Business Class Trucks Maintenance Manual Contents

Descriptions of Service Publications

Freightliner LLC distributes the following major service publications.

Workshop/Service Manual

Workshop/service manuals contain service and repair information for all vehicle systems and components, except for major components such as engines, transmissions, and rear axles. Each workshop/service manual section is divided into subjects that can include general information, principles of operation, removal, disassembly, assembly, installation, specifications, and troubleshooting.

Maintenance Manual

Maintenance manuals contain routine maintenance procedures and intervals for vehicle components and systems. They have information such as lubrication procedures and tables, fluid replacement procedures, fluid capacities, specifications, procedures for adjustments and for checking the tightness of fasteners. Maintenance manuals do not contain detailed repair or service information.

Driver's/Operator's Manual

Driver's/operator's manuals contain information needed to enhance the driver's understanding of how to operate and care for the vehicle and its components. Each manual contains a chapter that covers pretrip inspection and daily maintenance of vehicle components. Driver's/operator's manuals do not contain detailed repair or service information.

Parts Technical Manual

Freightliner LLC publishes this manual to aid in the identification of serviceable replacement vehicle parts. This manual is used in conjunction with the parts book and the service parts catalog microfiche.

Service Bulletins

Service bulletins provide the latest service tips, field repairs, product improvements, and related information. Some service bulletins are updates to information in the workshop/service manual. These bulletins take precedence over workshop/service manual information, until the latter is updated; at that time, the bulletin is usually canceled. The service bulletins manual is available only to dealers. When doing service work on a vehicle system or part, check for a valid service bulletin for the latest information on the subject.

IMPORTANT: Before using a particular service bulletin, check the current service bulletin validity list to be sure the bulletin is valid.

Recall Bulletins

These bulletins pertain to special situations that involve service work or replacement of parts in connection with a recall notice. Recall bulletins pertain to matters of vehicle safety. All bulletins are distributed to dealers; customers receive notices that apply to their vehicles.

Field Service Modifications

This publication is concerned with non-safety-related service work or replacement of parts. All field service modifications are distributed to dealers; customers receive notices that apply to their vehicles.

Metric/U.S. Customary Conversion Tables: 00–04

When You Know U.S. Customary	Multiply By	To Get Metric	When You Know Metric	Multiply By	To Get U.S. Customary
Length					
inches (in)	25.4	millimeters (mm)		0.03937	inches (in)
inches (in)	2.54	centimeters (cm)		0.3937	inches (in)
feet (ft)	0.3048	meters (m)		3.281	feet (ft)
yards (yd)	0.9144	meters (m)		1.094	yards (yd)
miles (mi)	1.609	kilometers (km)		0.6215	miles (mi)
Area					
square inches (in^2)	645.16	square millimeters (mm^2)		0.00155	square inches (in^2)
square inches (in^2)	6.452	square centimeters (cm^2)		0.155	square inches (in^2)
square feet (ft^2)	0.0929	square meters (m^2)		10.764	square feet (ft^2)
Volume					
cubic inches (in^3)	16387.0	cubic millimeter (mm^3)		0.000061	cubic inches (in^3)
cubic inches (in^3)	16.387	cubic centimeters (cm^3)		0.06102	cubic inches (in^3)
cubic inches (in^3)	0.01639	liters (L)		61.024	cubic inches (in^3)
fluid ounces (fl oz)	29.54	milliliters (mL)		0.03381	fluid ounces (fl oz)
pints (pt)	0.47318	liters (L)		2.1134	pints (pt)
quarts (qt)	0.94635	liters (L)		1.0567	quarts (qt)
gallons (gal)	3.7854	liters (L)		0.2642	gallons (gal)
cubic feet (ft^3)	28.317	liters (L)		0.03531	cubic feet (ft^3)
cubic feet (ft^3)	0.02832	cubic meters (m^3)		35.315	cubic feet (ft^3)
Weight/Force					
ounces (av) (oz)	28.35	grams (g)		0.03527	ounces (av) (oz)
pounds (av) (lb)	0.454	kilograms (kg)		2.205	pounds (av) (lb)
U.S. tons (t)	907.18	kilograms (kg)		0.001102	U.S. tons (t)
U.S. tons (t)	0.90718	metric tons (t)		1.1023	U.S. tons (t)
Torque/Work Force					
inch–pounds (lbf·in)	11.298	Newton–centimeters (N·cm)		0.08851	inch–pounds (lbf·in)
foot–pounds (lbf·ft)	1.3558	Newton–meters (N·m)		0.7376	foot–pounds (lbf·ft)
Pressure/Vacuum					
inches of mercury (inHg)	3.37685	kilo Pascals (kPa)		0.29613	inches of mercury (inHg)
pounds per square inch (psi)	6.895	kilo Pascals (kPa)		0.14503	pounds per square inch (psi)

Table 4, Metric/U.S. Customary Conversion

When You Know	Subtract	Then Divide By	To Get	When You Know	Multiply By	Then Add	To Get
degrees Fahrenheit (°F)	32	1.8	degrees Celsius (°C)		1.8	32	degrees Fahrenheit (°F)

