



PROTERRA



FLEET CHECK

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|----------------------------------|-----------------------------------------|
| ORIGINAL CREATION DATE: | 06/14/2023 |
| SERVICE BULLETIN SUBJECT: | DuoPower Gearbox Oil and Filter Samples |
| VINs or MODELS AFFECTED: | Service Specified Buses |
| COMPLETE BY: | Next Service Opportunity |
| SERVICE BULLETIN #: | FC-23-094 |
| LABOR OP CODE: | PP60Z |

| <u>Labor Table</u> | | | | |
|--------------------|------------------|-----------------------|-------------------------|--------------------|
| | Operation | Number of Technicians | Hours | Labor Time (T x H) |
| 1 | Step 1 – Step 23 | 1 | 1.5 | 1.5 |
| | | | Total Labor Time | 1.5 |

DuoPower Gearbox Oil and Filter Samples

Retrofit Description:

This procedure describes the process of acquiring oil and filter samples from the Duopower gearboxes.

Tools/Parts Required:

Tools and Supplies Required:

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|----------------------------|----------|
| 10mm Socket | |
| 13mm Socket | |
| Torque Wrench | |
| Fluid Fill Pump | |
| Marker | |
| 500mL Liter Sample Bottle | 4 EA |
| Plastic Bag (Small) | 2 EA |
| Plastic Bag (Large) | 1 EA |
| Gearbox Oil (Not Supplied) | 2-10 Qts |

Kit Parts Required:

| | | |
|--------|-------------------------------------------------------|------|
| 052501 | OIL FILTER, REPLACEMENT KIT, OIL COOLER, GEARBOX, EMP | 2 EA |
|--------|-------------------------------------------------------|------|

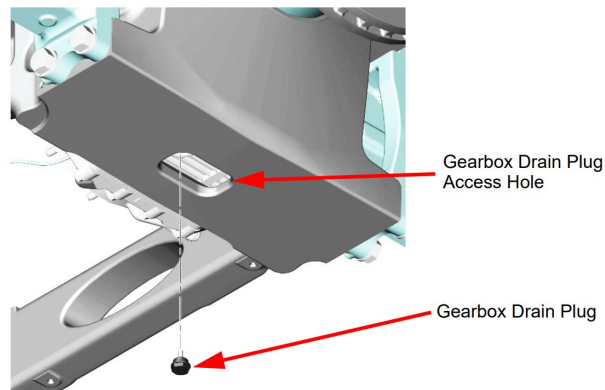
Procedure:

1. Prepare oil sample containers by labeling with:
 - a. The last 4 digits of VIN
 - b. Bus Side Location (CS or SS)
 - c. Milage accumulated on the gearbox oil (from last oil change)
 - d. Sample Number (1 or 2)
2. Prepare oil filter sample bags by labeling with:
 - a. The last 4 digits of VIN
 - b. Bus Side Location (CS or SS)
 - c. Milage accumulated on the gearbox oil (from last oil change)
3. Drive for approximately ten (10) miles to bring the vehicle up to operating temperature and to adequately stir up the fluid in the gearbox casing.

