

Fire Truck Chassis

OPERATIONS & MAINTENANCE MANUAL



SPARTAN CHASSIS, INC.
S P A R T A N C H A S S I S . C O M



SPARTAN CHASSIS, INC.
OPERATION AND MAINTENANCE MANUAL
for
CUSTOM FIRE TRUCK CAB & CHASSIS MODELS



Every effort has been made to insure accuracy and quality in publication of this document. At the time of printing, content is the most current available.

Due to technological advancements and continuous improvement of our products and the products of our component suppliers, Spartan Chassis, Inc. reserves the right to change specifications without notification.

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SPARTAN CHASSIS, INC.

www.spartanchassis.com

1165 Revnolds Rd. ♦ Charlotte. MI. ♦ 48813

Dear Valued Spartan Owner:

Everyone at Spartan Chassis would like to express our sincere thanks for your confidence in purchasing an emergency vehicle featuring our custom engineered and manufactured cab and chassis.

This manual describes the proper use and care of your cab and chassis, which will help assure years of safe and trouble free operation. Before operating the vehicle, the owners and operators should have a thorough understanding of vehicle operation and maintenance.

Once again, “Thank You” for selecting a premium emergency vehicle featuring a world class custom product manufactured by Spartan Chassis, Inc. If at any time you have questions pertaining to your cab and chassis, please contact the Spartan Chassis, Inc. Customer Assistance Group at 1-800-543-5008.

The fax number for our Fire Truck Warranty Parts Department is 517-543-7764.

The fax number for our Fire Truck Non-Warranty Parts Department is 517-543-9264.

Sincerely,
Spartan Chassis, Inc.



Not all information contained in this manual may pertain to your vehicle. If you have any questions about the operation of your cab & chassis or the manual, please contact Spartan Chassis, Inc. Customer Assistance Center: 1-800-543-5008.

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CHASSIS / APPARATUS INTERFACE

As a custom manufacturer of cab and chassis products, Spartan Chassis, Inc. (Spartan Chassis) is committed to providing a high quality product to our customers. Spartan Chassis works closely with the Apparatus Manufacturers to insure that system integrity is preserved and that the retail purchaser is presented with a quality product. It is important to understand that not all information in this manual will apply to every unit manufactured. Some features are optional.

Refer to the appropriate apparatus manufacturer's literature for additional information. Guidelines for apparatus interface requirements are provided to our Apparatus Manufacturers as published in the Fire Truck Apparatus Builders Manual.

MAINTENANCE RECORDS

It is the owner's responsibility to keep accurate maintenance and repair records, including receipts. Should the lack of required maintenance be the reason for repair, a warranty claim will not be accepted. Spartan Chassis reserves the right to request your maintenance and repair records for verification of compliance with required maintenance practices and intervals.

Spartan Chassis recommends that the maintenance and repair records/receipts be maintained as permanent records and kept with the vehicle. Acceptable records include itemized bills, dealer work orders, owner's vehicle log, and service facility receipts, which must state the date service was performed, mileage (kilometers), Vehicle Identification Number, and service performed.

SAFETY ALERTS

Safety alerts are presented in this manual with the following symbols describing the safety risks and potential outcome for each type of alert.



WARNING

A potentially hazardous condition exists that may result in death or serious injury, property damage, or destruction if instructions are not strictly observed.



CAUTION: A hazardous condition exists that may result in injury, death, property damage or destruction if instructions are not strictly observed.

REPORTING SAFETY DEFECTS

If you believe that your vehicle has a defect, which could cause a crash, injury, or death, you should immediately advise the National Highway Traffic Safety Administration (NHTSA) in addition to informing the Spartan Chassis Compliance Department.

NHTSA cannot become involved with individual issues between the customer and the dealer or any subsidiary. However, if NHTSA receives similar complaints, an investigation may be opened to

study the possibility of a safety defect that may exist in a group of vehicles. Should a defect be confirmed, a recall or remedy campaign may be ordered.

For the most up-to-date contact information for NHTSA:

call the DOT Auto Safety Hotline toll free at 1-888-327-4236 or

visit the NHTSA website (<http://www.nhtsa.dot.gov>) for additional information.



PRODUCT INFORMATION SHEET

FIRE DEPARTMENT: _____

SALES ORDER (SO) NUMBER: _____

The SO Number is the last 6 digits of the VIN (Vehicle Identification Number).

Overall Height: _____

Measured from the ground to the *highest point* of the apparatus, piece of equipment, or vehicle, while vehicle is parked on a level surface. This is not necessarily the top of the cab or antenna.

Overall Length: _____

Overall Width: _____

Wheel Base: _____

Angle of Approach: _____

Chassis Clearance: _____

Measured from the lowest point of the chassis to the ground with the vehicle parked on a level surface (generally the drive axle bowl).

Angle of Departure: _____

GVWR: _____

Turning Clearance Radius (wall-to-wall): _____

Front GAWR: _____

Rear GAWR: _____

REFERENCE THE ENGINE AND TRANSMISSION OPERATION AND MAINTENANCE MANUALS FOR INFORMATION SPECIFIC THE SALES ORDER NUMBER.

Engine Manufacturer: _____ **Model:** _____ **Diesel HP:** _____

Transmission Manufacturer: _____ **Model:** _____

Normal Operating Range

Some items may have a different specification due to customer requirements.

Idle: 600 – 700 RPM

High Idle: 1250 RPM

Governor: 2100 – 2400 RPM

Minimum Oil Pressure

@ Normal Idle: 10 psi (70 kPa) 35 - 45 psi (240 – 310 kPa) @ 2100 RPM

Cooling System: 180 - 200° F (80 – 95°C)

Transmission: 160 - 200° F (70 – 95°C)

Air Pressure: Cut In: 105 psi +/- 5 psi (725 +/- 35 kPa)

Cut Out: 130 psi +/- 5 psi (895 +/- 35 kPa)

Voltage: 13.2 / 14.0 Volts



DRIVER OPERATIONAL PROCEDURES & PRACTICES

The following information is provided as a guideline to assist the driver with vehicle operation.

BEFORE GETTING IN CAB

- Insure Driver's Daily Inspection is complete and approved for service. A Driver's Daily Inspection Form is available on the following page. It may be copied and/or altered to accommodate custom usage by the owner / operator. The appropriate fluid must be added per the engine and transmission manufacturer recommendations with additional information available on the data tag inside the cab.
- If optional auto ejects are not used, unplug electric and airlines connected to apparatus.
- Insure that all personnel understand the **3 points** of contact for entering and exiting the cab safely while facing the steps.

BEFORE DRIVING AWAY

- Place master switch in the "on" position; the "battery on" indicator lamp will light.
- Place the ignition switch in the "on" position; the "ignition on" indicator lamp will light.
The instrument gauges and warning buzzers are activated, including accessory items such as the heater. The telltales in the instrument panel briefly illuminate when the ignition is turned on to check lamp function.
- If equipped with a "Low Oil Level" indicator switch, wait 20-30 seconds before starting the engine. If the indicator light comes on, the oil level may be low. Check the oil level with the dipstick.
If the engine has been recently running, be sure that the oil has had time to drain back into the pan.
- Depress engine starter button to crank engine. Release button when engine starts.
- Insure that all personnel have seat belts fastened.
- Observe door ajar lamp for any open doors or cab tilt lock down (warning indicator is optional) not secured.
- Allow oil and air pressure to build to normal operating range.
NOTE: Turn signal and high beam lamps will not automatically bulb check; they may be checked by activating the turn signals and high beams.
- Battery voltage appears on the voltmeter. As a quick check to ensure the charging system is functioning, compare the voltage reading before the engine is started to the reading after it is started. The reading while the truck is running should be higher.
- Adjust driver's seat for pedal position comfort.
- Check mirrors for adjustment.
- Adjust steering wheel telescopic and tilt to a comfortable position.
- Turn head light switch on and lift turn lever for high/low beam to accommodate night driving.

- If conditions require, turn on wipers by depressing lever, toggle lever up for fast and down for intermittent.
- Check that all windows are closed.
- Adjust air conditioner or heater to desired temperature setting and insure all diffuser registers are open and properly aimed for defrosting/defogging the windshield. Do not drive without open and adjusted registers.

NOTE: A heater shut-off valve is located on the right outside rail near the cab pivot point.

- If emergency warning lamps are required, switch on.
- Release park brake.
- Put shift selector into drive and proceed forward.
- Disengagement (declutching) of the four-wheel drive and tandem interaxle differentials to be done on dry or hard surfaces.

A maintenance checklist and schedule are available at the end of this manual.

MAINTENANCE PRACTICES

- Ensure daily, weekly, and stated maintenance interval checklist items are performed.

If any information should seem unclear, please contact Spartan Chassis, Inc. Customer Assistance Group at 1-800-543-5008.

WEIGHT INFORMATION

It is important that drivers and maintenance personnel understand weight rating terminology as described below. For safety and proper chassis function, it is critical that:

- ◆ The axle and tire/wheel weight ratings are not exceeded.
- ◆ Proper tire pressures are maintained.
- ◆ The major chassis components supporting the vehicle not to be changed or replaced by components with lower ratings (e.g. tires).

TIRE PRESSURE

Tire pressures must be monitored closely to assure safe operation of the vehicle. Spartan Chassis, Inc. recommends checking tire pressure daily when the vehicle is in service. It is important to understand that a change in weight distribution or the amount of weight added or removed from the vehicle may require a change to tire pressures. Refer to the Gross Axle Weight section of this manual and the tire manufacturer's manual for details.

GROSS VEHICLE WEIGHT RATING (GVWR)

The GVWR is the **rating** established by Spartan Chassis, Inc. as the maximum weight of the vehicle (including cargo, passengers, liquids, etc.), or the load carrying capacity, that the components of the vehicle are designed to support. This rating excludes any towed item.

GROSS VEHICLE WEIGHT (GVW):

The GVW is the total **actual weight** of a fully loaded vehicle, also known as the in-service weight. This includes the vehicle, cargo, passengers, and any liquids/fuels. This rating excludes any towed item. The GVW must not exceed the GVWR.

GROSS AXLE WEIGHT RATING (GAWR)

The GAWR is the maximum weight **rating** that an axle assembly is designed to support, the load-carrying capacity. Axle assembly components include the axle, suspension, tires, wheels, and brakes.

GROSS AXLE WEIGHT (GAW)

The GAW is the total **actual weight** supported by a single axle, when the vehicle is fully loaded. The GAW of each axle must not exceed the corresponding GAWR for the axle. Weight distribution on an axle must be as equal side-to-side as possible to avoid overloading one side. Therefore, individual wheel position weights must be taken to avoid this condition. If one side is overloaded by more than 5% of the total axle rating (GAWR), it is necessary to redistribute the load appropriately. For example, if the GAWR of one axle on your vehicle is 10,000 pounds, 5% of that is 500 pounds. This means that the actual weight difference between the left and right side of the axle must be within 500 pounds. In addition, the actual weight on one side of a single axle must never exceed 50% or 1 half of the GAWR for that axle, which would be 5000 pounds for the preceding example. Refer to the axle manufacturer's literature for additional information.

TOWING

DO NOT LIFT, RAISE, OR SUPPORT THE CHASSIS USING THE TOW HOOKS OR EYE HOOKS ON THE FRAME.



WARNING

Follow industry safety measures when preparing and towing a vehicle. Failure to do so may lead to personal injury or death.

If a unit must be **towed** for any reason, subject to the options available for the vehicle, tow hooks and eyes are available for this purpose. Positioning of the lifting and towing device is the sole responsibility of the towing-vehicle operator. A towing device must be attached to the frame assembly or axle if allowed by the axle manufacturer.



WARNING

Do not release the parking brakes unless wheels are properly chocked/blocked or the vehicle is securely attached to the towing vehicle.

Refer to the appropriate transmission, axle, and suspension manufacturer's literature for specific towing instructions.

Depending on the reason for towing, the vehicle must be properly prepared. Wheels must be chocked/blocked and people must be safe from on-coming traffic.

Insure that water is emptied from water tanks, and unload any equipment that may cause abnormal load exertion on chassis/cab components.

For towing from the front, refer to the axle manufacturer's recommended practices. To prevent damage to components, removal of front bumper and other equipment may be necessary.

For towing from the rear, front tires must be positioned straight ahead and the steering wheel secured in that position.

CONTROL PANELS

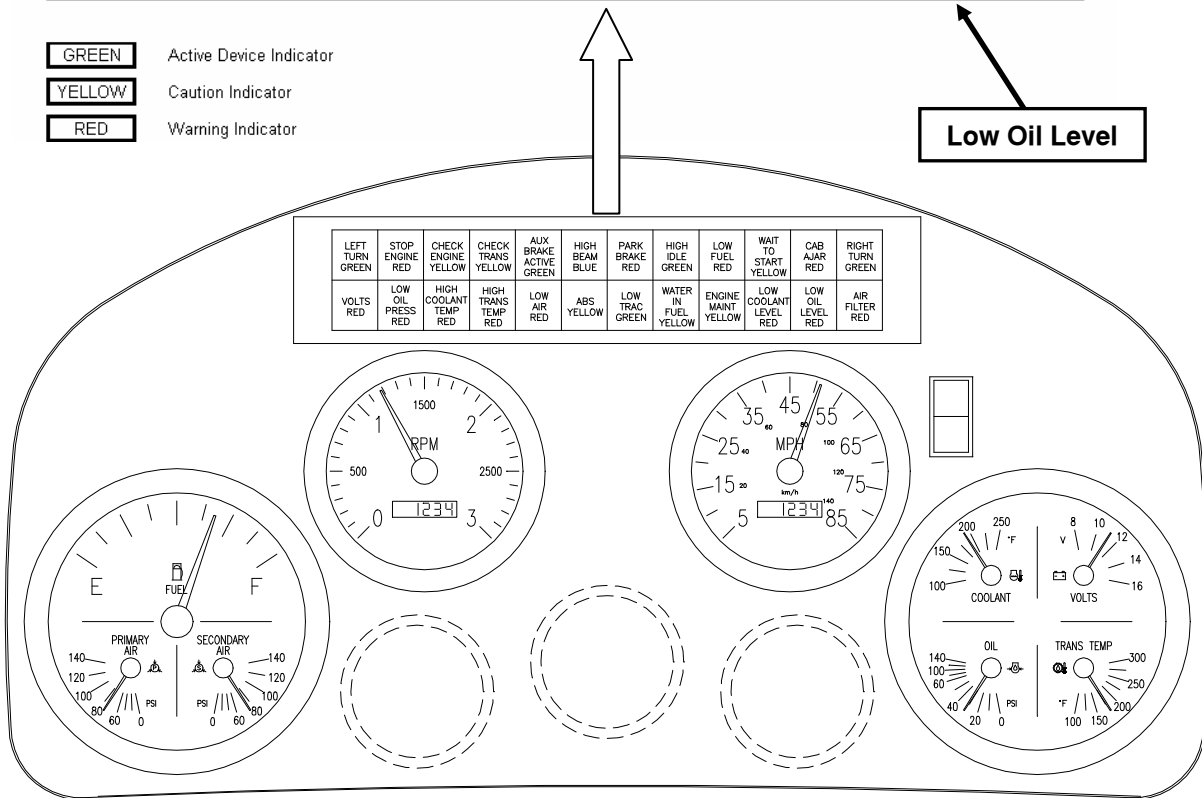
INSTRUMENT PANEL

24-DEAD FRONT WARNING LIGHTS IN CLUSTER

(LEFT TURN)	STOP ENGINE	CHECK ENGINE	CHECK TRANS	AUX BRAKE ACTIVE	(HIGH BEAM)	PARK BRAKE	HIGH IDLE	LOW FUEL	WAIT TO START	CAB AJAR	(RIGHT TURN)
GREEN	RED	YELLOW	YELLOW	GREEN	BLUE	RED	GREEN	RED	YELLOW	RED	GREEN
VOLTS	LOW OIL PRESS	HIGH COOLANT TEMP	HIGH TRANS TEMP	LOW AIR	ABS	TRACTION	WATER IN FUEL	ENGINE MAINT	LOW COOLANT LEVEL	LOW OIL LEVEL	AIR FILTER
RED	RED	RED	RED	RED	YELLOW	GREEN	YELLOW	YELLOW	RED	RED	RED

GREEN	Active Device Indicator
YELLOW	Caution Indicator
RED	Warning Indicator

Low Oil Level



LOW OIL LEVEL INDICATOR

If equipped with a “Low Oil Level” indicator switch, wait 20-30 seconds before starting the engine after the initial bulb check (ignition switch is activated). If the indicator light comes on, the oil level may be low and should be checked with the dipstick.