Table 5, Temperature Conversion

M1 Maintenance Interval Operations Table: 00–10

Maint. Oper. No.	M1 Maintenance Interval Operations
00–17	Lubrication and Fluid Level Check (FL112 only, includes the following): • Clutch Release Bearing and Cross-Shaft Lubricating • Manual Transmission Oil Level Checking • Fifth Wheel Lubricating • Suspension Lubricating • Knuckle Pin Lubricating • Tie-Rod End Lubricating • All-Wheel-Drive Front Axle Oil Level Checking • Axle Lubricant Level Checking • Two-Speed-Axle Shift Unit Oil Level Checking • Driveline Lubricating • Foot Brake Valve Actuator Lubricating, Bendix E-12 • Camshaft Bracket Bushing Lubricating • Manual Slack Adjuster Lubricating • Automatic Slack Adjuster Lubricating, Meritor • Air Reservoir Automatic Drain Valve Disassembly, Cleaning, Inspecting, and Lubricating, Bendix DV-2 • Automatic Slack Adjuster Lubricating, Gunite • Automatic Slack Adjuster Lubricating, Haldex • Steering Driveline Lubricating • Drag Link Lubricating • Power Steering Reservoir Fluid Level Checking • Steering Gear Lubricating (Ross TAS Series) • Weatherstrip, Door Hinge, and Door Latch Lubricating
26–06	Chrysler Transmission Fluid and Filter Changing
26–07	Chrysler Transmission Band Adjusting
31–02	Fifth Wheel Inspecting
32–01	Suspension Inspecting
33–02	Tie-Rod End Inspecting
35–02	Axle Breather Checking
41–01	Driveline Inspecting
42–01	Air Dryer Inspecting, Bendix AD–9
42–02	Air Brake Valve Inspecting and Leak Checking, Bendix BP–R1
42–04	Air Brake Valve Operation Checking, Bendix BP–R1 and E–12
42–05	Relay Valve Checking, Midland
42–06	Quick Release and Flipper Valves Checking, Midland
42–07	Brake Chamber Inspecting (All Models)

09–01 Air Cleaner Element Inspecting and Replacing

Method 1

Replace the air cleaner element at the recommended interval or when the air restriction indicator reaches 22 inH_2O on a vehicle with an MBE engine, or 25 inH_2O on a vehicle with a Detroit Diesel, Caterpillar, or Cummins engine, if equipped with an air restriction indicator. For replacement instructions, see **Group 09** of the *Business Class Trucks Service Manual*. Reset the air restriction indicator.

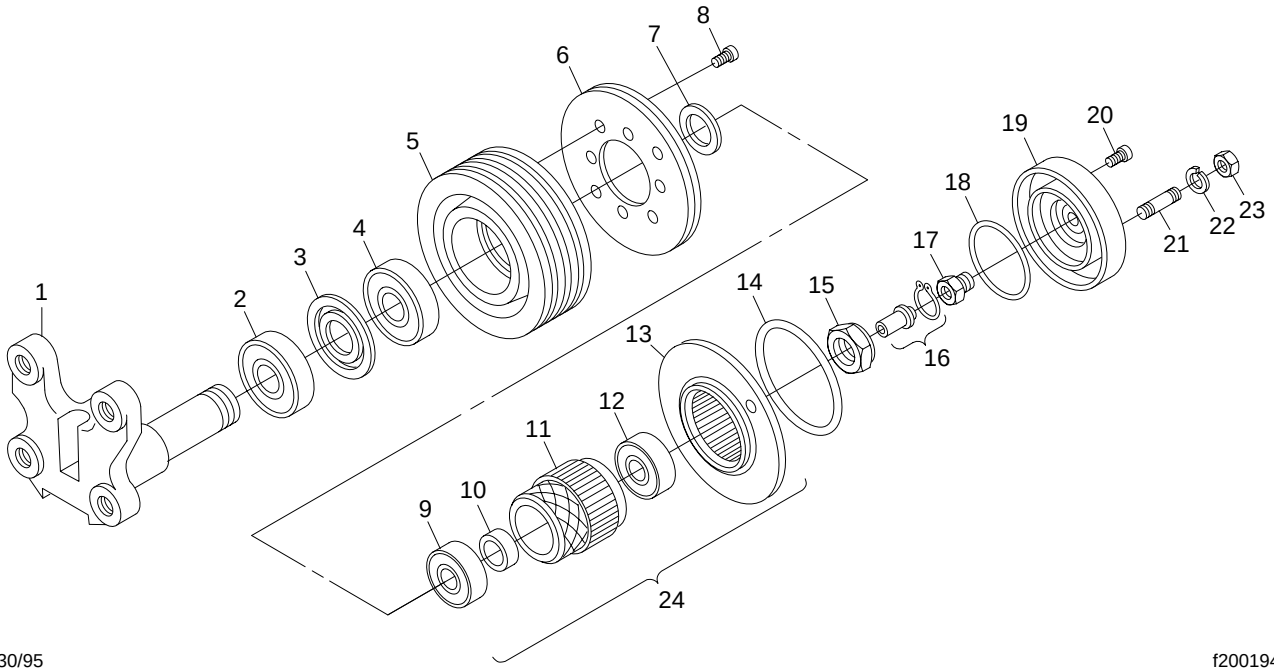
If the maximum restriction is not reached, record the air restriction value. If the value is higher than the previous recording, reset the air restriction indicator. If the value is lower than the previous recording, inspect the air cleaner and air cleaner element of cracks, leaks, or any other damage.

