ISSUE DATE:	1-21-2021
SERVICE BULLETIN SUBJECT:	Duopower Gearbox Lock Washer Retrofit
VINs or MODELS AFFECTED:	Service Specified Buses
COMPLETE BY:	Next Service Opportunity
SERVICE BULLETIN #:	SC-21-8
Labor Operation Code:	PP43Z

NOTICE! It is expected that this process will require 10 person-hours per bus. It is recommended to use two associates for this work. Please schedule appropriately to minimize vehicle downtime.

DUOPOWER GEARBOX LOCK WASHER RETROFIT

Retrofit Description:

This procedure updates the locking washers on the gearbox for improved reliability.

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Tools/Parts Required

Tools and Supplies Required:

- Approved Wheel Lifts (4 Required)
- Jack Stands (4 Required)
- Approved Lifting Device for Duopower Axle
- Ratchet
- 1/2-Inch Drive Pull Handle
- 10mm Socket
- 13mm Socket
- 16mm Socket (6-Point)
- TMFS 5 Socket (Proterra P/N 120-7746)
- 1/2-Inch Drive Pull Handle
- Calibrated Torque Wrench
- Offset Adapter for Torque Wrench (Proterra P/N 128-2242)
- Flashlight
- Orange Paint Pen

Parts Required:

• 125-6417	WASHER, LOCK	2 EA
• 001912	CABLE TIE, 11.5 BLACK 292MM"	10 EA

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Procedure:

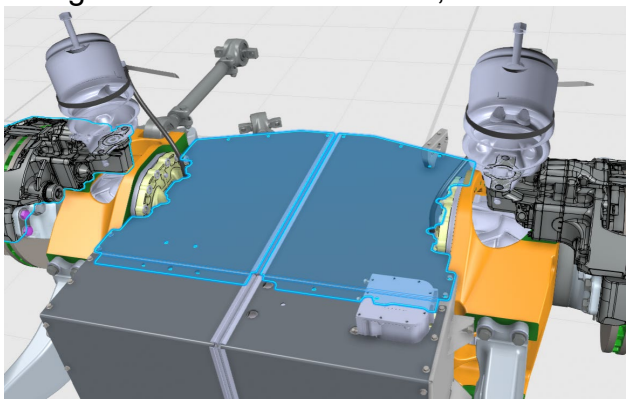
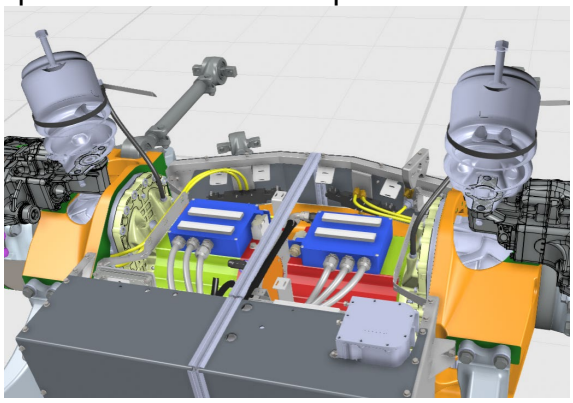
1. This procedure requires the removal and replacement of the Duopower Axle from the bus. The Axle removal and replacement procedures are included in the Maintenance Manual applicable to the bus that you are working on. Prior to beginning the procedure, you should familiarize yourself with the removal and replacement procedure for the Axle in the Maintenance Manual as well as the procedure in this document. The latest version of the Maintenance Manual should be downloaded from the following location before beginning the procedure.
   \\bus.local\files\Engineering\Service Bulletins\Service Bulletin Files for SC-21-8