If the engine has been recently running, be sure to allow sufficient time after shutting engine off for oil to drain back into pan. Pre-programmed settings for the switch include a 10 second delay and do not permit functionality when engine is above 300 RPM. The “Low Oil Level” switch is available with the Detroit Diesel Series 60 engine and the Cummins ISL and ISC engines.

BUILT- IN DIAGNOSTICS

The gauges reset to zero and the pointers vibrate briefly when the ignition is first activated indicating that the gauges are operational. If communication between the chassis and gauges is lost, the warning lights flash in a track pattern.

1 SPEEDOMETER WITH LCD TRIP ODOMETER

A speedometer and a trip-odometer operate from a signal received by the world transmission tail shaft output speed sensor. A small rocker switch on the instrument panel will switch the LCD display between odometer and trip-odometer modes. Pressing the switch for 1 to 3 seconds will switch modes. Pressing the switch for more than 4 seconds will reset the trip-odometer.

2 TACHOMETER WITH LCD ENGINE HOUR METER

The tachometer reads engine revolutions per minute (RPM) from the engine ECU. A digital liquid crystal display (LCD) hour meter reads the hours of engine run time from the engine ECU; it is located within the tachometer gauge.

3 3-IN-ONE COMBO GAUGE WITH LARGE FUEL GAUGE, PRIMARY AND SECONDARY AIR PRESSURE:

- a. The fuel gauge operates from a 0-90 ohm sender in the fuel tank and should have a nominal 5 to 7 gallon reserve at the empty mark. The low fuel lamp illuminates when the tank is 1/4 full. The warning buzzer will cycle on for 3 seconds and off for 3 minutes while the tank is below 1/4.
- b. The air gauge for system one (labeled "Primary Air" in the left-hand combo gauge) shows rapid air build-up. A buzzer and light activate at pressures below 65 psi.
 After system one air builds rapidly to 90 psi it supplies and builds system two (labeled "Secondary Air"). The system one tank supplies the park brake and rear brakes. The primary tank is divided into 2 sections: a wet tank and a dry tank.
 Air options such as air horns are supplied by an isolated tank (often referred to as the "auxiliary tank") that draws from system one and has a pressure protection valve in place.
- c. The air gauge for system two indicates brake air. It supplies the front brakes as well as the park brake. The low air light activates at pressures below 65 psi.

4 4-IN-ONE COMBO GAUGE WITH COOLANT TEMP, OIL PRESSURE, VOLTMETER, AND TRANSMISSION TEMP

- a. The engine coolant temperature gauge indicates the coolant temperature in the engine block. A lamp illuminates and an alarm activates when a temperature of 220° F is reached.
NOTE: Light and alarm shut off at approximately 215° F as temperature descends.
- b. The engine oil pressure gauge indicates oil galley pressure from the engine ECU, and the gauge and light/alarm will indicate low oil pressure. The lamp illuminates and an alarm is activated briefly prior to engine start up. See engine manual for proper operating pressure ranges. The light and alarm are also activated when the engine oil pressure drops below 6 psi while the engine is running.

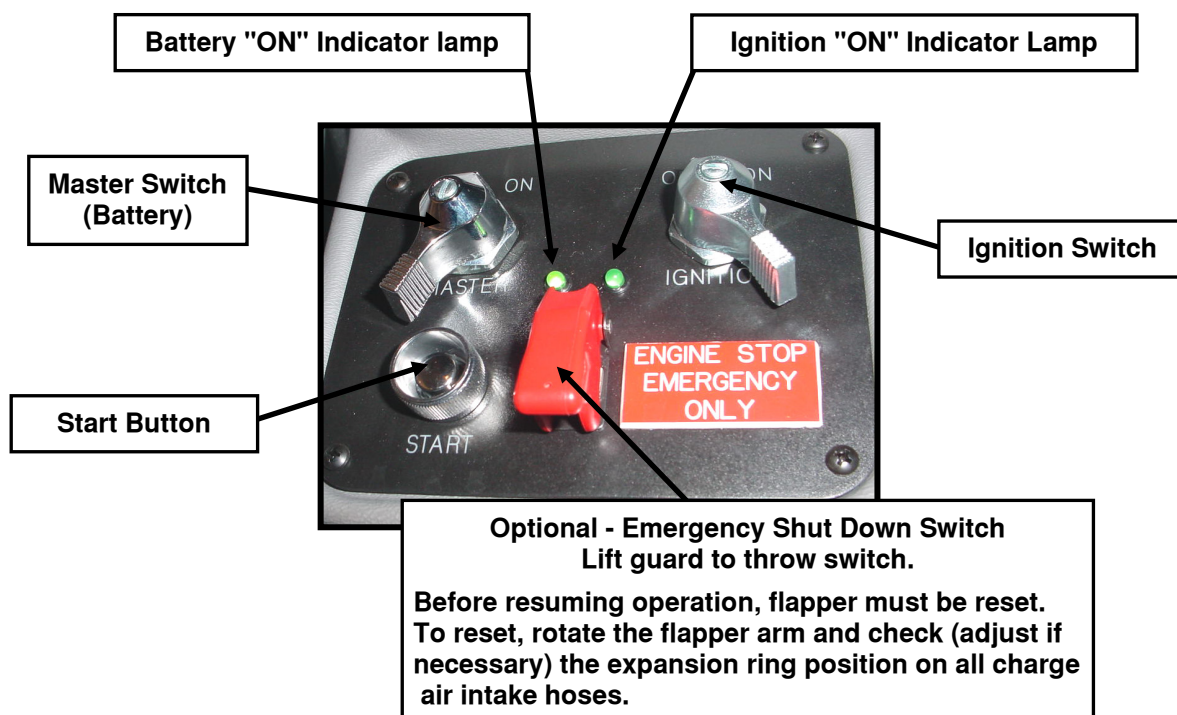
- c. The voltmeter will show the battery voltage and with the engine running should indicate voltage of 13.25 to 14.25 volts. The "Volts" warning lamp/alarm will indicate system voltage above 15.4 volt or below 11.8 volt.
- d. The automatic transmission oil temperature gauge indicates the temperature of oil in the transmission sump. A lamp illuminates and an alarm is activated when the transmission oil reaches 250° F.

5 ODOMETER SWITCH

When vehicle is powered up, the odometer is visible by default. Press once to toggle between odometer and trip. When in trip odometer mode, hold to reset trip to zero.

6 OPEN FOR THREE OPTIONAL 2” (READ ONLY) GAUGES

STARTING/STOPPING



Refer to shutting down engine for recommended procedure.



CAUTION: It is important to idle an engine for 3 to 5 minutes before shutting down. This allows the lubricating oil and coolant to carry heat away from the turbo charger bearings and cylinder walls, thus allowing gradual and uniform cooling.

MASTER SWITCH

This switch energizes the electrical system from the batteries. A green LED indicates switch is in the on position.

IGNITION SWITCH

Switches power to the starter button and accessories; use to shut down the engine when turned to the off position. A green LED indicates switch is in the on position.

ENGINE START BUTTON

Depress button to engage the cranking motor that cranks the engine if the transmission is in neutral.

TO START ENGINE

(Gear Selector in Neutral and Parking Brake Set)

NOTE: Pad shifters always shut down to neutral position.

1. Disconnect Electric And Air Lines From Shore Source.
2. Turn Master Switch On
3. Turn Ignition Switch On
4. Place Transmission Lever In Neutral (if equipped with "T" handle shifter)
5. Press Start Button

NORMAL ENGINE SHUT DOWN

(Gear Selector in Neutral and Parking Brake Set)

1. Turn Ignition Off.
2. Turn Master Off.
3. Connect Electric and Air Lines to Shore Source

The engine stop control is through the ignition switch; it cuts power to the fuel solenoid or microprocessor module.

EMERGENCY ENGINE SHUT DOWN (OPTIONAL)

The emergency shutdown flapper is located in the air intake. It is designed to shut down the engine in a fuel vapor cloud, where the vapor could enter the air intake and cause the engine to race.

To activate, lift the guard and throw the switch. Before resuming operation, flapper must be reset and charge air hose expansion rings may need to be repositioned. To reset, rotate the flapper arm and check (adjust if necessary) the expansion ring position on all charge air intake hoses.

PARK BRAKE

- Pull valve to apply the parking brake after vehicle is stopped.
- Push to release until valve stays in and park lamp goes out in warning lamp cluster.

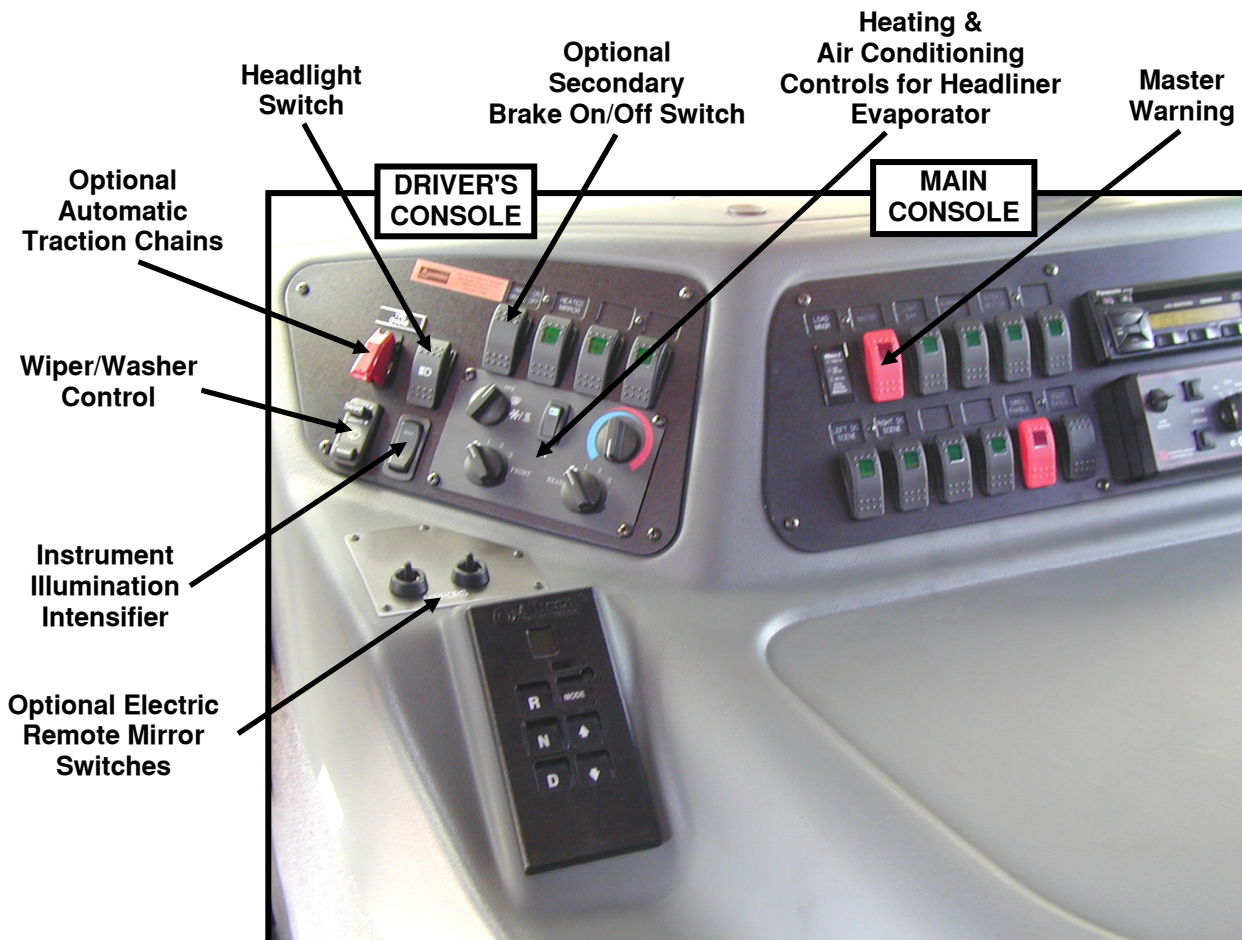
NOTE: The valve will not release until the air system maintains a minimum of 60 psi.



DRIVER'S CONSOLE

Switch positions and console layouts may vary based on console design and customer requested options. Not all controls described in this section are included with every product. Some controls are optional equipment. For supplemental operating information relative to the completed vehicle, refer to the respective apparatus builder's literature and component manufacturer's literature.

An optional multiplex data communication system utilizes the Vista Display that maintains many switch configurations and provides extensive information. Refer to the Vista Display Controls section for additional information.



HEATING AND AIR CONDITIONING CONTROLS

Refer to the Heating and Air Conditioning Controls section. These are present with a headliner mounted evaporator only.

INSTRUMENT ILLUMINATION INTENSIFIER

Push rocker to brighten/dim instrument illumination.

WIPER/WASHER CONTROL

Push lever down to turn on or shut off wipers. Move lever up for high speed or down for intermittent feature. Push lower button for wash cycle. The washer fluid tank fill is located in the driver's step or behind the grille.

AUTOMATIC TRACTION CHAINS (OPTIONAL)

The operating range is 0 to 35 mph and may be engaged at a speed range of 0 to 25 mph. Refer to the tire chain manufacturer's manual for maximum speed.

HEADLIGHT SWITCH

Push rocker to first position for parking lights.

Push rocker to the second position for headlights.

SECONDARY BRAKE ON/OFF SWITCH (OPTIONAL)

The auxiliary brake must be turned off while driving in wet or slippery conditions. It must be used during normal driving conditions as stated in the manufacturer guidelines for the secondary braking device.

ELECTRIC REMOTE MIRROR SWITCH

The electric remote mirror switches adjust the mirror flat areas to the desired position by using the left or right switch.

MAIN CONSOLE

MASTER WARNING SWITCH

The master warning provides power to the other warning light switches on the rocker switch console.

LIGHT BAR

Controls operation of the light bar located on the cab roof; zone "A" upper.

WARNING FRONT

Controls operation of the warning lights generally located above or below the headlights; zone "A" lower. They may alternately flash or rotate when activated.

WARNING SIDE

Controls operation of the warning lights located in the sides of the front bumper or the sides of the cab/body; zone “B” and zone “D”.

