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Introduction

CONGRATULATIONS

Congratulations on acquiring your new Ford Motor Company product. Please take the time to get well acquainted with your vehicle by reading this handbook. The more you know and understand about your vehicle, the greater the safety and pleasure you will derive from driving it.

For more information on Ford Motor Company and its products visit the following website:

- In the United States: www.ford.com
- In Canada: www.ford.ca
- In Mexico: www.ford.com.mx

Additional owner information is given in separate publications.

This vehicle's Owner's Guide describes every option and model variant available and therefore some of the items covered may not apply to your particular vehicle. Furthermore, due to printing cycles it may describe options before they are generally available.

Remember to pass on this vehicle's Owner's Guide when reselling the vehicle. It is an integral part of the vehicle.

SAFETY AND ENVIRONMENT PROTECTION



Warning symbols in this guide

How can you reduce the risk of personal injury to yourself or others? In this guide, answers to such questions are contained in comments highlighted by the warning triangle symbol. These comments should be read and observed.



Warning symbols on your vehicle

When you see this symbol, it is imperative that you consult the relevant section of this guide before touching or attempting adjustment of any kind.



Introduction

Protecting the environment

We must all play our part in protecting the environment. Correct vehicle usage and the authorized disposal of waste, cleaning and lubrication materials are significant steps toward this aim. Information in this respect is highlighted in this guide with the tree symbol.



CALIFORNIA PROPOSITION 65 WARNING



WARNING: Engine exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. In addition, certain fluids contained in vehicles and certain products of component wear contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

PERCHLORATE MATERIAL

Certain components of this vehicle such as airbag modules, safety belt pretensioners, and button cell batteries may contain Perchlorate Material – Special handling may apply for service or vehicle end of life disposal. See www.dtsc.ca.gov/hazardouswaste/perchlorate.

BREAKING-IN YOUR VEHICLE

Your vehicle does not need an extensive break-in. Try not to drive continuously at the same speed for the first 1,000 miles (1,600 km) of new vehicle operation. Vary your speed frequently in order to give the moving parts a chance to break in.

SPECIAL NOTICES

New Vehicle Limited Warranty

For a detailed description of what is covered and what is not covered by your vehicle's New Vehicle Limited Warranty, refer to the *Warranty Guide* that is provided to you along with your Owner's Guide.

Special instructions

For your added safety, your vehicle is fitted with sophisticated electronic controls.

Introduction

DATA RECORDING

Service Data Recording

Service data recorders in your vehicle are capable of collecting and storing diagnostic information about your vehicle. This potentially includes information about the performance or status of various systems and modules in the vehicle, such as engine, throttle, steering or brake systems. In order to properly diagnose and service your vehicle, Ford Motor Company, Ford of Canada, and service and repair facilities may access or share among them vehicle diagnostic information received through a direct connection to your vehicle when diagnosing or servicing your vehicle. For U.S. only (if equipped), if you choose to use the SYNC® Vehicle Health Report, you consent that certain diagnostic information may also be accessed electronically by Ford Motor Company and Ford authorized service facilities, and that the diagnostic information may be used for any purpose. See your SYNC® supplement for more information.

CELL PHONE USE

The use of mobile communications equipment has become increasingly important in the conduct of business and personal affairs. However, drivers must not compromise their own or others' safety when using such equipment. Mobile communications can enhance personal safety and security when appropriately used, particularly in emergency situations. Safety must be paramount when using mobile communications equipment to avoid negating these benefits.

Mobile communication equipment includes, but is not limited to, cellular phones, pagers, portable email devices, text messaging devices and portable two-way radios.



WARNING: Driving while distracted can result in loss of vehicle control, accident and injury. Ford strongly recommends that you use extreme caution when using any device or feature that may take your focus off the road. Your primary responsibility is the safe operation of your vehicle.

We recommend against the use of any handheld device while driving and that you comply with all applicable laws.

Introduction

FEDERAL HIGHWAY ADMINISTRATION REGULATION

Regulations such as those issued by the Federal Highway Administration or issued pursuant to the Occupational Safety and Health Act (OSHA), and/or state and local laws and regulations may require additional equipment for the way you intend to use the vehicle. It is the responsibility of the registered owner to determine the applicability of such laws and regulations to your intended use for the vehicle, and to arrange for the installation of required equipment. Your dealer has information about the availability of equipment which may be ordered for your vehicle.

ENTERING, EXITING AND/OR CLIMBING ON THIS VEHICLE

You must be careful and deliberate to minimize the possibility of personal injury from a slip and fall when entering, exiting and/or climbing on this vehicle. Always use the steps and assist handles before climbing. Do not skip any steps or assist handles. Use three point contact at all times with at least two feet and one hand or two hands and one foot firmly placed during all phases of entering, exiting and/or climbing. Always keep your shoe soles and hands clean. Keep the steps and assist handles free of snow, ice, oil, grease, substances or debris. Be sure to use extra care in bad weather. Avoid wearing thick gloves. Always perform trailer hook-up while standing on the ground.



WARNING: Do not carry items while entering, exiting, and/or climbing. Make sure you keep a firm grip. Always FACE the VEHICLE STEP and HANDLE SYSTEM while climbing up and down. Do not climb behind the cab unless you have three point contact with a step and handle system at all times.

Introduction

These are some of the symbols you may see on your vehicle.

Vehicle Symbol Glossary

Safety Alert		See Owner's Guide	
Fasten Safety Belt		Airbag - Front	
Airbag - Side		Child Seat Lower Anchor	
Child Seat Tether Anchor		Brake System	
Anti-Lock Brake System		Parking Brake System	
Brake Fluid - Non-Petroleum Based		Parking Aid System	
Stability Control System		Speed Control	
Master Lighting Switch		Hazard Warning Flasher	
Fog Lamps-Front		Fuse Compartment	
Fuel Pump Reset		Windshield Wash/Wipe	
Windshield Defrost/Demist		Rear Window Defrost/Demist	

Introduction

Vehicle Symbol Glossary

Power Windows Front/Rear		Power Window Lockout	
Child Safety Door Lock/Unlock		Interior Luggage Compartment Release	
Panic Alarm		Engine Oil	
Engine Coolant		Engine Coolant Temperature	
Do Not Open When Hot		Battery	
Avoid Smoking, Flames, or Sparks		Battery Acid	
Explosive Gas		Fan Warning	
Power Steering Fluid		Maintain Correct Fluid Level	
Service Engine Soon		Engine Air Filter	
Passenger Compartment Air Filter		Jack	
Check Fuel Cap		Low Tire Pressure Warning	

Vehicle Inspection Guide

To be sure your vehicle is ready to operate, conduct a pre-trip inspection at the beginning of each work period. Follow the steps listed in this section to ensure a proper vehicle inspection procedure. The pages in this section may be produced locally and used on a regular basis.

VEHICLE INSPECTION INFORMATION

Note: Always make sure the parking brake is applied before starting the engine.

Engine compartment (with engine stopped)	
Engine oil	Use the dipstick to verify the oil level is in the proper operating range.
Engine coolant	Look through the plastic reservoir or the clear sight glass on the reservoir (depending upon vehicle equipment) and verify the coolant level is within the proper operating range as marked on the reservoir. Do not remove pressure cap until the coolant has cooled.
Power steering fluid	Verify that the fluid level is in the proper operating range. Refer to <i>Power steering fluid</i> in the <i>Maintenance and Specifications</i> chapter.
Brake fluid	Remove the master cylinder caps and inspect the fluid level. The full mark is at the bottom of the opening of the fluid ports.
Hydraulic clutch fluid	Remove the cap and inspect the fluid level. The full mark is at the step of the reservoir.
Belts (fan, alternator, water pump and A/C compressor)	Inspect for glazing, fraying or cracking. There should be no more than 5-7 cracks per rib, per inch (2.5 cm).
Fluid leaks	Inspect for signs of fluid puddles, dripping fluid on the ground under the engine or the underside of the engine.
HVAC air inlet	Inspect for debris that may have collected on the HVAC air inlet grille or inside the exterior module as this may cause reduced system performance.

Vehicle Inspection Guide



WARNING: Exercise great caution when working on vehicle equipped with an automatic fan clutch. The fan starts in motion only after the engine coolant reaches a predetermined temperature or the refrigerant pressure (if equipped with air conditioning) reaches a predetermined setting. The fan starts at this point with no advance warning. Never reach near, or permit objects to protrude into, the fan blade radius while the engine is running as this could result in vehicle damage, personal injury or death.

Engine starting (parking brake applied)	
Safety/Emergency equipment	Before entering the cab, verify that the vehicle is equipped with spare electrical fuses (if used), three red reflective triangles, a properly charged and rated fire extinguisher and wheel chocks. Walk around the vehicle and verify all steps and grab handles, inside and out as well as behind, are tight and clean. Use extreme caution and a three-point stance at all times. Inspect door latches for positive closing, latching and locking.
Starting the engine	Set the parking brake, press the clutch (if equipped with a manual transmission) and verify the transmission is in neutral. Vehicles equipped with an automatic transmission should be in N (Neutral) or P (Park) (if equipped with a park position). Diesel engine: Turn the key to the on position; when the  light in the instrument cluster turns off, turn the key to start. Gas engine: Turn the key to start, then release it as soon as the engine starts.
Oil pressure	Verify engine oil pressure builds to normal operating range.

Vehicle Inspection Guide

Engine starting (parking brake applied)	
Air chime (if equipped with air compressor)	The low air pressure warning chime should sound immediately after the engine starts but before the compressor has built-up pressure. The chime should stop when the air pressure reaches 70 psi (483 kPa) (or more). Let the air pressure build to governed cut-out pressure, which should occur between 115–130 psi (793–896 kPa).
Accelerator	Press the accelerator and verify that it operates smoothly, without any binding or irregular feel. Release the pedal and verify the engine returns to idle speed immediately.
Voltmeter	Inspect the gauge (diesel engine) or indicator light (gasoline engine) to verify the alternator is charging.
Steering linkage free play	Inspect for excessive free play in the steering linkages. The steering wheel should have less than 2 inches (5 cm) of free play at its rim.
Full Power Hydraulic brake inspection	Pump the brake pedal several times with the ignition in the off or run position; the motor/pumps can be heard momentarily replenishing the accumulators.
Parking brake	Verify the parking brake holds the vehicle by gently trying to pull forward with the parking brake applied.

Vehicle Inspection Guide

Engine starting (parking brake applied)	
Air brakes	Verify air brake operation in the following manner (chock the wheels, if necessary. Push in the parking brake and on tractors, also push in the tractor parking brake knob): 1. Verify the air compressor or governor cut-out pressure is approximately 120 psi (827 kPa). 2. Turn off the engine, then turn the key back to the on position, without starting the engine. 3. Without the brake pedal applied, note the air pressure drop for one minute; it should be less than 2 psi (14 kPa) for single vehicles and 3 psi (21 kPa) for combination vehicles. 4. Press and hold the brake pedal with 90 psi (621 kPa) or more and make sure there is no more than a 3 psi (21 kPa) per minute leak; for combination vehicles, no more than 4 psi (28 kPa) per minute. 5. Pump the brake pedal to deplete the system of air pressure. The warning light and chime should activate at 57 psi (393 kPa). 6. Pump the brake pedal and make sure the parking brake and trailer parking brake knobs pop out at 20 psi (138 kPa) or higher.
Automatic transmission fluid	Inspect the automatic transmission fluid with the engine idling at normal operating temperature and the parking brake applied. If fluid needs to be added, refer to <i>Transmission fluid</i> in the <i>Maintenance and Specifications</i> chapter.

Vehicle Inspection Guide

Front of vehicle	
Lights	Verify all lights illuminate and are clean, headlights function (on high and low beam), reflectors are clean, unbroken and of proper color (red on rear, amber elsewhere) and running lights are also clean and unbroken.
Steering gear	Inspect for missing or loose fasteners, power steering fluid leaks and damage to power steering hoses.
Steering linkage	Verify connecting links, arms and rods are not worn or cracked, joints, sockets and boot seals are not worn or loose and that there are no loose or missing cotter keys, nuts or bolts.
Tow hooks	Inspect front and rear tow hooks for damage or loose mounting; this is particularly important on vehicles where they are used frequently.
Front suspension	
Springs	Inspect for missing, broken or shifted leaves or leaves that are in contact with (or nearly contacting) a tire, rim, brake drum, frame or body component.
Spring mounts	Inspect spring hangers, bolts, bushings, axle mounting bolts and nuts for cracks, breaks, wear, damage and tightness.
Shock absorbers	Inspect for cracks, leaks and missing or broken bolts or bushings.

Note: Never apply grease to spring pads.



WARNING: Do not operate the vehicle if any suspension conditions listed in the *Front suspension* chart are evident. Loss of steering or suspension could result in property damage, personal injury or death.

Vehicle Inspection Guide

Front brakes	
Hoses	Inspect for cracked, worn or frayed hoses; verify all couplings are secured.
Chambers	Verify brake chambers are not cracked or dented and that they are securely mounted.
Slack adjusters	Inspect for broken, loose or missing parts. The angle between the push rod and adjuster arm should be approximately 90° when the brakes are applied. When pulled by hand, the push rod should not move more than approximately 1 inch (2.5 cm).
Drums	Verify there are no cracks, dents or holes and no loose or missing bolts and that brake linings are not worn, dangerously thin or contaminated by lubricant.

Front wheels	
Rims	Inspect for damaged or bent rims; they should not have welding repairs and no rust trails that indicate it is loose on the wheel.
Lug nuts	Verify all lug nuts are present and not loose (look for rust trails around the lug nuts); there should be no cracks radiating from the lug bolt holes or distortion of the bolt holes.
Hub oil seals	Inspect wheel hub oil seal for leaks and, if sight glass is present, verify the oil level is adequate.
Oil-lubricated front wheel bearings	Inspect for proper lubrication level if the hubcap has a transparent window. If the hubcap does not have a transparent window, remove the rubber fill-plug and inspect for proper level.



WARNING: If a wheel must be changed, obtain expert tire service help. Mounting and un-mounting of tires should only be performed by a qualified technician using necessary safety procedures and equipment, otherwise the result could be property damage, personal injury or death.

Vehicle Inspection Guide

Driver/Fuel area	
Fuel tank(s)	Verify fuel tank(s) and cap(s) are secure and that there is no damage to the tank(s).
Leaks	Inspect for leaks from the fuel tank(s).
DEF area	
DEF tanks	Verify the DEF tanks and caps are secure and that there is no damage to the tanks.
Leaks	Inspect for leaks from the DEF tanks.
Underbody of vehicle	
Driveshaft	Verify the driveshaft is not bent or cracked and that all driveshaft couplings are secure.
Exhaust system	Verify the visible outside parts are securely mounted and that there are no cracks, holes or severe dents.
Frame	Inspect for cracks or bends in longitudinal frame members. Verify there are no loose, cracked, bent, broken or missing crossmembers or crossmember fasteners.



WARNING: Maintain adequate clearance between all parts of the exhaust system and all hoses, wires and lines for engine cooling, brake system, fuel system, power steering system and electrical system. Heat damage to hoses, wires or lines may cause vehicle malfunction that could result in property damage, personal injury or death.

Vehicle Inspection Guide

Rear of vehicle	
Air/Electric lines	Verify air hoses and electrical line insulation are not cut, cracked, chafed or worn. Listen for audible air leaks. Verify air and electrical lines are not tangled, crimped or pinched or being dragged against any truck parts. None of the air or electrical line should be spliced or taped. Inspect for corrosion on pins and in electrical sockets to ensure continuity and reduced heat build-up potential.
Deck plate	Verify deck plate is clean, securely bolted to the frame and clear of loose objects.
Signal/Brake lights	Verify both brake lights illuminate when the brake pedal is applied, each signal flashes and that four-way flashers work properly.
Lights, reflectors	Verify all lights illuminate and are clean, reflectors are clean, unbroken and of proper color (red on rear, amber elsewhere) and that running lights are also clean and unbroken. Rear running lights must be inspected separately from signal, flasher and brake lights.
Tractor - coupling system	
Mounting bolts	Inspect for loose or missing mounting brackets, clamps, bolts or nuts. Both fifth-wheel and slide mounting must be solidly attached.
Platform	Inspect for cracks or breaks in the platform structure.
Safety latch	Verify safety latch is engaged.
Release arm	Verify safety latch is in the engaged position and that any safety latch is in place.
Kingpin/Apron	Verify kingpin is not bent or worn, the apron lies flat on the fifth-wheel skid plate and that the visible part of the apron is not bent, worn, cracked or broken.

Vehicle Inspection Guide

Rear suspension	
Springs	Inspect for broken or shifted leaves or leaves that are in contact with (or nearly contacting) a tire, rim, brake drum, frame or body component. Inspect for missing or broken leaves in the leaf spring.
Spring mounts	Inspect for cracked or broken spring hangers, broken, missing or loose bolts, missing or damaged bushings, broken, loose or missing axle mounting parts.
Torsion, shocks	Verify torsion arm is not cracked, broken or missing. Inspect the shock absorber for cracks or leaks; there should be no missing or broken mounting bolts or worn bushings.
Rear brakes	
Hoses	Inspect for cracked, worn or frayed hoses. Verify all couplings are secured.
Chambers	Verify brake chambers are not cracked or dented and that they are securely mounted.
Slack adjuster	Inspect for broken, loose or missing parts. The angle between the push rod and adjuster arm should be approximately 90° when the brakes are applied. When pulled by hand, the push rod should not move more than approximately 1 inch (2.5 cm).
Drum	Verify there are no cracks, dents or holes, loose or missing bolts and the brake linings are not worn, dangerously thin or contaminated by lubricant.

Vehicle Inspection Guide

Rear wheels	
Spacers	Verify dual wheels are evenly separated and that tires are not touching one another.
Rims	Inspect for damaged or bent rims. Rims should not have welding repairs and no rust trails that indicate it is loose on the wheel.
Lug nuts	Verify all lug nuts are present and not loose (look for rust trails around the lug nuts); there should be no cracks radiating from the lug bolt holes or distortion of the bolt holes.

Trailer

If you are pulling a trailer, an inspection of the trailer similar to that of the tractor should be done. The inspection should follow trailer manufacturer recommendations and should include at a minimum: general condition, landing gear, doors, sides, lights, reflectors, suspension, brakes, tires, wheels, cargo placement, stability and tie-downs.

Transmission

If your vehicle is equipped with an automatic transmission, regularly inspect the transmission's neutral start switch. The engine should only start in the N (Neutral) or P (Park) positions.



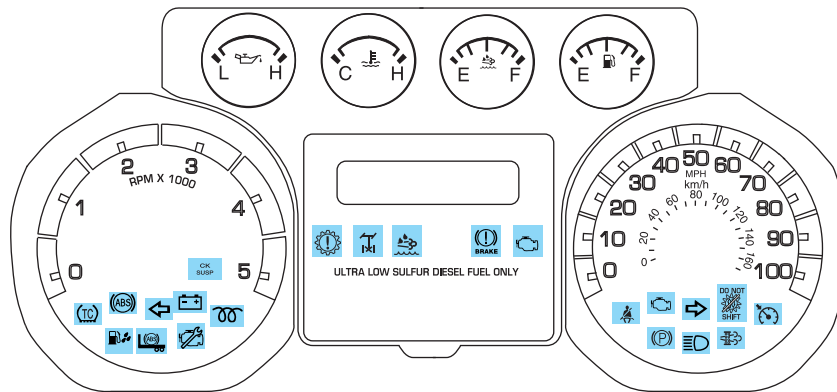
WARNING: If the unit starts in gear and/or the neutral start switch is not functioning correctly, the vehicle may inadvertently move which could result in property damage, personal injury or death.

Inspect the transmission fluid level and shift linkage for proper operation.

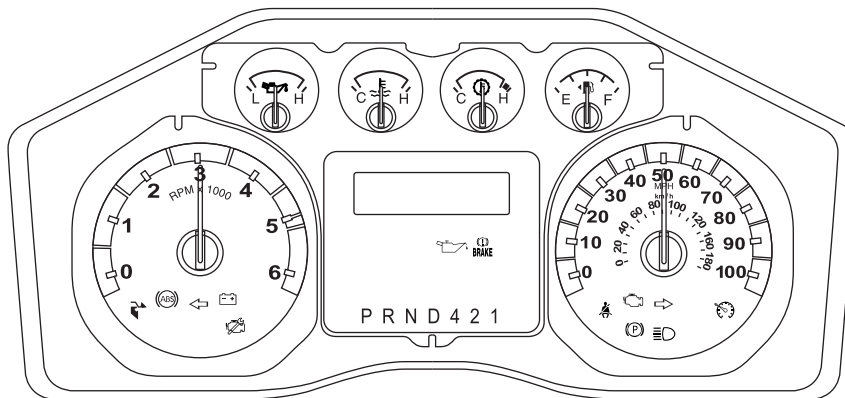
Instrument Cluster

WARNING LIGHTS AND CHIMES

Base instrument cluster for diesel engine with standard measure shown; metric similar



Base instrument cluster for gasoline engine with standard measure shown; metric similar



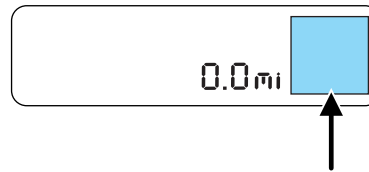
Warning lights can alert you to a vehicle condition that may become serious enough to cause expensive repairs by illuminating when a problem exists with one of your vehicle's systems. Many lights illuminate

20

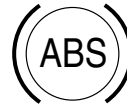
Instrument Cluster

when you start your vehicle to make sure the bulb works. If any light remains on after starting the vehicle, refer to the respective system warning light for additional information.

Note: Some warning lights are reconfigurable telltale (RTT) indicator lights and illuminate in the message center. These lights function the same as the other warning lights.



Anti-lock brake system: If the ABS light stays illuminated or continues to flash, a malfunction has been detected, have the system serviced immediately by your authorized dealer. Normal braking is still functional unless the brake warning light is also illuminated.



Brake system warning light: To confirm the brake system warning light is functional, it momentarily illuminates when the ignition is turned to the on position when the engine is not running, or in a position between on and start, or by applying the parking brake when the ignition is turned to the on position.



If the brake system warning light does not illuminate at this time, seek service immediately from your authorized dealer. Illumination after releasing the parking brake indicates low brake fluid level and the brake system should be inspected immediately by your authorized dealer.



WARNING: Driving a vehicle with the brake system warning light on is dangerous. A significant decrease in braking performance may occur. It takes you longer to stop the vehicle. Have the vehicle checked by your authorized dealer. Driving extended distances with the parking brake engaged can cause brake failure and the risk of personal injury.

Instrument Cluster

Charging system: Illuminates when the battery is not charging properly. If it stays on while the engine is running, there may be a malfunction with the charging system or a related component. Contact your authorized dealer as soon as possible.



Check fuel cap (gasoline engine only): Illuminates when the fuel cap may not be properly installed. Continued driving with this light on may cause the service engine soon warning indicator to illuminate.



Check suspension (if equipped): Illuminates when the air suspension dump switch has been activated.

CK
SUSP

Check trans (Allison automatic transmission only): Illuminates while driving if a problem has been detected and shifting may be restricted. Depending upon the severity of the problem, the read-out digit on the shifter display may be blank.



On MD 3000 series transmissions, operation may continue in order to reach service assistance. The ECU may not respond to shift selector requests, since operating limitations are being placed on the transmission, i.e. upshifts and downshifts may be restricted. Direction changes do not occur.

Refer to your transmission operator's manual for more information.

Diesel exhaust fluid (diesel engine only): Illuminates when the diesel exhaust fluid level falls below 0.5 gallon (1.9L) in the 5 gallon (19.0L) tank or 1 gallon (3.8L) in the 9 gallon (34.0L) tank. Refill the tank or, at a minimum, add at least 1 gallon (3.8L) to the 5 gallon (19.0L) tank or 2 gallons (7.6L) to the 9 gallon (34.0L) tank.



Instrument Cluster

Diesel particulate filter (diesel engine only): Illuminates when the soot level in the DPF has reached a point where it requires operator assistance. Refer to *Diesel particulate filter* in the *Maintenance and Specifications* chapter and your engine operator's manual, for more details.



Do not shift (Allison automatic transmission only): Illuminates while driving if a problem has been detected and shifting may be restricted. Depending upon the severity of the problem, the read-out digit on the shifter display may be blank. Operation may



continue in order to reach service assistance. The ECU may not respond to shift selector requests, since operating limitations are being placed on the transmission, i.e. upshifts and downshifts may be restricted. Direction changes do not occur.

Refer to your transmission operator's manual for more information.

Electronic locking differential (if equipped): Displays when using the electronic locking differential.



Engine oil pressure (gasoline engine only): Illuminates when engine oil pressure is low.



High beams: Illuminates when the high-beam headlamps are turned on.



Instrument Cluster

Low fuel (RTT) (gasoline engine only): Illuminates when the fuel level in the fuel tank is at, or near, empty.



Parking brake warning:

Momentarily illuminates when the ignition is turned to the on position and the engine is off. Also illuminates when the parking brake is engaged. If the parking brake warning lamp does not illuminate at these times, seek service immediately.



Vehicles equipped with the Power Park Parking Brake option: If after setting the parking brake on your vehicle the park brake warning lamp begins to blink, this may indicate a failure in the parking brake system. Seek service from your dealer immediately.

Powertrain malfunction/Reduced power/Electronic throttle control (RTT) (gasoline engine only):

Illuminates when the engine has defaulted to a “limp-home” operation or when a transmission problem has been detected and shifting may be restricted. If the light remains on, have the system serviced immediately by your authorized dealer.



Safety belt: Illuminates to remind you to fasten your safety belt. A Belt-Minder® chime also sounds to remind you to fasten your safety belt. Refer to the *Seating and*



Safety Restraints chapter to activate/deactivate the Belt-Minder® chime feature.

Instrument Cluster

Service engine soon: Illuminates when the ignition is first turned to the on position to check the bulb and to indicate whether the vehicle is ready for Inspection/Maintenance (I/M) testing.



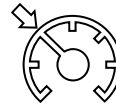
Solid illumination after the engine is started indicates the on-board diagnostics system (OBD-II) has detected a malfunction.



WARNING: Under engine misfire conditions, excessive exhaust temperatures could damage the catalytic converter, the fuel system, interior floor coverings or other vehicle components, possibly causing a fire.

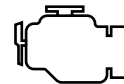
Speed control (if equipped):

Illuminates when the speed control system is engaged. Turns off when the speed control system is disengaged.



Stop engine (diesel engine only):

This red lamp illuminates when the engine needs to be stopped (as soon as it can be safely done). If the lamp begins flashing, automatic engine shutdown may take place in as little as 20 seconds.



WARNING: In the event of engine shutdown, make sure the vehicle is safely off the road and the problem is remedied prior to returning to the road. Failure to remove the vehicle from the road could result in an accident, causing serious injury or death.

If the engine shuts down, it can be restarted and operated for 30 seconds at a time or until the problem is corrected. For more information, refer to *Engine automatic shutdown warning light or chime* in the *Driving* chapter of this owner guide and/or your engine operator's manual.

Refer to your engine operator's manual for specific information regarding this feature. Drivers of electronically-controlled engines should know the extent of warning engine shutdown system before operating the vehicle.

Instrument Cluster

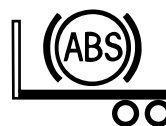
Traction control (if equipped) (diesel engine only): Illuminates and flashes slowly if the Off Road or Mud/Snow mode is selected. Illuminates and flashes rapidly during a traction control event.



Traction control (if equipped) (gasoline engine only): Illuminates when the traction control is active. If the light remains on, have the system serviced immediately, refer to the *Driving* chapter for more information.



Trailer anti-lock brake system (ABS): Illuminates briefly when the engine is powered-up and only when a PLC trailer or a PLC diagnostic tool is connected. If the light remains on after the vehicle is started, continues to flash or fails to illuminate, have the system serviced immediately.



Turn signal: Illuminates when the left or right turn signal or the hazard lights are turned on. If the indicators stay on or flash faster, check for a burned out bulb.



Wait to start (diesel engine only): Illuminates when the air intake heater is in operation and special starting procedures are required. Refer to *Starting* in the *Driving* chapter.



WARNING: If equipped with an air intake heater, DO NOT use ether or any other starting fluids. The use of starting fluids (ether) in an engine equipped with an air intake heater could result in damage and/or personal injury.

Instrument Cluster

Water in fuel (diesel engine only): Illuminates when the fuel filter/water separator has a significant quantity of water in it.



If the light illuminates when the engine is running, stop the vehicle as soon as safely possible, shut off the engine, then drain the fuel filter/water separator. Refer to your engine operator's manual for the drain procedure. Allowing water to stay in the system could result in extensive damage to, or failure of, the fuel injection system.



WARNING: Do not drain water separator while engine is running. Fuel may ignite if separator is drained while engine is running or vehicle is moving.

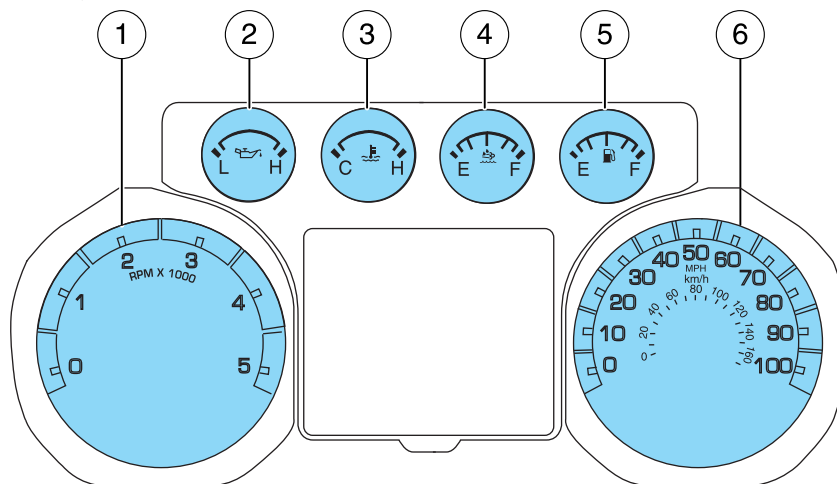
Headlamps on warning chime: Sounds when the headlamps or parking lamps are on, the ignition is off (the key is not in the ignition) and the driver's door is opened.

Key-in-ignition warning chime: Sounds when the key is left in the ignition in the off or accessory position and the driver's door is opened.

Instrument Cluster

GAUGES

Base instrument cluster for diesel engine with standard measure shown; metric similar



1. **Tachometer:** Indicates the engine speed in revolutions per minute. Driving with your tachometer pointer continuously at the top of the scale may damage the engine.

2. **Engine oil pressure gauge:** Indicates engine oil pressure. The needle should stay in the normal operating range (between L and H). If the needle falls below the normal range, stop the vehicle, turn off the engine and check the engine oil level. Add oil if needed. If the oil level is correct, have your vehicle checked at your authorized dealer.

3. **Engine coolant temperature gauge:** Indicates engine coolant temperature. At normal operating temperature, the needle is in the normal range (between H and C). **If it enters the red section, the engine is overheating. Stop the vehicle as soon as safely possible, switch off the engine and let the engine cool.**



WARNING: Never remove the coolant reservoir cap while the engine is running or hot.

4. **Diesel exhaust fluid (DEF) gauge:** Indicates fluid level in DEF tank.

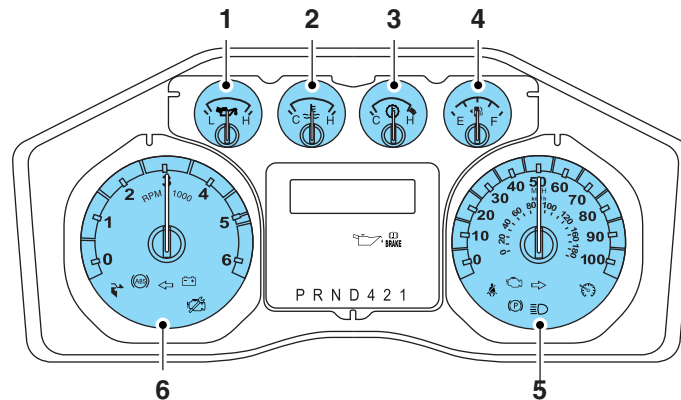
Instrument Cluster

5. **Fuel gauge:** Indicates approximately how much fuel is left in the fuel tank (when the ignition is in the on position). The fuel gauge reading may vary slightly when the vehicle is in motion or on a grade. Refer to *Filling the tank* in the *Maintenance and Specifications* chapter for more information.

6. **Speedometer:** Indicates the current vehicle speed.

Odometer and trip odometer: The odometer is displayed on the lower line in the message center and registers the total accumulated distance the vehicle has traveled. For trip odometer information, refer to *Message center* in this chapter.

Base instrument cluster for gasoline engine with standard measure shown; metric similar



1. **Engine oil pressure gauge:** Indicates engine oil pressure. The needle should stay in the normal operating range (between L and H). If the needle falls below the normal range, stop the vehicle, turn off the engine and check the engine oil level. Add oil if needed. If the oil level is correct, have your vehicle checked at your authorized dealer.

2. **Engine coolant temperature gauge:** Indicates engine coolant temperature. At normal operating temperature, the needle will be in the normal range (between H and C). **If it enters the red section, the engine is overheating. Stop the vehicle as soon as safely possible, switch off the engine and let the engine cool.**



WARNING: Never remove the coolant reservoir cap while the engine is running or hot.

Instrument Cluster

3. **Transmission fluid temperature gauge:** If the gauge is in the:

Normal area The transmission fluid is within the normal operating temperature (between H and C).

Yellow area The transmission fluid is higher than normal operating temperature. This can be caused by special operation conditions (i.e. snowplowing, towing or off road use). Refer to *Special operating conditions* in the *scheduled maintenance information* for instructions. Operating the transmission for extended periods of time with the gauge in the yellow area may cause internal transmission damage.

Altering the severity of the driving conditions is recommended to lower the transmission temperature into the normal range.

Red area The transmission fluid is overheating. Stop the vehicle to allow the temperature to return to normal range.

If the gauge is operating in the yellow or red area, stop the vehicle and verify the airflow is not restricted such as snow or debris blocking airflow through the grill. If the gauge continues to show high temperatures, see your authorized dealer.

4. **Fuel gauge:** Indicates approximately how much fuel is left in the fuel tank (when the ignition is in the on position). The fuel gauge may vary slightly when the vehicle is in motion or on a grade. The fuel icon and arrow indicates which side of the vehicle the fuel filler door is located.

Refer to *Filling the tank* in the *Maintenance and Specifications* chapter for more information.

5. **Speedometer:** Indicates the current vehicle speed.

6. **Tachometer:** Indicates the engine speed in revolutions per minute. Driving with your tachometer pointer continuously at the top of the scale may damage the engine.

Odometer and trip odometer: The odometer is displayed on the lower line in the message center and registers the total accumulated distance the vehicle has traveled. For trip odometer, refer to *Standard message center* or *Optional message center* in this chapter.

MESSAGE CENTER

The message center monitors many vehicle systems and alerts you to potential vehicle problems and various conditions with an informational message followed by a long indicator chime.

The message center display is located in the instrument cluster and the controls are located on the instrument panel.

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Instrument Cluster

Selectable features



Press INFO repeatedly to cycle through the following features:

Info (information menu)	
TRIP A/B	Registers the distance of individual trips. Press and release INFO until TRIP A/B appears in the display. Press RESET to switch between English and metric. Press and hold RESET for two seconds to reset the trip odometer.
MILES (km) TO E*	- Displays an estimate of how far you can drive with the fuel remaining in your tank under normal driving conditions. Remember to turn the ignition off when refueling to allow this feature to correctly detect the added fuel. - DTE is calculated using a running average fuel economy, which is based on your recent driving history of 500 miles (800 km). This value is not the same as the average fuel economy display. The running average fuel economy is re-initialized to a factory default value if the battery is disconnected.
XX.X MPG (L/100km)	Average fuel economy displays average fuel economy in miles/gallon (liters/100 km).
MPG (L/km) ↑ ↓	This displays instantaneous fuel economy as a bar graph ranging from ↓ poor economy to ↑ excellent economy. Note: Your vehicle must be moving to calculate instantaneous fuel economy. When your vehicle is not moving, this function shows ↓, one or no bars illuminated. Instantaneous fuel economy cannot be reset.

Instrument Cluster

Info (information menu)	
TIMER	Timer displays the trip elapsed drive time. To operate, do the following: 1. Press and release RESET to start the timer. 2. Press and release RESET to pause the timer. 3. Press and hold RESET until the timer resets.
*Available on vehicles with single fuel tank only.	



Press SETUP repeatedly to cycle through the following features:

System check and vehicle feature customization	
RESET FOR SYSTEM CHECK	When this message appears, press RESET and the message center cycles through different systems and provides a status if needed.
UNITS	Displays the current units in English or Metric. Press RESET to switch between English and Metric.
LANGUAGE = ENGLISH / SPANISH / FRENCH	Displays the message center readout in English, Spanish or French. Waiting four seconds or pressing RESET cycles the message center through each of the choices. Press and hold RESET for two seconds to set the choice.

Note: When returning to the SETUP menu and a non-English language has been selected, HOLD RESET FOR ENGLISH is displayed to change back to English. Press and hold RESET to change back to English.

Instrument Cluster

System warnings	
PARK BRAKE ENGAGED	Displays when the parking brake is set, the engine is running and vehicle speed is higher than 3 mph (5 km/h). If the message stays on after the parking brake is released, contact your authorized dealer as soon as possible.
CHECK BRAKE SYSTEM	Displays when a fault is detected by the ABS module.
CHECK CHARGING SYSTEM	Displays when the electrical system is not maintaining proper voltage. If you are operating electrical accessories when the engine is idling at a low speed, turn off as many of them as soon as possible. If the warning stays on or comes on when the engine is operating at normal speeds, contact your authorized dealer as soon as possible.
BRAKE FLUID LEVEL LOW	Indicates the brake fluid level is low and the brake system should be inspected immediately. Refer to <i>Brake fluid</i> in the <i>Maintenance and Specifications</i> chapter.

System warnings alert you to possible problems or malfunctions in your vehicle's operating systems.

In the event multiple warnings exist, the message center cycles the display to show each one for four seconds.

The message center displays the last selected feature if there are no more warning messages.

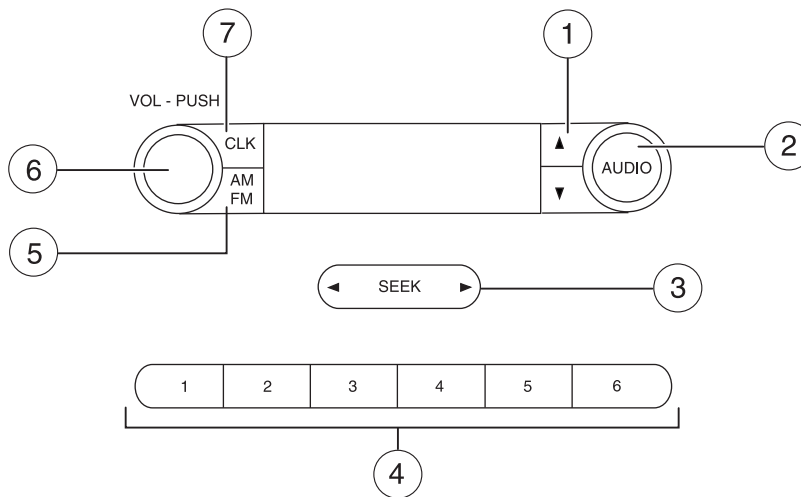
Types of messages and warnings:

- Some messages appear briefly to inform you of something you may need to take action on or be informed of.
- Some messages appear once and then again when the vehicle is restarted.
- Some messages reappear after clearing or being reset if a problem or condition is still present and needs your attention.
- Some messages can be acknowledged and reset by pressing RESET. This allows you to use the full message center functionality by clearing the message.

Entertainment Systems

AUDIO SYSTEMS

AM/FM stereo system (if equipped)



WARNING: Driving while distracted can result in loss of vehicle control, accident and injury. Ford strongly recommends that drivers use extreme caution when using any device or feature that may take their focus off the road. Your primary responsibility is the safe operation of the vehicle. We recommend against the use of any handheld device while driving and that you comply with all applicable laws.

The AM/FM stereo system does not contain rear speakers; only front driver side and passenger side speakers.

1. **▲ / ▼ (Tuner):** Press to manually go up or down the radio frequency. Press and hold for a fast advance through radio frequencies. Also use in AUDIO mode to gain access to various settings.



Entertainment Systems

2. **AUDIO:** Press AUDIO repeatedly to gain access to the following settings:



TREB (Treble): Press AUDIO to reach the treble setting.

Use ▲ / ▼ / ◀ SEEK ▶ .

BASS (Bass): Press AUDIO to reach the bass setting. Use ▲ / ▼ / ◀ SEEK ▶ .

BAL (Balance): Press AUDIO to reach the balance setting.

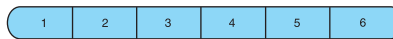
Use ▲ / ▼ / ◀ SEEK ▶ to adjust between the left and right speakers.

Setting the clock: Press and hold CLK until the hours start to flash, then use ▲ / ▼ / ◀ SEEK ▶ to adjust. To adjust minutes, press CLK again to make the minutes start to flash and use ▲ / ▼ / ◀ SEEK ▶ to adjust.

3. **SEEK:** Press ◀ SEEK ▶ to access the previous/next strong station.



4. **Memory presets:** To set a station: Select frequency band AM/FM1/FM2; tune to a station, press and hold a preset button until sound returns. You may store up to six stations in each frequency band for a total of 18.



5. **AM/FM:** Press AM/FM to select AM/FM1/FM2 frequency band.



6. **ON/OFF/Volume:** Press VOL - PUSH to turn ON/OFF. Turn VOL - PUSH to increase/decrease volume.

VOL - PUSH

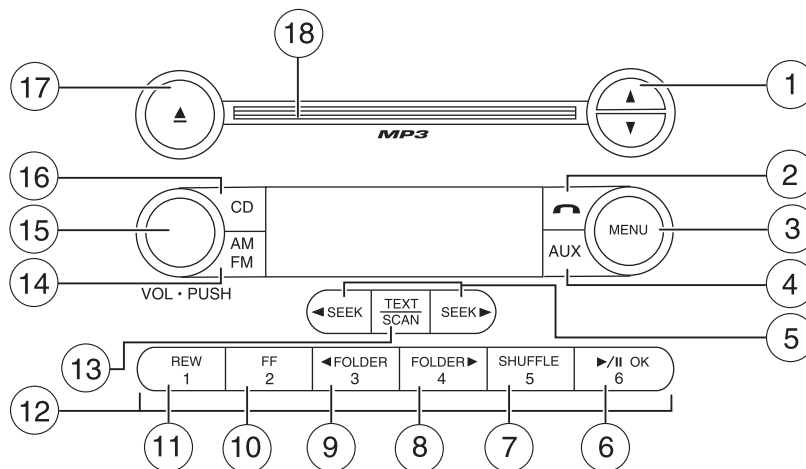


7. **CLK (Clock):** Press CLK to toggle between the clock and radio frequency.



Entertainment Systems

AM/FM stereo single CD/satellite-compatible sound system (if equipped)



WARNING: Driving while distracted can result in loss of vehicle control, accident and injury. Ford strongly recommends that drivers use extreme caution when using any device or feature that may take their focus off the road. Your primary responsibility is the safe operation of the vehicle. We recommend against the use of any handheld device while driving and that you comply with all applicable laws.

1. ▲ / ▼ : Press ▲ / ▼ to manually go up or down the radio frequency. Press and hold for a fast advance through radio frequencies.



In satellite radio mode (if equipped), press ▲ / ▼ to tune to the next/previous channel.

Satellite radio is available only with a valid SIRIUS® radio subscription. Check with your authorized dealer for availability.

Entertainment Systems

2. **☎ (Phone):** If your vehicle is equipped with SYNC®, press to access SYNC PHONE features. For further information, please refer to your SYNC® supplement. If your vehicle is not equipped with SYNC®, the display reads NO PHONE.



3. **MENU:** Press MENU repeatedly to access to the following settings:



Setting the clock: Press MENU until SET HOUR or SET MINUTES is displayed. Use ▲ / ▼ / ◀ SEEK, SEEK ▶ to adjust the hours/minutes.

SATELLITE RADIO MENU (if equipped): Press MENU when satellite radio mode is active to access. Press OK to enter into the satellite radio menu. Press ▲ / ▼ to cycle through the following options:

- **CATEGORY:** Press OK to enter category mode. Press ▲ / ▼ to scroll through the list of available SIRIUS® channel Categories (Pop, Rock, News, etc.) Press OK when the desired category appears in the display. After a category is selected, press SEEK to search for that specific category of channels only (i.e. ROCK). You may also select CATEGORY ALL to seek all available SIRIUS® categories and channels. Press OK to close and return to the main menu.
- **SAVE SONG:** Press OK to save the currently playing song title in the system's memory. (If you try to save something other than a song, CANT SAVE appears in the display.) When the chosen song is playing on any satellite radio channel, the system alerts you with an audible prompt. Press OK while SONG ALERT is in the display and the system takes you to the channel playing the desired song. You can save up to 20 song titles. If you attempt to save a song when the system is full, the display reads REPLACE SONG? Press OK to access the saved songs and press ▲ / ▼ to cycle through the saved songs. When the song appears in the display that you want to replace, press OK. SONG REPLACED appears in the display.

Entertainment Systems

- **DELETE SONG:** Press OK to delete a song title from the system's memory. Press ▲ / ▼ to cycle through the saved songs. When the song title appears in the display that you want to delete, press OK. The song appears in the display for confirmation. Press OK again and the display reads SONG DELETED. If you do not want to delete the currently listed song, press ▲ / ▼ to select either RETURN or CANCEL.
Note: If there are no songs presently saved, the display reads NO SONGS.
- **DELETE ALL SONGS:** Press OK to delete all songs from the system's memory. The display reads ARE YOU SURE? Press OK to confirm deletion of all saved songs and the display reads ALL DELETED.
Note: If there are no songs presently saved, the display reads NO SONGS.
- **ENABLE ALERTS / DISABLE ALERTS:** Press OK to enable/disable the satellite alert status which alerts you when your selected songs are playing on a satellite radio channel. (The system default is disabled.) SONG ALERTS ENABLED/DISABLED appears in the display. The menu listing displays the opposite state. For example, if you have chosen to enable the song alerts, the menu listing reads DISABLE as the alerts are currently on, so your other option is to turn them off.

Satellite radio is available only with a valid SIRIUS® radio subscription. Check with your authorized dealer for availability.

AUTOSET: Press MENU until the display reads AUTOSET. Autoset allows you to set the strongest local radio stations without losing your original manually set preset stations for AM/FM1/FM2. Use ▲ / ▼ / ◀ SEEK, SEEK ▶ to turn on/off.

When the six strongest stations are filled, the station stored in preset 1 begins playing. If there are less than six strong stations, the system stores the last one in the remaining presets.

BASS: Press MENU to reach the bass setting. Use ▲ / ▼ / ◀ SEEK, SEEK ▶ to adjust.

