



# RECREATIONAL VEHICLE CHASSIS MAINTENANCE MANUAL

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**Models: MC  
MCL  
XCL  
XCM  
XCP  
XCR  
XCS**

## Page Description

For an example of a maintenance manual page, see Fig. 1.

A      B

↓      ↓

**Front Axle**

C

↓

**33**

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**33-01 Knuckle Pin Lubricating** (See Fig. 1)

Hold a high pressure gun on each fitting until fresh grease appears. This will ensure that all the old contaminated grease has been forced out.

When lubricating knuckle pin bushings *initially* (5000 miles / 8000 km), raise the front axle until the front tires are off the ground. Wipe the lube fittings clean, and slowly feed multipurpose chassis grease (NLGI grade 1 or 2) into each bushing area while turning the wheels from extreme right to left and back again (lock to lock). This will eliminate small air pockets and improve grease distribution.

Lower the tires to the ground, and regrease both top and bottom bushings until new grease is seen at the seal on the bushing opposite the fittings. The grease seal will accept the grease pressure without damaging the seal, and is designed to have grease pumped out through it during lubrication. Even if grease leaks out around the top or bottom plate gasket, continue pumping until new grease is seen at the seal on the bushing opposite the grease fitting.

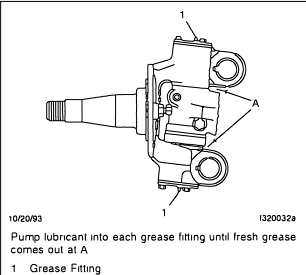
When lubricating knuckle pin bushings at indicated maintenance intervals, do not raise the front axle. Wipe the lube fittings clean, and apply multipurpose chassis

grease until new grease is seen at the grease seal on the bushing opposite the fittings.

**33-02 Tie-Rod End Lubricating and Inspecting**

- 1 Wipe the tie-rod end grease fittings clean, then pump multipurpose chassis grease (NLGI grade 1 or 2) to the tie-rod ends until all used grease is forced out and new grease appears at the ball stud neck.
- 2 Inspect the tie-rod ends.
  - 2.1 Shake the cross-tube. Movement or looseness between the tapered shaft of the ball and the cross-tube socket members means that the tie-rod end assembly must be replaced.
  - 2.2 The threaded portion of the tie-rod end assembly must be inserted all the way into the cross-tube split, for adequate clamping. See Fig. 2. Replace the parts if this cannot be done. For instructions, see the axle manufacturer's service manual.
  - 2.3 Check the tie-rod end nut and clamp nut torques. Tighten the tie-rod end nut 100 lbf ft (136 N m), and tighten the clamp nut 40 to 55 lbf ft (54 to 75 N m).

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Pump lubricant into each grease fitting until fresh grease comes out at A.

1 Grease Fitting

Fig. 1, Mentor Front Axle

**33-03 Toe-In Inspection**

For vehicle alignment to be accurate, the shop floor must be level in every direction. The turn plates for the front wheels must rotate freely without friction, and the alignment equipment must be calibrated every three months by a qualified technician from the equipment manufacturer. Freightliner dealers must have proof of this calibration history.

- 1 Apply the parking brakes, and chock the rear tires.
- 2 Raise the front of the vehicle until the tires clear the ground. Check that the safety stands will support the combined weight of the cab, axle, and frame. Place safety stands under the axle.
- 3 Using spray paint or a piece of chalk, mark the entire center rib of each front tire.

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D

E

11/11/2002

A. Maintenance Operation Number consists of the Group Number followed by the Sequence Number  
 B. Group Title  
 C. Group Number  
 D. Release Date  
 E. Group Number/Page Number

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Fig. 1, Example of a Maintenance Manual Page

<b>Group No.</b>	<b>Group Title</b>
00	General Information
01	Engine
09	Air Intake
15	Alternators and Starters
20	Engine Cooling/Radiator
26	Transmission
30	Throttle Control
32	Suspension
33	Front Axle
35	Rear Axle
40	Wheels and Tires
41	Driveline
42	Brakes
46	Steering
47	Fuel
49	Exhaust
54	Electrical
83	Heater and Air Conditioner