WARNING REAR

Controls operation of the warning lights located at the rear of the body; zone “C” upper and lower.

HEADLIGHT FLASHER (OPTIONAL)

When in response mode, controls the flashing of only the high beams. High beams will not flash when the high beam switch is in the on position.

AUTOMATIC HIGH IDLE (OPTIONAL)

If the system voltage drops to 12.4 volts, the automatic high idle system will raise the engine RPMs to increase alternator output. The system will only operate with the transmission in neutral, the park brake applied, and the fire pump disengaged. The automatic high idle will stay engaged for a minimum of 10 minutes and until the system voltage has reached 13.0 volts. Application of the service brake will override the automatic high idle for 1 minute.

ANTI-LOCK BRAKING SYSTEM (ABS)

This system continuously monitors individual wheel speed. If a wheel lockup condition is sensed, the brake pressure to that wheel will automatically be modulated when brakes are applied to prevent slippage. This allows for better stability of the vehicle during stops by avoiding skidding. The ABS system will enable reduced stopping distances on a variety of road surfaces while maintaining vehicle stability. When the engine is started, the ABS amber warning light illuminates and goes out after system is checked.

If a system failure occurs, only the affected wheel returns to normal braking function while the remaining wheels operate with ABS. Should total failure develop, the vehicle returns to standard braking without losing any of its normal efficiency.

NOTE: The ABS system is interfaced with the auxiliary braking device circuit. In the event of a wheel slip, the auxiliary braking device is disabled.

With air brake equipped vehicles it is not advisable to pump the brake pedal. Keep steady pressure on the pedal and modulate intensity as required for safe deceleration.



WARNING - If any type of problem develops with the ABS system, or any other portion of the braking system, immediately contact an authorized service center or contact the manufacturer.

The ABS test switch is used to perform diagnostic checks on the system. The information pertaining to these checks can be found in the Meritor Wabco maintenance manual supplied with the vehicle.

AUTOMATIC TRACTION CONTROL SYSTEM (ATC) (OPTIONAL)

The ATC function is similar to that of a limited slip differential. When wheel spin occurs braking automatically applies to the spinning drive wheel. Engine speed is also decreased as needed until traction is achieved to move the chassis.

The green low traction indicator light illuminates when wheel slip is detected.

If it is desired to rock the vehicle and ATC has cut the throttle back, depress the mud and snow switch.



CAUTION: Use reasonable care when depressing the mud and snow switch. When wheel/tire suddenly regains traction, component damage can occur.

ADDITIONAL INSTRUMENTATION

AIR FILTER RESTRICTION INDICATOR

A vacuum transducer attached to the clean air side of the air filter indicates restriction and the air filter requires servicing.

NOTE: Replace the filter when lamp is illuminated.

FUEL PRIMING PUMP (OPTIONAL)

An optional electric fuel priming pump can be mounted in the frame or on a cross member over the rear fuel tank. The fuel primer is activated by a momentary switch and is for priming the fuel filters or the fuel system in the event the tank has been run out of fuel.

Many engines are self-priming and do not require the optional electric fuel pump. Cummins ISB, ISC, and ICL are self-priming engines.

WAIT-TO-START LAMP

The engine ECU checks the intake manifold temperature to determine how long to energize the air heater before extinguishing the pre-heat lamp. (This is for the pre-heat phase).



WARNING
DO NOT USE STARTING FLUIDS (ETHER, ETC.)

WATER -IN -FUEL LAMP (OPTIONAL)

A sensor located in the fuel filter housing, activates the Water-In-Fuel (WIF) lamp. A WIF lamp illuminates indicating that the filter needs to be drained from the fuel filter assembly.

CLASS 1 TOTAL SYSTEM MANAGER (OPTIONAL)

SEQUENCING: To reduce strain on the chassis' charging system, any loads controlled by the load manager can be programmed to turn on in sequence when the activating switch (either ignition or master warning light switch) is closed. Each load can be assigned to one of eight sequence stages. The loads will sequence off in reverse order.

SHEDDING: To reduce the demand on the chassis' charging system, nonessential loads controlled by the load manager can be programmed to turn off under conditions of extreme electrical load. Eight of the twelve outputs controlled by the load manager can be assigned to shed at one of eight priority levels. The lowest priority loads will begin to shed when the system voltage drops to 12.7 volts, and all loads programmed to shed will turn off after the system voltage drops to 11.0 volts. In order for a load to shed, the system voltage must drop below the shed point voltage for a minimum of one minute. Shed loads will remain off for a minimum of 5 minutes and will not turn on again until the system voltage rises above the unshed point for one minute.

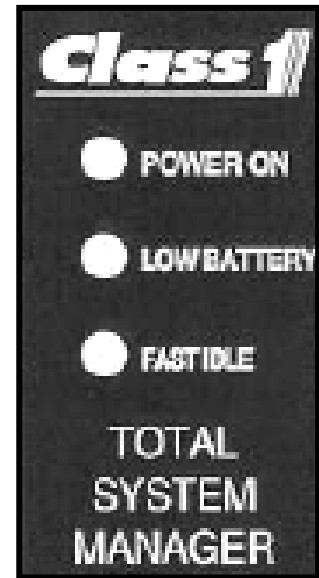
Load shedding is only active with the park brake set (scene mode). Each load controlled by the load manager can be given a shed priority independent of its sequence.

AUTOMATIC HIGH IDLE (OPTIONAL)

To increase alternator output under conditions of extreme electrical load, the load manager will boost the engine idle speed after the system voltage drops below 12.8 volts for at least one minute. The high idle will remain active for at least 10 minutes and until the system voltage has stabilized above 13.0 volts. Automatic high idle will only be available with the park brake set, transmission in neutral, and when fire pump is disengaged. The automatic high idle function can be deactivated by depressing the brake pedal. Automatic high idle mode is indicated by the "FAST IDLE" light in the load manager display.

LOW VOLTAGE LIGHT

The load manager provides a "LOW BATTERY" light in the load manager display and activates the alarm when the system voltage falls below 11.9 volts.



LOAD MANAGER DISPLAY

The load manager comes standard with a status display that fits conveniently in a standard rocker switch cutout. The display has LED tell tales for "POWER ON", "LOW BATTERY", and "FAST IDLE".

Operational Data

*SHED POINTS

Level 0	Never Shed
Level 1	11.0 Volts
Level 2	11.4 Volts
Level 3	11.8 Volts
Level 4	12.0 Volts
Level 5	12.2 Volts
Level 6	12.4 Volts
Level 7	12.6 Volts
Level 8	12.7 Volts

*UNSHED POINTS

Level 1	11.4
Level 2	11.6
Level 3	12.0
Level 4	12.2
Level 5	12.4
Level 6	12.6
Level 7	12.8
Level 8	13.0

SEQUENCING

Electrical loads will turn on sequentially in priority order from 1 to 8 when their respective switch is activated (either ignition or warning master) and the vehicle is operated in the mode selected for that output (response and/or scene). Loads will sequence off in reverse order. Priority zero loads will be sequenced on and off, but will not shed.

SHEDDING

Electrical loads will be turned off (shed) when the system voltage drops to the shed point for a minimum of one minute (this prevents load shedding due to momentary system power loading such as high current start-up devices). Once shed, loads will remain off for a minimum of five minutes and until the unshed voltage is achieved for a minimum of one minute. Loads will only shed if the Parking Brake is set and the Load Manage Enable input is "grounded".

***NOTE:** **SHED POINT** is the voltage that will cause a load to be turned off if the system voltage drops to this point.

UNSHED POINT is the voltage that must be achieved before a load is turned back on once it has been shed.

FAST IDLE

A fast Idle output is activated whenever the system voltage is reduced to 12.8 VDC for at least one minute. The fast idle output will remain ON for a minimum of 10 minutes and until 13.0 VDC is achieved. The fast idle output is dependent on the Parking Brake and Load Manage Enable inputs.

NOTE 1: This output should only be used as part of a fast idle control system when the proper safety interlocks are present.

NOTE 2: The FAST IDLE output will turn off immediately when the Load Manage Enable input is removed from ground potential.

LOW VOLTAGE ALARM

Whenever the system voltage drops below 11.9 VDC a low voltage alarm output (ground) is activated. This complies with the NFPA 1901 requirements

SWITCH SOURCES

IGNITION: Loads will sequence on when the vehicle ignition switch is turned off.

MASTER WARNING: Loads will sequence on when the master warning switch is turned ON.

EACH LOAD CAN BE PROGRAMMED FOR ACTIVATION BY EITHER SOURCE

USER SET POINT/VARIABLE TRIP

This is the user definable output. The user has the option of selecting a "trip" voltage between 10.5 and 15.0 VDC. If the trip point is set to 13.8V or above, the output acts as an over voltage indicator and will "energize" when the voltage drops to the set point.

AUXILIARY BATTERY MONITORING

Terminal #23 can be used to monitor an auxiliary battery. There should be no connection to this terminal if a remote battery is not monitored. If the auxiliary battery voltage drops below 11.9 volts, it will activate the auxiliary battery low output.

OVERRIDE

Outputs 1 through 12 are forced on when the override switch is active.

Twelve (12) outputs can be programmed by the user to be activated by the ignition or Master Switch, tied to Scene Mode, Response Mode or Both, and assigned a Specific Priority Level. More than one output load can be set to the same Priority Level.

OUTPUT MODES

RESPONSE MODE: Output is ON only when the Park Brake is *NOT* set

SCENE MODE: Output is ON only when the Park Brake *IS* set

BOTH Output is ON in both Response and Scene Mode

EACH LOAD CAN BE PROGRAMMED FOR RESPONSE MODE, SCENE MODE OR BOTH

OPERATING VOLTAGE

7.5 TO 20 Volts D.C.

OUTPUTS

High Side Drivers V_{main} at 0.5 amp. (source)

Low Side Drivers Ground at 0.5 amp. (sink)

TRANSIENT SUPPRESSION

Outputs are protected against thermal overload, direct shorts and transient spikes from -50 to +60 volts D.C.

MULTIPLEX VISTA DISPLAY (OPTIONAL)

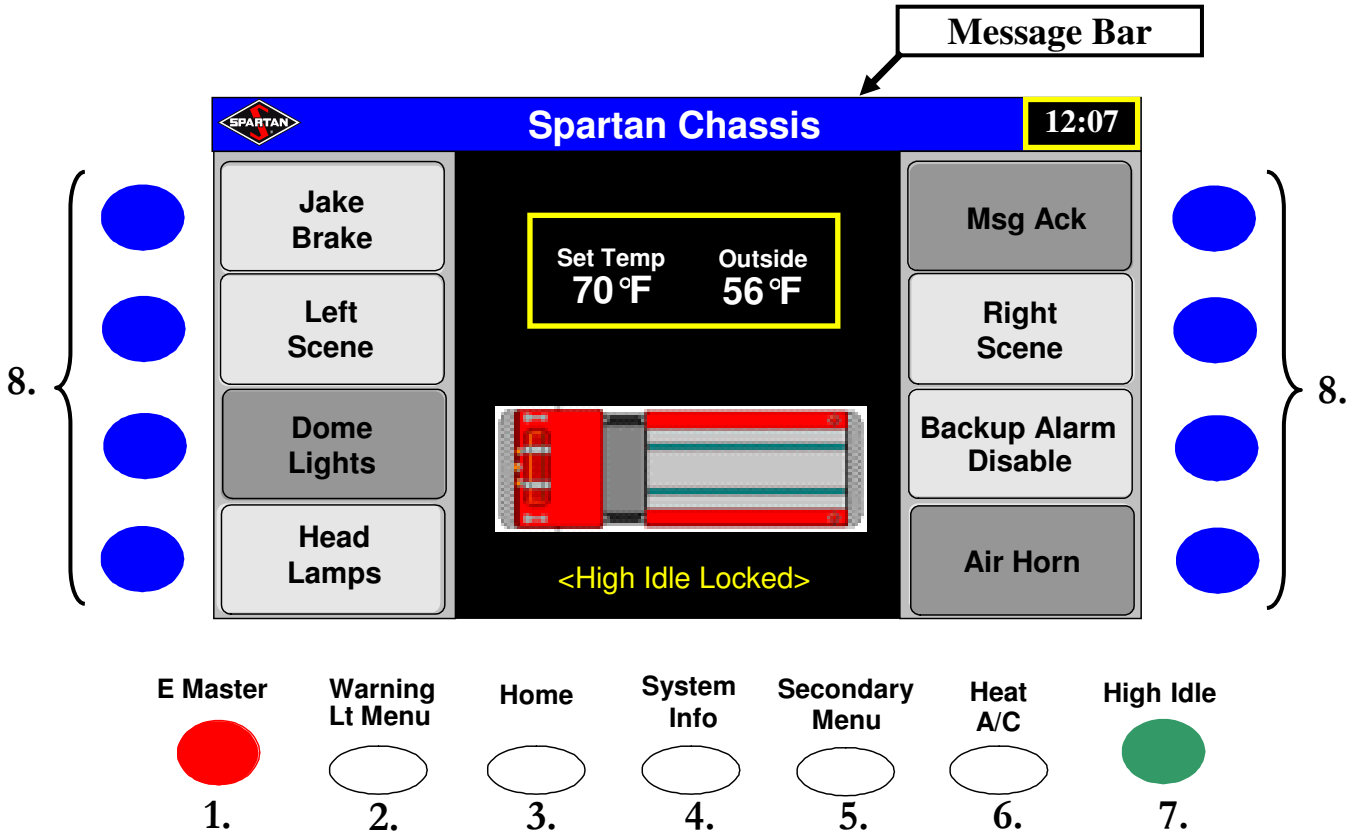
The Vista Display is utilized with a multiplex data communication system. It is located in the dash or mounted on a rotating pivot device on the center console. It provides access to most of the switching functions for electrical lighting and climate control on the vehicle.



Back lighting is activated when the headlamp switch is turned on. At that time, the main display screen dims to accommodate the change with the lighting environment.

The time is displayed in the upper right corner of the message bar.

The center area of the display may be programmed to show general information such as temperature settings and an illustrative top view of a fire truck that indicates when a door is ajar.



VISTA DISPLAY CONTROL BUTTONS (ITEMS 1 – 7)

There are five menu option buttons (items 2 through 6) and two control buttons (items 1 and 7) on the lower panel of the Vista Display housing. An indicator light above each button illuminates when the function is activated by depressing the corresponding button. The red “E Master” button and the green “High Idle” button are toggle controls that activate/deactivate the function when depressed.



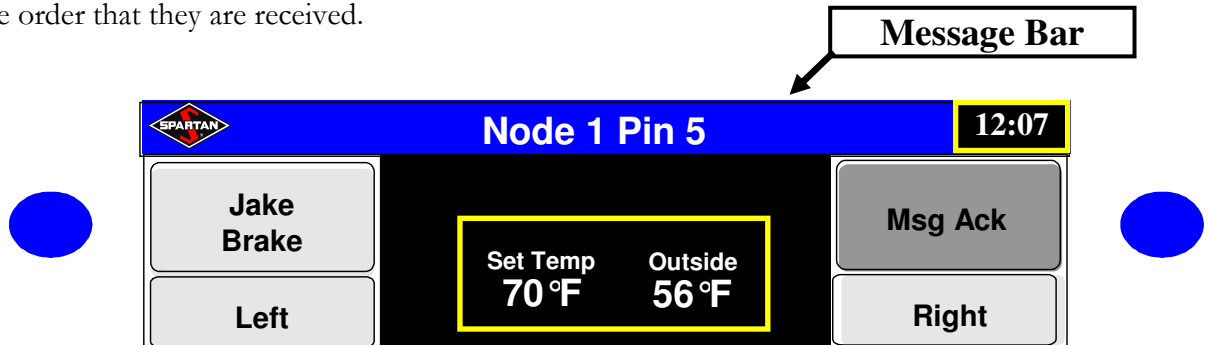
MULTI-FUNCTION BUTTONS (ITEM 8)

There are four multi-function buttons (item 8) on each side of the Vista Display. The active menu determines the function of each button. When a menu function is active, the background area of the button’s text is darker than that of a non-active function. In the illustration above, Dome Lights, Msg Ack, and Air Horn are enabled functions.