TREB (Treble): Press MENU to reach the treble setting. Use ▲ / ▼ / ◀ SEEK, SEEK ▶ to adjust.

BAL (Balance): Press MENU to reach the balance setting. Use ▲ / ▼ / ◀ SEEK, SEEK ▶ to adjust the audio between the left (L) and right (R) speakers.

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Entertainment Systems

FADE: Press MENU to reach the fade setting. Use ▲ / ▼ / ◀ SEEK, SEEK ▶ to adjust the audio between the back (B) and front (F) speakers.

SPEEDVOL (Speed sensitive volume, if equipped): Press MENU to reach the SPEEDVOL setting. Radio volume automatically gets louder with increasing vehicle speed to compensate for road and wind noise. Use ▲ / ▼ / ◀ SEEK, SEEK ▶ to adjust.

The default setting is *off*; increasing your vehicle speed does not change the volume level.

Adjust 1–7: Increasing this setting from 1 (lowest setting) to 7 (highest setting) allows the radio volume to automatically change slightly with vehicle speed to compensate for road and wind noise.

Recommended level is 1–3; SPEED OFF turns the feature off and level 7 is the maximum setting.

Track/Folder mode: Available only on MP3 discs in CD mode. In Track mode, pressing ◀ SEEK, SEEK ▶ scrolls through all tracks on the disc

In Folder mode, pressing ◀ SEEK, SEEK ▶ scrolls only through tracks within the selected folder.

Press ◀ FOLDER, FOLDER ▶ to access the previous/next folder (if available).

COMPRESS (Compression): Available only in CD/MP3 mode. Press MENU until COMPRESS ON/OFF appears in the display.

Use ▲ / ▼ / ◀ SEEK, SEEK ▶ to toggle ON/OFF. When COMPRESS is ON, the system brings the soft and loud CD passages together for a more consistent listening level.

4. **AUX:** Press repeatedly to cycle through LINE IN (auxiliary audio mode, if equipped) and SAT1, SAT2 and SAT3 modes (satellite radio, if equipped).



For location and further information on auxiliary audio mode, refer to *Auxiliary input jack* later in this chapter.

Satellite radio is available only with a valid SIRIUS® radio subscription. Check with your authorized dealer for availability.

Entertainment Systems

5. **SEEK:** In radio mode, press ◀ / ▶ to access the previous/next strong station.



In CD/MP3 mode, press ◀ / ▶ to access the previous/next CD/MP3 track.

In satellite radio mode (if equipped), press ◀ SEEK, SEEK ▶ to seek to the previous/next channel. If a specific category is selected, (Jazz, Rock, News, etc.), press ◀ SEEK, SEEK ▶ to seek to the previous/next channel in the selected category. Press and hold ◀ SEEK, SEEK ▶ to fast seek through the previous /next channels.

In TEXT MODE, press ◀ SEEK, SEEK ▶ to view the previous/additional display text.

In CATEGORY MODE, press ◀ SEEK, SEEK ▶ to select a category.

Satellite radio is available only with a valid SIRIUS® radio subscription. Check with your authorized dealer for availability.

6. ▶ / || **OK (Play/Pause):** This control is operational in CD/MP3 mode. When a CD/MP3 is playing, press to pause or play the current CD/MP3. The CD/MP3 status displays in the radio display.



OK: Use in various menu selections.

If your vehicle is equipped with a Family Entertainment System (FES) please refer to the *Family entertainment DVD system* section later in this chapter.

7. **SHUFFLE:** In CD/MP3 mode, press SHUFFLE to engage shuffle mode. SHUFFLE ON appears in the display. If you wish to engage shuffle mode right away, press SEEK to begin random play. Otherwise, random play begins when the current track is finished playing. CD SHUF appears in the display. To disengage, press SHUFFLE again. SHUFFLE OFF appears in the display.



Note: In CD/MP3 mode, press SHUFFLE to play the tracks in random order. In MP3 folder mode, the system randomly plays all tracks within the current folder.

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Entertainment Systems

8. **FOLDER** ► : In folder mode, press FOLDER ► to access next folder on MP3 discs, if available.



9. ◀ **FOLDER**: In folder mode, press ◀ FOLDER to access the previous folder on MP3 discs, if available.



10. **FF (Fast forward)**: Press FF to manually advance in a CD/MP3 track.



11. **REW (Rewind)**: Press REW to manually reverse in a CD/MP3 track.



12. **Memory presets**: To set a station: Select frequency band AM/FM1/FM2; tune to a station, press and hold a preset control until sound returns. You may store up to six stations in each frequency band for a total of 18.



In satellite radio mode (if equipped), there are 18 available presets, six each for SAT1, SAT2 and SAT3. To save satellite channels in your memory presets, tune to the desired channel then press and hold a preset control until sound returns.

Satellite radio is available only with a valid SIRIUS® radio subscription. Check with your authorized dealer for availability.

13. **TEXT/SCAN: In radio and CD/MP3 mode**, press and hold for a brief sampling of radio stations or CD tracks. Press again to stop.



In CD/MP3 mode, press and release to display track title, artist name, and disc title.

In satellite radio mode (if equipped), press and release to enter TEXT MODE and display the current song title. While in TEXT MODE, press again to scroll through the current song title, artist, channel category and the SIRIUS® long channel name.

Entertainment Systems

In TEXT MODE sometimes the display requires additional text to be displayed. When the “>” indicator is active, press SEEK ► to view the additional display text. When the “<” indicator is active, press ◀ SEEK to view the previous display text.

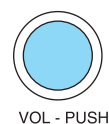
In satellite radio mode (if equipped), press and hold to hear a brief sampling of the next channels. Press again to stop. In CATEGORY MODE, press SCAN to hear a brief sampling of the channels in the selected category. Press again to stop.

Satellite radio is available only with a valid SIRIUS® radio subscription. Check with your authorized dealer for availability.

14. **AM/FM:** Press AM/FM to select AM/FM1/FM2 frequency band.



15. **ON/OFF/Volume:** Press VOL-PUSH to turn on/off. Turn VOL-PUSH to increase/decrease volume.



Note: If the volume is set above a certain level and the ignition is turned off, the volume comes back on at a “nominal” listening level when the ignition switch is turned back on.

16. **CD:** Press to enter CD/MP3 mode. If a CD is already loaded into the system, CD/MP3 play begins where it ended last.



17. **▲ (CD eject):** Press to eject a CD.



18. **CD slot:** Insert a CD label side up in the CD slot.



Entertainment Systems

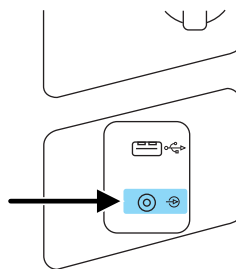
Auxiliary input jack (if equipped)



WARNING: Driving while distracted can result in loss of vehicle control, accident and injury. Ford strongly recommends that drivers use extreme caution when using any device or feature that may take their focus off the road. Your primary responsibility is the safe operation of the vehicle. We recommend against the use of any handheld device while driving and that you comply with all applicable laws.

Your vehicle may be equipped with an auxiliary input jack (AIJ). The auxiliary input jack, located on the instrument panel below the power point, provides a way to connect your portable music player to the in-vehicle audio system. This allows the audio from a portable music player to be played through the vehicle speakers with high fidelity.

To achieve optimal performance, please observe the following instructions when attaching your portable music device to the audio system.



Required equipment:

1. Any portable music player designed to be used with headphones
2. An audio extension cable with stereo male 1/8 in. (3.5 mm) connectors at each end

To play your portable music player using the auxiliary input jack:

1. Begin with the vehicle parked and the radio turned off.
2. Ensure that the battery in your portable music player is new or fully charged and that the device is turned off.
3. Attach one end of the audio extension cable to the headphone output of your player and the other end of the audio extension cable to the AIJ in your vehicle.
4. Turn the radio on, using either a tuned FM station or a CD loaded into the system. Adjust the volume to your normal listening level.
5. Turn the portable music player on and adjust the volume to ½ level normally used for the portable player.

Entertainment Systems

6. Press AUX on the vehicle radio repeatedly until LINE, LINE IN or SYNC LINE IN appears in the display.
You should hear audio from your portable music player although it may be low.
7. Adjust the sound on your portable music player until it reaches the level of the FM station or CD by switching back and forth between the AUX and FM or CD controls.

Troubleshooting:

1. Do not connect the audio input jack to a line level output. Line level outputs are intended for connection to a home stereo and are not compatible with the AIJ. The AIJ only works correctly with devices that have a headphone output with a volume control.
2. Do not set the portable music player's volume level higher than is necessary to match the volume of the CD or FM radio in your audio system as this causes distortion and reduces sound quality. Many portable music players have different output levels, so not all players should be set at the same levels. Some players sound best at full volume and others need to be set at a lower volume.
3. If the music sounds loud and/or distorted, turn the portable music player volume down. If the problems persist, replace or recharge the batteries in the portable music player. If the music is loud, but not distorted, turn down the volume on the vehicle's audio system.
4. The portable music player must be controlled in the same manner when it is used with headphones as the AIJ does not provide control (play, pause, etc.) over the attached portable music player.
5. For safety reasons, connecting or adjusting the settings on your portable music player should not be attempted while the vehicle is moving. Also, the portable music player should be stored in a secure location, such as the center console or the glove box, when the vehicle is in motion. The audio extension cable must be long enough to allow the portable music player to be safely stored while the vehicle is in motion.

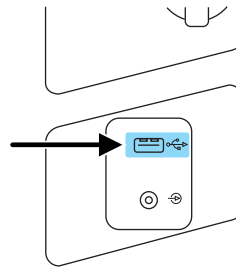
Entertainment Systems

USB port (if equipped)



WARNING: Driving while distracted can result in loss of vehicle control, accident and injury. Ford strongly recommends that drivers use extreme caution when using any device that may take their focus off the road. Your primary responsibility is the safe operation of the vehicle. We recommend against the use of any handheld device while driving, encourage the use of voice-operated systems when possible and that you become aware of applicable state and local laws that may affect the use of electronic devices while driving.

Your vehicle may be equipped with a USB port located on the instrument panel. This feature allows you to plug in media playing devices, memory sticks, and also to charge devices if they support this feature. For further information on this feature, refer to *Accessing and using your USB port* in the SYNC® supplement or *Navigation System* supplement.



GENERAL AUDIO INFORMATION

Radio frequencies

AM and FM frequencies are established by the Federal Communications Commission (FCC) and the Canadian Radio and Telecommunications Commission (CRTC). Those frequencies are:

AM - 530, 540–1700, 1710 kHz

FM- 87.7, 87.9–107.7, 107.9 MHz

Radio reception factors

There are three factors that can effect radio reception:

- Distance/Strength: The further you travel from an FM station, the weaker the signal and the weaker the reception.
- Terrain: Hills, mountains, tall buildings, power lines, electric fences, traffic lights and thunderstorms can interfere with your reception.
- Station overload: When you pass a broadcast tower, a stronger signal may overtake a weaker one and play while the weak station frequency is displayed.

Entertainment Systems

CD/CD player care

Do:

- Handle discs by their edges only. Never touch the playing surface.
- Inspect discs before playing. Clean only with an approved CD cleaner and wipe from the center out.

Don't:

- Expose discs to direct sunlight or heat sources for extended periods of time.
- Insert more than one disc into each slot of the CD changer magazine.
- Clean using a circular motion.

CD units are designed to play commercially pressed 4.75 inch (12 cm) audio compact discs only. Due to technical incompatibility, certain recordable and re-recordable compact discs may not function correctly when used in Ford CD players. Irregular shaped CDs, CDs with a scratch protection film attached, and CDs with homemade paper (adhesive) labels should not be inserted into the CD player. The label may peel and cause the CD to become jammed. It is recommended that homemade CDs be identified with permanent felt tip marker rather than adhesive labels. Ball point pens may damage CDs. Please contact your dealer for further information.

Audio system warranty and service

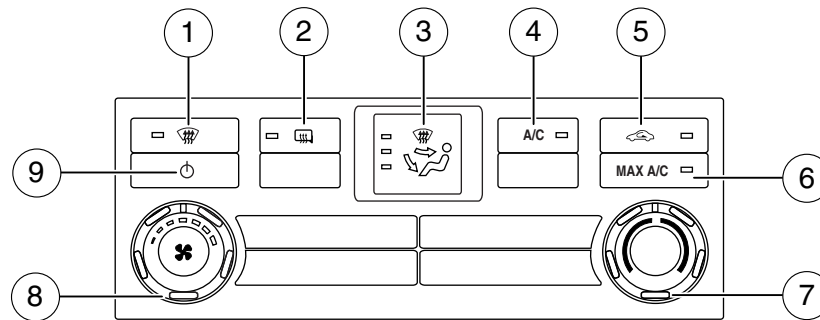
Refer to the *Warranty Guide* for audio system warranty information. If service is necessary, see your dealer or qualified technician.

SYNC® (IF EQUIPPED)

Your vehicle may be equipped with SYNC®, a hands-free communications and entertainment system with special phone and media features. For more information, please refer to the SYNC® supplement or to the SYNC® section in the *Navigation System* supplement (if equipped).

Climate Controls

SINGLE ZONE CLIMATE CONTROL



1. **Defrost:** Distributes outside air through the windshield defroster vents and de-mister vents. Can be used to clear the windshield of fog and thin ice. The system automatically provides outside air to reduce window fogging. Press this button again to return to the previous air flow selection.
2. **Heated mirrors (if equipped):** Press to activate/deactivate. This feature removes ice and snow from the side view mirrors.
3. **Multifunction control:** Press repeatedly to cycle through the settings to choose:
 - : Distributes air through the windshield defroster vents, de-mister vents, floor vents and rear seat floor vents. The system automatically provides outside air to reduce window fogging.
 - : Distributes air through the instrument panel vents.
 - : Distributes air through the instrument panel vents, floor vents, rear seat floor vents and de-mister vents.
 - : Distributes air through the floor vents and rear seat floor vents.
4. **A/C (if equipped):** Press to activate/deactivate air conditioning. Use with recirculated air to improve cooling performance and efficiency. A/C engages automatically in MAX A/C, (defrost) and (floor/defrost).
5. **Recirculated air (if equipped):** Press to activate/deactivate air recirculation in the vehicle. Recirculated air may reduce the amount of time needed to cool down the interior of the vehicle and may also help reduce undesired odors from reaching the interior of the vehicle.

Climate Controls

Recirculated air engages automatically when MAX A/C is selected or can be engaged manually in any airflow mode except  (defrost). When the ignition switch is turned off and back on, the climate system returns to the recirculated air mode only if the A/C button LED is illuminated and the air distribution selection is either  (panel) or  (panel/floor).

6. **MAX A/C (if equipped):** Distributes recirculated air through the instrument panel vents to cool the vehicle. This re-cooling of the interior air is more economical and efficient than normal A/C mode. Recirculated air may also help reduce undesirable odors from entering the vehicle. Press the MAX A/C button again for normal A/C operation.

7. **Temperature control:** Controls the temperature of the airflow in the vehicle.

8.  **Fan speed adjustment:** Controls the volume of air circulated in the vehicle.

9.  **Power:** Press to activate/deactivate the climate control system. When the system is off, outside air is prevented from entering the vehicle.

Operating tips

- To reduce fog build-up on the windshield during humid weather, select  (defrost) or  (floor/defrost). Temperature and/or fan speed can also be increased to improve clearing.
- To reduce humidity build-up inside the vehicle: do not drive with the system off or with recirculated air engaged and A/C off.
- Do not put objects under the front seats that will interfere with the airflow to the back seats.
- Remove any snow, ice or leaves from the air intake area at the base of the windshield.
- To improve the A/C cool down, drive with the windows slightly open for 2-3 minutes after start up or until the vehicle has been “aired out.”
- A small amount of air may be felt from the floor vent regardless of the air distribution setting that is selected.

If you are driving during extreme high ambient temperatures and idling for extended periods of time in gear, it is recommended to run the A/C in the MAX A/C position, adjust the blower fan speed to the lowest setting and put the vehicle's transmission into the P (Park) position to continue to receive cool air from your A/C system.

Climate Controls

For maximum cooling performance (MAX A/C):

1. Select MAX A/C.
2. Move the temperature control to the coolest setting.
3. Set the fan speed to the highest setting and then adjust as necessary to maintain comfort.
 - A/C and  (recirculated air) will be automatically selected.
 - Airflow will automatically be directed out of the panel vents.

To aid in side window defogging/demisting in cold weather:

1. Select  (panel/floor).
2. Select A/C.
3. Adjust the temperature control to maintain comfort.
4. Set the fan speed to the highest setting.
5. Direct the outer instrument panel vents towards the side windows.

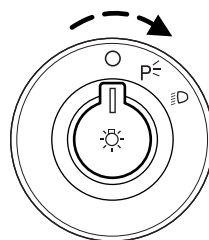
To increase airflow to the outer instrument panel vents, close the vents located in the middle of the instrument panel.

Lights

HEADLAMP CONTROL

Rotate the headlamp control clockwise to the first position  to turn on the parking lamps.

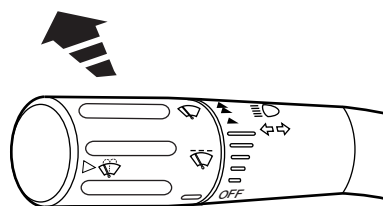
Rotate clockwise to the second position  to also turn on the headlamps.



High beams/Flash-to-pass

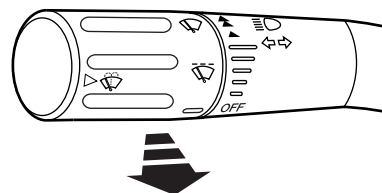
High beams:

Push the lever toward the instrument panel to activate. Pull the lever toward you to deactivate.



Flash-to-pass:

Pull toward you slightly to activate and release to deactivate.



Daytime Running Lamps (DRL) (if equipped)

Turns the headlamps on with a reduced output.

To activate:

- the ignition must be turned to the on position and
- the headlamp control is in the  position, parking lamp or autolamp position.

Lights

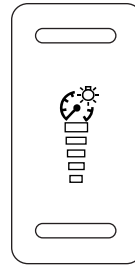


WARNING: Always remember to turn on your headlamps at dusk or during inclement weather. The Daytime Running Lamp (DRL) system does not activate your tail lamps and generally may not provide adequate lighting during these conditions. Failure to activate your headlamps under these conditions may result in a collision.

PANEL DIMMER CONTROL

Use to adjust the brightness of the instrument panel and all applicable lit components in the vehicle during headlamp and parking lamp operation.

- Tap the top or bottom of the control to brighten/dim all interior lit components incrementally, or
- Press and hold at the first position the top or bottom of the control until the desired lighting level is reached.

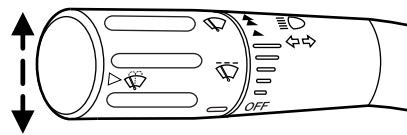


AIMING THE HEADLAMPS

The headlamps on your vehicle are properly aimed at the assembly plant. If your vehicle has been in an accident the alignment of your headlamps should be checked by a qualified service technician.

TURN SIGNAL CONTROL

- Push down to activate the left turn signal.
- Push up to activate the right turn signal.



If your vehicle is a tractor, the turn signals may not shut off when a turn is completed; this is normal. Please see your dealer if there are any questions on the options your vehicle has been equipped with.

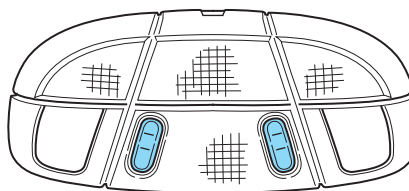
Lights

INTERIOR LAMPS

Map lamps (if equipped)

To turn on the map lamps, press the control next to each lamp. The dome lamp turns on when:

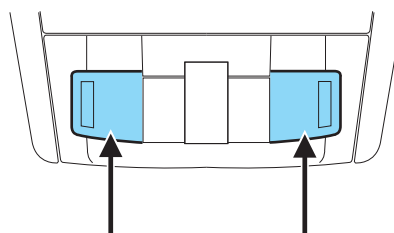
- any door is opened,
- any of the remote entry controls are pressed and the ignition is off.



EXTERIOR LAMPS

Bulb inspection

It is a good safety practice to check operation of headlamps, parking lamps, turn signals, clearance and marker lamps, instrument panel and control lamps each day.



Using the right bulbs

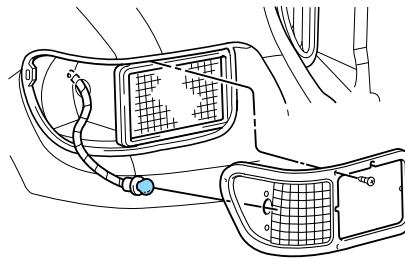
Function	Bulbs	Trade number
Headlamps	2	H6054
Front turn signal lamps	2	1157
Front sidemarker/Park lamps	2 (amber)	194
Brake/Tail/Stop/Rear turn signal/License lamps	1 bulb each side	1157
Back-up lamps	2	1156
Front clearance and identification lamps	5	194
Dome lamp	1	105
To replace all instrument panel lights - see your dealer		

Bulb replacement

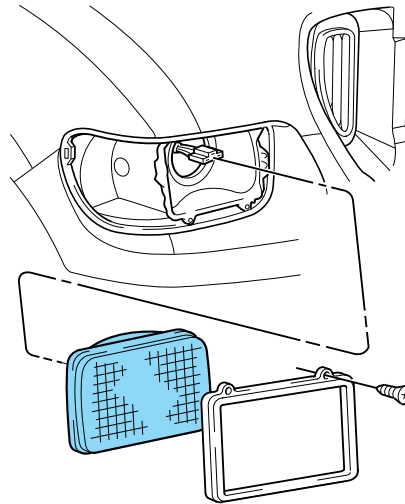
Replacing headlamp bulbs

To remove the headlamp bulbs:

1. Make sure the headlamp control is in the ○ position.
2. Remove the four screws and move the parking lamp assembly away from the headlamp bulb.



3. Remove the four screws and the retaining bracket from the headlamp bulb.
4. Pull the headlamp bulb out of the housing, disconnect the electrical connector and remove the headlamp bulb.
5. To complete installation, follow the removal procedure in reverse order.



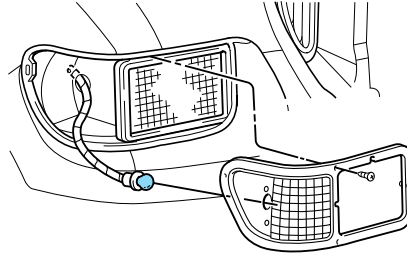
Replacing front parking lamp/turn signal/side marker bulbs

To remove the parking lamp/turn signal bulbs:

1. Make sure the headlamp control is in the ○ position and the turn signals are off.

Lights

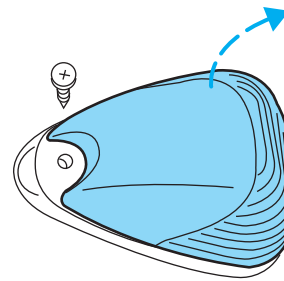
2. Remove the four screws from the lamp assembly.
3. Carefully lower the lamp assembly and pull the bulb socket straight out of the lamp assembly.
4. Carefully pull the bulb straight out of the socket and push in the new bulb.
5. To complete installation, follow the removal procedure in reverse order.



Replacing front clearance and identification lamp bulbs

To change the cab marker bulbs:

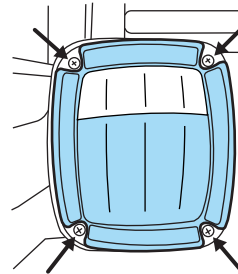
1. Make sure the headlamp control is in the  position, then remove the screw and lens from the lamp assembly.
2. Carefully pull the bulb straight out of the socket and push in the new bulb.
3. Install the lens on lamp assembly with screw.



Replacing brake/tail/rear turn signal/back-up/license plate lamp bulbs

The brake/tail/turn signal/back-up/license plate lamp bulbs are located in the same portion of the tail lamp assembly. Follow the same steps to replace any of these bulbs:

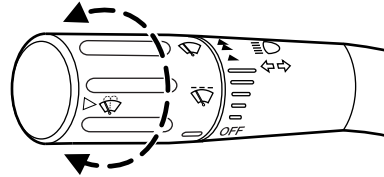
1. Make sure the headlamp control is in the  position and the turn signals are off, then remove the four screws and the lamp lens from lamp assembly.
2. Carefully pull the bulb straight out of the socket and push in the new bulb.
3. Install the lens on the lamp assembly with the four screws.



Driver Controls

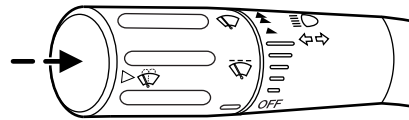
MULTI-FUNCTION LEVER

Windshield wiper: Rotate the end of the control away from you to increase the speed of the wipers; rotate towards you to decrease the speed of the wipers.



Windshield washer: Press the end of the stalk:

- briefly: causes a single swipe of the wipers without washer fluid.
- a quick press and hold: the wipers swipe three times with washer fluid.
- a long press and hold: the wipers and washer fluid activate for up to 10 seconds.

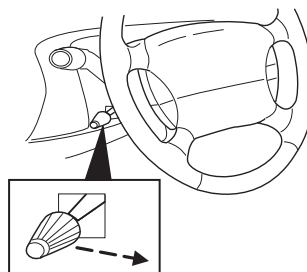


Note: Do not operate the washer when the washer reservoir is empty. This may cause the washer pump to overheat. Check the washer fluid level frequently. Do not operate the wipers when the windshield is dry. This may scratch the glass, damage the wiper blades and cause the wiper motor to burn out. Before operating the wiper on a dry windshield, always use the windshield washer. In freezing weather, be sure the wiper blades are not frozen to the windshield before operating the wipers.

Driver Controls

TILT STEERING

Pull the tilt steering control toward you to move the steering wheel up or down. Hold the control while adjusting the wheel to the desired position, then release the control to lock the steering wheel in position.



WARNING: Never adjust the steering wheel when the vehicle is moving.

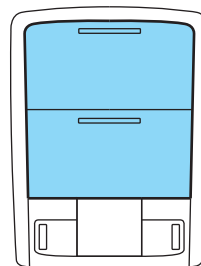
OVERHEAD CONSOLE (IF EQUIPPED)

The appearance of your vehicle's overhead console will vary according to your option package.

Storage compartment (if equipped)

Press the release tab on the rear edge of the bin door to open the storage compartment. The door will open to the full open position.

The storage compartment may be used to secure sunglasses or a similar object.



Driver Controls

AUXILIARY POWER POINT

Power outlets are designed for accessory plugs only. Do not insert any other object in the power outlet as this can damage the outlet and blow the fuse. Do not hang any type of accessory or accessory bracket from the plug. Improper use of the power outlet can cause damage not covered by your warranty.

Auxiliary power points can be found in the following locations:

- On the instrument panel (two locations)
- Inside the center console storage compartment (if equipped)
- On the rear of the center console (if equipped)
- Inside the 20-percent front seat console (if equipped)
- Inside the rear under seat storage compartment (if equipped)

Do not use the power point for operating the cigarette lighter element (if equipped).

To prevent the fuse from being blown, do not use the power point(s) over the vehicle capacity of 12 VDC/180W. If the power point or cigar lighter socket is not working, a fuse may have blown. Refer to *Fuses and relays* in the *Roadside Emergencies* chapter for information on checking and replacing fuses.

To have full capacity usage of your power point, the engine is required to be running to avoid unintentional discharge of the battery. To prevent the battery from being discharged:

- do not use the power point longer than necessary when the engine is not running,
- do not leave battery chargers, video game adapters, computers and other devices plugged in overnight or when the vehicle is parked for extended periods.

Always keep the power point caps closed when not being used.

Driver Controls

POWER WINDOWS (IF EQUIPPED)



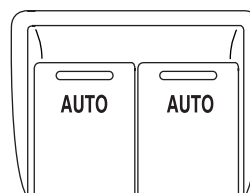
WARNING: Do not leave children unattended in the vehicle and do not let children play with the power windows. They may seriously injure themselves.



WARNING: When closing the power windows, you should verify they are free of obstructions and ensure that children and/or pets are not in the proximity of the window openings.

Press and pull the window switches to open and close windows.

- Press down (to the first detent) and hold the switch to open.
- Pull up (to the first detent) and hold the switch to close.



Rear Window Buffeting: When one or both of the rear windows are open, the vehicle may demonstrate a wind throb or buffeting noise. This noise can be alleviated by lowering a front window approximately 2–3 in. (5–8 cm).

One-touch down

Allows the driver's window to open fully without holding the control down. Press the switch completely down to the second detent and release quickly. The window will open fully. Momentarily press the switch to any position to stop the window operation.

Window lock

The window lock feature allows only the driver and front passenger to operate the power windows.

To lock out all the window controls (except for the driver's and front passenger's) press the control. A light on the control will illuminate when the windows are locked. Press the control again to restore the window controls.

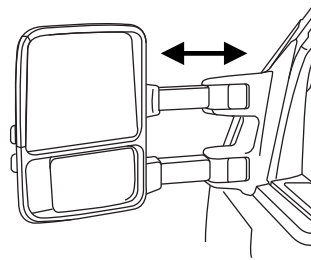
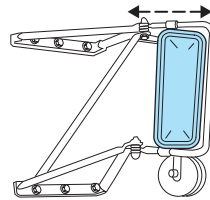


Driver Controls

EXTERIOR MIRRORS

With the doors closed and the seat adjusted for proper comfort, move the mirrors to maximize rear viewing area by adjusting the mirrors left or right as required.

Adjust the auxiliary convex mirrors. Convex mirrors are a ball-stud design for precise adjustment to maximize viewing area.



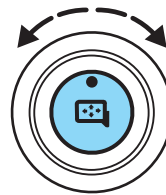
Power side view mirrors (if equipped)



WARNING: Do not adjust the mirror while the vehicle is in motion.

To adjust your mirrors:

1. Rotate the control clockwise to adjust the right mirror and rotate the control counterclockwise to adjust the left mirror.
2. Move the control in the direction you wish to tilt the mirror.
3. Return to the center position to lock mirrors in place.

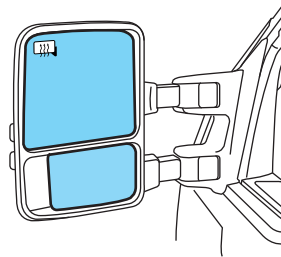


The spotter mirror below the main glass (if equipped) must be adjusted manually.

Driver Controls

Heated outside mirrors (if equipped)

The main mirror glass and lower convex spotter mirror are heated to remove ice, mist and fog. To activate the heated mirrors, press the heated mirror control  located on the climate control panel.



Do not remove ice from the mirrors with a scraper or attempt to re-adjust the mirror glass if it is frozen in place.

These actions could cause damage to the glass and mirrors.

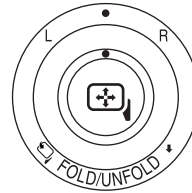
Do not clean the housing or glass of any mirror with harsh abrasives, fuel or other petroleum-based cleaning products.

Fold-away mirrors

Fold the side mirrors in carefully before driving through a narrow space, like an automatic car wash.

Power-fold mirrors (if equipped)

You can fold the side mirrors simultaneously using the power mirror switch.

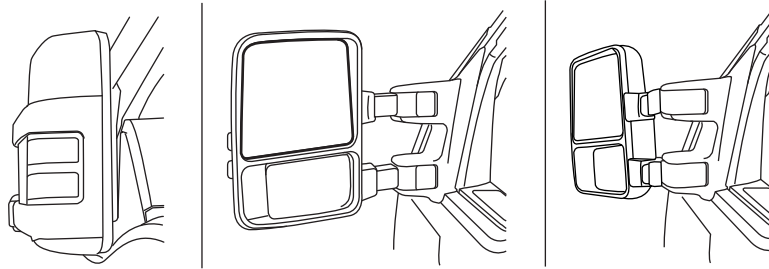


To operate the power-fold mirrors:

1. Rotate the switch to the center/neutral position.
2. Momentarily pull the switch rearward to auto fold in.
3. Momentarily pull the switch rearward again to fold back to design position.

Note: When power-folding the mirrors, it is normal to hear the sound of the motors.

Driver Controls



Power-fold mirror positions, from left to right: Position 1, Position 2, Position 3

The power-fold mirrors may be folded forward/rearward manually to any of the three positions shown and electrically to positions 1 and 2 only. If a mirror is folded manually forward to position 3, you must manually fold it back to position 1 or 2 in order for the power-fold function to continue functioning. **Note:** Although it is possible to electrically fold the mirror from position 3 to 2, it was not designed for this functionality and may not always work under all conditions.

Note: Ten or more switch activations within one minute, or repeated fold/unfolding of the mirrors while holding the switch rearward during the full travel may cause the system to disable the fold/unfold function to protect the motors from overheating. Should this occur, wait approximately 3½ minutes for the system to reset and function to return to normal.

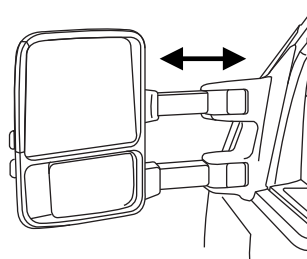
Note: The power-fold mirrors are designed to operate while the vehicle is stationary or traveling at moderate speeds. If you attempt to power-fold the mirrors at high speeds, they may not fully fold forward/rearward - slow down and power-fold or manually fold the mirrors in order to complete the fold operation.

Note: If the power fold/telescope mirror glass appears loose or vibrates when driving, it is possible that the mirrors have been manually folded or telescoped. To minimize the vibration, ensure that the mirrors are electronically folded and telescoped in/out with the switches on the door trim panel. If the power fold mirrors are out of sync, electronically power-fold the mirrors to re-sync the motors. This will cause a loud “click” and the mirrors will jerk during re-synchronization. This is normal.

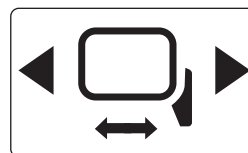
Driver Controls

Telescoping mirrors (if equipped)

The telescoping feature allows the mirror to extend approximately 2.75 inches (70 mm). This feature is especially useful to the driver when towing a trailer. Mirrors can be manually pulled out or pushed in to the desired telescopic position.



If equipped with PowerScope™ power telescoping mirrors, you can simultaneously position both mirrors using the power telescope switch found on the door trim panel.

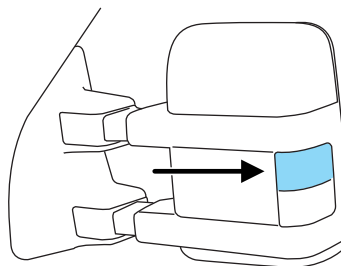


- To telescope the mirrors outboard, press and hold the left side of the power telescope switch until the mirrors reach their desired position. When the end of travel is reached, it is normal to hear the power telescoping motors running as long as you continue to hold the switch.
- To telescope the mirrors inboard, press and hold the right side of the power telescope switch until the mirrors reach their desired position.

Mirror-mounted side turn signal indicator (if equipped)

When the vehicle turn signals are activated, the outer portion of the mirror housing will blink amber.

The turn signal feature can be seen by other drivers who may approach from the rear of the vehicle.

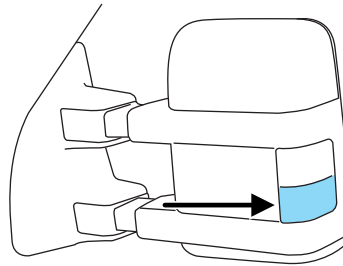


Driver Controls

Clearance lamps (if equipped)

Illuminates when the headlamps or parking lamps are switched on.

This provides additional visibility of your vehicle to other drivers on the road.



SPEED CONTROL

With speed control set, you can maintain a set speed without keeping your foot on the accelerator pedal.



WARNING: Do not use the speed control in heavy traffic or on roads that are winding, slippery or unpaved.

Using speed control

The speed controls are located on the steering wheel. The following buttons work with speed control.

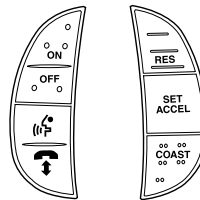
ON: Press to turn on speed control.

OFF: Press to turn off speed control.

RES (Resume): Press to resume a set speed.

SET/ACCEL: Press to set a speed or increase a set speed.

COAST: Press to reduce a set speed.



Setting speed control

1. Press and release ON.
2. Accelerate to the desired speed.
3. Press and release SET/ACCEL.
4. Take your foot off the accelerator pedal.
5. The indicator  light on the instrument cluster will turn on.

Driver Controls

Note:

- Vehicle speed may vary momentarily when driving up and down a steep hill.
- If the vehicle speed increases above the set speed on a downhill, you may want to apply the brakes to reduce the speed.
- If the vehicle speed decreases more than 10 mph (16 km/h) below your set speed on an uphill, your speed control will disengage.

Disengaging speed control

To disengage speed control, press the brake pedal. Disengaging speed control will not erase the previous set speed.

Resuming a set speed

Press and release RES. This will automatically return the vehicle to the previously set speed.

Increasing speed while using speed control

To increase the set speed:

- Press and hold SET/ACCEL until you get to the desired speed, then release. You can also use SET/ACCEL to operate the tap-up function. Press and release SET/ACCEL to increase the vehicle set speed in 1 mph (1.6 km/h) increments.
- Use the accelerator pedal to get to the desired speed. When the vehicle reaches that speed, press and release SET/ACCEL.

Reducing speed while using speed control

To reduce the set speed:

- Press and hold COAST until you get to the desired speed, then release. You can also use COAST to operate the tap-down function. Press and release COAST to decrease the vehicle set speed in 1 mph (1.6 km/h) increments.
- Press the brake pedal until the desired vehicle speed is reached, then press and release SET/ACCEL.

Turning off speed control

To turn off the speed control, press OFF or turn off the ignition.

Note: When you turn off the speed control or the ignition, your speed control set speed memory is erased.

Driver Controls

STEERING WHEEL CONTROLS (IF EQUIPPED)

SYNC® system hands free control feature (if equipped)

Press  briefly to use the voice command feature. You will hear a tone and LISTENING will appear in the radio display. Press and hold  to exit voice command.

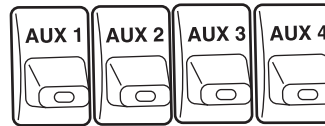


Press  to activate phone mode or answer a phone call. Press and hold  to end a call or exit phone mode.

For further information on the SYNC® system, refer to the SYNC® supplement.

UPFITTER CONTROLS (IF EQUIPPED)

Your vehicle may be equipped with the Upfitter option package which provides four switches, mounted in the center of the instrument panel, labeled AUX 1, AUX 2, AUX 3 and AUX 4. These switches only operate while the ignition is in the on position, whether the engine is



running or not. It is, however, recommended that the engine remain running to maintain battery charge when using the Upfitter switches for extended duration or higher current draws. (This is even more important for vehicles with diesel engines since the glow plugs are also draining battery power when the ignition key is in the on position.) Each switch provides 10 amps of power.

If your vehicle is equipped with this option, there is also a relay box located on the driver side end of the instrument panel. See your authorized dealer for service.

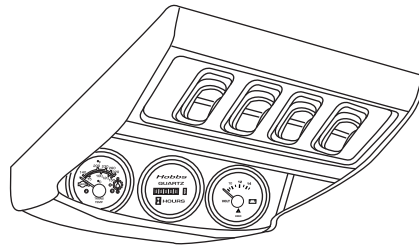
Switch access location is in a connector located in the engine compartment. More detailed information can be found at <https://www.fleet.ford.com/truck/bbas/>.

Driver Controls

GAUGE PACKAGE (IF EQUIPPED)

Your vehicle may be equipped with an optional gauge package which has one of the following configurations:

1. Transmission temperature gauge: displays the transmission temperature at the transmission sump.
2. Hourmeter: displays the hours of engine run time.
3. Voltmeter: displays electrical system voltage.



Locks and Security

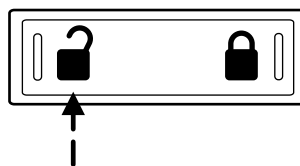
KEYS

The key operates all locks on your vehicle. In case of loss, replacement keys are available from your dealer.

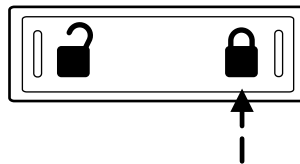
You should always carry a second key with you in a safe place in case you require it in an emergency.

POWER DOOR LOCKS (IF EQUIPPED)

Press control to unlock all doors.



Press control to lock all doors.



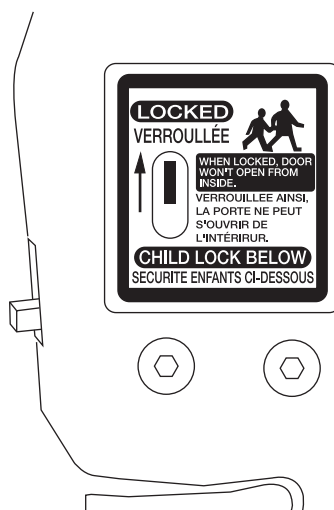
Locks and Security

CHILDPROOF DOOR LOCKS (IF EQUIPPED)

When these locks are set, the rear doors cannot be opened from the inside. The rear doors can be opened from the outside when the doors are unlocked.

The childproof locks are located on rear edge of each rear door and must be set separately for each door. Setting the lock for one door does not automatically set the lock for both doors.

Move lock control up to engage the childproof lock. Move control down to disengage childproof locks.



Seating and Safety Restraints

FRONT SEATS



WARNING: Reclining the seatback can cause an occupant to slide under the seat's safety belt, resulting in severe personal injuries in the event of a collision.



WARNING: Do not pile cargo higher than the seatbacks to reduce the risk of injury in a collision or sudden stop.



WARNING: Before returning the seatback to its original position, make sure that cargo or any objects are not trapped behind the seatback. After returning the seatback to its original position, pull on the seatback to ensure that it has fully latched. An unlatched seat may become dangerous in the event of a sudden stop or collision.



WARNING: Never adjust the driver's seat or seatback when the vehicle is moving.



WARNING: Always drive and ride with your seatback upright and the lap belt snug and low across the hips.

Adjustable head restraints (if equipped)

Your vehicle is equipped with front row outboard head restraints that are vertically adjustable.

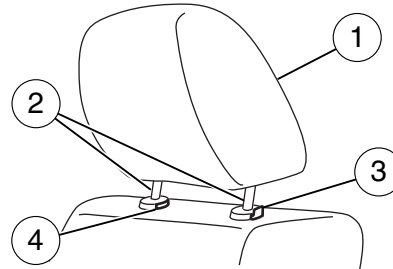


WARNING: To minimize the risk of neck injury in the event of a crash, the driver and passenger occupants should not sit in and/or operate the vehicle, until the head restraint is placed in its proper position. The driver should never adjust the head restraint while the vehicle is in motion.

Seating and Safety Restraints

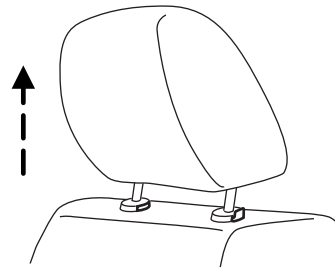
The adjustable head restraints consist of:

- a trimmed energy absorbing foam and structure (1),
- two steel stems (2),
- a guide sleeve adjust/release button (3),
- and a guide sleeve unlock/remove button (4).

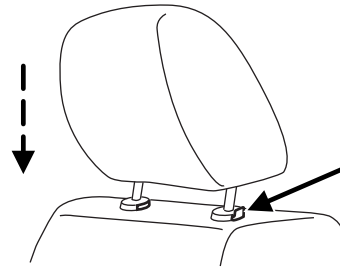


To adjust the head restraint, do the following:

1. Adjust the seatback to an upright driving/riding position.
2. Raise the head restraint by pulling up on the head restraint.



3. Lower the head restraint by pressing and holding the guide sleeve adjust/release button and pushing down on the head restraint.



Properly adjust the head restraint so that the top of the head restraint is even with the top of your head and positioned as close as possible to the back of your head. For occupants of extremely tall stature, adjust the head restraint to its full up position.

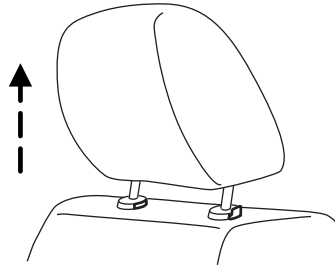
Seating and Safety Restraints



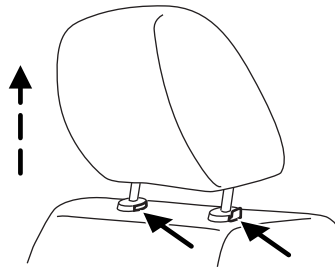
WARNING: The adjustable head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied.

To remove the adjustable head restraint, do the following:

1. Pull up the head restraint until it reaches the highest adjustment position.

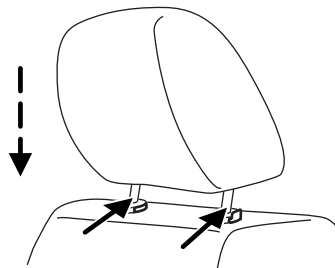


2. Simultaneously press and hold both the adjust/release button and the unlock/remove button, then pull up on the head restraint.



To reinstall the adjustable head restraint, do the following:

1. Insert the two stems into the guide sleeve collars.
2. Push the head restraint down until it locks.



Seating and Safety Restraints

Properly adjust the head restraint so that the top of the head restraint is even with the top of your head and positioned as close as possible to the back of your head. For occupants of extremely tall stature, adjust the head restraint to its full up position.



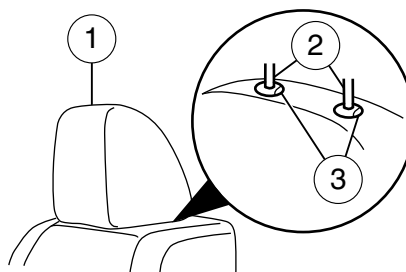
WARNING: To minimize the risk of neck injury in the event of a crash, head restraints must be installed properly.

Front row center non-adjustable head restraint (if equipped)

Vehicles equipped with a front center seat have a head restraint that is non-adjustable.

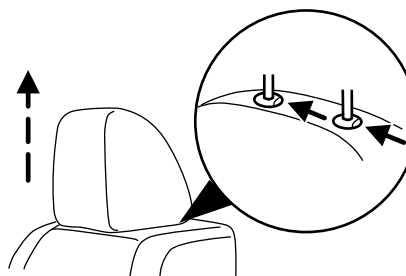
The non-adjustable head restraint consists of:

- a trimmed energy absorbing foam and structure (1),
- two steel stems (2),
- and two guide sleeve unlock/remove buttons (3).



To remove the non-adjustable head restraint, do the following:

Simultaneously press and hold both unlock/remove buttons, then pull up on the head restraint.