2. Complete the Proterra approved Lockout/Tagout procedure to make the bus safe for work.

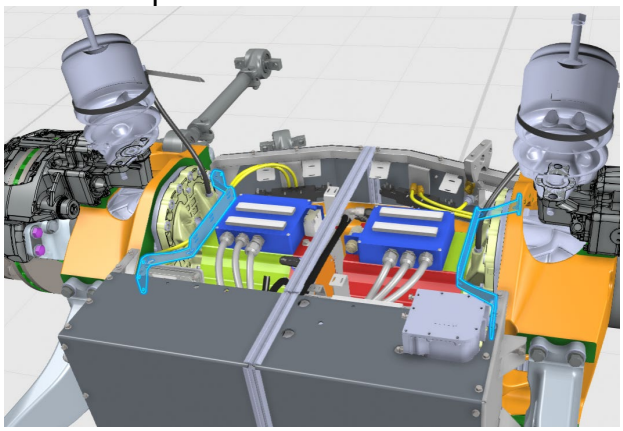
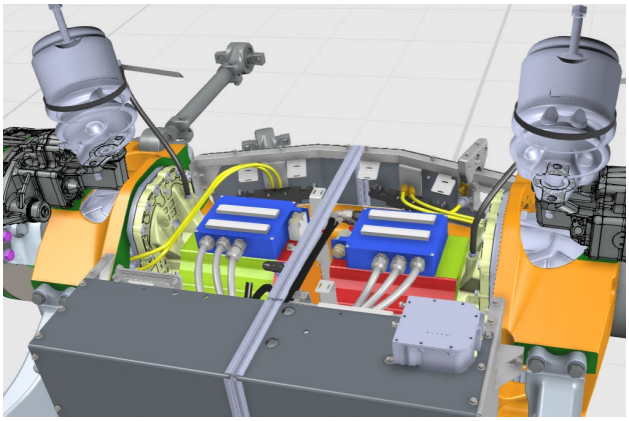
3. Lift the bus using Wheel Lifts and support it with Jack Stands to access the Duopower Drive.

4. Refer to the Maintenance Manual for lifting the bus and the removal and reinstallation of the Duopower Drive.

5. Using a 10mm Ratchet/Socket, remove the top covers from the Duopower Axle.

6. Using a 13mm Ratchet/Socket, remove the bolts that secure the Harness Brackets (046740) to the Duopower Drive.

7. Carefully remove the Harness Brackets (046740) from the Gearboxes.

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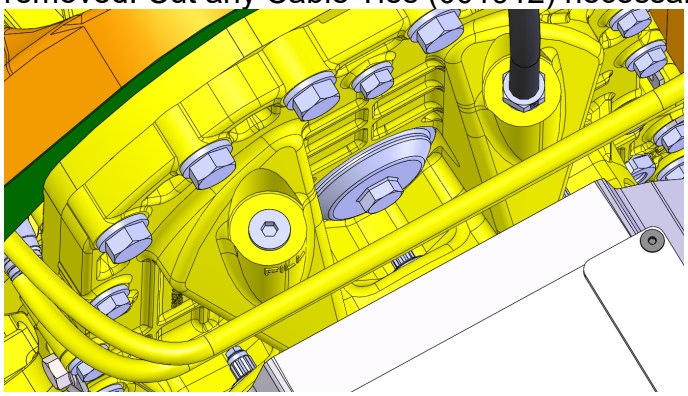
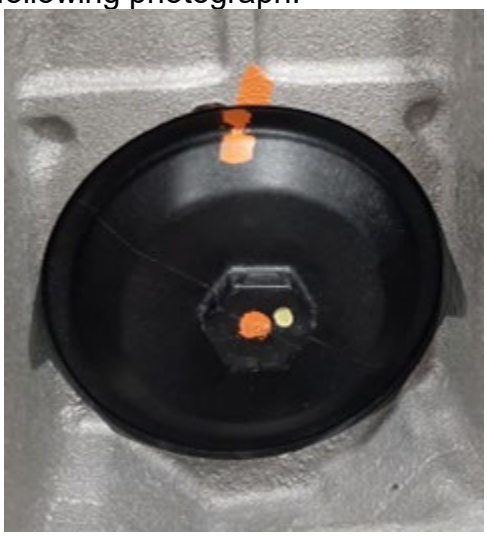
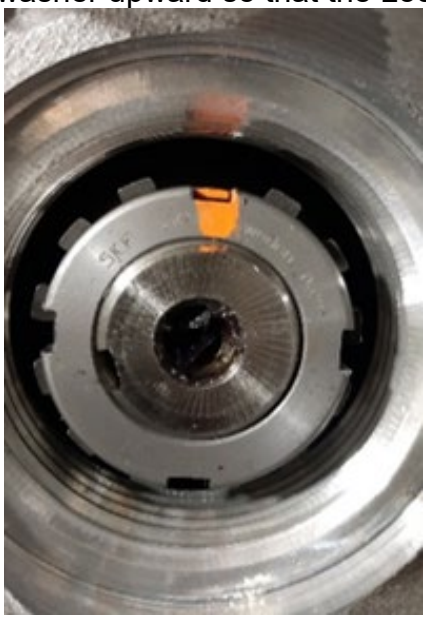
8. Access one of the Gearboxes through the area where the Harness Brackets (046740) were removed. Cut any Cable Ties (001912) necessary to access the gearbox.



