



Maintenance Schedule

HME Inc. Custom Chassis

HME, INC.

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Preface



WARNING: If the owner/operator of the vehicle is a skilled technician and intends to perform the vehicle maintenance and servicing, he/she is strongly urged to purchase and follow the appropriate service manuals. Failure to properly perform maintenance and servicing procedures could result in property damage, personal injury or death.

Your vehicle has been engineered and manufactured to provide economical and trouble-free service. However, it is the owner's responsibility to see that the vehicle receives proper care and maintenance.

As with any vehicle, care should be taken to avoid being injured when performing maintenance or repairs or making any checks. Improper or incomplete service could result in the vehicle not working properly which, in turn, may result in personal injury or damage to the vehicle or its equipment. If you have any question about performing some service, have the service done by a skilled technician.

The routine maintenance schedule provides maintenance intervals and the corresponding procedures that should be performed in order to properly maintain this product.

Intervals marked in the schedule only apply to Original Equipment (OE) components.

Equipment and components supplied by manufacturers other than HME, Inc. can impact the performance and reliability of the product if not correctly maintained. If your product is equipped with a component or accessory not manufactured or supplied by HME, Inc., see the maintenance recommendations provided by the component manufacturer.

HME, Inc. products are customized for end users. Customer selectable options listed in the routine maintenance schedule may not be on your product. Verification of the components installed on your product may be necessary prior to performing maintenance. For detailed information or assistance, contact your local HME, Inc. Certified Dealer.

The maintenance schedule provides guidance on servicing items supplied by component manufacturers through the use of the following statements:

- The statement "See equipment manufacturer service information" indicates the equipment manufacturer service information should be referenced for maintenance information.
- The statement "If equipped" indicates if the item is on your product, it should be serviced at the marked interval.
- The statement "See component manufacturer service information" indicates the component manufacturer service information should be referenced for maintenance information.

Multiple intervals may be marked for one maintenance item. The first marked interval indicates a first service event or break-in requirement for that item. The second marked interval indicates the routine service interval which should be followed for that item.

The end of the maintenance schedule does not indicate the end of required maintenance. Continue performing maintenance events at the indicated routine intervals throughout the life of the product.



Perform maintenance at whichever interval occurs first. At each scheduled maintenance interval, perform all previous maintenance checks that are due for scheduled maintenance



Maintenance Guidelines



WARNING: Failure to properly perform maintenance and servicing procedures could result in property damage, personal injury or death.



WARNING: Making any modifications to any part, component or system of the vehicle, can adversely affect the quality and reliability of your vehicle and must be avoided. Modifications to systems could result in property damage, personal injury or death.



WARNING: The use of inferior parts can adversely affect the quality and reliability of your vehicle, which could result in property damage, personal injury or death.



WARNING: To avoid property damage, personal injury or death, take care when performing any maintenance or making any check or repair. Some of the materials in this vehicle may also be hazardous if used, serviced, or handled improperly. If you have any questions pertaining to the service, have the work done by a skilled technician.



WARNING: To avoid property damage, personal injury or death when servicing the vehicle, park on a flat level surface, set the parking brake, turn off the engine, and chock the wheels.



WARNING: Always disconnect the ground battery terminal first, then the positive cable prior to electric welding. Attach the welder ground cable as close as possible to the part being welded. If welding close to an electrical component, temporarily remove that component. Failure to follow this warning could result in property damage, personal injury, or death.

When Servicing Your Vehicle Always:

1. Turn off the ignition switch unless the procedure calls for a running engine.
2. Set the parking brake and chock the wheels.
3. Use support stands, not a jack, whenever you must be under a raised vehicle.
4. Do not smoke.
5. Wear safety glasses for eye protection.



6. Operate engine only in a well-ventilated area.
7. Do not work on brakes unless proper precautions are taken to avoid inhaling friction material dust.
8. Do not wear loose clothing, hanging jewelry, watches, or rings. Tie up long hair and avoid rotating machinery.
9. Avoid contact with hot metal parts; allow hot components to cool before working on them.
10. Correct any problems that were revealed during inspection, prior to operating the vehicle.

Supporting Your Vehicle for Service



WARNING: Always use floor stands to support the vehicle before working under it. Using only a jack could allow the vehicle to fall resulting in property damage, personal injury or death.

When performing service repairs on a vehicle, first:

1. Park vehicle on level concrete floor.
2. Set parking brake and/or block wheels to prevent vehicle from moving.
3. Select jack with a rated capacity sufficient to lift the vehicle.
4. Raise vehicle with jack applied to axle. (DO NOT use bumper as a lifting point.)
5. Support vehicle with floor stands under axle(s).
 1. If axle or suspension components are to be serviced, support vehicle with floor stands
 2. under frame side members, preferably between the axles.



Air Dryer

EVERY 900 HOURS, 25,000 MILES OR 3 MONTHS

- Check for moisture in the air brake system by opening reservoirs, drain cocks, or drain valves and checking for presence of water. If moisture is present, the desiccant cartridge may require replacement; however the following conditions can also cause water accumulation and should be considered before replacing the desiccant:
 - An outside air source has been used to charge the system. This air does not pass through the drying bed.
 - Air usage is exceptionally high and not normal for a highway vehicle. This may be due to accessory air requirement that does not all the compressor to load and unload in a normal fashion.
 - Check for high air system leakage.
 - If the vehicle vocation has changed it may be necessary to upgrade the compressor size.
 - The air dryer has been installed in a system that has been previously used without an air dryer.
 - The system will be saturated with moisture and several weeks of operation may be required to dry it out.
 - A single check valve, or a device with a check valve feature, may have been installed to the inlet port of the supply tank or in the delivery line between the air dryer and the supply tank.
 - This will prevent regeneration of the air dryer desiccant cartridge and lead to moisture accumulation in the air reservoirs.
 - Location of the air dryer is too close to the air compressor.
 - In areas where more than a 30 degree range of temperature occurs in one day, small amounts of water can temporarily accumulate in the air brake system due to condensation.
 - Under these conditions, the presence of small amounts of moisture is normal and should not be considered as an indication that the dryer is not performing properly.

***NOTE* A small amount of oil in the system is normal and should not be considered as a reason to replace the desiccant cartridge; oil-stained desiccant can function adequately.**

- Visually check for physical damage to the AD-SP air dryer such as dented desiccant cartridge, chaffed or broken air and electrical lines and broken or missing parts. Check the SC-PR valve also.
- Check mounting bolts for tightness. Re-torque to 50 ft-lbs.
- Perform the Operation and Leakage Tests.

EVERY 3,600 HOURS, 100,000 MILES OR 12 MONTHS

- Test the AD-SP air dryer turbo cut-off and purge valves for leakage. Disconnect the supply, control and delivery lines from the AD-SP air dryer. Perform the test below in the order they are presented.
 - Apply 120 PSI shop air pressure to the control port and a soap solution to the supply port.
 - If leakage exceeds a 1" bubble in 5 seconds, repair the turbo cut-off piston and valve before proceeding to step 2.
 - With 120 PSI shop air pressure applied to the control port, apply a soap solution to the purge exhaust port.
 - If leakage exceeds a 1" bubble in 5 seconds, repair the purge piston and valve before proceeding to step 2.