If the air cleaner or air cleaner element is damaged, replace it and reset the air restriction indicator.

Method 2

Replace the air cleaner element at the recommended interval or when the air restriction indicator reaches 22 inH_2O on a vehicle with an MBE engine, or 25 inH_2O on a vehicle with a Detroit Diesel, Caterpillar, or Cummins engine, if equipped with an air restriction indicator. For replacement instructions, see **Group 09** of the *Business Class Trucks Service Manual*. Reset the air restriction indicator.

If the maximum restriction is not reached, inspect the air cleaner and air cleaner element for cracks, leaks, or any other damage. If the air cleaner or air cleaner element is damaged, replace it and reset the air restriction indicator.



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1. Mounting Bracket
2. Rear Sheave Bearing
3. Inner and Outer Bearing Spacers
4. Forward Sheave Bearing
5. Sheave
6. Friction Facing
7. Journal Spacer
8. Socket-Head Capscrew
9. Rear Hub Bearing
10. Bearing Spacer
11. Splined Hub
12. Forward Hub Bearing
13. Piston Friction Disc
14. Large O-Ring
15. Locknut
16. Cartridge Assembly
17. Face Seal
18. Small O-Ring
19. Air Chamber
20. Socket-Head Capscrew
21. Stud Bolt
22. Lockwasher
23. Hexnut
24. Piston Assembly

Fig. 6, Horton Advantage Fan Clutch Components

8. Start the engine.

Horton DriveMaster® Fan Clutch

NOTE: If any part of the fan clutch needs to be repaired or replaced after performing the checks below, see **Group 20** of the *Business Class® Trucks Service Manual*.

1. Disconnect the batteries at the negative terminals. Drain all air from the air system. If equipped with an air starter, drain the air starter reservoir.

⚠ WARNING

Make sure the batteries are disconnected, and if applicable, the air starter reservoir is drained before checking the fan clutch. If the engine starts during this procedure, the fan could engage, which could result in serious personal injury.

2. Inspect the electrical connections and wires to the fan clutch solenoid. Secure the connection if loose; replace wires and connectors if damaged.
3. Clean the fan clutch air solenoid valve filter, if equipped.
   - 3.1 Unscrew the fan clutch solenoid valve air filter assembly and remove the filter element.
   - 3.2 Clean the filter element with cleaning solvent.
   - 3.3 Using a clean, lint free cloth, wipe off any excess solvent.

26–04 Eaton Fuller Transmission Air Filter/ Regulator Element Cleaning

NOTE: Meritor transmissions do not have an air filter/regulator element that needs servicing.

1. Exhaust the air from the air reservoirs.

⚠ WARNING

Exhaust the air supply before servicing the air filter/regulator; otherwise, serious personal injury and component damage could result.

2. Clean the outside of the air filter/regulator with cleaning solvent, then let it air dry. See **Fig. 3**.

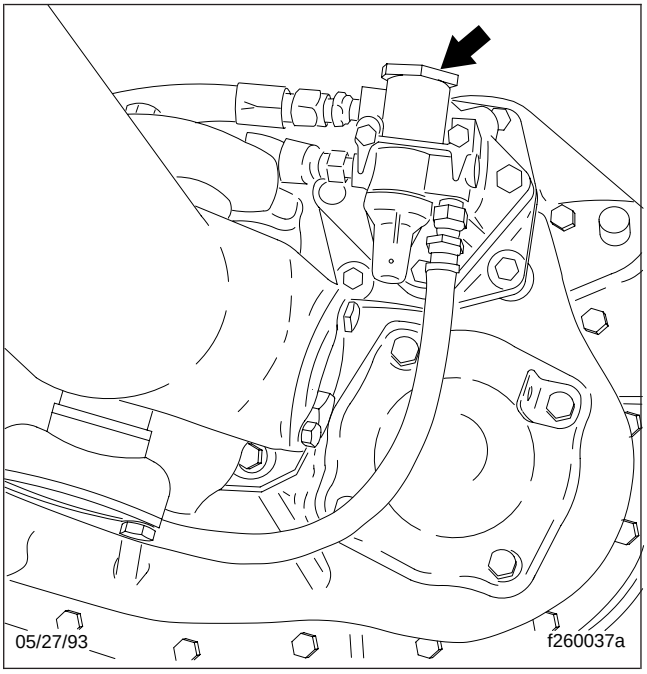
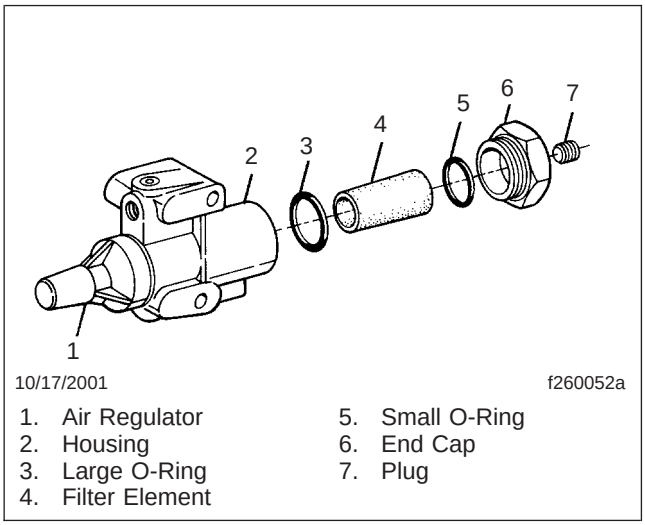


Fig. 3, Eaton Fuller Transmission Air Filter/ Regulator Location

3. Remove the end cap, large O-ring, and filter element from the filter housing. See **Fig. 4**. Remove the small O-ring from the end cap.