<b>Title of Maintenance Operation (MOP)</b>	<b>MOP Number</b>
15,000 Mile or 12 Month Maintenance. . . . .	00-04
30,000 Mile or 24 Month Maintenance. . . . .	00-05
45,000 Mile or 36 Month Maintenance. . . . .	00-06
60,000 Mile or 48 Month Maintenance. . . . .	00-07
6000 Mile or 6 Month Initial Maintenance . . . . .	00-03
General Maintenance Schedule Information. . . . .	00-01
Metric/U.S. Customary Conversion Tables. . . . .	00-10
Noise Emission Controls Maintenance. . . . .	00-08
Torque Specifications Tables. . . . .	00-11
Vehicle Maintenance Schedule Table . . . . .	00-02
Verification of Inspections Log. . . . .	00-09

## General Maintenance Schedule Information

### General Maintenance Schedule Information

Performing regular maintenance on your vehicle will help ensure that your vehicle delivers safe reliable service and optimum performance for years to come. Failure to follow a regular maintenance program can result in inefficient operation and unscheduled down time.

When the vehicle reaches the distance or time (whichever comes first) given for a maintenance interval, see the Vehicle Maintenance Schedule Table for a list of the maintenance operations to be performed at that maintenance interval. Use the maintenance operation reference numbers to find detailed instructions in the manual for each operation.

**NOTE:** Maintenance instructions in this manual are based on average vehicle use and normal operating conditions. Unusual vehicle operating conditions may require service at more frequent intervals.

For specific engine maintenance information, see the *Cummins Operation and Maintenance Manual*.

**IMPORTANT:** Maintenance operations appearing in italics in the following tables are for emission control components. Numbers in the table are reference numbers matching those in the text of this manual.

## Camp Freightliner Owner Training

Owners who want to learn more about their vehicle can attend a two-day training class, offered at the Freightliner Custom Chassis Service Center in Gaffney, South Carolina. Some of the items covered during the training include the air brake system, electrical system, vehicle storage, weight distribution, and maintenance intervals.

To learn more about the class or to register, go to [www.freightlinerchassis.com](http://www.freightlinerchassis.com). After entering the website, click "Motorhomes" and select "Owner Info". A class description and the registration form are located under the "Camp Freightliner" tab.

If needed, service work can be scheduled for your vehicle at the service center during your stay.

## Tear-Out Checklists

**IMPORTANT:** Additional copies of the checklists should be made before giving this to a dealer, as they may not be returned to you. The correct number of checklists are included to cover the warranty period, however, if you want copies of the checklists for future maintenance after the warranty expires, you will need to make them. Freightliner Custom Chassis Corporation (FCCC) will not be able to send you additional copies.

At the back of the maintenance manual, there are checklists for each maintenance interval up to 60,000 miles (96 540 km). When a maintenance interval needs to be performed, take the vehicle to an authorized Freightliner dealer, remove the appropriate checklist, and give it to the dealer. These are the items that will be inspected for maintenance.