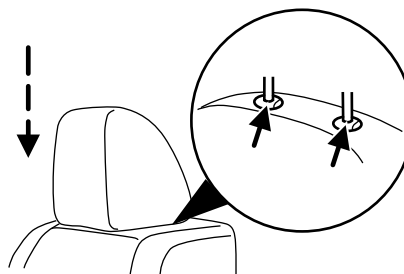
Seating and Safety Restraints

To reinstall the non-adjustable head restraint, do the following:

1. Insert the two stems into the guide sleeve collars.
2. Push the head restraint down until it locks.



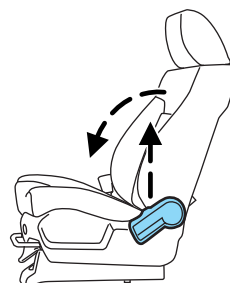
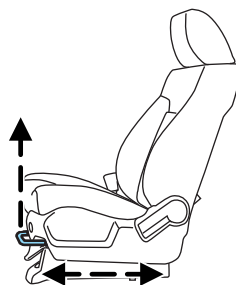
WARNING: The non-adjustable head restraint is a safety device. It should be installed whenever the seat is occupied.



WARNING: To minimize the risk of neck injury in the event of a crash, head restraints must be installed properly.

40/20/40 front seats (if equipped)

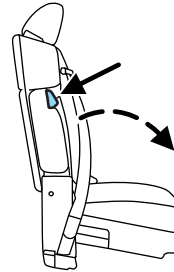
- Lift the track release bar to move the seat forward or rearward. Make sure that the seat is relocked into place.
- Pull the release lever handle located on the side of the seat up to move the seatback forward or backward.



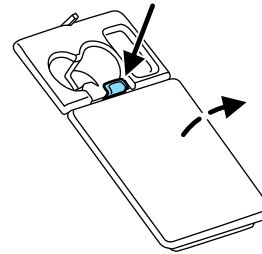
Seating and Safety Restraints

20% front seat armrest and console (if equipped)

To release the armrest and gain access to the cupholders and seatback storage bin, push the button on the right-hand side of the seat and pull the seatback down.



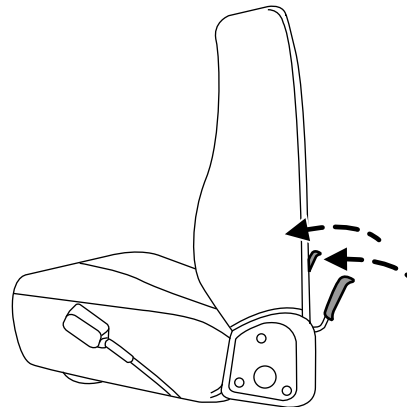
Pull up on the tab to open the storage bin.



Lift up on the seatback to return it to the upright position.

70% two-person passenger bench seat (if equipped)

Lift the handle on the seatback to tilt the seatback forward.



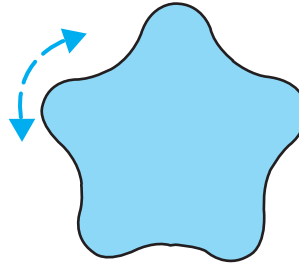
Seating and Safety Restraints

Using the manual lumbar support (if equipped)

The lumbar support control is located on the outboard side of the seat.

Turn the lumbar support forward toward the front of the vehicle for more support.

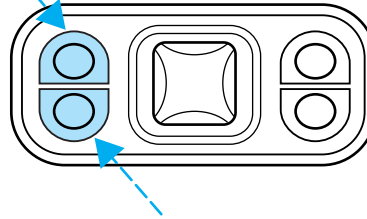
Turn the lumbar support backward toward the rear of the vehicle for less support.



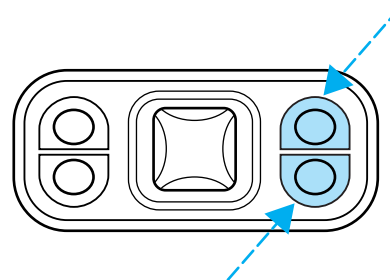
Adjusting the front power seat (if equipped)

The control is located on the outboard side of the seat cushion.

Press to raise or lower the front portion of the seat cushion.

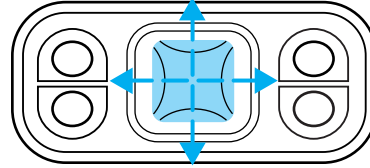


Press to raise or lower the rear portion of the seat cushion.



Seating and Safety Restraints

Press the control to move the seat forward, backward, up or down.



Heated seats (if equipped)

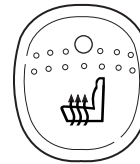


WARNING: Persons who are unable to feel pain to the skin because of advanced age, chronic illness, diabetes, spinal cord injury, medication, alcohol use, exhaustion, or other physical conditions, must exercise care when using the seat heater. The seat heater may cause burns even at low temperatures, especially if used for long periods of time. Do not place anything on the seat that insulates against heat, such as a blanket or cushion, because this may cause the seat heater to overheat. Do not puncture the seat with pins, needles, or other pointed objects because this may damage the heating element which may cause the seat heater to overheat. An overheated seat may cause serious personal injury.

Note: Do not do the following:

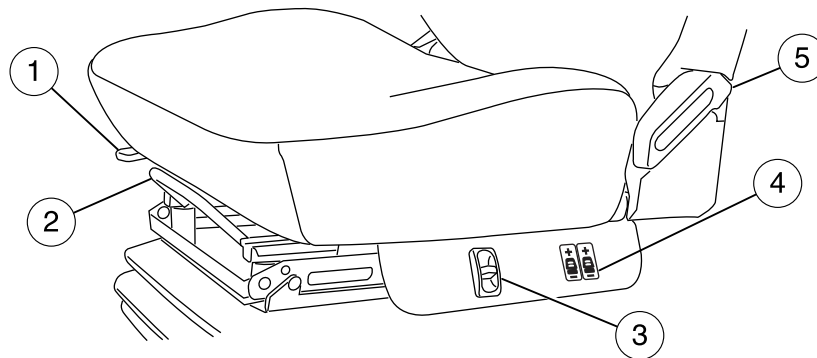
- Place heavy objects on the seat
- Operate the seat heater if water or any other liquid is spilled on the seat. Allow the seat to dry thoroughly.

Press the control to turn the heated seats on and off.



Seating and Safety Restraints

Air-Ride seat (if equipped)



1. **Chugger option:** Dampens road vibrations and allows the seat to move with the driver when unlocked.
To unlock, sit in the seat and slide the tab away from the seat (to the right)
To lock, sit in the seat and slide the tab toward the seat (to the left).
2. **Seat adjuster:** Lift up to move the seat forward or backward. Release the bar to lock the seat in position.
3. **Seat height adjuster:** Pull the control up to raise the seat, push it down to lower the seat.



WARNING: To reduce the risk of excess slack in the belt system, always adjust the seat height before fastening the seat belt.

4. **Power lumbar:** Press the top of the forward control to inflate the lower lumbar support; press the bottom of the forward control to deflate the lower lumbar support.
Press the top of the rear control to inflate the upper lumbar support; press the bottom of the rear control to deflate the upper lumbar support.
5. **Recline:** Lift the handle to adjust the angle of the seatback.

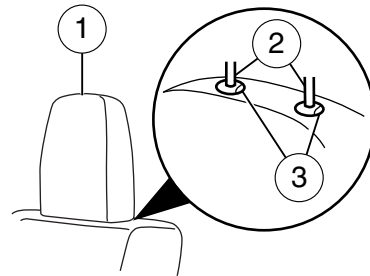
Seating and Safety Restraints

REAR SEATS

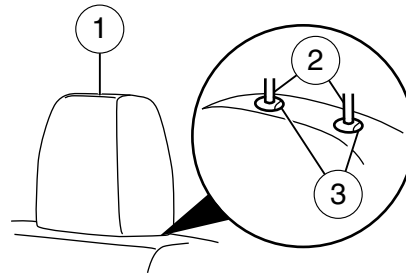
Non-adjustable second-row head restraints

Your vehicle is equipped with second row outboard head restraints that are non-adjustable.

Outboard head restraints (Crew Cab)



Center head restraint (Crew Cab)



The non-adjustable second row head restraints consist of :

- a trimmed energy absorbing foam and structure (1),
- two steel stems (2),
- and two guide sleeve unlock/remove buttons (3).

Removal of the second-row non-adjustable head restraints is the same as the front row center head restraint.



WARNING: The non-adjustable head restraint is a safety device. It should be installed whenever the seat is occupied.



WARNING: To minimize the risk of neck injury in the event of a crash, head restraints must be installed properly.

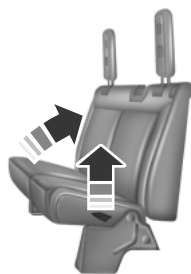
Seating and Safety Restraints

Note: The SuperCab has rear outboard head restraints that are not removable and are bolted to the back wall.

Rear flip-up seat (if equipped)

Folding Up the Rear Seats (SuperCab)

1. Pull the control to release the seat cushion.
2. Rotate the seat cushion up until it locks into the vertical storage position.



Returning the Seat to the Seating Position



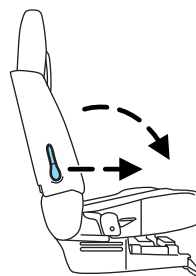
WARNING: Make sure that cargo or any objects are not trapped underneath the seat cushion before returning the seat cushion to its original position, and that the seat cushion locks into place. Failure to do so may prevent the seat from operating properly in the event of a crash, which could increase the risk of serious injury.

1. Pull the control on the side of the seat to release the seat cushion from the storage position.
2. Push the seat cushion down until it locks into the horizontal position.

Seating and Safety Restraints

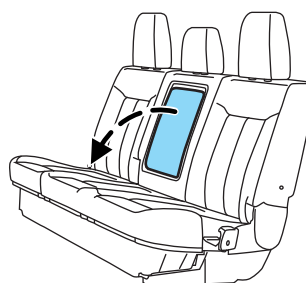
Folding the rear seatback (Crew Cab)

1. Pull forward on the control to fold down the seatback.
2. Pull down on the handle and lift up on the seatback to return it to the original position.



Rear center armrest (if equipped)

To use the armrest simply rotate it forward from the seatback.



SAFETY RESTRAINTS

Safety restraints precautions



WARNING: Always drive and ride with your seatback upright and the lap belt snug and low across the hips.



WARNING: To reduce the risk of injury, make sure children sit where they can be properly restrained.



WARNING: All occupants of the vehicle, including the driver, should always properly wear their safety belts.

Seating and Safety Restraints



WARNING: Never let a passenger hold a child on his or her lap while the vehicle is moving. The passenger cannot protect the child from injury in a collision.



WARNING: It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed. Do not allow people to ride in any area of your vehicle that is not equipped with seats and safety belts. Be sure everyone in your vehicle is in a seat and using a safety belt properly.



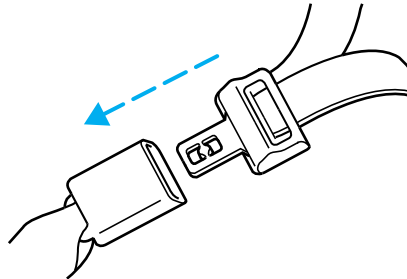
WARNING: In a rollover crash, an unbelted person is significantly more likely to die than a person wearing a safety belt.



WARNING: Each seating position in your vehicle has a specific safety belt assembly which is made up of one buckle and one tongue that are designed to be used as a pair. 1) Use the shoulder belt on the outside shoulder only. Never wear the shoulder belt under the arm. 2) Never swing the safety belt around your neck over the inside shoulder. 3) Never use a single belt for more than one person.

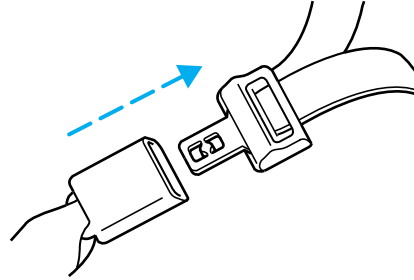
Combination lap and shoulder belts

1. Insert the belt tongue into the proper buckle (the buckle closest to the direction the tongue is coming from) until you hear a snap and feel it latch. Make sure the tongue is securely fastened in the buckle.



Seating and Safety Restraints

2. To unfasten, press the release button and remove the tongue from the buckle.



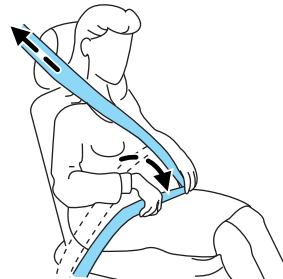
The front and rear outboard safety restraints in the vehicle are combination lap and shoulder belts. The front and rear seat passenger outboard safety belts have vehicle sensitive emergency locking retractors.

Restraint of pregnant women



WARNING: Always ride and drive with your seatback upright and the safety belt properly fastened. The lap portion of the safety belt should fit snug and be positioned low across the hips. The shoulder portion of the safety belt should be positioned across the chest. Pregnant women should also follow this practice. See figure below.

Pregnant women should always wear their safety belt. The lap belt portion of a combination lap and shoulder belt should be positioned low across the hips below the belly and worn as tight as comfort will allow. The shoulder belt should be positioned to cross the middle of the shoulder and the center of the chest.



Seating and Safety Restraints

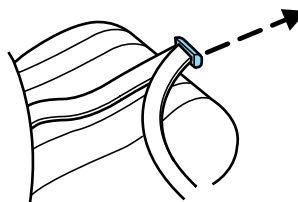
Lap belts

The front center and rear center lap belts do not adjust automatically.

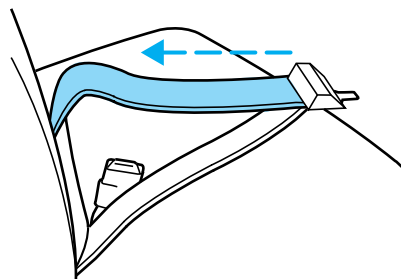


WARNING: The lap belt should fit snugly and as low as possible around the hips, not across the waist.

Insert the tongue into the correct buckle (the buckle closest to the direction the tongue is coming from). To lengthen the belt, turn the tongue at a right angle to the belt and pull across your lap until it reaches the buckle. To tighten the belt, pull the loose end of the belt through the tongue until it fits snugly across the hips.



Shorten and fasten the belt when not in use.



Vehicle sensitive mode

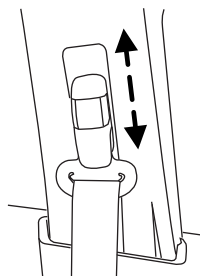
The vehicle sensitive retractor allows free shoulder belt length adjustment to your movements and locks in response to vehicle movement. For example, if the driver brakes suddenly or turns a corner sharply, or the vehicle receives an impact of approximately 5 mph (8 km/h) or more, the combination safety belts lock to help reduce forward movement of the driver and passengers.

Seating and Safety Restraints

Front safety belt height adjustment

Your vehicle has safety belt height adjustments at the front outboard seating positions. Adjust the height of the shoulder belt so the belt rests across the middle of your shoulder.

To adjust the shoulder belt height, pull on the center button and slide the height adjuster up or down. Release the button and pull down on the height adjuster to make sure it is locked in place.



WARNING: Position the safety belt height adjusters so that the belt rests across the middle of your shoulder. Failure to adjust the safety belt properly could reduce the effectiveness of the safety belt and increase the risk of injury in a collision.

Safety belt extension assembly

If the safety belt is too short when fully extended, there is an eight inch (20 cm) safety belt extension assembly that can be added (part number 611C22). This assembly can be obtained from your dealer at no cost.

Use only extensions manufactured by the same supplier as the safety belt. Manufacturer identification is located at the end of the webbing on the label. Also, use the safety belt extension only if the safety belt is too short for you when fully extended.



WARNING: Do not use extensions to change the fit of the shoulder belt across the torso.

Seating and Safety Restraints

Safety belt warning light and indicator chime

The safety belt warning light illuminates in the instrument cluster and a chime sounds to remind the occupants to fasten their safety belts.

Conditions of operation

If...	Then...
The driver's safety belt is not buckled before the ignition switch has been turned to on...	The safety belt warning light illuminates 1-2 minutes and the warning chime sounds 4-8 seconds.
The driver's safety belt is buckled while the indicator light is illuminated and the warning chime is sounding...	The safety belt warning light and warning chime turn off.
The driver's safety belt is buckled before the ignition switch has been turned to on...	The safety belt warning light and indicator chime remain off.

Belt-Minder®

The Belt-Minder® feature is a supplemental warning to the safety belt warning function. This feature provides additional reminders to the driver that the driver's safety belt is unbuckled by intermittently sounding a chime and illuminating the safety belt warning lamp in the instrument cluster.

If...	Then...
The driver's safety belt is not buckled before the vehicle has reached at least 3 mph (5 km/h) and 1-2 minutes have elapsed since the ignition switch has been turned to on...	The Belt-Minder® feature is activated - the safety belt warning light illuminates and the warning chime sounds for six seconds every 30 seconds, repeating for approximately five minutes or until safety belt is buckled.
The driver's safety belt is buckled while the safety belt indicator light is illuminated and the safety belt warning chime is sounding...	The Belt-Minder® feature does not activate.
The driver's safety belt is buckled before the ignition switch is turned to the on position...	The Belt-Minder® feature does not activate.

Seating and Safety Restraints

The following are reasons most often given for not wearing safety belts:
(All statistics based on U.S. data)

Reasons given...	Consider...
"Crashes are rare events"	36700 crashes occur every day. The more we drive, the more we are exposed to "rare" events, even for good drivers. <i>1 in 4 of us will be seriously injured in a crash during our lifetime.</i>
"I'm not going far"	3 of 4 fatal crashes occur within 25 miles (40 km) of home.
"Belts are uncomfortable"	We design our safety belts to enhance comfort. If you are uncomfortable - try different positions for the safety belt upper anchorage and seatback which should be as upright as possible; this can improve comfort.
"I was in a hurry"	Prime time for an accident. Belt-Minder® reminds us to take a few seconds to buckle up.
"Seat belts don't work"	Safety belts , when used properly, reduce risk of death to front seat occupants by 45% in cars , and by 60% in light trucks .
"Traffic is light"	Nearly 1 of 2 deaths occur in single-vehicle crashes , many when no other vehicles are around.
"Belts wrinkle my clothes"	Possibly, but a serious crash can do much more than wrinkle your clothes, particularly if you are unbelted.
"The people I'm with don't wear belts"	Set the example, teen deaths occur 4 times more often in vehicles with TWO or MORE people. Children and younger brothers/sisters imitate behavior they see.

Seating and Safety Restraints

Reasons given...	Consider...
"I have an air bag"	Air bags offer greater protection when used with safety belts. Frontal air bags are not designed to inflate in rear and side crashes or rollovers.
"I'd rather be thrown clear"	Not a good idea. People who are ejected are 40 times more likely to DIE . Safety belts help prevent ejection, WE CAN'T "PICK OUR CRASH".



WARNING: Do not sit on top of a buckled safety belt or insert a latchplate into the buckle to avoid the Belt-Minder® chime. To do so may adversely affect the performance of the vehicle's air bag system

One-time disable

Any time the safety belt is buckled and then unbuckled during an ignition ON cycle, Belt-Minder® is disabled for that ignition cycle only.

Deactivating/Activating the Belt-Minder® feature

Read Steps 1-9 thoroughly before proceeding with the deactivation/activation programming procedure.

The Belt-Minder® feature can be deactivated/activated by performing the following procedure:

Before following the procedure, make sure that:

- The parking brake is set.
- The gearshift is in P (Park) (if equipped) or N (Neutral) (automatic transmissions) or the neutral position (manual transmission).
- The ignition switch is in the off position.
- All vehicle doors are closed.
- The driver's safety belt is unbuckled.
- The headlamp control is in the ○ position.



WARNING: While the design allows you to deactivate your Belt-Minder®, this system is designed to improve your chances of being safely belted and surviving an accident. We recommend you leave the Belt-Minder® system activated for yourself and others who may use the vehicle. To reduce the risk of injury, do not deactivate/activate the Belt-Minder® feature while driving the vehicle.

Seating and Safety Restraints

Belt-Minder® activation and deactivation procedure

1. Turn the ignition switch to the on position. (DO NOT START THE ENGINE.)
2. Wait until the safety belt warning light turns off. (Approximately 1–2 minutes.)
 - Steps 3–5 must be completed within 60 seconds or the procedure has to be repeated.
3. Buckle then unbuckle the safety belt three times, ending with the safety belt unbuckled. This can be done before or during Belt-Minder® warning activation.
4. Turn on the parklamps/headlamps, turn off the parklamps/headlamps.
5. Buckle then unbuckle the safety belt three times, ending with the safety belt unbuckled.
 - After Step 5 the safety belt warning light turns on for three seconds.
6. Within seven seconds of the safety belt warning light turning off, buckle then unbuckle the safety belt.
 - This disables Belt-Minder® if it is currently enabled, or enable Belt-Minder® if it is currently disabled.
7. Confirmation of disabling Belt-Minder® is provided by the safety belt warning light flashing four times per second for three seconds.
8. Confirmation of enabling Belt-Minder® is provided by:
 - The safety belt warning light flashing four times per second for three seconds.
 - Followed by three seconds with the safety belt warning light off.
 - Once again, the safety belt warning light flashes four times per second for three seconds.
9. After receiving confirmation, the deactivation/activation procedure is complete.

Seating and Safety Restraints

SAFETY RESTRAINTS FOR CHILDREN

Important child restraint precautions



WARNING: Always make sure your child is secured properly in a device that is appropriate for their height, age and weight. Child safety restraints must be purchased separately from the vehicle. Failure to follow these instructions and guidelines may result in an increased risk of serious injury or death to your child.



WARNING: All children are shaped differently. The Recommendations for Safety Restraints are based on probable child height, age and weight thresholds from NHTSA and other safety organizations or are the minimum requirements of law. Ford recommends checking with a NHTSA Certified Child Passenger Safety Technician (CPST) and consult your pediatrician to make sure your child seat is appropriate for your child, and is compatible with and properly installed in the vehicle. To locate a child seat fitting station and CPST contact the NHTSA toll free at 1-888-327-4236 or on the internet at <http://www.nhtsa.dot.gov>. In Canada, check with your local St. John Ambulance office for referral to a CPST or for further information, contact your provincial ministry of transportation, your local St. John Ambulance office at <http://www.sfa.ca>, or Transport Canada at 1-800-333-0371 (<http://www.tc.gc.ca>). Failure to properly restrain children in safety seats made especially for their height, age, and weight may result in an increased risk of serious injury or death to your child.

Recommendations for Safety Restraints for Children		
	Child size, height, weight, or age	Recommended restraint type
Infants or toddlers	Children weighing 40 lb (18 kg) or less (generally age four or younger)	Use a child safety seat (sometimes called an infant carrier, convertible seat, or toddler seat).

Seating and Safety Restraints

Recommendations for Safety Restraints for Children		
	Child size, height, weight, or age	Recommended restraint type
Small children	Children who have outgrown or no longer properly fit in a child safety seat (generally children who are less than 4 feet 9 inches (1.45 meters) tall, are greater than age four (4) and less than age twelve (12), and between 40 lb (18 kg) and 80 lb (36 kg) and upward to 100 lb (45 kg) if recommended by your child restraint manufacturer)	Use a belt-positioning booster seat.
Larger children	Children who have outgrown or no longer properly fit in a belt-positioning booster seat (generally children who are at least 4 feet 9 inches (1.45 meters) tall or greater than 80 lb (36 kg) or 100 lb (45 kg) if recommended by child restraint manufacturer)	Use a vehicle safety belt having the lap belt snug and low across the hips, shoulder belt centered across the shoulder and chest, and seatback upright.

- You are required by law to properly use safety seats for infants and toddlers in the U.S. and Canada.
- Many states and provinces require that small children use approved booster seats until they reach age eight, a height of 4 ft 9 in. (1.45 meters) tall, or 80 lb (36 kg). Check your local and state or provincial laws for specific requirements regarding the safety of children in your vehicle.
- When possible, always properly restrain children twelve (12) years of age and under in a rear seating position of your vehicle. Accident statistics suggest that children are safer when properly restrained in the rear seating positions than in a front seating position.

Seating and Safety Restraints



WARNING: If you must use a forward-facing child seat in the front seat, move the vehicle seat all the way back. When possible, all children age 12 and under should be properly restrained in a rear seating position. If all children cannot be seated and restrained properly in a rear seating position, properly restrain the largest child in the front seat.



WARNING: Always carefully follow the instructions and warnings provided by the manufacturer of any child restraint to determine if the restraint device is appropriate for your child's size, height, weight, or age. Follow the child restraint manufacturer's instructions and warnings provided for installation and use in conjunction with the instructions and warnings provided by the vehicle manufacturer. A safety seat that is improperly installed or utilized, is inappropriate for your child's height, age, or weight or does not properly fit the child may increase the risk of serious injury or death.



WARNING: Never let a passenger hold a child on his or her lap while the vehicle is moving. The passenger cannot protect the child from injury in a collision, which may result in serious injury or death.



WARNING: Never use pillows, books, or towels to boost a child. They can slide around and increase the likelihood of injury or death in a collision.



WARNING: Always restrain an unoccupied child seat or booster seat. These objects may become projectiles in a collision or sudden stop, which may increase the risk of serious injury.



WARNING: Never place, or allow a child to place, the shoulder belt under a child's arm or behind the back because it reduces the protection for the upper part of the body and may increase the risk of injury or death in a collision.



WARNING: Do not leave children, or pets unattended in your vehicle.

Seating and Safety Restraints

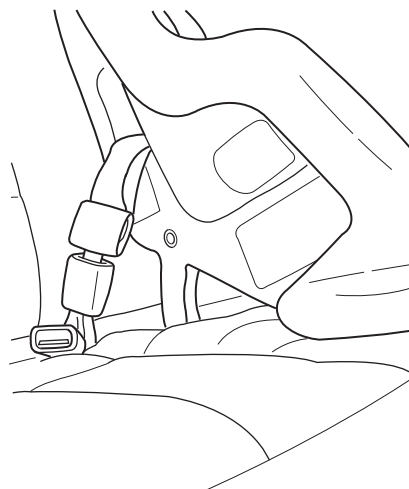
SAFETY SEATS FOR CHILDREN

Child and infant or child safety seats

Use a safety seat that is recommended for the size and weight of the child. Carefully follow all of the manufacturer's instructions with the safety seat you put in your vehicle. If you do not install and use the safety seat properly, the child may be injured in a sudden stop or collision.

When installing a child safety seat:

- Use the correct safety belt buckle for that seating position.
- Insert the belt tongue into the proper buckle until you hear a snap and feel it latch. Make sure the tongue is securely fastened in the buckle.
- Keep the buckle release button pointing up and away from the safety seat, with the tongue between the child seat and the release button, to prevent accidental unbuckling.



- Place seat back in upright position.

Ford recommends the use of a child safety seat having a top tether strap. Install the child safety seat in a seating position with a tether anchor. For more information on top tether straps and anchors, refer to *Attaching child safety seats with tether straps*.

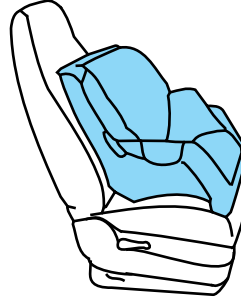


WARNING: Carefully follow all of the manufacturer's instructions included with the safety seat you put in your vehicle. If you do not install and use the safety seat properly, the child may be injured in a sudden stop or collision.

Seating and Safety Restraints

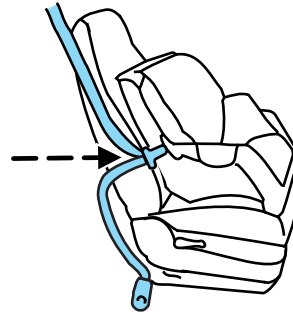
Installing child safety seats with combination lap and shoulder belts

1. Position the child safety seat in a seat with a combination lap and shoulder belt.



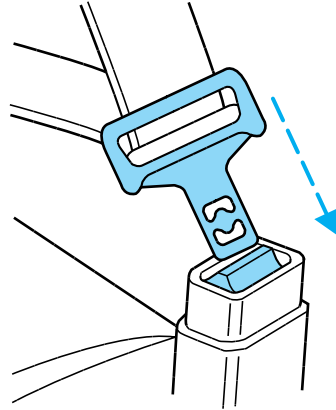
WARNING: Children 12 and under should be properly restrained in a rear seating position whenever possible.

2. While holding the shoulder and lap belt portions together, route the tongue through the child seat according to the child seat manufacturer's instructions. Be sure the belt webbing is not twisted.

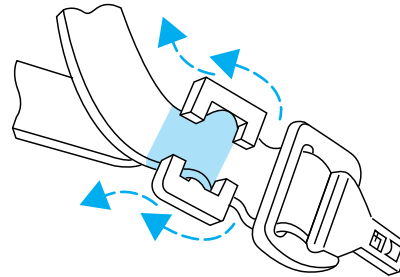


Seating and Safety Restraints

3. Buckle the seat belt. Push down on the child seat and pull on the shoulder portion of the belt to snug the lap belt. Hold the lap and shoulder belts next to the tongue and unbuckle the belt.



4. Install a locking clip over both lap and shoulder belt portions next to the sliding tongue. Rebuckle the belt. Obtain the locking clip kit (part number FO3Z-5461248-A) at no charge from an authorized dealer. A locking clip may also have been provided with your child safety seat.



5. Before placing the child in the seat, forcibly tilt the seat forward and back to make sure the seat is securely held in place. To check this, grab the seat at the belt path and attempt to move it side to side and forward and back. There should be no more than one inch of movement for proper installation.

6. If the child seat is not tight enough, unbuckle the seat belt, move the tongue and locking clip to shorten the lap portion and push down hard on the child seat while you rebuckle the belt.

7. Check to make sure the child seat is properly secured before each use.

8. Ford recommends checking with a NHTSA Certified Child Passenger Safety Technician (CPST) to make certain the child restraint is properly installed.

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Seating and Safety Restraints

Installing child safety seats in the lap belt seating positions

1. Lengthen the lap belt. To lengthen the belt, hold the tongue so that its bottom is perpendicular to the direction of webbing while sliding the tongue up the webbing.
2. Place the child safety seat in the center seating position.
3. Route the tongue and webbing through the child seat according to the child seat manufacturer's instructions.
4. Insert the belt tongue into the proper buckle for the center seating position until you hear a snap and feel it latch. Make sure the tongue is securely fastened to the buckle by pulling on tongue.
5. Push down on the child seat while pulling on the loose end of the lap belt webbing to remove slack from and tighten the belt.
6. Before placing the child into the child seat, forcibly tilt the child seat from side to side and in forward direction to make sure that the seat is securely held in place. To check this, grab the seat at the belt path and attempt to move it side to side and forward and back. There should be no more than one inch of movement for proper installation.
7. Ford recommends checking with a NHTSA Certified Child Passenger Safety Technician (CPST) to make certain the child restraint is properly installed.

Attaching child safety seats with LATCH (Lower Anchors and Tethers for CHildren) attachments

The LATCH system is composed of three vehicle anchor points: two (2) lower anchors located where the vehicle seat back and seat cushion meet (called the “seat bight”) and one (1) top tether anchor located behind that seating position. This vehicle is not LATCH compatible. The vehicle **is not** equipped with the two (2) lower anchors in the seat bight. For forward-facing child seats, the top tether strap must also be attached to the proper top tether anchor, if a top tether strap has been provided with your child seat. Ford Motor Company recommends the use of a child safety seat having a top tether strap. See *Attaching child safety seats with tether straps* and *Recommendations for attaching safety restraints for children* in this chapter for more information.

Seating and Safety Restraints

Tether anchorage hardware

A tethered seat can be installed in the front seat. Put the tether strap over the seatback and attach it to an anchor bracket.

An anchor bracket can be installed to the inside of the back panel of your vehicle.

The anchor bracket must be installed using the instructions provided with the tether anchorage hardware kit.

Tether anchorage hardware kits (part number 613D74) including instructions, may be obtained at no charge from any Ford or Lincoln Mercury dealer.

If you have a Crew Cab, Ford recommends you attach tether safety seats in the rear seating position (if possible) with the tether strap attached to the tether anchorage bracket as shown in the instructions provided with the tether anchor kit.



WARNING: Tighten the anchor according to specifications. Otherwise, the safety seat may not be properly secured and the child may be injured in a sudden stop or collision.

Attaching child safety seats with tether straps

Many forward-facing child safety seats include a tether strap which extends from the back of the child safety seat and hooks to an anchoring point called the top tether anchor. Tether straps are available as an accessory for many older safety seats. Contact the manufacturer of your child seat for information about ordering a tether strap, or to obtain a longer tether strap if the tether strap on your safety seat does not reach the appropriate top tether anchor in the vehicle.

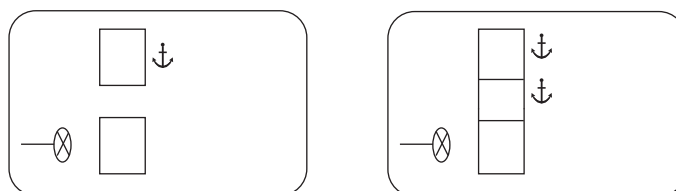
The passenger seats of your vehicle may be equipped with built-in tether strap anchors located behind the seats as described below.

The tether anchors in your vehicle may be straps on the seatback or an anchor bracket mounted to the body shell on the back panel.

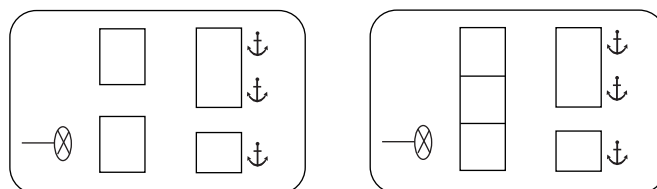
Seating and Safety Restraints

The tether strap anchors in your vehicle are in the following positions (shown from top view):

- **F-Series Regular Cab**



- **F-Series Crew Cab**



Attach the tether strap only to the appropriate tether anchor as shown. The tether strap may not work properly if attached somewhere other than the correct tether anchor.

Once the child safety seat has been installed using the safety belt, you can attach the top tether strap.

Tether strap attachment

1. Route the child safety seat tether strap over the back of the seat.

For vehicles with adjustable head restraints, route the tether strap under the head restraint and between the head restraint posts, otherwise route the tether strap over the top of the seatback. If the top of the safety seat hits the head restraint, raise the head restraint to let the child seat fit further rearward.

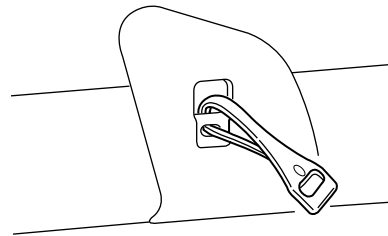
2. Locate the correct anchor for the selected seating position.

Seating and Safety Restraints

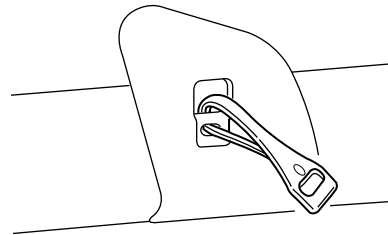
3. You may need to pull the seatback forward to access the tether anchors. Make sure the seat is locked in the upright position before installing the child seat. Refer to the *Folding the rear seat back (Crew Cab)* section in this chapter for information on how to operate the rear seats.

4. Clip the tether strap to the anchor as shown.

- Front seats (Regular Cab)



- Rear seats (Crew Cab)



If the tether strap is clipped incorrectly, the child safety seat may not be retained properly in the event of a collision.

5. Refer to the *Installing child safety seats with combination lap and shoulder belts* and *Installing child safety seats in lap belt seating positions* sections of this chapter for further instructions to secure the child safety seat.

6. Tighten the child safety seat tether strap according to the manufacturer's instructions.

If the safety seat is not anchored properly, the risk of a child being injured in a collision greatly increases.

If your child restraint system is equipped with a tether strap, and the child restraint manufacturer recommends its use, Ford also recommends its use.

Seating and Safety Restraints

Child booster seats

The belt-positioning booster (booster seat) is used to improve the fit of the vehicle safety belt. Children outgrow a typical child seat (e.g., convertible or toddler seat) when they weigh about 40 lb (18 kg) and are around four (4) years of age. Consult your child safety seat owner guide for the weight, height, and age limits specific to your child safety seat. Keep your child in the child safety seat if it properly fits the child, remains appropriate for their weight, height and age AND if properly secured to the vehicle.

Although the lap/shoulder belt will provide some protection, children who have outgrown a typical child seat are still too small for lap/shoulder belts to fit properly, and wearing an improperly fitted vehicle safety belt could increase the risk of serious injury in a crash. To improve the fit of both the lap and shoulder belt on children who have outgrown child safety seats, Ford Motor Company recommends use of a belt-positioning booster.

Booster seats position a child so that vehicle lap/shoulder safety belts fit better. They lift the child up so that the lap belt rests low across the hips and the knees bend comfortably at the edge of the cushion, while minimizing slouching. Booster seats may also make the shoulder belt fit better and more comfortably. Try to keep the belt near the middle of the shoulder and across the center of the chest. Moving the child closer (a few centimeters or inches) to the center of the vehicle, but remaining in the same seating position, may help provide a good shoulder belt fit.

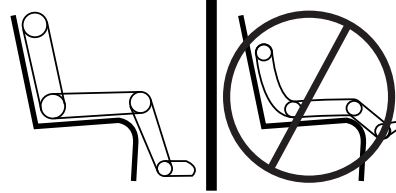
When children should use booster seats

Children need to use booster seats from the time they outgrow the toddler seat until they are big enough for the vehicle seat and lap/shoulder belt to fit properly. Generally this is when they reach a height of at least 4 feet 9 inches (1.45 meters) tall (around age eight to age twelve and between 40 lb (18 kg) and 80 lb (36 kg) or upward to 100 lb (45 kg) if recommended by your child restraint manufacturer). Many state and provincial laws require that children use approved booster seats until they reach age eight, a height of 4 feet 9 inches (1.45 meters) tall, or 80 lb (36 kg).

Seating and Safety Restraints

Booster seats should be used until you can answer YES to ALL of these questions when seated without a booster seat:

- Can the child sit all the way back against the vehicle seat back with knees bent comfortably at the edge of the seat cushion?
- Can the child sit without slouching?
- Does the lap belt rest low across the hips?
- Is the shoulder belt centered on the shoulder and chest?
- Can the child stay seated like this for the whole trip?



Types of booster seats

There are generally two types of belt-positioning booster seats: backless and high back. Always use booster seats in conjunction with the vehicle lap/shoulder belt.

- **Backless booster seats**

If your backless booster seat has a removable shield, remove the shield. If a vehicle seating position has a low seat back or no head restraint, a backless booster seat may place your child's head (as measured at the tops of the ears) above the top of the seat. In this case, move the backless booster to another seating position with a higher seat back or head restraint and lap/shoulder belts, or consider using a high back booster seat.



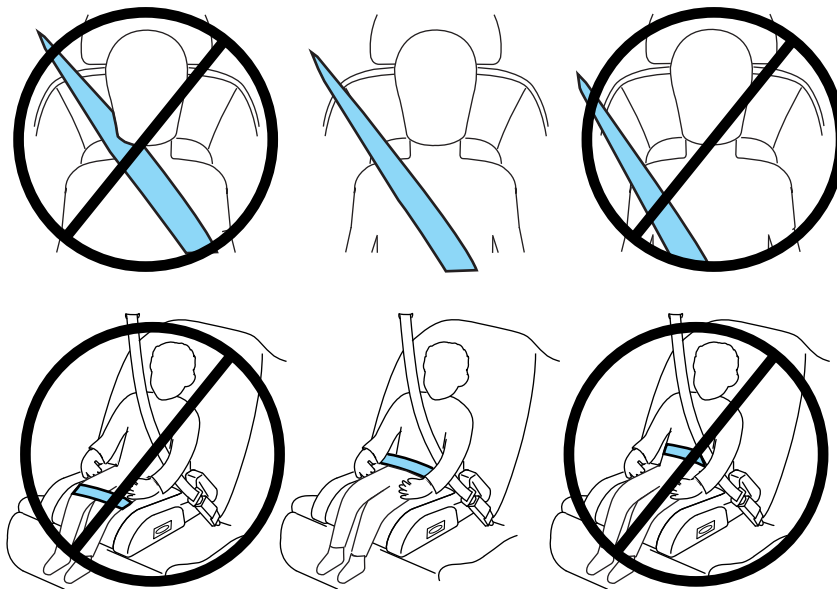
- **High back booster seats**

If, with a backless booster seat, you cannot find a seating position that adequately supports your child's head, a high back booster seat would be a better choice.



Seating and Safety Restraints

Children and booster seats vary in size and shape. Choose a booster that keeps the lap belt low and snug across the hips, never up across the stomach, and lets you adjust the shoulder belt to cross the chest and rest snugly near the center of the shoulder. The drawings below compare the ideal fit (center) to a shoulder belt uncomfortably close to the neck and a shoulder belt that could slip off the shoulder. The drawings below also show how the lap belt should be low and snug across the child's hips.



If the booster seat slides on the vehicle seat, placing a rubberized mesh sold as shelf or carpet liner under the booster seat may improve this condition. Do not introduce any item thicker than this under the booster seat. Check with the booster seat manufacturer's instructions.

The importance of shoulder belts

Using a booster without a shoulder belt increases the risk of a child's head hitting a hard surface in a collision. For this reason, you should never use a booster seat with a lap belt only. It is generally best to use a booster seat with lap/shoulder belts in the back seat.

Move a child to a different seating location if the shoulder belt does not stay positioned on the shoulder during use.

Seating and Safety Restraints

Follow all instructions provided by the manufacturer of the booster seat.



WARNING: Never place, or allow a child to place, the shoulder belt under a child's arm or behind the back because it reduces the protection for the upper part of the body and may increase the risk of injury or death in a collision.

Safety belt maintenance

Inspect the vehicle safety belts and child safety seat systems periodically to make sure they work properly and are not damaged. Inspect the vehicle and child seat safety belts to make sure there are no nicks, tears or cuts. Replace if necessary. All vehicle safety belt assemblies, including retractors, buckles, front safety belt buckle assemblies, buckle support assemblies (slide bar-if equipped), shoulder belt height adjusters (if equipped), shoulder belt guide on seatback (if equipped), child safety seat LATCH and tether anchors, and attaching hardware, should be inspected after a collision. Refer to the child restraint manufacturer's instructions for additional inspection and maintenance information specific to the child restraint. Ford Motor Company recommends that all safety belt assemblies in use in vehicles involved in a collision be replaced. However, if the collision was minor and an authorized dealer finds that the belts do not show damage and continue to operate properly, they do not need to be replaced. Safety belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted.

For proper care of soiled safety belts, refer to *Interior* in the *Cleaning* chapter.



WARNING: Ford Motor Company recommends that all safety belt assemblies used in vehicles involved in a collision be inspected for proper function and replaced, if necessary. Safety belt assemblies not in use during a collision should also be inspected and replaced if either damage or improper operation is noted.

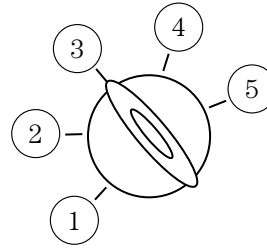


WARNING: Failure to inspect and if necessary replace the safety belt assembly under the above conditions could result in severe personal injuries in the event of a collision.

STARTING

Positions of the ignition

1. ACCESSORY – allows the electrical accessories such as the radio to operate while the engine is not running.
2. LOCK – locks the automatic transmission gearshift lever if equipped with a P (Park) position and allows key removal.
3. OFF – shuts off the engine and all accessories.
4. ON – all electrical circuits operational. Warning lights illuminated. Key position when driving.
5. START – cranks the engine. Release the key as soon as the engine starts.



Starting the engine (diesel engine only)



WARNING: Operation of a diesel engine near flammable vapors in the air may cause the engine speed to increase uncontrollably and over speed. If this situation occurs, mechanical damage, fire, explosion, personal injury or death could result. *Turning off the ignition key does not slow or stop the engine due to uncontrollable fueling of the engine through flammable vapors being drawn into the engine air inlet.* Operation of components such as starter, alternator, electric motors, etc. and static electricity could also ignite flammable vapors.

Do not operate the truck in the possible presence of flammable vapors unless both a complete hazard analysis is performed and necessary additional safety processes and/or equipment such as vapor testing, air intake shutoff devices, ventilation, etc. are utilized. The operator is responsible for using those processes and/or equipment to ensure that the diesel engine and all other components on the truck can be operated safely under the specific conditions and hazards that may be encountered.

Note: When starting the engine, do not press the accelerator as engine damage may result.

Driving

1. Ensure headlamps and all electrical accessories are turned off, the parking brake is applied and the transmission is in the neutral position (or P [Park], if equipped).

2. Turn the key to the on position, but do not start the engine.

In cooler weather, the air intake heater may activate the  light. If the  light illuminates, **do not** crank the engine until it goes off.



WARNING: If equipped with an air intake heater, DO NOT use ether or any other starting fluids. The use of starting fluids (ether) in an engine equipped with an air intake heater could cause an explosion and result in property damage and/or personal injury.

3. When the  light turns off, turn the key to the start position; when the engine starts, release the key.

If the engine does not start after 30 seconds of cranking, allow two minutes for the starter to cool before trying again. Excessive cranking may damage the starter.

After the engine starts:

- On some engines, the  light should illuminate after the engine starts. Allow the engine to idle about three minutes or until the engine coolant temperature gauge begins to rise. Maintain idle speed until the  light turns off to indicate the air intake heater has shut off (approximately six minutes); operating the engine at higher speeds reduces the effectiveness of the air inlet heater.
- Do not increase engine speed until the oil pressure gauge indicates normal pressure (as indicated by the arrows); this should be indicated on the gauge within 15 seconds after starting.
- Idle the engine for three to five minutes before operating with a full load.
- Try to limit engine idle to 10 minutes; excessive idling reduces fuel economy.
- When starting a cold engine, increase the engine RPM slowly to make sure adequate lubrication is available to the bearings.

Starting the engine (gasoline engine only)

Engine starting is controlled by the powertrain control system.

This system meets all Canadian interference-causing equipment standard requirements regulating the impulse electrical field strength of radio noise.

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Driving

When starting a fuel-injected engine, don't press the accelerator before or during starting. Only use the accelerator when you have difficulty starting the engine.



WARNING: Extended idling at high engine speeds can produce very high temperatures in the engine and exhaust system, creating the risk of fire or other damage.



WARNING: Do not park, idle, or drive your vehicle in dry grass or other dry ground cover. The emission system heats up the engine compartment and exhaust system, which can start a fire.



WARNING: Do not start your vehicle in a closed garage or in other enclosed areas. Exhaust fumes can be toxic. Always open the garage door before you start the engine.



WARNING: If you smell exhaust fumes inside your vehicle, have your dealer inspect your vehicle immediately. Do not drive if you smell exhaust fumes.

When the engine starts, the idle RPM runs faster to warm the engine. If the engine idle speed does not slow down automatically, have the vehicle checked. If your vehicle is operated in a heavy snow storm or blowing snow conditions, the engine air induction may become partially clogged with snow and/or ice. If this occurs, the engine may experience a significant reduction in power output. At the earliest opportunity, clear all the snow and/or ice away from the air induction inlet. The following starting instructions are for vehicles equipped with a gasoline engine; if your vehicle is equipped with a diesel engine, refer to *Starting the engine (diesel engine only)* in this chapter.

