



# INSTRUCTION TO SERVICE

ITS-61479		10/30/2025
<b>SECTION:</b>	292 - Electrical Harnesses	
<b>SUBJECT:</b>	Rework center axle encoder harnesses.	
<b>ISSUE:</b>	Encoder harness connector terminals become corroded due to moisture ingress.	
<b>SUMMARY:</b>	Supplier has lengthened the temperature and speed sensor harness to 2.5 meters. Existing harness will be shortened to move connectors to the interior of the bus.	

# ITS-61479

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

**THIS ITS DOCUMENT SHOULD BE RETAINED AND REFERRED TO FOR FUTURE MAINTENANCE UNTIL THE NEW FLYER PARTS AND/OR SERVICE MANUAL IS UPDATED TO REFLECT WORK DONE AS A RESULT OF THIS DOCUMENT. ENSURE THAT THIS DOCUMENT IS AVAILABLE FOR PARTS AND MAINTENANCE STAFF GOING FORWARD.**

**PROCEDURE:**

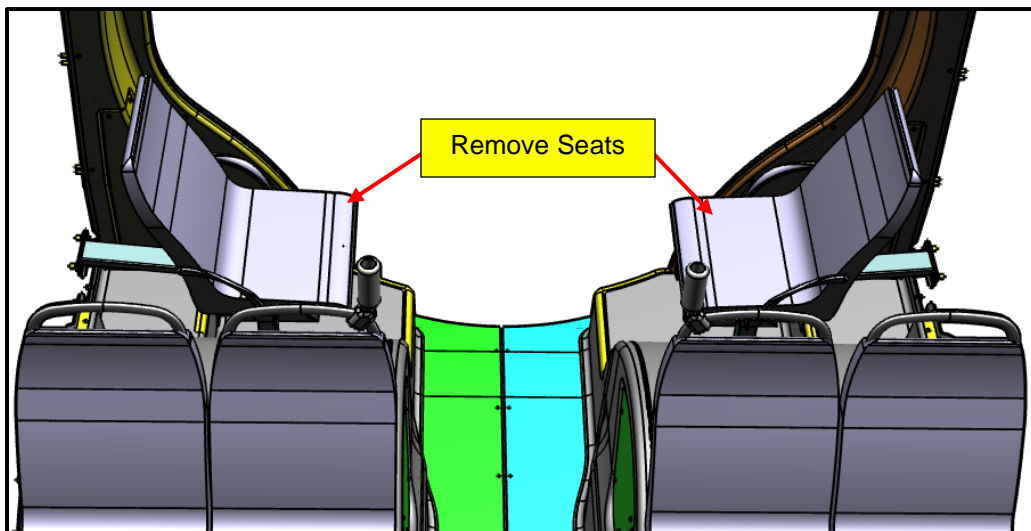
1. Set the park brake and chock wheels.
2. Set the Master Run Switch to the Stop Engine position.

**⚠ Caution: Wait two minutes after turning the Master Run Switch to Stop Engine, before turning the Battery Disconnect switch OFF.**

3. Turn the 12/24V battery disconnect switch to the “OFF” position. Lock and tag the switch and retain key.
4. Place the Emergency Power Disconnect switch to the “OFF” position.

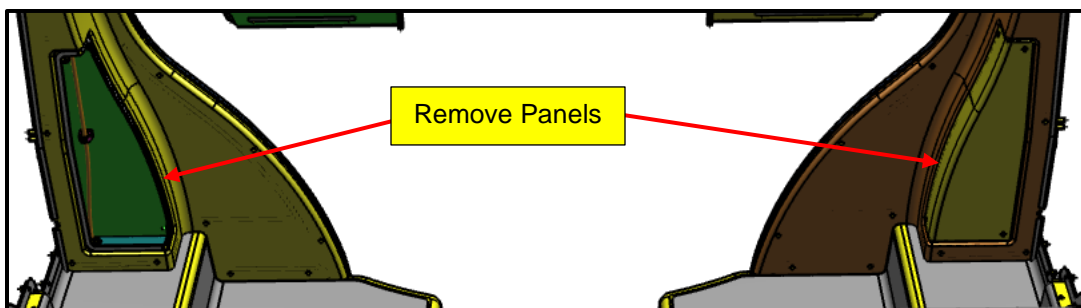
**👉 NOTE: The Emergency Power Disconnect Switch cannot be locked out but should be switched OFF to disconnect low voltage power to the High Voltage system.**

5. Verify the Low Voltage and High Voltage Systems are disabled. Refer to Section 1.7 “De-Energizing & Energizing Procedure in the Service Manual or Appendix A in this ITS.
6. Remove both curbside and streetside aisle facing wheelhouse seats by removing the mounting hardware on floor and rear side of the seat. Set aside for reinstallation later.