NOTE: Do not remove, disassemble, or adjust the air regulator. If the air regulator is not keeping the air pressure between 57 to 62 psi (396 to 431 kPa), replace the air filter/regulator. It cannot be repaired.



1. Air Regulator
2. Housing
3. Large O-Ring
4. Filter Element
5. Small O-Ring
6. End Cap
7. Plug

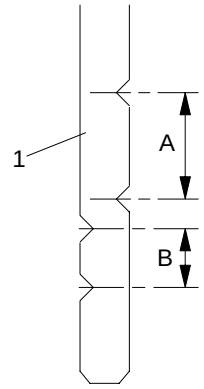
Fig. 4, Eaton Fuller Transmission Air Filter/ Regulator Components

4. Clean the filter element.

   4.1 Dip the filter element in alcohol or other cleaning solvent. Blow compressed air through the filter element (inside to outside) to loosen surface dirt and to dry the element. The sintered metallic filter element will last the life of the vehicle, provided it is not damaged.

   4.2 Wipe out the filter housing with a clean, dry, lint-free rag.

5. Clean and inspect the O-rings and the end cap. Replace any parts that are damaged.
6. Install the large O-ring, then the filter element (small end first) into the filter housing.
7. Install the small O-ring into the end cap, then install the end cap on the filter housing. Tighten the end cap until firm.
8. Start the engine, and build up pressure in the air system. Check for air leaks at the filter housing and air line connections, and repair any leaks.



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A. Hot Range
B. Cold Range
1. Dipstick

Fig. 17, ATF Dipstick, Aisin Transmission

12. Inspect the high temperature ATF level.

    12.1 Make sure the vehicle is in neutral and start the engine and remove the chocks. Drive the vehicle for 30 minutes to raise the ATF temperature to normal working oil temperature.

    Park the vehicle on a level service and chock the tires.

    12.2 With the engine idling, engage the brake pedal and successively shift gear positions to spread ATF throughout the transmission.

    12.3 Set the shift selector to neutral (N).

    12.4 Continue engine idle and remove the dipstick. Wipe it clean, re-insert it, remove it and measure the ATF level.

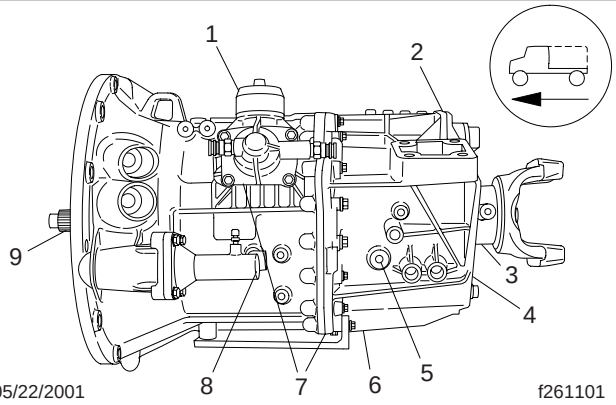
    12.5 If the ATF temperature is between 158 to 176°F (70 to 80°C), the fluid should measure in the HOT range. See **Fig. 17**.

    - If the ATF level is below the HOT range, add ATF until the level is within the HOT range.
    - If the ATF level is above the HOT range, remove the drain plug (**Fig. 16**) and drain ATF until the level is lower than the required range. Then, install the drain plug and refill with ATF until the level is within the HOT range.

13. Remove the chocks from the tires.

26-09 Mercedes-Benz (MBT) Transmission Leak Checking

1. Park the vehicle on a level surface. Apply the parking brakes and chock the rear tires.
2. Check for signs of leakage at the breather. See **Fig. 18**.



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NOTE: The transmission is shown from the left-hand side.

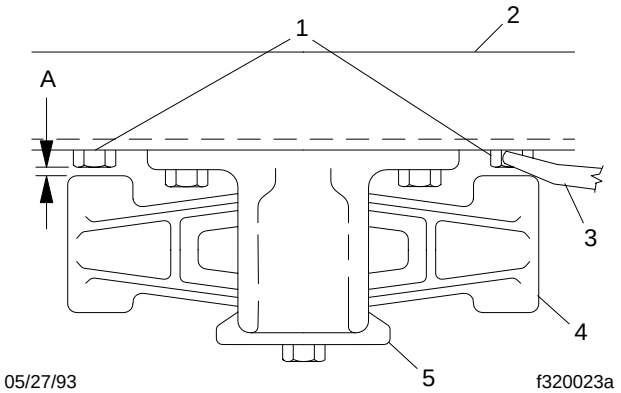
1. Shift Lever Cap Seal
2. Breather
3. Output Shaft Radial Seal
4. Countershaft Rear Cover Plate
5. Transmission Fluid Fill Plug
6. Transmission Fluid Drain Plug
7. Gear Case Seals
8. Clutch Slave Cylinder
9. Input Shaft Radial Seal