- With 120 PSI shop air pressure applied to the control and supply port, applies a soap solution to the purge exhaust port.
 - If leakage exceeds a 1" bubble in 5 seconds, repair the turbo cut-off piston and valve before proceeding to step 2.
- With a plug installed in the delivery port, 0 PSI in the control port, and 120 PSI applied to the supply port, apply a soap solution to the purge exhaust port.
 - If leakage exceeds a 1" bubble in 5 seconds, repair the purge piston and valve before proceeding to step 2.
- Perform the Operation and Leakage Tests.

EVERY 10,800 HOURS, 350,000 MILES OR 36 MONTHS

- Replace the air dryer desiccant cartridge.
- *NOTE*** The desiccant change interval may vary from vehicle to vehicle. Although typical desiccant cartridge life is 3 years, many will perform adequately for a longer period of time. In order to take maximum advantage of desiccant life and assure that replacement occurs only when necessary, it is important that Operation and Leakage Tests be performed.
- Perform the Operation and Leakage Tests shown below.

WARNING: This air dryer is intended to remove moisture and other contaminants normally found in the air brake system. Do not inject alcohol, anti-freeze, or other deicing substances into or upstream of the air dryer. Alcohol is removed by the dryer, but reduces the effectiveness of the device to dry air. Use of other substances can damage the air dryer and may void the warranty.

OPERATION & LEAKAGE TESTS

- Check for excessive leakage around the purge valve. With the compressor in loaded mode (compressing air), apply a soap solution to the purge valve exhaust port and observe that leakage does not exceed a 1" bubble in 5 second. If the leakage exceeds the maximum specified, service the purge valve assembly.
- Check for leakage around the desiccant cartridge. With the compressor in loaded mode (compressing air), apply a soap solution around the desiccant cartridge seal and observe that no leakage occurs. If leakage is noted, tighten the cartridge using a strap wrench and re-test for leakage.
- While observing the dash gauge(s), build up system pressure at approximately 1,800 engine/compressor rpm to governor cut-out. Note the pressure on the dash gauge(s) at the moment governor cutout occurs and that the AD-SP air dryer purges with an audible escape of air. Observe the dash gauge(s) pressure for two minutes after the purge cycle begins. The front axle service (secondary) reservoir pressure should not drop more than 8-14 psi below the governor cutout pressure noted and the rear axle (primary) reservoir pressure should not drop more than 2 psi. Perform this test 3 times to positively confirm the values.
 - If the pressure drop in the front axle reservoir exceeds 8-14 psi, check the air brake system for excessive leakage and repair and re-test. If the excessive pressure drop persists, replace the AD-SP air dryer.
 - If the pressure drop in the rear axle reservoir exceeds 2 psi, check the air brake system for excessive leakage and repair.
- Build up system pressure to governor cut-out, wait 30 seconds for completion of the purge cycle, then "Fan" the service brakes to reduce system air pressure to governor cut-in. Note that the system once again builds to full pressure and is followed by an AD-SP air dryer purge.



- Check the operation of the SC-PR single check protection valve. Build system pressure to governor cutout, wait 30 seconds for completion of the purge cycle, then drain all air pressure from the supply reservoir while observing the front axle reservoir dash gauge. Reservoir pressure should decrease to approximately 95 psi and stop. If front axle reservoir pressure continues to drop replace the SC-PR™ valve. **Do not attempt to adjust the SC-PR valve.** This valve is factory preset and mix adjustment can result in insufficient air pressure in the front axle reservoir in the event of a line or component failure. The rear axle reservoir pressure should remain constant.
- Check the operation of the heater and thermostat assembly in the body during cold weather operation (if possible) as follows:
 - Electric Power to the Heater and Thermostat With the ignition or engine kill switch in the ON position, check for voltage to the heater and thermostat assembly using a voltmeter or test light. Unplug the electrical connector at the air dryer and place the test leads on each of the pins of the male connector. If there is no voltage, look for a blown fuse, broken wires, or corrosion in the vehicle wiring harness. Check to see if a good ground path exists.
 - Thermostat and Heater Operation
 - Turn off the ignition switch and cool the body assembly to below 40 degrees Fahrenheit.

NOTE If this test is performed in warm weather (above 30 deg. F) it may be necessary to remove the heater and thermostat assembly and cool it in a freezer.

Using an ohmmeter, check the resistance between the electrical pins in the connector. The resistance should be 1.5 to 1.7 ohms for the 12 volt heater assembly and 6.0 to 6.9 ohms for the 24 volt heater assembly. If the resistance is higher than the maximum stated, replace the heater and thermostat assembly. Warm the heater and thermostat assembly to over 90 degrees Fahrenheit and again check the resistance. The resistance should exceed 1000 ohms.

- If the resistance values obtained are within the stated limits, the thermostat and heater assembly is operating properly.
- If the resistance values obtained are outside the stated limits, replace the heater and thermostat assembly.

Warranty Note: Failure to properly maintain air dryer will not void emissions-related components warranty but will void general warranty clause.



Allison

PERIODIC INSPECTION AND CARE

Transmission Inspection

Clean and inspect the exterior of the transmission at regular intervals. Severity of service and operating conditions determine the frequency of these inspections. Inspect the transmission for:

- Loose bolts—transmission and mounting components.
- Fluid leaks—repair immediately.
- Loose, dirty, or improperly adjusted throttle sensor.
- Damaged or loose hoses.
- Worn, frayed, or improperly routed electrical harnesses.
- Worn or damaged electrical connectors.
- Dented, worn or out-of-phase driveline U-joints and slip fittings.
- Clogged or dirty breather (vent assembly).
- Check transmission fluid for evidence of engine coolant.

Vehicle Inspection

Check the vehicle cooling system occasionally for evidence of transmission fluid. Transmission fluid in the vehicle cooling system indicates a faulty oil cooler.

Welding

CAUTION: When welding on the vehicle:

- DO NOT WELD on the vehicle without disconnecting from the TCM all control system wiring harness connectors.
- DO NOT WELD on the vehicle without disconnecting TCM battery power and ground leads.
- DO NOT WELD on any control components.
- DO NOT CONNECT welding cables to any control components.

A label describing on-vehicle welding precautions (ST2067EN) is available from your authorized Allison service dealer and should be installed in a conspicuous place. A vehicle used in a vocation that requires frequent modifications or repairs involving welding must have an on-vehicle welding label.

FLUID RECOMMENDATIONS

The hydraulic fluid (oil) used in the transmission directly affects transmission performance, reliability, and durability. Only a fluid meeting TES 295 or DEXRON®-III specifications recommended for use in 3000 and 4000 Product Family transmissions. TranSynd™ is a fully synthetic transmission fluid developed by Allison Transmission and Castrol Ltd. and is fully qualified to the Allison Transmission TES 295 specifications. To make sure a fluid is qualified for use in Allison transmissions, check for fluid license or approval numbers on the container, or consult the lubricant manufacturer. Consult your Allison Transmission dealer or distributor before using other fluid types.