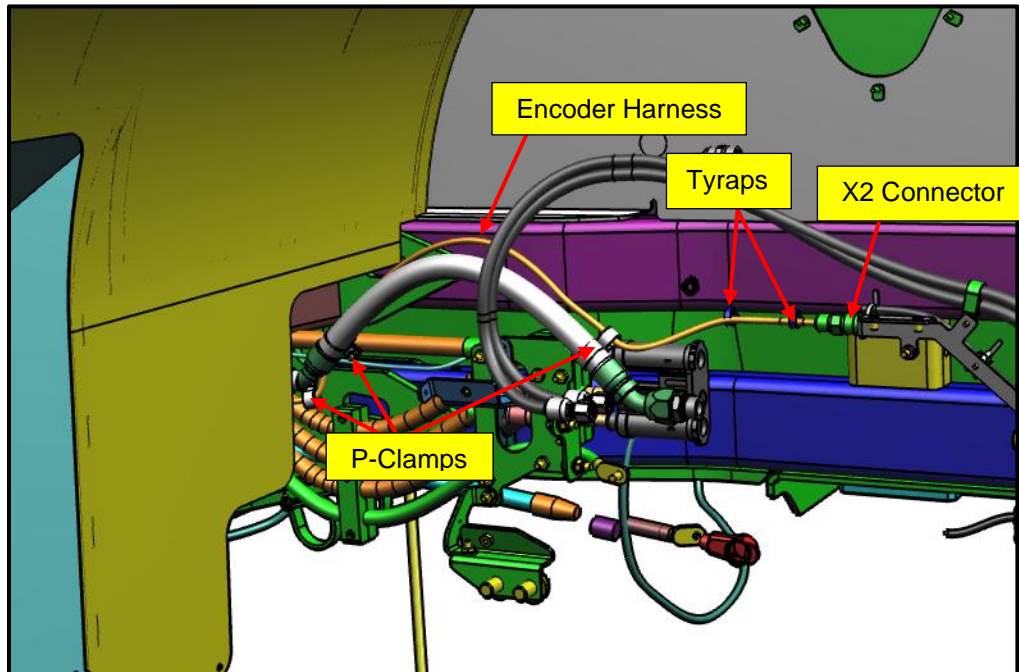
**Figure 1: Aisle Facing Wheelhouse Seats**

