

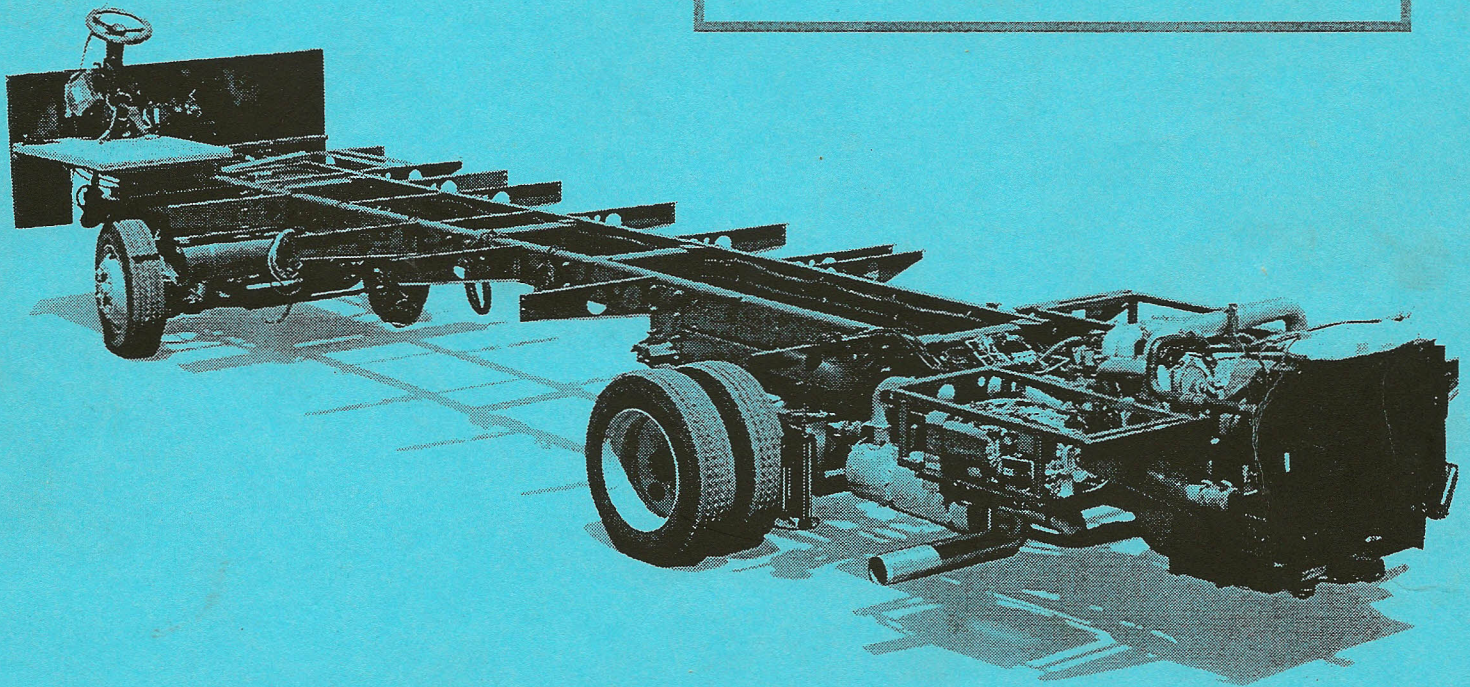
CHASSIS OWNER'S MANUAL

Magnum S24E250

Magnum S26E250

Magnum B30A300

Magnum M28V300



MAGNUM

Magnum Manufacturing

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The descriptions and specifications in this manual were in effect at the time of its approval for printing. The manufacturer reserves the right to change specifications or designs without notice and without incurring obligation. This manual includes information on several different models. Your chassis may not contain every system described.

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Protecting Your Coach Chassis

Section 1

Before Driving

Before starting your vehicle and taking off on your first vacation, learn how to use your vehicle and the equipment on board. Take time to inspect the following items:

1. Check the tires for proper pressure and unusual damage. (Refer to pg. 28)
2. Check the engine oil level.
3. Check the transmission fluid level.
4. Check the coolant level in reservoir.
5. Check the fuel water separator.

Refer to the section on Daily Maintenance for additional information on how to check these items. Your Vehicle Owners Manual may also have additional items to check.

Breaking In Your New Coach*

** Refer to the CAT 3126 Operation and Maintenance Manual*

Your new vehicle goes through an adjustment or break-in period during the first 1,000 miles that you drive it. During this period you need to pay special attention to how you drive. Here are some tips to keep in mind when on the road for the first time.

Try not to drive continuously at the same speed. Parts tend to adjust better to each other if various speeds are used for the first 1000 miles. To break in a new brake set, 100 miles of city driving or 1000 miles of highway driving is required. During this time, apply the brakes gradually to slow down and avoid repeated heavy stops. Don't add special brake-in oils during the first few thousand miles of operation. Additives may prevent piston ring seating.

Fuel Requirements*

**Refer to the CAT 3126 Operation and Maintenance Manual*

Warning. Fuel is highly flammable. Do not refuel while smoking or when near an open flame or sparks. Always stop the engine when refueling and always fill the tank outdoors. If you notice fuel overflowing from the cap, remove the cap with caution. Internal pressure may cause fuel expulsion.

Use good quality grade No. 2 or grade No. 2-D climatized fuel. The cetane number should be no less than 40 to assure satisfactory starting and overall performance. If operating your vehicle at low temperatures or high altitudes, the cetane number should be more than 45.

Fuel Contaminated With Water

During refueling, it is possible for water and other contaminants to be pumped into your fuel tank along with the fuel. Water, dirt, or other contaminants can cause damage to the entire engine. Drain the water from the fuel filter/water separator until clear fuel is seen.

Tips For Fuel Economy*

**Refer to your CAT 3126 Operations and Maintenance Manual*

Your vehicle's economy is mainly dependent on your driving style: how you drive, where you drive and when you drive. These factors all have an effect on how many miles you can get from a gallon of fuel. To operate your vehicle as economically as possible, use the following driving suggestions to help save money in both fuel and engine repairs:

1. Avoid lengthy warm-up idling. Once the engine is running smoothly, begin driving.
2. To save fuel, avoid quick starts, sudden stops, and maintain a constant cruising speed when traffic conditions allow.
3. Using the dash air conditioner can contribute to decreased fuel economy.
4. In the long run, careful maintenance will enhance coach performance, longevity, and fuel economy. Pay attention to proper engine and air cleaner maintenance, lubrication intervals, wheel alignment, and tire inflation pressures. (Refer to chassis maintenance section.)

Do not alter the engine to enhance the fuel efficiency. The engine is certified to meet all applicable emission requirements.