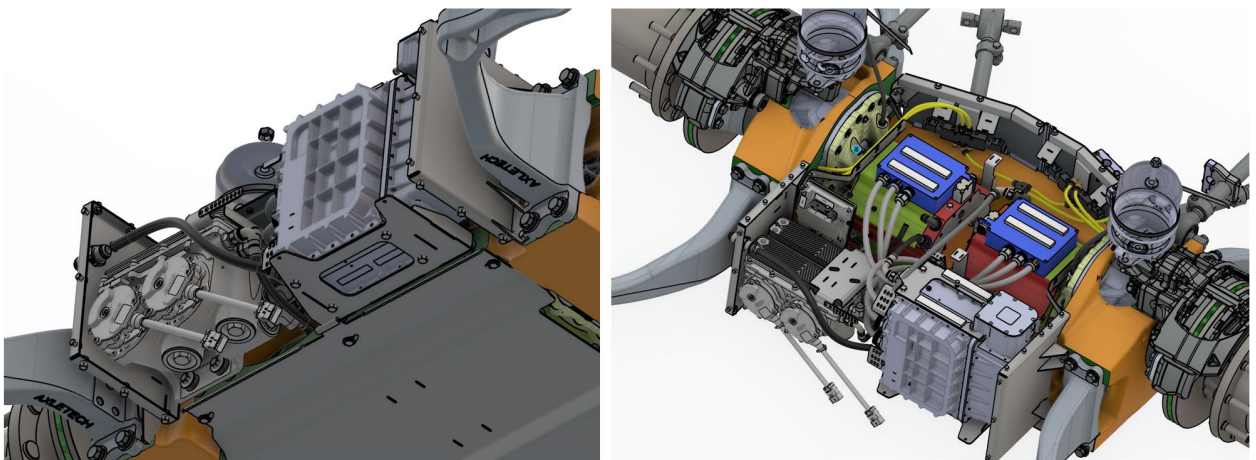
NOTE: Be prepared to drain the fluid immediately after shutdown while the fluid is still at normal operating temperature.
4. Using four Wheel Lifts, raise the bus into the air. Using four Jack Stands, support the bus for safety.
5. Gain access to the street side gearbox oil drain plug on the bottom side of the gearbox.
6. Place catch pan underneath the gearbox oil drain plug.

7. Remove the drain plug and allow 2 seconds of fluid to drain before collecting oil in sample containers.

NOTE: Make sure to collect oil in the containers in the order labeled on the containers as “Sample Number”.

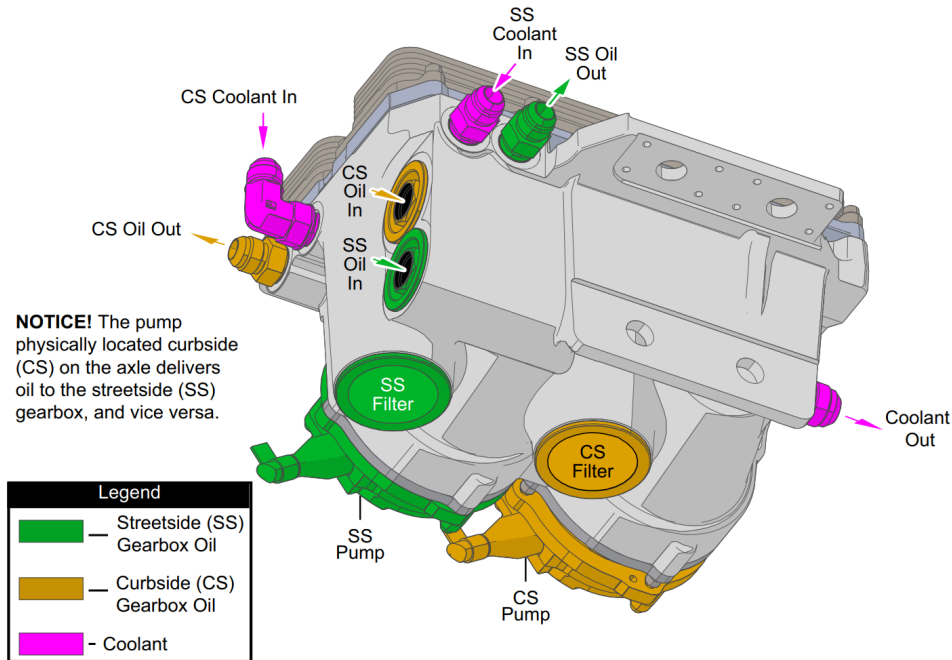


8. Collect 500mL of oil in each of the sample containers as the oil drains out of the gearbox.
9. Analyze the oil in the sample containers. If the oil contains particles of the decaying filter, ensure all the street side gearbox oil has been drained.
10. Reinstall the drain plug.
11. Discard the oil that was initially drained and not caught with sample container.
12. Repeat Step 5-11 for the curb side gearbox oil.
13. Remove the DuoPower front/rear cover plates and top plates to provide access to the system. Retain fasteners for reinstall.



- Remove and inspect the street side oil filter. Place the filters in the labeled bag taking care not to contaminate the filter with any outside debris. If the oil filter is decaying, ensure all the street side gearbox oil has been drained.