7. Remove lower joint access panels on both curbside and streetside. Set aside panel and hardware.



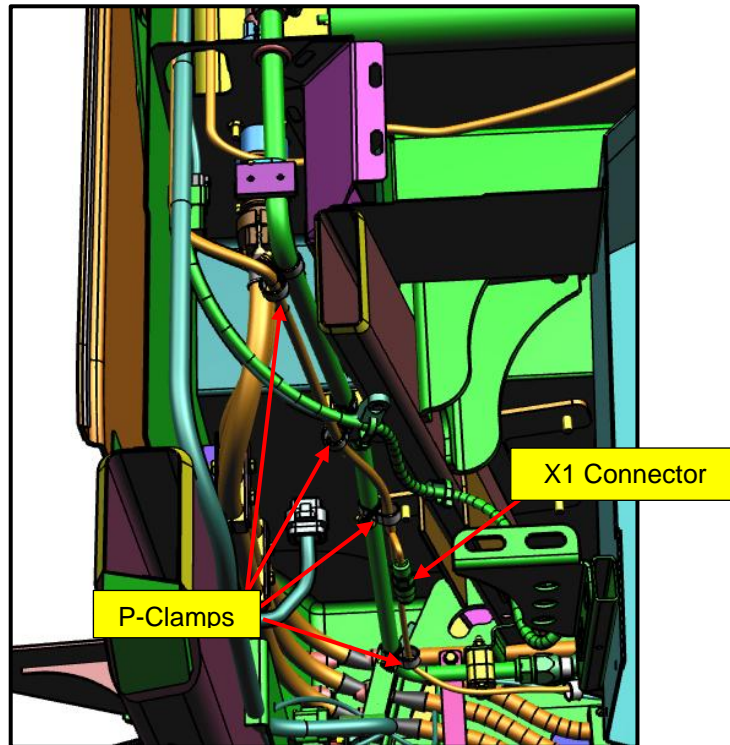
**Figure 2: Remove Panels**

8. Raise the bus in accordance with the procedures in the Service manual and install jackstands.
- ☞ **NOTE: Rework procedure is assumed to be completed with the center axle removed from the bus.**
9. Locate the encoder cable X2 connector in the curbside center axle wheel well.
10. Remove the two tyrap and P-clamps that secure the encoder harness with the cooling hose if still present.  
Set aside P-clamps.



**Figure 3: Curbside X2 Connector, Tyrap and P-Clamp locations.**

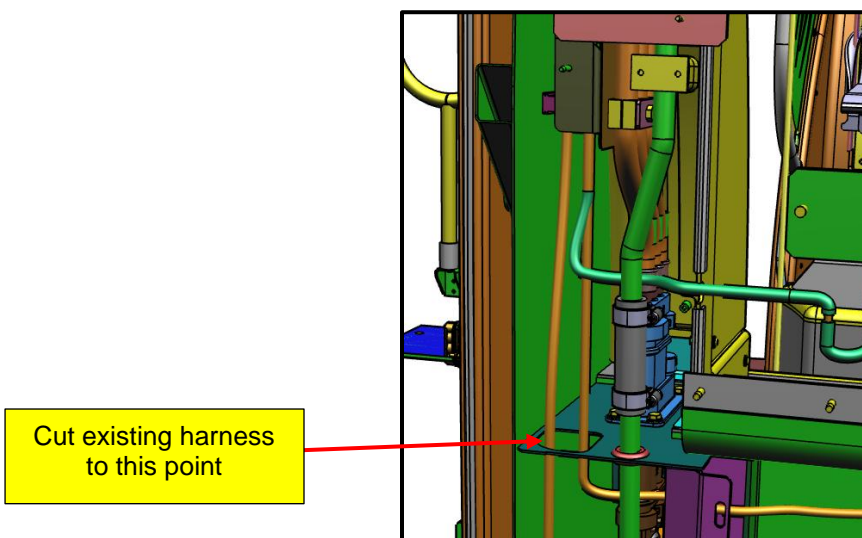
11. Locate the encoder cable X1 connector. Remove and set aside the four P-clamps that secure the encoder harness with the cooling hose.



**Figure 4: Curbside X1 Connector and P-Clamp locations. Exterior Panels are hidden.**

12. Cut the existing harness to the same level as the floor support bracket splitting the two cables with about 6" of cable length each.

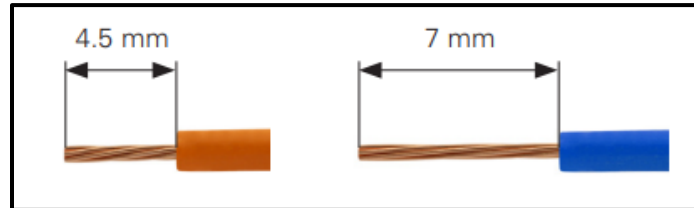
**Note: Ensure cables remain identified, CTR DRIVE CS-X1 for temperature sensor and CTR DRIVE CS-X2 for speed sensor.**



**Figure 5: Existing Harness Cut Point**

Wire Crimping Instruction

- Use a well-maintained stripping plier that is suitable for the wire size to be stripped.
  - When  $\varnothing$  over insulation  $\leq 2$  mm strip to a 4.5 mm length
  - When  $\varnothing$  over insulation  $> 2$  mm strip to a 7 mm length



**Figure 6: Recommended Wire Stripping Length**

- Find the pin at the bottom of the turret, and align it with the hole on the retaining ring. Tighten down the two screws. When doing this procedure, ensure the handle of the crimping tool is in an open position.