9. Using a Ratchet with a 6-Point 16mm Socket, remove the black dust cover shown in the following photograph.



10. Using a Flat Blade Screwdriver and a small hammer, bend the locking tab of the installed lock washer upward so that the Lock Nut may be removed.



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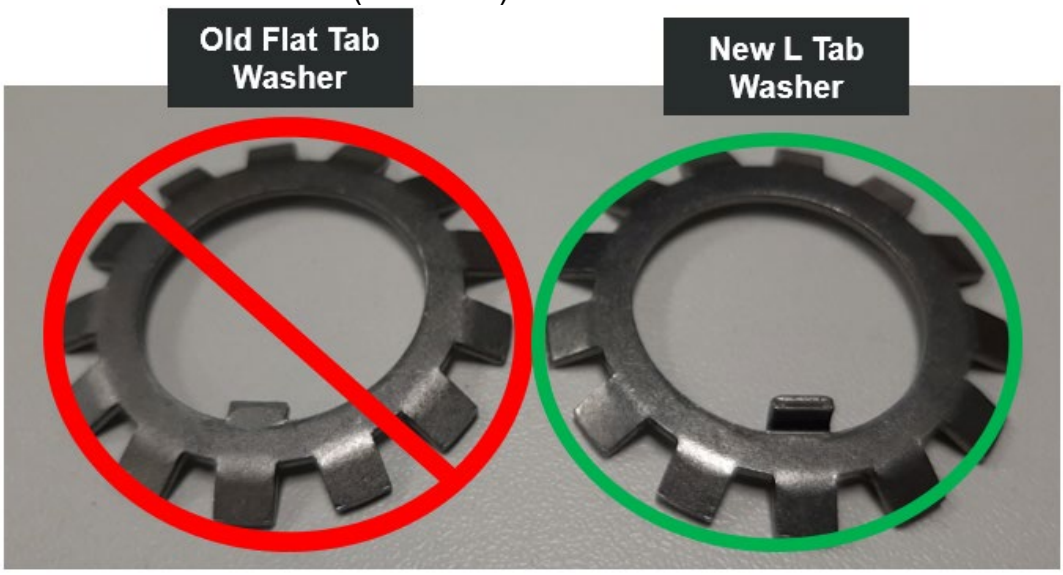
11. Using a 1/2-Inch Drive Pull Handle with a TMFS 5 Socket, remove the Lock Nut.

12. Inspect the removed Lock Washer. Is the ID Tab within the axel shaft keyway? Is the ID Tab Damaged? If the Lock Washer is damaged, take a photograph of it and email it to jotto@proterra.com.

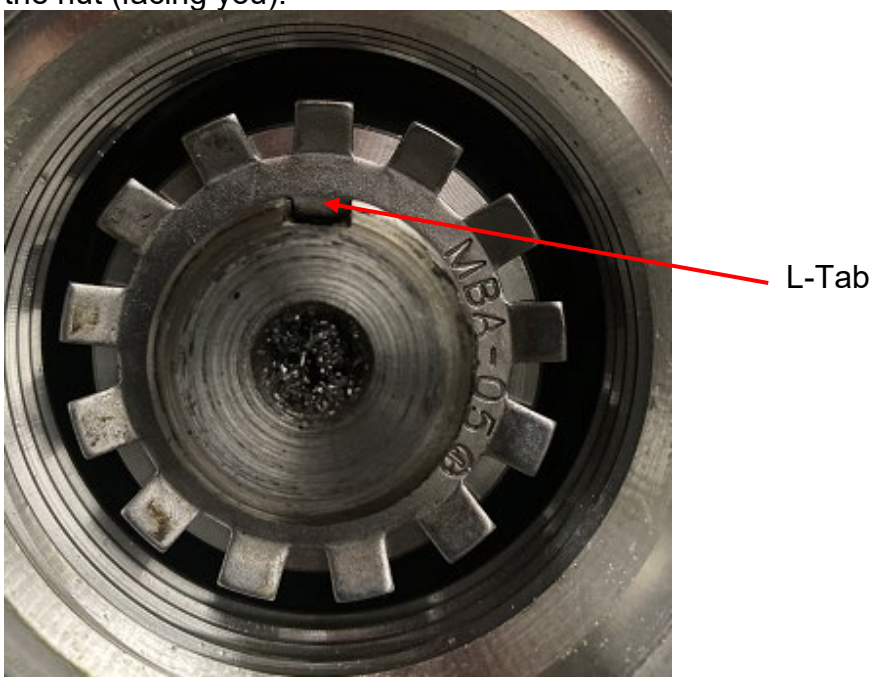
13. If the ID Tab of the Lock Washer is not in the keyway, rotate it until it is.