Fig. 18, MBT Transmission Leak Check

    2.1 If leakage is found, check the breather for a missing cap. Replace the cap if necessary.

    2.2 Check the fluid level at the fill plug. If the level is too high, correct the fluid level.

3. Check for signs of leakage at the cap seal on the shift lever. If the cap seal is damaged, replace it.



A. 1/8 inch (3 mm) Clearance
1. Frame Fasteners
2. Frame Rail
3. Pry Bar
4. Equalizer
5. Equalizer Bracket

Fig. 4, Top View of the Equalizer

when inflated. If the clearance is less than 1 inch (25 mm), relocate the obstructing parts.

⚠ CAUTION

Failure to relocate obstructing parts could result in damage to the air spring.

Freightliner AirLiner Component Inspecting and Operation Checking

⚠ WARNING

Inspect the components and check their operation as described below. Failure to perform these inspections and checks could result in separation of worn suspension components and loss of vehicle control resulting in property damage, serious personal injury or death.

1. Chock the front tires. Raise the rear of the vehicle so the tires just clear the ground and the suspension is fully extended. Place safety stands under the vehicle frame.
2. Squeeze all air springs to check for complete deflation. If any air springs remain partially or fully inflated, see **Group 32** of the *Business Class® Trucks Service Manual*.
3. Inspect each air spring for wear at its connection to its pedestal. Replace any worn air springs; for instructions, see **Group 32** of the *Business Class® Trucks Service Manual*.
4. Check the axle connection welds (beam-seat to equalizing-beam) and axle-adapter to axle for cracks. If welds are cracked, grind them out and reweld the parts.
5. Move the axle up and down while checking for signs of looseness due to worn parts at the front pivot connections. Replace any worn parts by following the procedures in **Group 32** of the *Business Class® Trucks Service Manual*.
6. Inspect the shock absorbers for oil leaks and worn rubber bushings. Replace the shock absorbers and/or rubber bushings if wear or damage is noted. For instructions, see **Group 32** of the *Business Class® Trucks Service Manual*.
7. Remove the safety stands and lower the rear of the vehicle to the ground. Run the engine until air pressure of at least 100 psi (689 kPa) is maintained throughout the system.
8. Check that all air springs are inflated. If the air springs do not inflate, see **Group 32** of the *Business Class® Trucks Service Manual* for possible causes and corrections.

Freightliner AirLiner Control Rod Checking

1. Without disconnecting the control rods, attempt to move (by hand) each of the control rod ends up, down, in, and out. If there is any movement, examine the control rods for wear or damage. Replace if necessary.
2. Inspect the rubber bushings for cracks or cuts.
3. Check for any shifting of the barpin.
4. Check for cracks in the metal components and welds.

NOTE: The Freightliner AirLiner Suspension is manufactured at numerous weight ratings up to 46,000 pounds. The control rod on the 46,000-pound-rated suspension is larger, and is fastened differently than on other applications; see **Group 32**of the *Business Class® Trucks Service Manual* for removal and installation information.

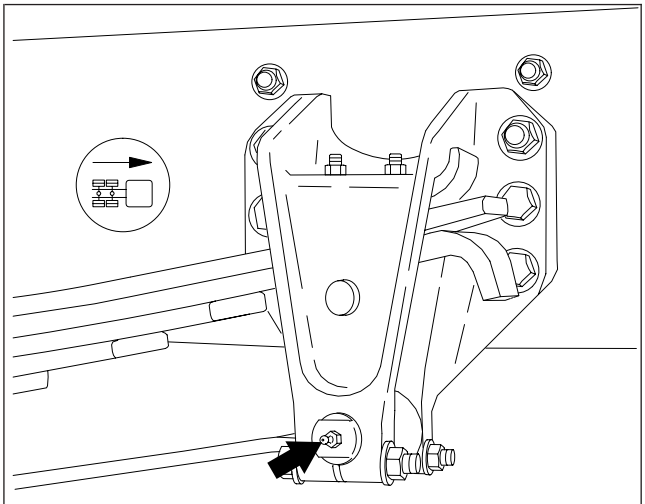
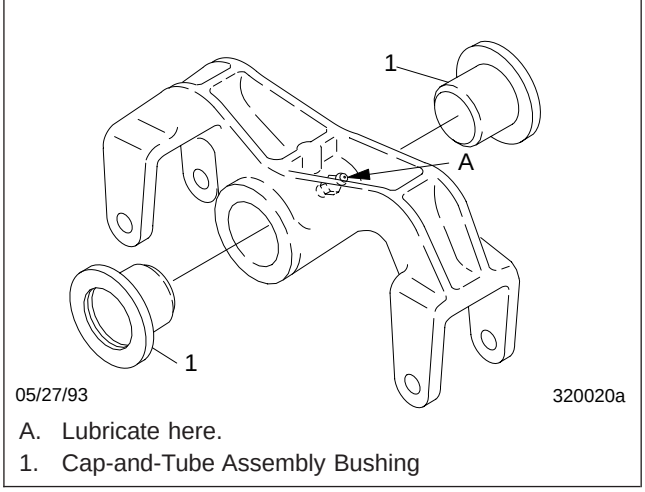


Fig. 10, Forward Spring Bracket Spring Pin Grease Fitting

with a hand gun or pressure gun until grease is forced out from the base of the pressure-relief fitting.