MESSAGE ACKNOWLEDGE (MSG ACK)

The **message bar** is located above the display screen. When activated, the Msg Ack function clears the current message and displays the next existing message.

Important messages that need acknowledgement by the user are displayed at the top of the screen in the order that they are received.



BACKUP ALARM DISABLE

The backup alarm is enabled by default. It may be disabled by pressing the Backup Alarm Disable button. The alarm may be re-enabled by pressing the button again and is automatically re-enabled after cycling the Master Power battery switch.

1. E MASTER BUTTON

The on/off control for the Master Warning Lights is a red button located on the far left side of the Vista Display control panel. It toggles all warning lights on and off.

2. WARNING LT MENU BUTTON

The Warning Light Menu accesses the controls for the individual warning lights. By pressing the multi-function button associated with a specific type of warning light, the button toggles the light “on” or “off”.

NOTE: All clear warning lights deactivate automatically when the park brake is set (blocking mode), per NFPA 1901.

3. HOME MENU BUTTON

When first powered up, the Vista Display shows the Home Menu. A typical Home Menu display is shown on the previous page. The information may be customized to the user’s specifications.

4. SYSTEM INFO BUTTON

Pressing the System Info button accesses the Vehicle Information Menu.

VEHICLE INFORMATION MENU

This menu allows access to the Diagnostic and Maintenance Menus, as well as the Engine, Transmission, and Chassis Information Menus.

DIAGNOSTIC MENU

Pressing the Diagnostic Menu accesses the onboard diagnostics of the multiplex system.

Load Levels - **monitors the load shedding level of the nodes.**

Shorts/Opens - **monitors the circuit (short/open) status of nodes and pins.**

Node Info - **verifies the Vista Display operating system and the version of System Designer programming software.**

Net Stats - **displays network information such as incoming/outgoing buffer overflows and the number of sent/received messages.**

ENGINE INFORMATION MENU

Engine Information displays the engine serial number, filter part numbers, and fluid fill information for the engine.

TRANSMISSION INFO MENU

Transmission Info displays the transmission serial number, filter part numbers, and fluid fill information for the transmission.

CHASSIS INFO MENU

Chassis Info displays the VIN, sales order (SO) number, and paint numbers.

MAINTENANCE SCHEDULE MENUS

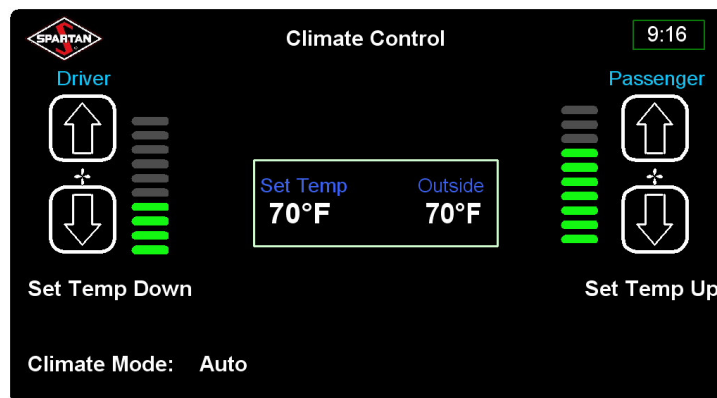
The Maintenance Sch 1 and Maintenance Sch 2 Menus provide important mileage horizons that need special attention.

5. SECONDARY MENU BUTTON

The Secondary Menu contains additional controls that are not programmed into the other menus.

6. HEAT A/C BUTTON

The Heat A/C button allows access to the Climate Control Menu.



CLIMATE CONTROL MENU

The Climate Mode button allows the user to scroll through each available mode. The fan speed is adjustable in any mode position except “off”. Adjust the fan speed by pressing the up/down arrows for the front and rear of the vehicle.

Set Temp control buttons are used as stated (up/down) to adjust the inside cab temperature to the desired setting.

Climate Mode button: allows the user to scroll through the available operational modes using the Climate Mode button.

Auto Mode - The setting activates the appropriate system (Air Conditioner or Heater) regulating the front and rear fan speeds to achieve the preset cab temperature.

A/C Mode - the air conditioning system is activated and the air damper is open to allow cooled air to flow into the main portion of the cabin.

Defrost Mode - the heater valve is activated and the air damper is closed to allow all heated air to pass over the windshield. This mode should be used whenever there is build up of ice on the windshield.

Heat Mode - the heater valve is activated and the air damper is opened to allow the heated air to flow into the main portion of the cabin.

Defog Mode - the heater valve, the air conditioning system, the freon compressor, and the air damper are activated to allow warm, dehumidified air to pass over the windshield. This mode should be used whenever there is an excessive build up of condensation on the inside of the windshield.

7. HIGH IDLE BUTTON

The manual activation/deactivation for the high idle control is the green button on the far right of the Vista Display.

To activate high idle, the transmission must be shifted into neutral range, the parking brake set, and the fire pump disengaged. The display screen shows “<High Idle Locked>” indicating that the high idle cannot be activated until the above conditions are met.

To deactivate the manual high idle, the operator may depress and hold the service brake pedal, press the manual high idle button (changes the display to “High Idle Unlocked”), or release the parking brake.

HEATING & AIR CONDITIONING CONTROLS

Your truck may be equipped with a combination heating and air conditioning system, a single overhead heater/defroster system, or a system that includes various auxiliary heaters.

If the truck has a multiplex electrical system, the heating and air conditioning controls are accessed through the Vista Display.

A non-multiplex system includes controls located on the Switch Console Center for headliner evaporators and controls for the overhead heater/defroster systems located on the driver's side of the overhead unit.

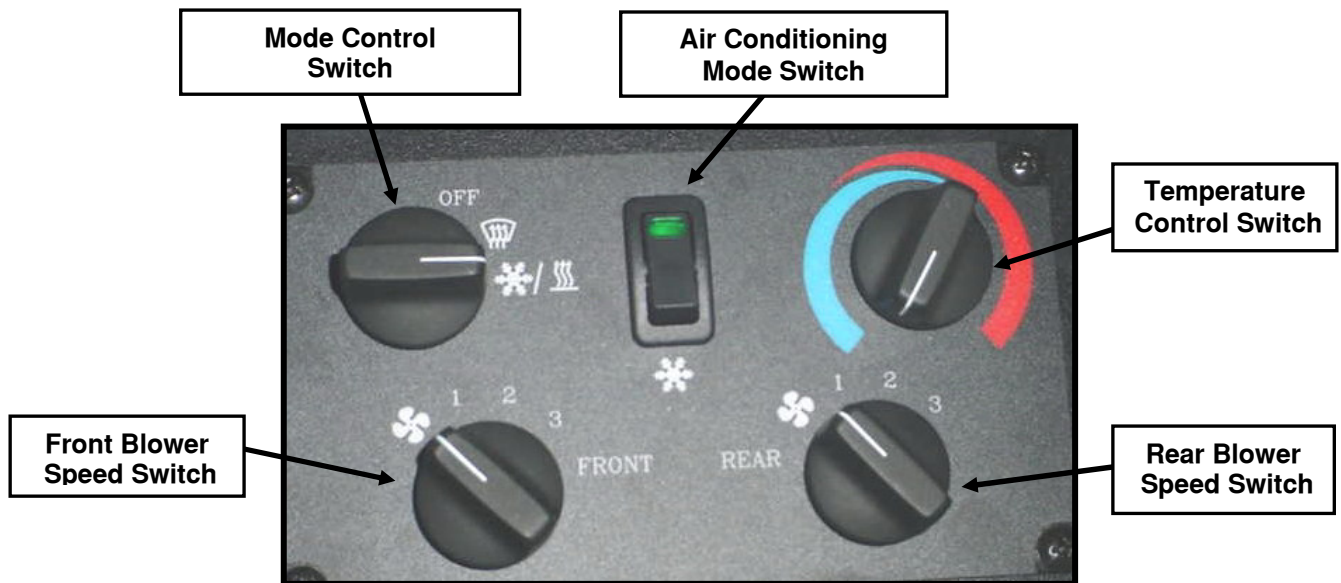
The controls for the auxiliary (tunnel mounted) combination heating and air conditioning unit may be located on the front of the unit (most common) or on the Switch Console Center.

To adjust the temperature, rotate the temperature control switch to the desired level.

To adjust air speed, rotate the blower control switch(es) to low, medium, or high fan speed.

For combination units, the air conditioning switch must be in the on position for cold air operation.

It will be necessary to adjust the diffusers as necessary to direct the airflow.



OVERHEAD HEATING & AIR CONDITIONING UNIT

Filter may be removed for cleaning when necessary.
For optimal performance, clean filter regularly with warm soapy water and dry before reinstalling.



Headliner Center Section Shown



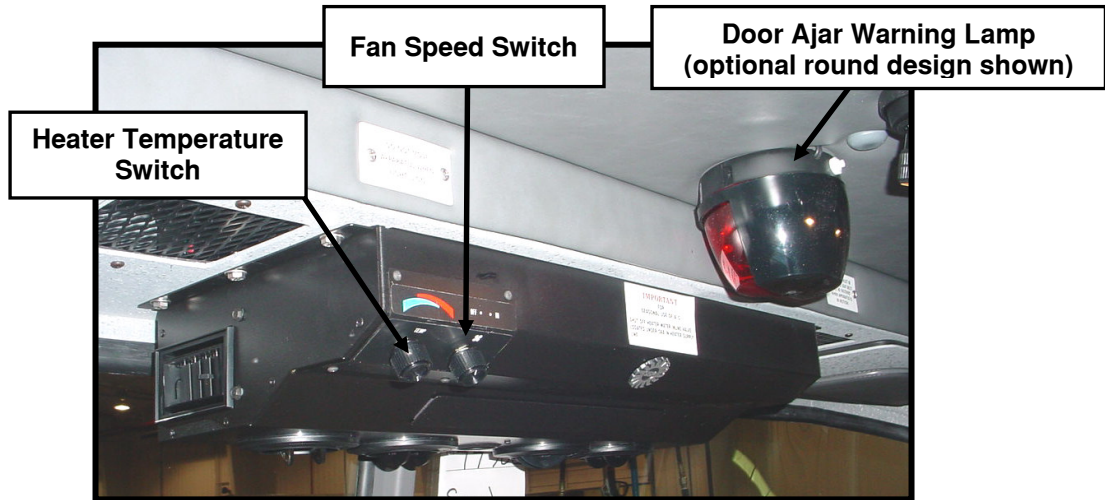
Driver and Passenger Headliner Sections Shown



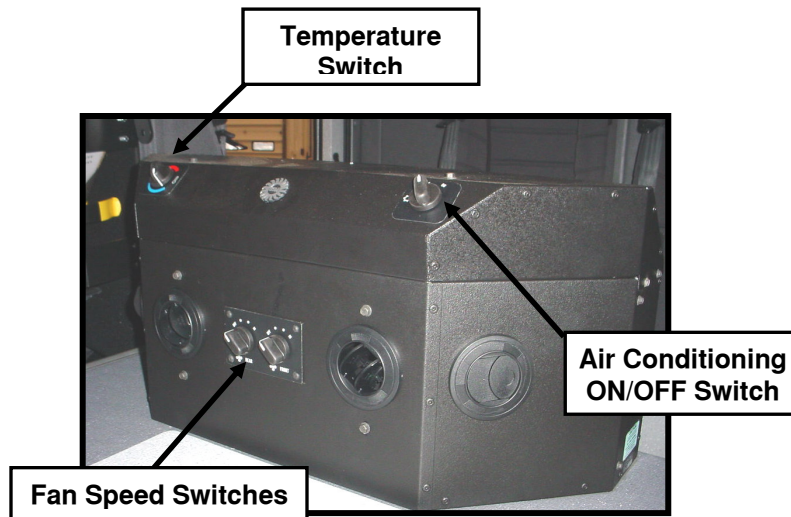
CAUTION: Always check operation and adjust diffusers prior to driving the truck.

OVERHEAD FRONT CONTROLS AND HEATER

Optional defroster fans are not shown.



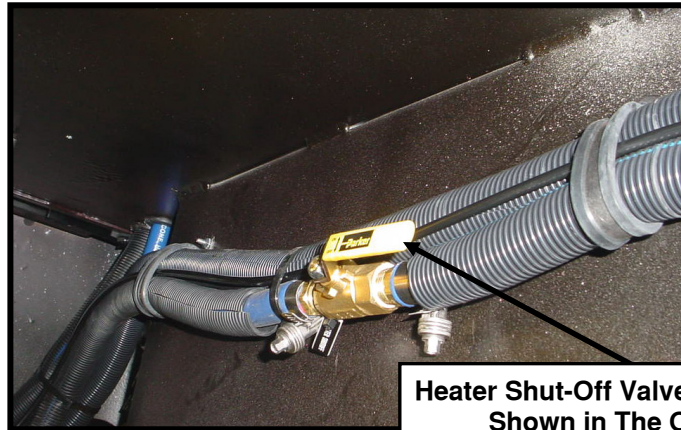
AUXILIARY COMBINATION UNIT AND CONTROLS



CAUTION: Always check operation and adjust diffusers prior to driving the truck.

FRONT AND REAR SHUT- OFF VALVE (FOR AUXILIARY UNITS)

NOTE: A seasonal hot water shut-off valve (located under the cab, behind the passenger step, above the air cleaner) must be turned off by rotating the lever 90° during warm weather when air conditioning is required.

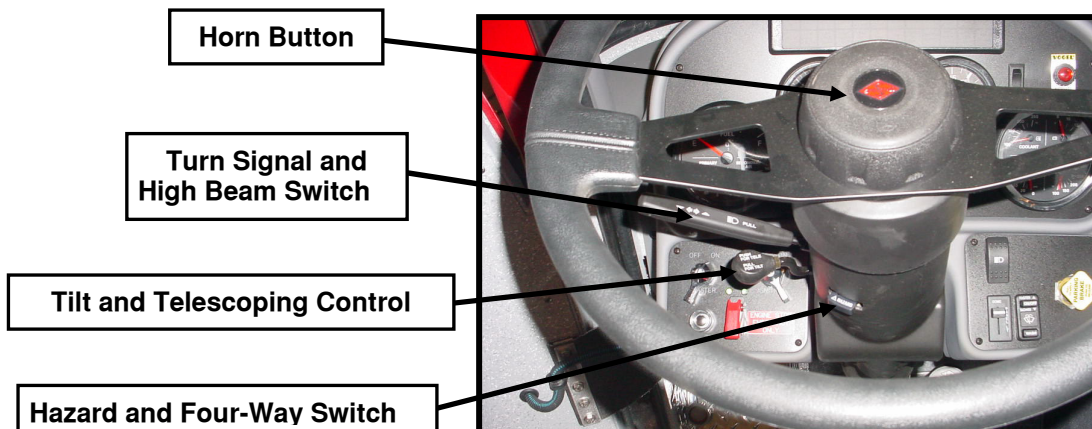


Heater Shut-Off Valve Under The Cab Shown in The On Position

STEERING SYSTEM AND COLUMN CONTROLS

TILT & TELESCOPING STEERING COLUMN

To provide optimum steering wheel position, the steering column is fully adjustable. Also featured on the column are the horn button, directional switch, high beam switch and four-way flasher switch.