Driving In Dangerous Conditions*

**Refer to your CAT 3126 Operation and Maintenance Manual*

Slippery Roadways

When driving in slippery conditions, decrease your speed and allow for extra stopping room. If you need to stop, apply the brakes by pumping the pedal steadily and evenly. This technique will help avoid wheel lock up and loss of control. If possible, avoid quick steering wheel movements.

Warning. To avoid skidding on slippery roads do not downshift into low gear (1) at speeds above 20 mph. Do not use the cruise control on slippery roads.

Wheel Spin

If the wheels on your vehicle spin during vehicle start up, shift into a lower gear. Move forward slowly and evenly.

Driving Through Water

If you must drive in extremely wet conditions take the following precautions:

1. Slow down and put the transmission in low gear.
2. Apply the brakes gently. This technique presses the pads against the brake discs and keeps mud, silt, sand, and water from getting in.
3. Increase the engine rpm and cross the water while keeping light pressure on the brakes.
4. Once out of the water, maintain light pressure on the brakes for a short distance to heat them up and dry them out.
5. Check behind to make sure no one is following and make a test stop, applying the brakes to be sure they work properly. If the brakes have not returned to normal, continue to dry them out in the manner described above.

Warning. Do not apply too much brake pressure and accelerator pressure at the same time or you will overheat the brake rotors and pads.

Descending A Grade

The proper way to use your brakes for a long downhill grade is to go slowly enough that light brake use will keep the vehicle speed from increasing. Remember to downshift before descending a grade. Al-

though brakes are designed to take a lot of heat, when driving downhill brakes can overheat and fail to perform properly. By attempting to slow down too quickly, or from too high a speed numerous times you may overheat your brakes. Braking ability will decrease and you will have less stopping power if the brakes overheat.

Since brake rotors cool very slowly, it is not enough to let up on the brakes from time to time as a brake system cooling technique. The amount of cooling between applications is not enough to prevent overheating. Letting up on the brakes from time to time also requires heavier brake pressure and creates more heat than steady application does. Be sure to select the right gear, go slowly, and maintain a light steady use of the brakes.

Using The Exhaust Retarder

The exhaust retarder is used in order to increase the engines braking efficiency while saving the primary brakes from overuse. The exhaust brake does not engage until throttle is at idle position. The exhaust retarder is best used for downgrades and hilly terrain and is more effective when applied at higher rpms. The higher the rpm, the more braking horse power is available. The exhaust retarder preselects a lower gear in order to increase stopping effectiveness. All models may not have the exhaust retarder.

Warning. The exhaust retarder is not intended to be used for complete stopping. Do not use the retarder when the road surfaces are slippery.

Cold Weather Starting

Climate conditions can influence the starting ease of your vehicle. Plan ahead for cold weather. Since a diesel engine depends on the heat of compression, and not spark plugs, it is important that the engine is able to crank rapidly in order to start. Change to a lighter grade of engine oil to make starting easier under cold weather conditions. Use the proper viscosity oil recommended by the engine manufacturer.

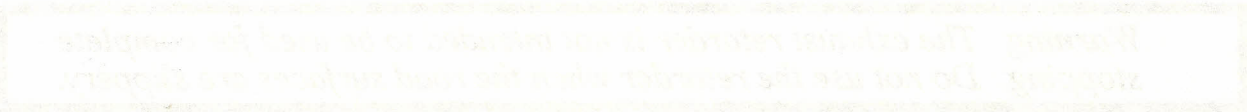
Cold Weather Operation

Your vehicle's battery is extremely important in cold weather conditions. Keep your battery in good shape by having it checked at regular intervals. If terminal voltage is below 12.48V, have the battery charged. Turn your headlights off when the engine is not running or idling to prevent drain on the battery. Remember that the battery works overtime during long hours of winter darkness.

When you begin driving, take it easy at first to give transmission and axle lubricants time to circulate.

Antifreeze Protection

Your new vehicle has antifreeze protection to negative 34 degrees Fahrenheit. If the radiator is low, add coolant and water. Check your antifreeze protection regularly and watch the engine temperature indicator. Any sudden rise in the temperature reading may indicate a freeze-up somewhere in the cooling system. If the temperature does not come down after a few miles, have your dealer check the thermostat and the cooling system.



Cold Weather Starting

Cold weather conditions can affect the starting ease of your vehicle. For best cold weather starting, since a diesel engine depends on the heat of compression, and not spark plug, it is important that the engine is able to crank rapidly in order to start. Change to a lighter grade of engine oil to make starting easier under cold weather conditions. Use the proper viscosity oil recommended by the engine manufacturer.

Cold Weather Operation

Driving Your Vehicle

Section 2

Starting Procedure*

* Refer to your CAT 3126 Operation's and Maintenance Manual

When starting your coach these procedures should be followed.

1. Be sure the headlights are off. This will reduce electrical load on the battery and allow all power to go to the starter motor.
2. Engage the parking brake.
3. Place the shift selector in the neutral position and turn the ignition switch to the "ON" position. The shifter will not indicate until the key is turned on.
4. Turn the ignition to the "START" position.

Warning. Do not crank the starter for more than 30 seconds at a time. This may result in overheating or damage to the starter. If the engine fails to start, wait two minutes before re-engaging the starter.

5. When the engine fires, release the key from the start position and allow the engine to idle for a couple minutes. (Refer to the Fast Idle Indicator)
6. Check the engine oil pressure gauge. The engine oil pressure must be indicated on the gauge within 15 seconds after starting.
7. Make sure all warning lights on the dash panel turn off. If the lights do not shut off, react accordingly to the illuminated light warning.

If you are starting a cold engine, the engine automatically changes its idle speed (RPM) to make sure adequate lubrication is available to the bearings. The engine should idle from three to five minutes at approximately 1000 rpm's before operating with a load.

Warning. Long periods of idling (more than ten minutes) can damage an engine because the combustion chamber temperature drops so low that the fuel won't burn completely. The unburnt fuel will cause carbon build-up which in turn will clog the injector spray holes and piston rings, and cause valves to stick. If the engine temperature gets too low, raw fuel will wash the lubricating oil off the cylinder walls and dilute the crank case oil. When this happens not all of the engine's moving parts will receive the correct amount of lubrication.

Transmission**

***Refer to your Allison World Transmission Operator's Manual*

The Transmission Status Light

When you start the engine, the transmission status indicator will light up for a few seconds and then go off. This is to show that the status light circuit is working properly. If the status light doesn't come on during the engine start up, have the circuit serviced immediately.

If the status light comes on during the vehicle operation, it indicates that the transmission has either overheated or has a mechanical malfunction. To see if it has overheated, check the transmission temperature gauge. If the temperature is normal, have the coach serviced as soon as possible. In some cases the electronic control unit will activate and will inhibit upshifts or direction changes.