Before starting the vehicle:

1. Make sure all occupants buckle their safety belts. For more information on safety belts and their proper usage, refer to the *Seating and Safety Restraints* chapter.
2. Make sure the headlamps and electrical accessories are off.
3. Make sure the parking brake is set.
4. Make sure the gearshift is in P (Park).
5. Turn the key to 4 (on) without turning the key to 5 (start).

Driving

Starting a diesel engine with the vehicle on a steep grade

When starting a diesel engine when the loaded vehicle is on a grade, the engine RPM starts to fall slightly when the clutch is engaged; do not disengage the clutch and try to increase engine RPM as this may damage driveline components. The engine recovers as the vehicle begins moving.

Cold weather operation



WARNING: Do not use volatile starting aids such as ether, propane or gasoline in the engine air intake system. Glow plugs may ignite vapors which can cause engine damage or personal injury.

For best engine operation in temperatures of 32°F (0°C) or lower:

- Make sure the batteries are the correct type and are fully charged. Check other electrical components to make sure they're in optimum condition.
- Use a permanent-type engine coolant to protect the engine against damage from freezing.
- If your vehicle is equipped with a water-fuel separator, drain it daily. Fill the fuel tank at the end of daily operation to prevent condensation in the fuel system.
- Use the proper engine oil and maintain it at its proper level.
- At temperatures of -4°F (-20°C) or below, it is recommended that you use a crankcase-mounted coolant heater to improve cold engine starting.
- If operating in arctic temperatures of -20°F (-29°C) or lower, consult your truck dealer for information about special cold weather equipment and precautions.

Note: Idling in cold weather does not heat the engine to its normal operating temperature. Long periods of idling in cold weather can cause a build-up of heavy deposits of carbon and rust on valve stems causing them to stick which, in turn, can cause valvetrain damage.

The use of winter fronts, or other air-restrictive devices mounted in front of the radiator on vehicles with chassis-mounted charge air coolers, are not recommended unless extremely cold weather conditions exist. Air flow restriction can cause high exhaust temperatures, power loss, excessive fan usage and a reduction in fuel economy. If you must use a winter front, the device should have a permanent opening of at least 120 sq in. (774 sq. cm) directly in line with the fan hub.

Hot weather operation

- Use a permanent-type engine coolant to protect the engine against damage from overheating.
- Fill the fuel tank at the end of daily operation to prevent condensation in the fuel system.
- Keep external surfaces of the engine, radiator, charge air cooler, A/C condenser and accessories clean to avoid dirt build-up.
- Above normal coolant temperatures could be experienced while driving in a transmission gear ratio which lugs the engine. To correct this problem, engine speed should be increased by downshifting into the next lower gear.

Restarting after running out of fuel

The fuel system may need to be purged of air, refer to *Running out of fuel* in the *Maintenance and Specifications* chapter.

Engine shutdown (diesel engine only)

Allow the engine to idle for three to five minutes before shutting it down. The larger the engine, the greater the need for this idling period. However, do not let the engine idle for more than 10 minutes.

GENERAL OPERATING INSTRUCTIONS

- Start the vehicle in motion by using the highest gear speed in the transmission that lets the engine easily start the load without slipping the clutch.
- Accelerate smoothly and evenly; rapid acceleration increases fuel consumption without increasing engine performance.
- When approaching a hill, press the accelerator smoothly to start the incline at full power, then shift down as needed to maintain vehicle speed.
- When going down a hill, or long steep grades, prevent overspeeding of the engine; normally, choose the same gear to descend the hill that you use to ascend the hill. The engine governor has no control over engine speed when it is being pushed by a loaded vehicle.
- Operate in a gear that permits an engine speed not in excess of the maximum governed speed or high-idle RPM (no load).
- Always shift to a lower gear at high altitudes to prevent engine smoking.
- **Diesel engines:** Allow the engine to idle for three to five minutes before shutting it down; the larger the engine, the greater the need for this idling period. However, do not let the engine idle for more than 10 minutes.

Driving



WARNING: All vehicles have blind spots. To reduce the risk of severe injury or property damage, never move your vehicle to the side or rear or change lanes without being sure your way is clear on both sides and to your rear.

Backing up



WARNING: To reduce the risk of the possibility of personal injury while backing the vehicle, always be sure your vehicle's path is clear.

Before backing your vehicle, be sure you can do so safely. If anything behind the cab limits your view, do not rely on mirrors alone to ensure that your intended path is clear. If other people are in the vicinity, have someone standing well behind your vehicle and outside of your intended path (visible through an exterior mirror) guide you as you back up.

Although OSHA or some governmental regulations may require the use of an electrical or mechanical back-up alarm to warn bystanders, such an alarm does not ensure that the intended path is clear. When in doubt, get out of the vehicle and visually check the intended path is clear; back-up slowly as to allow others time to move, if necessary.

If an electrical back-up alarm is installed, it should be connected to the back-up lamp circuit.

Parking your vehicle

Always use the parking brake. When parking on a grade, block the wheels and turn the front wheels to one side so that if the vehicle rolls, the front tires act against the curb to stop the vehicle. The front wheels are more effective at stopping a rolling vehicle than the rear wheels.



WARNING: When parking your vehicle, do not leave the transmission in gear; if the key is in the on position and the vehicle rolls, the engine could start. Failure to follow these instructions could result in an unattended vehicle moving, possibly causing personal injury or property damage.

Driving through water

If driving through deep or standing water is unavoidable, proceed very slowly especially if the depth is not known. Never drive through water that is higher than the bottom of the hubs. Traction or brake capability

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Driving

may be limited and your vehicle may stall. Water may also enter your engine's air intake and severely damage your engine, drive axles or the transmission (through the breather ports).

Once through the water, always dry the brakes by moving your vehicle slowly while applying light pressure on the brake pedal. Wet brakes do not stop the vehicle as quickly as dry brakes.

ENGINE AUTOMATIC SHUTDOWN WARNING LIGHT OR CHIME (IF EQUIPPED)

This feature illuminates a light in the instrument cluster and/or sounds a chime indicating that the engine is being shut down in the event of high coolant temperature, low engine oil pressure, high diesel particulate filter soot loading or low engine coolant level. In the event any of these conditions exist, the engine automatically shuts down.

If the engine shuts down, it can be restarted and operated for 30 seconds at a time or until the problem is corrected. Do not attempt to use this restarting feature to drive the vehicle very far as serious engine damage could result.



WARNING: In the event of engine shutdown, make sure the vehicle is safely off the road and the problem is remedied prior to returning to the road. Failure to remove the vehicle from the road could result in an accident, causing serious injury or death.

GENERAL BRAKE INFORMATION

All standard equipment brakes are designed to be self-adjusting. Automatic adjustment, when required, occurs whenever the brakes are applied and released during forward or reverse operation. Refer to the *Scheduled Maintenance Guide* chapter for scheduled maintenance.

Occasional brake noise is normal and often does not indicate a performance concern with the vehicle's brake system. In normal operation, automotive brake systems may emit occasional or intermittent squeal or groan noises when the brakes are applied. Such noises are usually heard during the first few brake applications in the morning; however, they may be heard at any time while braking and can be aggravated by environmental conditions such as cold, heat, moisture, road dust, salt or mud. If a "metal-to-metal," "continuous grinding" or "continuous squeal" sound is present while braking, the brake linings may be worn-out and should be inspected by a qualified service technician.

Know the required stopping distances for all driving conditions that may be encountered. For longer brake lining life, take full advantage of engine braking power when coming to a stop.

Driving



WARNING: Do not drive with your foot resting on the brake pedal. This results in abnormally high brake temperatures, excessive lining wear and increased stopping distances.

Before descending a long or steep hill, shift to a lower gear and avoid continuous application of the brakes. Normally, choose the same gear to descend the hill that you use to ascend the hill.



WARNING: Continuous application of the brakes causes the brakes to overheat, resulting in a temporary loss of braking.

If brakes do not grip well

- If you have been driving through deep water, gently apply the brakes several times while the vehicle is moving slowly.
- Let the brakes cool if you have been using them excessively, as in mountain driving or after several fast, high-speed stops.
- Check brake adjustment.
- Check brake linings for excessive wear.
- Check system air pressure on vehicles equipped with air brakes.

HYDRAULIC BRAKES (IF EQUIPPED)

Full Power Brake System

This system incorporates standard braking, an anti-lock braking system (ABS) and optional Power Park Brake into one fully-integrated hydraulic brake system. With the Full Power Brake System, braking energy is stored, similar to an air brake system, resulting in faster response times and shorter stopping distances. This is accomplished using motor/pump assemblies that pressurize the system by pumping brake fluid into accumulators. This is similar to the air compressor of an air brake system pressurizing the air tanks. The system includes a master cylinder that provides the normal pedal “feel” and transfers the pedal force, via brake fluid, to the main components of the system.

Note: The motor/pumps run momentarily with the ignition switch in the on or run positions or the switch is in the off position and the brake pedal is pressed.

Driving



WARNING: If the red BRAKE warning lamp in the instrument cluster remains illuminated after engine start up, this indicates a system failure in the Full Power Brake System. Stop the vehicle safely as soon as possible and seek service immediately.

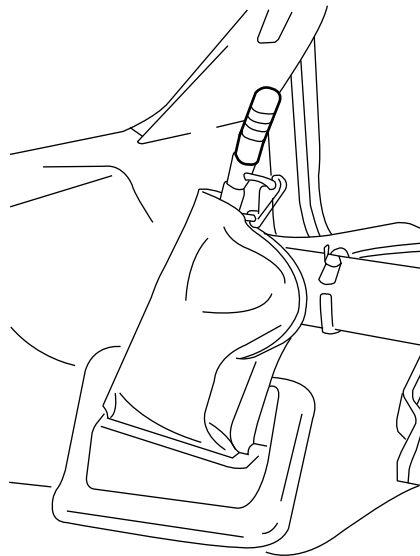
Note: During normal driving the pump/motors may be heard replenishing the accumulators; this is a normal function of the system.

Parking brake

Apply the parking brake whenever the vehicle is parked. To set the parking brake, pull handle up until it snaps into the locked position.



WARNING: Do not use the gearshift selector in place of the parking brake. Always set the parking brake fully AND make sure the gearshift selector is in R (Reverse) for vehicles equipped with manual transmission, P (Park) **(if equipped)** or N (Neutral) for vehicles with automatic transmission. Use of wheel chocks is also recommended in hilly or off-road usage.



WARNING: Unexpected and possible sudden vehicle movement may occur if these precautions are not taken.

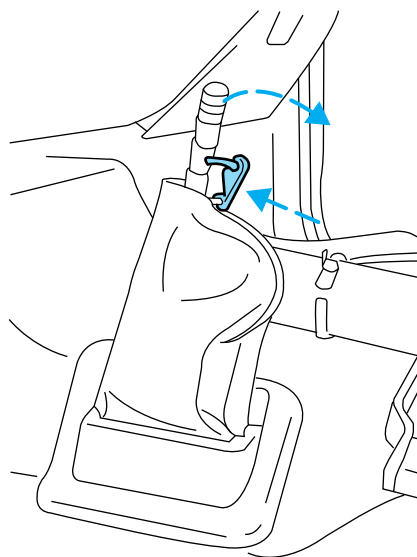
When the parking brake is out of adjustment, seek service immediately.

Driving

The parking brake warning lamp in the instrument cluster illuminates, and remains illuminated (when the ignition is turned on), until the parking brake is released.



Push the palm release lever on the parking brake handle and push down as far as possible to release the brake. Driving with the parking brake on causes the brakes to wear out quickly and reduce fuel economy.



WARNING: If the parking brake is fully released but the parking brake warning lamp remains illuminated, the brakes may not be working properly. See your dealer or a qualified service technician.

The parking brake is not recommended to stop a moving vehicle. However, if the normal brakes fail, the parking brake can be used to stop your vehicle in an emergency. Since the parking brake only applies retardation to the rear wheels, the vehicle's stopping distance increases greatly and the handling of your vehicle is adversely affected.

POWER PARK (PARKING BRAKE) OPTION (IF EQUIPPED)

This feature uses a brake chamber mounted on the chassis to power a spring-applied, hydraulically-released driveline parking brake. It is controlled by a yellow, dash-mounted parking brake knob.

The Power Park Brake is controlled by the park brake dash-mounted, yellow knob-type switch. The switch has three positions: apply (out), neutral (central), and release (in). The switch is spring-loaded to return to the neutral (central) position after being pushed or pulled.

There is no visual indication at the knob that the park brake is applied or released; check the instrument cluster. If the (P) light is illuminated, the parking brake is applied.

Applying the parking brake

To apply the parking brake, pull the yellow, dash-mounted parking brake knob. A red light ((P)) in the instrument cluster should illuminate indicating that the parking brake has been successfully set.

Note: If the (P) light blinks and a warning chime sounds when the control knob is pulled, the parking brake is not functioning properly; seek immediate service from your dealer. Refer to *Parking brake warning system* in this section.

Releasing the parking brake

Note: Read and understand the following steps and perform them whenever you prepare to drive the vehicle.

Note: The parking brake does not disengage unless sufficient system air pressure is available.

Automatic transmissions - dash-mounted push button (Allison 3000 Series) and steering column-mounted (Allison 2200 and 2500) gear selection:

1. With the engine running, press and hold the service brake pedal.
2. Select the appropriate drive gear.
3. Push and hold the yellow, dash-mounted parking brake knob until the (P) light turns off, then release.

Manual transmissions - (TTC 7-speed, Eaton/Fuller 5-speed and 6-speed):

1. With the engine running, press and hold the service brake pedal.
2. Press and hold the clutch pedal.

Driving

3. Select the appropriate drive gear.
4. Push and hold the yellow, dash-mounted parking brake knob until the (P) light turns off, then release.



WARNING: Hold the brake pedal down while moving the gearshift lever from position to position. If the brake pedal is not held down, the vehicle may move unexpectedly resulting in property damage, personal injury or death.

Parking brake light illumination due to low air pressure

If at any time during vehicle operation air pressure becomes too low, the parking brake may apply and the (P) light turns on.

If the parking brake is applied due to low air pressure, immediate service is required to the parking brake system.

Parking brake warning system (hydraulic brake vehicles only)

If the (P) light blinks and a chime sounds when pulling the yellow control knob out, this indicates the parking brake is not functioning properly; seek service for the parking brake immediately.

With the ignition key not in the run position:

- A chime sounds if the parking brake remains released (or in an unknown state). The chime extinguishes in approximately eight minutes or until the parking brake is applied. Seek service for the parking brake immediately.

Parking brake light ((P)) operation (light only works when the ignition key is in the run position):

- On - Parking brake applied
- Off - Parking brake released and no faults/malfunctions
- Blink and chime - Parking brake released (or unknown) and faults/malfunctions exist

Releasing spring manually



WARNING: Do not attempt to disassemble the parking brake chamber under any circumstances. The high spring load may cause serious injury.

If hydraulic pressure is released from the spring brake chamber the power spring applies the brake and, unless hydraulic pressure can be re-established, the spring brake must be released as follows in order to move the vehicle.

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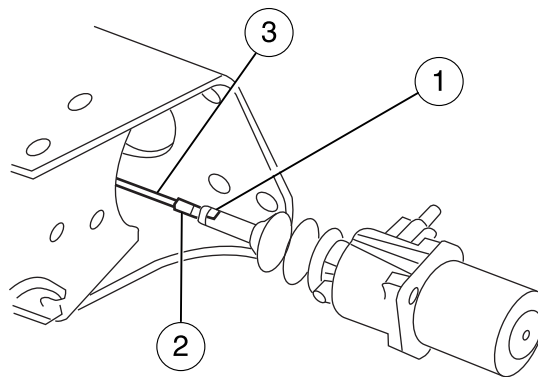
Driving



WARNING: Block the wheels to help prevent the vehicle from moving.



WARNING: Unexpected and possibly sudden vehicle movement may occur if these precautions are not taken.



Loosen the jam nut (1) and un-thread the adjustment rod (2) from the chamber to reduce tension on the cable (3). Continue to un-thread the adjustment rod all the way and remove it from the chamber. The nut and shaft are metric.

AIR BRAKES (IF EQUIPPED)

General air brake information

After starting the engine, give the air compressor time to build up the air pressure to 60 psi (414 kPa) before moving the vehicle.



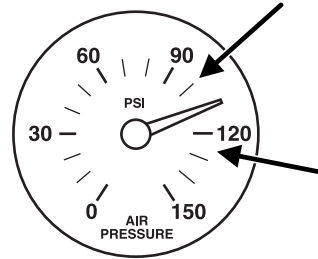
WARNING: Do not drive or continue to drive if the low air pressure buzzer is sounding or the brake warning light is lit. These warnings indicate that air pressure is not to normal operating level. Continued use of the vehicle could result in loss of braking ability.



WARNING: Avoid repeated light application of the brake pedal. This depletes air pressure faster and could result in loss of braking capability.

Driving

Periodically check the air pressure gauge while driving. Pressure should range between approximately 100–125 psi (690–862 kPa). The air compressor governor cut-in and cut-out pressure settings are set at the factory and are not adjustable.



When air pressure is insufficient (below 60 psi [414 kPa]), a warning light illuminates and a buzzer sounds when the ignition is in the on position.



This condition may be caused by excessive brake applications depleting the system air pressure. If this condition occurs, stop driving the vehicle until the compressor has fully recharged the air system.



WARNING: Do not move the vehicle when the air pressure is insufficient because the brake system may be inoperative.

Select a gear ratio to help slow your vehicle before descending grades. Supplement with brakes as required to safely slow the vehicle and avoid overspeeding the engine.

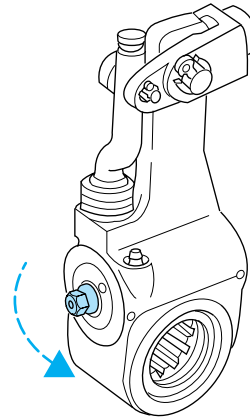
Air chamber stroke indication

Air chamber push rods have orange stroke indicator markers that warn when the braking system requires adjustment or repair. The orange stripe is painted on the air chamber push rod at the slack adjuster stroke dimension which requires service when visible during brake application.

Air brake inspection and adjustment or repairs should be performed by a qualified service technician in accordance with the instructions in the service manual.

Cam brakes - automatic slack adjusters

Standard air brakes (cam) are equipped with automatic brake adjusters. Automatic adjustment occurs during brake applications. Inspect brakes for proper adjustment at the intervals listed in the *Scheduled Maintenance Guide* chapter.



WARNING: Do not manually adjust the automatic slack adjusters to correct excessive push rod stroke as it may result in reduced brake effectiveness and a vehicle crash. Excessive push rod stroke indicates that a problem exists with the automatic adjuster, with the installation of the adjuster, or with foundation brake components that manual adjustment does not remedy. Seek service from a qualified facility for excessive push rod stroke.

Emergency air brake

All vehicles are equipped with a dual brake system. In the unlikely event of a failure of one system, the second system functions for emergency stopping. These systems are all controlled by the brake pedal in the same manner as for normal stops.



WARNING: Do not continue to operate the vehicle with a failure of one of the brake systems. Take the vehicle to your dealer for service immediately.

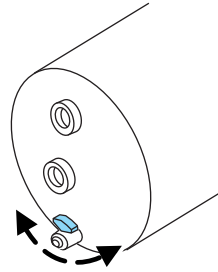
Driving

Air brake reservoir draining



WARNING: Failure to drain air brake reservoirs can result in a reduction or loss of braking ability due to fluid accumulation in the reservoir and/or possible freeze-up during cold weather.

Drain all the air brake reservoirs daily, completely to 0 psi/kPa, by opening the draincock at the ends of the tanks (where accessible). Pull-chains are used when the drains are undercab or otherwise inaccessible). Close draincock after complete draining. Air tanks equipped with automatic moisture ejector valves may also be drained manually as required to maintain a dry air system. Contact your dealer if you are unsure of the air reservoir locations or the draining procedure.



Parking brake



WARNING: Do not use the gearshift selector in place of the parking brake; unexpected and possible sudden vehicle movement may occur if these precautions are not taken. Always set the parking brake fully AND make sure the gearshift selector is in R (Reverse) for vehicles equipped with manual transmission, N (Neutral) for vehicles with automatic transmission (except Allison 2200 transmission) or P (Park) (Allison 2200 transmission).

If the service brakes should fail to operate while the vehicle is in motion, you can make an emergency stop with the parking brake. Since the parking brake only applies stopping power to the rear wheels, the vehicle's stopping distance greatly increases and the handling of the vehicle is adversely affected. Repairs should be made immediately to an inoperative air brake system circuit.

Parking brake control (knob)

Pull the yellow parking brake knob out to apply the parking brake. Push the knob in to release the parking brake.



WARNING: This control is used for parking only. Do not leave the vehicle unattended after setting the parking brake without placing the transmission in R (Reverse) for manual transmission, N (Neutral) for automatic transmission (except Allison 2200 transmission) or P (Park) (Allison 2200 transmission). Use of wheel chocks is also recommended in hilly or off-road usage.

The (P) light illuminates and remains illuminated (when the ignition is turned to the on position) until the parking brake is released.



Releasing spring brake with air pressure

The air system in all vehicles with spring-actuated rear wheel parking brakes is equipped with a tank valve located on the supply or service air tank for connection to an outside air supply. The valve permits the system to be recharged with air from an outside source, releasing the spring-actuated parking brakes. The vehicle may then be towed in an emergency.

An outside air source can be used only if the protected system is in operating condition. If air pressure cannot be restored in the protected air system, the spring-actuated brakes must be released manually.

Driving

Releasing spring brake manually

 **WARNING:** Do not attempt to disassemble the parking brake chamber under any circumstances. The high spring load may cause serious injury if the chamber clamps are removed.

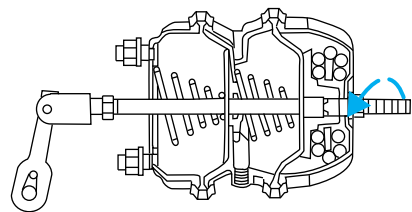
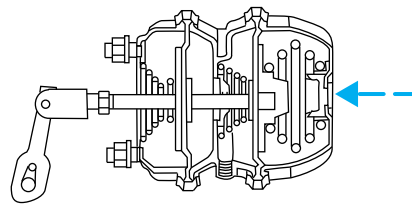
If air pressure is released from the spring brake chamber the power spring applies the brake and, unless air pressure can be re-established, the spring brake must be released as follows in order to move the vehicle.

 **WARNING:** Block the wheels to help prevent the vehicle from moving.

 **WARNING:** Unexpected and possibly sudden vehicle movement may occur if these precautions are not taken.

Impact wrenches should not be used as they may damage the piston and prevent proper caging of the spring. Do not apply more than 50 ft-lb (68 N•m) torque to the release bolt nut.

1. Remove the stud tool and nut from the carrying pocket on the brake chamber assembly.
2. Remove the access plug from the end of the spring chamber.
3. Insert the release stud through the opening in the chamber and into the spring pressure plate.
4. Turn the release stud one-quarter turn to engage the stud tangs with the slot in the pressure plate. Keep the stud engaged and install the nut on the release stud.
5. Tighten the nut until the spring is fully caged and the brakes are released. Do not loosen or remove the release stud and nut unless the brake chamber is completely assembled and is securely clamped.
6. When the air pressure is restored, unscrew and remove the release stud and install in the carrying pocket. Install the access plug.

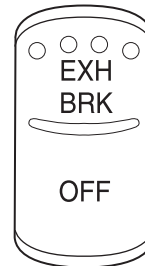


EXHAUST BRAKE (IF EQUIPPED)

An exhaust brake is an auxiliary braking system that assists, but does not replace, the primary service brake system. It is intended to help control vehicle speed; it is not a vehicle stopping device.

A switch on the instrument panel, in combination with the accelerator and clutch pedal, allows the operator to make maximum use of the exhaust brake in the following conditions:

- off-highway driving
- mountain driving
- heavy traffic
- high speed highway driving



To operate the brake, push the switch up to turn it on. Push the switch down to turn it off.

Note: Before starting the engine, make sure that the exhaust brake switch is pushed down to the off position. Do not turn the exhaust brake on until the engine has reached normal operating temperature.

While approaching a steep grade, make sure that the exhaust brake switch is in the on position. The exhaust brake actuates as soon as you remove your foot from the accelerator pedal.

Before descending a hill or steep grade always select the proper gear. If the transmission is taken out of gear while descending, it is possible that you can't select another gear because of maximum RPM being governed.

Make sure the engine speed does not exceed the maximum allowable engine RPM; exceeding the maximum allowable engine RPM can result in damage to the engine. Apply the service brakes to reduce the engine RPM or make a slower descent by using a lower gear.

While going down the grade, use a low enough gear to descend safely with a minimum application of the service brakes. As a general guideline, use the same gear as you use to ascend the hill.

Note: Engine speed has a major influence of retarding performance. When engine speed is maintained at the maximum allowable level, the exhaust brake operates at peak performance.

Note: Maximum exhaust brake performance is related to the type of transmission your vehicle is equipped with.

Driving

Note: Manual transmissions should be downshifted to the lowest gear possible, without exceeding the maximum RPM limit of the engine. This maximizes the exhaust brake's retarding effect.

Note: Exhaust brakes operate effectively with automatic transmissions, but performance varies with engine speed and the gear selected by the transmission.

Note: Installing an exhaust or auxiliary brake does not necessarily protect the engine from exceeding maximum governed speed. The primary brakes should be used to make sure the engine never exceeds maximum governed speed under any conditions.



WARNING: The exhaust brake is not recommended for use on slippery or low traction road surfaces. Under these conditions a loss of vehicle control could occur.

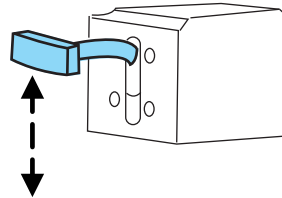
Exhaust brake operating characteristics

When you remove your feet from both the accelerator and clutch pedals and the exhaust brake switch is in the on position, the exhaust brake is activated. The following conditions should exist if the brake is operating properly:

- A slight change in the sound of the engine when the exhaust brake is activated.
- A smooth braking effect; do not expect a retarding effect similar to sudden, hard application of the service brakes.
- The retarding force possibly felt acting against your body when the brake is applied, depending on the grade and vehicle load. The brake's retarding force is actually preventing the vehicle from going much faster.
- Engine temperature remains in the normal operating range.
- During a descent, the tachometer usually shows a drop in engine RPM depending on the grade and the vehicle load.
- Road speed usually decreases when the exhaust brake is applied during a descent, except when the vehicle is carrying a heavy load or the grade is extremely steep. In these instances, you may need to apply the service brakes occasionally.

TRAILER BRAKE HAND CONTROL (IF EQUIPPED)

The hand control, located on the right-hand side of the instrument panel, is used to apply the trailer service brakes which are independent of the truck or tractor service brakes.



WARNING: The hand control should never be used to apply the brakes when the tractor and trailer are parked unattended. Air may leak from the system and the vehicle could possibly move, resulting in possible property damage, personal injury or death.

The hand control operates a valve that provides gradual control of air pressure applied; when the valve is only partially applied, the trailer brakes can be overridden by pressing fully on the brake pedal.

To apply the trailer brakes using the hand control, move the lever downward. The further the lever is pushed down, the greater the air pressure is applied to the brakes. The lever remains in place until manually moved.

To release the trailer brakes, move the lever up completely.

TRAILER AIR SUPPLY AND PARKING BRAKE MODULAR CONTROLS (IF EQUIPPED)

The trailer air supply valve delivers air to the trailer supply and automatically pops out, shutting off the trailer supply, if pressure is decreased to approximately 35 psi (249 kPa).

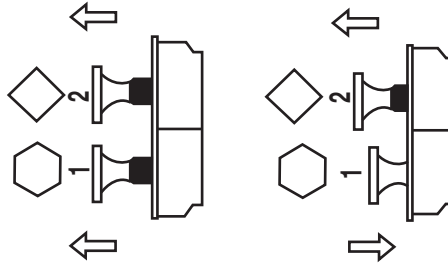


The parking brake controls the spring brakes on the tractor. When the knob is pulled out it causes the trailer supply valve to pop out, applying both the tractor and trailer parking brakes. The trailer brakes may be independently released by pushing only the trailer air supply valve in.

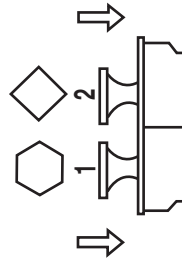


Driving

Initial charge

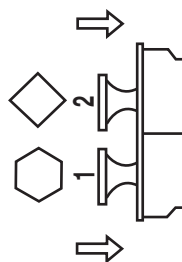


With the air system completely discharged, both knobs (1 and 2) are out. When the air pressure reaches 70 psi (483 kPa) the trailer air supply (1 – red knob) may be pushed in and should stay in, charging the trailer air system and releasing the trailer brakes.



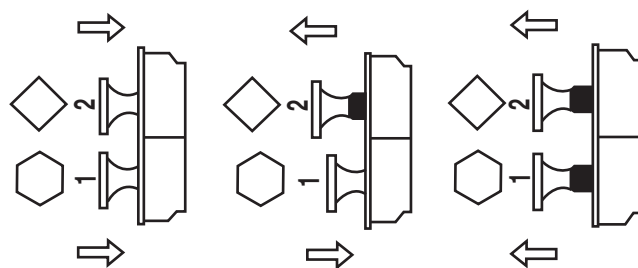
The parking brake (2–yellow knob) can now be pushed in and supply air to the tractor spring brakes, releasing them.

Normal driving position



With both knobs pushed in, air is then supplied to both trailer and tractor spring brakes and all brakes are released.

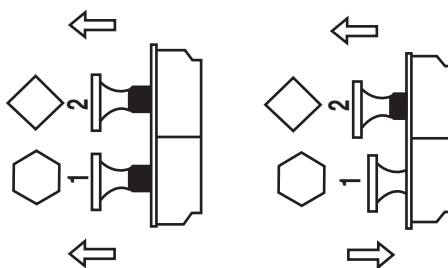
System park



With both knobs pushed in (normal driving position), the parking brakes for both the tractor and trailer can be applied by pulling the parking brake knob (2) out, exhausting air from the tractor spring brakes, simultaneously causing the trailer air supply valve to pop out, applying the trailer brakes.

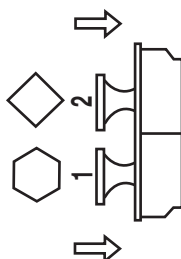
Driving

Trailer charge



If both knobs are out, and you want to recharge the trailer while leaving the tractor spring brakes applied, the trailer air supply (1) can be pushed in to recharge the trailer air supply line. This mode may also be used to park a combination vehicle with tractor spring brakes.

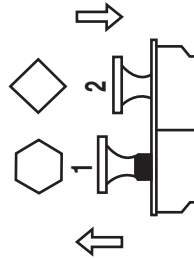
Automatic application



If both knobs are pushed in and the brake system air pressure is reduced to approximately 35 psi (249 kPa), the trailer air supply (1) knob automatically pops out applying the emergency or parking brakes on the trailer. If the trailer air supply (1) knob is manually held in and the air pressure is reduced to approximately 30 psi (207 kPa), a tripper piston within the valve moves, exhausting the trailer air supply, applying the trailer brakes. Further reduction of air pressure, while holding the trailer air supply knob in, causes the parking brake knob to pop out at 25 psi (172 kPa).

Driving

Actuation of trailer park (emergency) or tractor bobtail position



To actuate the trailer brakes only, pull out the trailer air supply knob (1). The trailer brakes are now applied whether emergency or spring brakes are used on the trailer.

This mode is also used when the tractor or truck with trailer is used during bobtail operation.

ANTI-LOCK BRAKE SYSTEM (ABS)

Your vehicle is equipped with an anti-lock braking system (ABS). This system helps you maintain steering control during emergency stops by keeping the brakes from locking. Noise from the ABS pump motor and brake pedal pulsation may be observed during ABS braking; any pulsation or mechanical noise you may feel or hear is normal.

When hard braking is required, apply continuous force on the brake pedal. Do not pump the brake pedal since this reduces the effectiveness of the ABS and increases your vehicle's stopping distance. The ABS activates immediately, allowing you to retain steering control during hard braking and on slippery surfaces. However, the ABS does not decrease stopping distance.

ABS warning light

The  light in the instrument cluster momentarily illuminates when the ignition is turned on. If the light does not illuminate during start up, remains on after the vehicle reaches 5–10 mph (8–16 km/h), or flashes, the ABS may be disabled and may need to be serviced.

Even when the ABS is disabled, normal braking is still effective. If the  light illuminates with the parking brake released, have your brake system serviced immediately.

Driving

TRACTION CONTROL (IF EQUIPPED)

Your vehicle may be equipped with a traction control system which helps you maintain stability and steerability, especially on slippery road surfaces such as snow- or ice-covered roads and gravel roads, by reducing engine power and/or selectively applying the rear brakes.

Note: The traction control system does not apply the brakes when vehicle speed is above 25 mph (40 km/h).

When the traction control switch is pressed, standard traction control changes to Off Road or Mud/Snow traction mode and the traction control light illuminates and flashes slowly. If a traction event occurs, in either mode, the light flashes rapidly. The standard traction control can be selected by pressing the traction control switch again or is automatically selected at next ignition cycle.



During traction control operation, the traction control light flashes rapidly and the engine does not "rev-up" when you press further on the accelerator; this is normal system behavior and should be no reason for concern. If the traction control light does not flash during a traction control event or stays illuminated, the system is not functioning properly, take your vehicle to your dealer for service.



If you should become stuck in snow or ice or on a very slippery road surface, try switching to the Off Road or Mud/Snow mode. This may allow excess wheel spin to "dig" the vehicle out and enable a successful "rocking" maneuver.



WARNING: Aggressive driving in any road conditions can cause you to lose control of your vehicle increasing the risk of severe personal injury or property damage. The occurrence of a traction control event is an indication that at least some of the tires have exceeded their ability to grip the road; this may lead to an increased risk of loss of vehicle control, vehicle rollover, personal injury and death. If you experience a severe road event, SLOW DOWN.

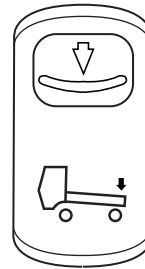
AIR SUSPENSION (IF EQUIPPED)

The air suspension system automatically adjusts to different loads to maintain a constant frame height, allows for ease of vehicle loading and provides improved vehicle ride and increased driver comfort.

Note: The vehicle must not be operated without air in the suspension springs. Operating the vehicle without air in the air suspension springs damages the suspension, degrades ride performance and may cause property damage.

Air suspension dump switch (if equipped)

The system is controlled by a switch located in the overhead switch pack which operates only when the ignition is in the accessory or on positions and the air tanks have sufficient pressure to fill the air springs. When the ignition is turned off, the suspension remains in whatever state it was last set.



Pressing the upper portion of the switch exhausts air from the air springs, lowering the frame for loading. Pressing the lower portion of the switch fills the air springs so the vehicle remains at normal ride height.

The air suspension warning lamp illuminates when the switch has been activated to release air pressure in the rear air shocks.

Never drive the vehicle when the warning lamp is illuminated and there is no (or low) air pressure in the shocks.

Note: The suspension dumps air when the ignition is in the accessory or on position, but only fills when the ignition is in the on position.

**CK
SUSP**

Driving

Tractor-trailer connections



WARNING: To reduce the risk of personal injury, use extreme caution when making brake and light connections. Inclement weather and accumulated road contamination deposits on handhold and stepping surfaces require extra care to avoid slip and falls. Provide adequate lighting of working areas.



WARNING: Do not climb on the back of the tractor unless it has been provided with a deck plate and handholds. Use a three-point stance when climbing up and down from a deck plate. Do not jump from the vehicle. Whenever possible, make all connections while standing on the ground.

Connecting and disconnecting a trailer with air suspension and air suspension dump switch (if equipped)

When connecting to a trailer:

- Press the lower portion of the dump switch to exhaust air from the air suspension system.
- After making the connection to the trailer, press the upper portion of the dump switch, then raise the landing gear.

When disconnecting the trailer:

- Lower the landing gear, then press the lower portion of the dump switch.
- Disconnect the brake hoses, trailer-side and rear light connectors, then pull the release lever on the fifth-wheel.

The upper portion of the dump switch must be pressed before operating with a trailer or operating in the bobtail mode.

Suspension conversions

It is not recommended, or approved, that suspension conversions be performed. However, it is understood that, on occasion, aftermarket add-on suspensions are installed by others on the truck chassis which allow operator control for weight transfer from other axles (i.e., air lift axles).



WARNING: When operating a loaded vehicle, the driver must keep all adjustable axles on the ground at all times, supporting their share of the vehicle's load. Failure to do so can overload other axles, tires, wheels, springs, steering components, brakes and frames, resulting in early component failure, loss of vehicle control, possible property damage and personal injury.

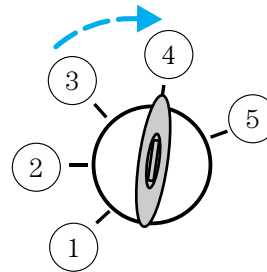
BRAKE-SHIFT INTERLOCK

Vehicles equipped with a gasoline engine have a brake-shift interlock feature that prevents the gearshift lever from being moved from P (Park) when the ignition is in the on position and the brake pedal is not pressed.

If you cannot move the gearshift lever out of P (Park) with the ignition in the on position and the brake pedal pressed, it is possible that a fuse has blown or the vehicle's brake lamps are not operating properly. Refer to *Fuses and relays* in the *Roadside Emergencies* chapter.

If the fuse is not blown and the brake lamps are working properly, the following procedure will allow you to move the gearshift lever from P (Park):

1. Apply the parking brake, and turn the engine off.
2. Remove the lower finish panel below the steering column
3. Turn the key to on (position 4), but do not start engine.

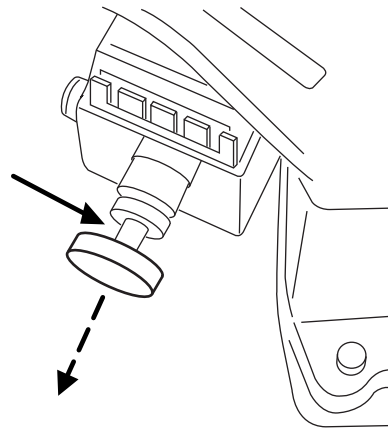


4. Pull back on the solenoid, and at the same time, shift the transmission into N (Neutral).
5. Start the vehicle.

See your authorized dealer as soon as possible if this procedure is used.



WARNING: Do not drive your vehicle until you verify that the brake lamps are working.



Driving



WARNING: When doing this procedure, you will be taking the vehicle out of park which means the vehicle can roll freely. To avoid unwanted vehicle movement, always fully set the parking brake prior to doing this procedure. Use wheel chocks if appropriate.



WARNING: If the parking brake is fully released, but the brake warning lamp remains illuminated, the brakes may not be working properly. See your authorized dealer.

AUTOMATIC TRANSMISSION OPERATION (IF EQUIPPED)

Main transmission, auxiliary transmission, transfer case and power take-off (PTO) control shift patterns can be found on a placard or decal on the driver's sun visor, on the instrument panel or on the shift control itself.

The main transmission control is used to select the various gear ratios or speeds of the transmission. Selecting D (Direct Drive), does not change the transmission gear ratio, but is used where the gear ratios in the main transmission are adequate to handle the vehicle operation.

If the transmission fails to shift properly, check the inline 10A fuse located in the battery cables above the battery.



WARNING: Hold the brake pedal down while you move the gearshift lever between positions. If you don't hold the brake pedal down, your vehicle may move unexpectedly and cause property damage, personal injury or death.

6-speed TorqShift® transmission

P	R	N	D	4	2	1
---	---	---	---	---	---	---

This vehicle is equipped with an adaptive transmission shift strategy. Adaptive transmission shift strategy offers the optimal transmission operation and shift quality. When the vehicle's battery has been disconnected for any type of service or repair, the transmission will need to relearn the normal shift strategy parameters, much like having to reset your radio stations when your vehicle battery has been disconnected. The adaptive transmission shift strategy allows the transmission to relearn these operating parameters. This learning process could take

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several transmission upshifts and downshifts; during this learning process, slightly firmer shifts may occur. After this learning process, normal shift feel and shift scheduling will resume.

P (Park)

This position locks the transmission and prevents the rear wheels from turning.

To put your vehicle in gear:

1. Start the engine
2. Press the brake pedal
3. Move the gearshift lever into the desired gear

To put your vehicle in P (Park):

1. Come to a complete stop
2. Move the gearshift lever and securely latch it in P (Park)



WARNING: Always set the parking brake fully and make sure the gearshift is latched in P (Park). Turn the ignition to the off position and remove the key whenever you leave your vehicle.

R (Reverse)

With the gearshift lever in R (Reverse), the vehicle will move backward. Always come to a complete stop before shifting into and out of R (Reverse).

N (Neutral)

With the gearshift lever in N (Neutral), the vehicle can be started and is free to roll. Hold the brake pedal down while in this position.

D (Drive)

This is the normal driving position for the best fuel economy. This position allows automatic upshifts and downshifts through gears one through six.

4 (Fourth)

This position allows automatic upshifts and downshifts in gears one through four.

2 (Second)

Use 2 (Second) to start-up on slippery roads or to provide additional engine braking on downgrades.

Driving

1 (First)

- Provides maximum engine braking.
- Allows upshifts by moving gearshift lever.
- The transmission will not downshift into 1 (First) at high speeds; it will downshift to a lower gear and then shift into 1 (First) when the vehicle reaches slower speeds.

Forced downshifts

- Allowed in 4 (Fourth).
- Press the accelerator to the floor.
- Allows transmission to select an appropriate gear.

Allison 2200 with parking pawl feature

Note: For Allison automatic transmission-equipped vehicles, also refer to the separate *Allison Transmission Operator's Manual*.

A parking pawl effectively grounds the transmission's output shaft preventing rotation of the driveline. If the vehicle is stationary, selecting the P (Park) position places the transmission in neutral and engages the parking pawl. Always use the parking brake when parking the vehicle.



WARNING: Always set the parking brake fully. Do not use the gearshift in place of the parking brake.

Note: If the P (Park) position is selected when the vehicle is in motion, the parking pawl mechanism ratchets and **DOES NOT** hold the truck.



WARNING: To avoid sudden, unexpected vehicle movement and possible personal injury or death:

1. Bring the vehicle to a complete stop.
2. Shift the transmission into P (Park). Slowly lift your foot from the brake pedal to engage the transmission parking pawl mechanism.
3. Apply the parking brake and make sure it is holding properly. Do not rely solely on the parking mechanism of the transmission.)
4. Turn the engine off when you leave the vehicle. **Never leave the vehicle unattended when the engine is running.**

Allison 2500

This transmission is available with a column-mounted gearshift lever. The gear positions are displayed on the RNDL in the instrument cluster.



WARNING: To avoid sudden, unexpected vehicle movement and possible personal injury or death:

1. Bring the vehicle to a complete stop.
2. Shift the transmission into N (Neutral).
3. Apply the parking brake and make sure it is holding properly.
4. Turn the engine off when you leave the vehicle. **Never leave the vehicle unattended when the engine is running.**

Transmission fluid operating temperatures - 2200/2500 models

Allison 2200 and 2500 models: The sump/fluid reservoir temperatures should not exceed 250°F (120°C). The converter temperature should not exceed 300°F (144°C). The sump/fluid reservoir temperature should not exceed 250 F (120 C).

TorqShift® 6-Speed models: The sump/fluid reservoir temperatures should not exceed 250°F (120°C).

Allison 3000 series

The Allison 3000 Series offers two shift modes: Performance and Economy. Performance Mode gives the best all-around transmission operation; Economy Mode provides operation at lower engine RPM while maintaining adequate performance. The transmission defaults to Performance Mode when you start the engine. Pressing MODE on the shifter activates Economy Mode and illuminates the Mode ON lamp.

If the engine speed is above idle when a gear is selected using the shifter, the vehicle won't move; the shifter must be moved to re-select a gear after the engine speed returns to idle.

Note: For more information regarding the Allison 3000 Series, refer to the separate *Allison 3000 Series Operator's Manual*.

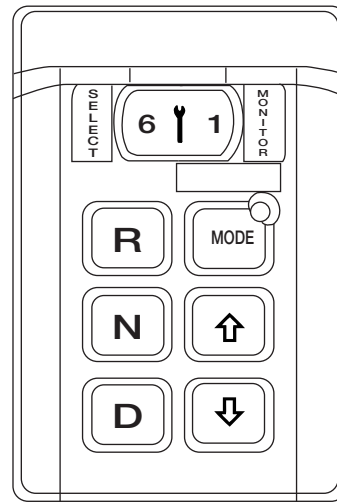
Torque lock

If your vehicle is parked on an incline and P (Park) is not properly engaged (the parking brake is not applied before the transmission is shifted into P [Park]), the weight of the vehicle may generate an excessive amount of torque on the parking pawl, making it difficult to shift the transmission out of P (Park). Hold the brake pedal down while shifting out of P (Park), then release the parking brake.

Driving

Allison 3000 series push-button shifter

To shift the transmission into R (Reverse) or D (Drive), press the brake pedal, press R or D on the shifter, then release the brake pedal. To select a lower range when in D (Drive), press the down-arrow button. To select a higher range when in D (Drive), press the up-arrow button. To place the transmission in N (Neutral), press N.



Allison 3000 prognostics

Allison 3000 Series transmissions are equipped with the Allison Prognostics feature that can alert the driver to needed transmission maintenance and transmission fluid/filter life. Refer to the separate Allison transmission manual for complete details.

CLUTCH (IF EQUIPPED)

Do not ride or slip the clutch as this causes unnecessary heat and wear. Maintain the specified clutch adjustment to prolong its life and regularly inspect the clutch control linkage for tightness. Refer to the *Scheduled Maintenance Guide* chapter for other maintenance information. When adjustment of the clutch is necessary, it is very important that the work be performed properly or early clutch failure may result and a costly clutch overhaul may become necessary. Clutch work should only be performed by a qualified technician.

Note: Continued use of a damaged or worn clutch, prolonged clutch slippage or downshifting at excessive speeds can result in a failure of the engine, transmission or clutch components.

Note: To avoid premature clutch wear and failure, do not drive with your foot resting on the clutch pedal or use it to hold the vehicle at a standstill on an upgrade as when waiting for a traffic light.

Engaging the clutch

- **Always start in the proper gear.** An empty vehicle can start in a higher gear than a fully loaded vehicle. Starting in too high a gear can cause clutch slippage and excessive heat and wear on the clutch. A gear that starts the vehicle moving at idle speed is the correct gear. If the engine has to be revved to get the vehicle going, the gear selection is too high.
- **Do not shift until the vehicle has reached the proper speed.** Upshifting before the vehicle has reached the proper speed can cause clutch slippage and excessive heat and wear on the clutch.
- **Never hold a vehicle on a grade with the clutch.** This causes the clutch to slip and can actually burn up the clutch.
- **Never coast with the clutch disengaged.** The high RPM (sometimes over 10,000), can actually burst the facing material of the clutch.
- **Never engage the clutch while coasting.** Re-engaging the clutch after coasting may not only cause a great shock to the clutch, but the whole drivetrain. Internal engine damage and/or clutch and flywheel failure can result from this.