CAUTION: Disregarding minimum fluid temperature limits can result in transmission malfunction or reduced transmission life.



TRANSMISSION FLUID AND FILTER CHANGE INTERVALS

Severe Vocation: All Retarders, On/Off-Highway, Refuse, Transit, and Intercity Coach with duty cycle greater than one stop per mile.

General Vocation: Intercity Coach with duty cycle less than or equal to one stop per mile. Local conditions, severity of operation, or duty cycle may require more or less frequent change intervals that differ from the published recommended fluid change intervals of Allison Transmission. Transmission protection and fluid change intervals can be optimized by the use of fluid analysis. Filters must be changed at or before recommended mileage, months, or elapsed hour intervals (whichever occurs first).

Product Family 3000

Schedule 1: Non-TranSynd/Non-TES 295 Fluid

Severe Vocation:

Fluid: 12,000 miles (20,000 km), 6 months, 500 hours

Filters:

Main: 12,000 miles (20,000 km), 6 months, 500 hours

Internal: Overhaul

Lube/auxiliary: 12,000 miles (20,000 km), 6 months, 500 hours

General Vocation:

Fluid: 25,000 miles (40,000 km), 12 months, 1000 hours

Filters:

Main: 25,000 miles (40,000 km), 12 months, 1000 hours

Internal: Overhaul

Lube/auxiliary: 25,000 miles (40,000 km), 12 months, 1000 hours

Schedule 2: TranSynd/TES 295 Fluid

Recommendations in Schedule 2 are based upon the transmission containing 100 percent TranSynd™ or TES 295 fluid. 3000 Product Family filter change intervals in Schedule 2 are only valid with the use of Allison Gold series filters. Flushing machines are not recommended or recognized due to variation and inconsistencies with assuring removal of 100 percent of the used fluid.

Severe Vocation:

Fluid: 75,000 miles (120,000 km), 36 months, 3000 hours

Filters:

Main: 75,000 miles (120,000 km), 36 months, 3000 hours

Internal: Overhaul

Lube/auxiliary: 75,000 miles (120,000 km), 36 months, 3000 hours

General Vocation:

Fluid: 150,000 miles (240,000 km), 48 months, 4000 hours

Filters:

Main: 75,000 miles (120,000 km), 36 months, 3000 hours

Internal: Overhaul

Lube/auxiliary: 75,000 miles (120,000 km), 36 months, 3000 hours



Product Family 4000

INITIAL FILTER CHANGE INTERVAL: Main/Lube—5000 miles (8000 km), 200 hours

Schedule 1: Non-TranSynd/Non-TES 295 Fluid

Severe Vocation:

Fluid: 12,000 miles (20,000 km), 6 months, 500 hours

Filters:

Main: 12,000 miles (20,000 km), 6 months, 500 hours

Internal: Overhaul

Lube/auxiliary: 12,000 miles (20,000 km), 6 months, 500 hours

General Vocation:

Fluid: 25,000 miles (40,000 km), 12 months, 1000 hours

Filters:

Main: 25,000 miles (40,000 km), 12 months, 1000 hours

Internal: Overhaul

Lube/auxiliary: 25,000 miles (40,000 km), 12 months, 1000 hours

Schedule 2: TranSynd/TES 295 Fluid

4 inch Control Module (3.5inchapproximately) — Requires filter kit P/N29540494

NOTE: The following recommendations in Schedule 2 and 3 based upon the transmission containing 100 percent TranSynd™ or TES295fluid. Filter change intervals are valid only if Allison Transmission supplied filters are used. 4000 Product Family filter change intervals in Schedule 2 and 3 are valid only with the use of Allison Transmission Gold series filters. Flushing machines are not recommended or recognized due to variation and inconsistencies with assuring removal of 100 percent of the used fluid.

Severe Vocation:

Fluid: 75,000 miles (120,000 km), 36 months, 3000 hours

Filters:

Main: 75,000 miles (120,000 km), 36 months, 3000 hours

Internal: Overhaul

Lube/auxiliary: 75,000 miles (120,000 km), 36 months, 3000 hours

General Vocation:

Fluid: 150,000 miles (240,000 km), 48 months, 4000 hours

Filters:

Main: 75,000 miles (120,000 km), 36 months, 3000 hours

Internal: Overhaul

Lube/auxiliary: 75,000 miles (120,000 km), 36 months, 3000 hours



Schedule 3: TranSynd/TES 295 Fluid

2 inch Control Module (1.75inchapproximately) — Requires filter kit P/N29540493

Severe Vocation:

Fluid: 50,000 miles (80,000 km), 24 months, 2000 hours

Filters:

Main: 50,000 miles (80,000 km), 24 months, 2000 hours

Internal: Overhaul

Lube/auxiliary: 50,000 miles (80,000 km), 24 months, 2000 hours

General Vocation:

Fluid: 150,000 miles (240,000 km), 48 months, 4000 hours

Filters:

Main: 50,000 miles (80,000 km), 24 months, 2000 hours

Internal: Overhaul

Lube/auxiliary: 50,000 miles (80,000 km), 24 months, 2000 hours



Cam Brakes

Components	Meritor Specification	NLGI Grade	Grease Type	Outside Temperature
Retainer Clips Anchor Pins Rollers (Journals Only) Camshaft Bushings Camshaft Splines Automatic Slack Adjusters*	0-704	2	Calcium Sulfonate Complex	Down to -30°F (-34.4°C)
Optional: Low temperature clay-base grease, otherwise recommend 0-704. Retainer Clips Anchor Pins Rollers (Journals Only) Camshaft Bushings Camshaft Splines Automatic Slack Adjusters*	0-645	2	Synthetic Oil, Clay-Base	Down to -65°F (-54°C)
Retainer Clips Anchor Pins Rollers (Journals Only) Camshaft Bushings Camshaft Splines (Excluding Automatic Slack Adjusters)	0-617	1 and 2	Lithium-Base	Refer to the grease manufacturer's specifications for the temperature service limits.
Optional: Lithium grease, otherwise recommend 0-704. Automatic Slack Adjusters*	0-692 (every 0-692 grease also meets 0-617)	1 and 2	Lithium-Base	Down to -40°F (-40°C)
Camshaft Splines	0-704, 0-617, 0-645, 0-692 as noted above.	Refer to Above	Refer to Above	Refer to Above
	0-641	--	Anti-Seize	Not applicable for anti-seize compound.

*For non-Meritor automatic slack adjusters, refer to the vehicle manufacturer's instructions for maintenance intervals and specifications.