Gear Selection

The Push Button Gear Selector

The gear selector in your vehicle is a push button shift selector with a panel of switches, not a traditional lever. Each switch pad is labeled according to its function: "N" for NEUTRAL; "D" for DRIVE; UP and DOWN arrows for switching gears; and "R" for REVERSE. Simply push the switch pad for the function you desire.

When you push the switch you will feel a click sensation. The "SELECT" indicator will display the function you choose. Next a "beep" tone will sound and the transmission will shift to the starting range. The monitor displays the starting range. If you choose the "D" (Drive) option you can complete your selection by using the arrow pads to gear up or down.

Conditions resulting in illumination of the status light located on the instrument panel will disable the pad and no beeps will sound. In such circumstances, check the Transmission Status Light and act accordingly.

The Arrow Pads and Gear Selection

The push button selector uses arrow buttons for gear selection. Push the "Up" or "Down" arrow to get the desired gear. When you have reached the desired gear, the select indicator will display your choice and the monitor will display the current operating gear.

Neutral (N)

The select indicator and the monitor will display "N" when in neutral. Use neutral to start the engine, to check the vehicle accessories, and to idle for extended periods of time if necessary. The engine shouldn't be able to start in any other gear. If the coach does start in a gear other than neutral, be sure to service the start circuit immediately.

Warning. Do not coast while in neutral. This can result in transmission damage. When coasting in neutral there is no available engine braking.

Drive (D)

The transmission will be in first gear when "D" is selected. As the vehicle increases in speed, the transmission will automatically upshift through each gear.

Warning. If you have to leave your vehicle unattended, be sure to put the transmission in neutral, set the parking brake and turn the engine completely off. Do not leave your vehicle running in neutral unattended. These precautions will protect you and others from injury due to any unexpected vehicle movement.

As it slows down, it will downshift through each gear. The select indicator will display the highest gear available and the monitor will display the gear that is being used.

Low Gear (1)

When you drive through mud or deep snow, maneuver in tight spaces, or drive on steep grades, use low gear. This gear makes it possible to maximize driving power and engine braking power. Note that the transmission uses a holding feature that prohibits upshifting above a gear selected during normal driving. If the engine speed exceeds a certain limit, the transmission will upshift to prevent engine damage, regardless of the gear selector setting.

Second, Third, Fourth, and Fifth (2, 3, 4, 5)

Road conditions, traffic conditions, or load may make it necessary to restrict the automatic shifting to a lower gear. These gear positions provide greater engine braking on down grades. The lower the gear, the better the braking effect. However, if the engine speed becomes too great, the transmission will automatically upshift to prevent damage to the engine transmission.

Reverse

In order to shift from forward to reverse, or from reverse to forward, the vehicle must be completely stopped. To put the coach into reverse press the "R" button, the selector indicator and the monitor will display the "R."

Downshifting

When you must slow down in heavy traffic or while driving up steep hills, downshift before the engine starts to labor. Downshifting can give better acceleration when you need to increase your speed. When the vehicle is in motion going down steep hills, downshifting helps maintain safe speed and prolongs brake life.

Resetting The Shifter

The shifter may need to be reset if there are service problems, such as transmission overheating or an electrical malfunction. To reset the shifter follow this procedure:

1. Bring the coach to a complete stop in a safe location.
2. Set the parking brake and select "N" (neutral) using the switch.
3. Press the Up and Down arrows simultaneously one time.
4. Press and hold the "Mode" button until you hear a tone. Then release the button.
5. Select "N" and the transmission will return to normal operation.

If the condition is temporary, the status light will not come back on and your vehicle will operate in a normal manner. If the problem is not temporary, the status light will come back on and the transmission may remain inhibited or operate in a normal manner until the condition is detected again. The type of operation allowed by the ECU (Electronic Control Unit) will depend on the type of condition.

Warning. If the status light does not come back on, have the transmission checked at the earliest opportunity.

Economical and Performance Modes**

** Refer to your Allison World Transmission Operator's Manual

You can use the mode button to enhance your fuel economy and to select shift patterns. The mode button is located on the gear shifter pad. When the mode button is "OFF" the transmission shifts are delayed until a higher engine rpm is attained. This shifting standard will

improve the vehicles overall performance and is called the "Performance Mode." When the mode button is "ON" (as indicated by the display light), the transmission shifts sooner allowing for smoother shifts and improved fuel economy. You can press the mode button at any speed to put your coach in "Economy Mode."

Cruise Control*

* Refer to CAT 3126 Operation's and Maintenance Manual

The cruise control allows you to automatically set and maintain the speed of your vehicle above 30 mph. The switches for the cruise control are built into the turn signal lever.

Warning. Use only FCC approved radio transmitting equipment that is properly installed. Use of other transmitting equipment may cause the cruise control to malfunction.

Operating Instructions

Cruise Control ON/OFF Switch

This switch must be on before cruise control or controlled idle can be activated.

Set/Resume Switch

With the Cruise Control On/Off switch in the ON position and the vehicle speed within the programmed low cruise and high cruise control limits range, momentarily pressing the Set switch will activate cruise or controlled idle, and the Electronic Control Module (ECM) will maintain the current speed.

Once a speed has been set, and is then disengaged using the brake, clutch, or ON/OFF switch, the ECM will accelerate (or decelerate) to the previous set speed when the Resume switch is toggled.

After a speed has been set, pressing and holding the set/resume switch in position will cause the engine to accelerate or decelerate to establish a new set speed. Momentarily pressing or toggling the set/resume switch will accelerate or decelerate the cruise set point one mph.

To Accelerate or Decelerate

Push the set/resume switch in position until you have reached the desired speed, then release the switch. Vehicle speed will increase or decrease by 1 mile per hour by toggling the switch and not holding it down.

To Disengage the Cruise Control

To disengage the cruise control you can either step on the brake, clutch, or slide the cruise control switch to the off position, or turn the vehicle off.

Warning. Do not shift to neutral ("N") when using cruise control. Doing so will cause your engine to overspeed.

Warning. Do not use cruise control on wet roads or in heavy, congested traffic.

Steering

Power steering systems use energy from the engine to make steering easier. If you notice any change in the feel of your steering system during normal vehicle operation, have the power steering system checked. A hissing sound at the full right or full left of the steering wheel positions is normal.

Warning. Never hold the steering wheel against the stops (extreme right or left turn) for more than five seconds. If the steering wheel is held for longer than five seconds, the power steering pump could be damaged.

The Power Steering Check

Check the power steering after any severe impact such as striking large potholes, inadvertently sliding into curbs on icy roads, or a collision involving the front end of the vehicle. Observe the steering alignment, if the spokes of the steering wheel seem to be in a different position while going down the road, have the front suspension and steering checked for possible damage.

Please note that your coach is aligned to very strict standards. Due to driving conditions and road hazards we can not be responsible for future alignment.