## Vehicle Maintenance Schedule Table: 00–02

Maintenance Operation Procedures and Schedule																				
Maintenance Operation Number and Description	Maintenance Interval in Miles x 1000																			
	6	15	30	45	60	75	90	105	120	135	150	165	180	195	210	225	240	255	270	285
	Maintenance Interval in Kilometers x 1000																			
	9	24	48	72	96	120	145	169	193	217	241	265	290	314	338	362	386	410	434	458
	Maintenance Interval in Months																			
6	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	
<b>01–01</b> Engine Drive Belt Inspecting	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>01–02</b> Engine-Support Fasteners Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>09–01</b> Air Cleaner Inspecting and Replacing*	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>09–02</b> Charge Air Cooler (CAC) Inspecting and Cleaning	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>15–01</b> Alternator, Battery, and Starter Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>20–01</b> Radiator Cap Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>20–02</b> Radiator Inspecting and Cleaning	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>20–03</b> Coolant Replacing	The coolant replacement interval is every 100,000 miles (160 900 km) or 60 months, whichever comes first. You must check and, if necessary, recharge the supplemental coolant additive (SCA) levels and freeze point every 25,000 miles (40 225 km) or 6 months, whichever comes first. See the applicable engine operation and maintenance manual for further information.																			
<b>20–04</b> Mechanical Fan Drive Gearbox Oil Changing	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>20–05</b> Mechanical Fan Drive Gearbox Lubricating	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>26–01</b> Transmission Breather Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>26–02</b> Allison MD/MH Series Transmission Fluid Level Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>26–03</b> Allison Transmission Fluid and Filter Changing (internal/external filter)	For oil and filter change intervals, see the applicable Allison Operator's Manual.																			
<b>30–01</b> Throttle Pedal Pivot Pin Lubricating	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>32–01</b> Suspension Fastener Torque Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>32–02</b> Suspension Height Control Valve Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>32–03</b> Neway Suspension Inspecting	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>32–04</b> ZF IFS Lubricating	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

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	Maintenance Interval in Kilometers x 1000																			
	9	24	48	72	96	120	145	169	193	217	241	265	290	314	338	362	386	410	434	458
	Maintenance Interval in Months																			
6	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	
<b>32–05</b> Suspension Inspecting	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>32–06</b> Suspension U-Bolt Torque Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>33–01</b> Knuckle Pin Lubricating†	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>33–02</b> Tie-Rod End Lubricating and Inspecting†	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>33–03</b> All-Axle Alignment Checking	•																			
<b>33–04</b> Wheel End Inspection	•	•		•		•		•		•		•		•		•		•		•
<b>33–05</b> Oil-Filled Hubs Oil Level Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>33–06</b> Oil-Filled Hubs Oil Changing		•		•		•		•		•		•		•		•		•		•
<b>35–01</b> Axle Lubricant Level Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>35–02</b> Axle Lubricant Changing and Magnetic Plug Cleaning	For Detroit rear axles with petroleum-based oil, change the lubricant every 100,000 miles (160 900 km) or every 12 months, whichever comes first; if synthetic oil is used, change the lubricant every 250,000 miles (402 250 km) or every 36 months, whichever comes first. For Meritor rear axles with petroleum-based oil, change the lubricant at 100,000 miles (160 900 km) or at 12 months of service, whichever comes first, and every 24 months thereafter; if synthetic oil is used, change the lubricant every 250,000 miles (402 250 km) or every 36 months, whichever comes first.																			
<b>35–03</b> Axle Breather Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>35–04</b> Oil-Filled Hubs Oil Level Checking, Tag Axle	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>35–05</b> Oil-Filled Hubs Oil Changing, Tag Axle		•		•		•		•		•		•		•		•		•		•
<b>40–01</b> Wheel Nut Checking	•		•		•		•		•		•		•		•		•		•	
<b>40–02</b> Wheel Cleaning and Polishing	Perform these steps each time the wheels and/or the vehicle is washed.																			
<b>41–01</b> Driveline Inspecting and Lubricating	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>42–01</b> Brake System Valves Inspecting	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>42–02</b> Air Dryer Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>42–03</b> Air Dryer Desiccant and Coalescent Filter Replacing				•		•		•		•		•		•		•		•		•
<b>42–04</b> Camshaft Bracket Bushing Lubricating		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