**Figure 7: Turret Installation**

- Raise the selector setting and align it to #3 as we're crimping a 20 AWG wire.



**Figure 8: Adjusting the Selector Setting**

- Rotate the turret to the red position, then press on it to lock it in place.



**Figure 9: Turret in Lock Position**

- Take the terminal pin and install it on the tool. Install the wire after the pin. Ensure all the strands of the wire are securely inside the contact barrel.



**Figure 10: Insert Terminal Pin and Wire**

- Squeeze pliers until you hear a distinct click. The pliers should spring open when the ratchet mechanism is released. Check the crimp aspect



**Figure 11: Crimping Tool Squeezed**

Insertion Instructions

- Disassemble and slide connector rear accessory over cables.
- Using the insertion tool, manually insert the contact into the desired insert cavity.
- Insert the wires between the plier jaws, the tip of the jaws butting the contact shoulder.
- Introduce contacts one by one in insert cavities pushing straight in until the contact snaps into position and the clip ensures contact retention. Ensure filler plugs as used as necessary.



**Figure 11: Wire Insertion**

13. Pin the following wires to new supplied X1 connector (NF PN: 585038). Insert cavity plugs (NF PN: 630781) into cavities except A and B.

**Note: Follow Wire Crimping and Insertion Instructions above when loading wires to connector.**

- a. Load wire 904HP20#22BK to CTR DRIVE CS-X1 cavity A with terminal (NF PN: 603426).
- b. Load wire 904HP20#22BN to CTR DRIVE CS-X1 cavity B with terminal (NF PN: 603426).
- c. For 904HP20#22DRN, cut wire and leave unterminated.
- d. For 904HP20#22OR, cut shield flush with cable insulation.
- e. For 904HP20#22RD, cut shield flush with cable insulation.

14. Pin the following wires to new supplied X2 connector (NF PN: 585039). Insert cavity plugs (NF PN: 630781) into cavities except A, B, E and F.

- a. Load wire 904HP20#5BK to CTR DRIVE CS-X2 cavity A with terminal (NF PN: 603426).
- b. Load wire 904HP20#5BN to CTR DRIVE CS-X2 cavity E with terminal (NF PN: 603426).
- c. For 904HP20#5DRN, cut wire and leave unterminated.
- d. Load wire 904HP20#5OR to CTR DRIVE CS-X2 cavity B with terminal (NF PN: 603426).
- e. Load wire 904HP20#5RD to CTR DRIVE CS-X2 cavity F with terminal (NF PN: 603426).