14. Using Needle Nose Pliers, remove the Lock Washer.

15. The following photographs show the difference between the old style of Lock Washer and the new L-Tab Lock Washer (125-6417).



16. Place the Lock Washer (125-6417) into position with the L-Tab facing outward toward the Wheel Ends (facing away from you). The Outer Diameter Tabs will be facing inward toward the nut (facing you).



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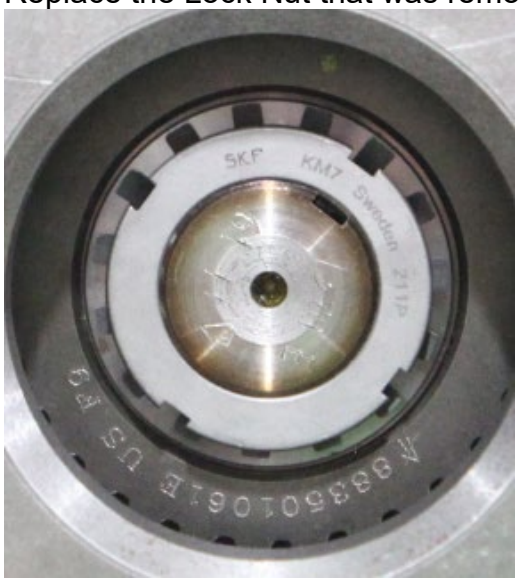
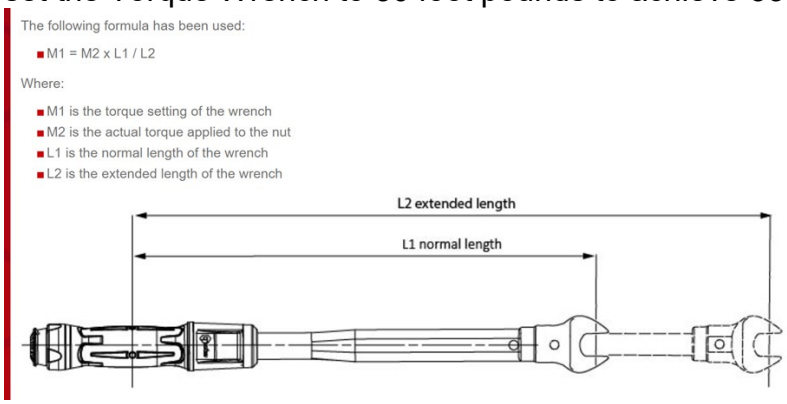
17. Replace the Lock Nut that was removed earlier and hand tighten it.



18. Using a Calibrated Torque Wrench with an Offset Adapter set at ninety degrees, **torque the Lock Nut to 33 foot pounds.** Use a pry bar between the wheel studs to prevent rotation when torqueing the Lock Nut.
Note: The 1/2-Inch Driver Square may be removed from the offset adapter and inserted into the TMFS 5 Socket and used with a 15mm Wrench on the square to snug the lock nut before torqueing.

19. If you cannot torque the lock nut with the Torque Wrench set at 90 degrees to the offset adapter, place the torque wrench at 180 degrees to the offset adapter and use the equation below to determine the proper setting for the Torque Wrench. For example, you may need to set the Torque Wrench to 30 foot pounds to achieve 33 foot pounds at the lock nut.