Positioning The Steering Wheel

To change the position of your tilt steering wheel, pull the lowest lever on the right hand side of the column toward you and move the steering wheel to the desired position, then release the lever. The steering wheel can also be tilted for convenient entry and exit of the captain's chair. To telescope the steering wheel, push the same lever and extend or retract the steering wheel as desired.

Brake System

Brakes are a vital safety feature of your vehicle. Take note of changes in braking action such as pulling to one side, strange sounds that occur while braking, or increased pedal travel in order to brake effectively. If you notice any problems with your brakes, investigate immediately and see a service center if necessary.

Parking Brake Use

To set the parking brake, hold the service brake down and pull out the park brake control. Once the park brake control is out, the service brake may be released when the engine is in neutral. To release the park brake, hold the service brake down and push the park brake control valve back in.

Before driving your vehicle, make sure the parking brake is completely disengaged and check the brake system warning light. Do not drive the vehicle while the parking brake is set. This will reduce brake effectiveness and cause excessive brake wear.

Warning. Do not use the gear shifter in place of the parking brake. Always use the parking brake when you park or leave the driver's seat. The transmission does not have any braking effect when parked.

Hydraulic Brakes

The reserve hydraulic pump can be tested by stepping on the brake pedal while the ignition switch is in the "OFF" position. Listen to see if the pump is running while the brake pedal is depressed. Be sure to check your electrically powered reserve pump periodically using this procedure.

When the reserve hydraulic pump runs, a buzzer should sound and a light in the dash will illuminate. If this happens when the engine is running, it is a warning that the main hydraulic system has a malfunction.

If The Brakes Pull

First, check the tire pressure. If they pull during the first 500 miles, make ten moderately fast stops from 40 mph. Repeat if required. This procedure may be necessary to properly seat brake pads against the rotors. If the brakes pull after the first 500 miles, have them serviced immediately.

Warning. Do not drive with your foot resting on the brake pedal. This will result in abnormally high brake pressure, excessive wear lining, and increased stopping distances.

Air Over Hydraulic Brakes***

***Refer to your Midland-Grau Brake Systems Manual

The Exhaust System*

* Refer to your CAT 3126 Operation and Maintenance Manual

Warning. Never idle the engine in closed areas. Avoid sitting in a parked or stopped vehicle for any extended amount of time with the engine running. Exhaust gases, particularly carbon monoxide, may build up and can be harmful and potentially lethal.

For protection from possible entry of carbon monoxide into your vehicle, have a technician inspect the exhaust system and body ventilation system properly:

1. Whenever the vehicle is raised.
2. Whenever you notice a change in sounds from the exhaust system.
3. Whenever the vehicle has been damaged by impact with another vehicle, object, or road obstruction.

Warning. Carbon Monoxide is not easily detectable because its odorless and colorless. Still, carbon monoxide can be present with all other exhaust fumes. If you ever smell exhaust fumes of any kind inside your vehicle, have it inspected immediately by your dealer and have the condition corrected. Do not drive with exhaust fumes present.

Proper Ventilation

If you idle the engine while stopped in an open area, open the windows at least one inch, and adjust the heating or air conditioning to draw outside air into the vehicle as follows:

1. If your vehicle has outside air vents, open them fully.
2. Heating - Set fan speed on medium or high, with the function control lever on HEAT or DEFROST, and the temperature control lever on any desired position.
3. Air Conditioning - Set fan speed on MEDIUM or HIGH with the function control lever on any position except OFF or MAX. The temperature control lever should be at mid-position.

Gauges*

Depending on the model, your chassis may not have all of these gauges.

**Refer to your CAT 3126 Operation and Maintenance Manual*

Water Coolant Temperature Gauge

The water temperature gauge demonstrates how high or low the water temperature is. The position of the pointer should remain within the normal range. Typical water coolant temperature range is 88 to 102C, (190 to 215F). Maximum allowable temperature is 110C (230F) with the cooling system cap. If the gauge pointer moves beyond the normal range area toward the hot position, it indicates overheating that may damage the engine. Do not continue to drive with an overheated engine.

High Temperature Indicator

If the high temperature indicator light comes on, the engine coolant is not cooling the engine and there may be overheating that will damage the engine. Do not continue to drive with an overheated engine. The CAT Engine will automatically derate itself at 222 degrees and shut down at 230 degrees.

Fuel Gauge

The fuel gauge displays approximately how much fuel is in the tank when the ignition is in the ON position. The fuel gauge may vary slightly while the vehicle is in motion. This is the result of fuel movement within the tank. A more accurate reading may be obtained with the vehicle on smooth, level ground.

Tachometer

The tachometer indicates the approximate number of engine revolutions per minute (rpm). Use this while driving to select the correct shift points and prevent engine lugging and overrevving. The engine can be operated at high idle without damage, but should not be allowed to overspeed. Overspeeding (over 3000 rpm's) can result in serious engine damage.

Transmission Temperature Gauge

The transmission temperature gauge indicates at what temperature the transmission fluid is. This temperature should remain between 140 and 290 degrees. This temperature will vary under more severe conditions. Under cool conditions in higher gears when driving on level ground, it is not uncommon for the gauge to read under 140 degrees.

Engine Oil Pressure Gauge

The engine oil pressure gauge indicates the relative oil pressure. The position of the pointer should remain above 6psi when the engine is hot and idling. If the pointer drops below the normal range when the engine is running, you have lost oil pressure. If this happens, pull off of the road as soon as possible and turn off the engine. Severe damage will occur if the engine is not shut off immediately. Check the oil level and add oil as needed. Do not overfill. Typical oil pressure range is 240 to 480 kPa (35 to 70 psi) when the engine is running at rated engine speed. A lower pressure is normal at idling speed. If no pressure is indicated, stop the engine. High pressures are normal on start with cold oil.

Oil Light on Gauge

The oil indicator light will illuminate when there is not enough oil pressure. If the oil indicator lights up, the engine oil level needs to be measured. Stop the coach and immediately check the oil level and act accordingly.

Warning. A circuit breaker in the light switch protects the headlight circuits. If the headlights begin to flicker on and off, have the headlamp wiring checked immediately.

Battery Voltage Gauge

The battery voltage gauge indicates the amount of charge or discharge in the battery charging circuit. When the engine is operating, this gauge indicates the charging system voltage. The normal range is between 13.5 volts and 14.5 volts without a load. With a load the battery reading will vary, down from 14.5 volts, depending on how many items in the coach are turned on.

Speedometer and Odometer

The speedometer indicates the forward speed of the vehicle. The odometer indicates the total distance that the vehicle has traveled.

Turbo Boost

The turbo boost gauge shows the relative boost of pressure in the turbo. Normal boost at full load for a 250HP engine is 25psi and normal for a 300HP engine is 27psi.

Indicator Lights

Depending on the model, your coach may not have all of these gauges indicators. These indicators can be located on the icon bar.