15. Apply loom (NF PN: 795551) on the cables. Apply tape (NF PN: 795551) on junction and on loom as necessary.



**Figure 12: Tape Junction Sample**

16. Slide a 2" piece of adhesive heat shrink (NF PN: 136365) to the X1 and X2 cable harness.

17. Shrink the heatshrink on both X1 and X2 cables extending over the back of the connector and wire bundle.

18. Relabel the harness as following using (NF PN: 8112067) at about 2-3" back from the connector body.

**Label Note: CTR DRIVE CS-X1 for temperature sensor and CTR DRIVE CS-X2 for speed sensor.**

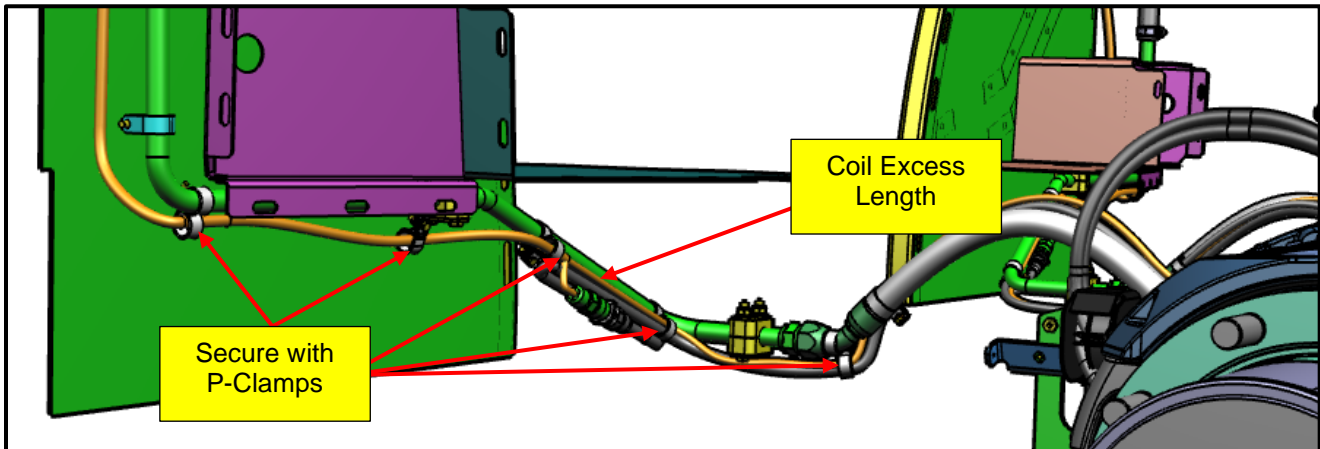


**Figure 13: Finished Harness Sample**

19. Connect the new temperature sensor to X1 connector.
20. Connect the new speed sensor to X2 connector.

**Note: The new temperature and speed sensors are provided with the reworked AVE130 ZF center axle.**

21. Route the new temperature and speed sensor cables along the center axle cooling line which is the same route as before. Secure new cables using the set aside P-clamps (NF PN: 514099), screw (NF PN: 22S00012) and lock nut (NF PN: 42N00000). As required, coil up excess length of new ZF sensors, See Figure 14 and 15.