AUTOMATIC SLACK ADJUSTER GREASE SPECIFICATIONS

Components	Meritor Specification	NLGI Grade	Grease Type	Outside Temperature
Automatic Slack Adjuster*	0-704	2	Calcium Sulfonate Complex	Down to -30°F (-34.4°C)
	0-645	2	Synthetic Oil, Clay-Base	Down to -65°F (-54°C)
	0-692	1 and 2	Lithium Base	Down to -40°F (-40°C)
Clevis Pins	Any of Above	Refer to Above	Refer to Above	Refer to Above
	0-641	--	Anti-Seize	Not applicable for anti-seize compound

*For non-Meritor automatic slack adjusters, refer to the vehicle manufacturer's instructions for maintenance intervals and specifications.

APPROVED GREASES

Lubricant	Recommendation
0-704	TEK-678 Lubricant
0-645	Mobilgrease 28(Military) Mobiltemp SHC32 (Industrial) Aerospace Lubricants Inc. Tribolube 12-Grade 1
0-692	Amoco Super Permalube Grade 2 Citgo Premium Lithium EP-2 Grade 2 Exxon Ronex MP-2 Grade 2 Kendall L-427 Super Blu Grade 2 Molilith AW-1 Grade 1 Sohio Factran EP-2 Grade 2
0-641	Never-Seez Compound Corp.



INSPECTION AND MAINTENANCE INTERVALS

Application	Interval
Linehaul and General Service Vehicles	<p>Q+, Cast+ and Q Series brakes at every 100,000 miles (160,000 km); or every six months, whichever comes first.</p> <p>P Series Brakes at every 50,000 miles (80,000 km); or every six months, whichever comes first.</p>
General Service and Heavy Service Vehicles	<p>At least every four months, when you replace the seals and reline the brakes.</p> <p>Every two weeks during the first four-month period, inspect for hardened or contaminated grease, and for the absence of grease, to help determine lubrication intervals.</p> <p>Lubricate more often for severe-duty applications.</p>
Restricted Service Vehicles	Lubricate every six months, at each reline, or at every 10,000 miles (16,000 km), whichever comes first.



Cummins

Perform maintenance at whichever interval occurs first. At each scheduled maintenance interval, perform all previous maintenance checks that are due for scheduled maintenance.

Maintenance Procedures at Daily Interval

- Air Cleaner Restriction - check
- Air Intake Piping - check
- Air Tanks and Reservoirs - drain
- Coolant Level - check
- Charge-Air Piping - check
- Crankcase Breather Tube - check
- Drive Belts - Check
- Fan, Cooling - inspect
- Fuel-Water Separator - drain
- Lubricating Oil Level - check
- After-treatment Exhaust Piping - check
- Diesel Exhaust Fluid (DEF) Level - check

Maintenance Procedures at 40,000 Kilometers [25,000 Miles], 400 Hours, or 6 Months

- Lubricating Oil and Filters - change
- Supplemental Coolant Additive (SCA) and Antifreeze Concentration - check
- Radiator Pressure Cap - test
- Charge-Air Cooler - check

Maintenance Procedures at 48,000 Kilometers [30,000 Miles], 1000 Hours, or 6Months

- Pressure Fuel Filter - change
- Fuel Filter Suction - change

Maintenance Procedures at 80,000 Kilometers [50,000 Miles], 1500 Hours, or 1 Year

- Air Compressor Discharge Lines - check
- Air Compressor Air Cleaner Element - check
- Air Leaks, Air Intake and Exhaust Systems - check
- Belt Tensioner, Refrigerant Compressor, and Automatic - check
- Cooling Fan Belt Tensioner - check
- Coolant Filter - change
- Engine Wiring Harness - check

Maintenance Procedures at 200,000 Kilometers [125,000 Miles], 3000 Hours, or 2 Years

- Radiator Hoses - check
- Cold Starting Aid - check
- Radiator Shutter Assembly - check
- Engine Mounting Bolts - check



- Engine Steam Cleaning - clean

Maintenance Procedures at 240,000 Kilometers [150,000 Miles] or 4000 Hours

- Crankcase Breather Element - change
- After-treatment Fuel Injector - clean

Maintenance Procedures at 400,000 Kilometers [250,000 Miles], 6000 Hours, or 2 Years

- Cooling System - flush
- Vibration Damper, Viscous - inspect
- Engine Brake - adjust
- Overhead Set - adjust

Maintenance Procedures at 480,000 Kilometers [300,000 Miles] or 6750 Hours

- After treatment Diesel Exhaust Fluid Dosing Unit Filter - change
- After treatment Diesel Particulate Filter - check

Maintenance Procedures at 800,000 Kilometers [500,000 Miles], 10,000 Hours, or 5 Years

- Fan Hub, Belt Driven - check

1. The lubricating oil and lubricating oil filter intervals are based on Cummins® Engineering Standard 20,081 and a normal duty cycle. Oil change intervals can be adjusted based on fuel consumption and whether or not the oil meets Cummins® Engineering Standard 20,081. See the Oil Drain and Fuel Filter Change Intervals Table for Severe Duty and Light Duty drain intervals in this section.
2. Follow the manufacturer's recommended maintenance procedures for the starter, alternator, generator, batteries, electrical components, engine brakes, exhaust brake, charge-air cooler, air compressor, air conditioner compressor, and fan clutch.
3. Test the SCA concentration level every 6 months unless the concentration is over three units; then check at every oil drain interval until the concentration is below three units. Use the following procedure for coolant condemnation limits. Refer to Procedure 018-004 in Section V.
4. The crankcase breather element intervals can be adjusted based on engine blow-by. See the Crankcase Breather Element Change Intervals table below.
5. The components of the engine brake that are subjected to wear during normal operation of the engine are available as a kit through Cummins® Distributors/Dealers. It is recommended to do this maintenance at 400,000 km [250,000 mi], 6,000 hours, or 2 years.
6. The after treatment diesel particulate filter intervals can be adjusted, based on the type of engine oil that is used. See the After treatment Cleaning Intervals Table for cleaning intervals.
7. The fuel filter change intervals are based on a normal duty cycle. Fuel filter change intervals can be adjusted based on the fuel consumption. See Oil Drain and Fuel Filter Change Intervals Table in this section for Severe Duty and Light Duty drain intervals.

All low emission EPA 07, EPA 10, EPA13, and EPA Tier 4 Interim/European Union Stage IIIB 2011(174 - 751 hp) engine systems equipped with exhaust after treatment must operate on ultra-low sulfur diesel (ULSD) with a maximum sulfur content of 15 ppm in the United States and 10 ppm in the European



Union. Failure to do so can permanently damage engine and after treatment systems within a short period of time. This damage could cause the engine to become inoperable and affect the warranty coverage on the engine system.

After treatment Cleaning Intervals

Oil Classification Kilometers/miles Hours

CES20081 480,000 [300,000] 6750

CES20078 360,000 [225,000] 6750

Crankcase Breather Element Change Intervals

Engine Blowby Interval

Less than 305 mm-H₂O [12 in-H₂O] 240,000 kilometers [150,000 miles] or 4000 hours

Greater than or equal to 305 mmH₂O [12 in-H₂O] 160,000 kilometers [100,000 miles] or 3000 hours

Oil Drain and Fuel Filter Change Intervals

Select the oil drain and fuel filter change interval based on oil classification for Recreational Vehicle, Refuse, Mixer, Dump, Delivery, Logging, Fire Truck, or Crane vehicle applications. See Table 1.