High Beam Indicator

The high beams indicator lights up when the high beams are being used.

Hazard Warning Lights

The hazard light system serves as a warning to other drivers to use extreme caution when approaching or passing your vehicle. The flashers will not work when the brake pedal is depressed. The ignition switch can be in any position for the hazard lights to work. To turn the hazard lights on, pull out the switch on the under side of the steering column. Push the switch in to turn the lights off. The lights will flash

continuously for two hours (provided the batteries are fully charged and in good condition) without discharging the battery excessively, even though the engine is not running.

Parking Brake Light

The parking brake light will illuminate when the brake is on. Do not start to drive when the parking brake light is illuminated, release the brake first.

Brake Service

The brake service light will illuminate and a buzzer will sound when the emergency back-up electric motor comes on if there is no hydraulic pressure and also if the brakes need to be serviced. Have them serviced at your earliest convenience.

Fast Idle Indicator

The fast idle enable switch, is enabled by depressing/toggling the switch and then releasing it. This ramps the engine up to the programmed fast idle of 1000rpm. The driver can override the programmed fast idle rpm by depressing the accelerator pedal and depressing the fast idle enable switch when the engine is at the desired rpm. This rpm would then be the fast idle rpm until the engine is shut down.

The fast idle is disengaged when the service brake, clutch, or neutral switches are on, or if the coach speed exceeds the programmed idle speed limit.

A fast idle enabled lamp will come on when the fast idle is enabled. The fast idle switch is on whenever the switch is held in the depressed/toggled position.

Check Engine Indicator

To indicate a problem has been detected by the engine monitoring system, the electronic control module causes the check engine lamp to flash.

Inlet Air Heater Light (Wait to Start Light)

The inlet air heater indicator will light up when the diesel engine is not ready to start. Turn the key and then wait to start the engine until the light goes off. The length of time that the indicator remains lit will depend upon how cold the engine is due to weather conditions. When

the key is turned on, the inlet air heater lamp should come on for a minimum of two seconds regardless of coolant temperature. Depending on temperature conditions, the heater may activate for 30 seconds, or at the longest, the cycle may last for up to 13 minutes. The heater should turn on and then turn off once the cycle is complete.

Do Not Shift Indicator

The electronic control system is programmed to inform you if operating parameters have been exceeded and automatically take action to protect the operator, vehicle, and transmission. A diagnostic code will be registered when the do not shift light is on and also when other conditions are diagnosed which do not require the do not shift light to be on. Every time the engine is started, the do not shift light comes on, then goes off after a few seconds. This momentary lighting is to show that the light circuit is working properly. If the light does not come on during engine start, service the coach immediately.

Left and Right Hand Turn Signal Lights

To signal for a left turn, pull the turn level down until it stays in the down position. To signal a right turn, push the turn signal lever up until it stays in the up position. If the indicator continues to flash after making a turn, manually return the lever to center position. Be sure to use the signals when turning corners and changing lanes. If the direction indicator light in the instrument panel does not flash or remains continuously on when you signal a turn, the signaling system is malfunctioning. Have the condition corrected as soon as possible. In the meantime, use the accepted hand signals.

Lights

The control knob for the headlights, taillights, parking lights, license lights, marker lights, and instrument panel lights is located on the lower left of the switch panel. Following is a list of switch positions and light functions:

1. When the switch is pushed in fully toward the panel then all lights are off.
2. If the switch is pulled out to the first stop, all of the lights are turned on except the headlights.
3. A fully pulled out switch signifies that all of the lights are on.

4. A bright or dim headlight beam depends on the dimmer position. The dimmer can be changed by rotating the lightswitch. Rotate the knob to adjust the instrument panel light brightness.

Towing

Towing a load puts extra strain on your vehicle's engine, drive train, brakes, tires, and suspension. With this and the safety of yourself and others in mind, be sure to match the towed load to the vehicle as follows:

The Gross Combined Weight Rating (GCWR) and Gross Vehicle Weight (GVW) determine the towing capacity. If the GCWR is exceeded, serious damage to the drive train may result, and safety may be compromised. Subtract the GVW (which is the actual weight of the vehicle alone) from the GCWR (which is the total weight this vehicle can safely motor) to determine the acceptable weight this vehicle can tow.

Make sure the towing equipment is properly and safely attached to your vehicle. Check to see that the tires are properly inflated and always use a safety chain to provide a backup for the hitch. The tongue weight of the trailer should be approximately 10-15% of the loaded trailer weight for best handling. Heavy trailers (over 2000 lbs.) should have trailer brakes hooked up.

Adjust your driving habits to provide for the extra length of the trailer. When turning, drive slightly beyond the normal turning point before steering in that direction. Descend hills at a slower speed than usual, and avoid sudden braking.

Chassis Maintenance

Section 3

Like all equipment, your chassis requires regular maintenance. Even when its running beautifully, it is slowly wearing down. With neglected maintenance comes all kinds of disappointments; chronic breakdowns, poor mileage, and greater depreciation, but with a small share of your attention, you can keep it running great for years.

Magnum Manufacturing stands behind its product one-hundred percent, but we can not warrant against neglect. If you fail to maintain your chassis, Magnum reserves the right to void your warranty.

Following is a list of the various inspections and service items that should be performed. They are divided into groups according to the frequency of the maintenance. If you are operating your chassis in particularly rough conditions (dust, hills, or city driving), you should increase the frequency of the maintenance operations.

** Refer to the CAT 3126 Operation and Maintenance Manual for engine maintenance specifications.*

Daily Maintenance

Every time you stop to refuel, and before every trip, be sure to check the following:

1. Water Fuel Separator

To check the water fuel separator, inspect the plastic bowl on the bottom of the filter. If the fluid looks contaminated or if you can see two different liquids in the bowl, then the separator should be drained. To drain the separator, first start the engine and run it until the engine temperature reaches at least 140 degrees. Then shut the engine off. Place a light colored cup under the bowl and open the drain to allow a small amount of liquid into the cup. Any water in the fuel will separate and form light brown or gray balls or bubbles. If there is water or other

contamination, repeat the process, draining and inspecting small amounts of fluid. Afterwards, start the engine and run it at half throttle for two or three minutes or until any air introduced to the system is out.

2. Coolant Level

Check the coolant level with the engine stopped and cool. Remove the radiator filler cap slowly to relieve pressure. Fill to the proper level if the coolant is low and install the filler cap. The recommended engine coolant is a heavy duty diesel engine 50% Ethylene Glycol, and 50% Distilled Water combination.

3. Engine Oil

The vehicle must be turned off and parked on a level surface when performing this procedure. Make sure that the engine is stopped. To check the engine oil, pull out the oil dipstick and wipe it off. Reinsert the dipstick fully and then remove it again to observe the level of engine oil. Add more oil if necessary. Do not overfill. The recommended engine oil is 15W40 CE/SG Oil.