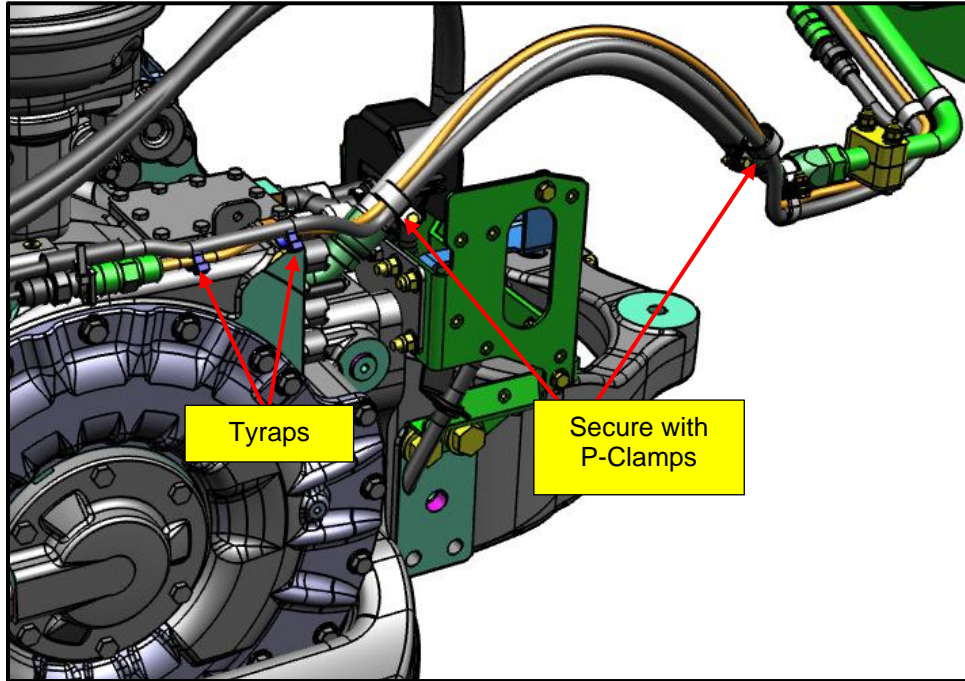


**Figure 14: New Temperature and Speed Sensor Harness Routing on Cooling Line**



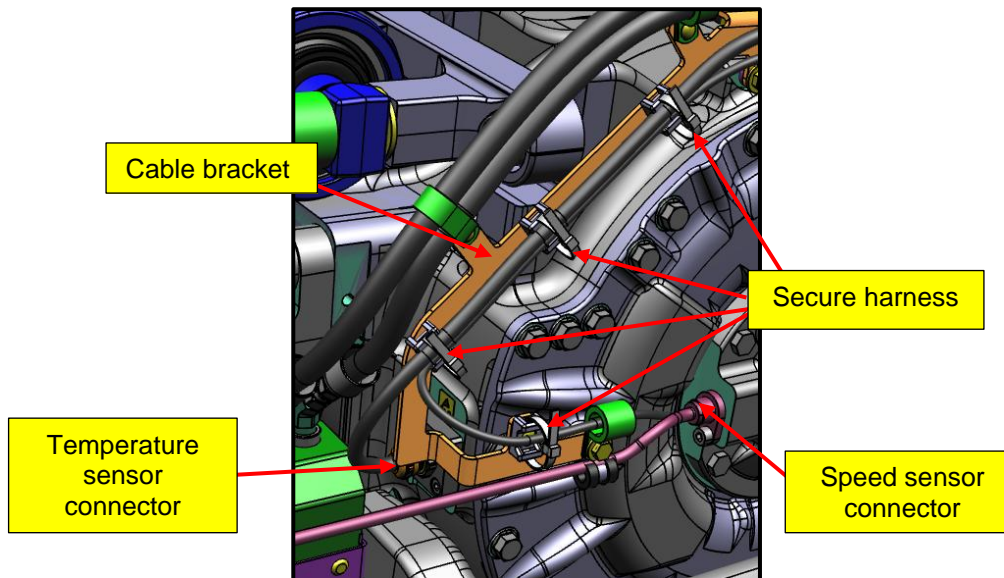
**Figure 15: Coiled Harness Example**

22. Secure harness with the cooling hose connected to the center axle with set aside P-Clamps (NF PN: 514099 & 514101), screw (NF PN: 22S00012) and lock nut (NF PN: 42N00000). The bigger P-clamp (NF PN: 514101) is used on the cooling hose. Use tyraps (NF PN: 5955945) as needed.



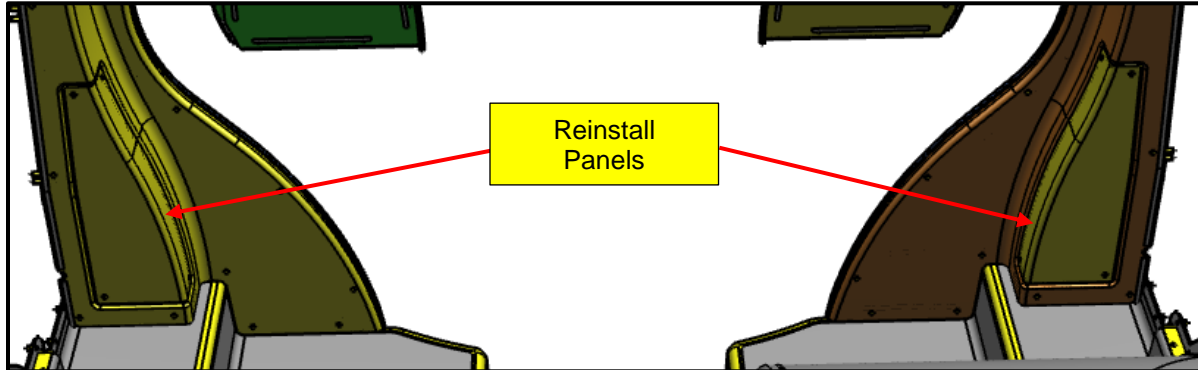
**Figure 16: New Temperature and Speed Sensor Harness Routing on Cooling Hose**

23. Secure the new temperature and speed sensor harness to the cable bracket in orange in Figure 14. Using cable tie mount (NF PN: 291987), tyrap (NF PN: 5958112) and self-tapping screw (NF PN: 34S00006). Connect the temperature and speed sensor to the center axle.