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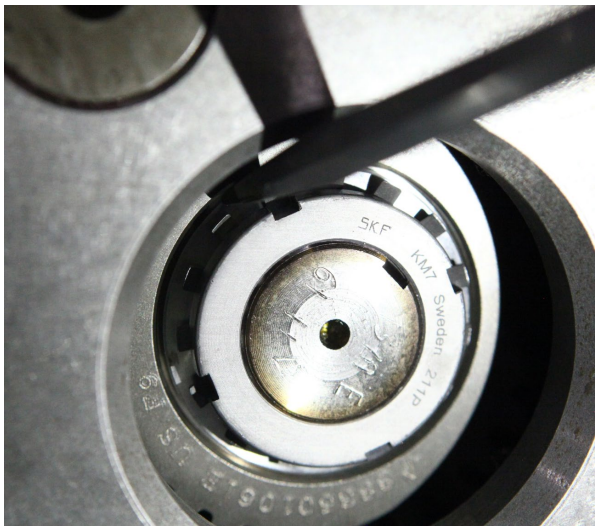
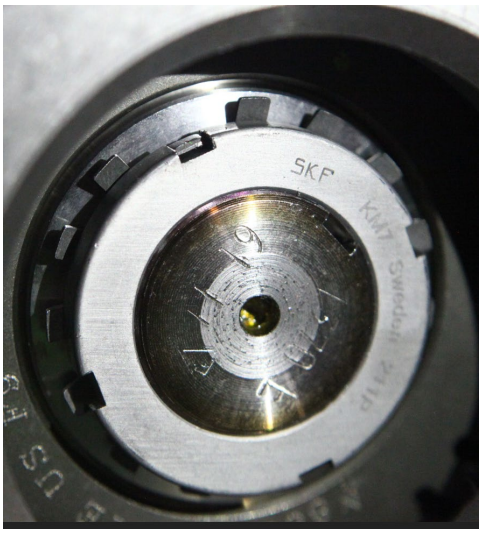
20. After torqueing the Lock Nut, observe the Lock Washer (125-6417) to determine if one of the Outside Diameter Tabs aligns with one of the four slots in the Lock Nut.

21. If none of the Outside Diameter Tabs align with a Lock Nut Slot, continue using the Torque Wrench to tighten the Lock Nut until a Tab is in alignment. **Do not exceed 50 foot pounds of Torque.**

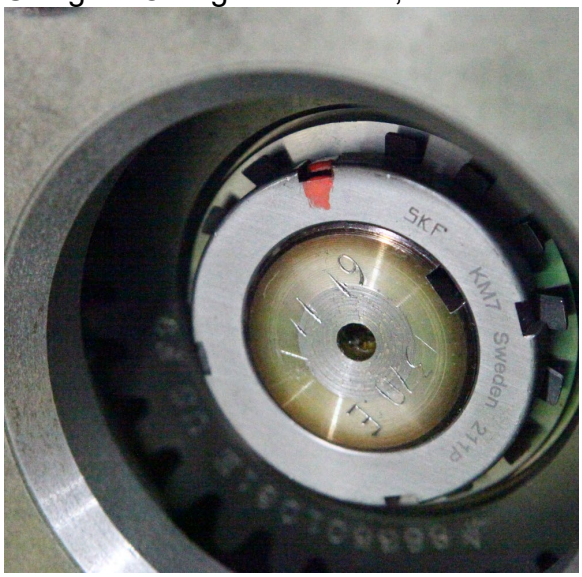
22. Using a Flashlight, inspect the Lock Washer (125-6417) for damage. If the Lock Washer is damaged, it must be replaced with one of the spares from the kit.

23. Using a Flat Blade Screwdriver or a Pick, bend the Outside Diameter Tab into the slot on the Lock Nut.





24. Using an Orange Paint Pen, mark the bent Tab.



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25. Using a Ratchet with a 6-Point 16mm Socket, replace the black dust cover shown in the following photograph.

26. Using a Calibrated Torque Wrench with a 6-Point 16mm Socket, **torque the Dust Cover to 12 foot pounds.**

27. Mark the Dust Cover with the Orange Paint Pen.

28. Using an Orange Paint Pen, paint the letters “NLW” in large print onto the suspension arm closest to the gearbox where the Lock Washer (125-6417) was replaced as shown in the following photograph.