4. Transmission Oil

When the engine is running and the transmission oil reaches 146 degrees, the Up and Down arrows (for shifting gears) can be simultaneously pushed to check the transmission oil. If the transmission oil is low, add Dextron III Automatic Transmission Fluid.

5. Batteries

There is a voltage gauge on the dash but the batteries can also be checked by using a voltmeter. Set the voltmeter to read "Volts DC," then place one lead on a negative terminal and the other on a positive terminal. Read the voltage meter. If the screen reads less than 12.48 V, the batteries are low and should be recharged or replaced if needed.

6. Brake Master Cylinder Fluid Level

The brake master cylinder fluid level is a container that is located behind the firewall. A visual check is sufficient to tell if more fluid needs to be added. Add fluid if necessary. Dot 3 Brake Fluid is recommended.

7. Tire Pressure and Unusual Damage

With a tire pressure gauge, check the pressure of all six tires. The pressure of the tires depends on the weight of the vehicle. The pressure should be less than the maximum that each tire can withhold. Refer to

the following tire chart, if any of the tires are low, add more air. Examine the tires for unusual damage while checking the tire pressure. If there are any peculiar marks, have the tire examined by a professional.

Tire Charts

Goodyear Tires

Tire Size - 9R22.5
 Tire Type - G159 Goodyear
 PSI (Pounds per square inch)

| PSI | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 |
|--------|------|------|------|------|------|------|------|------|------|------|
| Dual | 2960 | 3120 | 3270 | 3410 | 3550 | 3690 | 3820 | 3950 | | |
| Single | 3010 | 3190 | 3370 | 3560 | 3730 | 3890 | 4050 | 4210 | 4350 | 4500 |

Toyo Tires

Tire Size - 255/ 70R22.5
 PSI (Pounds per square inch)

| PSI | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 |
|--------|------|------|------|------|------|------|------|------|------|------|
| Dual | 3195 | 3415 | 3640 | 3860 | 4080 | 4190 | 4410 | 4540 | 4805 | 5070 |
| Single | 3525 | 3750 | 3970 | 4190 | 4410 | 4540 | 4805 | 4940 | 5205 | 5510 |

Toyo Tires

Tire Size - 9R22.5
 Tire Model - M-87
 PSI (Pounds per square inch)

| PSI | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 |
|--------|------|------|------|------|------|------|------|------|------|------|
| Dual | 2960 | 3120 | 3270 | 3410 | 3550 | 3690 | 3820 | 3950 | | |
| Single | 3010 | 3190 | 3370 | 3560 | 3730 | 3890 | 4050 | 4210 | 4350 | 4500 |

Weekly Maintenance

The following list of items should be maintained on a weekly basis.

1. Check the power steering fluid
2. Check the air cleaner filter minder
3. Check the belts for proper tension
4. Check the engine fan

Every 6000 Miles

These maintenance procedures should be followed at least every 6000 miles. If the coach has been stored for any length of time this list should be checked before using the coach.

General Inspection

Check air intake system for damage.

Check hydraulic hoses for leakage.

Check Fluid Levels

Check hydraulic fluid level.

Check transmission fluid level.

Oil Change

Change the engine oil and filter.

Lubrication

Check rear axle lubricant.

Lubricate the front axle king pins.

Lubricate steering linkage, drive shaft, U-joints, and slip yoke.

Lubricate brake pedal arm, tie rods, and drag link.

If equipped with Ellipti-Ride, lubricate the leaf spring pins.

Tire Inspection

Check wheel lug nut torque.

Inspect tires for abnormal wear.

Every 12,000 Miles

These procedures should be followed every 12,000 miles or at least once each year.

Change Hydraulic Fluid

In hot climates this change should be accelerated.

Change Filters

Change engine coolant filter.

Change engine fuel filter.

Other Changes

Change fuel water separator element.

Change rear axle lubricant.

Replace air cleaner if it has not been replaced already.

Brakes

Inspect disc brake system.

Lubricate calipers.

Rotate Tires

Every 18,000 Miles

Inspections

Check all engine belts for proper tensions.

Inspect fan and shroud for damage.

Check belt tension bearing.

Check brake master cylinder fluid level.

Inspect exhaust system for damage.

Inspect parking brake system for damage. Test for proper function.

Check accelerator and throttle controls for damage.

Check vibration damper hub.

Inspect engine mounts and torque engine mount bolts.

Inspect and lubricate front axle bearings.

Automatic Transmission

Change transmission filters.

Change transmission fluid.

Changes

Change power steering fluid.

Replace engine mounted fuel water separator.

Every 42,000 Miles

Flush the cooling system.

Every 100,000 Miles

Change rear axle lubricants

Lubricant Specifications

CAT Multipurpose Molybdenum Grease or any other multi purpose type grease which contains 3-5% molybdenum. Please see chassis lubrication points.

Other Procedures

Coolant - Before Summer and Winter

Check the coolant condition.

Inspect the coolant hoses and clamps.

Coolant - Every Two Years

Replace the engine coolant.

Rear Axle Lubricant

Drain and replace after the first 5000 miles. The second change is at 100,000 miles.

While Operating Your Vehicle

If any of the following problems do occur, have the coach serviced at your earliest convenience.

1. Note any changes in the sound of the exhaust or any smell of exhaust fumes in the vehicle.
2. Check for vibrations in the steering wheel. Notice any increased effort or looseness in the steering wheel, or change in its straight ahead position.
3. Notice if your vehicle constantly turns slightly or "pulls" to one side when traveling on smooth, level road, and accounting for wind.
4. When stopping, listen for strange sounds and notice if the vehicle pulls to one side, has increased pedal travel, or a "hard" to push brake pedal.

Lubrication Recommendations*

The leaf spring shackles, front axle king pin, tie rod, drag link, drive shaft, U-joint, slip yoke, brake pedal arm, steering shaft U-joint, front wheel bearings, and rear wheel bearings should all be lubricated with NLGI No. 2 or equivalent.

The disc brake caliper rails should be lubricated with silicone lubber grease and caliper slide grease. GL5, 85/140 Gear lubricant hypoid should be used on the rear axle differential.

The hydraulic system reservoir should be lubricated with Dextron 2 Automatic Transmission Fluid.