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	Maintenance Interval in Kilometers x 1000																			
	9	24	48	72	96	120	145	169	193	217	241	265	290	314	338	362	386	410	434	458
	Maintenance Interval in Months																			
6	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	
<b>42–05</b> Slack Adjuster Lubricating	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>42–06</b> Foot Brake Valve Actuator Lubricating	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>42–07</b> Bendix Hydro-Max® Brake System Inspecting (front-engine diesel chassis)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>42–08</b> Brake Caliper Slide Pin Lubricating, Bosch Brakes (front-engine diesel chassis)	Lubricate every 6 months OR every 18,000 miles (28 962 km), whichever comes first.																			
<b>42–09</b> Brake Lines Checking, Hydraulic Disc or Air Brakes	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>42–10</b> Brake Lining Wear Checking, Hydraulic Disc Brakes (front-engine diesel chassis)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>42–11</b> Brake Inspecting	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>42–12</b> Meritor Roller Pin Lubricating	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>46–01</b> Drag Link Lubricating	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>46–02</b> Power Steering Reservoir Fluid Level Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>46–03</b> Power Steering Fluid and Filter Changing	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>46–04</b> Steering Driveline Lubricating	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>46–05</b> Steering Gear Lubricating	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>46–06</b> Hydraulic Reservoir Filter Changing (metal reservoir only)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>47–01</b> Fuel Tank Mounts and Fuel Line Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>47–02</b> Fuel/Water Separator Element Replacing	See the applicable engine operation and maintenance manual for fuel/water separator element replacing intervals.																			
<b>49–01</b> Exhaust System Inspecting (Noise Emission Control)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>54–01</b> Ground Cables Checking and Cleaning	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
<b>54–02</b> Battery Voltage Checking	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•



Vehicle Maintenance Schedule Table: 00-02

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	Maintenance Interval in Kilometers x 1000																				
	9	24	48	72	96	120	145	169	193	217	241	265	290	314	338	362	386	410	434	458	
	Maintenance Interval in Months																				
	6	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	
<b>83-01</b> Air Conditioner Inspecting	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	

\* Inspect the air cleaner every 6 months. Replace the air filter every 12 months, or when filter restriction reaches 25 inH<sub>2</sub>O (if equipped with an air restriction gauge).

† For vehicles with Detroit axles, complete this procedure once a year or every 25,000 miles (40 000 km), whichever comes first.

**Table 1, Maintenance Operation Procedures and Schedule**

## 6000 Mile or 6 Month Initial Maintenance: 00–03

Procedure Performed (check off or initial)	6000 Mile (9654 km) or 6 Month Initial Maintenance*	MOP
Inspect _____	Engine Drive Belt Inspecting	01–01
Check _____	Engine-Support Fasteners Checking	01–02
Change _____	Engine Oil and Filter (see the engine manufacturer's manual)	—
Change _____	Air Cleaner Inspecting and Replacing	09–01
Inspect _____	Charge Air Cooler (CAC) Inspecting and Cleaning (if cleaning is needed)	09–02
Check _____	Alternator, Battery, and Starter Checking	15–01
Inspect/ Check _____	Radiator (radiator cap, coolant freeze points, SCA levels, hose routing for chaffing and leaks)	20–01, 20–02, 20–03
Change _____	Mechanical Fan Drive Gearbox Oil Changing	20–04
Change _____	Transmission Fluid and Filter (if required by Allison)	26–03
Inspect _____	Transmission Hose Routing for Chaffing and Leaks	—
Lubricate _____	Throttle Pedal Pivot Pin Lubricating	30–01
Inspect _____	Suspension	32–01, 32–06
Check _____	Suspension Height Control Valve Checking	32–02
Lubricate _____	ZF IFS Lubricating	32–04
Check _____	Suspension U-Bolt Torque Checking	32–06
Lubricate _____	Knuckle Pin Lubricating <sup>†</sup>	33–01
Lubricate _____	Tie-Rod End Lubricating and Inspecting <sup>†</sup>	33–02
Check _____	All-Axle Alignment Checking	33–03
Inspect _____	Wheel End Inspecting	33–04
Check/ Change _____	Oil-Filled Hubs Oil Changing (front and tag axle)	33–05, 33–06, 35–04, 35–05
Check _____	Axle Seals for Leaks	—
Change _____	Axle Lubricant Changing and Magnetic Plug Cleaning (Detroit and Meritor axles)	35–02
Check _____	Axle Breather Checking	35–03
Check _____	Wheel Nut Checking	40–01
Check _____	Tire Pressure	—
Lubricate _____	Driveline Inspecting and Lubricating	41–01
Inspect _____	Brake System Valves Inspecting	42–01
Inspect _____	Air Dryer and Air Lines for Proper Routing, Chaffing, and Leaks	42–02

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