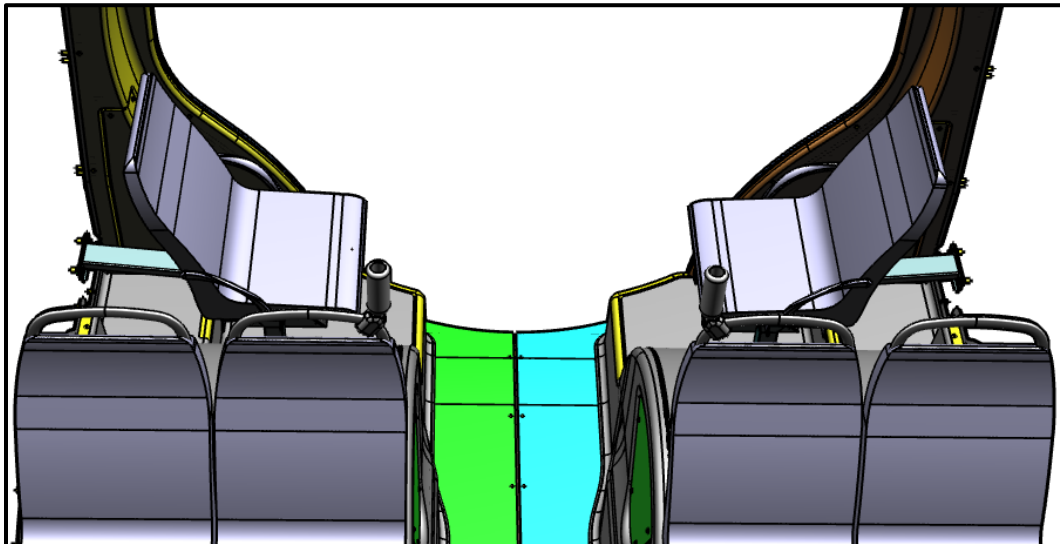
**Figure 17: New Temperature and Speed Sensor Harness Routing on Center Axle**

24. Repeat step 9-23 to do the same rework on streetside harness.
25. Remove the jack stands and lower the bus.
26. Reinstall lower joint access panels on both curbside and streetside.



**Figure 18: Reinstall Lower Joint Access Panels**

27. Reinstall aisle facing wheelhouse seats using the same hardware. Torque hardware of rear side to 30-35 ft-lbs. Torque hardware on the floor to 15-17 ft-lbs. Apply 1 to 2 drops of Loctite-243 as required.



**Figure 19: Aisle Facing Wheelhouse Seats**

28. Remove all tools and debris from work area to return coach to service.
29. Turn on the 12/24V battery switch.
30. Re-Energize the High Voltage System. Refer to the De-Energizing & Energizing Procedure in Section 9, 1.7 the Service Manual.



<b>LABOUR ESTIMATE</b>				
	Operation	Number of Technician(s)	Hours	Labor Time T X HR
1	Rework existing NF center axle encoder cables	1	4.0	4.0

<b>PARTS REQUIRED</b>					
Item	Part Number	Description	Qty. per Coach	Units	Notes
1	136365	TUBE-HEAT SHRINK .75 SS	1	FT	
2	585038	CONN-6CCT TWR 851	1	EA	
3	630781	PLUG-CAVITY SOURIAU 851	6	EA	
4	603426	SOCKET- 18-24 AWG 851 SOURIAU	6	EA	
5	585039	CONN-6CCT TWR 851	1	EA	
6	5955945	TYRAP-14.5 BLACK	12	EA	
7	5958112	TYRAP-7.0 BLACK	8	EA	
8	795551	LOOM-CONVOL LIGHT WALL 0.39"	1	FT	
9	5962260	TAPE-ELECTRICAL, .75 WIDE	1	EA	
10	8112067	MARKER-WRITE ON	2	EA	

<b>SPECIAL TOOLS REQUIRED</b>					
Item	Part Number	Description	Qty.	Units	Notes
1	6701657	TOOL-CRIMP WIRE AF8	1	EA	Source Locally
2	6701656	TOOL-TURRET HEAD AF8	1	EA	Source Locally
3	6701684	TOOL-INSERTION AF8	1	EA	Source Locally
4	6701683	TOOL-EXTRACTION AF8	1	EA	Source Locally