Table 1 Intervals by Application Type Kilometers Miles Hours Months

Fuel Filter Change 48,000 30,000 1000 6

Oil Drain - CES 20081 (1) (2) 24,000 15,000 400 6

Oil Drain - CES 20078 (1) (2) 30,000 20,000 500 6

If the application is not one of the above, select the oil drain and fuel filter change interval Severe Duty, Normal Duty, or Light Duty, based on how you use the engine. See Oil Drain Intervals by severity km [mi] located in Table 2.

- Follow oil drain interval Severe Duty if the vehicle operates under either of the conditions listed in interval Severe Duty.
- Follow oil drain interval Normal Duty if the vehicle operates under either of the conditions listed in interval Normal Duty and does not meet any of the conditions listed in interval Severe Duty.
- Follow oil drain interval Light Duty if the vehicle operates under both of the conditions listed in interval Light Duty and does not meet any of the conditions listed in interval Severe Duty or interval Normal Duty.

Table 2

Intervals Severe Duty Normal Duty Light Duty

Less than 2.6 kn/liter [6.0 mpg] 2.6 to 3.0 km/liter [6.0 to 7.0 mpg] Greater than 3.0 km/liter [7.0 mpg]

Fuel Filter Change 48,000 km [30,000 mi] 48,000 km [30,000 mi] 56,000 km [35,000 mi]

Oil Drain - CES 20081 (1) (2) (3) 24,000 km [15,000 mi] 32,000 km [25,000 mi] 56,000 km [35,000 mi]

Oil Drain - CES 20078 (1) (2) 32,000 km [20,000 mi] 48,000 km [30,000 mi] 64,000 km [40,000 mi]

1. The use of Centinel™ or any type of oil blending is prohibited. The use of a high quality filter is mandatory.
2. Engines must be operated on ultra-low sulfur diesel (15 ppm sulfur) fuel.
3. For Normal and Light duty cycles only (outlined in the above table): If Valvoline Premium Blue™ or Valvoline Premium Blue Extreme™ is being used; the oil drain intervals listed in the above chart can be increased by 8050 km [5000 miles]. All other oil brands must follow the oil drain intervals listed above.



NOTE: Extending the oil and filter change interval beyond the recommendation will decrease engine life, due to factors such as corrosion, deposits, and wear.

Electrical

ANNUALLY

- The batteries and their connections should be cleaned and inspected annually (more often if conditions are severe).
- Apply corrosion inhibitor to all contacts.
- Inspect all frame rail ground connections and service as necessary.
- Clean and apply a thin layer of high temperature automotive grease to the contact surfaces, assemble and seal connection with electrical insulating varnish.
- Inspect and service alternator belt with others during regular maintenance checkups.

FoamPro Foam Pump

MONTHLY MAINTENANCE

- Inspect wiring, hoses, flowmeters and connections for tightness, corrosion, leaks and/or damage.
- Remove and clean the foam strainer screen(s). Flush as required.
- Check foam pump gear case oil level and refill as necessary with SAE 30 weight non-detergent oil.

ANNUALLY

- Drain the pump oil and refill pump crankcase with SAE 30 weight non-detergent oil. Check for concentrate or water in the drain oil.

NOTE Water quality, flushing and storage techniques, environment and usage may have an effect on your maintenance schedule. To ensure equipment longevity, it is recommended to adjust your schedule accordingly.

CAUTION: Release all pressure and drain all concentrate and water from the discharge system before servicing any of its component parts.

Warranty Note: Failure to properly maintain foam pump will not void emissions-related components warranty but will void general warranty clause.



Front Non-drive Steer Axles

Check to make sure that the front axle mounting U-bolts, attaching, or mounting bolts and nuts are securely tightened.

Observe the following when checking the front axle for damaged, binding, or worn parts and adequate lubrication:

- Kingpin wear inspection requires that no weight be on the tires.
- Kingpin and kingpin bushing lubrication requires that the vehicle weight is off tires and the front wheels be turned fully to the left or right prior to installing grease distribution.
- Kingpin thrust bushing lubrication requires that the vehicle weight is resting on the tires.
- Power grease guns may be used; however, a hand-pumped grease gun is recommended for optimal grease distribution within each component joint.
- Inspect, lubricate, and adjust the wheel bearings at regular intervals. Refer to the axle service manual for recommend intervals.

Normal Maintenance

During operation, the air and oil inside the hub/wheel cavity expands. It is normal for a mist of oil to be present on the outside of the hubcap around the vent slit or hole. Over time, if not wiped off, this film may collect dust and appear unsightly. If the entire face and end of the hubcap become wet with oil, investigate the cause. Refer to the axle service manual for repair procedures.

Routinely clean the hubcap to ensure that the lube level can be easily observed through the clear window as intended. In situations where the window is clean on the outside but discolored on the inside, check the lube level by removing the rubber fill/vent plug and insert a finger into the hole.

The specified lube level for clear window type hubcaps is slightly above the minimum or add line.

If the lube level suddenly drops dramatically below the minimum level, see the axle service manual for diagnostic procedure.

Severity of Service	Typical Vocations	Typical Operation Conditions	Inspection Interval ¹	Lubrication Interval ²	
				King Pin Bushing/Tie Rod End ³	
Light	95% On-highway or turnpike, line haul only.	High Mileage operation, more than 50,000 mi/year (80,500 km/year)	Each oil change or maximum 50,000 miles (80,500 km)	King Pin Bushing/Tie Rod End ³	100,000 miles (161,000 km)
Medium	Fire and rescue, city delivery, inner city, coach, heavy haul, school bus, motor home, transit coach	Lower mileage operation, less than 50,000 mi/year (80,500 km/year)	20,000 miles (32,000 km)	King Pin Bushing/Tie Rod End ³	40,000 miles (64,000 km)
Harsh	Logging, oil field, construction, heavy haul, yard tractor (highway licensed), residential refuse	Low mileage operation, less than 25,000 mi/year (40,250 km/year)	10,000 miles (16,100 km)	King Pin Bushing/Tie Rod End	10,000 miles (16,100 km)



		Heavy-duty service with substantial off-road operation			
Severe	Mining, yard tractor (non-highway licensed), and land fill refuse	Heavy-duty service	5,000 miles (8050 km) or 100 hours	King Pin Bushing/Tie Rod End	5,000 miles (8050 km) or 100 hours
Very Severe	Mining, logging, and construction	Severe duty 80-100% off highway	48 hours	King Pin Bushing/Tie Rod End	48 hours

¹Draw key nuts should be retightened at 6,000 miles (9656 km) and then again, every 36,000 miles (57936 km) thereafter.

²If power washers are used during vehicle cleaning operations, lubrication intervals need to be adjusted. Frequent power-washed vehicles will require more frequent lubrication.

³Tie rod ends with an anti-tilt style seal require lubrication every 10,000 miles (16,100 km).