A. Lubricate here.
1. Cap-and-Tube Assembly Bushing

Fig. 11, Equalizer Assembly Lubrication

Hendrickson Equalizer Beam End Bushings and Rubber Center Bushings

No lubrication is required for the equalizer beam end bushings or equalizer beam rubber center bushings.

Hendrickson Spring Eye Pins, "RT," "RTE," "U," AND "UE" Series

Apply multipurpose chassis grease at the spring eye pin grease fitting (located on the inboard side of the spring eye pin) until clean grease appears at both ends of the spring eye pin.

32–03 U-Bolt Torque Checking

Check the U-bolt torque of both the front and rear axles (where applicable).

⚠ CAUTION

Failure to retorque the U-bolt nuts could result in spring breakage and abnormal tire wear.

1. Park the vehicle on a flat surface and apply the parking brakes. Chock the tires to prevent the vehicle from moving.
2. Check the U-bolt torque in a diagonal pattern. Set a click-type torque wrench to the highest torque value for the fastener being checked. See **Table 1** for U-bolt torque specifications. Turn the wrench in a clockwise motion (looking up) until the torque wrench clicks.
3. Remove the chocks.

35–01 Axle Lubricant Level Checking

CAUTION

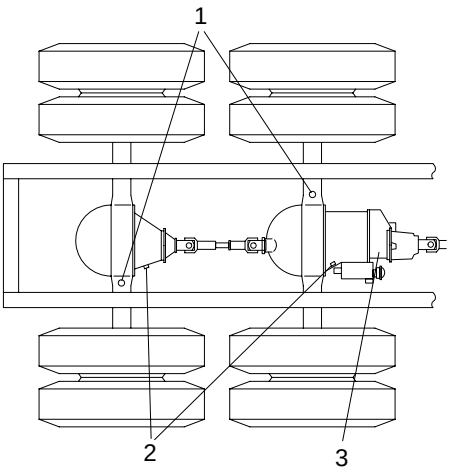
Failure to keep the rear axle filled to the proper level, with the recommended lubricant, can result in rear axle damage.

1. Clean the oil fill hole plug, located in the carrier or the side of the axle housing, and the area surrounding it (**Fig. 1**). Remove the plug.

NOTE: Some Meritor axles have a small tapped and plugged hole located near and below the housing oil fill hole. This smaller hole is for the lubricant temperature sensor only, and must not be used as a fill or level hole.

2. With the vehicle on level ground, lubricant must be level with the bottom of the oil fill hole.

   If low, add lubricant. See **Table 1** for approved axle lubricants and see **Table 2** or **Table 3** for axle capacities.



1. Axle Housing Breathers
2. Carrier Oil Fill Plugs
3. Interaxle Differential

Fig. 1, Fill Hole Plug and Axle Housing Breather Locations

3. Install the fill hole plug, and tighten it 35 lbf·ft (47 N·m).

Rockwell Drive Axle Recommended Lubricant			
Recommended Lubricant Type	**Ambient Temperature**	**Lubricant SAE Viscosity Grade**	**Rockwell Specification**
Hypoid Gear Oil API Service Classification GL–5	+10°F (–12.2°C) and up *	85W–140	0–76–A
	–15°F (–26.1°C) and up *	80W–140	0–76–B
	–15°F (–26.1°C) and up *	80W–90	0–76–D
	–40°F (–40°C) and up *	75W–90	0–76–E
	–40°F (–40°C) to +35°F (+2°C)	75W	0–76–J
	–40°F (–40°C) and up *	75W–140	0–76–L
Synthetic Gear Oil	–40°F (–40°C) and up *	75W–90	0–76–N
	–40°F (–40°C) and up *	75W–140	0–76–M

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

Table 1, Rockwell Drive Axle Recommended Lubricant

40–01 Wheel Nut Checking

IMPORTANT: In addition to the maintenance interval in this manual, check the wheel nut torque the first 50 to 100 miles (80 to 160 km) of operation after a wheel has been removed and installed.

When checking wheel nuts on a dual disc assembly, remove one outer nut at a time, tighten the inner nut, then reinstall the outer nut. Repeat this procedure for all of the inner wheel nuts in the sequence shown in **Fig. 1**, then tighten all of the outer wheel nuts in the same sequence.

⚠ CAUTION

Too little wheel nut torque can cause wheel shimmy, resulting in wheel damage, stud breakage, and extreme tire tread wear. Too much wheel nut torque can break studs, damage threads, and crack discs in the stud hole area.

See **Table 1**, **Table 2**, or **Table 3** for wheel nut torque specifications, and see **Fig. 1** for the tightening sequence.