NOTE: The Oil Module is located on the Street Side of the DuoPower axle. The filter physically located towards the curb side is the Street Side oil filter. The filter located towards the Street Side is the Curb Side oil filter.

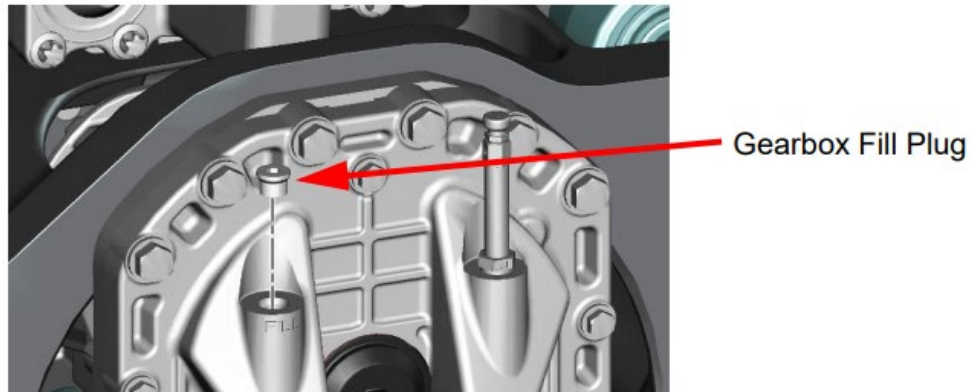


- Remove and inspect the Street Side wire mesh filter. Clean off any debris if necessary and reinstall. If filter debris is found in the wire mesh filter, all of the gearbox oil will need to be replaced.

NOTE: The Street Side prefilter is located on the lower side of the module while the Curb Side prefilter is located on the upper side.

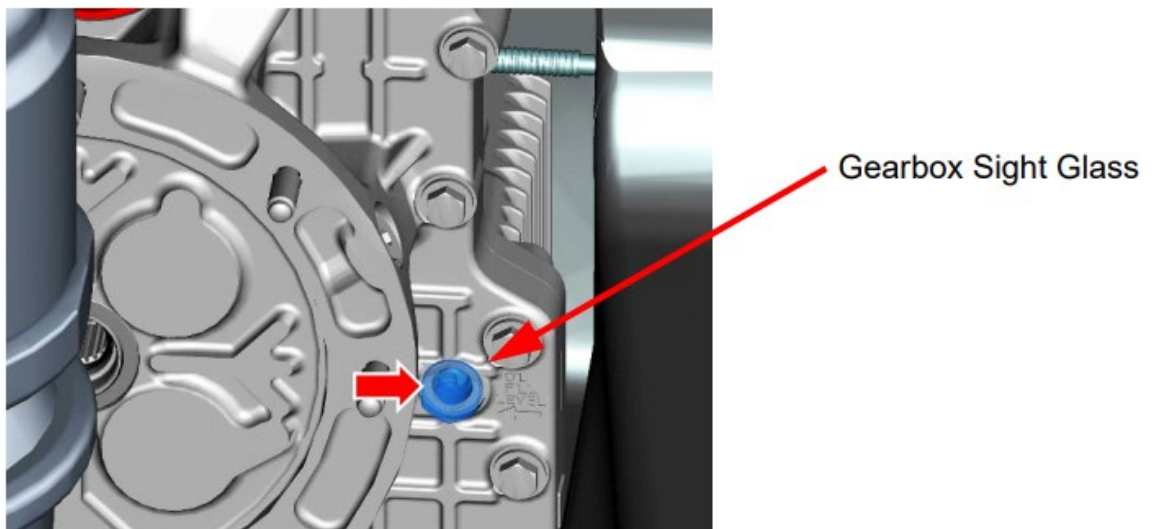
- Repeat Steps 14-15 for the Curb Side Gearbox.
- Install the 2 new oil filters.
- Install the Oil Filter Caps. **Torque the to 200 ft-lbs (270 Nm).**
- Install the Mesh Prefilter Caps. **Torque the to 155 ft-lbs (210 Nm).**
- Check and clean the street side drain plug and then install drain plug into the bottom of the gearbox. **Torque drain plug to 18 ft-lbs.**

21. Remove the street side gearbox fill plug.



22. Using a fluid fill pump with angled fill tip, fill the street side gearbox with the recommended fluid until seen in the sight glass.