TO TELESCOPE WHEEL

Push down on the lever located below the directional switch on the left side of the column while simultaneously raising or lowering the wheel to the desired position.

TO TILT WHEEL

Pull up on the lever located below the directional switch on the left side of the column while simultaneously tilting the wheel to the desired position.

HORN BUTTON

The horn button is in the hub of the steering wheel and activated by depressing the button.

TURN SIGNAL LEVER AND HIGH BEAM SWITCH

This is located on the left side of the steering column below the wheel. It operates the turn signals and is self-canceling type. This lever also controls the headlight high beam function. To turn the high beams on or off, raise this lever until it clicks into position and release. An instrument panel indicator blue light will illuminate when you have selected high beam.

HAZARD FOUR WAY FLASHERS

This switch is located under the column towards the left side. Pull the slide switch out to turn on and push in to turn off.

GENERAL INSPECTION AND MAINTENANCE

- Ask your service mechanic to examine the steering mechanism. Minor adjustments could head off problems.
- Check tie rod, drag link end clamp bolts and ball joints. They must be kept tight.
- Check for installation and spread of cotter pins and tightness of nuts at both ends of tie rod and drag links.
- Check to see that the pitman arm (steering arm at steering gear) mountings are tight and locked.
- Check system for leaks or hose chafing and if necessary replace at once.
- Check for proper steering gear and power steering pump lubricant levels.
- Regularly inspect steering column joint bolts and steering linkage, particularly for body-to-chassis clearance.



WARNING:

Failure to maintain the steering system in proper condition can cause reduced steering ability resulting in personal injury and property damage. Have any steering problems corrected by a qualified mechanic.

MAINTAIN STEERING COLUMN JOINT BOLTS

As a good maintenance practice, it is recommended that steering column joint bolts be checked for tightness a minimum of every 50,000 miles (80,000 m) or annually, whichever occurs first. Tighten bolts to the torque specified in the table. **DO NOT OVER-TIGHTEN.**

MAINTAIN HYDRAULIC POWER STEERING SYSTEM

Whenever the hydraulic (power steering) system has been opened for any reason, air **MUST** be removed from the system before placing the vehicle in service.

SEAT CONTROLS

All seats are equipped with three point seat belts. Push the red button on the receiver to release.

The controls for adjustable seats are located at the front of the seat frame below the cushion. Seat adjustments are activated by a mechanical lever, an air pressure switch, or an electronic switch depending upon the options selected.

The available seat comfort adjustments for fore and aft, raise and lower, back angle adjustment, leg angle adjustment, and lumbar is determined by the ordered option.



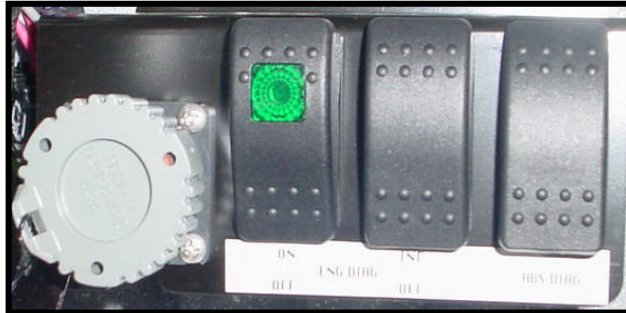
WARNING:

Occupants must be seated and seat belts must be securely fastened when vehicle is in motion or death or serious injury may result.

CUMMINS DIAGNOSTIC CENTER

IDLE ADJUSTMENT SWITCH

Use the middle switch to adjust the engine idle speed. Each time the switch is pressed briefly to the minus (-) position, the idle speed is decreased by 25 RPM. When the switch is pressed briefly to the plus (+) position, the idle speed is increased by 25 RPM.



ENGINE TEST SWITCH

The control system can show and record operation anomalies that present themselves as fault codes. These codes make troubleshooting easier. The fault codes are recorded in the ECM. They can be read using the fault lamps in the dash or with the INSITE™ service tool.

There are three types of system codes:

- Engine electronic control system fault codes
- Engine protection system fault codes
- Engine maintenance indicator codes

All fault codes recorded will be either active (fault code is currently active on the engine) or inactive (fault code was active at some time, but at the moment is not active). Most, but not all, of the electronic fault codes will light a lamp that can be illuminated when a fault code is active:

- The CHECK ENGINE lamp is yellow and indicates the need to repair the fault at the first available opportunity.
- The STOP ENGINE lamp is red and indicates the need to stop the engine as soon as it can be safely done. The engine should remain shut down until the fault can be repaired.

To check for active engine electronic codes turn the ignition switch to the OFF position and move the diagnostic switch to the ON position. Turn the vehicle ignition switch to the ON position. If no active fault codes are recorded, neither the CHECK nor the STOP lamp will illuminate. If active faults are recorded, both the CHECK and STOP lamps will illuminate momentarily, then begin to flash the codes of the recorded faults. The fault code will flash in the following sequence.

1. A yellow check lamp will flash
2. There is a short 1 or 2 second pause
3. The fault code will flash on the red STOP lamp
4. There is a short 1 or 2 second pause between each number

When the number has finished flashing in red, a yellow check lamp will appear again. The fault code will repeat the same sequence. Each fault code flashes two times before advancing to the next code. To skip to the next fault code, move the IDLE SPEED ADJUST switch momentarily to the (+) position. You can go back to the previous fault code by momentarily moving the IDLE SPEED ADJUST switch to the (-) position. If only one active fault code is recorded, the ISC control system will continuously display the same fault code, even with either the (+) or (-) selected. When not using the diagnostic system, turn OFF the Diagnostic Switch. If the Diagnostic Switch is left in the ON position the electronic control module (ECM) will not log some fault codes.

ABS TEST SWITCH WITH INDICATOR LIGHTS

The ABS light is amber and comes on at start-up on the diagnostic panel. The light turns off after ECU check-out comes on any time there is a failure in the ABS system. The low traction ("Low Trac") light is green and will illuminate when wheel slip is detected.

FUEL PRIMER BUTTON (OPTIONAL)

Used after a filter change or prior to starting vehicle that has been refueled after running out of fuel.

ENGINE TEST SWITCH

Used to receive diagnostic codes from the engine by turning on and counting blink codes.

NOTE: Always record all logged codes and toggle switch to display codes. Check engine handbook for code legends.

DOOR AJAR SYSTEM

Whenever a cab or compartment door is open and the parking brake is not engaged, a red light flashes to alert of the condition. The light is located overhead between the driver and passenger.



WARNING:

DO NOT MOVE VEHICLE WHEN LIGHT IS ON. If the red Door Ajar light illuminates while driving, the vehicle must be stopped to check for an open door.

BRAKE OPERATION

The chassis has an air brake system. To prevent brake bounce, the driver should make brake application by placing heel of foot on the floor, while applying a smooth, even force on the treadle valve pedal (brake pedal) with the ball of foot.



WARNING:

Frequent use of the service brakes will cause them to heat up and reduce their stopping ability in dangerous brake fade.

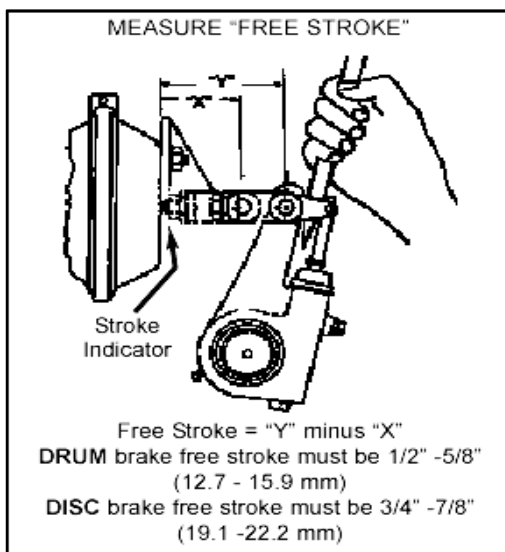
BRAKE INSPECTION

Regular inspection is required including the proper draining of any water from air tanks. This will indicate if the air dryer and check valves between tank systems are functioning properly.



SLACK ADJUSTER INSPECTION

Inspect Slack Stroke To Insure Automatic Adjuster Is Working. Stroke Indicator On Chamber Rod (Color or Knurled Band Exposed) Indicates Slack Needs Adjusting (Refer to "Free Stroke" below).



U.S. DOT Stroke Limits

80-90 psi (550-620Kpa) Pressure in Air Chamber.
Clamp Type Air Cleaner

Chamber Type (Size)	Adjust the stroke as short as possible without the brakes dragging. The vehicle may be put out of service if the stroke is not:
9	less than 1-3/8" (34.9 mm)
12	less than 1-3/8" (34.9 mm)
16	less than 1-3/4" (44.4 mm)
20	less than 1-3/4" (44.4 mm)
24	less than 1-3/4" (44.4 mm)
30	less than 2" (50.8 mm)
36	less than 2-1/4" (57.1 mm)

Refer to Manufacturer's Service Manual for Proper Adjustment Procedure

CHECK OPERATION OF THE AIR BRAKE SYSTEM

Weekly (or when air tanks are normally bled off for water content), the air brake system should be checked for proper function. This test assures the check valves are cycled in the system and ensures proper performance of dual air system. When performing pedal applications, depress and hold while listening for air leaks.

A visual inspection of the slack adjuster travel must also be made to ensure the slack adjusters are properly adjusted. Refer to the slack adjuster inspection section for further details.

NOTE: Vehicle must be parked on level surface, wheel chocks or curbing installed at the front and rear tires, and park brake in the off position.

STEP #1

Start engine and build both air systems to full system capacity, approximately 120-130 psi. Shut the engine off.

NOTE: System #1 should build up to 90 psi before system #2 starts to change.

STEP #2

Drain the air from system #2. After the air is drained from system #2, apply the brake pedal. The rear brakes should function. The park brake valve must be in the off position to perform this test.

STEP #3

Start the engine and recharge both systems to full capacity; approximately 120-130 psi. Shut the engine off.

STEP #4

Drain air from system #1. After the air is drained from system #1, apply the brake pedal. The front and rear brakes should both work. The park brake valve must be in the off position to perform this test.

If the truck is not equipped with self adjusting wedge brakes, "P" type "S" cam with automatic slack adjusters, or self adjusting disc brakes, then visually inspect brake function by observing slack adjuster travel. Travel should not exceed dimension in chart on previous page (refer to the appropriate manufacturer's maintenance manual for proper adjustment).

NOTE: Park brake system is integral with rear brakes and they **MUST** be properly adjusted to insure hold power.

IF THE BRAKES DO NOT FUNCTION AS DESCRIBED ABOVE, CONTACT SPARTAN CHASSIS IMMEDIATELY.

AUXILIARY BRAKING

EXHAUST OR COMPRESSION BRAKE (OPTIONAL)

DESCRIPTION

The auxiliary brake is a vehicle-slowng device only, not a vehicle stopping device. It therefore is not a substitute for the service braking system. The service brakes must be used to bring the vehicle to a complete stop.

OPERATION

Activating the dash switch will create automatic braking when there is no throttle application. This is a diesel engine retarder and is power absorbing by exhaust restriction similar to an air compressor or a vacuum pump.

Some auxiliary brake designs have a switch for selection of high, low, and/or medium absorbing capacity.

The brake operates with or without service brake application.

All brakes are most effective at governed engine speeds. Lower gear selection will give maximum retarding power. Transmission pre-select can be set for gear range 3 or 2 and will ensure maximum braking when brake is turned on. Pre-select keeps engine RPM speed at governor shift points for maximum braking and cooling.

In the case of an ABS event the auxiliary brake is automatically deactivated.

**WARNING:**

Vehicles equipped with an auxiliary braking device may lose control in wet or slippery road conditions if ABS system is in the failure mode and the braking device is activated. See auxiliary brake manufacturers manual for safe operating practices.

TRANSMISSION OUTPUT RETARDER (OPTIONAL)

DESCRIPTION

The transmission output retarder absorbs horsepower on the driveshaft and slows the vehicle. When using the transmission output retarder, the energy is transferred to heat to be dispatched by the cooling system.

OPERATION

A switch mounted on the dash turns on the retarder. Completely removing foot from the accelerator applies the first one third of the retarder.

Applying pressure to the brake pedal applies the second one third of the retarder capacity.

The transmission temperature must be monitored. TURN OFF if it reaches the 300° level.

Transmission pre-select can be set for gear range 3 or 2 and will ensure maximum braking when brake is turned on. Pre-select keeps engine RPM speed at governor shift points for maximum braking and cooling to retarder and fan speed.



CAUTION: The retarder will not bring the vehicle to a stop. You must apply the chassis brake to bring the vehicle to a full stop.



WARNING:

Vehicles equipped with an auxiliary braking device may lose control in wet or slippery road conditions if ABS system is in the failure mode and the braking device is activated. See auxiliary brake manufacturers manual for safe operating practices.

ELECTRIC DRIVELINE RETARDER (OPTIONAL)

DESCRIPTION

The Electric Driveline Retarder is an auxiliary braking device located in the driveline. Its purpose is to supply additional braking torque to avoid fading of the chassis brakes that result from frequent stopping. This will allow the chassis brakes to be more effective during a braking event.

OPERATION

The Electric Driveline Retarder is activated by brake pedal application. The level of effectiveness is increased as the pedal is further depressed. The levels of progression are displayed by the four amber indicator lights on the instrument panel. When the retarder is activated, the brake lights illuminate.

The toggle switch (on/off) located on the switch panel near the headlight switch will enable or disable the Retarder operation. This switch is used to disable the retarder in the event of slippery road surfaces.

Transmission pre-select can be set for gear range 3 or 2 and ensures maximum braking when brake is turned on. It keeps engine RPM speed at governor shift points for maximum braking and alternator output.



CAUTION: The retarder will not work when vehicle speed is below 3 m.p.h. You must apply the chassis brake to bring the vehicle to a full stop.



WARNING:

Vehicles equipped with an auxiliary braking device may lose control in wet or slippery road conditions if ABS system is in the failure mode and the braking device is activated. See auxiliary brake manufacturers manual for safe operating practices.