If the transmission is equipped with a ceramic clutch, you must start the vehicle moving in first gear and engage the clutch before pressing the accelerator at idle. Also, don't try to slip the clutch by raising engine RPM and riding or feathering the clutch pedal since this causes erratic engagement which can cause engine stalling and potential serious damage to driveline components.

Clutch brake (non-synchronized transmissions) - Vehicle stationary

A clutch brake is used to stop transmission input shaft rotation so that the initial 1 (First) or R (Reverse) gear selection can be accomplished when the vehicle is stationary and the engine is at idle speed. Clutch brake application occurs in the last inch (25 mm) of clutch pedal travel.

When using the clutch brake, fully press the clutch pedal and shift the transmission into 1 (First) or R (Reverse). If the transmission won't go into one of these gears, slowly release the clutch pedal while applying light pressure on the transmission shift lever until it shifts into gear.

Note: After engagement of 1 (First) gear, **do not** use the clutch brake for upshifting or downshifting. If you do, clutch brake life shortens and gear selection shift efforts may increase.

Driving

Double-clutch procedures - non-synchronized transmissions

In order to properly upshift or downshift:

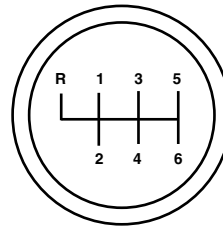
1. Press the clutch pedal to disengage the clutch.
2. Shift the transmission into neutral.
3. Release the clutch pedal.

If upshifting, wait until the engine speed matches the transmission speed of the gear you are selecting.

If downshifting, accelerate the engine until the engine speed matches the input speed of the gear you are selecting. Press the clutch pedal immediately and shift into the desired gear, then release the clutch pedal.

MANUAL TRANSMISSION OPERATION (IF EQUIPPED)

Manual transmission shift patterns are displayed on either the shift lever knob or the sun visor. Study this information carefully before you drive the vehicle even though you may be familiar with similar units. Do not attempt to drive the vehicle without knowing the exact shift pattern of the transmission. Consult your authorized dealer if any questions exist as to the shifting instructions posted in your vehicle.



Driving hints

The following driving hints are provided as a brief, general guide in operating the different manual transmissions used in your vehicle.

- When shifting into 1 (First) or R (Reverse) with vehicle standing still, quickly release and press the clutch pedal (if necessary to complete gear engagement).
- Always use the lowest (or most appropriate) gear to start the vehicle.
- Always use a gear ratio low enough to allow the engine to operate above the minimum engine operation speed range.
- Do not lug the engine.
- Do not slam or jerk the gearshift lever into gear.
- When more power is required, shift to a lower gear and accelerate the engine near the governed speed.

Driving



WARNING: Do not coast the vehicle with the clutch pedal pressed or with the transmission in neutral. This practice could result in loss of vehicle control.

To go forward

With the engine idling, press the clutch pedal in and shift into 1 (First). Engage the clutch while pressing the accelerator to start forward. Operate the clutch and upshift as required by driving conditions.

To go backward

Put the gearshift lever in R (Reverse) and engaging the clutch while pressing lightly on the accelerator.

Shifting with a synchronized transmission

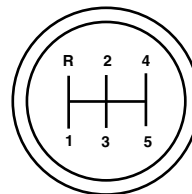
With the clutch pedal pressed in, use the 2 (Second) gear synchronizer to stop the clutch disc rotation; this allows smooth engagement of 1 (First) or R (Reverse). To complete the gear engagement, it may be necessary to apply light pressure to the gearshift lever during initial engagement of the clutch. It takes a second or two to match gear speeds; steady pressure on the gearshift lever helps the synchronizer perform its job more quickly. If the gearshift lever is forced into position, this action defeats the purpose of the synchronizer by causing gear clash.

Shifting with a non-synchronized transmission

Refer to *Clutch brake* and *Double clutch procedures* in the *Clutch* section of this chapter.

Operating the Eaton FS-5205A 5-speed transmission

This transmission is equipped with five forward gears and one reverse; gears 2–5 are synchronized. The shift pattern is embossed on the gear shift knob.

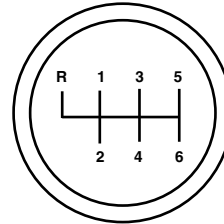


Do not shift the transmission into R (Reverse) while the vehicle is moving as this could damage the transmission.

Driving

Operating the Eaton FS-5406A, FS-5406N, FS-6406A and FSO-6406A 6-speed transmissions

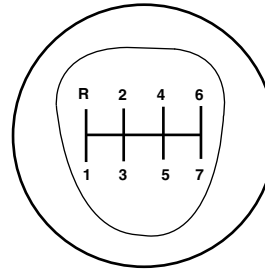
These transmissions are equipped with six forward gears and one reverse; all forward gears are synchronized. The shift pattern is embossed on the gear shift knob.



Do not shift the transmission into 1 (First) or R (Reverse) while the vehicle is moving as this could damage the transmission.

Operating the Spicer ES56-7B and ES066-7B 7-speed transmissions

These transmissions are equipped with seven forward gears and one reverse; gears 2-7 are synchronized. The shift pattern is embossed on the gear shift knob.



Do not shift the transmission into 1 (First) or R (Reverse) while the vehicle is moving as this could damage the transmission.

POWER TAKE-OFF (PTO) OPERATION (IF EQUIPPED)

Vehicles equipped with an Allison automatic transmission (except Allison 3000 Series applications)

The PTO can be operated while the vehicle is standing or moving. To engage the PTO, apply the brakes and shift to any gear other than N (Neutral), then engage the PTO.

If engagement is prevented by the gear teeth not meshing properly, release the brakes and allow the vehicle to creep slightly or shift the selector to N (Neutral) and then back into gear. The PTO should never be engaged by clashing the gear teeth as this may damage the PTO unit and the transmission PTO drive gear teeth which could result in further damage to the transmission and PTO.

Driving

PTO operation with vehicle stationary

Stop the vehicle, idle the engine and set the parking brake. Make sure the gear selector is in any forward drive range, then engage the PTO. After the PTO is engaged, move the range selector to N (Neutral). Increase the engine speed until the desired PTO operation speed is obtained. To disengage the PTO after operation with the vehicle standing, release the throttle, allow the drive equipment to come to a stop, and then disengage the PTO.



WARNING: When the PTO is operated with the vehicle stationary, the transmission must be placed in N (Neutral) with the parking brake set. If the transmission is not in N (Neutral) and is equipped with a remote throttle control, an increase in engine speed can overpower the parking brake and cause the vehicle to move, possibly resulting in personal injury and/or property damage.

PTO operation while vehicle is moving

After the PTO is engaged for driven vehicle operation, shift to the desired range and drive the vehicle. The speed of the PTO, during this period of operation, always maintains direct relation to vehicle speed. PTO speed decreases in relation to vehicle (transmission output) speed as shifts to a higher gear occur. When operating the PTO while the vehicle is moving, the PTO may be disengaged whenever it is no longer required. When there is no load on the PTO gear, it can be pulled out of engagement.

Vehicles equipped with an Allison 3000 Series automatic transmission

The PTO drive gear is engine-driven and provides direct engine power. The PTO can be operated when the vehicle is either stationary or moving. The PTO gear is in constant mesh with the drive gear in the torque converter housing. A friction clutch or constant drive is used to transmit power to the PTO.

Vehicles equipped with a manual transmission

Transmission-mounted PTO units are available for local installation on your vehicle. See your *Body Builder's Layout Book* for restrictions on use and installation of PTO units.

To engage the PTO unit, stop the vehicle and place the transmission in N (Neutral). Press the clutch and allow the gears to stop rotating, then engage the PTO unit. The PTO can also be selected with the transmission in gear as long as the clutch is pressed.

When operating the PTO with the vehicle stationary, first set the parking brake (chock the wheels if the vehicle is on a hill or another uneven surface).

Driving

REAR AXLE INFORMATION

Axle operating temperature normally don't exceed 100°F (38°C). If the operating temperature exceeds 230°F (110°C), the rate of axle lubrication oxidation increases and shorten the life of the lubricant and seals, requiring axle lubrication changes to become more frequent to preserve the axle. Extreme Pressure (EP) lubricants should not be run consistently above 230°F (110°C).

Gross axle weight

Your truck has gross axle weight, gross vehicle weight and gross combination weight ratings. Do not exceed these ratings.



WARNING: Exceeding these ratings by overloading can cause component failure resulting in property damage, personal injury or death.

Rear axles with locking or limited-slip differentials (if equipped)

If your vehicle is equipped with a locking or limited-slip differential, note the following:

- Power is transmitted to the opposite wheel should one of the wheels begin to slip.
- Both wheels must be raised off the ground should it be necessary to operate one wheel with the vehicle stationary.



WARNING: If both wheels are not raised off the ground, the one wheel that is not raised may pull the vehicle off its support, possibly resulting in personal injury

Driver-controlled differential lock

To prevent the vehicle from moving when servicing the wheels, tires or brakes, turn the engine off and raise all drive wheels of the locker differential axle. Axles equipped with NoSPIN Detroit Locker differentials deliver power to both wheels even when only one wheel is on the ground.



WARNING: Failure to raise all drive wheels with this type of differential could cause the vehicle to move unexpectedly, resulting in property damage, personal injury or death.

Driving

Care should be taken to avoid sudden accelerations when both drive wheels are on a slippery surface.



WARNING: Sudden accelerations on slippery surfaces could cause the wheels to spin, the vehicle to turn sideways on a crowned road surface or in a turn, possibly resulting in loss of vehicle control and personal injury.

Some drive axles have a driver-controlled differential lock. The differential lock can lock or unlock the differential when the vehicle is moving or stopped. When extra traction is required, the differential lock provides full power to both axles.

When the differential is locked, the vehicle's turning radius increases (vehicle "under-steers").

The differential can be locked or unlocked when the vehicle is moving at a constant speed of under 25 mph (40 km/h) and while the wheels are not slipping. The differential must not be locked when the vehicle is traveling down steep grades and traction is minimal.

Note: Never use the differential lock at vehicle speeds above 25 mph (40 km/h).

The differential lock and differential lock light automatically disengage at speeds above 25 mph (40 km/h). The differential lock remains off until either the vehicle is restarted or the differential lock switch is turned off then back on.

Axle conversions

It is not recommended, or approved, for axle conversions to be performed. However, it is understood that, on occasion, aftermarket add-on axles are installed by others on the truck chassis which allow operator control for weight transfer from other axles (i.e., air lift axles).



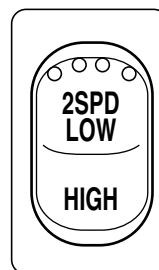
WARNING: When operating a loaded vehicle, the driver must keep all adjustable axles on the ground at all times, supporting their share of the vehicle's load. Failure to do so can overload other axles, tires, wheels, springs, steering components, brakes and frames, resulting in early component failure, loss of vehicle control, possible property damage and personal injury.

Driving

TWO-SPEED REAR AXLE (IF EQUIPPED)

A two-speed rear axle allows the driver to select a LO range for greater pulling power and a HI range for greater road speed and fuel economy. These ranges can also be used to provide additional steps between transmission shifts when driving on steep grades and/or fuel economy may be factors.

Note: Do not shift between ranges when the speed control is on.



WARNING: Never shift a two-speed axle when descending a steep grade as this may cause loss of vehicle control and result in personal injury.

Axle shifting

Manual transmissions

- **To downshift**, select the next lower gear, release and press the accelerator pedal rapidly, or while holding the accelerator pedal down, release and engage the clutch rapidly. **Note:** The clutch method is recommended when driving at slower speeds.
- **To upshift**, keep the accelerator pedal down, select the next higher gear, release the accelerator and pause until the axle upshifts. **Note:** De-clutch for smoother axle upshifts when driving at slower speeds.

Automatic transmissions

- Use LOW when you drive a fully-loaded vehicle on a severe grade or in congested traffic. To activate LOW, press the upper portion of the switch.
- Use HIGH for all normal driving conditions with a lightly-loaded or partially-loaded vehicle. To activate HIGH, press the lower portion of the switch.

Note: You can't split-shift with an automatic transmission. Also, downshifting above 40 mph (64 km/h) may result in transmission or axle damage.

To shift the axle from LOW to HIGH with the vehicle stopped, place the transmission in N (Neutral), then press the lower part of the switch.

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Driving

To shift the axle from LOW to HIGH with the vehicle moving, accelerate to approximately 35 mph (56 km/h), press the lower part of the switch while the transmission is in N (Neutral), then release and apply the accelerator.

To shift the axle from HIGH to LOW with the vehicle stopped, place the transmission in N (Neutral), then press the upper part of the switch.

Note: Do not shift the axle to LOW with the vehicle in motion.

Split-shifting (combined axle and transmission shift - manual transmissions only)

Split-shift sequence											
Ratio combination	1	2	3	4	5	6	7	8	9	10	11
Transmission gear	1st	1st	2nd	2nd	3rd	3rd	4th	4th	5th	6th	6th
Axle range	LO	HI	LO	HI	LO	HI	LO	HI	LO	LO	HI

To downshift the axle to a slower ratio and shift the transmission, shift the transmission and move the switch to the lower ratio before the clutch is re-engaged.

To upshift the axle and shift the transmission, move the switch to a faster ratio and make the transmission shift in the usual manner.

Ratio extender use

Low end: A two-speed axle can be used as a ratio-extender when split-shifting is not necessary. For low end use, just shift the axle into LOW to start out, and shift to HIGH when the extra torque is no longer needed.

Transmission (5-speed)	1st	1st	2nd	3rd	4th	5th	6th
Two-speed axle	Axle low		Axle high				

High end: To use the two-speed axle as a high end ratio-extender, stay in the LOW range for normal upshifts and only shift the axle to HIGH on the freeway for greater road speed.

Transmission (5-speed)	1st	2nd	3rd	4th	5th	6th
Two-speed axle	Low for gradeability					Axle high

Driving

MAXIMUM VEHICLE LOADING

Every vehicle manufactured by Ford Motor Company is supplied with information on the Safety Compliance Certification Label, located on either the B-pillar or the driver's door edge, listing the maximum loading for the vehicle (GVWR), and its axle systems (GAWR) at the tire to ground interface.

A product of FORD MOTOR COMPANY									
Incomplete Vehicle Manufactured By (Vehicle incomplet fabrique par)									
BLUE DIAMOND TRUCK, S. de R.L. de C.V.									
G P		G P		FRONT		G P		REAR	
V N (33000 LB)		A N (12000 LB)				A N (21000 LB)			
W B 14969 KG		W B 5443 KG				W B 9525 KG			
R V		R E				R E			
A SUITABLE TIRE		11RX22.5-14 TIRES		11RX22.5-14 TIRES		22.5X8.25 RIMS		22.5X8.25 RIMS	
AND RIM CHOICE:		AT 724 KPA/105 PSI COLD		AT 724 KPA/105 PSI COLD		AT 724 KPA/105 PSI COLD DUAL		AT 724 KPA/105 PSI COLD DUAL	
WB: 194.0 IN 493.0 CM		Model: F750 4X2				ASSEMBLED IN MEXICO			
VIN 3FRXF75L0V285893					MFD ON AUG-24-2006				
VIN BARCODE HERE									
Ext. Pnt: XX		Int. Trim: XX		Axle: XX		Tran: X			

Under no circumstances should your vehicle be loaded in excess of the GVWR or GAWR. It is the operator's responsibility to ensure that neither the axle capacities, spring capacities, tire capacities nor the vehicle rated GVWR is exceeded.



WARNING: Do not exceed the GVWR or the GAWR specified on the Safety Compliance Certification Label.



WARNING: Do not use replacement tires with lower load carrying capacities than the originals because they may lower the vehicle's GVWR and GAWR limitations. Replacement tires with a higher limit than the originals do not increase the GVWR and GAWR limitations.



WARNING: Exceeding any vehicle weight rating limitation could result in serious damage to the vehicle and/or personal injury.

Driving

Unloaded or lightly loaded vehicles

The braking system has been designed to safely stop your vehicle when fully loaded to its GVWR.



WARNING: When operating empty or lightly loaded, sudden or hard braking may induce wheel lockup with loss of vehicle control and the possibility of accident and serious injury, especially on wet or slippery road surfaces.

TRAILER TOWING

Towing a trailer places an additional load on your vehicle's engine, transmission, axle, brakes, tires and suspension. Inspect these components carefully prior to and after any towing operation.

Consult your local motor vehicle speed regulations for towing a trailer.

Your vehicle's load capacity is designated by weight, not by volume, so you cannot necessarily use all available space when loading a vehicle. 2nd unit bodies are not included in maximum trailer weight ratings. The weight of the additional "body" must be subtracted from the maximum trailer weight.

Note: Do not exceed the GVWR or the GAWR specified on the certification label.

Note: Do not exceed the GCWR rating or transmission damage may occur.



WARNING: Towing trailers beyond the maximum recommended gross trailer weight exceeds the limit of the vehicle and could result in engine damage, transmission damage, structural damage, loss of vehicle control, vehicle rollover and personal injury.

Model	Maximum GVWR - lb (kg)	Maximum GCWR
F-650 Pro-Loader (Kick-Up Frame)	20500–26000 (9299–11792)	*
F-650 Pro-Loader (Straight Frame)/F-650 Straight Frame	20500–29000 (9299–13154)	*
F-750	25999–37000 (11793–16783)	*
* Specific GCWR and maximum trailer weight applicable to a given F-650/750 model is dependent on many variables including transmission capability. Check with your sales consultant for the exact rating on your vehicle.		

Driving

Preparing to tow

Use the proper equipment for towing a trailer and make sure it is properly attached to your vehicle. See your dealer or a reliable trailer dealer if you require assistance.

Hitches

Do not use hitches that clamp onto the vehicle's bumper or attach to the axle. You must distribute the load in your trailer so that 10–15% of the total weight of the trailer is on the tongue.

Safety chains

Always connect the trailer's safety chains to the frame or hook retainers of the vehicle hitch. To connect the trailer's safety chains, cross the chains under the trailer tongue and allow slack for turning corners.

If you use a rental trailer, follow the instructions that the rental agency gives to you.

Do not attach safety chains to the bumper.

Trailer brakes

Electric brakes and manual, automatic or surge-type trailer brakes are safe if installed properly and adjusted to the manufacturer's specifications. The trailer brakes must meet local and Federal regulations.



WARNING: Do not connect a trailer's hydraulic brake system directly to your vehicle's brake system. Your vehicle may not have enough braking power and your chances of having a collision greatly increase.

Trailer lamps

Trailer lamps are required on most towed vehicles. Your vehicle may be equipped with one of two possible trailer wiring designs. Make sure all running lights, brake lights, turn signals and hazard lights are working. See your dealer or trailer rental agency for proper instructions and equipment for hooking up trailer lamps.

Driving while you tow

When towing a trailer:

- Do not drive faster than 70 mph (113 km/h) during the first 500 miles (800 km) of trailer towing and don't make full-throttle starts.

Driving

- Turn off the speed control. The speed control may shut off automatically when you are towing on long, steep grades.
- Use a lower gear to eliminate excessive shifting and assist in transmission cooling.
- Allow more distance for stopping with a trailer attached; anticipate stops and brake gradually.

Servicing after towing

If you tow a trailer for long distances, your vehicle requires more frequent service intervals. Refer to the *Scheduled Maintenance Guide* chapter for more information.

Trailer towing tips

- Practice turning, stopping and backing up before starting on a trip to get the feel of the vehicle trailer combination. When turning, make wider turns so the trailer wheels clears curbs and other obstacles.
- Allow more distance for stopping with a trailer attached.
- If you are driving down a long or steep hill, shift to a lower gear. Do not apply the brakes continuously, as they may overheat and become less effective.
- The trailer tongue weight should be 10–15% of the loaded trailer weight.
- If you are towing a trailer frequently in hot weather, hilly conditions, at GCW, or any combination of these factors, consider refilling your rear axle with synthetic gear lube if not already so equipped. Refer to *Lubricant specifications* in the *Maintenance and Specifications* chapter for the lubricant specification. Remember that regardless of the rear axle lube used, do not tow a trailer for the first 500 miles (800 km) of a new vehicle, and that the first 500 miles (800 km) of towing be done at no faster than 70 mph (112 km/h) with no full throttle starts.
- After you have traveled 50 miles (80 km), thoroughly check your hitch, electrical connections and trailer wheel lug nuts.
- To aid in engine/transmission cooling and A/C efficiency during hot weather while stopped in traffic, place the gearshift lever in P (Park) (if available on your automatic transmission) or N (Neutral) (manual transmissions and automatic transmissions without a P [Park] position).
- Vehicles with trailers should not be parked on a grade. If you must park on a grade, place wheel chocks under the trailer's wheels.

Driving

FIFTH-WHEEL OPERATION



WARNING: Failure to follow the fifth-wheel manufacturer's instructions for hooking and unhooking as well as sliding the fifth-wheel could result in an accident, personal injury or death.



WARNING: When the tractor and trailer are parked unattended, the trailer brake hand control should never be used to apply the brake, since air may leak from the system, allowing vehicle movement, resulting in possible property damage, personal injury or death.

Before hook-up, make sure:

- The fifth-wheel jaws are fully opened.
- The fifth-wheel is fully tilted back to prevent body damage when the tractor is backed under a trailer.
- The trailer wheels are blocked and the trailer spring brakes are adjusted and applied. Never chase a trailer.
- The brake hoses and light cords are clear of the fifth-wheel.

Hook-up

1. Back the tractor squarely under the trailer, engaging the fifth-wheel jaws on the kingpin. Always back-up slowly, making sure the trailer is neither too high nor too low. Avoid backing under the trailer from an angle.
2. Connect the service and emergency brake hoses and trailer light connector. Refer to *Tractor-trailer connections* in the *Air suspension* section of this chapter, adhering to the warning and using the three-point stance while connecting and disconnecting the trailer.
3. Inspect the jaws of the fifth-wheel to be sure they have fully closed on the trailer kingpin and the trailer plate is resting securely on the fifth-wheel.
4. Be sure the coupler release lever is in the locked position.
5. Charge the trailer brake system. Set the trailer brakes, either with the hand valve or tractor protection valve. Pull against the trailer for an additional check of proper hook-up. Do not pull hard enough to damage or strain the equipment.

Driving

6. Set the tractor parking brakes and fully raise the trailer landing gear. Refer to *Brakes* in this chapter for proper operation of the parking brake and trailer brakes.
7. Check the operation of all trailer lights and correct any lights that may be faulty.

Un-hook

1. Try to keep the tractor and trailer in a straight line.
2. Apply the parking brakes.
3. Lower the trailer landing gear, making sure it is on solid, level ground. The weight of the trailer is to be on the landing gear.
4. Block the trailer wheels.
5. Disconnect the brake hoses and light cords. Be sure hoses and cords are clear.
6. Pull coupler release lever to disengage the fifth-wheel jaws.
7. Release the tractor parking brakes.
8. Pull out from the trailer slowly, allowing the landing gear to take the load gradually.

Roadside Emergencies

GETTING ROADSIDE ASSISTANCE

To fully assist you should you have a vehicle concern, Ford offers a complimentary roadside assistance program. This program is separate from the New Vehicle Limited Warranty and is not applicable to vehicles sold in Canada. The service is available:

- 24-hours, seven days a week
- for the New Vehicle Limited Warranty period (U.S.) of two years (unlimited miles)

Roadside assistance covers:

- battery jump start.
- lock out assistance (key replacement is customer responsibility).
- towing – Ford/Mercury/Lincoln eligible vehicle towed to the nearest authorized dealer within 35 miles (56.3 km) of the disablement location or to the nearest authorized dealer. If a member requests to be towed to the nearest authorized dealer more than 35 miles (56.3 km) from the disablement location, the member shall be responsible for any mileage costs in excess of 35 miles (56.3 km).

Trailers shall be covered up to \$200 if the disabled Eligible Vehicles requires service at the nearest authorized dealer. If the trailer is disabled, but the towing vehicle is operational, the trailer does not qualify for any Roadside services.

Using roadside assistance

Complete the roadside assistance identification card and place it in your wallet for quick reference. This card is found in the Owner Guide portfolio in the glove compartment.

To receive roadside assistance in the United States, call 1-800-241-3673.

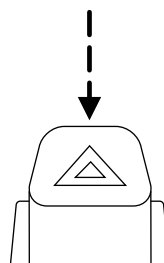
If you need to arrange roadside assistance for yourself, Ford reimburses a reasonable amount. To obtain information about reimbursement, call 1-800-241-3673.

Roadside Emergencies

HAZARD FLASHER

The hazard flasher control is located on the steering column, just behind the steering wheel. The hazard flashers operate when the ignition is off.

Press the flasher control and all front and rear direction signals will flash. Press the flasher control again to turn them off. Use it when your vehicle is disabled and is creating a safety hazard for other motorists.



Note: With extended use, the flasher may run down your battery.

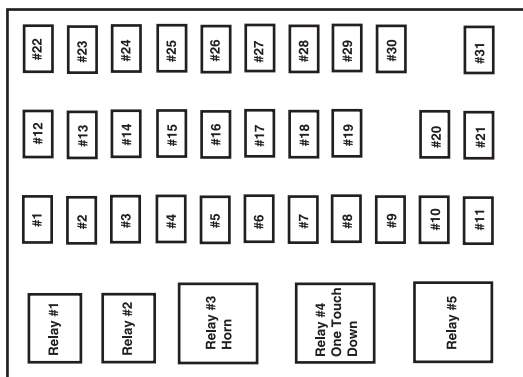
FUSING

If electrical components in the vehicle are not working, a fuse may have blown. Blown fuses are identified by a broken wire within the fuse. Check the appropriate fuses before replacing any electrical components.

Note: Always replace a fuse with one that has the specified amperage rating. Using a fuse with a higher amperage rating can cause severe wire damage and could start a fire.

Roadside Emergencies

Passenger compartment fuse panel



The fuse box is located behind the passenger airbag cover and can be accessed through the glove box.

Fuse/Relay location	Fuse amp rating	Fuse description
1	20A	Horn
2	15A	Flasher relay
3	20A	Power point
4	10A	Data Link Connector (DLC), Engine diagnostic connector, Parking brake warning
5	15A	Run relay
6	—	Not used
7	—	Not used
8	5A	Radio, GEM
9	5A	Power window relay
10	15A	Heated mirrors
11	5A	Wiper and washer systems
12	10A	Transmission shift selector
13	20A	Radio/SYNC®, Power mirrors
14	10A	Interior lamp relay

Roadside Emergencies

Fuse/Relay location	Fuse amp rating	Fuse description
15	10A	Interior lamp relay
16	15A	High beams, Indicator
17	—	Not used
18	5A	Dimmer switch, Interior lighting
19	15A	Engine control (diesel engine only)
20	5A	Starting system
21	10A	DRL resistor
22	15A	Air horn, Air suspension dump, Two-speed axle, Driver-controlled locking differential
23	10A	Flasher relay
24	15A	Hydraulic brakes relay, Fuel heater relay (diesel engine only), Air dryer
25	10A	Blower motor relay coil
26	10A	Right-hand low beam headlight
27	—	Not used
28	10A	Left-hand low beam headlight
29	10A	Cluster, GEM
30	15A	Allison electronic transmission
31	15A	Mirror fold relay
Relay 1	—	Interior lamps
Relay 2	—	Not used
Relay 3	—	Horn
Relay 4	—	Not used
Relay 5	—	Not used

Roadside Emergencies

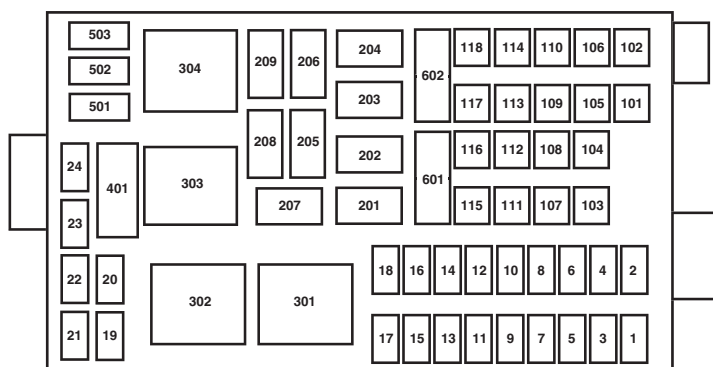
Power distribution box



WARNING: Always disconnect the battery before servicing high current fuses.



WARNING: To reduce risk of electrical shock, always replace the cover to the Power Distribution Box before reconnecting the battery or refilling fluid reservoirs.



Fuse/Relay location	Fuse amp rating	Fuse description
1	20A	Upfitter switches (AUX 2 and AUX 4)/Trailer 12V socket pin
2	30A	Power seat (driver)
3	30A	Power seat (passenger)
4	15A	Windshield washer relay, Washer pump motor
5	5A	Brake warning switch (hydraulic brake only)
6	20A	Upfitter switches (AUX 1 and AUX 3)
7	15A	Brake pressure switches, ABS event relay
8	20A	DEF (Urea), Line heaters (diesel engine only)
9	20A	Ignition switch, Starter cutoff

Roadside Emergencies

Fuse/Relay location	Fuse amp rating	Fuse description
10	15A	Air tank moisture removal valve
11	30A	Electric trailer brake
12	20A	Passenger compartment fuse box 5 and 21
13	15A	Instrument cluster/Gateway module
14	20A	Nitrogen oxide sensor (diesel engine only)
15	—	Not used
16	5A	Bendix® Air ABS
17	—	Not used
18	10A	Fuel transfer pump
19	15A	Powertrain control module power 1 (gasoline engine only)
20	10A	Powertrain control module power 2 (gasoline engine only)
21	20A	Powertrain control module power 3 (gasoline engine only)
22	20A	Powertrain control module power 4 (gasoline engine only)
23	—	Not used
24	10A	Powertrain control module keep-alive power (gasoline engine only)
101	30A	Bendix Air ABS relay (Air brake vehicles only)
		Hydraulic brakes module (Hydraulic brake vehicles only)
102	20A	Ignition switch
103	20A	Ignition switch, Passenger compartment fuse box fuses 19, 29 and 30
104	20A	Power point
105	20A	Power door lock switches
106	30A	Main light switch, Multi-function switch
107	50A	Passenger compartment fuse box fuses 1, 2, 3, 4, 12, 13, 14 and 15

Roadside Emergencies

Fuse/Relay location	Fuse amp rating	Fuse description
108	40A	Fuel heater (diesel engine only)
	20A	Fuel pump module (gasoline engine only)
109	40A	Power window
110	30A	Windshield wiper
111	30A	Body builder relay, Parking lamps
112	40A	Blower motor
113	30A	Heated seats, Air-Ride seat
114	20A	Aftertreatment DCU
115	20A	Ignition switch, Passenger compartment fuse box fuses 8, 9, 10 and 11
116	30A	Left/Right turn relays, Back-up lamp relay
117	20A	Stoplamps
118	60A	Hydraulic brake vehicles (Trailer tow package only)
601	60A	Trailer socket
602	60A	Air brake trailer tow fuse block
	30A	Hydraulic brakes pump motor 2
201	—	Windshield washer relay
202	—	Wiper high/low relay
203	—	Wiper run/park relay
204	—	Windshield wiper relay
205	—	Body builder relay, right turn
206	—	Body builder relay, left turn
207	—	ABS event relay (Hydraulic brake vehicles only)
208	—	Body builder relay, back-up lamps relay
209	—	Auxiliary stoplamp relay
301	—	Fuel heater/Fuel transfer pump relay (diesel engine only)
	—	Fuel pump module (gasoline engine only)
302	—	Body builder relay, parking lamps relay
303	—	Blower motor relay

Roadside Emergencies

Fuse/Relay location	Fuse amp rating	Fuse description
304	—	DEF (Urea) line heaters relay (diesel engine only)
	—	Powertrain control module power VPWR1 (gasoline engine only)

Individual maxi-fuse holder in engine compartment

Fuse location	Fuse amp rating	Fuse description
9925	30A	Hydraulic brakes pump motor 1

Relay center

	R1	R2	R3	R4	R5	R6	R7	R8
R9	R10	R11	R12	R13	R14	R15	R16	R17
R18	R19	R20	R21	R22	R23	R24	R25	R26

The relay center is located along the passenger side A-pillar on the right side of the footwell.

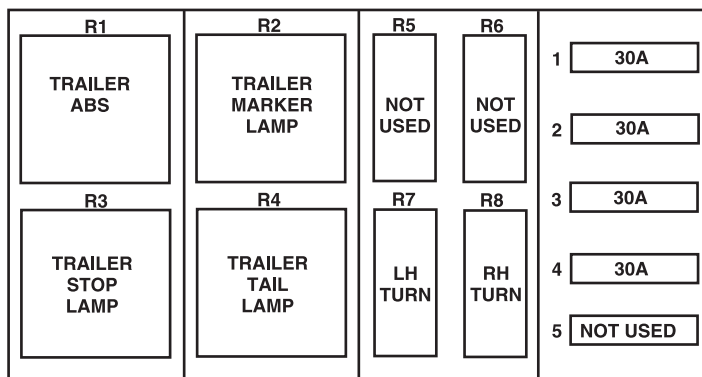
Relay location	Relay description
R1	Spring applied hydraulic release warning chime module or PCM power VPWR 2, 3 and 4
R2	A/C compressor clutch
R3	Power windows
R4	Flasher (standard/LED)
R5	Upfitter relay 1
R6	Upfitter relay 2
R7	Headlights
R8	Spare

Roadside Emergencies

Relay location	Relay description
R9	Upfitter relay 3
R10	Starter
R11	DCU (diesel engine only)
R12	Two-speed axle/Differential lock
R13	Door lock
R14	Air tank moisture valve
R15	DRL #1
R16	Heated mirrors
R17	Spare
R18	Upfitter relay 4
R19	Shift interlock/EPRNDL display
R20	Selective Catalyst Reduction (SCR) system (NO _x) (diesel engine only)
R21	Run
R22	Door unlock
R23	ABS warning indicator
R24	DRL #2
R25	Park lights
R26	Spare

Roadside Emergencies

Trailer tow relays (if equipped)



Fuse/Relay Location	Fuse Amp Rating	Description
1	30A*	Trailer tow ABS feed (non electric trailer brake vehicles only)
2	30A*	Trailer tow park/marker lamps
3	30A*	Trailer tow stop lamps
4	30A*	Trailer tow turn/stop lamps (combined)
		Trailer tow turn lamps (separate)
5	—	Not used
R1	—	Trailer tow ABS relay (non electric trailer brake vehicles only)
R2	—	Trailer tow marker lamp relay
R3	—	Trailer tow stop lamp relay
R4	—	Trailer tow tail lamp relay
R5	—	Not used
R6	—	Not used
R7	—	Trailer tow left turn lamp relay
R8	—	Trailer tow right turn lamp relay
*Maxi fuse		

Roadside Emergencies

Inline fuses

Your vehicle may have several inline fuses located in/on the battery cables located in the battery box depending on application.

- All Allison transmission equipped vehicles have a 10 Amp fuse located in the clean power cables located in the battery box.
- All vehicles have a 30 Amp fused located in the clean power cables located in the battery box.
- All vehicles equipped with an Eaton transmission have a 30 Amp fuse located in the clean power cables located in the battery box.
- All Hydraulic brake equipped vehicles have a 40 Amp fuse located in the clean power cables located in the battery box and in addition another 30 Amp fuse located in a fuse holder just above the power distribution center located in the vehicles engine compartment.

JUMP STARTING



WARNING: The gases around the battery can explode if exposed to flames, sparks, or lit cigarettes. An explosion could result in injury or vehicle damage.



WARNING: Batteries contain sulfuric acid which can burn skin, eyes and clothing, if contacted.

Do not attempt to push-start your automatic transmission vehicle. Automatic transmissions do not have push-start capability. Attempting to push-start a vehicle with an automatic transmission may cause transmission damage.

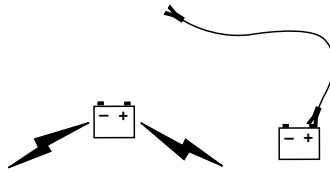
Before connecting a fast-charger, booster battery or installing a new battery, make sure the ground polarities of the fast-charger, booster battery or alternator (when installing a battery) are matched to the ground polarity of the vehicle battery. Improper usage of the fast-charger, hook-up of booster battery or installation of a new battery can cause damage to the electrical system or to the alternator. Do not attempt to polarize the alternator.

Roadside Emergencies

Preparing your vehicle

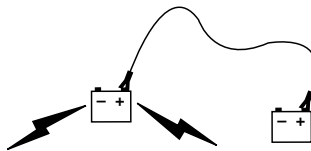
1. **Use only a 12-volt supply to start your vehicle.** Do not attach the jumper cables to the glow plug relay as this could severely damage the glow plugs, injector driver module and PCM.
2. Do not disconnect the battery of the disabled vehicle as this could damage the vehicle's electrical system.
3. Park the booster vehicle close to the hood of the disabled vehicle making sure the two vehicles **do not** touch. Set the parking brake on both vehicles and stay clear of the engine cooling fan and other moving parts.
4. Check all battery terminals and remove any excessive corrosion before you attach the battery cables. Ensure that vent caps are tight and level.
5. Turn the heater fan on in both vehicles to protect from any electrical surges. Turn all other accessories off.

Connecting the jumper cables



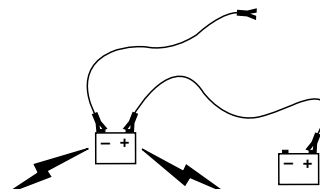
1. Connect the positive (+) jumper cable to the positive (+) terminal of the discharged battery.

Note: In the illustrations, *lightning bolts* are used to designate the assisting (boosting) battery.

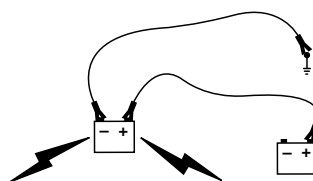


2. Connect the other end of the positive (+) cable to the positive (+) terminal of the assisting battery.

Roadside Emergencies



3. Connect the negative (-) cable to the negative (-) terminal of the assisting battery.



4. Make the final connection of the negative (-) cable to an exposed metal part of the stalled vehicle's engine, away from the battery and the carburetor/fuel injection system. **Do not** use fuel lines, engine rocker covers or the intake manifold as *grounding* points.



WARNING: Do not connect the end of the second cable to the negative (-) terminal of the battery to be jumped. A spark may cause an explosion of the gases that surround the battery.

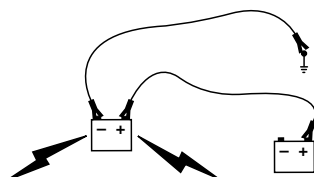
5. Ensure that the cables are clear of fan blades, belts, moving parts of both engines, or any fuel delivery system parts.

Jump starting

1. Start the engine of the booster vehicle and run the engine at moderately increased speed.
2. Start the engine of the disabled vehicle.
3. Once the disabled vehicle has been started, run both engines for an additional three minutes before disconnecting the jumper cables.

Roadside Emergencies

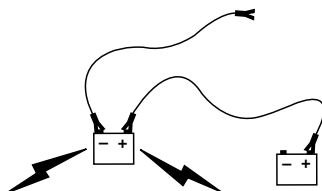
Removing the jumper cables



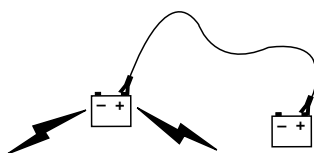
Remove the jumper cables in the reverse order that they were connected.

1. Remove the jumper cable from the *ground* metal surface.

Note: In the illustrations, *lightning bolts* are used to designate the assisting (boosting) battery.

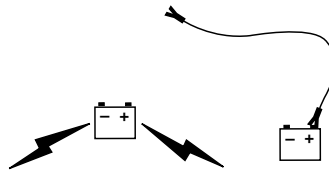


2. Remove the jumper cable on the negative (-) connection of the booster vehicle's battery.



3. Remove the jumper cable from the positive (+) terminal of the booster vehicle's battery.

Roadside Emergencies



4. Remove the jumper cable from the positive (+) terminal of the disabled vehicle's battery.

After the disabled vehicle has been started and the jumper cables removed, allow it to idle for several minutes so the engine computer can *relearn* its idle conditions.

WRECKER TOWING INSTRUCTIONS

Before moving the disabled vehicle, check for adequate road clearance of vehicle components. It is recommended the disabled vehicle be unloaded prior to being towed to reduce any abnormal load to the vehicle components resulting from the towing procedures. Before towing, be sure to fully release the parking brake. The spring-actuated type parking brake can be reset by recharging the air system with at least 64 psi (441 kPa) of air. If the brake system does not retain air pressure, then the spring brakes must be released manually. Refer to *Parking brake* in the *Driving* chapter.

Note: For towing, make sure the vehicle is securely connected to the tow vehicle and the tow vehicle's parking brakes are applied before releasing the disabled vehicle's spring brakes.



WARNING: To reduce the risk of personal injury or property damage when manually releasing the spring brakes, be sure to block the wheels so the vehicle cannot move once the brakes are released.

Towing the vehicle with the front wheels suspended

When it is necessary to tow a vehicle with the front wheels suspended, extra precautions must be taken to avoid transmission or differential damage:

- Remove the axle shafts from the axle assembly to prevent the wheels from driving the differential and the transmission.
- The wheel hub ends must be covered to prevent loss of axle lubricant and entrance of other contaminants. If the axle shafts are not removed, removal of the driveshaft is required.

Roadside Emergencies

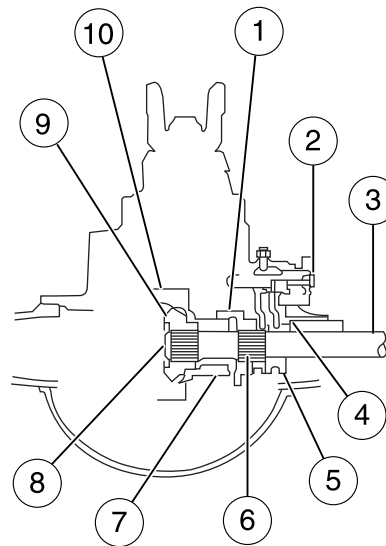
Note: To avoid transmission damage, vehicles should not be towed even a short distance without suspending rear wheels or removing the axle shafts or driveshaft.

Note: In the event the chassis is equipped with a tandem axle and the vehicle is to be towed from the front, the forward rear axle may be raised to clear the road surface and secured to the frame by chains or U-bolts, allowing only the rear rear axle to contact the road surface. Axle shafts must be removed from the rear rear axle assembly. The wheel hub ends must be covered to prevent loss of axle lubricant and entrance of contaminants. Use extreme care in securing the chains or U-bolts to avoid possible damage to the brake lines, hoses or other components.

Towing vehicles equipped with a driver-controlled differential lock

Note: If the vehicle must be towed to a service facility with the drive axle wheels on the ground, it is necessary to remove the axle shafts before the vehicle is towed.

1. Shift collar in the locked position
2. Actuator assembly and shift fork
3. Axle shaft
4. Interference between the shift collar and housing
5. Shift collar in the unlocked position
6. Outer splines - axle shaft to collar
7. Shift collar and differential case splines
8. Inner splines - axle shaft to side gear
9. Side gear
10. Differential (plain) case half



Roadside Emergencies

Removing axle shafts before towing

1. Shift the main differential to the unlocked (disengaged) position; the differential lock light turns off.
2. Remove the capscrews and washers or stud nuts and washers from flanges of both axle shafts.
3. Loosen the tapered dowels in the flanges of both axle shafts by holding a 1½ inch diameter brass drift or hammer against the axle shaft center and hitting it with a five or six pound hammer. **Note:** Do not use a chisel or wedge to loosen the axle shafts and dowels. Use of a chisel or wedge can damage the hub, axle shafts and oil seals.
4. Remove the tapered dowels and both axle shafts from the axle assembly.
5. Assemble a cover over openings of both wheels ends to prevent loss of lubricant and keep dirt away from the wheel bearing cavities.

Note: One of the axle shafts has two sets of splines. One set to engage with the differential side gear and one set to engage with the shift collar for the differential lock. It may be necessary to rotate the shaft slightly to align the gear spline teeth with the shift collar teeth in order to remove the axle shaft.

Installing the axle shafts

1. Remove the covers from the wheel ends.
2. Shift the differential lock to the unlocked (disengaged) position.
3. Install the axle shafts.
 - Place the gaskets on the wheel hub studs.
 - Push the right-hand axle shaft and gasket into the wheel end and housing until the shaft stops against the differential shift collar.
 - Push down and in on the axle shaft flange and rotate the shaft until the splines of the shaft and shift collar are engaged.
 - Push the axle shaft further into the housing until the shaft stops against the differential side gear.
 - Push down on the axle shaft flange and rotate the shaft until the splines of the shaft and side gear are engaged.
 - Push the axle shaft completely into the housing until the axle shaft flange and the gasket are flush against the wheel hub.
 - Install the left-hand axle shaft and gasket into the wheel end.

Roadside Emergencies

4. If tapered dowels are required, install them at each stud and into the flange of the axle shaft. Use a punch or drift and hammer, if needed.
5. Install the fasteners and tighten to correct torque value. Refer to the *Service Manual*.

Towing the vehicle with the rear wheels suspended

Note: To avoid damage to the cab roof or air deflector when towing the vehicle backward (rear wheels suspended) the air deflector must be removed.

Whenever possible, it is preferable to tow a disabled vehicle from the rear by raising the rear of the chassis. When towing a vehicle with the rear of the chassis suspended, the front wheels must be locked in the straight-ahead position.

Vehicles equipped with a manual transmission must have at least 1.0 pint (0.5L) of transmission fluid drained from the case. This prevents the transmission fluid from entering the clutch housing and fluid saturating the clutch discs. Make sure that the transmission fluid is replaced before the vehicle is returned to service.

Customer Assistance

GETTING THE SERVICES YOU NEED

Warranty repairs to your vehicle must be performed by an authorized Ford dealer. While any authorized dealer handling your vehicle line will provide warranty service, we recommend that you return to your authorized selling dealer to ensure your continued satisfaction. Please note that certain warranty repairs require special training and/or equipment, so not all authorized dealers are authorized to perform all warranty repairs. This means that, depending on the warranty repair needed, you may need to take your vehicle to another authorized dealer.

If you have questions or concerns, or are unsatisfied with the service you are receiving, follow these steps:

1. Contact your Sales Representative or Service Advisor at your selling/servicing dealership.
2. If your inquiry or concern remains unresolved, contact the Sales Manager or Service Manager at the dealership.
3. If the inquiry or concern cannot be resolved at the dealership level, contact the Ford Commercial Vehicle Operations Hotline. Please have the following information available:
 - Vehicle Identification Number (VIN)
 - Your telephone number (home and business)
 - The name of the authorized dealer and city where located
 - The vehicle's current odometer reading

In some states, you must directly notify Ford in writing before pursuing remedies under your state's warranty laws. Ford is also allowed a final repair attempt in some states.