NOTE: Gearbox fluid alternatives shown in Appendix A.



23. Apply a small amount of gearbox oil to the O-ring seal on the fill plug and then install the street side gearbox fill plug. **Torque to 13 ft-lbs (18 Nm).**
24. Repeat Steps 20-23 for the Curb Side Gearbox.
25. Run both the Street Side and Curb Side oil pumps to purge any air from the system.
26. If necessary, top off gearbox oil until fluid is seen in both sight glasses.
27. Install the removed axle panels with the retained fasteners.
28. Remove the Jack Stands and lower the bus using the Wheel Lifts.

Appendix A: Gearbox Oil Alternatives

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|------------------------------------------|-------------------------------------------------------------|
| Allied Oil and Tire Co. | Allied Syntx MTF 7000 Synthetic Transmission Fluid |
| Bardahl de Mexico S.A. de C.V. | Bardhl Gear Oil MTF Fully SYN PS-386 |
| BASF Corporation | EMGARD MTF 7000 |
| BG Products, Inc. | SAE 40 Full Synthetic Transmission Oil |
| BP Lubricants USA Inc. | Transmax Manual E Longlife 40 |
| Chevron Products | Delo® Syn-trans XE SAE 75W90 |
| Chrysan Industries | Chrysan PS-386 MTF |
| CHS Incorporated | Maxtron MT 40 |
| Citgo Petroleum Corp | Syndurance Synthetic MTF |
| | Mystik SX-7000 Synthetic MTF |
| Comercial Importadora S.A. de C.V. | Synquest CD 50 |
| Comercial Roshfrans, S.A. de C.V. | Gear Plus CD-700 (Synthetic Transmission Fluid) |
| David Weber Oil Co. | Gibraltar Syngear PS-386 SAE 40 |
| Exxon Mobil Fuels and Lubricants | Mobil Delvac 1 Transmission Fluid 40 |
| Federated Co-Operatives Ltd. | MTA EA Synthetic |
| Fuchs Petrolub | Fuchs Titan Cytrac ETN SAE 40 |
| Industrial Villanueva, S.A. DE C.V. | Invisa Synthetic Oil Gear AC SAE 75W-90 |
| Lubrication Engineers, Inc. | Synolec Transmission Fluid SAE 40 (640) |
| Mercedes-Benz Australia/Pacific Pty Ltd | Alliance Prime Trans Plus 40 |
| Navistar | Fleetrite PS-386 Synthetic Manual Transmission Lubricant |
| Northland Products Co. | Northland Synergy Synthetic® ExP Transmission 50 |
| Petro-Canada Lubricants Inc. | TRAXON E Synthetic MTF (Synthetic Transmission Fluid) |
| Phillips 66 Company | Triton® Synthetic MTF |
| | Kendall SHP® Synthetic MTF |
| Quick Smart Products P/L | Road Trans MTF PS-386 |
| Raloy Lubricantes, S.A. C.V. | Raloy Transintex Plus SAE 40 |
| Repsol Lubricantes Y Especialidades S.A. | Repsol Cartago LD 40 |
| Royal Manufacturing Co. | Monarch Syntran Plus SAE 40 |
| Safety-Kleen Oil | Performance Plus Synthetic HD PS-386 Transmission Fluid |
| Shell | Spirax S6 GME 40 |
| Texas Refinery | Syntex 2000 SAE40 Synthetic Manual Transmission Lubricant |
| The Valvoline Company | Syn Gard™ Transmission Fluid E386 |
| Total Mexico S.A. DE C.V. | Transmission SYN 7000 |
| TOTAL Specialties USA, Inc. | TOTAL Transmission Gear 8 FE SAE 40 |
| Warren Oil | America Max Full Synthetic SAE 40 Manual Transmission Fluid |
| | Lubriguard SAE 40 Synthetic Heavy Duty Transmission Fluid |
| | PURUS Synthetic SAE 40 Heavy Duty Transmission Fluid |