MAINTENANCE FOR TELMA RETARDERS

GOAL	FREQUENCY	METHOD	
Washing	Twice a year	Pressurized water, air dry	
Greasing SUPERTELMACO 3	Every 24,000 miles	Fill grease fitting until grease appears at air hole. Avoid grease leakage.	
Mechanical Maintenance	Check at 3,000 miles	Check every 6,000 miles	Check every 24,000 miles
No abnormal play rotor/stator	X	X	X
Tighten bolts & screws	X	X	X
Driveline seals		X	X
Electrical Maintenance	Check at 3,000 miles	Check every 6,000 miles	Check every 24,000 miles
Wiring insulation			X
Coil connections			X
Tighten connectors	X	X	X
Ground terminal condition/tightness	X	X	X
Contactors box function/condition/tightness	X	X	X
Foot control	X	X	X
Cutoff switch	X	X	X
Indicator lights	X	X	X

COOLING SYSTEM

OPERATION AND INSPECTION

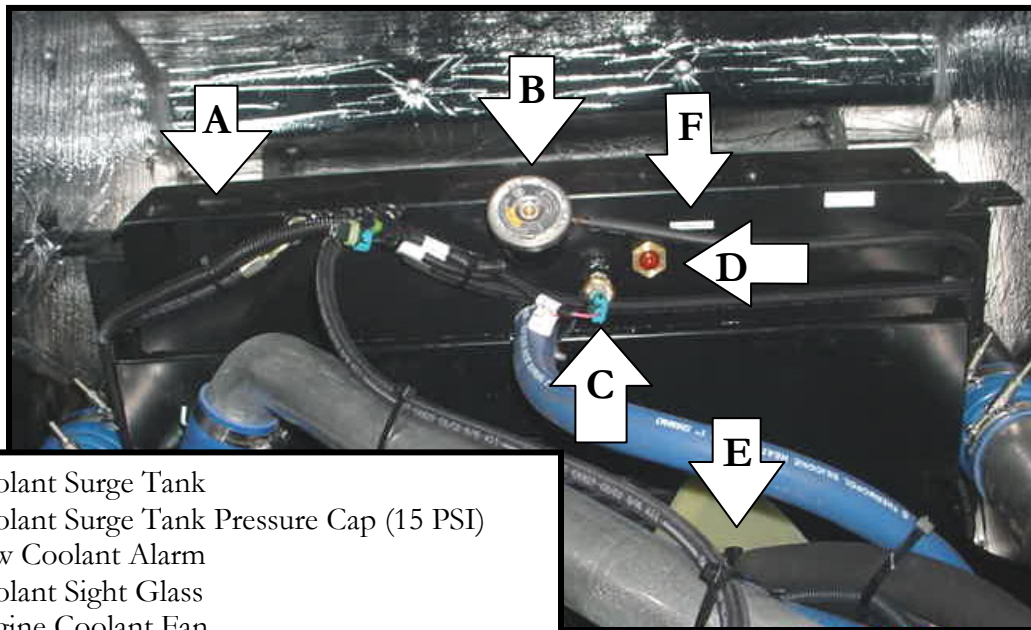
The following should be inspected and maintained to avoid engine overheating.

- ♦ Check fluid level, mixture concentration, and PH factor. Refer to the engine manufacturer's operation and maintenance information for proper fluid specifications. When the coolant is cold, the coolant level should be at the **FULL COLD** mark. If the coolant is not at this level, you may have a leak in the radiator hoses, heater hose, radiator or somewhere else in the system.
- ♦ Check radiator hoses, heater hoses and clamps for cracks and/or leaks.
- ♦ Check condition of fan drive belts (always use proper belt tension gauge per belt application).
- ♦ Keep radiator core clear and clean.

NOTE: Use of high air or water pressure can damage core fins.

- ♦ Ensure that recirculation shields are in position and undamaged.
- ♦ Inspect air cleaner element; it must be clean and unrestricted.
- ♦ Inspect air cleaner intake cap or spark arrestor for cleanliness.
- ♦ Inspect exhaust system for restriction (no crushed areas in pipe).
- ♦ Inspect fan blade and shroud (no pieces missing in shroud or loose blade).

SYSTEM COMPONENTS



- | |
|--|
| <ul style="list-style-type: none"> A. Coolant Surge Tank B. Coolant Surge Tank Pressure Cap (15 PSI) C. Low Coolant Alarm D. Coolant Sight Glass E. Engine Coolant Fan F. "FULL COLD" Mark |
|--|

If an overheated engine condition exists, the engine converts to an overheat protection mode, which alternates firing groups of cylinders to help prevent engine damage. In this mode, you will notice a loss in power and engine performance. This operating mode allows your vehicle to be driven to a safe place in an emergency.

NOTE: To avoid engine damage: After driving in the overheated engine protection-operating mode, allow engine to cool before attempting any repair. The engine oil will be severely degraded. Repair the cause of coolant loss and change the oil.



CAUTION: Heater and radiator hoses, and other engine components can be very hot. Do not touch them.



CAUTION: Never remove radiator cap while coolant is hot. Remove cap slowly when coolant is at ambient condition. A sudden release of pressure from heated cooling system can result in serious personal injury from explosion of hot coolant.

TRANSMISSION

All operators and owners should read the transmission operation manual before operating the vehicle.

SHIFT SELECTOR

The transmission shift selector is either pushbutton or t-handle (lever). A full description and function for each type of selector is included in the transmission operation manual supplied with your vehicle.

OIL CHECK PROCEDURE

Fluid level is critical to the transmission operation. Refer to the transmission operation manual to determine the appropriate method of obtaining the oil level reading.

Weekly, check transmission oil for contamination of water/glycol via the dipstick. The engine should be running for this inspection.

DIAGNOSTIC INCIDENT DISPLAY PROCEDURE

To check for diagnostic codes, be sure the vehicle is safely stopped, the park brake is activated, and the transmission is in neutral. Refer to the transmission operation manual for a detailed explanation of accessing, viewing, and clearing code information.

TRANSMISSION COOLER

Every 3 years, 32,000 miles, or 2,500 hours of operation, the transmission cooler should be replaced.

FLUID CHECKS

The transmission, engine oil, power steering and coolant fluid levels should be checked each shift.

Fluid levels should be checked while the vehicle is on a level surface, the parking brake engaged, appropriate wheel chocks in place, and the transmission is in neutral. Refer to the manufacturer's operation and/or maintenance manual for proper procedures such as checking the transmission fluid when engine is running.

The type of fluid for each component is listed on the fluid label located inside the cab.



CAUTION: It is very important that the proper fluids are used. Fluid types should never be mixed unless the system has been completely flushed. Refer to component manufacturer's documentation for additional information.

ELECTRICAL INFORMATION

CIRCUIT BREAKERS

The circuit breakers are SAE J553, type 1, 2, or 3.

BATTERY

Battery removal and terminal maintenance: Always remove all negative battery terminals first and positive last. When replacing cables install positive terminal first and install negative terminal last. Battery terminals should be cleaned and installed with a dielectric compound or coated with battery terminal spray or clear polyurethane spray. Battery jumper studs are provided.



CAUTION: Placing a wrench on the positive terminal without removal of the negative connection first, or contact of a wrench between posts, can result in a spark that could explode the battery.

Disconnect batteries and ECU connectors when performing electrical service, or welding on apparatus, to protect the microprocessors on chassis. Proper eye and apparel protection is required.

INTERIOR LIGHTING

CAB FRONT DOME LAMPS

There is a clear light above each door, which activates when the door is opened. This same light may be used when the door is closed by pressing the switch on the light housing. Additionally, there may be lights recessed into each door panel or ground lamps that come on when that door is opened. The red dome light must be switched on manually with the switch at the lamp.

CAB REAR DOME LAMPS

Rear doors have two lights above them. The clear lights will come on when the rear door(s) is opened, or can be switched manually on when all doors are closed.

The red dome light must be switched on manually with the switch at the lamp.

LIGHT BULB REPLACEMENT

To insure proper replacement, inspect lens and/or bulb to identify the appropriate manufacturer.

CAB EXTERIOR:

Location of Lamp	Manufacturer	Replacement Bulb	Type of Base	Qty.
Roof Mounted Marker Light	GE Lighting	904	Plug In	5
Face Mounted Marker Light	Grote	45103	Sealed Unit	5
Face Mounted Marker Light	Weldon	9186-1500-20	Sealed Unit	5
Side Marker (Beehive) Light	GE Lighting	1157	Push & Twist	2
Head Light High Beam	GE Lighting	H4656	Sealed Beam Plug In	2
Head Light High Beam	GE Lighting	9007	Plug & Twist	2
Head Light Low Beam	GE Lighting	H4651	Sealed Beam Plug In	2
Head Light Low Beam	GE Lighting	9007	Plug & Twist	2
Front Mounted Turn Signal	GE Lighting	H4651	Sealed Beam Plug In	2
Front Mounted Turn Signal	GE Lighting	3157NA	Plug & Twist	2
Ground Lts- Circular Optics	Truck-Lite	40244	Sealed Unit	4
Ground Lts- Diamond Optics	Truck-Lite	40203	Sealed Unit	4
Tilt Switched Tunnel Lt- Diamond Optics	Truck-Lite	40223	Sealed Unit	1
Step Light- Circular Optics	Truck-Lite	40244	Sealed Unit	4
Step Light- Diamond Optics	Truck-Lite	40203	Sealed Unit	4
Turn Guide Arrows	GE Lighting	1157	Push & Twist Asm.	2
Turn Guide Arrows	Whelen	60A00TAR	LED Asm	2
Warning Lights	Varies	Mfg.Catalog	Varies	

NOTE: When replacing Halogen and Strobe bulbs it is recommended that gloves or a cloth be used to avoid direct contact with your hands.

CAB INTERIOR:

Location of Lamp	Manufacturer	Replacement Bulb	Type of Base	Qty.
Battery On	Romar	12-26	Push In	1
Ignition On	Romar	12-26	Push In	1
Rocker Switch Panel Back Light	Romar	Varies-Contact Mfg; LED Asm as required		
Door Panel Lights	Weldon	93	Plug In	4
Door Header Red/Clr Lt	Weldon	921	Plug In	4
Open Door Beacon Light	Weldon	1076	Push & Twist	1
Center 3-Way (2) Swivel Dome Lt	Weldon	1003	Push & Twist	2
Center 2-Way Non-Directional Lt	GE Lighting	921	Plug In	1
7 Inch Round Dome Light	Truck-Lite	1156	Push & Twist	Varies
Map Light- Varies	See Mfg. Catalog			

CAB TILT SYSTEM



WARNING:

Before raising or lowering the cab, safety precautions must be taken to avoid personal injury or equipment damage. Insure frontal and overhead clearance is sufficient to fully raise cab without hitting electrical wires or dangerous overhead objects that could result in serious injury or death.



CAUTION: Insure headlamps, compartment doors, and the grille, are secured before raising or lowering the cab.



CAUTION: An aluminum cab tilt control instruction plate has been provided with the cab/chassis. The plate must be secured in a location close to the storage place of the remote pendant to allow visibility prior to each pendant usage.

CAB TILT CONTROL INSTRUCTIONS:

⚠ WARNING: REFER TO THE OPERATOR'S MANUAL FOR COMPLETE OPERATING INSTRUCTIONS AND FOR OPERATING INSTRUCTIONS ON THE OPTIONAL MANUAL CAB TILT SYSTEM.

BEFORE RAISING CAB:

1. INSURE FRONTAL AND OVERHEAD CLEARANCE TO FULLY RAISE CAB WITHOUT DAMAGE.
2. VEHICLE MUST BE PARKED ON LEVEL GROUND WITH PARK BRAKE ON.
3. NO PERSONNEL OR LOOSE EQUIPMENT SHOULD REMAIN IN CAB DURING TILT SYSTEM OPERATIONS. THE CAB TILT SYSTEM IS DESIGNED TO TILT THE CAB STRUCTURE ONLY! ADDITIONAL LOADS MAY CAUSE SYSTEM FAILURE.
4. CAB DOORS MUST BE SECURELY CLOSED PRIOR TO TILT OPERATIONS.
5. ALL ITEMS IN THE TILT ARCH (SUCTION SWIVELS, HOSES, ETC) MUST BE REMOVED FROM BUMPER APRON.
6. MASTER ELECTRICAL SWITCH MUST BE IN THE "TOP" POSITION.
7. IGNITION SWITCH MUST BE IN THE "OFF" POSITION.
8. ALL PERSONNEL MUST REMAIN CLEAR OF FRONT AND UNDER CAB AT ALL TIMES THE TILT SYSTEM IS IN OPERATION.
9. CAB SAFETY SUPPORT MECHANISM MUST BE FULLY ENGAGED BEFORE PERSONNEL GO UNDER THE RAISED CAB.

RAISING CAB:

1. PLUG IN CAB PENDANT CONTROL.
2. ENERGIZE THE ELECTRIC/HYDRAULIC PUMP BY DEPRESSING AND HOLDING THE "UP" BUTTON ON THE REMOTE PENDANT.
3. RAISE CAB UNTIL SAFETY SUPPORT CHANNEL CLEARS THE RIGHT-HAND SIDE TILT CYLINDER HOUSING AND AUTOMATICALLY ENGAGES ON TOP OF CYLINDER HOUSING AGAINST PISTON ROD. VISUALLY CONFIRM SAFETY ENGAGEMENT.
4. DE-ENERGIZE THE ELECTRIC/HYDRAULIC PUMP BY RELEASING THE "UP" BUTTON.

LOWERING CAB:

⚠ WARNING: ALL PERSONNEL MUST STAY CLEAR FROM UNDER CAB WHEN LOWERING CAB OR PERSONAL INJURY WILL OCCUR.

1. RELEASE SAFETY SUPPORT MECHANISM BY PULLING THE SUPPORT RELEASE CABLE. THE CAB MAY NEED TO FIRST BE RAISED APPROXIMATELY ONE INCH IN ORDER TO REMOVE THE LOAD FROM THE SAFETY SUPPORT MECHANISM.
2. WHILE PULLING ON THE SUPPORT RELEASE CABLE, ENGAGE THE ELECTRIC/HYDRAULIC CIRCUIT BY DEPRESSING AND HOLDING THE "DOWN" BUTTON. CAB WILL SLOWLY LOWER. RED INDICATOR LIGHT ON REMOTE PENDANT WILL LIGHT.
3. SUPPORT SAFETY CABLE MUST BE RELEASED ONCE SUPPORT CHANNEL IS CLEAR OF TOP OF CYLINDER HOUSING.
4. WHEN RED INDICATOR LIGHT TURNS OFF, BOTH CAB LOCKS WILL BE FULLY ENGAGED. DE-ENERGIZE THE ELECTRIC/HYDRAULIC CIRCUIT BY RELEASING THE "DOWN" BUTTON.
5. REMOVE CAB PENDANT CONTROL AND STOW.

NOTE: THE SPEED AT WHICH THE CAB LOWERS IS PRE SET AND CANNOT BE ADJUSTED.

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CAB TILT PROCEDURE

REMOTE ELECTRIC CAB TILT PENDANT

The red light on the pendant will illuminate any time the tilt system is energized by the "DOWN" button until the cab locks have fully engaged.

BEFORE RAISING CAB

1. Insure frontal and overhead clearance to fully raise cab without damage.
2. Vehicle must be parked on level surface with park brake on.
3. No personnel or loose equipment should remain in cab during tilt system operations. The cab tilt system is designed to tilt the cab structure only! Additional loads may cause system failure.
4. Cab doors must be securely closed prior to tilt operations.



5. All items in the tilt arch (suction swivels, hoses, etc.) must be removed from bumper apron.
6. Master electrical switch must be in the “ON” position.
7. Ignition switch must be in the “OFF” position.
8. All personnel must remain clear from front and under cab at all times the tilt system is in operation.
9. Cab safety support mechanism must be fully engaged before personnel go under the raised cab.

RAISING CAB

10. Plug in cab pendant control.
11. Energize the electric/hydraulic pump by depressing and holding the "UP" button on the remote pendant.