29. Repeat the process to replace the Lock Washer (125-6417) on the other gearbox.

30. Carefully replace the Harness Brackets (046740) back onto the Gearboxes.

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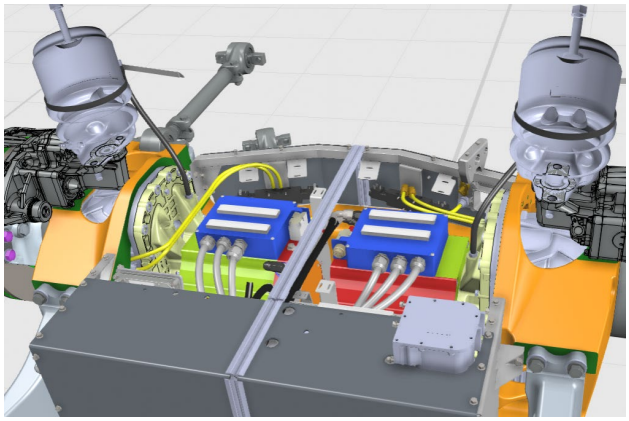
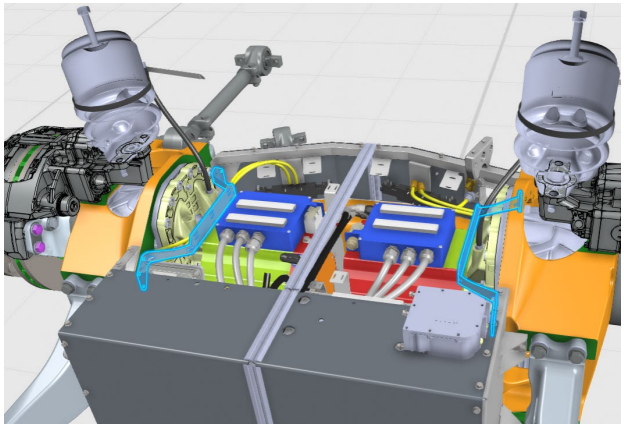
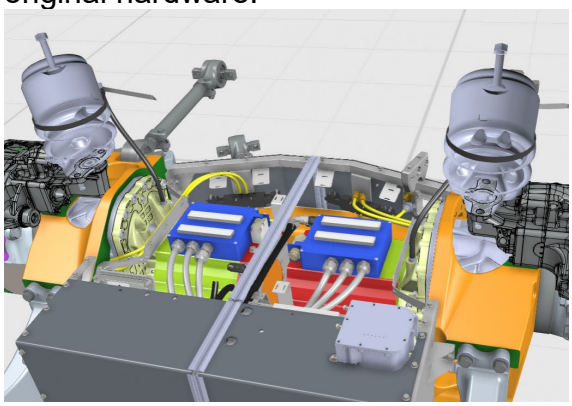
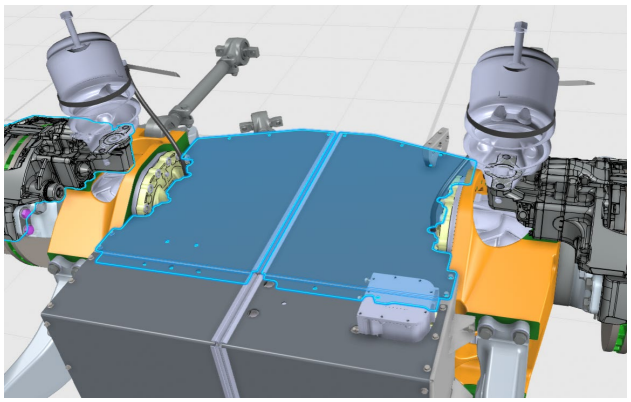
31. Using a 13mm Ratchet/Socket, replace the bolts that secure the Harness Brackets (046740) to the Duopower Drive.

32. Using a Calibrated Torque Wrench with a 13mm Socket, **torque the bolts to 27 foot pounds.**

33. Using an Orange Paint Pen, mark the properly torqued bolts.

34. Using a 10mm Ratchet/Socket, replace the top covers on the Duopower Axle using the original hardware.

35. Using a Calibrated Torque Wrench with a 10mm Socket, **torque the bolts to 11 foot pounds.**

36. Using an Orange Paint Pen, mark the properly torqued fasteners.

37. Record the Axle Serial Number on the Work Order.

38. Refer to the Maintenance Manual for replacing the Duopower Drive and lowering of the bus.

39. Remove the Lockout/Tagout Devices and return the bus to service.

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