Front Axle Alignment

Maintaining front axle alignment is very important to achieve maximum tire life and vehicle control. Inspecting steer axle tires in the first 1,500 to 3,000 service miles will generally show if tires are wearing normally.

- Rapid outside shoulder wear on both tires indicates too much toe-in.
- Rapid inside shoulder wear on both tires indicates too much toe-out.
- Excessive wear on the inside or outside of one steer tire but not the other can indicate a toe-in or toe-out condition coupled with a misaligned front or rear axle.
- Pulling to the right or left can indicate misalignment of the front or rear axle, unequal tire pressures, or a damaged/mismatched tire.

Rear Axle

Make sure the axle mounting U-bolt nuts, attaching, or mounting bolts and nuts, are securely tightened. Loose or misaligned rear axles will affect vehicle alignment, front tire wear, and handling. Refer to AXLE U-BOLT NUT TORQUE CHART for torque specifications.

Check the rear axle oil level. Proper oil level minimizes gear wear, heat and damage to the wheel bearings and seals. The oil level should be at the lower edge of the level inspection hole when the vehicle is on level ground. Add oil as necessary.

Refer to the axle manufacturers maintenance manual for additional information.



Hale Pump

PREVENTATIVE MAINTENANCE

POST OPERATION

NOTE If necessary, follow the Extreme Maintenance Conditions.

- On two-stage pumps, remove the suction tube strainers, and reach in to ensure that check valves are free to swing. Also, verify that no foreign matter is caught between the valve and seat.
- Inspect the suction hose rubber washers and washers in the suction tube caps. Remove foreign matter from under these washers. Replace worn, damaged, or dry washers.
- Verify that all discharge valves, booster line valves, drain valves, and cocks are closed.
- Tighten suction cups.

EXTREME CONDITIONS MAINTENANCE

DURING FREEZING WEATHER

- Open all discharge and suction valves, remove suction tube caps, and discharge valve caps.
- Open pump body drain cocks and/or Hale multiple drain valve.
- On two state pumps, move the transfer valve back and forth to both the volume and the pressure positions.
- After the pump is completely drained, replace all caps and close all valves.

AFTER PUMPING FROM SALT WATER, CONTAMINATED WATER, OR WITH FOAM SOLUTION

- After drafting from sea water, contaminated, sandy, or dirty water, flush the pump and suction hoses by using water from a hydrant or other clean water source.
- After pumping foam through the pump, flush as above until all residues of foam have gone.

WEEKLY MAINTENANCE

- Test relief valve system or governor at 150, 200, 250 PSIG.
- Test transfer valve (if applicable).
- Test the priming system.
 - Check lubrication level in priming tank.
- Lubricate all valves, discharge, suction hose, drain, and multi-drain.
- Check pump shift warning indicator lights.

MONTHLY MAINTENANCE

- Complete weekly checks
- Lubricate threads on PM relief valve panel control and check light
- Lubricate remote valve controls
- Check controlled packing leakage and adjust if necessary (8-10 drops per minute)
- Perform dry vacuum test
 - Per NFPA-1911, 22 inches Hg minimum vacuum loss not to exceed 10 inches Hg vacuum in 5 minutes.
- Check drive flange bolts to ensure tightness
- Lubricate suction tube threads
- Clean strainer
- Inspect gaskets
- Check oil level in pump gearbox
- Add oil if necessary



- If necessary, replace oil with SAE EP 90 oil

ANNUAL PROCEDURES

- Complete weekly and monthly checks
- Check gauge calibration
- Check oil level in AutoLube assembly (SAE-EP 9000 or 80W-90)
 - See operation and maintenance manual for details
- Lubricate power transfer cylinder, power shift cylinder, and shift control valve with vacuum cylinder oil, if applicable
- Change pump gearbox oil and refill (SAE-EP 90 oil or 80W-90)
- Check individual drain lines from pump to multi-drain to ensure proper drainage and protection from freezing
- Lubricate transfer valve mechanism on two-stage pumps
 - Dry moly spray is preferred
- Run yearly standard pump test (per NFPA-1911) to check pump performance levels
- Repacking of pump is recommended every two or three years

NOTE The above general recommendations are provided for normal use and conditions. Extreme conditions or variables may indicate a need for increased maintenance. Good preventative maintenance lengthens pump life and ensures greater dependability. Consult service or diagnostic chart in Operator's Manual for detailed information.

Hannay Grounding Reel

PRIOR TO USE EACH DAY

The reel, cable, and clamps should be inspected for:

- Damaged cables
- Broken or defective mechanical parts
- Condition of all component parts to ensure they are clean, tight and mechanically sound.

WARNING: If any of the above conditions exist, the truck reel shall not be used until repairs are made.

BI-ANNUALLY

- Remove cable and bonding jumper from the reel and clean all connections.
- Inspect reel for mechanical damage and proper working condition.
- Locate the grease zerk fitting on the side of one of the reel discs.
 - With a hand operated grease gun, pump in a couple pumps of grease.
 - Hannay Reels recommends Acheson GP20 #0 conductive grease or equivalent.
- Verify current carrying capacity of the cable and bonding jumper.
- Reconnect cable and bonding jumper to reel.
 - A brass or broze bolt must always be used to attach bonding jumper to reel shaft.
- Using a low resistance Ohm meter, measure from the cable connection on the roto-ground to the bonding jumper shaft connection.
 - Resistance readings in excess of 2mΩ require re-inspection of the connections.
 - DO NOT place reel in service until high resistance can be corrected.



NOTE All grounding shall be in accordance with OSHA 1926.954, 1910.269, and your company's policies and procedures regarding the grounding of vehicles and equipment.

Warranty Note: Failure to properly maintain grounding reel will not void emissions-related components warranty but will void general warranty clause.

Independent Front Suspension 20,000/24,000 GAWR

12,000 MILES

Relay Rod Ball Joints:

- Inspect for ruptured seals
- Check that cotter pin is installed.

Control Arm Bushings:

- Inspect for contact between control arm and mount
- Inspect for Bushing wear

Tie Rod Ends:

- Inspect ball socket endplay
- Check for looseness of taper connection
- Check that cotter pin is installed

Brake System:

- Inspect brake caliper for correct stroke
- Inspect for air leaks using soapy water solution

Air Springs:

- Inspect for proper clearance (1" minimum all around)
- Check upper mount nut and lower mount bolt torque
- Inspect for signs of chafing or wear
- Inspect for air leaks using soapy water solution

Shock Absorbers:

- Check mounting nut torque
- Inspect shocks for signs of fluid leak, broken eye ends, loose fasteners, or worn bushings.

Wheels:

- Check wheel nut torque

Air Fittings and Air Lines:

- Inspect for air leaks using soapy water solution
- Inspect for signs of chafing, cracking or wear.

24,000 MILES

Relay Rod Ball Joints:

- Inspect for ruptured seals
- Check that cotter pin is installed.