Fastener Torque for 10-Hole Disc Wheel With Inner and Outer Locknuts			
Description	**Nut Size**	**Wheel Manufacturer**	**Torque (dry threads) lbf·ft (N·m)**
Front Wheel Nut	3/4–16, 1-1/8–16	Accuride	450–500 (610–680)
Rear Wheel Inner Nut	3/4–16	Accuride	450–500 (610–680)
Rear Wheel Outer Nut	1-1/8–16	Accuride	450–500 (610–680)
Wheel Stud Retainer Nut	3/4–16	Accuride	175–200 (235–270)

Table 1, Fastener Torque for 10-Hole Disc Wheel With Inner and Outer Locknuts

Fastener Torque for 8-Hole Disc Wheel With Cone Locknuts		
Description	**Nut Size**	**Torque (lubricated threads) lbf·ft (N·m)**
Front and Rear Wheel Nuts	M20	280–310 (380–420)

Table 2, Fastener Torque for 8-Hole Disc Wheel With Cone Locknuts

Spoke-Type Wheel Fastener Torque			
Description	**Size**	**Wheel Manufacturer**	**Torque (dry threads) lbf·ft (N·m)**
Front Wheel Nut, 5- and 6-Spoke	3/4–10	Gunite	200–225 (270–305) *
Rear Wheel Nut, 5- and 6-Spoke With Channel Spacer (**Fig. 2**)	3/4–10	Gunite	200–225 (270–305)
Rear Wheel Nut, 5- and 6-Spoke With Corrugated Channel Spacer (**Fig. 3**)	3/4–10	Gunite	240–260 (325–350)

* On front axles with over 12,000 lbs (5448 kg) capacity, tighten the wheel nuts 240 to 265 lbf·ft (325 to 359 N·m). Gunite part number W–854 nut with a phosphate and oil coating must be used.

Table 3, Spoke-Type Wheel Fastener Torque

42–01 Air Dryer Inspecting, Bendix AD–9

1. Check the reservoirs for moisture. A small amount (teaspoon or less) is normal. Larger amounts may mean that the desiccant needs to be replaced. Check the mounting and connecting lines.
2. Tighten the fasteners attaching the air dryer to the vehicle. Use the following torque values.

   28 lbf·ft (38 N·m) for SAE grade 5, 3/8–16 fasteners.

   135 lbf·ft (183 N·m) for SAE grade 5, 5/8–11 fasteners.

   Check all air lines, fittings, and electrical connections for damage, leakage, or looseness.
3. Replace damaged or leaking parts, and tighten loose fittings or electrical connections.

42–02 Air Brake Valve Inspecting and Leak Checking, Bendix BP–R1

1. Clean the valve exterior and inspect it for corrosion and damage.
2. Inspect the air lines connected to the valve for signs of wear or damage. Replace the lines as needed.
3. Check the valve for leakage.

   3.1 Apply the service brakes and hold them on full line pressure of at least 80 psi (550 kPa).

   3.2 Check the air line fittings for leaks; tighten or replace the fittings as needed.

   3.3 Coat the exhaust port and body of the valve with soapy water, and check for leakage. Leakage is excessive if it produces a 1-inch (25-mm) bubble within 5 seconds.

   If the brake valve does not function as described above, or if leakage is excessive, replace it with a new or remanufactured unit. Repeat the leakage checks before placing the brake valve in service.

42–03 Foot Brake Valve Actuator Lubricating, Bendix E–12

1. Clean any dirt, gravel, and other foreign debris from the plunger boot and brake base bracket.
2. Check the brake plunger boot for cracks, holes, or deterioration. Replace if necessary.
3. Lift up the edge of the brake plunger boot and check the plunger for existing lubrication. If the plunger is dry, remove it by removing the cotter pin from the clevis pin and pulling the clevis pin out. Remove the piston rod and boot. Lift out the plunger. Lubricate the plunger and the tip of the piston rod with barium grease part number BW 246671, or Penzoil Adhezoplex EP 2. Install the piston rod, boot, clevis pin, and cotter pin.

   If the plunger has grease on it, lift the edge of the brake plunger boot enough to apply 2 to 4 drops of light oil around the brake plunger. Do not over-oil. Install the plunger boot.
4. Lubricate the clevis pin with light oil.
5. Check for leakage; see **Group 42** of the *Business Class® Trucks Service Manual* for instructions.

42–04 Air Brake Valve Operation Checking, Bendix BP–R1 and E–12

Check for proper operation; see **Group 42** of the *Business Class® Trucks Service Manual*.

42–05 Relay Valve Checking, Midland

Chock the tires. Start the engine and run it long enough to pressurize the air system to at least 80 psi (550 kPa), then turn off the engine.

Repeat as necessary, to maintain 80 psi (550 kPa) pressure during this check.

3. Check the service brake chambers for leakage.

   3.1 Apply the service brakes and hold them on full line pressure of at least 80 psi (550 kPa).

⚠ CAUTION

Do not overtighten the clamp ring. This can distort the flange sealing surface, or the clamp ring itself.

   3.2 Using soapy water, coat the service chamber clamp ring. Leakage is excessive if it produces a 1-inch (25-mm) bubble within 5 seconds. See **Fig. 1**. On Bendix service chambers, tighten the clamp ring enough to stop the leakage, but do not exceed the maximum torque limits in **Table 2**. *Do not overtighten.*

   On other service chamber makes, if leakage is detected, tighten the clamp ring; but do not exceed the maximum torque limits in **Group 42** of the *Business Class® Trucks Service Manual*.

