. Assemble the lower shock mounting components as follows:
    a. Slide the rubber bushing and shock mount plate onto the shock stud ensuring that the flat side of the rubber bushing seats against the shock body.
    b. Compress the shock sufficiently to allow the shock stud to enter the lower mounting bracket.
59. Assemble the remaining lower shock mounting components as follows:
    a. Slide the centering ring and rubber bushing onto the shock stud ensuring that the pilot diameter of the rubber bushing seats within the concave side of the centering ring.

b. Install the clamping plate onto the rubber bushing ensuring that the concave side of the clamping plate seats against the flat side of the rubber bushing.
c. Clock the dust covers on the shock absorbers so that the molded plug on the sensor harness faces the rear of the vehicle as seen in Figure 13.
d. Install the M16 self-locking nut and torque to 56 Ft -Lbs using Never Seize NF P/N 5928660 on the threads. Ensure that the dust cover does not rotate when the M16 nut is torqued.
e. Install the protective cap over the lock nut.

1. Shock Absorber Assembly
2. Bushing, Rubber
3. Plate, Shock Mount
4. Bushing, Rubber
5. Nut, Hex Locking M16x 1.5"
6. Cap

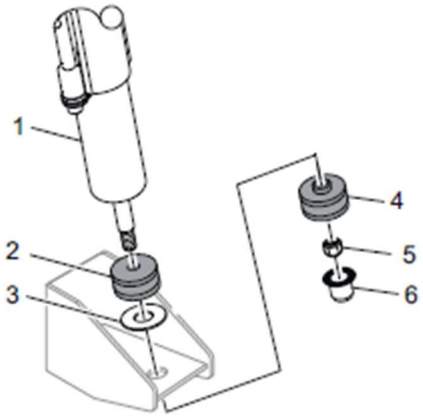

Figure 18: Shock absorbers Lower hardware detail.

60. Route the height sensor harnesses forward to the vehicle harness connector.

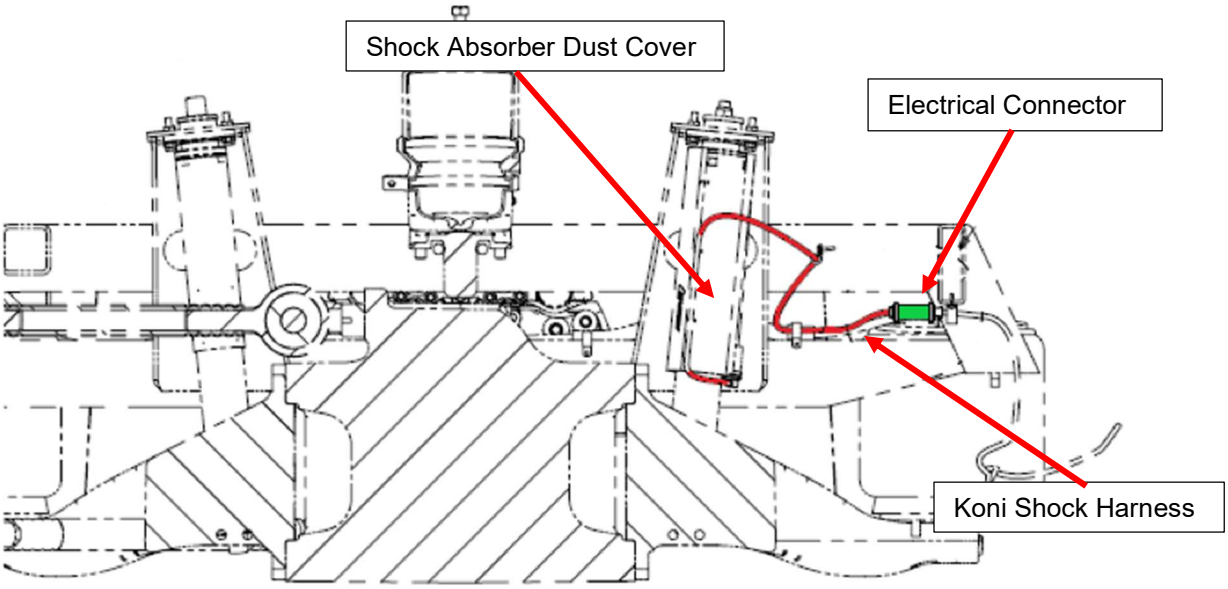

Figure 19: Center Suspension Harness (street side shown).

61. Inspect the height sensor harness connector on the vehicle side of the harness.
    a) Inspect the terminals and barrels of the connector for corrosion.
    b) If the terminals are lightly corroded, they should be cleaned. If the terminals are heavily corroded the connectors should be replaced. On the vehicle side replacing the harness connector involves splicing a new connector/harness wire NF P/N 691560 into the vehicle harness.
62. After ensuring the connector terminals are in good condition, they may be sealed with shrink tube. Figure 8.
    a) Slip a 2.5” length of shrink tube NF P/N 5940526 over one of the connector halves.
    b) Apply dielectric grease NF P/N 8111767 to the connector terminals.
    c) Join the two halves of the connector and secure the two halves of the connector using the threaded collar.
    d) Center the shrink tube over the electrical connector and carefully heat until tightly secured around the connector.
    e) Secure the heat tube at each end using two tyraps NF P/N 5962614.
63. Secure the height sensor harnesses to the vehicle chassis using the original hardware.
64. Repeat the dust cover install as well as the inspection and shrink tube process on the other side of the center suspension.
65. Lower the bus in accordance with the New Flyer Service Manual.
66. Turn the main battery disconnect switch to the “ON” position.
67. Perform a ride height sensor calibration. Refer to Section 8 of the Service Manual for the calibration procedure.
68. Road test the bus to ensure proper operation
69. Remove all tools and debris and return the bus to service condition.

LABOUR ESTIMATE				
	Operation	Number of Technician(s)	Hours	Labor Time T X HR
1	Replace dust covers & apply shrink tube to Smart Rider height sensor harness connectors.	1	4.0	4.0

PARTS REQUIRED					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	6482203	SENSOR ASSY W/DUST COVER-RIDE HEIGHT	6	EA	
2	5955945	TYRAP – 14.0 BLACK	9	EA	
3	5928660	NEVER SEIZE	0.03	EA	
1	5940526	BS HEAT SHRINK.75BK (4 LENGTH)	1.5	FT	
2	5962614	TYRAP-4.0 BLACK	12	EA	
3	8111767	ANTI-CORROSION COMPOUND NYK-77	0.020	EA	
5	691560	CBL-STRAIGHT ECOLINK CABLE		EA	AS REQUIRED

SPECIAL TOOLS REQUIRED					
Item	Part Number	Description	Qty.	Units	Notes
1					

a