In the United States:

Mailing address
Ford Motor Company
Commercial Vehicle Operations
PO Box 6248
Dearborn, MI 48121
800-782-8627 (option #3)
(TDD for the hearing impaired: 1-800-232-5952)
www.fleet.ford.com

Customer Assistance

In Canada:
Mailing address
Customer Relationship Centre
Ford Motor Company of Canada, Limited
P.O. Box 2000
Oakville, Ontario L6J 5E4
800-565-3673
www.ford.ca

Additional information and resources are available online at
www.fleet.ford.com:

- U.S. dealer locator by Dealer Name, City/State, or Zip Code
- Owner Guides
- Maintenance Schedules
- Recalls
- Ford Extended Service Plans
- Ford Genuine Accessories

IN CALIFORNIA (U.S. ONLY)

California Civil Code Section 1793.2(d) requires that, if a manufacturer or its representative is unable to repair a motor vehicle to conform to the vehicle's applicable express warranty after a reasonable number of attempts, the manufacturer shall be required to either replace the vehicle with one substantially identical or repurchase the vehicle and reimburse the buyer in an amount equal to the actual price paid or payable by the consumer (less a reasonable allowance for consumer use). The consumer has the right to choose whether to receive a refund or replacement vehicle.

California Civil Code Section 1793.22(b) presumes that the manufacturer has had a reasonable number of attempts to conform the vehicle to its applicable express warranties if, within the first 18 months of ownership of a new vehicle or the first 18,000 miles (29,000 km), whichever occurs first:

1. Two or more repair attempts are made on the same nonconformity likely to cause death or serious bodily injury OR
2. Four or more repair attempts are made on the same nonconformity (a defect or condition that substantially impairs the use, value or safety of the vehicle) OR
3. The vehicle is out of service for repair of nonconformities for a total of more than 30 calendar days (not necessarily all at one time)

Customer Assistance

In the case of 1 or 2 above, the consumer must also notify the manufacturer of the need for the repair of the nonconformity at the following address:

Ford Motor Company
16800 Executive Plaza Drive
Mail Drop 3NE-B
Dearborn, MI 48126

UTILIZING THE MEDIATION/ARBITRATION PROGRAM (CANADA ONLY)

For vehicles delivered to authorized Canadian dealers. In those cases where you continue to feel that the efforts by Ford of Canada and the authorized dealer to resolve a factory-related vehicle service concern have been unsatisfactory, Ford of Canada participates in an impartial third party mediation/arbitration program administered by the Canadian Motor Vehicle Arbitration Plan (CAMVAP).

The CAMVAP program is a straight forward and relatively speedy alternative to resolve a disagreement when all other efforts to produce a settlement have failed. This procedure is without cost to you and is designed to eliminate the need for lengthy and expensive legal proceedings.

In the CAMVAP program, impartial third-party arbitrators conduct hearings at mutually convenient times and places in an informal environment. These impartial arbitrators review the positions of the parties, make decisions and, when appropriate, render awards to resolve disputes. CAMVAP decisions are fast, fair, and final as the arbitrator's award is binding on both you and Ford of Canada.

CAMVAP services are available in all Canadian territories and provinces. For more information, without charge or obligation, call your CAMVAP Provincial Administrator directly at 1-800-207-0685 or visit www.camvap.ca.

GETTING ASSISTANCE OUTSIDE THE U.S AND CANADA

Before exporting your vehicle to a foreign country, contact the appropriate foreign embassy or consulate. These officials can inform you of local vehicle registration regulations and where to find diesel fuel.

If you cannot find diesel fuel or can only get fuel with an anti-knock index lower than is recommended for your vehicle, contact a regional office or owner relations/customer relationship office.

The use of low quality diesel fuel may affect your emissions control system and may cause engine damage. Ford Motor Company/Ford of Canada is not responsible for any damage caused by use of improper

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Customer Assistance

fuel. In the United States, using leaded fuel may also result in difficulty importing your vehicle back into the U.S.

Ford dealerships outside of the US & Canada may be unable to support the F-650/750 due to the specialized training and servicing requirements of these vehicles. If your vehicle must be serviced while you are traveling or living in Central or South America, the Caribbean, or the Middle East, contact the nearest Ford dealership. If the dealership cannot help you, write or call:

FORD MOTOR COMPANY
FORD EXPORT OPERATIONS
1555 Fairlane Drive
Fairlane Business Park #3
Allen Park, Michigan 48101
U.S.A.
Telephone: (313) 594-4857
FAX: (313) 390-0804

If you are in another foreign country, contact the nearest Ford dealership. If the dealership employees cannot help you, they can direct you to the nearest Ford affiliate office.

If you buy your vehicle in North America and then relocate outside of the U.S. or Canada, register your vehicle identification number (VIN) and new address with Ford Motor Company Export Operations.

ORDERING ADDITIONAL OWNER'S LITERATURE

To order the publications in this portfolio, contact Helm, Incorporated at:

HELM, INCORPORATED
47911 Halyard Drive
Plymouth, Michigan 48170
Attention: Customer Service

Or to order a free publication catalog, call toll free: 1-800-782-4356

Monday-Friday 8:00 a.m. - 6:00 p.m. EST

Helm, Incorporated can also be reached by their website:
www.helminc.com.

(Items in this catalog may be purchased by credit card, check or money order.)

Obtaining a French Owner's Guide

French Owner's Guides can be obtained from your authorized dealer or by contacting Helm, Incorporated using the contact information listed previously in this section.

Customer Assistance

REPORTING SAFETY DEFECTS (U.S. ONLY)

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety



Administration (NHTSA) in addition to notifying Ford Motor Company.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Ford Motor Company.

To contact NHTSA, you may call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); go to <http://www.safercar.gov>; or write to:

Administrator
1200 New Jersey Avenue, Southeast
Washington, D.C. 20590

You can also obtain other information about motor vehicle safety from <http://www.safercar.gov>.

REPORTING SAFETY DEFECTS (CANADA ONLY)

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform Transport Canada, using their toll-free number: 1-800-333-0510, or online at: <https://www.wapps.tc.gc.ca/Saf-Sec-Sur/7/PCDB-BDPP/Index.aspx>.

WASHING THE EXTERIOR

Wash your vehicle regularly with cool or lukewarm water and a neutral pH shampoo, such as Motorcraft® Detail Wash (ZC-3-A), which is available from your authorized dealer.

- Never use strong household detergents or soap, such as dish washing or laundry liquid. These products can discolor and spot painted surfaces.
- Never wash a vehicle that is “hot to the touch” or during exposure to strong, direct sunlight.
- Always use a clean sponge or car wash mitt with plenty of water for best results.
- Dry the vehicle with a chamois or soft terry cloth towel in order to eliminate water spotting.
- It is especially important to wash the vehicle regularly during the winter months, as dirt and road salt are difficult to remove and cause damage to the vehicle.
- Immediately remove items such as gasoline, diesel fuel, bird droppings and insect deposits because they can cause damage to the vehicle's paint and trim over time. Use Motorcraft® Bug and Tar Remover (ZC-42) which is available from your authorized dealer.
- Remove any exterior accessories, such as antennas, before entering a car wash.
- **Suntan lotions and insect repellents can damage any painted surface; if these substances come in contact with your vehicle, wash off as soon as possible.**

Exterior chrome

- Wash the vehicle first, using cool or lukewarm water and a neutral pH shampoo, such as Motorcraft® Detail Wash (ZC-3-A).
- Use Motorcraft® Custom Bright Metal Cleaner (ZC-15), available from your authorized dealer. Apply the product as you would a wax to clean bumpers and other chrome parts; allow the cleaner to dry for a few minutes, then wipe off the haze with a clean, dry rag.
- **Never use abrasive materials such as steel wool or plastic pads as they can scratch the chrome surface.**

WAXING

- Wash the vehicle first.
- Use a quality wax that does not contain abrasives.

Cleaning

- Do not allow paint sealant to come in contact with any non-body (low-gloss black) colored trim, such as grained door handles, roof racks, bumpers, side moldings, mirror housings or the windshield cowl area. The paint sealant will “gray” or stain the parts over time.

PAINT CHIPS

Your authorized dealer has touch-up paint to match your vehicle's color. Take your color code (printed on a sticker in the driver's door jamb) to your authorized dealer to ensure you get the correct color.

- Remove particles such as bird droppings, tree sap, insect deposits, tar spots, road salt and industrial fallout before repairing paint chips.
- Always read the instructions before using the products.

ALUMINUM WHEELS AND WHEEL COVERS

Aluminum wheels and wheel covers are coated with a clear coat paint finish. In order to maintain their shine:

- Clean weekly with Motorcraft® Wheel and Tire Cleaner, which is available from your authorized dealer. Heavy dirt and brake dust accumulation may require agitation with a sponge. Rinse thoroughly with a strong stream of water.
- Never apply any cleaning chemical to hot or warm wheel rims or covers.
- Some automatic car washes may cause damage to the finish on your wheel rims or covers. Industrial-strength (heavy-duty) cleaners, or cleaning chemicals, in combination with brush agitation to remove brake dust and dirt, could wear away the clear coat finish over time.
- Do not use hydrofluoric acid-based or high caustic-based wheel cleaners, steel wool, fuels or strong household detergent.
- To remove tar and grease, use Motorcraft® Bug and Tar Remover , available from your authorized dealer.

ENGINE

Engines are more efficient when they are clean because grease and dirt buildup keep the engine warmer than normal. When washing:

- Take care when using a power washer to clean the engine. The high-pressure fluid could penetrate the sealed parts and cause damage.

Note: To prevent damage to the engine control module, never spray-wash it directly. Never spray any connector.

- Do not spray a hot engine with cold water to avoid cracking the engine block or other engine components.

Cleaning

- Spray Motorcraft® Engine Shampoo and Degreaser (ZC-20) on all parts that require cleaning and pressure rinse clean.
- Never wash or rinse the engine while it is hot or running; water in the running engine may cause internal damage.

PLASTIC (NON-PAINTED) EXTERIOR PARTS

Use only approved products to clean plastic parts. These products are available from your authorized dealer.

- For routine cleaning, use Motorcraft® Detail Wash (ZC-3-A).
- If tar or grease spots are present, use Motorcraft® Bug and Tar Remover (ZC-42).

WINDOWS AND WIPER BLADES

The windshield, rear and side windows and the wiper blades should be cleaned regularly. If the wipers do not wipe properly, substances on the vehicle's glass or the wiper blades may be the cause. These may include hot wax treatments used by commercial car washes, water repellent coatings, tree sap, or other organic contamination; these contaminants may cause squeaking or chatter noise from the blades, and streaking and smearing of the windshield. To clean these items, follow these tips:

- The windshield, rear windows and side windows may be cleaned with a non-abrasive cleaner such as Motorcraft® Ultra-Clear Spray Glass Cleaner (ZC-23), available from your authorized dealer.
- The wiper blades can be cleaned with isopropyl (rubbing) alcohol or Motorcraft® Premium Windshield Washer Concentrate (ZC-32-A) in the U.S., or Premium Quality Windshield Washer Fluid [CXC-37-(A, B, D, or F)] in Canada, available from your authorized dealer. This washer fluid contains special solution in addition to alcohol which helps to remove the hot wax deposited on the wiper blade and windshield from automated car wash facilities. Be sure to replace wiper blades when they appear worn or do not function properly.
- Do not use abrasives, as they may cause scratches.
- Do not use fuel, kerosene, or paint thinner to clean any parts.

If you cannot remove those streaks after cleaning with the glass cleaner or if the wipers chatter and move in a jerky motion, clean the outer surface of the windshield and the wiper blades using a sponge or soft cloth with a neutral detergent or mild-abrasive cleaning solution. After cleaning, rinse the windshield and wiper blades with clean water. The windshield is clean if beads do not form when you rinse the windshield with water.

Cleaning

INSTRUMENT PANEL/INTERIOR TRIM AND CLUSTER LENS

Clean the instrument panel, interior trim areas and cluster lens with a clean, damp, white cotton cloth, then use a clean and dry white cotton cloth to dry these areas.

- Avoid cleaners or polishes that increase the gloss of the upper portion of the instrument panel. The dull finish in this area helps protect the driver from undesirable windshield reflection.
- Be certain to wash or wipe your hands clean if you have been in contact with certain products such as insect repellent and suntan lotion in order to avoid possible damage to the interior painted surfaces.
- Do not use household or glass cleaners as these may damage the finish of the instrument panel, interior trim and cluster lens.
- Do not allow air fresheners and hand sanitizers to spill on interior surfaces. If a spill occurs, **wipe off immediately**. Damage may not be covered by your warranty.



WARNING: Do not use chemical solvents or strong detergents when cleaning the steering wheel or instrument panel to avoid contamination of the airbag system.

If a staining liquid like coffee/juice has been spilled on the instrument panel or on interior trim surfaces, clean as follows:

1. Wipe up spilled liquid using a clean, white, cotton cloth.
2. Wipe the surface with a damp, clean, white cotton cloth. For more thorough cleaning, use a mild soap and water solution. If the spot cannot be completely cleaned by this method, the area may be cleaned using a commercially available cleaning product designed for automotive interiors.
3. If necessary, apply more soap and water solution or cleaning product to a clean, white, cotton cloth and press the cloth onto the soiled area—allow this to set at room temperature for 30 minutes.
4. Remove the soaked cloth, and if it is not soiled badly, use this cloth to clean the area by using a rubbing motion for 60 seconds.
5. Following this, wipe area dry with a clean, white, cotton cloth.

Cleaning

INTERIOR

For fabric, carpets, cloth seats and safety belts:

- Remove dust and loose dirt with a vacuum cleaner.
- Remove light stains and soil with Motorcraft® Professional Strength Carpet & Upholstery Cleaner (ZC-54).
- If grease or tar is present on the material, spot-clean the area first with Motorcraft® Spot and Stain Remover (ZC-14). In Canada, use Motorcraft® Multi-Purpose Cleaner (CXC-101).
- If a ring forms on the fabric after spot cleaning, clean the entire area immediately (but do not oversaturate) or the ring will set.
- Do not use household cleaning products or glass cleaners, which can stain and discolor the fabric and affect the flame retardant abilities of the seat materials.



WARNING: Do not use cleaning solvents, bleach or dye on the vehicle's seatbelts, as these actions may weaken the belt webbing.

LEATHER SEATS (IF EQUIPPED)

- Remove dust and loose dirt with a vacuum cleaner.
- Clean spills and stains as quickly as possible.
- For routine cleaning, wipe the surface with a soft, damp cloth. For more thorough cleaning, wipe the surface with a mild soap and water solution. In Canada, use Motorcraft® Vinyl Cleaner (CXC-93). Dry the area with a soft cloth.
- If the leather cannot be completely cleaned using a mild soap and water solution, the leather may be cleaned using a commercially available leather cleaning product designed for automotive interiors.
- To check for compatibility, first test any cleaner or stain remover on an inconspicuous part of the leather.
- Do not use household cleaning products, alcohol solutions, solvents or cleaners intended for rubber, vinyl and plastics, or oil/petroleum-based leather conditioners. These products may cause premature wearing or damage to the leather.

UNDERBODY

Flush the complete underside of your vehicle frequently. Keep body and door drain holes free from packed dirt.

Cleaning

FORD CAR CARE PRODUCTS

Your vehicle's authorized dealer has many quality products available to clean your vehicle and protect its finishes. These quality products have been specifically engineered to fulfill your automotive needs; they are custom designed to complement the style and appearance of your vehicle. Each product is made from high quality materials that meet or exceed rigid specifications. For best results, use the following products or products of equivalent quality:

- Motorcraft® Bug and Tar Remover (ZC-42))
- Motorcraft® Custom Bright Metal Cleaner (ZC-15)
- Motorcraft® Detail Wash (ZC-3-A)
- Motorcraft® Dusting Cloth (ZC-24)
- Motorcraft® Engine Shampoo and Degreaser (U.S. only) (ZC-20)
- Motorcraft® Engine Shampoo (Canada only) (CXC-66-A)
- Motorcraft® Multi-Purpose Cleaner (Canada only) (CXC-101)
- Motorcraft® Premium Glass Cleaner (Canada only) (CXC-100)
- Motorcraft® Premium Quality Windshield Washer Fluid (Canada only) (CXC-37-[A, B, D or F])
- Motorcraft® Premium Windshield Washer Concentrate (U.S. only) (ZC-32-A)
- Motorcraft® Professional Strength Carpet & Upholstery Cleaner (ZC-54)
- Motorcraft® Spot and Stain Remover (U.S. only) (ZC-14)
- Motorcraft® Ultra-Clear Spray Glass Cleaner (ZC-23)
- Motorcraft® Vinyl Cleaner (Canada only) (CXC-93)
- Motorcraft® Wheel and Tire Cleaner (ZC-37-A)

Maintenance and Specifications

GENERAL SERVICING GUIDELINES AND PRECAUTIONS

Always use care when performing vehicle maintenance, repairs or system checks. Improper or incomplete service could result in the vehicle not working properly which may result in personal injury or damage to the vehicle or equipment. It is the operator's responsibility to see that the vehicle receives proper care and maintenance. If you have any questions about performing service, have the service done by a qualified technician.

Servicing guidelines

When servicing your vehicle, always:

- wear safety glasses for eye protection.
- do not wear loose-fitting clothing, hanging jewelry, watches or rings.
- do not smoke.
- set the parking brake or chock the wheels.
- use support stands, not a jack, when working under a raised vehicle.
- turn off the ignition unless a procedure requires the engine to be running.
- operate the engine in a well-ventilated area.
- do not work on the brakes or the clutch unless the proper precautions are taken to avoid inhaling friction material dust.
- avoid contact with hot metal parts. Allow the components to cool before working with, or around, them.

Quality service parts are available through your dealer. If dealer parts are not used, make sure the replacement parts are of equivalent quality.



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

Note: To avoid damage to the vehicle's electrical components prior to electric welding:

- disconnect both battery cables.
- attach the welder ground cable as close as possible to the part being welded.
- if it is necessary to weld close to an electrical component, it is recommended that the component be temporarily removed.

Maintenance and Specifications

Follow the checks and services in the *Scheduled Maintenance Guide* chapter. Have your dealer or service center inspect your vehicle at least once a year; remember that regular maintenance and inspections usually prevent serious problems from developing later.



WARNING: Making modifications to various parts, components and systems of the vehicle, such as brake and steering systems can adversely affect the quality, reliability and operation of your vehicle and could result in property damage, personal injury or death. Such modifications must be avoided.



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

If the owner/operator of the vehicle is a skilled technician and intends on performing the vehicle maintenance and service, he is strongly urged to purchase a service manual.



WARNING: Take care when performing any maintenance, system check or service on your vehicle. Some of the materials may also be hazardous if used, serviced or handled improperly and could result in property damage, personal injury or death.

Air conditioning system checks

Have the air conditioning system checked each spring. The refrigerant charge, cleanliness of the condenser-evaporator cores and belt condition are essential to system performance.

When the air conditioning system is being used daily, remove the fresh air filter (if equipped) once each season and check for dirt, lint, etc. Replace the filter if necessary. Vehicles operating in unusually dusty conditions may require more frequent filter inspection and replacement.

Front axle - general service information

Maintaining the front axle alignment to specifications is very important and should only be performed by a qualified technician. Toe-in adjustment is particularly important with radial tires.

Make sure the axle mounting U-bolt nuts, attaching or mounting bolts and nuts are securely tightened. Regularly check front axle for damage, binding, worn parts and adequate lubrication.

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Maintenance and Specifications

At regular intervals, or during other scheduled maintenance (tire rotation/service, wheel bearing service, alignment, etc.), the kingpins should be checked for excessive wear. Refer to the service manual for proper procedures.

Toe-in setting - general inspection

Inspecting steer axle tires in the first 3,000–10,000 service miles (5,000–16,000 service km) generally shows if tires are wearing normally.

Rapid outside shoulder wear on both tires indicates too much toe-in.

Rapid inside shoulder wear on both tires indicates too much toe-out. In P&D-type service, left-to-right steer tire tread life differentials up to 40% can be observed depending on routes and other variables.

Follow the tire manufacturer's recommended cold inflation pressure for the tire size, load range (ply rating) and steer axle loading typical for their operation (each steer axle tire equals $\frac{1}{2}$ steer axle loading).

Special applications may warrant a setting based on experience with the type of tire operating loads and conditions. Radial tires are more sensitive to toe-in setting than bias ply tires. While not insensitive to vehicle alignment, fine tuning school bus alignment to line-haul truck standards does not drastically improve tire tread life.

It is essential that correct toe-in and tire pressure be maintained for optimum tire wear.

Rear axle - general inspection

Make sure that the axle mounting U-bolts, attaching or mounting bolts and nuts are securely tightened. Refer to *U-bolt nut torque* in this chapter. Regularly check the rear axle for damaged, binding or worn parts.

NoSpin Detroit Locker positive locking differential

Vehicles equipped with this type differential have the operator's manual supplied with the vehicle. Refer to this manual for maintenance checks.

Maintenance and Specifications

Brake system - general inspection

Your vehicle is equipped with non-asbestos brake linings. However, exposure to excessive amounts of brake material (whether asbestos or non-asbestos, fiberglass, mineral wool, aramid or carbon) may be a serious health hazard.

Note: Persons handling brake linings should follow all precautions listed below:



WARNING:

1. Always wear a respirator approved by the National Institute of Occupational Studies of Health (NIOSH) or Mine Safety and Appliance (MSA) during all brake service procedures. Wear the respirator from removal of the wheels through assembly.
2. **Never** use compressed air or dry brushing to clean brake parts or assemblies.
3. Clean brake parts and assemblies in open air. During assembly, carefully place all parts on the floor to avoid getting dust in the air. Use an industrial vacuum cleaner with a HEPA filter system to clean dust from the brake drums, backing plates and other brake parts. After using the vacuum, remove any remaining dust with a rag soaked in water and wrung until nearly dry.
4. **Never** use compressed air or dry sweeping to clean the work area. Use an industrial vacuum cleaner with a HEPA filter system and rags soaked in water until wrung until nearly dry. Dispose of used rags with care to avoid getting dust in the air. Use an approved respirator when emptying vacuum cleaners and handling used rags.
5. **Worker clean-up:** Wash your hands before eating, drinking or smoking. Vacuum your work clothes after use and then launder them separately, without shaking them, to prevent fiber dust getting into the air.

Air brakes

Inspection and adjustment: Establish a regular schedule for periodic cleaning, lubrication and adjustment inspection based on vehicle use. Exact maintenance intervals are difficult to predetermine since vehicles are used in a wide variety of applications and conditions; if you are uncertain of the proper schedule for your vehicle, contact your dealer.

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Maintenance and Specifications

Periodic checking of push rod travel or brake adjustment is essential for effective braking. Check push rod travel every service interval to determine if adjustment is correct. Brake chamber push rods on original equipment chambers now incorporate an orange paint marker near the base of the push rod as a stroke indicator to aid in adjustment checks. If the push rod is clean and the brakes are out of adjustment, the orange marker can be seen protruding from the chamber when the brakes are applied.



WARNING: Do not manually adjust the automatic slack adjusters to correct excessive push rod stroke as it may result in reduced brake effectiveness and a vehicle crash. Excessive push rod stroke indicates that a problem exists with the automatic adjuster, with the installation of the adjuster, or with foundation brake components that manual adjustment does not remedy. Seek service from a qualified facility for excessive push rod stroke.

Inspect the brake lining every maintenance interval. When brake lining or blocks are worn to within 1/16 inch (1.6 mm) of rivets, replace the brake linings. This inspection or adjustment should only be performed by a qualified technician and must be in accordance with instructions provided by the service manual.

Do not back off or disconnect the front brakes so that they are less effective, letting the rear brakes do all the stopping of the vehicle. Do not overlook the brakes on the trailer, either. Brake condition on the trailer is just as important as the tractor. Proper brake balance on trucks and tractor-trailers is essential for effective braking.

Once a year, the entire brake system must be inspected. Check the following:

- Any rubber components for deterioration. These components should be inspected by a qualified technician and replaced as necessary. Replacement intervals vary according to the severity and length of vehicle service.
- Condition of brake drums, brake chambers and slack adjusters.
- System for air leaks.
- Hose or pipes for rust, damage and deterioration.
- Operation of service and parking brakes.

Some parts such as air brake chamber diaphragm, air compressor and air cleaner should be inspected periodically and replaced if considered unserviceable.

Maintenance and Specifications

Air dryer: Climactic conditions affect performance of desiccant or after-cooler type air dryers. Maintenance schedules must be established for each specific operation.

The use of an air dryer on a vehicle does not eliminate the need to periodically drain the air reservoirs.

Desiccant air dryer: Inspect for moisture in the air system by opening reservoirs, draincocks or valves and checking for presence of water. The presence of small amounts of water due to condensation is normal and should not be considered as an indication that the dryer is not functioning properly.

The desiccant cartridge should be replaced or rebuilt when it has been determined that the desiccant is contaminated and does not have adequate water absorption capacity. The desiccant change interval may vary; it is generally recommended that the desiccant be replaced every 12 months (yearly). If experience has shown that extended or shortened life has resulted for a particular installation, then the yearly interval can be increased or decreased accordingly.

Hydraulic brakes

Inspection and adjustment: Establish a regular schedule for periodic cleaning, lubrication and adjustment inspection based on vehicle use. Exact maintenance intervals are difficult to predetermine since vehicles are used in a wide variety of applications and conditions; if you are uncertain of the proper schedule for your vehicle, contact your dealer.

Inspect the brake lining every maintenance interval. Establish inspection intervals that provide for lining replacement before damage to the disc occurs. Excessive lining wear may expose the backing plate to the disc causing scoring of the disc faces. This inspection should be performed by a qualified technician and must be in accordance with instructions provided by the service manual. Hydraulic brake systems are power-assisted. Braking capabilities are greatly reduced without engine assist.

Fluid level: Fluid level should be at the bottom edge of the ring on each reservoir fill port. Do not fill the master cylinder to the top of the reservoir. If fluid level requires attention to maintain a proper master cylinder level, this is an indication of either severe operation (pad wear) or fluid leakage. A more frequent and thorough brake inspection is required.

Maintenance and Specifications

Brake lines, hoses and fittings: Inspect these components every 4,000 miles (6,000 km):

- Lines for kinks, dents, corrosion or rupture.
- Hoses for abrasions, kinks, soft spots or rupture, collapse, cracks, twists or loose frame supports. When replacing a hose, be sure there is adequate clearance to the hose to avoid an abrasion to the new hose.
- All connections for leaks.
- Repair or replace brake line tubes, hoses or fittings as required.

Driveline parking brake

Parking brake adjustment should only be performed by a qualified technician, and in accordance with the instructions in the service manual.



WARNING: Use wheel chocks and exercise caution when inspecting under the vehicle. A vehicle roll-away could result in property damage, personal injury or death.

Catalytic converter (diesel engine)

If your diesel engine is equipped with a catalytic converter, it is important to review the maintenance schedule to ensure proper functioning of the catalytic converter. Also, take precautions not to damage the catalytic converter when servicing your engine or storing your vehicle.

Note: If your vehicle is equipped with a catalytic converter/muffler, **do not** blend waste oil with diesel fuel. Operate only on ultra low sulfur (less than 15 parts per million sulfur) diesel fuel with a cetane value of 45 or higher.

Diesel exhaust fluid (DEF), Diesel particulate filter (DPF) and Select catalyst reduction (SCR) system

Refer to your engine operator's manual for information regarding DEF, DPF and SCR system service.

Air induction system

Once each year, perform a complete inspection of the air induction system. In areas where road salt is used, the inspection consists of disassembling the joints of each aluminum component and inspecting for salt build-up, presence of chlorine that can cause aluminum particles to flake off and enter the engine combustion chambers.

Maintenance and Specifications

If evidence of corrosion is found (usually at the pipe connections), use a wire brush to clean the inside of the pipes and inside the rubber hoses.

If the intake pipes are pitted at the joint ends, use Motorcraft® Silicone Gasket and Sealant TA-30 to seal the joints. Be certain that no excess material is on the inside of the pipes that can be pulled into the engine. If the service condition of the pipes, hoses or clamps is questionable, replace the defective part(s).

Be sure that prior to reassembly all dust and debris has been cleaned out of the pipes and couplings with a clean, damp rag.



WARNING: When performing maintenance to any turbocharged engine with engine air inlet piping disconnected, keep loose clothing, jewelry and long hair away from the engine air inlet piping. A turbocharger compressor air inlet protective shield should be installed over the turbocharger air inlet to reduce the risk of personal injury or death.

Steering - general inspection

- Ask your service technician to examine the steering mechanism. Only minor adjustments may be necessary.
- Check tie rod, drag link end clamp bolts and ball joints. They must be tight.
- Check for installation and spread of cotter pins and tightness of nuts at both ends of the tie rod and drag link.
- Check that pitman arm (steering arm at steering gear) mounting is tight and locked. Check system for leaks or hose chafing. Repair at once.
- Maintain proper steering gear and power steering pump lubricant levels.
- Regularly inspect steering column joint bolts and steering linkage, particularly for body-to-chassis clearance.

Note: Have any steering problems corrected at once by a qualified service technician.



WARNING: Failure to maintain the steering system in proper condition can cause reduced steering ability resulting in property damage, personal injury or death.

Maintenance and Specifications

Tightening steering column joint bolts

As a good maintenance practice, it is recommended that steering column joint bolts be checked for tightness every 60,000 miles (96,000 km) or annually, whichever occurs first. DO NOT OVERTIGHTEN.

Power steering hydraulic system

Whenever the power steering's hydraulic system has been drained and refilled for any reason, air must be bled from the system before returning the vehicle to service. Failure to properly bleed the hydraulic system can result in degradation of power system performance.

Consult your dealer who is aware of the proper procedures for filling and bleeding the system.

OPENING THE HOOD

The hood and fenders are held in position by a latch located on each fender.



WARNING: The parking brake must be fully set before opening the hood or possible personal injury may occur.



WARNING: To reduce the risk of the possibility of personal injury, never stand beneath the hood when it is being raised or lowered.



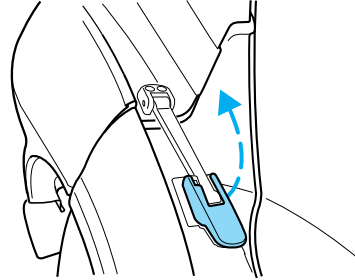
WARNING: If you must leave the engine running while checking under the hood, do not allow any loose clothing, jewelry, hair or other items to get near moving engine components or possible personal injury may occur.

To open the hood:

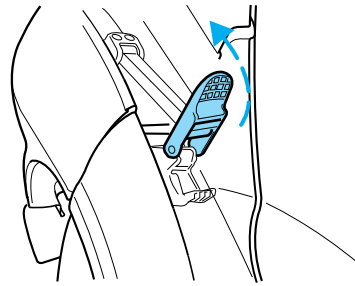
1. Set the parking brake, shift into N (Neutral) (automatic transmission) or 1 (First) (manual transmission) and turn the engine off.

Maintenance and Specifications

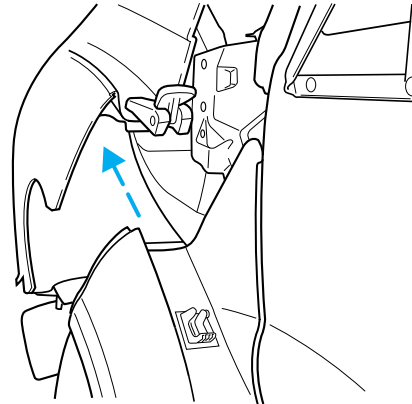
2. Lift upward on the bottom of each latch.



3. Pull the bottom of each latch away from the fender.



4. Tilt the hood forward until stopped by the retaining cables.



Maintenance and Specifications

To lower the hood:

1. Push the hood rearward at the top center of the hood above the grille until closed.
2. Engage the latch on each fender.
3. Push down on the bottom of each latch until locked.

WINDSHIELD WASHER FLUID

Add fluid to fill the reservoir if the level is low. In very cold weather, do not fill the reservoir completely.

Only use a washer fluid that meets Ford specifications. Do not use any special washer fluid such as windshield water repellent type fluid or bug wash. They may cause squeaking, chatter noise, streaking and smearing. Refer to *Maintenance product specifications and capacities* in this chapter.

State or local regulations on volatile organic compounds may restrict the use of methanol, a common windshield washer antifreeze additive. Washer fluids containing non-methanol antifreeze agents should be used only if they provide cold weather protection without damaging the vehicle's paint finish, wiper blades or washer system.



WARNING: If you operate your vehicle in temperatures below 40°F (5°C), use washer fluid with antifreeze protection. Failure to use washer fluid with antifreeze protection in cold weather could result in impaired windshield vision and increase the risk of injury or accident.

Maintenance and Specifications

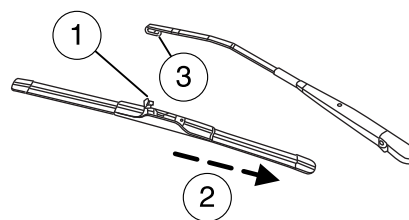
CHANGING THE WIPER BLADES

1. Pull the wiper arm away from the vehicle. Pry open the lock cover with your thumb (1) to release the blade and pull the wiper blade down toward the windshield to remove it from the arm (2).

2. Insert the wiper arm hook into the wiper arm (3).

3. While holding the wiper arm, push the wiper blade up and away from the windshield.

4. Close the lock cover.



Replace wiper blades at least once per year for optimum performance.

Poor wiper quality can be improved by cleaning the wiper blades and the windshield. Refer to *Windows and wiper blades* in the *Cleaning* chapter.

To prolong the life of the wiper blades, it is highly recommended to scrape off the ice on the windshield before turning on the wipers. The layer of ice has many sharp edges and can damage the micro edge of the wiper rubber element.

ENGINE OIL (DIESEL ENGINE ONLY)

Refer to your engine operator's manual for information on checking and adding engine oil as well as engine oil specifications, capacities and required maintenance.

Maintenance and Specifications

ENGINE OIL (GASOLINE ENGINE ONLY)

Checking the engine oil

Refer to the *scheduled maintenance information* for the appropriate intervals for checking the engine oil.

1. Make sure the vehicle is on level ground.
2. Turn the engine off and wait 15 minutes for the oil to drain into the oil pan.
3. Set the parking brake and ensure the gearshift is securely latched in P (Park).
4. Open the hood. Protect yourself from engine heat.
5. Locate and carefully remove the engine oil dipstick.
6. Wipe the dipstick clean. Insert the dipstick fully, then remove it again.
 - If the oil level is **between the two holes**, the oil level is acceptable. **DO NOT ADD OIL.**
 - If the oil level is at or below the lower hole, add enough oil to raise the level to within the two holes. Refer to *Adding engine oil* in the following section.
 - Oil levels above the upper hole may cause engine damage. Some oil must be removed from the engine by a service technician.

When the oil level is in its proper operating range, put the dipstick back in and ensure it is fully seated.

Adding engine oil

Check the engine oil. For instructions, refer to *Checking the engine oil*.

1. If the engine oil level is not within the normal range, add only certified engine oil of the recommended viscosity. Remove the engine oil filler cap and use a funnel to pour the engine oil into the opening.
2. Recheck the engine oil level. Make sure the oil level is not above the normal operating range on the engine oil level dipstick.
3. Install the dipstick and ensure it is fully seated.
4. Fully install the engine oil filler cap by turning the filler cap clockwise until three clicks are heard or until the cap is fully seated.

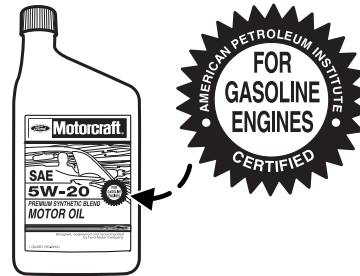
To avoid possible oil loss, DO NOT operate the vehicle with the engine oil dipstick and/or the engine oil filler cap removed.

Maintenance and Specifications

Engine oil and filter recommendations

Look for this certification trademark.

Only use oils certified for gasoline engines by the American Petroleum Institute (API). An oil with this trademark symbol conforms to the current engine and emission system protection standards and fuel economy requirements of the International Lubricant Standardization and Approval Committee (ILSAC), comprised of U.S. and Japanese automobile manufacturers.



To protect your engine and engine's warranty, use Motorcraft® SAE 5W-20 or an equivalent SAE 5W-20 oil meeting Ford specification WSS-M2C945-A. **SAE 5W-20 oil provides optimum fuel economy and durability performance meeting all requirements for your vehicle's engine.** Refer to *Maintenance product specifications and capacities* later in this chapter for more information.

Do not use supplemental engine oil additives, cleaners or other engine treatments. They are unnecessary and could lead to engine damage that is not covered by Ford warranty.

Ford production and Motorcraft® replacement oil filters are designed for added engine protection and long life. If a replacement oil filter is used that does not meet Ford material and design specifications, start-up engine noises or knock may be experienced.

It is recommended you use the appropriate Motorcraft® oil filter or another with equivalent performance for your engine application.

Maintenance and Specifications

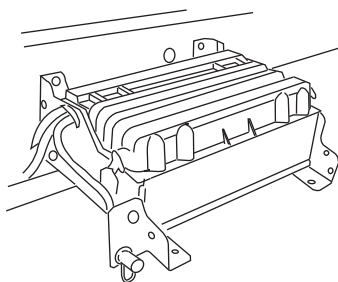
BATTERY

Your vehicle is equipped with two or three maintenance-free batteries mounted in a covered tray located on the left frame rail. The covered battery tray, depending upon application, may also have one or two steps attached.

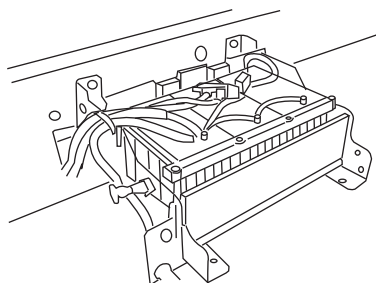


WARNING: This vehicle is equipped with more than one battery, removal of cable from only one battery does not disconnect the vehicle electrical system. Be sure to disconnect cables from all batteries when disconnecting power. Failure to do so may cause serious personal injury or property damage.

- Covered battery tray shown. Battery tray with steps similar. The two rubber straps on top of the cover must be pulled up and moved to the side of the battery in order to remove the lid.



- Battery tray with cover removed.



Maintenance-free batteries do not normally require adding additional water.

Make sure the battery cover/shield is reinstalled after the battery has been cleaned or replaced.

For longer, trouble-free operation, keep the top of the batteries clean and dry. Also, make certain the battery cables are always tightly fastened to the battery terminals.

Maintenance and Specifications

If you see any corrosion on the battery or terminals, remove the cables from the terminals and clean with a wire brush. You can neutralize the acid with a solution of baking soda and water.

It is recommended that the negative battery cable terminal be disconnected from the battery if you plan to store your vehicle for an extended period of time; this minimizes the discharge of your battery during storage.

If the engine cranks but does not start, remove the battery box cover and check the 40A inline fuse located on the battery cable above the battery.



WARNING: Batteries normally produce explosive gases which can cause personal injury. Therefore, do not allow flames, sparks or lighted substances to come near the battery. When working near the battery, always shield your face and protect your eyes. Always provide proper ventilation.



WARNING: When lifting a plastic-cased battery, excessive pressure on the end walls could cause acid to flow through the vent caps, resulting in personal injury and/or damage to the vehicle or battery. Lift the battery with a battery carrier or with your hands on opposite corners.



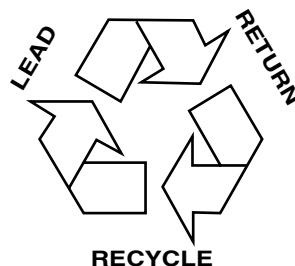
WARNING: Keep batteries out of reach of children. Batteries contain sulfuric acid. Avoid contact with skin, eyes or clothing. Shield your eyes when working near the battery to protect against possible splashing of acid solution. In case of acid contact with skin or eyes, flush immediately with water for a minimum of 15 minutes and get prompt medical attention. If acid is swallowed, call a physician immediately.



WARNING: Battery posts, terminals and related accessories contain lead and lead compounds. **Wash hands after handling.**

Maintenance and Specifications

Always dispose of automotive batteries in a responsible manner. Follow your local authorized standards for disposal. Call your local authorized recycling center to find out more about recycling automotive batteries.



ENGINE COOLANT (DIESEL ENGINE ONLY)

Refer to your engine operator's manual for engine coolant checking and adding instructions.

Severe climates

If you drive in extremely cold climates (less than -34°F [-36°C]):

- **It may be necessary to increase the coolant concentration above 50%.**
- **NEVER increase the coolant concentration above 60%.**
- **Engine coolant concentrations above 60% decreases the overheat protection characteristics of the engine coolant and may cause engine damage.**
- **If available, refer to the chart on the coolant container to ensure the coolant concentration in your vehicle provides adequate freeze protection at the temperatures in which you drive in the winter months.**

If you drive in extremely hot climates:

- **It is still necessary to maintain the coolant concentration above 40%.**
- **NEVER decrease the coolant concentration below 40%.**
- **Engine coolant concentrations below 40% decreases the corrosion protection characteristics of the engine coolant and may cause engine damage.**
- **Engine coolant concentrations below 40% decreases the freeze protection characteristics of the engine coolant and may cause engine damage.**
- **If available, refer to the chart on the coolant container to ensure the coolant concentration in your vehicle provides adequate protection at the temperatures in which you drive.**

Maintenance and Specifications

Vehicles driven year-round in non-extreme climates should use a 50/50 mixture of engine coolant and distilled water for optimum cooling system and engine protection.

Fan clutches

Your vehicle's cooling system is equipped with a viscous fan clutch which:

- Helps control cooling, increase performance, improve fuel economy and reduce noise.
- Is controlled by bimetallic spring sensors. Do not tamper with these sensors as this may change their calibration or keep the fan clutch from operating at all.



WARNING: Stay clear of the fan/fan area while the engine is running or possible personal injury may occur.

ENGINE COOLANT (GAS ENGINE ONLY)

Checking engine coolant

The concentration and level of engine coolant should be checked at the intervals listed in your scheduled maintenance information. The coolant concentration should be maintained at 50/50 coolant and distilled water. For best results, coolant concentration should be tested with a refractometer such as Rotunda tool 300-ROB75240E available from your dealer. Ford does not recommend the use of hydrometers or coolant test strips for measuring coolant concentration. The level of coolant should be maintained at the FULL COLD level or within the COLD FILL RANGE in the coolant reservoir. If the level falls below, add coolant per the instructions in the *Adding engine coolant* section.

Your vehicle was factory-filled with a 50/50 engine coolant and water concentration. If the concentration of coolant falls below 40% or above 60%, the engine parts could become damaged or not work properly. **A**

50/50 mixture of coolant and water provides the following:

- **Improved freeze protection.**
- **Improved boiling protection.**
- **Protection against rust and other forms of corrosion.**
- **Proper function of calibrated gauges.**

When the engine is cold, check the level of the engine coolant in the reservoir.

Maintenance and Specifications

- The engine coolant should be at the FULL COLD level, or within the COLD FILL or MIN / MAX range as listed on the engine coolant reservoir (depending upon application).
- Refer to your scheduled maintenance information for service interval schedules.

If the engine coolant has not been checked at the recommended interval, the engine coolant reservoir may become low or empty. If the reservoir is low or empty, add engine coolant to the reservoir. Refer to *Adding engine coolant* in this chapter.

Note: Automotive fluids are not interchangeable; do not use engine coolant/antifreeze or windshield washer fluid outside of its specified function and vehicle location.

Adding engine coolant

When adding coolant, make sure it is a 50/50 mixture of engine coolant and distilled water. Add the mixture to the coolant reservoir, **when the engine is cool**, until the appropriate fill level is obtained. If coolant is filled to the COLD FILL RANGE or FULL COLD level when the engine is not cool, the system will remain underfilled.



WARNING: Do not add engine coolant when the engine is hot. Steam and scalding liquids released from a hot cooling system can burn you badly. Also, you can be burned if you spill coolant on hot engine parts.



WARNING: Do not put engine coolant in the windshield washer fluid container. If sprayed on the windshield, engine coolant could make it difficult to see through the windshield.

- **DO NOT MIX** different colors or types of coolant in your vehicle. Make sure the correct coolant is used. Mixing of engine coolants may harm your engine's cooling system. The use of an improper coolant may harm engine and cooling system components and may void the warranty. Refer to *Maintenance product specifications and capacities* in this chapter.

Note: Do not use stop leak pellets or cooling system sealants/additives as they can cause damage to the engine cooling and/or heating systems. This damage would not be covered under your vehicle's warranty.

Maintenance and Specifications

- A large amount of water without engine coolant may be added, in case of emergency, to reach a vehicle service location. In this instance, the cooling system must be drained, chemically cleaned with Motorcraft® Premium Cooling System Flush, and refilled with a 50/50 mixture of engine coolant and distilled water as soon as possible. Water alone (without engine coolant) can cause engine damage from corrosion, overheating or freezing.
- **Do not use alcohol, methanol, brine or any engine coolants mixed with alcohol or methanol antifreeze (coolant).** Alcohol and other liquids can cause engine damage from overheating or freezing.
- **Do not add extra inhibitors or additives to the coolant.** These can be harmful and compromise the corrosion protection of the engine coolant.

For vehicles with overflow coolant systems with a non-pressurized cap on the coolant recovery system, add coolant to the coolant recovery reservoir when the engine is cool. Add the proper mixture of coolant and distilled water to the FULL COLD level. For all other vehicles which have a coolant degas system with a pressurized cap, or if it is necessary to remove the coolant pressure relief cap on the radiator of a vehicle with an overflow system, follow these steps to add engine coolant.



WARNING: To reduce the risk of personal injury, make sure the engine is cool before unscrewing the coolant pressure relief cap. The cooling system is under pressure; steam and hot liquid can come out forcefully when the cap is loosened slightly.

Add the proper mixture of coolant and water to the cooling system by following these steps:

1. Before you begin, turn the engine off and let it cool.
2. When the engine is cool, wrap a thick cloth around the coolant pressure relief cap on the coolant reservoir (a translucent plastic bottle). Slowly turn cap counterclockwise (left) until pressure begins to release.
3. Step back while the pressure releases.
4. When you are sure that all the pressure has been released, use the cloth to turn it counterclockwise and remove the cap.

Maintenance and Specifications

5. Fill the coolant reservoir slowly with the proper coolant mixture, to within the FULL COLD level, or within the COLD FILL or MIN / MAX range as listed on the engine coolant reservoir (depending upon application). If you removed the radiator cap in an overflow system, fill the radiator until the coolant is visible and radiator is almost full.

6. Replace the cap. Turn until tightly installed. Cap must be tightly installed to prevent coolant loss.

After any coolant has been added, check the coolant concentration (refer to *Checking engine coolant*). If the concentration is not 50/50, drain some coolant and adjust the concentration. It may take several drains and additions to obtain a 50/50 coolant concentration.

Whenever coolant has been added, the coolant level in the coolant reservoir should be checked the next few times you drive the vehicle. If necessary, add enough 50/50 concentration of engine coolant and distilled water to bring the liquid level to the proper level.