WARNING:

Failure to insure that the support mechanism is in place may result in personal injury or death

12. Raise cab until support channel clears the right side of the tilt cylinder housing and automatically engages on top of cylinder housing against the piston rod. Visually confirm that support mechanism is engaged.
13. Deactivate the electric/hydraulic pump by releasing the "UP" button.

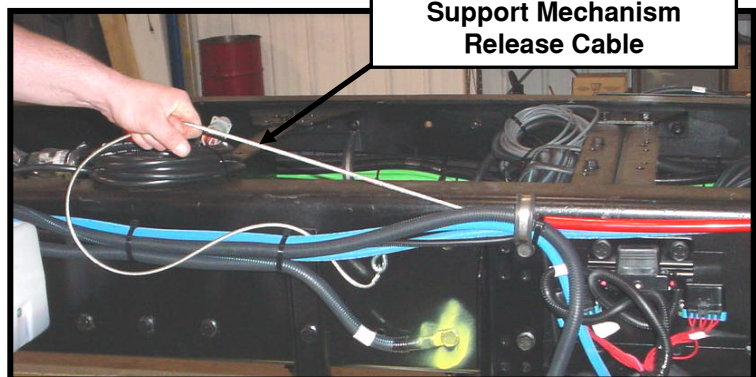
LOWERING CAB



WARNING:

All personnel must stay clear from under cab when lowering cab or serious personal injury or death may occur.

1. Release safety support mechanism by pulling the support release cable. The cab may need to first be raised approximately one inch in order to remove the load from the safety support mechanism.
2. While pulling on the support release cable, activate the electric/hydraulic circuit by depressing and holding the "DOWN" button. Cab slowly lowers and the red indicator on the remote pendant is illuminated.



3. The red light on the pendant illuminates any time the tilt system is activated by the "DOWN" button, until the cab locks fully engage. The speed at which the cab lowers is pre-set and cannot be adjusted.
4. The support safety cable may be released once support channel is clear of top of cylinder housing.
5. When red indicator light turns off, both cab locks will be fully engaged. De-energize the electric/hydraulic circuit by releasing the "DOWN" button.

MANUAL TILT PUMP DEVICES (OPTIONAL)

If equipped, the tilt pump may be operated manually. To lower the cab manually, release the safety support cable and turn the T-handle counter-clockwise using an appropriate device. Insure cab locks are engaged and turn T-handle clockwise to fully seat. (cab drifts down if not seated).



Optional Manual Release T-Handle

If equipped, the jacking rod is mounted on the side of the pump. To raise the cab manually, insert the jacking rod into the jacking device and jack the cab up until the safety support channel clears the right side tilt cylinder housing and automatically engages on top of the cylinder housing against the piston rod. Visually confirm safety engagement.

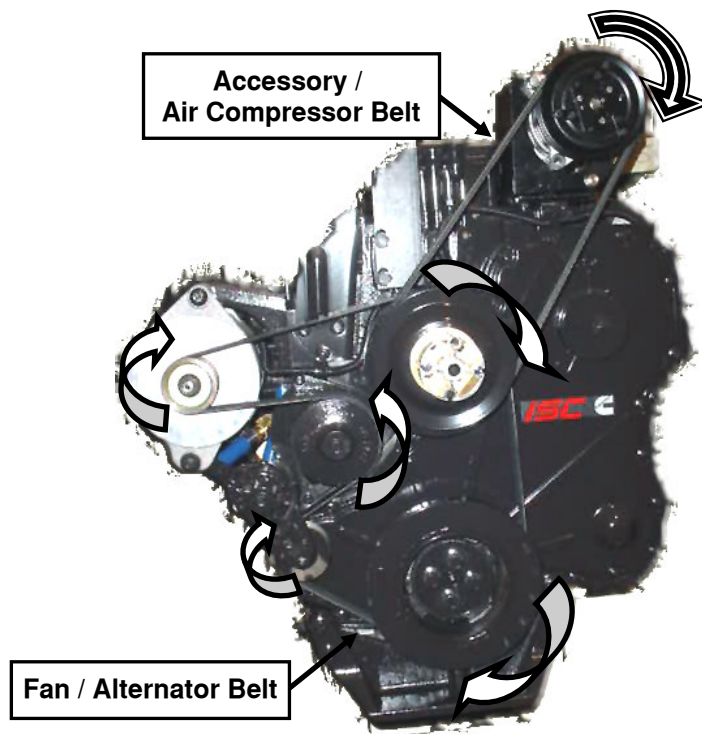
BELT MAINTENANCE / REPLACEMENT

Refer to the engine operation and maintenance manuals; use the recommended belts or an equivalent product.

ENGINE	FAN	ALTERNATOR	ACCESSORY / AIR COMPRESSOR	
CUMMINS ISM	3911560 Cummins Bridgeway Length – 70.5 in / 1790.7 mm with Leece-Neville (270 or 320)		3289314 Cummins Bridgeway Length - 55 in / 1397 mm	with TM21 Air Compressor
CUMMINS ISC / ISL	3289279 Cummins Bridgeway Length - 70 in / 1778 mm with Leece-Neville Alternator (270 or 320)		17420 Dayco	with TM16 Air Compressor
			17480 Dayco	with Fan Clutch with TM21 Air Compressor
			17485 Dayco	without Fan Clutch with TM21 Air Compressor
CAT C10 / C12	25-080830 NAPA Length - 83.75 in / 2127.25 mm with Leece-Neville Alternator (270 or 320)		17530 Dayco	with TM21 Air Compressor
	25-080839 NAPA Length - 84.38 in / 2143.25 with Nieoff Alternator (290)			
DETROIT SERIES 60	(a) (3) 17470 Dayco		5080570 Dayco with Leece-Neville Aternator (270 or 320)	with TM21 Air Compressor
CAT 3126			5080720 Dayco with Leece-Neville Alternator (270)	with TM16 Air Compressor

- NOTES:**
- a) The quantity of belts required in a matched set is shown in parenthesis (x) preceding the belt part number. Always replace all belts in a matched set even if it is not necessary.
 - b) Dayco belt length is represented by the last 3 digits of the part number - multiply inches by 25.4 to arrive at mm.
e.g. the length of belt # 5080570 is 57 in.
e.g. the length of belt # 17485 is 48.5 in.

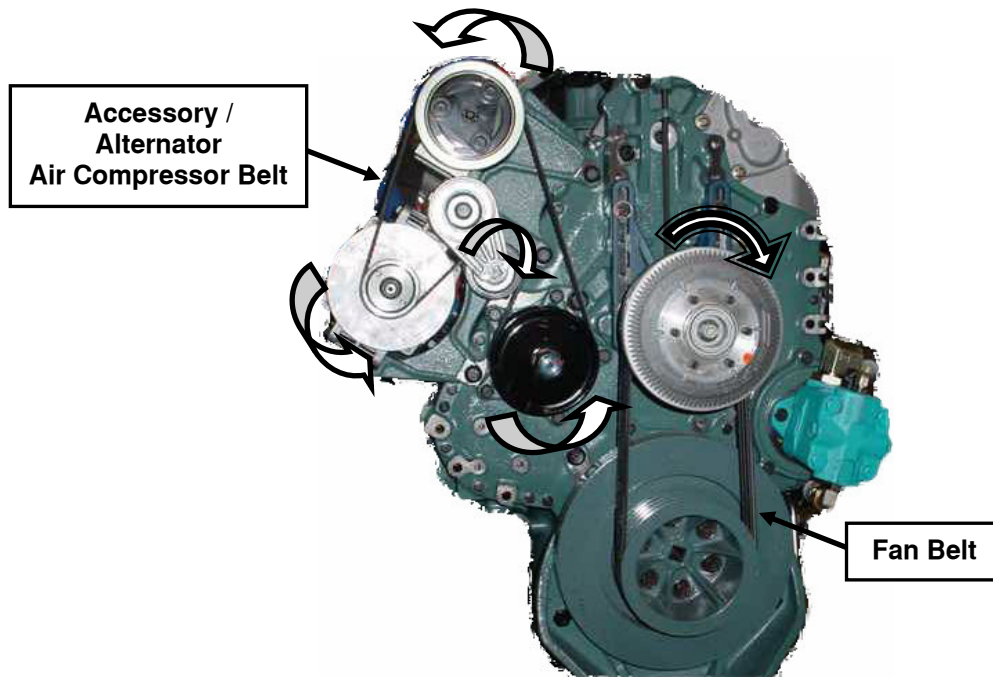
ISC/ISL BELT ROUTING



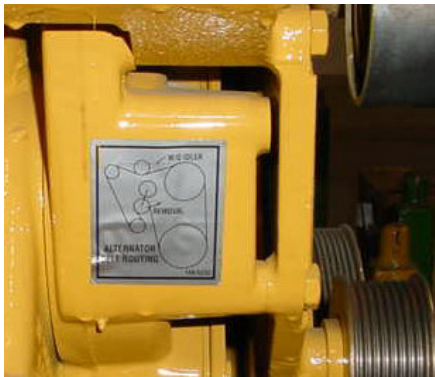
ISM BELT ROUTING



DETROIT SERIES 60 BELT ROUTING



CAT C10 / C12 BELT ROUTING



The label to show routing of the alternator belt is located on the front right corner of the gear case, below the alternator.

TANDEM AXLE OPERATION (OPTIONAL)

A driver control differential lock switch is located on the console panel. In slippery and off road conditions apply lock up at low torque application. This will provide evenly distributed drive to both leads and rear axles.

NOTE: This is independent of the side-to-side differential in each axle that has optional differential locks.

TIRES AND WHEELS

It is critical that the proper tire pressure is equivalent side-to-side on the same axle. The maximum tire pressure is stated on the vehicle certification label.

Replacement wheels and tires must have equivalent load carrying capacity as the original equipment. Wheels must have the same rim width, rim offset, and mounting configuration as the original equipment, while tires must be of the same size and type, and conform to government regulations. Wheel nut torque is 450-500 lbs. ft.

INSPECTION

Check the condition of the tires daily. Look for any bumps, blisters, cuts, punctures, cracks, uneven wear, and tread depth; check for proper inflation and tread depth. When tread is worn to 4/32 in. (3.175 mm), replace tire or rotate tire from front axle to rear axle position, if equivalent as stated above. Replace tire on rear axle when tread is worn to 2/32 in. (1.5888 mm). Always keep tires inflated to tire manufacturer's recommended pressure for the load being carried. Always check inflation pressure when tires are cold.



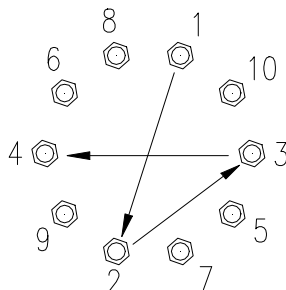
WARNING:

Always maintain your tires in good condition. Frequently check and maintain correct inflation pressures as specified by the tire manufacturers. Inspect periodically for abnormal wear patterns and replace/repair cut or broken tire casing. Always use experienced properly trained personnel with the correct equipment and procedures to mount or remove tires. Failure to adhere to these warnings could result in tire malfunction, damage to your vehicle, personal injury and possible death.

INSTALLATION AND TIGHTENING

Before installing wheels, clean all mounting surfaces with a wire brush. Check to make sure the threads are clean. Refer to the wheel manufacturer's installation and maintenance manual included with this manual for the proper inspection and installation procedures.

Initially tighten all wheel nuts to 50 lb. ft. using the pattern shown below. Complete wheel nut tightening to the torque value specified by the wheel manufacturer. For example, the torque for a hub piloted M22 X 1.5 standard wheel application is 450-500 lb. ft. Maintain wheel nut torque by retorquing at the first 50 miles (80 km) and routinely at 10,000 miles or 6 months after that.



MAINTENANCE SCHEDULE AND CHECKLIST

Maintenance must be performed to keep your vehicle in good operating condition. It is necessary to perform maintenance checks, inspections, lubrication, cleaning or other types of service. Regular maintenance helps avoid potential problems and may help correct problems before they become serious.

The following maintenance schedule is arranged into mileage and time intervals. The intervals listed are the maximum and must not be exceeded. If your vehicle is operated on very hilly terrain, or in a very dusty or sandy environment, you may need to reduce the time between scheduled maintenance intervals. The maintenance schedule may be copied and used as a check off sheet.

Perform maintenance at whichever interval occurs first. When reaching a particular service level, inspect / perform all previous maintenance items that may be due.

MAINTENANCE CHECKLIST

Page 1

Daily

- Check Engine Oil Level
- Check for Engine Oil Leaks
- Check Power Steering Fluid
- Check Coolant System Level
- Inspect Accessory Drive Belts
- Inspect Fan Drive Belts
- Inspect Fan Belt Tension
- Inspect Cooling Fan
- Inspect Coolant Hose Condition
- Check for Coolant Leaks
- Check Transmission Fluid Level
- Check for Transmission Fluid Leaks
- Voltmeter Reading – Engine Running
- Defroster Fan
- Wiper Blade Condition
- Mirrors Adjusted
- Washer Solvent Level
- Brake Air Pressure
- Instrument Lamps
- Head Lights
- Tail Lamps
- Turn Signals
- Marker Lamps
- Stop Lamps
- Warning Lamps
- Slack Adjuster Adjustment
- Drain Water from Air Tanks
- Axle Oil Leaks
- Wheel Nut Inspection
- Tire Inflation
- Tire Condition
- Water Tank Level
- Drain Fuel-Water Separator
- Inspect Tires/Check Tire Pressure

Weekly

- Thoroughly Wash Complete Chassis, Underbody, and Cab
- Run A/C System to Lubricate Components
- Check Brake Adjustment Slack Throw
- Inspect Transmission Oil for Contamination of Water/Glycol

50 Miles (Break-in & after wheel installation)

- Check and Retorque Wheel Nuts

3,000 Miles or 1 Month

- Inspect Condenser Coil
- Inspect Clean A/C System Air Filter
- Inspect Compressor Belt-Check Tension
- Check Condenser Fans for Damage and a Quiet/Smooth Operation
- Lubricate Chassis
- Inspect Brake Components (including brake linkage)
- Lubricate Brake Treadle Valve Hinge Pin
- Lubricate Axle King Pins
- Check Front Spring U-Bolt Torque
- Check Rear Spring U-Bolt Torque
- Check Torque Arm Bolt Nut Torque
- Check Torque Arm Clamp Nut Torque
- Inspect Spring Pin Locking Bolt
- Inspect Spring Pin And Bushing Wear
- Lubricate Spring Pin
- Inspect All Suspension Components for Damage or Misalignment
- Inspect Shocks for Damage or Leaks
- Check Air Suspension Components Torque if Necessary
- Inspect Drive Shaft for Damage
- Lubricate Driveline Universal Joints
- Lubricate Driveline Slip Joint
- Check Front Axle Wheel Bearing Oil
- Lubricate Driveline Bearing Assembly
- Inspect the Air Brake Chambers and Hoses And Check for Proper Operation

4,000 Miles (Break-in Only)

- Adjust Front Axle Wheel Bearings
- Lubricate Front Axle King Pins
- Lubricate Front Axle Tie Rod Ends
- Lubricate Cab Hold Down Latches
- Lubricate Steering Slipshafts

5,000 Miles (Break-in Only)