** Refer to your CAT 3126 Operation and Maintenance Manual for CAT Engine Lubrication Specifications*

Axle, Engine/Transmission & Radiator: Fluids, Belts & Capacities

| | |
|------------------------------------|-----------------------------------|
| Description | Cat 3126 - 250 and Cat 3126 - 300 |
| Engine Oil Filter | Cat 9L8439 |
| Engine Crankcase Capacity | 32 QUARTS |
| Oil Capacity When Replacing Filter | 33 QUARTS |
| Primary Fuel Filter | Racor 490R10 |
| Secondary Fuel Filter | Cat IR - 0751 |
| Engine Fuel Filter | Optional Winn Fuel Filter Option |
| Radiator System Coolant Capacity | 11 GALLONS |
| Main Drive Belt | Napa 25 - 78069 |
| Water Pump Belt | Cat 720244/Napa 25-08755 |
| Air Cleaner | FARR 99842-009B |

The internal filter: deep sump, for transmission MD3060 should be number 9506337. The initial fill for the deep sump should be at 27 quarts. A refill after an oil change should have 19 quarts in the deep sump. The lube capacity for an Eaton 15040S is 21 pints. The lube capacity for an Eaton 19040S is 25 pints.

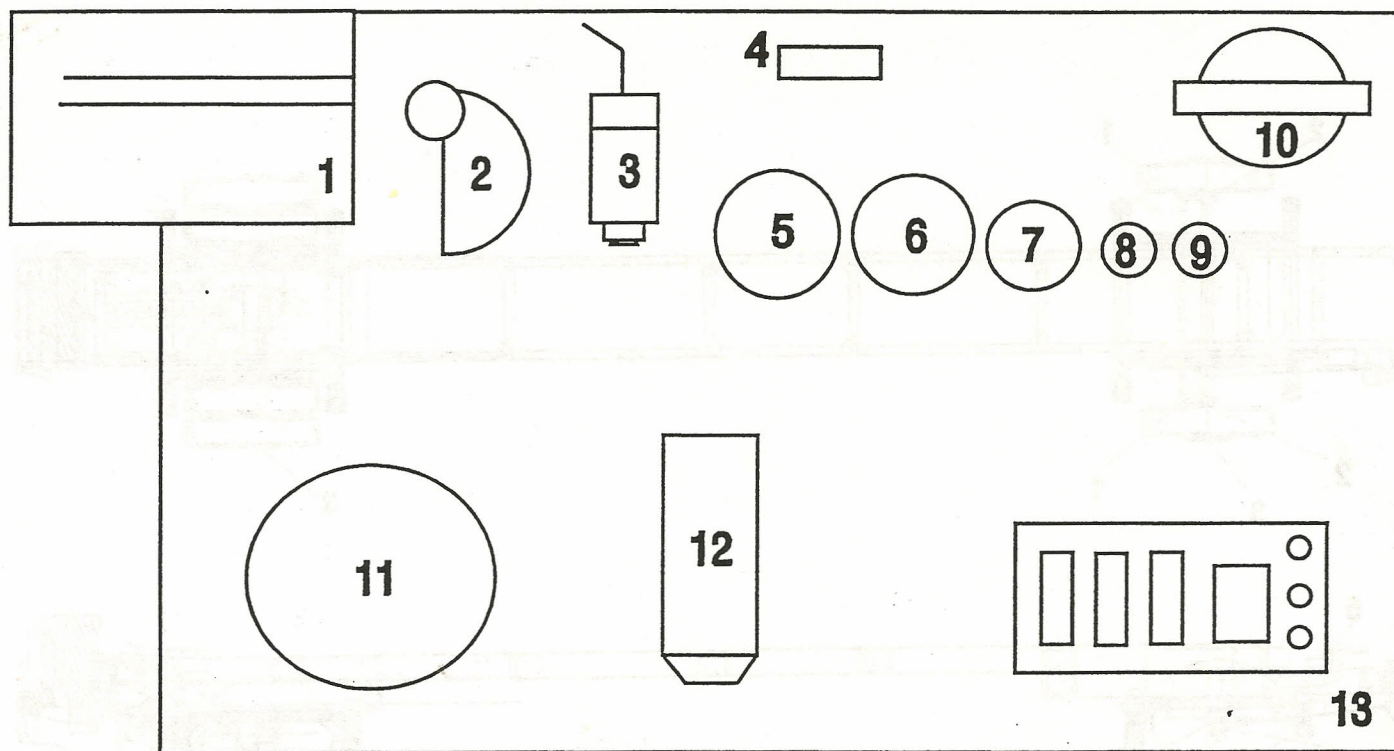
Auto Repair Transmission & Drivetrain: Fluids, Belts & Clutch

| Item | Quantity | Notes |
|------------------------|----------|-----------------|
| Transmission Fluid | 10.0 | Check level |
| Power Steering Fluid | 5.0 | Check level |
| Brake Fluid | 2.0 | Check level |
| Engine Oil | 5.0 | Check level |
| Water | 1.0 | Check level |
| Antifreeze | 1.0 | Check level |
| Clutch Fluid | 1.0 | Check level |
| Brake Pads | 4 | Front & Rear |
| Brake Discs | 2 | Front & Rear |
| Timing Belt | 1 | Check condition |
| Water Pump | 1 | Check condition |
| Idler Pulley | 1 | Check condition |
| Tensioner Pulley | 1 | Check condition |
| Timing Chain | 1 | Check condition |
| Timing Cover | 1 | Check condition |
| Timing Chain Sprocket | 1 | Check condition |
| Timing Chain Guide | 1 | Check condition |
| Timing Chain Tensioner | 1 | Check condition |
| Timing Chain Sprocket | 1 | Check condition |
| Timing Chain Guide | 1 | Check condition |
| Timing Chain Tensioner | 1 | Check condition |
| Timing Chain Sprocket | 1 | Check condition |
| Timing Chain Guide | 1 | Check condition |
| Timing Chain Tensioner | 1 | Check condition |

The following are the most common items that are replaced during a transmission and drivetrain service. The amount of work that is done will depend on the condition of the vehicle. The following are the most common items that are replaced during a transmission and drivetrain service. The amount of work that is done will depend on the condition of the vehicle.