Control Arm Bushings:

- Inspect for contact between control arm and mount
- Inspect for Bushing wear

Tie Rod Ends:

- Inspect ball socket endplay
- Check for looseness of taper connection
- Check that cotter pin is installed



Brake System:

- Inspect brake caliper for correct stroke

Air Springs:

- Inspect for signs of chafing or wear

Shock Absorbers:

- Inspect shocks for signs of fluid leak, broken eye ends, loose fasteners, or worn bushings.

Wheels:

- Check wheel nut torque

Front Alignment:

- Inspect toe-in

Air Fittings and Air Lines:

- Inspect for signs of chafing, cracking or wear.

36,000 MILES

Relay Rod Ball Joints:

- Inspect for ruptured seals
- Check that cotter pin is installed.

Control Arm Bushings:

- Inspect for contact between control arm and mount
- Inspect for Bushing wear

Tie Rod Ends:

- Inspect ball socket endplay
- Check for looseness of taper connection
- Check that cotter pin is installed

Brake System:

- Inspect brake caliper for correct stroke

Air Springs:

- Inspect for signs of chafing or wear

Shock Absorbers:

- Inspect shocks for signs of fluid leak, broken eye ends, loose fasteners, or worn bushings.

Wheels:

- Check wheel nut torque

Air Fittings and Air Lines:

- Inspect for signs of chafing, cracking or wear.

48,000 MILES

Relay Rod Ball Joints:

- Check axial endplay
- Inspect for ruptured seals
- Check that cotter pin is installed.

Control Arm Bushings:

- Check bolt torque
- Inspect for contact between control arm and mount
- Inspect for Bushing wear

Tie Rod Ends:

- Inspect ball socket endplay



- Check for looseness of taper connection
- Check that cotter pin is installed

Brake System:

- Inspect brake caliper for correct stroke

Air Springs:

- Inspect for signs of chafing or wear

Shock Absorbers:

- Inspect shocks for signs of fluid leak, broken eye ends, loose fasteners, or worn bushings.

Kingpins:

- Check for wear
- Inspect vertical endplay

Wheels:

- Check bearing endplay
- Check wheel nut torque

Front Alignment:

- Inspect toe-in

Air Fittings and Air Lines:

- Inspect for air leaks using soapy water solution
- Inspect for signs of chafing, cracking or wear.

60,000 MILES

Relay Rod Ball Joints:

- Inspect for ruptured seals
- Check that cotter pin is installed.

Control Arm Bushings:

- Inspect for contact between control arm and mount
- Inspect for Bushing wear

Tie Rod Ends:

- Inspect ball socket endplay
- Check for looseness of taper connection
- Check that cotter pin is installed

Brake System:

- Inspect brake caliper for correct stroke

Air Springs:

- Inspect for signs of chafing or wear

Shock Absorbers:

- Inspect shocks for signs of fluid leak, broken eye ends, loose fasteners, or worn bushings.

Wheels:

- Check wheel nut torque

Air Fittings and Air Lines:

- Inspect for signs of chafing, cracking or wear.

72,000 MILES

Relay Rod Ball Joints:

- Inspect for ruptured seals
- Check that cotter pin is installed.



Control Arm Bushings:

- Inspect for contact between control arm and mount
- Inspect for Bushing wear

Tie Rod Ends:

- Inspect ball socket endplay
- Check for looseness of taper connection
- Check that cotter pin is installed

Brake System:

- Inspect brake caliper for correct stroke

Air Springs:

- Inspect for signs of chafing or wear

Shock Absorbers:

- Inspect shocks for signs of fluid leak, broken eye ends, loose fasteners, or worn bushings.

Wheels:

- Check wheel nut torque

Front Alignment:

- Inspect toe-in

Air Fittings and Air Lines:

- Inspect for signs of chafing, cracking or wear.

84,000 MILES

Relay Rod Ball Joints:

- Inspect for ruptured seals
- Check that cotter pin is installed.

Control Arm Bushings:

- Inspect for contact between control arm and mount
- Inspect for Bushing wear

Tie Rod Ends:

- Inspect ball socket endplay
- Check for looseness of taper connection
- Check that cotter pin is installed

Brake System:

- Inspect brake caliper for correct stroke

Air Springs:

- Inspect for signs of chafing or wear

Shock Absorbers:

- Inspect shocks for signs of fluid leak, broken eye ends, loose fasteners, or worn bushings.

Wheels:

- Check wheel nut torque

Air Fittings and Air Lines:

- Inspect for signs of chafing, cracking or wear.

96,000 MILES

Relay Rod Ball Joints:

- Check axial endplay
- Inspect for ruptured seals
- Check that cotter pin is installed.



Control Arm Bushings:

- Check bolt torque
- Inspect for contact between control arm and mount
- Inspect for Bushing wear

Tie Rod Ends:

- Inspect ball socket endplay
- Check for looseness of taper connection
- Check that cotter pin is installed

Brake System:

- Inspect brake caliper for correct stroke

Air Springs:

- Inspect for signs of chafing or wear

Shock Absorbers:

- Inspect shocks for signs of fluid leak, broken eye ends, loose fasteners, or worn bushings.

Kingpins:

- Check for wear
- Inspect vertical endplay

Carrier Bearings:

- Check axial endplay

Wheels:

- Check bearing endplay
- Check wheel nut torque

Front Alignment:

- Inspect toe-in

Air Fittings and Air Lines:

- Inspect for air leaks using soapy water solution
- Inspect for signs of chafing, cracking or wear.

96,000+ MILES

Continue to perform specified maintenance every 12,000 miles or at previous interval.

NOTES

- 1. Wheel nuts must be retightened to proper torque specifications as per the vehicle or chassis manufacturer's Owner Guide.**
- 2. Final stage manufacturer should complete toe-in inspection and adjustment after completion of vehicle.**



Meritor Driveline

INITIAL INSPECTION

NO MORE THAN 2,000 MILES/3,200 KM

- Verify that all bolts are tightened to 115-135 lb-ft (155-183 N-m)
- Inspect bearing cup cap-screws and wing-style cap-screws and lock washers.
 - If cap-screws are missing: Check for damage to the universal joint and yoke. Replace damaged parts and missing cap-screws.
 - If cap-screws are loose: Remove and discard loose cap-screws. Replace them with new cap-screws.

EVERY 25,000 MILES (40,000 KM)

If you observe any of the following conditions, remove and replace components as needed:

- Check for excessive looseness across the ends of the universal joint bearing cup assemblies and trunnions.
 - Grip the driveline near the inboard yoke with both hands.
 - Try to move the yoke vertically and horizontally. Movement in the universal joint relative to the inboard or outboard yokes must not exceed 0.006 inch (0.152 mm)
- Inspect the slip yoke spline seal for grease leakage or seal damage.
- Inspect for missing balance weights, damaged tubing or a missing welch plug at the slip yoke.