Clamp Ring Torque Values (Bendix Chambers)	
Description	**Torque: lbf·in (N·cm)**
5/16–24 Nut	130–150 (1460–1700)
3/8–16 Nut	140–180 (1580–2040)

Table 2, Clamp Ring Torque Values (Bendix Chambers)

   3.3 If leakage persists, use the instructions in **Group 42** of the *Business Class® Trucks Service Manual* to replace the service brake diaphragm.

   3.4 Using soapy water, coat the area around the piston-rod bore. On some Bendix service chambers loosen the boot, if necessary. No leakage is permitted. If there is leakage, use the instructions in the applicable brake chamber section in **Group 42** of the *Business Class® Trucks Service Manual* and replace the service brake diaphragm.

NOTE: On weatherproof Bendix chambers, the leakage check can be performed at the cross-drilled mounting stud.

Parking Brake Operation and Leakage Checking

⚠ DANGER

Do not loosen or remove the parking brake clamp ring (see Fig. 1) for any purpose at any time. The parking/emergency brake section is not intended to be serviced. Serious injury or death may result from sudden release of the power spring.

Before doing any repairs or adjustments on a service/parking brake chamber, read the applicable warnings and instructions in the applicable brake chamber section in Group 42 of the *Business Class® Trucks Service Manual*.

1. Chock the tires.
2. Build the air pressure in the system to at least 100 psi (690 kPa), and shut off the engine.
3. Place the park control valve in the park position. The brake should apply immediately. Then, place the park control valve in the released position. The brake should release immediately.

   If the brakes do not apply or release as required, see the air brake system troubleshooting guide in the applicable brake chamber section in **Group 42** of the *Business Class® Trucks Service Manual* for possible causes and corrections.

⚠ WARNING

Do not disconnect the pressurized parking brake hose. If disconnected under pressure, the parking brake hose will whip as air escapes from the line, and the air stream can direct dirt or sludge toward persons in the area, which could result in injury.

4. Check the parking brake chambers for leakage.

   4.1 With the park control valve released, apply soapy water around the parking brake diaphragm clamp ring and at the drain slots and exhaust breather on the body. Disconnect the service brake hose at the service port, and apply soapy water to check for piston O-ring leakage.

83–01 Air Conditioner Checking, R–12 and R–134a Refrigerant Systems

Preliminary Checks

1. Apply the parking brakes and chock the tires.
2. Make sure the refrigerant compressor drive belt is not damaged, and is correctly tensioned. Also check the tightness of the compressor mounting fasteners. For instructions and torque values, see **Group 01** of the *Business Class® Trucks Service Manual*.
3. Using a feeler gauge, check for correct clutch clearance. For instructions, see **Group 83** in the *Business Class® Trucks Service Manual*.
4. Inspect the compressor clutch coil wire. Check the connector for damage or looseness. Replace the wire if it is damaged.
5. Check for broken, burst, or cut hoses. Also check for loose fittings on all parts.

⚠ WARNING

Wear eye protection when using compressed air or high-pressure water to clean parts, as permanent harm to eyes could result from flying debris.

6. Check for a build-up of road debris on the condenser fins. Using a whiskbroom and air pressure, or a spray of soapy water, carefully clean off the condenser; be careful not to bend the fins.

Cooling Checking

1. Start the engine, and set engine speed at 1500 rpm. Close the doors and windows.

IMPORTANT: When outside temperature and humidity are high, it will take longer to cool the cab, especially if fresh-air vents are left open.

2. Turn on the air conditioner; set the controls at maximum cooling and blower speed.
3. Allow the system to run for at least 10 minutes (longer on hot and humid days).
4. Check air flow from the vents. If there is not enough air flow, check the air intake vent for blockage, and the blower motor for proper operation.

   If the air flow is not cold enough, see **Group 83** of the *Business Class® Trucks Service Manual*.
5. Carefully feel the system lines.
   - The compressor discharge line should feel hot.
   - The condenser inlet line should be noticeably warmer than the outlet line.
   - The line from the condenser should feel warm.
   - The inlet and outlet lines of the receiver-drier should be about the same temperature.
   - The line from the receiver-drier to the evaporator should feel warm.
   - The line from the evaporator to the compressor should feel cold.

NOTE: Oily spots on the lines or at the fittings could indicate a system leak.

Refrigerant Checking

1. If equipped with a moisture indicator sight glass, check the color of the moisture indicator. See **Fig. 1**, Ref. 1.

   If the indicator is a deep cobalt blue, the refrigerant charge is dry.

   If the indicator is *not* blue, the system is contaminated with water; recover the refrigerant, replace the receiver-drier, evacuate the system, and add a full refrigerant charge.
2. *On R–12 refrigerant systems only*, check the receiver-drier sight glass. See **Fig. 1**, Ref. 2.

   The presence or absence of bubbles tells whether or not the system has enough refrigerant. Bubbles normally appear when the system is started, then disappear after a few seconds. Only an occasional bubble should be seen during normal operation. If bubbles continue all of the time the system is running, the system is merely low on (not completely out of) refrigerant.