- Change Rear Axle Lubricant

5,000 Miles or 3 Months

- Inspect the Fuel Cap, Fuel Tank, Tank Vent, and Fuel Lines for Leaks

MAINTENANCE CHECKLIST

Page 2

5,000 Miles or 6 Months

- Clean and Replace Air Compressor
Sponge Strainer (if equipped)
- Clean Drive Axle Vent
- Change Drive Axle Lubrication
- Clean Battery Posts and Terminals
- Inspect Alternator
- Test Anti-Freeze PH Factor
- Re-Torque All Steering Balls, Bolts, Tie
Rods, Drag Links, Frame Bolts,
Suspension Hangers and Components
- Inspect Frame and Cross Member for
Corrosion or Loss of Paint

6,000 Miles or 6 Months

- Change the Engine Oil and Oil Filter
- Inspect Air Intake System
- Inspect Charge Air Cooler
- Inspect Single and Double Air Brake
Check Valves
- Lubricate Steering Slipshafts
- Inspect Air Filter
- Lubricate Brake Camshaft
- Change Coolant Filter
- Lubricate Steering Drag Link Ball Joints
- Lubricate Brake Treadle Valve Pin
- Lubricate Power Steering Housing

8,000 Miles or 1 Month

- Inspect Air Brake Chambers and Hoses.
Check Air Brakes for Proper Operation

10,000 Miles or 6 Months

- Inspect and Clean Radiator
- Inspect Radiator Hoses

12,000 Miles or 12 Months

- Inspect Engine Block Heater
- Inspect Heater Water Hoses
- Check Anti Freeze Concentration and PH
Factor
- Change Fuel/Water Separator Filter
- Change Engine Fuel Filter
- Lubricate Steering Slipshafts
- Lubricate Brake Treadle Valve Hinge Pin

12,000 Miles or 12 Months (cont)

- Adjust Steering Gear Relief Plungers
- Inspect Power Steering Pump and
Steering Gear

18,000 Miles or 5 Months

- Lubricate Front Axle King Pins
- Lubricate Front Axle Tie Rod Ends
- Lubricate Brake Treadle Valve

20,000 Miles or 18 Months

- Lubricate Steering Slipshafts
- Replace Pleated Paper Filter in Air
Compressor, if Equipped

24,000 Miles or 12 Months

- Adjust Engine Valves
- Inspect Drive Belts, Check Drive Belt
Tension, and Tensioner Bearing

25,000 Miles or 3 Months

- Inspect Air Brake Air Dryer
- Lubricate Brake Valve, Foot Operated

25,000 Miles or 12 Months

- Change Automatic Transmission Fluid
And Filter
- Inspect Automatic Transmission Vent
- Inspect Automatic Transmission Cable
- Inspect Front Axle Alignment and
Component Wear
- Inspect Wheel Bearings

48,000 Miles or 24 Months

- Drain, Flush, and Replace Engine Coolant
- Inspect Engine Vibration Dampener

50,000 Miles or 3 Months

- Lubricate Brake Slack Adjuster (shoe)

50,000 Miles or 6 Months

- Inspect Air Brake Air Dryer for Proper
Operation
- Inspect Air Compressor Discharge Head
- Clean and Lubricate Air Brake Treadle
Valve

MAINTENANCE CHECKLIST

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100,000 Miles or 12 Months

- Change Rear Axle Lubricant
- Change Power Steering Reservoir Filter
- Change Air Filter
- Change Front Axle Wheel Bearing Oil

200,000 Miles or 24 Months

- Clean Brake Pressure Protection Valves
- Inspect Air Compressor
- Clean Brake Relay Valves
- Clean Spring Brake Valves
- Clean Parking Brake Valve
- Clean Quick Release Valve
- Inspect Pop-off Valve
- Inspect Air Dryer Desiccant and Oil Filter
- Clean Single and Double Check Valves
- Check Air Brake System Before Putting Vehicle Back In Service

As Required

- Torque Drive Line Cap Screws and Bolts
- Adjust Steering Gear Relief Plungers
- Adjust Front Axle Steering Stops
- Adjust Rear Axle Wheel Bearings
- Replace Burned Out Light Bulbs
- Replace Wiper Blades
- Replace Brake Shoes

MAINTENANCE SCHEDULE

3,000 MILES OR 1 MONTH

Check Or Service Ref	Vendor	General Information	Remarks
Lubricate Brake Linkage (Shoe-Type)	Refer to Brake Manual	Lubricate With NLGI Grade 2 Grease At Four Fittings	
Lubricate Cab Hold Down Latches and Hook Pivots		Lubricate With NLGI-1	
Check Front Spring U-Bolt Torque		Torque to 450 lb.-ft.	
Check Rear Spring U-Bolt Torque		Torque to 450 lb.-ft.	
Check Torque Arm Bolt Nut Torque		Torque to 350-400 lb.-ft.	
Check Torque Arm Clamp Nut Torque		Torque to 175-200 lb.-ft.	
Inspect Spring Pin Locking Bolt		Bolt, Washer, And Nut Should Be In Position	
Inspect Spring Pin And Bushing Wear			
Lubricate Spring Pin		Lubricate With NLGI Grade 2 Grease At Eight Fittings	
Inspect All Suspension Components for Damage Or Misalignment			
Inspect Shocks For Damage or Leaks			
Check Air Suspension Components Torque			
Inspect Drive Shaft for Damage			
Lubricate Drive Line Universal Joints	Refer to Drive Line Manual	Lubricate With NLGI Grade 2 Grease	
Lubricate Drive Line Slip Joint		Lubricate With NLGI Grade 2 Grease	
Lubricate Wheel Bearing Assembly		Clear 90 W	Lubricate Anytime Drum Hub Is Removed

4,000 MILES (BREAK-IN ONLY)

Check or Service	Vendor Ref	General Information	Remarks
Adjust Front Axle Wheel Bearings Check Front Axle Wheel Bearing Oil	Refer to Axle Manual		GL-5 Gear Lube
Lubricate Front Axle King Pins Lubricate Front Axle Tie Rod Ends	Refer to Axle Manual		Lube With NLGI Grade 2 Grease
Lubricate Steering Slip Shafts		Glide Coat Splines Requires Wiping Clean and Re-lubrication	Lube With Never Seize

4,000 MILES OR 1 MONTH

Check or Service	Vendor Ref	General Information	Remarks
Check Front Axle Wheel Bearing Oil	Refer to Axle Manual		GL-5 Gear Lube

5,000 MILES (BREAK-IN ONLY)

Check or Service	Vendor Ref	General Information	Remarks
Change Rear Axle Lubricant	Refer to Rear Axle Service Manual		First Change At 5,000 miles, Then Every 10,000 Miles or 12 Months Thereafter

5,000 MILES OR 3 MONTHS

Check or Service	Vendor Ref	General Information	Remarks
Inspect The Fuel Cap, Fuel Tank, Tank Vent, and Fuel Lines For Leaks		Repair Leaks As Required. Fuel Tank Vent Must Remain Open For Proper Operations	
Inspect Cable	Refer To Engine Manual	Inspect Cable For Damage And Proper Connections.	

5,000 MILES OR 6 MONTHS

Check or Service	Vendor Ref	General Information	Remarks
Clean And Replace Air Compressor Sponge Strainer, If Equipped	Refer To Air Brake		In Dusty Environments, Reduce the Interval Between Services
Clean Rear Axle Vent	Refer To Rear Axle Service Manual		Clean While Doing Fluid Check
Clean Battery Posts		Clean More Often If Corrosion Appears.	
Inspect Alternator	Refer To Alternator Manual		
Check PH Factor On Radiator Coolant		Serious Corrosion Will Occur If Correct Charge Is Not Used To Balance PH Factor	
Change Rear-End Carrier Lubrication	Refer To Drive Axle Manual		
Re-Torque All Steering, Balls And Bolts, Tie Rods, Drag Links, Suspension Hangers And Components And Frame Bolts			
Inspect For Frame And Cross Member Corrosion Or Loss Of Paint.		Scrap, Grind Or Sand Effected Areas	Use A Quality Primer And Paint And Re-Coat Areas

6,000 MILES OR 6 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Change The Engine Oil And Oil Filter			
Clean Air Brake Governor	Refer To Air Brake Handbook		
Inspect Single And Double Air Brake Check Valves.	Refer To Air Brake Handbook		
Lubricate Power Steering Drag Rod	Refer To Power Steering Service Manual	Lubricate With NLGI Grade 2 Grease At Two Fittings	
Lubricate Power Steering Housing		Lubricate With NLGI 2 Grease At Fitting In Housing	
Inspect Air Intake System	Refer To Engine Manual	Inspect Air Intake Ducts And Pipes For Damage, Cracks, Or Loose Connections.	
Inspect Air Filter	Refer To Engine Manual	Inspect The Air Filter For Tears Or Holes. Replace If Any Are Found. Replace If Air Restriction Gauge Indicates The Filter Is Clogged	In Dusty Environments, Reduce The Interval Between Service
Lubricate Brake Cam Shaft	Refer To Brake Manual	Lubricate With NLGI – 1 Grease	
Inspect Change Air Cooler		Inspect For Damage, Cracks Or Lose Connections.	
Change Coolant Filter		Check PH Factor To Determine Replacement Filter Charge.	
Lubricate Axle King Pins		Lubricate With NLGI Grade 2 Grease at Fittings.	
Lubricate Steering Slip Shafts		Lubricate Glide Coat Spline With Never Seize Grease.	

8,000 MILES OR 1 MONTH

Check Or Service	Vendor Ref.	General Information	Remarks
Inspect The Air rake Chambers And Hoses And Check Air Brake For Proper Operation.	Refer To Handbook		

10,000 MILES OR 6 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Inspect And Clean Radiator		Clean Bugs, Leaves, Or Other Material From Radiator Core. Inspect Radiator Core For Damage Or Leaks. Inspect Radiator Cap For Worn OR Missing Gasket.	
Inspect Radiator Hoses		Check Radiator Hoses For Leaks, Cracks, Soft Spots, Or Loose Clamps.	
Wheel Nut Torque	Refer to Wheel Service Manual	Initial wheel nut torque must be checked at the first 50 miles.	

12,000 MILES OR 12 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Change Engine Fuel Filter	Refer To Engine Service Manual		
Change Fuel/Water Separator Filter	Refer To Engine Service Manual		
Inspect Power Steering Pump and Steering Gear	Refer To Power Steering Service Manual	Check For Leaks. Repair If Required.	
Adjust Steering Gear Relief Plungers	Refer To Power Steering Service Manual		
Inspect Engine Block Heater		Inspect Parts For Deterioration Damage, Or Loose Connections.	
Inspect Heater Water Hoses		Check Hoses For Deterioration, Damage, Leaks, Or Loose Clamps	
Check Anti-Freeze Concentration		50/50 Glycol And Water Mixture	

18,000 MILES OR 5 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Lubricate Front Axle King Pins	Refer To Axle Manual	Lubricate With NLGI-1 Or LGI-2 (EP-1 Or EP-2) Grease	
Lubricate Front Axle Tie Rod Ends	Refer To Axle Manual	Lubricate With NLGI-1 Or LGI-2 (EP-1 Or EP-2) Grease	
Lubricate Steering Slip Shaft		Lubricate Glide Coat Spline With Never Seize Grease.	

20,000 MILES OR 18 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Replace Pleated Paper Filter In Air Compressor, If Equipped	Refer To Air Brake Handbook		In Dusty Environments, Reduce The Intervals Between Service

24,000 MILES OR 12 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Adjust Engine Valves	Refer To Engine Service Manual		Initial Adjustment Is At 24,000 Miles. Adjust Every 48,000 Miles Thereafter.
Inspect Drive Belts, Check Drive Belt Tension, And Tensioner Bearing	Refer To Engine Service Manual		

25,000 MILES OR 3 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Inspect Air Dryer	Refer To Brake Handbook		
Lubricate Brake Valve, Foot Operated	Refer To Brake Handbook		

25,000 MILES OR 12 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Change Automatic Transmission Fluid And Filter	Refer To Transmission Service Manual		Drain Transmission Fluid Into A Pan And Dispose of It In An Environmentally Safe Manner. Industry Environments, Reduce The Interval Between Services.
Inspect Automatic Transmission Vent	Refer To Transmission Service Manual		
Inspect Automatic Transmission Cable	Refer To Transmission Service Manual		
Inspect Front Axle Alignment And Component Wear	Refer to Front Axle Service Manual	Refer To "Alignment Chart"	Alignment Needs To Be Done Only If Tire Wear Is Evident.
Inspect Wheel Bearings	Refer To Front Axle Service Manual		

48,000 MILES OR 24 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Drain, Flush And Replace Engine Coolant	Refer To Engine Service Manual	Use A 50/50 Mixture Of Ethylene Glycol And Water See Engine Manual For Proper Use OF Propylene Glycol	Drain Old Coolant Mixture Into A Pan And Dispose of It In An Environmentally Safe Manner.
Inspect Engine Vibration Damper	Refer To Engine Service Manual	Check Index Lines	Replace If Out Of Alignment By More Than 1/16"

50,000 MILES OR 3 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Lubricate Brake Slack Adjuster (Shoe-Type)	Refer To Brake Slack Adjuster Manual	Lubricate With Standard Chassis Lubricant At Two Fittings On Each Wheel.	

50,000 MILES OR 6 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Inspect Air Brake Air Dryer For Proper Operation.	Refer To Air Brake Manual		
Inspect Air Compressor Discharge Head	Refer To Air Brake Manual		

100,000 MILES OR 12 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Check Rear Axle Lubricant	Refer To Rear Axle Service Manual		Drain Old Oil Into A Pan And Dispose of It In AN Environmentally Safe Manner. In Dusty Environments, It May Be Necessary To Reduce The Interval Between Service
Change Power Steering Reservoir Filter	Refer To Power Steering Service Manual		In Dusty Environments, It May Be Necessary To Reduce The Interval Between Service.
Change Air Filter			
Change Front Axle Wheel Bearing Oil	Refer To Axle Manual	GL-5 Gear Lube	In Dusty Environments, It May Be Necessary To Reduce The Interval Between Service.

200,000 MILES OR 24 MONTHS

Check Or Service	Vendor Ref.	General Information	Remarks
Clean Brake Pressure Protection Valves	Refer To Air Brake Handbook		
Inspect Air Compressor	Refer To Engine Manual		
Clean Brake Relay Valves	Refer To Air Brake Handbook		
Clean Spring Brake Valves	Refer To Air Brake Handbook		
Clean Parking Valve	Refer To Air Brake Handbook		
Inspect Air Dryer Desiccant And Oil Filter	Refer To Air Brake Handbook		
Clean Single And Double Check Valve	Refer To Air Brake Handbook		
Inspect Pop-Off Valves	Refer to Air Brake Handbook		
Check Air Brake System Before Putting Vehicle Back In Service	Refer To Air Brake Handbook		

AS REQUIRED

Check Or Service	Vendor Ref.	General Information	Remarks
Torque Driveline Cap Screws And Bolts		If Driveline Is Disassembled, Torque Cap Screws To 47-51 lb.-ft. Torque U-Bolts To 35-39 lb.-ft.	
Adjust Steering Gear Relief Plungers	Refer To Power Steering Service Manual		
Adjust Front Axle Steering Stops	Refer To Front Axle Service Manual		
Adjust Rear Axle Wheel Bearings	Refer To Rear Axle Service Manual		
Replace Brake Shoes	Refer To Axle Service Manual		
Replace Burned Out Light Bulbs			
Replace Wiper Blades			