EVERY 150,000 MILES (240,000 KM)

If you observe any of the following conditions, remove and replace components as needed:

- Check for excessive looseness across the ends of the universal joint bearing cup assemblies and trunnions.
 - Grip the driveline near the inboard yoke with both hands.
 - Try to move the yoke vertically and horizontally. Movement in the universal joint relative to the inboard or outboard yokes must not exceed 0.006 inch (0.152 mm)
- Inspect the slip yoke spline seal for grease leakage or seal damage.
- Inspect for missing balance weights, damaged tubing or a missing welch plug at the slip yoke.
- Use a dial indicator to inspect the slip splines for wear (backlash). Radial looseness between the slip yoke and the tube shaft must not exceed 0.017 inch (0.432 mm).

NON-GREASEABLE DRIVELINES

INSPECT EVERY 25,000 MILES (40,000 KM).

GREASEABLE DRIVELINES

EVERY 6,500 MILES (10,000 KM)

CITY-Applications where truck is operated at least 90% in city environment.

EVERY 16,000 MILES (25,000 KM)

HIGHWAY-Applications where the truck is operated at least 90% on paved road surfaces and up to 10% on gravel, dirt or unpaved roads.

EVERY 50,000 MILES (80,000 KM)

LINE HAUL-Applications where the truck is operated entirely on concrete or smooth paved road surfaces.



Meritor Front and Rear Drive Axles

Meritor Lubricant Specification	Description	Cross Reference	Minimum Outside Temperature	Maximum Outside Temperature
0-76-A	Hypoid Gear Oil	GL-5, S.A.E. 85W/140	10°F (-12.2°C)	*
0-76-B	Hypoid Gear Oil	GL-5, S.A.E. 80W/140	-15°F (-26.6°C)	*
0-76-D	Hypoid Gear Oil	GL-5, S.A.E. 80W/90	-15°F (-26.6°C)	*
0-76-E	Hypoid Gear Oil	GL-5, S.A.E. 75W/90	-40°F (-40°C)	*
0-76-J	Hypoid Gear Oil	GL-5, S.A.E. 75W	-40°F (-40°C)	35°F (1.6°C)
0-76-L	Hypoid Gear Oil	GL-5, S.A.E. 75W/140	-40°F (-40°C)	*

*There is no upper limit on these outside temperatures, but the axle sump temperature must never exceed 250°F (121°C).

Vocation or Vehicle Operation	Oil Change Intervals for All Front Drive and Rear Drive Axles
Initial Oil Change	Note Required
Check Oil Level: Add the correct type and amount of oil as required	Every 10,000 miles (16,000 km), once a month, or the fleet maintenance interval, whichever comes first.
Petroleum-Based Oil: Change on axles with or without a pump and filter system	Every 50,000 miles (80,000 km) or annually, whichever comes first.
Synthetic Oil: Change on axles with or without a pump filter system.¹	Every 250,000 miles (400,000 km), or every 4 years, whichever comes first.
Filter Change: Change on axles with a pump and filter system.	Every 100,000 miles (160,000 km).

¹This interval applies to approved semi-synthetic and full-synthetic oils only. For a list of approved extended-drain axle oils, refer to TP-9539, Approved Rear Drive Axle Lubricants. To obtain this publication, please visit meritor.com to access and order additional information.



PRV

QUARTERLY INSPECTION

The Pressure Relief Valve requires no routine maintenance but should be tested regularly. Since the PRV may not need to open in normal use it is important that it be inspected at least quarterly for proper function per NFPA 1962 section 8.2. In particular assure that:

- There is no damage such as cracks or dents
- There is no corrosion
- Setting indications are readable
- The waterway is clear of obstructions
- The valve opens at the set pressure

SEMI-ANNUAL INSPECTION

TFT recommends testing the PRV semi-annually to the following test procedures:

- Set up the line with a pressure gauge upstream from the appliance and pressure relief valve.
- Make sure the PRV is set to your operating pressure, and close all appliance outlets.
- Fill the appliance with water using pressure less than where the PRV is set, being sure to bleed all air out of the system.
- Carefully increase the pressure on the appliance to the set pressure. Check to see if the valve has opened to allow water to escape. If the valve has not opened and there is no water, increase the pressure by 5 PSI. If the valve has not opened, the valve has failed and should be taken out of service immediately.
 - Any valves taken out of service due to failure should be returned to the factory for repair or replacement.



Trident Primer

ANNUAL PRIMER TESTING

DRY VACUUM TEST

- Close all valves and drains. Cap all suction openings and the outlet of the suction side relief valve (if so equipped).
- Connect a test vacuum gauge or manometer to the intake test gauge connection on the pump panel.
- Start with the air tanks fully charged, and run the primer until the gauge or manometer indicates 22 in-Hg or more of vacuum.
- Watch the gauge. If the vacuum falls more than 10 in-Hg in 5 minutes, it is a certain indication of at least one air leak. Vacuum leaks may be detected by ear if the engine is turned off. Correct leaks immediately to return the pump to a serviceable condition.

NOTE This test may be run with the pump rotating or stationary. **Never run a dry pump at engine speeds above 1000rpm.** There is no time requirement for the vacuum to reach 22 in-Hg. If the compressor is small, it can take several minutes to reach. This time can be shortened by not rotating the pump and increasing the engine speed to 1200 rpm.

NFPA 1901 PRIMING TIME TEST

- Set up the apparatus in accordance with the pumping outlined in the NFPA 1901 standard.
- Engage the pump, and increase the throttle to maximum engine speed of 1000 rpm.
- With the air tanks fully charged, start the primer. Release the push button when a discharge pressure over 20 PSIG is obtained.
- The time to prime should not exceed 30 seconds for 1250 gpm and smaller pumps. The time to prime should not exceed 45 seconds for 1500 gpm and larger pumps. An additional 15 seconds is allowed for pumps with auxiliary suctions having a volume of 1 cubic foot or more.

NOTE The Air Prime is designed to meet the NFPA requirements. Higher lifts and operating at higher elevations will slow down the time to prime. The air compressor rating for lifts in excess of 15 feet and elevations over 4000 feet must be at least 18.7-CFM. Operation at these extremes may require the primer to be operated at engine speeds in excess of 1000 rpm without spinning the pump, until water reaches the impeller. **Never run a dry pump at engine speeds above 1000 rpm.**

Tires

Replacing a tire that is greenhouse gas certified

The tires installed on this vehicle at the factory as original equipment are certified for Greenhouse Gas and Fuel Efficiency regulations. Replacement tires must be of equal or lower rolling resistance level (TRRL or Crr). Consult with your tire supplier(s) for appropriate replacement tires.

Maintaining a greenhouse gas certified tire

- In order to limit the rolling resistance of the tires and thereby optimize fuel economy, the maintenance procedures specified by the tire manufacture must be followed. As owner or operator, your vehicle and equipment should be properly maintained in good working order.
- Repair and replacement of vehicle components should be done to original vehicle manufacturers' specifications to ensure proper function of the vehicle. Tire replacement should



be to tires with performance as good, or better, than tires originally equipped on the vehicle.
Consult with the tire manufacturer for tire specifications.



Revision Table

Rev.	Date	By	Description
A	5/1/2020	KB	Initial Release