If you have to add more than 1.0 quart (1.0 liter) of engine coolant per month, have your authorized dealer check the engine cooling system. Your cooling system may have a leak. Operating an engine with a low level of coolant can result in engine overheating and possible engine damage.

Recycled engine coolant

Ford Motor Company does NOT recommend the use of recycled engine coolant since a Ford-approved recycling process is not yet available.



Used engine coolant should be disposed of in an appropriate manner. Follow your community's regulations and standards for recycling and disposing of automotive fluids.

Coolant refill capacity

To find out how much fluid your vehicle's cooling system can hold, refer to *Maintenance product specifications and capacities* in this chapter.

If your vehicle is equipped with a diesel engine, refer to your operator's manual.

Fill your engine coolant reservoir as outlined previously in the *Adding engine coolant* section.

Maintenance and Specifications

Severe climates

If you drive in extremely cold climates:

- **It may be necessary to increase the coolant concentration above 50%.**
- **NEVER increase the coolant concentration above 60%.**
- **A coolant concentration of 60% will provide improved freeze point protection. Increased engine coolant concentrations above 60% will decrease the overheat protection characteristics of the engine coolant and may cause engine damage.**
- **If available, refer to the chart on the coolant container to ensure the coolant concentration in your vehicle will provide adequate freeze protection at the temperatures in which you drive in the winter months.**

If you drive in extremely hot climates:

- **It is still necessary to maintain the coolant concentration above 40%.**
- **NEVER decrease the coolant concentration below 40%.**
- **Decreased engine coolant concentrations below 40% will decrease the corrosion/freezing protection characteristics of the engine coolant and may cause engine damage.**
- **If available, refer to the chart on the coolant container to ensure the coolant concentration in your vehicle will provide adequate protection at the temperatures in which you drive.**

Vehicles driven year-round in non-extreme climates should use a 50/50 mixture of engine coolant and distilled water for optimum cooling system and engine protection.

What you should know about fail-safe cooling (if equipped)

If the engine coolant supply is depleted, this feature allows the vehicle to be driven temporarily before incremental component damage is incurred. The “fail-safe” distance depends on ambient temperatures, vehicle load and terrain.



WARNING: If fail-safe cooling activates, pull off the road as soon as safely possible and turn the engine off. The engine may automatically shut off while driving without further indication.

Maintenance and Specifications

How fail-safe cooling works

If the engine begins to overheat:

- The engine coolant temperature gauge will move to the red (hot) area.
- The message center will indicate the engine is overheating.
- The service engine soon  indicator will illuminate.

If the engine reaches a preset over-temperature condition, the engine will automatically switch to alternating cylinder operation. Each disabled cylinder acts as an air pump and cools the engine.

When this occurs the vehicle will still operate. However:

- The engine power will be limited.
- The air conditioning system will be disabled.

Continued operation will increase the engine temperature and the engine will completely shut down, causing steering and braking effort to increase.

Once the engine temperature cools, the engine can be restarted. Take your vehicle to an authorized dealer as soon as possible to minimize engine damage.

When fail-safe mode is activated

You have limited engine power when in the fail-safe mode, so drive the vehicle with caution. The vehicle will not be able to maintain high-speed operation and the engine will run rough. Remember that the engine is capable of completely shutting down automatically to prevent engine damage; therefore:

1. Pull off the road as soon as safely possible and turn off the engine.
2. Arrange for the vehicle to be taken to an authorized dealer.
3. If this is not possible, wait a short period for the engine to cool.
4. Check the coolant level and replenish if low.



WARNING: Never remove the coolant reservoir cap while the engine is running or hot.

5. Re-start the engine and take your vehicle to an authorized dealer.

Driving the vehicle without repairing the engine problem increases the chance of engine damage. Take your vehicle to an authorized dealer as soon as possible.

Maintenance and Specifications

FUEL FILTER/WATER SEPARATOR (DIESEL ENGINE)

 **WARNING:** Do not drain water separator while engine is running. Fuel may ignite if separator is drained while engine is running or vehicle is moving.

The fuel filter/water separator removes any contaminated particles and/or water from the fuel before the fuel enters the engine.

Refer to your engine operator's manual for information on draining and replacing the fuel filter.

FUEL INFORMATION

Important safety precautions

 **WARNING:** Do not overfill the fuel tank. The pressure in an overfilled tank may cause leakage and lead to fuel spray and fire.

 **WARNING:** The fuel system may be under pressure. If the fuel filler cap is venting vapor or if you hear a hissing sound, wait until it stops before completely removing the fuel filler cap. Otherwise, fuel may spray out and injure you or others.

 **WARNING:** The fuel system may be under pressure. If the fuel cap is venting vapor or if you hear a hissing sound, wait until it stops before completely removing the cap.

 **WARNING:** Automotive fuels can cause serious injury or death if misused or mishandled.

 **WARNING:** Fuel ethanol and gasoline may contain benzene, which is a cancer-causing agent.

Maintenance and Specifications

Observe the following guidelines when handling fuel:

- Extinguish all smoking materials and any open flames before fueling your vehicle.
- Always turn off the vehicle before fueling.
- Automotive fuels can be harmful or fatal if swallowed. If fuel is swallowed, call a physician immediately, even if no symptoms are immediately apparent. The toxic effects of fuel may not be visible for hours.
- Avoid inhaling fuel vapors. Inhaling too much fuel vapor of any kind can lead to eye and respiratory tract irritation. In severe cases, excessive or prolonged breathing of fuel vapor can cause serious illness and permanent injury.
- Avoid getting fuel liquid in your eyes. If fuel is splashed in the eyes, remove contact lenses (if worn), flush with water for 15 minutes and seek medical attention. Failure to seek proper medical attention could lead to permanent injury.
- Fuels can also be harmful if absorbed through the skin. If fuel is splashed on the skin and/or clothing, promptly remove contaminated clothing and wash skin thoroughly with soap and water. Repeated or prolonged skin contact with fuel liquid or vapor causes skin irritation.
- Be particularly careful if you are taking “Antabuse” or other forms of disulfiram for the treatment of alcoholism. Breathing gasoline and/or ethanol vapors, or skin contact could cause an adverse reaction. In sensitive individuals, serious personal injury or sickness may result. If fuel is splashed on the skin, promptly wash skin thoroughly with soap and water. Consult a physician immediately if you experience an adverse reaction.



WARNING: When refueling always shut the engine off and never allow sparks or open flames near the filler neck. Never smoke while refueling. Fuel vapor is extremely hazardous under certain conditions. Care should be taken to avoid inhaling excess fumes.



WARNING: The flow of fuel through a fuel pump nozzle can produce static electricity, which can cause a fire if fuel is pumped into an ungrounded fuel container.

Maintenance and Specifications

If you must replace the fuel filler cap, replace it with a genuine Ford or Motorcraft® part. The customer warranty may be void for any damage to the fuel tank or fuel system if a genuine Ford or Motorcraft® fuel filler cap is not used.



WARNING: If you do not use the proper fuel filler cap, excessive pressure or vacuum in the fuel tank may damage the fuel system or cause the fuel cap to disengage in a collision, which may result in possible personal injury.

Choosing the right fuel - diesel engines

Use only Ultra Low Sulfur (15 ppm Sulfur Maximum) number 1-D or 2-D diesel fuel in your diesel engine. The engine and exhaust system were designed to only use this fuel. Look for the ULTRA-LOW SULFUR HIGHWAY DIESEL FUEL (15 ppm Sulfur Maximum) label on fuel pumps when purchasing your fuel.

Number 1-D or winter blend number 2-D fuel is recommended at temperatures below 20°F (-7°C) (see *Cold weather operation* in the *Driving* chapter. Diesel fuel containing no more than 20% biodiesel may be used. Biodiesel fuel is a product that has been converted from renewable fuel sources, including vegetable oil, animal fat and cooking oil. Raw or refined vegetable oil, animal fat, cooking oil or recycled greases should not be used. All biodiesel up to B20 must comply with ASTM D7467 standards.

Refer to your engine operator's manual for additional information and restrictions regarding use of biodiesel fuel.



WARNING: Do not use home heating oil or any diesel fuel not intended for highway use. Red dye is used to identify fuels intended for agricultural and non-highway use. Damage to the fuel injection system, engine and exhaust catalyst can occur if an improper fuel is used. Do not add gasoline, gasohol or alcohol to diesel fuel. This practice creates a serious fire hazard and engine performance problems.

Note: Use of any fuel other than those recommended may cause powertrain damage, a loss of vehicle performance, and repairs may not be covered under warranty.

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Maintenance and Specifications



WARNING: Using low sulfur (16-500 ppm) or high sulfur (greater than 500 ppm) diesel fuel in a diesel engine designed to use only Ultra Low Sulfur Diesel fuel increases the likelihood of engine oil dilution with fuel which may lead to major engine damage.



WARNING: Using low sulfur (16-500 ppm) or high sulfur (greater than 500 ppm) diesel fuel in a diesel engine designed to use only Ultra Low Sulfur Diesel fuel causes certain emission components to malfunction which may also cause the Service Engine Soon light to illuminate indicating an emissions-related concern.



WARNING: Do not mix diesel fuel with gasoline, gasohol or alcohol. This could cause an explosion resulting in personal injury.



WARNING: Do not use starting fluid such as ether or gasoline. Such fluids can cause immediate explosive damage to the engine and possible personal injury.

Choosing the right fuel - gasoline engines

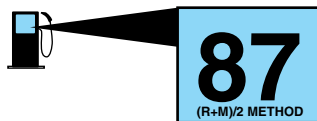
Use only UNLEADED fuel or UNLEADED fuel blended with a maximum of 10% ethanol. Do not use fuel ethanol (E85), diesel, methanol, leaded fuel or any other fuel. The use of leaded fuel is prohibited by law and could damage your vehicle.

Your vehicle was not designed to use fuel or fuel additives with metallic compounds, including manganese-based additives.

Note: Use of any fuel other than those recommended may cause powertrain damage, a loss of vehicle performance, and repairs may not be covered under warranty.

Octane recommendations - gasoline engines

“Regular” unleaded gasoline with a pump (R+M)/2 octane rating of 87 is recommended. Some stations offer fuels posted as “Regular” with an octane rating below 87, particularly in high altitude areas. Fuels with octane levels below 87 are not recommended.



Maintenance and Specifications

Do not be concerned if your engine sometimes knocks lightly. However, if it knocks heavily under most driving conditions while you are using fuel with the recommended octane rating, see your authorized dealer to prevent any engine damage.

Fuel quality - diesel engines

It should not be necessary to add any aftermarket additives to your fuel tank if you use a properly formulated diesel fuel that meets ASTM D 975 specification. Aftermarket additives can damage the injector system or engine. Repairs to correct the effects of using an aftermarket product in your fuel may not be covered by your warranty.

Do not blend used engine oil with diesel fuel under any circumstances. Blending used oil with the fuel significantly increases your vehicle's exhaust emissions and reduce engine life due to increased internal wear.

Many of the world's automakers approved the World-wide Fuel Charter that recommends diesel fuel specifications to provide improved performance and emission control system protection for your vehicle. Diesel fuel that meet the World-wide Fuel Charter should be used when available. Ask your fuel supplier about fuel that meet the World-Wide Fuel Charter.

Fuel quality - gasoline engines

If you are experiencing starting, rough idle or hesitation driveability problems during a cold start, try a different brand of "Regular" unleaded gasoline.

Do not add aftermarket fuel additive products to your fuel tank. It should not be necessary to add any aftermarket products to your fuel tank if you continue to use high quality fuel of the recommended octane rating. These products have not been approved for your engine and could cause damage to the fuel system. Repairs to correct the effects of using an aftermarket product in your fuel may not be covered by your warranty.

Many of the world's automakers approved the World-Wide Fuel Charter that recommends gasoline specifications to provide improved performance and emission control system protection for your vehicle. Gasolines that meet the World-Wide Fuel Charter should be used when available. Ask your fuel supplier about gasolines that meet the World-Wide Fuel Charter.

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Maintenance and Specifications

Cleaner air - gasoline engines

Ford endorses the use of reformulated “cleaner-burning” gasolines to improve air quality, per the recommendations in the *Choosing the right fuel* section.

Running out of fuel - diesel engines

Avoid running out of fuel as this allows air to enter the fuel system, which makes restarting the vehicle difficult.

If you have run out of fuel:

- **If your vehicle is equipped with dual fuel tanks**, add at least 4–5 gallons (15–19 liters) of fuel to each tank before attempting to restart the engine.
- The fuel system must be primed before attempting to restart the engine. Refer to the engine operator’s manual for instructions on priming the engine.
- **Use caution not to overheat and damage the starter** by cranking the engine for an excessive period of time. You may need to crank the engine for a longer time than normal. If the engine fails to start in 30 seconds, turn the ignition to the off position and wait for two minutes before cranking the engine again.
- Any remaining trapped air self-purges from the fuel system once the engine starts running.
- The engine may run rough and produce white smoke while air is in the fuel system. This is normal and should stop after a short period of time.

Running out of fuel - gasoline engines

Avoid running out of fuel because this situation may have an adverse effect on powertrain components.

If you have run out of fuel:

- You may need to cycle the ignition from off to on several times after refueling to allow the fuel system to pump the fuel from the tank to the engine. On restarting, cranking time will take a few seconds longer than normal.
- **If your vehicle is equipped with dual fuel tanks**, adding 4–5 gallons (15–19 liters) of fuel is enough to restart the engine. If the vehicle is out of fuel and on a steep grade, more than 4–5 gallons (15–19 liters) may be required.

Maintenance and Specifications

- The service engine soon  indicator may come on. For more information on the service engine soon  indicator, refer to *Warning lights and chimes* in the *Instrument Cluster* chapter.

Selective Catalytic Reduction (SCR) System - diesel engines

Your vehicle is equipped with a selective catalytic reduction (SCR) system to help reduce emission levels of oxides of nitrogen from the exhaust of the diesel engine. The system automatically injects diesel exhaust fluid (DEF) into the exhaust system to enable proper SCR function.

Importance of maintaining the DEF level

In order for the SCR system to operate properly, the DEF must be maintained. Generally, the DEF tank should be filled before the DEF gauge in the instrument cluster reached the first low level warning (refer to *DEF warning messages and vehicle operations*).

The engine control unit monitors the amount of fluid available in the DEF tank. Failure to maintain an adequate amount of DEF in the system generates warning messages that appear in the instrument cluster message center and, unless the DEF tank is refilled, leads to a forced reduction of engine operations.

DEF warning messages and vehicle operations

Your vehicle is equipped with a DEF gauge located in the instrument cluster. The low level warning symbols (see chart) are illuminated if the DEF gauge level drops below 0.5 gallon (1.9L) in the 5 gallon (19.0L) DEF tank or 1 gallon (3.8L) in the 9 gallon (34.0L) DEF tank.

Upon filling the DEF tank after a low level warning, normal operation resumes when the vehicle is restarted.

Continued driving without refilling results in the following actions as required by the U.S. Environmental Protection Agency (EPA):

DEF Low Level Warning and Vehicle Consequence			
DEF Tank Level	Indicator Lamps	Consequence	Remedy
Above initial warning threshold (Over 10% full)	None	None	None

Maintenance and Specifications

DEF Low Level Warning and Vehicle Consequence			
DEF Tank Level	Indicator Lamps	Consequence	Remedy
Below initial warning threshold (10% full)	DEF solid 	None	Add minimum of 1 gallon (3.8L) DEF to 5 gallon (19.0L) tank or 2 gallons (7.6L) DEF to 9 gallon (34.0L) tank
Below critical warning threshold (5% full)	DEF blinking 	None	
Below initial derate level (2.5% full)	DEF blinking  / Amber warning solid 	40% torque reduction	
Empty + engine intentionally shut down or in extended idle	DEF blinking  / Amber warning solid  / Red engine solid 	40% torque reduction + 5 mph (8 km/h) vehicle speed limit	

Filling the DEF tank

Your vehicle is equipped with a DEF tank with a blue-capped filler port. The 5 gallon (19.0L) DEF tank is located on the left side of the vehicle under the cab and the 9 gallon (34.0L) DEF tank is located on the right side of the vehicle behind the Regular Cab and Super Cabs and under the Crew Cab. The tank can be filled using a nozzle at a DEF filling station (similar to fuel fill) or using a DEF bottle with a spout. Motorcraft® brand DEF bottles are recommended. Other aftermarket bottles can be used but it should have a seal on the spout and an internal vent tube to achieve best fill performance and prevent overfilling.

Note: Do not put DEF in the fuel tank or any other tank on the vehicle. This can cause damage to components not covered by your vehicle's warranty.

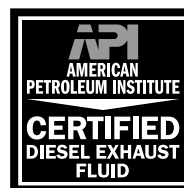
Maintenance and Specifications

You can purchase DEF at your authorized dealer, most highway truck stops or you can contact roadside assistance for help in finding a retailer that sells DEF. See the *Customer Assistance* chapter for more information. Also, a government website locator is available for diesel exhaust fluid supplies. The following web address can be used to find the nearest location to purchase DEF: <http://www.afdc.energy.gov/afdc/locator/def>.

Use Motorcraft® DEF or equivalent meeting Ford specification WSS-M2C130-A and/or ISO 22241.

Use only DEF certified by the American Petroleum Institute. Look for this certification trademark.

Repairs resulting from the use of a non-certified DEF products may not be covered by your vehicle's warranty.



Maintaining the purity of DEF is important to avoid malfunctions in the SCR system.

If DEF is removed from the tank for any reason, such as repair work, the same DEF must not be used to refill the tank as its purity is no longer guaranteed.



WARNING: Make sure that DEF does not come into contact with eyes, skin or clothing. Should DEF contact your eyes, flush them with plenty of water and contact a physician. Clean affected skin with soap and water. If DEF is swallowed, drink plenty of water and contact a physician immediately.



WARNING: Refill DEF in a well-ventilated area. When opening the cap on the DEF tank or bottle containing DEF, ammonia vapors may escape. The vapors can be irritating to skin, eyes and mucous membranes. Inhaling ammonia vapors can cause burning to the eyes, throat and nose and cause coughing and watery eyes.

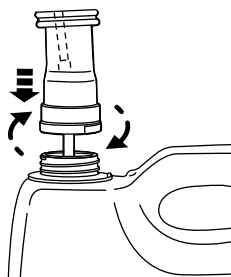
To fill the DEF tank, see your authorized dealer or do the following (before filling the DEF tank in cold climates, see *Filling the DEF tank in cold climates* later in this section):

Maintenance and Specifications

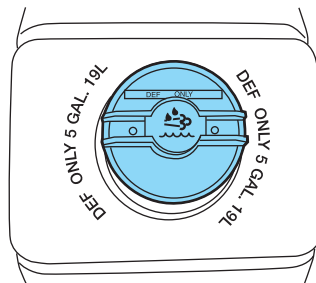
DEF bottle fill with spout

The following procedure applies to Motorcraft® DEF or similar DEF bottles; for other brands or bottle types, refer to the instructions on the bottle label.

1. Remove the cap from DEF container and twist the spout onto the container until the locking tab is engaged.

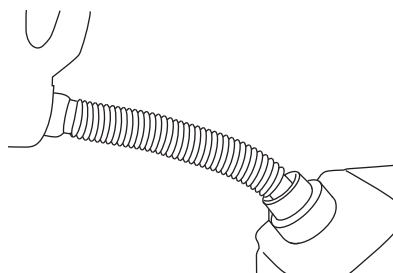


2. Open the DEF filler port on the vehicle by turning the blue cap counterclockwise 1/4-turn.



3. Lift and hold the DEF container, without tipping, and insert the spout into the DEF filler.

4. Lift and tip the container to let DEF flow into the tank. Pour DEF until the container is empty or DEF flow stops. DEF can be seen flowing through the spout, but does not completely fill the spout while flowing. Air is trapped in the spout while DEF is flowing. When the DEF tank is full, DEF completely fills the spout and displaces the air in the spout.



Maintenance and Specifications

5. Once the spout is full with DEF (no more large air pockets) return the container to the vertical position slightly below the DEF filler port and let any DEF drain out of the spout. DO NOT try to continue to add DEF to the tank by shaking or repositioning the container to induce flow. This may cause spilling and overfill the tank. Overfilling the DEF tank can cause damage to the tank.
6. Once the spout has drained, remove the spout from the DEF filler port and install the blue cap on the DEF filler port by turning the cap $\frac{1}{4}$ -turn clockwise.
7. Remove the spout from the DEF container and install the cap back on the bottle.
8. If the container is empty, discard the empty container and spout, or recycle if possible. If there is some DEF left in the container, retain it and the spout for later use. Store the spout to ensure it is kept clean.
9. Wipe away any DEF that has spilled on painted surfaces with water and a damp cloth.

DEF filling station nozzle fill

Filling the DEF tank using a nozzle is similar to a normal fuel fill. The nozzle shuts off automatically when the tank is full. Do not continue to fill the tank as this may cause spilling and overfill the tank which can cause damage.

Filling the DEF tank in cold climates

DEF freezes below 12°F (-11°C); if temperatures are at or below this for an extended period of time and the DEF tank is full and you are not going to drive the vehicle, there is a risk that the tank could freeze and cause damage. If low temperature conditions are expected you should keep your tank at least 50% full and make sure you add DEF on level ground to prevent the fluid from freezing on angle.

Maintenance and Specifications

Contaminated DEF

SCR systems are sensitive to contamination of the DEF. USE ONLY CERTIFIED DIESEL EXHAUST FLUID. If the system becomes contaminated and the vehicle continues to be driven with contaminated DEF, the following warnings result:



Reducing Agent and Vehicle Consequence		
Condition	Indicator Lamps	Consequence
Correct reducing agent	None	None
Incorrect reducing agent, at detection	Amber warning 	None
Incorrect reducing agent, at detection + 10 hours	Amber warning 	40% torque reduction
Incorrect reducing agent, at detection + 20 hours and engine intentionally shut down or in extended idle	Amber warning  Red engine 	40% torque reduction + 5 mph (8 km/h) vehicle speed limit

If any of these warnings appear, the contaminated DEF must be purged and replaced with approved DEF; refer to an authorized dealer or the workshop manual.

Upon filling the DEF tank after a DEF contaminated warning, normal operation resumes when the vehicle is restarted.

DEF guidelines and information

- DEF is non-flammable, non-toxic, colorless and water-soluble liquid.
- Use only DEF that carries the trademark: AMERICAN PETROLEUM INSTITUTE CERTIFIED DIESEL EXHAUST FLUID.
- Ammonia odor may be smelled when cap is removed or during refill. Refill DEF in a well ventilated area.
- Prior to filling, make sure surrounding area is clean of debris to prevent contamination.
- Do not dilute DEF with water or any other liquid.
- Do not put DEF in the fuel tank or any other tank on the vehicle.
- Do not re-use the DEF container or nozzle once it is emptied.
- Do not overfill the DEF tank.

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- Avoid spilling DEF on painted surfaces, carpeting or plastic components. Immediately wipe away any DEF that has spilled on painted surfaces with a damp cloth and water. If it has already crystallized, use warm water and a sponge.
- DEF freezes below 12°F (-11°C). Your vehicle is equipped with an automatic pre-heating system which allows the DEF system to operate below 12°F (-11°C).
- Do not store DEF bottle in vehicle. If it leaks it could cause damage to interior components or release ammonia odor inside the vehicle.
- Store DEF fluid out of direct sunlight and in temperatures between 23°F (-5°C) – 68°F (20°C).

FUEL CONSUMPTION IMPROVEMENT MEASURES

There are two important factors you can control to improve fuel economy: the mechanical condition of your vehicle and how you drive it.

A properly maintained vehicle delivers better performance than a neglected vehicle. Always follow your maintenance schedule to keep your vehicle in top operating condition.

Also, your driving habits have a significant influence on use of fuel. By following these suggestions, you can stretch your fuel use:

- Avoid changes in speed as much as possible.
- Anticipate changing traffic conditions. Sudden stops and fast acceleration waste fuel.
- Avoid extensive idling.
- Do not drive with your foot resting on the brake pedal.

Essentials of good fuel economy

Measuring techniques

Your best source of information about actual fuel economy is you, the driver. You must gather information as accurately and consistently as possible. Fuel expense, frequency of fill-ups or fuel gauge readings are NOT accurate as a measure of fuel economy. We do not recommend taking fuel economy measurements during the first 1,000 miles (1,600 km) of driving (engine break-in period). You get a more accurate measurement after 2,000–3,000 miles (3,000–5,000 km).

The advertised fuel capacity of the fuel tank(s) on your vehicle is equal to the rated refill capacity of the fuel tank(s) as listed in *Refill capacities* in this chapter. The advertised capacity is the amount of the

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indicated capacity and the empty reserve combined. Indicated capacity is the difference in the amount of fuel in a full tank and a tank when the fuel gauge indicates empty. Empty reserve is the small amount of usable fuel remaining in the fuel tank after the fuel gauge indicates empty.

The amount of empty reserve varies and should not be relied upon to increase driving range. When refueling your vehicle after the fuel gauge indicates empty, you might not be able to refuel the full amount of the advertised capacity of the fuel tank due to the empty reserve still present in the tank.

Filling the tank

For consistent results:

- Use the same fill rate setting (low-medium-high) each time during filling.
- Allow three automatic click-offs when filling.
- Always use fuel of a known quality, preferably a national brand.
- Have the vehicle loading and distribution the same every time.
- When refueling a vehicle equipped with dual fuel tanks, if the two tanks are not filled equally, the fuel gauge reading may fluctuate slightly until the fuel level between the two tanks balance out and become equal.

Your results are most accurate if your filling method is consistent.

Note: For vehicles equipped with dual fuel tanks, engine performance may degrade if fuel is not added to both tanks when refueling.

Calculating fuel economy

1. Fill the fuel tank(s) completely and record the initial odometer reading (in miles or kilometers).
2. Each time you fill the tank(s), record the amount of fuel added (in gallons or liters).
3. After at least three to five tank fill-ups, fill the fuel tank(s) and record the current odometer reading.
4. Subtract your initial odometer reading from the current odometer reading.
5. Follow one of the simple calculations in order to determine fuel economy:
 - Divide total miles traveled by total gallons used.
 - Multiply liters used by 100, then divide by total kilometers traveled.

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Keep a record for at least one month and record the type of driving (city or highway). This provides an accurate estimate of the vehicle's fuel economy under current driving conditions. Additionally, keeping records during summer and winter shows how temperature impacts fuel economy. In general, lower temperatures give lower fuel economy.

Driving style - good driving and fuel economy habits

Give consideration to the lists that follow and you may be able to change a number of variables and improve your fuel economy.

Habits

- Smooth, moderate operation can yield up to 10% savings in fuel.
- Steady speeds without stopping usually give the best fuel economy.
- Anticipate stopping; slowing down may eliminate the need to stop.
- Sudden or hard accelerations may reduce fuel economy.
- Slow down gradually.
- Driving at reasonable speeds (traveling at 55 mph [88 km/h] uses 15% less fuel than traveling at 65 mph [105 km/h]).
- Using the air conditioner or defroster may reduce fuel economy.
- Resting your foot on the brake pedal while driving may reduce fuel economy.

Conditions

- Carrying unnecessary weight may reduce fuel economy.
- Fuel economy may decrease with lower temperatures during the first 8–10 miles (12–16 km) of driving.
- Flat terrain driving improves fuel economy over hilly roads.
- Transmissions give their best fuel economy when operated in the top cruise gear and with steady pressure on the accelerator.
- Close windows for highway driving.

DIESEL PARTICULATE FILTER (DPF)

Your vehicle is equipped with a diesel particulate filter (DPF), as part of the after-treatment exhaust system, to trap soot and other large particles produced by the engine combustion process. The soot that accumulates in the filter must be periodically reduced to ash to prevent excessive exhaust restriction. The soot reduction process, also known as “filter regeneration,” is generally performed automatically by your engine and after-treatment system.

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WARNING: The normal operating temperature of the exhaust system is very high. Never work around, or attempt to repair, any part of the exhaust system until it has cooled. Use special care when working around the diesel particulate filter. The DPF heats up to a high temperature after only a short period of engine operation, and can remain hot even after the engine is turned off. Failure to follow these instructions may result in serious personal injury.

Diesel particulate filter regeneration

Under most operating conditions, DPF regeneration is transparent to the operator. A small increase in engine/turbo sound-level is normal during filter regeneration. If, however, your engine is operated for extended periods of time under one of the following conditions, operator assistance may be required to facilitate the filter regeneration process:

- Vehicle is operated in stop-and-go traffic and/or maintains low speeds as in a city/delivery driving
- Engine is started and shut-off frequently
- Vehicle payload is relatively light
- Vehicle is regularly operated in cold ambient temperatures (i.e. below 0°F [-18°C])

Diesel Particulate Filter Four-Level Loading Chart		
Level/Lamp status	Filter status	Requested action
Level 1  solid	Regeneration required	Drive on highway at highway speeds OR start “parked regeneration” to prevent loss of engine performance
Level 2  flashing (once per second)	Nearly full; engine performance is limited	“parked regeneration” to prevent loss of engine performance
Level 3  flashing +  solid	Full; engine is increasingly limited	Perform “parked regeneration” to prevent loss of engine performance
Level 4  solid	Over full; engine performance is highly limited. Continued operation may result in irreparable damage to the filter.	Pull vehicle safely off roadway, turn on hazard flashers and shut down engine as soon as possible; seek service immediately

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Instrument cluster lamp(s) illuminate and/or flash when operator assistance is required. In addition, engine performance becomes increasingly limited above Level 1.



At Levels 1 and 2, two courses of action may be taken by the operator to facilitate filter regeneration:

1. The vehicle may be driven on the highway at highway speeds,
2. The operator may perform a parked regeneration by following the steps in *Parked regeneration procedure*.

At Level 3, performing a parked regeneration is the only available course of action (short of professional servicing) available to the operator for regenerating the filter. At Level 4, professional servicing is the only way to regenerate the filter.

Parked regeneration procedure



WARNING: When performing the parked regeneration procedure, make certain the vehicle is safely off roadway, and the exhaust system is away from people, or any flammable materials, vapors, or structures. Engine speed may increase during parked regeneration.

Note: Parked regeneration is only available when the DPF lamp on the instrument cluster is illuminated (solid or flashing).

1. Bring the vehicle to a complete stop on level ground and safely off the road with the exhaust system away from people, flammable materials, vapors or structures. Ford recommends that you perform a walk-around to check before commencing parked regeneration.
2. If your vehicle is equipped with an automatic transmission and a steering column shift lever, place transmission in P (Park). Otherwise, place the transmission in N (Neutral).
3. Remove feet from the accelerator pedal and clutch pedal (if equipped).
4. Set the parking brake.
5. **Within 5 seconds of setting the parking brake**, remove foot from the service brake pedal.

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The engine speed may increase slightly. To allow parked regeneration to continue uninterrupted:

1. The vehicle must remain parked
2. The transmission must remain in P (Park) or N (Neutral) (as previously described in Step 2).
3. The accelerator pedal, service brake pedal, and clutch pedal (if equipped) must not be pressed
4. The parking brake must remain set

On average (depending on filter level and other factors), the process takes 20–30 minutes to complete. The DPF lamp turns off when the process is complete. Repeat Steps 1–5, if parked regeneration is interrupted.

To discontinue parked regeneration

Press any of the floor pedals to discontinue parked regeneration.

Diesel particulate filter maintenance and service

The DPF is designed to retain a relatively large amount of residual ash and provide many miles and hours of maintenance-free operation. At some point, generally beyond 150,000 miles (240,000 km) or 5,000 hours of operation (whichever comes first), the DPF requires professional cleaning to remove the accumulated ash.

The exact number of miles or hours of operation varies greatly depending upon vehicle/engine loading and operating conditions, ash content of the engine oil, and quality of the diesel fuel used in your truck. Adhering to your engine manufacturer's recommended oil and fuel specifications maximizes the miles and hours of operation before a DPF professional cleaning is required. Refer to your engine manufacturer's owner's manual for more details regarding recommended maintenance and service of your DPF.

Exhaust outlet assembly



WARNING: The normal operating temperature of the exhaust system is very high. Never work around or attempt to repair any part of the exhaust system until it has cooled. Failure to follow these instructions may result in serious personal injury.

The exhaust outlet assembly on your vehicle is a uniquely functioning device that accompanies the DPF assembly. It is designed to help control the temperature of the exhaust during the DPF regeneration process. **Do not modify or remove this device. Modification of the system**

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and/or additions of aftermarket devices can reduce the effectiveness of the system, as well as cause damage to the exhaust system and/or engine. Any modifications may also invalidate the vehicle and/or engine warranties. See the vehicle and engine warranty guides for more information.

The inlet holes in the side of the assembly are functional. These holes allow outside air to be drawn into the outlet assembly. The holes need to be kept clear of mud and other foreign material to maintain proper functionality of the system. One way to keep the holes clear is to spray the outlet assembly with a hose when washing the vehicle. Failure to keep the functional holes clear of foreign material may result in the holes becoming blocked or plugged. **Blocked/plugged holes or modification/removal of the outlet assembly could result in elevated exhaust temperatures which may result in vehicle/property damage and/or personal injury.**

NOISE EMISSIONS – EXTERIOR

In order to comply with the federal exterior noise regulations, your vehicle may be equipped with noise emission items. Depending on the vehicle configuration, it may have all or some of the following items:

Air Intake System: Inspect air cleaner; do not alter its location. Do not alter inlet and outlet piping.

Body: Inspect wheel well splash shields, cab shields and underhood insulation for deterioration, dislocation and orientation.

Cooling System:

- Inspect fan for damage to blades; if damaged, replace with the recommended parts. Inspect for fan-to-shroud interference and any damage to shroud such as cracks and holes.
- Do not change fan ratio or alter fan spacer dimensions and positions.
- Inspect fan clutch for proper operation; make sure the fan is disengaged when cooling of the engine is not required.
- Inspect radiator shutters (if equipped) for proper operation; the shutters should be open during normal operating temperatures.

Engine: Valve covers and block covers are made to damp-out engine mechanical noise and, if needed, should be replaced with recommended parts. Check for mechanical isolations.

Transmission Enclosure: Inspect for cracks, holes and tears. Clean any deposits such as oil, dirt and stones.

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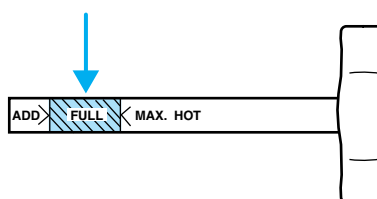
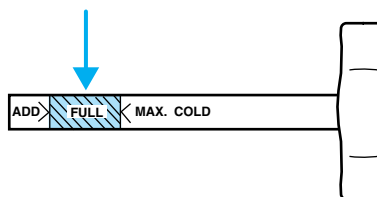
Exhaust System:

- Inspect for leaks at various joint connections and loose clamps.
- Perform a visual inspection for cracks or holes in the muffler and tail pipe.
- Always use the recommended parts when items need to be replaced.
- Do not change the tail pipe elbow or offset tail pipe orientation from the standard position as originally received.
- To avoid abnormal changes in vehicle sound levels, it is necessary for the owner to perform inspections and necessary maintenance at the intervals shown in the *Scheduled Maintenance Guide* chapter.

POWER STEERING FLUID

Check the power steering fluid level using the following procedure:

1. Set the parking brake, shift into N (Neutral) (automatic transmission) or 1 (First) (manual transmission) and turn the engine off.
 2. Open the hood.
 3. Clean the top of the power steering fluid reservoir.
 4. Remove the dipstick from the reservoir and wipe the dipstick clean.
 5. Reinstall the dipstick. Remove it again and check the fluid level.
- Check the COLD side of the dipstick if the fluid is cool or warm to the touch (approximately 68°-120°F [20°-49°C]); the fluid level should be within the FULL range. If necessary, add fluid in small amounts, continuously checking the level, until it reaches the proper level.
 - Check the HOT side of the dipstick if the fluid is too hot to touch (approximately 176°-230°F [80°-110°C]); the fluid level should be within the FULL range. If necessary, add fluid in small amounts, continuously checking the level, until it reaches the proper level.



Whenever the dipstick is installed, make sure it is properly seated and tightened securely.

Maintenance and Specifications

The fluid level can also be checked by looking at the see-through plastic reservoir. Make sure that the fluid is within the minimum and maximum fluid range as marked on the reservoir.

To avoid damage to the power steering system, **do not** operate the vehicle with a low power steering fluid level.

Note: Refer to *Lubricant specifications* in this chapter for the proper fluid type if adding fluid is necessary. A low fluid level may indicate a leak in the power steering system. Inspect the power steering system and repair the leak or see your dealer or a qualified technician for service. Refer to the *Scheduled Maintenance Guide* chapter for the recommended service intervals.

BRAKE FLUID

Check and refill the Full Power brake fluid reservoir using the following procedure. Refer to the *Scheduled Maintenance Guide* chapter for the service interval.

1. Clean the reservoir caps before removal to prevent dirt or water from entering the reservoir.
2. Visually inspect the fluid level; it should be at the bottom of the fill ports.
3. Add brake fluid, if necessary, from a clean, unopened container until the level reaches the bottom of the fill ports. Do not fill above this line.

Only use a DOT 3 brake fluid certified to meet manufacturer specifications. Refer to *Lubricant specifications* in this chapter.



WARNING: Brake fluid is toxic. If brake fluid contacts the eyes, flush eyes with running water for 15 minutes. Seek medical attention if irritation persists. If taken internally, drink water and induce vomiting. Seek medical attention immediately.



WARNING: If you use a brake fluid that is not DOT 3, you will cause permanent damage to your brakes.



WARNING: Do not let the reservoir for the master cylinder run dry. This may cause the brakes to fail.

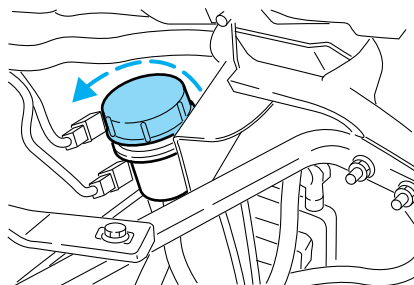
Maintenance and Specifications

CLUTCH FLUID/LINKAGE ADJUSTMENTS

Clutch fluid (if equipped)

During normal operation, the fluid level in the clutch reservoir should remain constant. If the fluid level drops, fill to step in the reservoir.

1. Set the parking brake, shift into 1 (First) and turn the engine off.
2. Open the hood.
3. Clean the reservoir cap before removal to prevent dirt and water from entering the reservoir.
4. Remove cap and rubber diaphragm from reservoir.
5. Add fluid, if necessary, until it reaches the step in the reservoir.
6. Reinstall rubber diaphragm and cap onto reservoir.



Use only a DOT 3 brake fluid designed to meet manufacturer specifications. Refer to *Lubricant specifications* in this chapter.



WARNING: Carefully read cautionary information on product label. For MEDICAL EMERGENCY INFORMATION, contact a physician or Poison Control Center immediately; on Ford-Motorcraft® products call: 1-800-959-3673 (FORD). Failure to follow these instructions may result in personal injury.

Refer to the *Scheduled Maintenance Guide* chapter for service interval schedules.

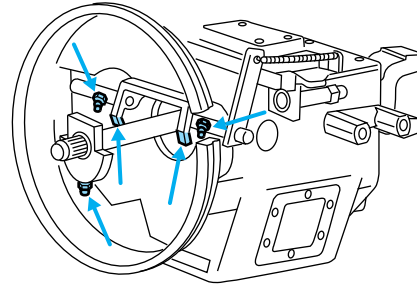
Clutch linkage (if equipped)

Lubricate the clutch linkage using the following procedure. Use a grease which meets manufacturer specifications. Refer to *Lubricant specifications* in this chapter.

1. Set the parking brake, shift into 1 (First) and turn the engine off.
2. Remove the inspection cover from the clutch housing.

Maintenance and Specifications

Transmission and clutch removed for clarity



3. Lubricate the clutch release bearing (at one location) and the clutch release shaft (at two locations), using the grease fittings provided, with a grease gun.
4. Lubricate clutch release wear pads at the two locations where they contact the clutch release bearing with a brush or similar tool.
5. Install the inspection cover onto the clutch housing.

Refer to the *Scheduled Maintenance Guide* chapter for the service interval schedules.

TRANSMISSION FLUID

Automatic transmission fluid

Refer to your *Allison Automatic Transmission Operator's Manual* for scheduled transmission fluid check/change intervals. Your transmission does not consume fluid. However, the fluid level should be checked if the transmission is not working properly, i.e., if the transmission slips or shifts slowly or if you notice some sign of fluid leakage.

Automatic transmission fluid expands when warmed. To obtain an accurate fluid check, drive the vehicle until it is warmed up (approximately 20 miles [30 km]). If your vehicle has been operated for an extended period at high speeds, in city traffic or during hot weather, the vehicle should be turned off for about 30 minutes to allow fluid to cool before checking.

1. Drive the vehicle 20 miles (30 km) or until it reaches normal operating temperature.
2. Park the vehicle on a level surface and engage the parking brake.
3. With the parking brake engaged and your foot on the brake pedal, start the engine and move the gearshift lever through all of the gear ranges. Allow sufficient time for each gear to engage.

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4. Place the gearshift lever in N (Neutral) or P (Park) and leave the engine running.
5. Remove the dipstick, wiping it clean with a clean, dry, lint-free rag.
6. Install the dipstick, making sure it is fully seated in the filler tube.
7. Remove the dipstick and inspect the fluid level.

If you must add transmission fluid, refer to your *Allison Automatic Transmission Operator's Manual* for the correct fluid type. **Use of a non-approved automatic transmission fluid may cause internal transmission component damage.**

Fluid levels above the safe range may result in transmission failure; an overfill condition of transmission fluid may cause shift and/or engagement concerns and/or possible damage.

Eaton UltraShift (if equipped)

The Eaton UltraShift transmission is filled with synthetic fluid from the factory with no scheduled fluid change intervals as this fluid is intended to last the life of the transmission. However, the system should be checked regularly to ensure that proper transmission fluid levels remain constant. Refer to the *Eaton Driver Instructions Manual* for details.

Manual transmission fluid

Refer to the *Scheduled Maintenance Guide* chapter for transmission fluid level check/change intervals.

Your manual transmission may be filled with an optional synthetic fluid which allows the use of extended service intervals. A tag on the filler plug identifies the use of the synthetic fluid.

Only use fluid that meets manufacturer specifications; refer to *Lubricant specifications* in this chapter. **Use of a non-approved transmission fluid may cause internal transmission component damage.**

Check your transmission fluid level using the following procedure:

1. Park the vehicle on level ground.
2. Set the parking brake and shift into 1 (First) and turn the engine off.
3. Clean any dirt from around the filler plug.
4. Remove the filler plug and inspect the fluid level; the fluid level should be at the bottom of the filler plug opening.
5. Add fluid, if necessary, through the filler plug opening.
6. Clean and install the filler plug securely.

Maintenance and Specifications

Drain and refill your transmission fluid, while it is warm, using the following procedure:

1. Park the vehicle on level ground.
2. Set the parking brake and shift into 1 (First) and turn the engine off.
3. Clean any dirt from around the filler and drain plugs.
4. Remove the filler and drain plugs and drain the fluid into a suitable container. Dispose all used automotive fluids in a responsible manner following your local authorized standards.
5. Clean and install the drain plug securely.
6. Add fluid through the filler plug opening.
7. Clean and install the filler plug securely.

CHASSIS-MOUNTED CHARGE AIR COOLER

Inspect charge air cooler daily

Visually inspect the core assembly for debris and clogging of external fins with the engine off. Prior to engine operation, remove any debris blocking the core.

- Turbocharger-to-charge air cooler
- Charge air cooler-to-intake manifold pipe
- Mounting bracket
- Chassis-mounted charge air cooler core

Inspect air intake piping

- Check for accumulation of salt deposits (where applicable). If present, disassemble and clean the complete air intake piping system. If the intake piping is pitted, use Motorcraft® Silicone Gasket and Sealant TA-30 to seal joints against leakage.
- Check for loose hoses and clamps.
- Check for ruptured or collapsed hoses.
- Check air cleaner housing for cracks.

Maintenance and Specifications

ELECTRICAL SYSTEM INSPECTIONS

Periodically inspect electrical connectors on the outside of the cab, and on the engine and frame for corrosion and tightness. Exposed terminals such as the fuel sender, cranking motor, alternator and feed-through studs should be cleaned and re-coated with a lubricant sealing grease such as Motorcraft® Silicone Brake Caliper Grease and Dielectric Compound XG-3, or equivalent. This should include the ground cable connector for batteries, engine and cab as well as the jump starting stud.

Accessory feed connections

Vehicle electrical systems are complex and often include powertrain components such as engine and transmission controls, instrument panels, ABS, etc. While most systems operate on battery voltage (12 volts), some systems can be as high as 90 volts or as low as 5 volts. Refer to the Electrical Circuit Diagram Manuals, available from your vehicle's manufacturer, to ensure that any additional body lights and accessories are connected to circuits that are both appropriate and not overloaded. No modification should be made to any vehicle control system without first contacting your dealer.

SUSPENSION INSPECTION

Note: Do not adjust air suspension height to any setting other than the specified setting. Altering the height setting changes the driveline angle and may result in unwarrantable component damage, such as transmission component damage.

Verify drive axle air suspension height and height control valve performance at engine oil change intervals.

Periodically check:

- Condition of spring leaves for evidence of fatigue, bending or breakage.
- Condition of suspension mounting brackets and bushings.
- Torque rod mounting fasteners for tightness.
- For proper suspension alignment; this must be maintained at all times.
- U-bolts after the chassis has been operating under load for 1,000 miles (1,600 km) or six months (whichever comes first), the U-bolt nuts must be re-torqued. The U-bolt nuts must be re-torqued every 36,000 miles (58,000 km) thereafter. The U-bolt and nut threads and seats should be cleaned and lubricated to ensure a "like new" condition when re-torquing.

Note: See the *U-bolt nut torque* chart later in this section.

Maintenance and Specifications

Supporting your vehicle for service

Prepare the vehicle for service repairs by doing the following:

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



WARNING: Do not use a jack when working under a vehicle. It may give way, causing the vehicle to fall and result in property damage, personal injury or death. Always use floor stands to support the vehicle.

FRAME AND TOW HOOKS

Your vehicle's chassis is manufactured with frame rails of either HSLA steel or heat-treated steel; each must be handled in a specific manner to ensure maximum service life. Consult the service manual or your dealer before attempting frame repair or modification.

It is important, particularly on vehicles where the tow hooks are used frequently, to inspect the front and rear tow hooks for damage or a loose mounting.

SPRING U-BOLT CHECKS

Check U-bolt nuts and re-torque every 36,000 miles (58,000 km) after initial 1,000 miles (1,600 km) re-torque. The U-bolt and nut threads and seats should be cleaned and lubricated to ensure peak condition when re-torqued.

U-bolt nut torque

Suspension	ft-lb	N•m
Front axle – 8500 lb (3856 kg)	180-200	244-271
Front axles – 10000 lb (4536 kg) and higher	260-300	353-407

Maintenance and Specifications

Suspension	ft-lb	N•m
Rear axle with multi-leaf	260-300	353-407
Rear axle with IROS air suspension	370-400	502-542
Rear axle with Hendrickson air suspension	400-450	542-610

See air suspension U-bolt re-torquing and installation information below.