Your Chassis at a Glance

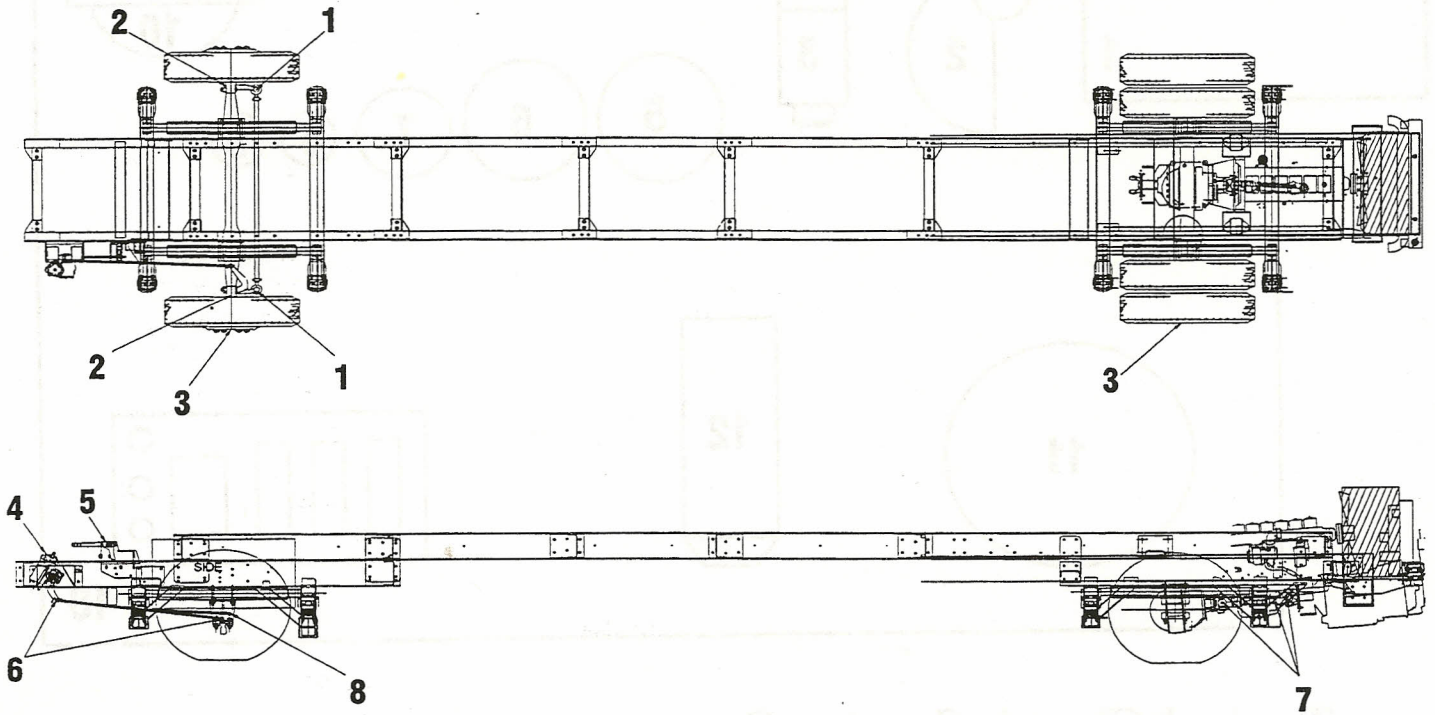
Section 4



-Typical Chassis Service Center

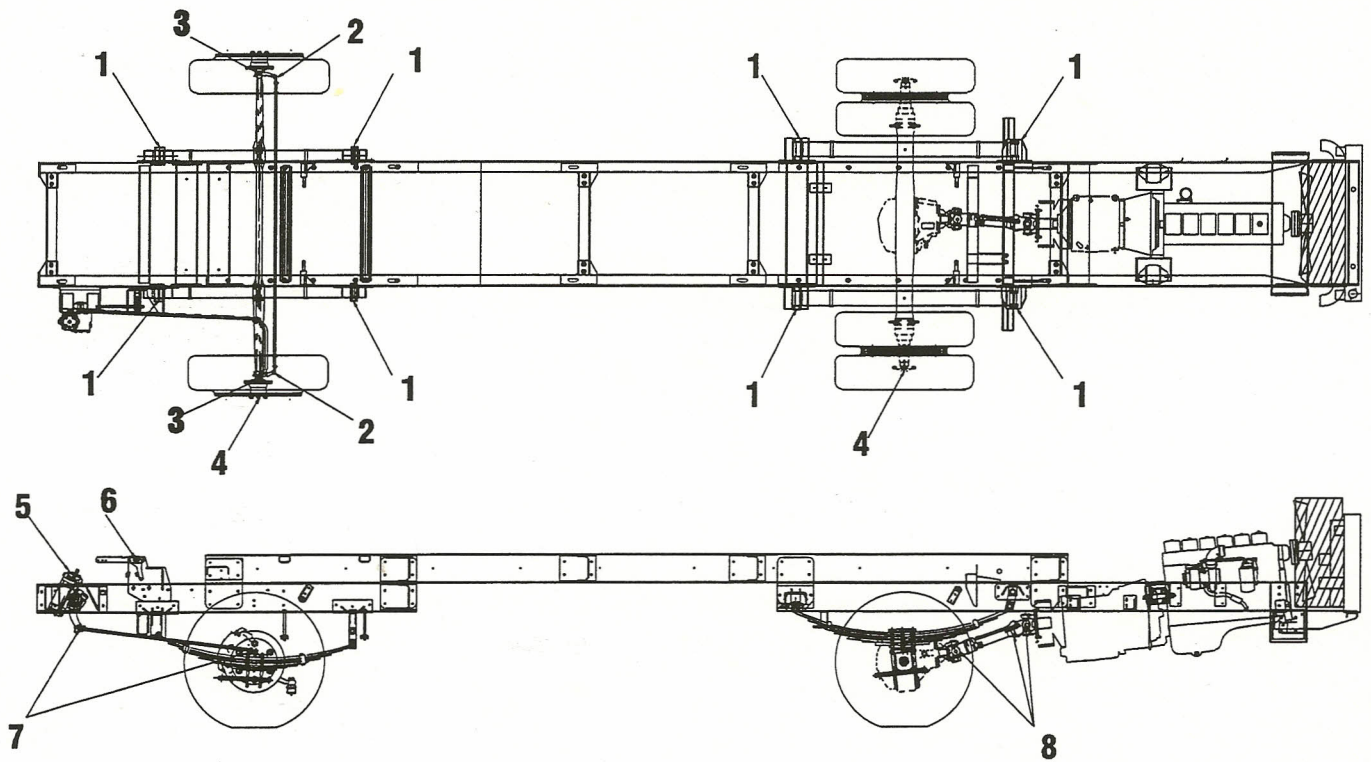
1. Hydraulic Fluid Reservoir
2. Retractable Trouble Light
3. Air Filter Restriction Indicator
4. Engine Oil
5. Oil Pressure
6. Water Temperature
7. Engine Hours
8. Engine Start Button
9. Engine Stop Button
10. Transmission Oil Gauge
11. Paper Towels
12. Primary Fuel Filter / Water Separator
13. Leveling System and Warning Lights

-Lubrication Points (Blue Max)



1. Tie Rod End
2. King Pin
3. Front and Rear Wheel Bearings
4. Steering Gear Box
5. Brake Arm
6. Steering Drag Link
7. Drive Line & U-joints
8. Front Stabilizer Bar

-Lubrication Points (Blue Streak)



1. Spring Shackle Pins
2. Tie Rod End
3. King Pin
4. Front and Rear Wheel Bearings
5. Steering Gear Box & Shaft U-joints
6. Brake Arm
7. Steering Drag Link
8. Drive Line, Slip Joint & U-joints