Air suspension U-bolt checks and re-torquing procedures

1. Inspect the threads of the U-bolt and nut for rust and debris. Clean the threads if contaminated.
2. Using a torque wrench, determine if any nuts can be turned with a force below the specified torque.
3. Using the lowest discovered torqued nut as a starting point, retighten the nuts using the sequence listed under *Air suspension U-bolt and U-bolt nut installation*.

Air suspension U-bolt and U-bolt nut installation

1. Inspect the threads of the U-bolt and nut for rust and debris. Clean the threads if contaminated.
2. Install the U-bolts and nuts and torque the nuts to seat the cap flat which is about 18 ft-lb (25 N•m) using a diagonal pattern. Use the same diagonal pattern for each of the following U-bolt nut re-torque steps.
3. Tighten U-bolt nuts in increments of 74 ft-lb (100 N•m) until tightened to final torque for the particular suspension.

DRIVESHAFT

Check the universal joints for any evidence of wear or looseness at the regular lubrication interval. Stop the vehicle immediately, should driveshaft vibrations occur, to avoid possible hazardous consequences or damage to other components.

REAR AXLE LUBRICANT

Refer to the *Scheduled Maintenance Guide* chapter for rear axle lubricant level check/change intervals.

Your rear axle may be filled with an optional synthetic lubricant which allows the use of extended service intervals. A tag on the filler plug identifies the use of the synthetic lubricant.

Only use a lubricant that meets manufacturer specifications; refer to *Lubricant specifications* in this chapter. **Use of a non-approved rear axle lubricant may cause internal axle component damage.**

Maintenance and Specifications

Checking the rear axle lubricant level

1. Park the vehicle on level ground.
2. Set the parking brake and shift into N (Neutral) (automatic transmission) or 1 (First) (manual transmission) and turn the engine off.
3. Clean any dirt from around the rear axle filler plug.
4. Remove the filler plug and inspect the lubricant level; it should be up to the bottom of the filler plug opening.
5. Add lubricant, if necessary, through the filler plug opening.
6. Clean and install the filler plug securely.

Draining and refilling the rear axle lubricant

1. Drain the rear axle while the lubricant is warm.
2. Park the vehicle on level ground.
3. Set the parking brake and shift into N (Neutral) (automatic transmission) or 1 (First) (manual transmission) and turn the engine off.
4. Clean any dirt from around the rear axle filler and drain plugs.
5. Remove the filler and drain plugs and drain the lubricant into a suitable container. Dispose of all used automotive fluids in a responsible manner following your local authorized standards.
6. Clean and install the drain plug securely.
7. Add lubricant through the filler plug opening.
8. Clean and install the filler plug securely.

WHEELS

General

Wheel bearings should be inspected, lubricated and adjusted at regular intervals. This is especially important if operating in deep sand, mud or water. Refer to *Lubricant specifications* in this chapter.

Mount wheel balance weights on the dome-side of the wheel only; failure to do so may result in loss of wheel weight and/or damage to brakes or wheels.

Important: Remember to replace the wheel air valves when the road tires are replaced at the end of their useful life.

Maintenance and Specifications

Oil-lubricated front wheel bearings

During normal vehicle duty cycle, the lube and air inside the hub/wheel cavity expands and, if not vented, causes pressure build-up that could cause accelerated seal wear. There are two venting methods that can be used to prevent pressure build-up:

- a slit or small hole in the rubber check vent or
- the window

Normal maintenance

Over a period of time, if not routinely cleaned, a slight film of oil can collect dirt around the rubber fill plug and face, which could appear to be a leak. Routine cleaning ensures that the lube level can be easily observed through the clear window as intended. In situations where the window is clean on the outside but discolored on the inside, the lube level may be checked by inserting a finger through the rubber check vent hole.

The specified lube level for a clear window type hubcaps is from the minimum line to + 5/16 inch above the minimum line. If the lube level should suddenly drop dramatically below the minimum level, see the *Workshop Manual* for diagnostic procedure.

Installation, tightening and alignment

Verify the threads on studs and nuts are clean to permit correct torque when installing wheels. The mounting surfaces of rims, wheels, spacer rings and clamps must be free of dirt, rust, lubricants or damage. Use a wire brush to clean the mounting contact surfaces. Do not use lubricant on threads.

Check the rim or wheel for proper alignment after it has been properly tightened. Rotate the wheel with a piece of chalk attached to a steady, firm surface, and placed to just barely clear the outside surface of the tire bead seat; this procedure points out the high spot. A high spot does not necessarily mean that the lug nuts have been unevenly tightened, but could be the result of a bent wheel.

Use the following installation procedure:

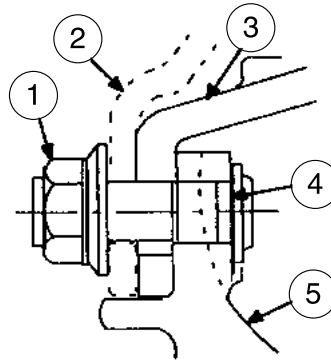
1. Slide inner rear or front tire and wheel in position over studs and push it back as far as possible. Use care so that the threads on studs are not damaged.

Maintenance and Specifications

Disc wheel with flange nuts (hub-piloted)

Front wheel mounting of flange nut system

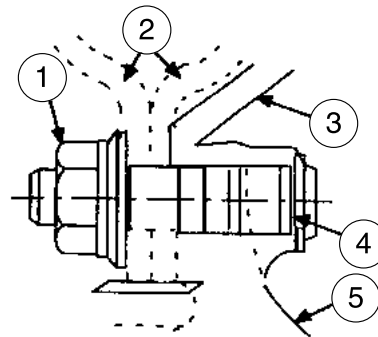
1. Flange nut
2. Wheel(s)
3. Brake drum
4. Wheel stud (22 mm)
5. Wheel hub



2. Position the outer rear tire and wheel in place over the studs and push it back as far as possible. Use care so that the threads on studs are not damaged.

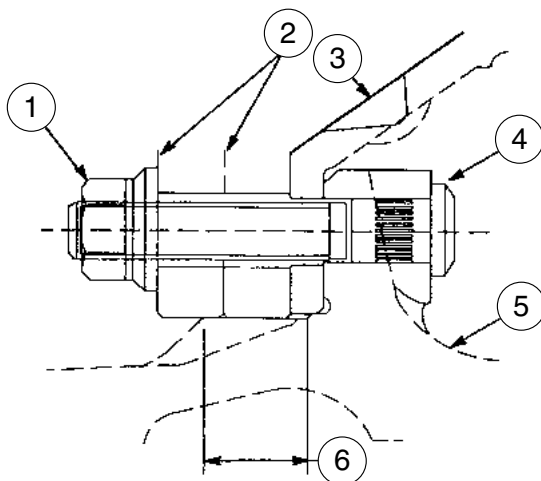
Rear wheel mounting of flange nut system

1. Flange nut
2. Wheel(s)
3. Brake drum
4. Wheel stud (22 mm)
5. Wheel hub



Maintenance and Specifications

Aluminum rear disc wheel with flange nuts (hub-piloted)



1. Flange nut
2. Wheel(s)
3. Brake drum
4. Wheel stud (22 mm)
5. Wheel hub
6. Wheel locator pad

Note for aluminum wheels: Clean each wheel locator pad on the hub from all dirt, rust and foreign material prior to re-installing rear aluminum hub-piloted wheels. Apply a light coat of chassis grease, never-seize or disc brake corrosion control grease, only to the wheel locator pad.

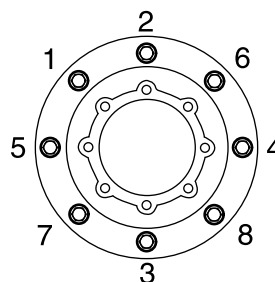
3. Run the nuts on the studs until they contact the wheel(s). Rotate the wheel assembly a half-turn to permit the parts to seat.

4. Draw-up the nuts alternately following the crisscross sequence illustrated under the following wheel tightening sequence illustrations. Do not fully tighten the nuts. This allows uniform seating of the nuts and ensure even face-to-face contact of the wheel and hub.

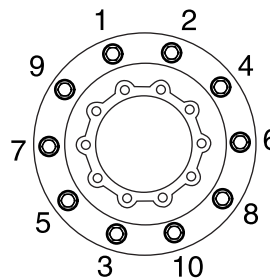
Maintenance and Specifications

Wheel tightening sequence:

8-lug wheel



10-lug wheel



5. Continue tightening the nuts to the torque specifications in the torque chart using the same crisscross sequence shown.

6. After operating the vehicle approximately 50 miles (80 km), check the nuts for tightness; some natural seating of parts may be encountered and the torque on the nuts will drop. Retighten all nuts to specifications.

Once a week, inspect and retighten the wheel stud nuts.

Note: Make sure the tire valve stem clears the brake caliper when installing the tire and rim assembly on disc-brake equipped axles. The use of a tire manufacturer's stem forming tool is the only acceptable method of obtaining clearance when necessary.

Proper torque

It is important to tighten and maintain wheel and rim mounting nuts to the proper torque. Loose nuts or over-tightened nuts can lead to premature wear and possible failure of the wheel and/or mounting hardware.

Maintenance and Specifications

Changing wheel types

Consult your dealer or wheel/rim distributor before attempting any wheel or fastener changes.



WARNING: Use only the same type and style wheels and mounting hardware to replace original parts. Failure to do so may result in an assembly that looks fine, but does not fit together properly. This could possibly cause wheel or fastener failures which could result in property damage, personal injury or death.

Note: Do not attempt to mix stud-piloted wheels or fasteners with hub-piloted wheels or fasteners.

Note: Do not change from aluminum wheels to steel wheels or vice-versa without changing the mounting hardware required or, with flange-nut mounting systems, changing the hub and stud assembly.

WHEEL NUT TORQUE

Size	Nut mounting	Torque	
		ft-lb	N•m
22 mm	Flange	450–500	610–678

Note: Do not use lubrication on dry threads. Where excessive corrosion exists, a light coat of lubricant on the first three threads of the stud bolt is permitted. Keep lubricant away from:

- Hex nut and rim clamp contact surfaces.
- Cap nut ball face and ball seat on the disc wheel.
- Flange nut washer surface and flat on the disc wheel.

Maintenance and Specifications

TIRE INFORMATION

Inflation



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



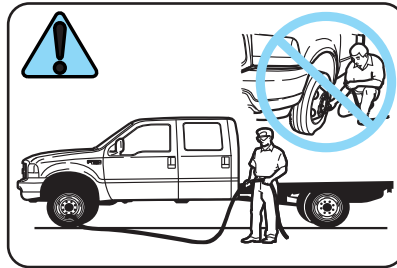
WARNING: To avoid personal injury or death, always follow these instructions when mounting radial tires on wheels:

- Only personnel that have had proper training and experience should mount or remove tires from rims or wheels.
- Use only heavy-duty rims or approved rims for radial tires. It may be necessary to contact your wheel and rim distributor to determine if your rims are approved for radial tires.
- If a tube is to be used, make sure special radial tire tubes are used because of the increased flexing of the sidewalls on radial tires.
- Never use anti-freeze, silicones, or petroleum based lubricants when mounting radial tires. Only an approved lubricant should be used as an aid for mounting tires.
- Always inflate tires in a safety cage.
- Do not attempt to mix stud piloted wheels or fasteners with hub piloted wheels or fasteners. To do so may cause premature wheel failure resulting in property damage, personal injury, or death.
- Do not mix foreign (not made in North America) wheel mounting parts with domestic (made in North America) parts. Many foreign wheel components look similar to, but not exactly the same as domestic made components. Mixing components could cause wheel or fastener failures and result in property damage, personal injury, or death.
- Do not change from aluminum wheels to steel wheels or vice-versa without changing the mounting hardware where required or, in some cases with flange nut mounting systems, changing the hub and stud assembly. Mixing components could cause wheel or fastener failures and result in property damage, personal injury, or death.

Maintenance and Specifications

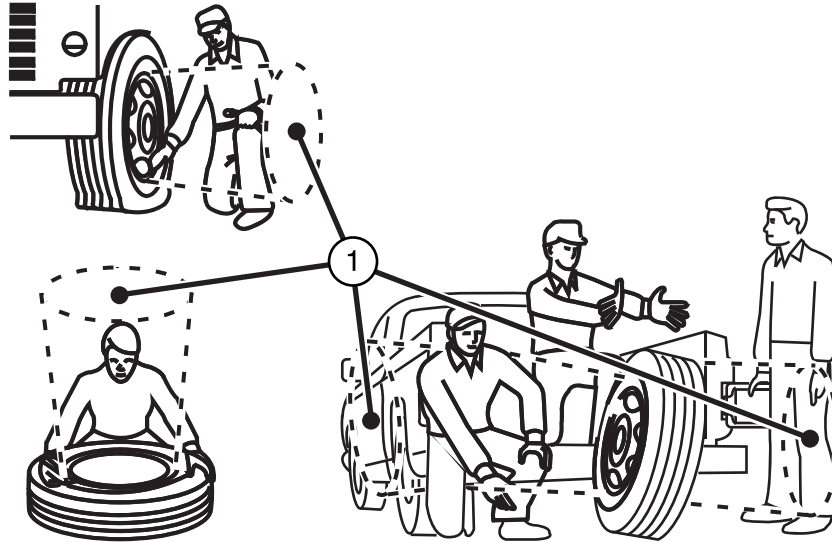
All tires with Steel Carcass Plies (if equipped):

This type of tire utilizes steel cords in the sidewalls. As such, they cannot be treated like normal light truck tires. Tire service, including adjusting the air pressure, must be performed by personnel trained, supervised and equipped according to Federal Occupational Safety and Health Administration (OSHA) regulations. For example, during any procedure involving tire inflation, the technician or individual must utilize a remote inflation device, and ensure that all persons are clear of the trajectory area.



WARNING: An inflated tire and rim can be very dangerous if improperly used, serviced or maintained. To avoid serious injury, never attempt to re-inflate a tire which has been run flat or seriously under-inflated without first removing the tire from the wheel assembly for inspection. Do not attempt to add air to tires or replace tires or wheels without first taking precautions to protect persons and property.

Maintenance and Specifications



Stay out of the trajectory (1) as indicated in the illustration.



WARNING: Do not mount tube type tires on tubeless wheels or tubeless tires on tube type wheels. To do so could result in tire or wheel failure and cause property damage, personal injury or death.

Preserving proper inflation pressure is a very important maintenance practice to insure safe vehicle operation and long life for the tires.

Failure to maintain correct inflation pressure may result in sudden tire destruction, improper vehicle handling, and may cause rapid and irregular tire wear. Therefore, inflation pressures should be checked daily and always before long distance trips.

Follow the tire manufacturer's recommended cold inflation pressure for the tire size, type, load range (ply rating) and axle loading typical for your operation. (Each steer axle tire load equals $\frac{1}{2}$ steer axle loading; each drive tire load is $\frac{1}{4}$ the axle loading if fitted with four tires).

Checking inflation

Always check inflation pressure when tires are cold. Never bleed air from hot tires to relieve normal pressure build-up. Normal increases in pressure due to service conditions is 10–15 psi (69–103 kPa), which is allowable in truck tires.

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Maintenance and Specifications

Tires should be properly inflated to manufacturers recommended pressure for the size and service load in which the vehicle is being used. Refer to the specific tire manufacturer with which your vehicle is equipped with for the latest information concerning service load and inflation pressure.

It is particularly important to keep moisture from the inside of tires, and proper selection of air compressor equipment, proper air line routing, and the use of shop air dryers is strongly recommended to avoid moisture in the high pressure air used for tire inflation.

Under-inflation

Tires should not be permitted to become under-inflated. Increased flexing due to under-inflation causes heat build-up within the tire components. This leads to reduced strength, breakdown of the rubber compounds, and possible separation of the tire components (i.e., ply and tread separation and reduced retreadability).

Under-inflation is the primary cause of premature tire concerns including sudden loss of air. In addition, low inflation causes an increase in rolling resistance. This results in reduced fuel mileage, a loss in tread mileage, and uneven wear due to increased tread movement. To determine proper inflation refer to the tire manufacturer load/inflation guide which can be found on the tire manufacturer website or at your local truck tire dealer.

Inspection

Check condition of tires for abnormal wear patterns, and proper inflation pressures. Cut or broken tire casing must be repaired or replaced.

Tires should be inspected for the following conditions. If any are present, the tire should be removed and repaired, retreaded or scrapped as the condition indicates.

- Any blister, bump or raised portion anywhere on the surface of the tire tread or sidewall (other than a bump made by a repair). These indicate the start of internal separation.
- Any cut that reaches to the belt or ply cords, or any cut that is large enough to grow in size and depth.
- Any nail or puncturing object.
- If any stone or object is held by a tread groove and is starting to drill into the tread base, remove the object.

Proper tire inflation, toe-in adjustment, loads, and road speeds are important factors governing tire mileage, steering ease and maneuverability.

Maintenance and Specifications

Loads



WARNING: Loading tires beyond their rated capacity decreases tire life requiring more frequent replacement of tires. Overloading creates an unsafe condition that may result in sudden air loss from a tire failure resulting in an accident that could cause property damage, personal injury or death.

Note: Your GAW/GVW rating is correct at the time of your vehicle production, and reflects the exact rating of the tires specified. When replacing tires be sure that the replacement tire load rating (listed in pounds and kilograms on the tire sidewall) is the same or higher than the tire that is removed. Failure to do so adversely affects maximum load carrying capacity. Tires with the same size specification do not always have the same load specification.

Matching

Dual Tires: Dual tires should be matched using tires of equivalent size. Tires which differ more than $\frac{1}{4}$ inch (6 mm) in diameter or $\frac{3}{4}$ inch (19 mm) in circumference should not be mounted on the same dual wheel assembly.

Mixing: Never mix bias and radial tires on this vehicle. Never mix different tire sizes or constructions on the same axle.

Rotation:

Rotation is always advisable:

1. If front (steering) axle tires become irregularly worn, move to rear position.
2. In a dual assembly, reverse the position of the tires if one tire wears much faster than its mate.
3. On the drive axle, if heel and toe wear or alternate lug wear occurs, rotating the tires from one end of the axle to the other end of the axle may help even out this wear.

Rotation may not advisable:

1. **Front (Steering) Axle:** Tires must be removed when tread is worn to $\frac{4}{32}$ inch (3 mm) or less. Retread or rotate worn tires to drive position. Retreaded tires are not recommended to be used on steering axles.
2. **Rear Axles:** Tires must be removed when tread is worn to $\frac{2}{32}$ inch (2 mm).

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Maintenance and Specifications

If rib tire is used on front axle and lug or off-road type on rear axle positions:

1. **Front (Steering) Axle:** Replace tires at front wheels when tread is worn to $\frac{4}{32}$ inch (3 mm) or less.
2. **Rear Axles:** Tires must be removed when the tread is worn to $\frac{2}{32}$ inch (2 mm) or less. Tires identified with the word “re-groovable” molded on the sidewall can be re-grooved. A minimum of $\frac{3}{32}$ inch (2.5 mm) of under-tread must be left at the bottom of the grooves.

Wheel and tire balancing

Out-of-round or out-of-balance wheels or tires can cause vehicle vibration, bounce and shimmy. Replace damaged or out-of-round wheels. Out-of-round tires and wheel assemblies can be corrected by re-clocking the tire relative to the wheel.

The tire and wheel assembly should then be dynamically balanced.

Wear

Radial tires can exhibit three types of normal wear patterns:

1. Even
2. Erosion
3. Chamfer

Even wear is a sign that the tire is being properly used and maintained.

Erosion wear has also been called rolling wear, channel or river wear. Erosion wear is found more often at free rolling tires. This is an indication that the tire is being used in a slow wearing operation. What happens is that the belt plies are held very rigid and the tread is not allowed to distort as it passes through the contact area. Wear only occurs at the edge of the tread. No corrective action required. If erosion gets to be $\frac{1}{16}$ inch (2 mm) or more, the tire may be rotated to a drive axle.

Chamfer or shoulder wear, with tires inflated properly, is a normal tendency of most radial tire designs. If both inside and outside shoulders are wearing evenly around the tire, no further action is required. Over-inflation is not effective in correcting this effect.

Tires: Irregular Wear

If irregular wear is present, check the axle alignment, tire pressure, wheel balancing, shock and suspension component condition, and wheel bearing end play.

This condition not only shortens tire life, but adversely affects the handling of your vehicle, which is dangerous.

Maintenance and Specifications

Rotating tires from one wheel position to another is a way often used to even out many types of irregular wear or to avoid it altogether. Some of the more effective tire rotation programs are:

- Steer tires that have developed some type of irregular wear pattern can be rotated to drive axles if rib tires are being used on all wheel positions. Applying steer tires to a drive position often cleans them and they can be moved back to the steer axles or run out to re-tread stage on the rear axle.
- Another rotation possibility for fleets with rib tires in all wheel positions is to break in the new steer tires in the drive axle positions, then move them to steer axles. This wears away tread rubber relatively quickly in the early life of a tire when it is most likely to develop an unusual wear pattern.
- Drive axle tires may be placed on the other end of the same axle so that direction of rotation is reversed. This is often helpful if a heel and toe or alternate lug wear pattern has developed.

Irregular wear can be minimized by:

- Using the right inflation pressure for the load being carried.
- Maintaining proper front wheel alignment - **especially toe-in** - to specifications.
- Maintaining proper tire and wheel balance.
- Maintaining shock absorbers and suspension components.

Use of tire chains

Refer to chain manufacturer's recommendation for correct tire chain usage, installation and removal.

Maintenance and Specifications

MAINTENANCE PRODUCT SPECIFICATIONS AND CAPACITIES

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Eaton-Spicer axle (generic) - front axle wheel bearing oil	Multipurpose EP gear lube of API GL-5 quality meeting MIL-PRF-2105E specifications including synthetic lubricants. Do not mix conventional and synthetic lubricants.	Non-driving front axle	
		SAE 75W: -40°F to -15°F (-40°C to -26°C)	Motorcraft® SAE 75W-140 Synthetic Rear Axle Lubricant / XY-75W140-QL
		SAE 75W-80: -40°F to 80°F (-40°C to 27°C)	
		SAE 75W-140: -40°F and above (-40°C and above)	
		SAE 80W-140: -15°F and above (-26°C and above)	
		SAE 85W-140: 10°F and above (-12°C and above)	
		SAE 80W-90: -15°F to 100°F (-26°C to 38°C)	Motorcraft® SAE 80W-90 Premium Rear Axle Lubricant / XY-80W90-QL

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Spicer axle - front axle wheel bearing oil	Multipurpose EP gear lube of API GL-5 quality meeting MIL-PRF-2105E specifications including synthetic lubricants. Do not mix conventional and synthetic lubricants.	SAE 75W: -40°F to 32°F (-40°C to 0°C)	Motorcraft® SAE 75W-140 Synthetic Rear Axle Lubricant / XY-75W140-QL
		SAE 75W-140: -40°F and above (-40°C and above)	
		SAE 80W-140: -15°F and above (-26°C and above)	
		SAE 85W-140: 10°F and above (-12°C and above)	
		SAE 140W: 40°F and above (4°C and above)	Motorcraft® SAE 80W-90 Premium Rear Axle Lubricant / XY-80W90-QL
		SAE 80W: -15°F to 70°F (-26°C to 21°C)	
		SAE 90W: 10°F to 100°F (-12°C to 38°C)	Motorcraft® SAE 80W-90 Premium Rear Axle Lubricant / XY-80W90-QL

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Eaton-Spicer axle, Spicer axle - Front axle wheel bearing grease, tie rod ends, drag link, kingpin and bushing	EP2 Lithium complex-based moly grease (or equivalent) GC/LB NLGI #2 multi-purpose lithium complex grease	Note: Eaton-Spicer and Meritor Easy Steer axles: With chassis load on axle, force grease through thrust bearings; then with axle lifted clear of the floor, force grease between kingpin and bushing surfaces.	Motorcraft® Premium Long Life Grease / XG-1-C
Steering			
Power steering fluid	MERCON® V ATF	—	MERCON® V / XT-5-QMC; XT-5-QM; XL-14
Steering gear Ross TAS - Output Seal, Steering column U-joints / slip joint	GC/LB NLGI #2 lithium complex-based moly grease or multi-purpose lithium complex grease	—	Motorcraft® Premium Long Life Grease / XG-1-C

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Driveshaft			
U-joint	GC/LB NLGI #2 lithium complex-based moly grease or multi-purpose lithium complex grease	—	Motorcraft® Premium Long Life Grease / XG-1-C
Clutch			
Release bearing / shafts / fork	GC/LB NLGI #2 lithium complex-based moly grease or multi-purpose lithium complex grease	—	Motorcraft® Premium Long Life Grease / XG-1-C
Reservoir	DOT 3, WSS-M6C62-A or WSS-M6C65-A1	—	High Performance DOT 3 Motor Vehicle Brake Fluid, PM-1-C (U.S.) or CPM-1-C (Canada)
Cooling system			
Engine coolant	WSS-M97B44-D	—	Motorcraft® Specialty Orange Engine Coolant (orange-colored) / VC-3-B (US) / CVC-3-B (Canada)

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Windshield washer			
Washer fluid	WSB-M8B16-A2	—	Motorcraft® Premium Windshield Washer Concentrate / ZC-32-A (US) or CXC-37-(A, B, D, and F) (Canada)
Transmission			
Six-speed automatic (6R140)	—	—	Motorcraft® MERCON® LV ATF / XT-10-QLV
Eaton-Fuller	Petroleum oil: Engine oil API-SL or API-CF (MIL-L-2104E or MIL-L-46152E)	SAE 40W: Below 10°F (-12°C)	—
		SAE 50W: Above 10°F (-12°C)	—
	Mineral gear oil: API-GL-1 (rust and oxidation inhibited)	SAE 75W: Below 10°F (-12°C)	—
		SAE 80W-90: Above 10°F (-12°C)	—
	Synthetic oil: Eaton®, Roadranger® synthetic CD-50 transmission fluid	CD SAE 50W: All temperatures	—

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Spicer (non-synchronized) (lubricants are listed in order of preference)	Petroleum oil: Engine oil API-SL or API-CF (MIL-L-2104E or MIL-L-46152E)	SAE 40W: Below 0°F (-18°C)	—
		SAE 50W: Above 0°F (-18°C)	—
	Mineral gear oil: API-GL-1 (rust and oxidation inhibited)	SAE 80W: Below 0°F (-18°C)	—
	(EP gear oils are not acceptable)	SAE 90W: Above 0°F (-18°C)	—
	Synthetic oil: Synthetic engine oil meeting MIL-L-2104E or MIL-L-46152E, API-SL or API-CF	CD SAE 50W: All temperatures	—

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Spicer (synchronized) (lubricants are listed in order of preference)	Petroleum oil: Engine oil API-SL or API-CF (MIL-L-2104E or MIL-L-46152E)	SAE 40W: Below 10°F (–12°C)	—
		SAE 50W: Above 10°F (–12°C)	—
	Mineral gear oil: API-GL-1 (rust and oxidation inhibited)	SAE 80W: Below 10°F (–12°C)	—
		SAE 90W: Above 10°F (–12°C)	—
	Synthetic oil: Synthetic engine oil meeting MIL-L-2104E or MIL-L-46152E, API-SL or API-CF	SAE 50W: All temperatures	—

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Meritor	Petroleum oil: Heavy Duty Engine Oil MIL-L-2104E or API-SL or API-CF (previous API designations acceptable)	SAE 30W: Below 10°F (-12°C)	Motorcraft® SAE 30 Super Duty Motor Oil / XO-30-QSD
		SAE 40W or SAE 50W: Above 10°F (-12°C)	—
	Mineral gear oil with rust and oxidation inhibitor API-GL-1. Do not use multi-weight and GL-5 EP gear oils; they may cause transmission failure or damage.	SAE 80W: Below 10°F (-12°C)	—
		SAE 90W: Above 10°F (-12°C)	—
Allison Eaton UltraShift	Synthetic oil: MIL-L-2104E or MIL-L-46152D. Do not use multi-weight and GL-5 EP gear oils; they may cause transmission failure or damage.	SAE 50W: All temperatures	—
	Refer to transmission operator's manual		
	Refer to transmission driver instructions manual		

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Rear axle			
Eaton-Spicer - two-speed axle	RHEOLUBE 362 (or equivalent) (Eaton part number 113741)	—	—
Eaton - single-speed axle	Generic lubricant	SAE 75W: -40°F to -15°F (-40°C to -26°C)	Motorcraft® SAE 75W-140 Synthetic Rear Axle Lubricant / XY-75W140-QL
		SAE 75W-80: -40°F to 80°F (-40°C to 27°C)	
		SAE 75W-140: -40°F and above (-40°C and above)	
		SAE 80W-140: -15°F and above (-26°C and above)	
		SAE 85W-140: 10°F and above (-12°C and above)	
		SAE 80W-90: -15°F to 100°F (-26°C to 38°C)	
			Motorcraft® SAE 80W-90 Premium Rear Axle Lubricant / XY-80W90-QL

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Spicer - single-speed axle	Multipurpose EP gear lube of API GL-5 quality meeting MIL-PRF-2105E specifications including synthetic lubricants	SAE 75W: -40°F to 32°F (-40°C to 0°C)	Motorcraft® SAE 75W-140 Synthetic Rear Axle Lubricant / XY-75W140-QL
		SAE 75W-140: -40°F and above (-40°C and above)	
		SAE 80W: -15°F to 70°F (-26°C to 21°C)	
		SAE 80W-140: -15°F and above (-26°C and above)	
		SAE 85W-140: 10°F and above (-12°C and above)	
		SAE 140W: 40°F and above (4°C and above)	
		SAE 90W: 10°F to 100°F (-12°C to 38°C)	
			Motorcraft® SAE 80W-90 Premium Rear Axle Lubricant / XY-80W90-QL

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Meritor (non-extended drain lubricants)	Petroleum with EP additives of API GL-5 quality meeting MIL-PRF-2105E specifications.	SAE 75W: Above -40°F (-40°C); Up to 35°F (2°C)	Motorcraft® SAE 75W-140 Synthetic Rear Axle Lubricant / XY-75W140-QL
		SAE 75W-90: Above -40°F (-40°C)	
		SAE 75W-140: Above -40°F (-40°C)	
		SAE 80W-140: Above -15°F (-26°C)	
		SAE 85W-140: Above 10° (-12°C)	
		SAE 80W-90: Above -15°F (-26°C)	
			Motorcraft® SAE 80W-90 Premium Rear Axle Lubricant / XY-80W90-QL

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Meritor (extended drain lubricants)	Petroleum with extended drain additives of API GL-5 quality meeting MIL-PRF-2105E specifications including synthetic lubricants.	SAE 75W-90: Above -40°F (-40°C) (full synthetic)	Motorcraft® SAE 75W-140 Synthetic Rear Axle Lubricant / XY-75W140-QL
		SAE 75W-140: Above -40°F (-40°C) (full synthetic)	
		SAE 80W-90: Above -15°F (-26C) (semi-synthetic)	Motorcraft® SAE 80W-90 Premium Rear Axle Lubricant / XY-80W90-QL
Cab components			
Door check, hinges, latches and strikers; Seat adjuster slides	GC/LB NLGI #2 lithium complex-based moly grease (or equivalent) or multi-purpose lithium complex grease	—	Motorcraft® Premium Long Life Grease / XG-1-C
Door lock cylinders	Lock oil	—	Motorcraft® Penetrating and Lock Lubricant / XL-1

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Door window regulators	NGLI #2 multipurpose lithium complex grease	—	Motorcraft® Multi-Purpose Grease Spray / XL-5 or Motorcraft® Multi-Purpose Grease / XG-4
Weatherstripping	Silicone lubricant	—	Motorcraft® Silicone Spray / XL-6
Engine oil			
Diesel engine: Refer to engine operator manual			

Maintenance and Specifications

Component	Lubrication type	Viscosity / Ambient temperature / Notes	Equivalent Ford part name / number
Gasoline engine:	• Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil (US) • Motorcraft® SAE 5W-20 Full Synthetic Motor Oil (US) • Motorcraft® SAE 5W-20 Super Premium Motor Oil (Canada) • Motorcraft® SAE 5W-20 Synthetic Motor Oil (Canada) / WSS-M2C945-A and API Certification Mark	—	• XO-5W20-QSP (US) • XO-5W20-QFS (US) • CXO-5W20-LSP12 (Canada) • CXO-5W-20-LFS12 (Canada)
Brake fluid			
Master cylinder	DOT 3, WSS-M6C62-A or WSS-M6C65-A1	—	High Performance DOT 3 Motor Vehicle Brake Fluid, PM-1-C (U.S.) or CPM-1-C (Canada)

Maintenance and Specifications

REFILL CAPACITIES

Rear axle - Eaton-Spicer models

Axle code	Weight capacity - lb (kg)	Description	Pints (Liters) ^{1,2}
S135-S	13500 (6123)	Single reduction	24.5 (11.6)
4S150-S	15500 (7031)	Single reduction	24.5 (11.6)
17060S	17500 (7938)	Single reduction	28.0 (13.2)
19055T	17500 (7938)	Two-speed	28.0 (13.2)
M190T	19000 (8618)	Two-speed	35.0 (17.0)
19060S	19000 (8618)	Single reduction	28.0 (13.2)
21060S	21000 (9525)	Single reduction	28.0 (13.2)
21060D	21000 (9525)	Single reduction, driver-controlled locking differential	28.0 (13.2)
M210T	21000 (9525)	Two-speed	16.0 (33.0)
23090S	23000 (10432)	Single reduction	39.0 (18.5)
23090D	23000 (10432)	Single reduction, driver-controlled locking differential	39.0 (18.5)
23082T	23000 (10432)	Two-speed	37.0 (17.5)

¹ Quantities listed are approximate. Fill axle until the lubricant level is at the bottom of the filler hole, with the vehicle on level ground.

² If hubs are removed, add an additional 1.6 pints (0.75L) of axle lubricant. Add lubricant through the axle vent.

Rear axle - Meritor models

Axle model	Pints (Liters)*
RS-17-140	28.6 (13.5)
RS-17-144	32.0 (15.0)
RS-17-145	33.6 (15.9)
RS-17-220	30.7 (14.5)
RS-17-224	29.0 (13.0)
RS-19-144	32.0 (15.0)
RS-19-145	33.2 (15.7)

Maintenance and Specifications

Axle model	Pints (Liters)*
RS-19-220	30.0 (14.0)
RS-19-223	29.0 (13.0)
RS-21-145	32.3 (15.3)
RS-21-160	39.0 (18.0)
RS-21-230	38.9 (18.4)
RS-23-160	39.5 (18.7)
RS-23-161	37.2 (17.6)
RS-23-180	47.3 (22.4)
RS-23-186	47.3 (22.4)
RS-23-240	37.4 (17.7)
RS-23-380	63.6 (30.1)

*Oil capacities are for standard track axles that have been measured at various common drive pinion angles. The quantities listed include enough oil for both wheel ends. These capacities change if the track or the drive pinion angle is different.

Engine coolant and oil

Engine	Engine coolant ^{1,2}	Engine oil ¹
Diesel	26.0 quarts (24.6L)	Refer to engine operator's manual
Gas	26.3 quarts (24.9L)	7.0 quarts (6.6L) (includes filter change)

¹Quantities listed are approximate.

²Add the coolant type originally equipped in your vehicle.

Power steering system

Steering gear	Power steering fluid volume
TAS40	17.6 pints
TAS66	18.4 pints

Note: Capacities may be increased if the vehicle is equipped with a cooler. Always check to make sure the fluid level is in the acceptable range.

Maintenance and Specifications

Transmission

Description	Pints (Liters)
Allison 2000 Series	30.0 (14.2)*
Allison 3000 Series	37.6 (17.8)*
TorqShift® 6-speed	31.0 (14.9L)
5-speed manual	12.5 (5.9)
6-speed manual	19.5 (9.2)
7-speed manual	22.0 (10.4)
*Total fluid capacity (dry transmission and torque converter).	

Note: Capacities may be increased if the vehicle is equipped with a cooler. Always check to make sure the fluid level is in the acceptable range.

Air conditioner refrigerant - r134a

This system uses PAG-type refrigerant oil.

Refrigerant fitting torque

Captured washer nut: 170–190 inch lb. (19–21 N•m)

Note: This system uses mineral-based refrigerant oil to lubricate o-rings and fittings.

Fuel tanks

Standard tanks are listed as such; all other tanks available for your vehicle are optional equipment.

Vehicles with gasoline engine	Tank type	Gallons (Liters)
F-650 Low Profile, F-650 Dock Height	Single, steel rectangular	42 (159)
		60 (227)
Vehicles with diesel engine	Tank type	Gallons (Liters)
F-650 Low Profile (standard), F-650 Dock Height	Single, steel rectangular	35 (132)
F-650 Low Profile, F-650 Dock Height (standard), F-750 Pick-up and Delivery (standard), F-750 Severe Service (standard)	Single, steel rectangular	45 (170)

Maintenance and Specifications

Vehicles with diesel engine	Tank type	Gallons (Liters)
F-650 Dock Height, F-750 Pick-up and Delivery, F-750 Severe Service	Single, steel D-style	65 (246)
F-650 Low Profile, F-650 Dock Height	Dual, steel rectangular	35(RH)/45(LH) (132[RH]/170[LH])
F-650 Low Profile, F-650 Dock Height, F-750 Pick-up and Delivery	Dual, steel rectangular	65/65 (246/246)
F-650 Dock Height, F-750 Pick-up and Delivery, F-750 Severe Service	Dual, steel D-style	65/65 (246/246)

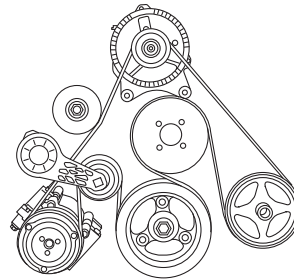
ENGINE DATA

Engine	6.8L V10 engine
Cubic inches	413
Required fuel	Minimum 87 octane
Firing order	1-6-5-10-2-7-3-8-4-9
Spark plug gap	0.039–0.043 inch (1.0–1.1 mm)
Ignition system	Coil on plug
Compression ratio	9.2:1

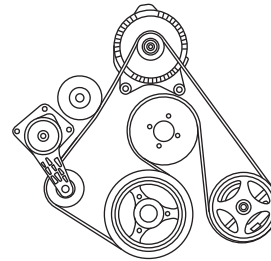
Maintenance and Specifications

Engine drivebelt routing

6.8L V10 engine with A/C



6.8L V10 engine - without A/C



VEHICLE IDENTIFICATION NUMBER (VIN)

The VIN is printed on the Vehicle Rating Decal attached to the vehicle on the edge of the driver's door or B-Pillar. The VIN also serves as the warranty number. If you ever find it necessary to communicate with Ford Motor Company about your vehicle, always include the VIN in your communication.

Scheduled Maintenance Guide

WHY MAINTAIN YOUR VEHICLE?

Carefully following this schedule helps protect against major repair expenses resulting from neglect or inadequate maintenance and may also help to increase the value of your vehicle when you sell or trade it.

It is your responsibility to see that all scheduled maintenance is performed and that the materials used meet Ford engineering specifications as identified in the *Maintenance and Specifications* chapter. Failure to perform scheduled maintenance specific in this guide will invalidate warranty coverage on parts affected by the lack of maintenance. Be sure receipts for completed maintenance are kept with the vehicle and confirmation of the work performed is always recorded in this guide.

Your dealer has factory-trained technicians who can perform the required maintenance using genuine Ford parts. They are committed to meeting your service needs and to assuring your continuing satisfaction.

Protecting Your Investment

Maintenance is an investment that will pay dividends in the form of improved reliability, durability and resale value. To maintain the proper performance of your vehicle and its emission control systems, it is imperative that scheduled maintenance be completed at the designated intervals.

Your vehicle is very sophisticated and built with multiple complex performance systems. Every manufacturer develops these systems using different specifications and performance features. That's why it's important to rely upon your dealership to properly diagnose and repair your vehicle.

Ford Motor Company has recommended maintenance intervals for various parts and component systems based upon engineering testing. Ford Motor Company relies upon this testing to determine the most appropriate mileage for replacement of oils and fluids to protect your vehicle at the lowest overall cost to you and recommends against maintenance schedules that deviate from the scheduled maintenance information.

Ford strongly recommends the use of genuine Ford replacement parts. Parts other than Ford, Motorcraft® or Ford-authorized remanufactured parts that are used for maintenance replacement or for the service of components affecting emission control must be equivalent to genuine Ford Motor Company parts in performance and durability. It is the owner's responsibility to determine the equivalency of such parts. Please consult your *Warranty Guide* for complete warranty information.

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Chemicals or additives not approved by Ford are not required for factory recommended maintenance. In fact, Ford Motor Company recommends against the use of such additive products unless specifically recommended by Ford for a particular application.

Oils, Fluids and Flushing

In many cases, fluid discoloration is a normal operating characteristic and, by itself, does not necessarily indicate a concern or that the fluid needs to be changed. However, discolored fluids that also show signs of overheating and/or foreign material contamination should be inspected immediately by a qualified expert such as the factory-trained technicians at your dealership. Your vehicle's oils and fluids should be changed at the specified intervals or in conjunction with a repair. Flushing is a viable way to change fluid for many vehicle sub-systems during scheduled maintenance. It is critical that systems are flushed only with new fluid that is the same as that required to fill and operate the system, or using a Ford-approved flushing chemical.

OWNER CHECKS AND SERVICES

Certain basic maintenance checks and inspections should be performed by the owner or a service technician at the intervals indicated. Service information and supporting specifications are provided in this owner's guide.

Any adverse condition should be brought to the attention of your dealer or qualified service technician as soon as possible for the proper service advice. The owner maintenance service checks are generally not covered by warranties so you may be charged for labor, parts or fluids used.

Daily owner checks	
Engine	Air filter restriction gauge
	Engine oil level
	Engine coolant level
Brake system	Air brake reservoir automatic drain valve operation
	Drain the air brake reservoir (manual valve)
Transmission	Visually check for fluid leakage
Steering system	Power steering pump fluid level and check the system for leaks
	Entire vehicle for evidence of fluid leaks

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Daily owner checks	
U.S. Department of Transportation, Federal Highway Administration requirements (ensure that the entire system is functioning properly)	Service brakes
	Parking brake
	Steering mechanism
	Lighting devices and reflectors
	Tires
	Horn
	Windshield wipers
	Rear vision mirrors
	Wheels and rims
	Emergency equipment
Every oil change	
Engine	Inspect engine cooling system hoses, clamps and protection.*
	Inspect drive belts.
Exhaust system	Inspect entire exhaust system (including the inlet pipe(s), muffler(s), outlet pipe(s), clamps and fasteners) for holes, leakage, breakage, corrosive damage and separation from other components. Adjust, service or replace with the same or the equivalent part. (Also a noise emission control service.)
Suspension	Tighten the front and rear spring U-bolts to the specified torque.
Driveline and rear axle	Lubricate the U-joints and the slip yoke.

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Every oil change	
Brakes	Lubricate the air brake foot control valve, hinge and roller.
	Inspect the drum brake linings through the inspection holes.
	Lubricate the rear caliper slide rails.
	Lubricate the brake camshafts (air brakes only).
	Lubricate the brake slack adjuster (air brakes only).
	Inspect the disc brake pads and the piston boots (hydraulic brakes only).
Clutch	Lubricate the clutch release cross shaft and all linkages.
	Check the clutch fluid level.
Fuel system	Drain the accumulated water or sediment from the fuel tank(s).
Steering system	Lubricate the steering shaft(s), U-joints and splines if equipped with grease fittings.
	Lubricate the front axle spindle pins.
	Lubricate the steering linkage when equipped with grease fittings.
	Lubricate the power steering gear output shaft.
* Coolant protection checks should be made just prior to the onset of freezing weather, where applicable. If coolant is dirty or rusty in appearance, the system should be drained, flushed and refilled with the prescribed solution of cooling system fluid and distilled water. Use only permanent type coolant that meets specifications as listed in your engine operator's manual. See the engine manufacturer's operating guide for supplemental corrosion inhibitor specifications.	

Scheduled Maintenance Guide

Periodic component/system checks

The following are vehicle checks that should be made periodically either by the owner or a qualified technician. It is recommended that deficiencies be brought to the attention of your dealer or another qualified service outlet as soon as possible in order that advice regarding the need for service or replacement can be obtained.

Frequency	Recommended action
At every engine start up	Check ABS lamp operation
After first 500 and 1000 miles (800 and 1600 km), then every 500 and 1000 mile (800 and 1600 km) interval after tire removal/replacement	Tighten the wheel mounting nuts to the specified torque. Refer to <i>Wheels</i> in the <i>Maintenance and Specifications</i> chapter
At least twice annually	Clean body/door drain holes
As required	Clean windshield wiper blades
Observation	Maintenance operation
Insufficient power shown in loaded practice stop	Inspect the automatic slack adjuster function
Subpar vehicle handling qualities	Check the operation of the brakes, clutch and steering ^{(1),(2)}
Excessive noise from under the cab or engine compartment	Inspect the vehicle for missing, damaged or mislocated noise shields
Excessive engine noise	Check the engine performance and the engine governor
Engine overheats; excessive fan noise; fan constantly runs at high speed or wobbles due to worn bearings	Inspect the fan, fan shroud and fan clutch
Excessive exhaust noise; smell of exhaust fumes is experienced	Inspect the entire exhaust system for holes, leaks, breakage, looseness and corrosive damage

Scheduled Maintenance Guide

Observation	Maintenance operation
Excessive engine compartment noise	Inspect the engine air induction system (including air ducts and air filter) for loose, damaged or missing components
Poor steering; wandering; excessive tire wear	Check front end alignment, inspect the tires and tire pressure ⁽³⁾
Vibration or abnormal tire wear indicating imbalance	Balance the wheels and the tires
Hard shifting or excessive vibration	Check the transmission and engine mountings ⁽²⁾
High effort to shift; noisy transmission	Check and adjust transmission controls ⁽²⁾
Insufficient full-throttle power or backfiring	Check fuel pump pressure
Radiator cap does not hold pressure	Clean the cap seal and cap surface on the radiator
Electrical power supply has diminished	Check the battery terminals for corrosion
Cleaning the wiper blades with a clean cloth and mild detergent and washing with a cleaner does not restore a clean wipe	Replace wiper blades
Noisy or difficult to operate	Lubricate body lock cylinders
Headlamp beams in wrong position when vehicle operating loaded	Check headlamp alignment
Windshield washers do not spray when operated	Check windshield washer fluid level; add fluid if required
¹ During maintenance and repair, protect the fuel tube and the hose assemblies, power steering lines, and brake lines from external heat, acids and abrasions that could damage them.	
² Check for (free) linkage action and ensure that (return) spring force is adequate to maintain pedal free play.	
³ Adjust, repair or replace as required with the same or equivalent parts.	

Scheduled Maintenance Guide

EMISSIONS CONTROL SYSTEM

To ensure the emissions control systems operate effectively, you should have the services listed in the maintenance schedule performed at the specified time and mileage intervals. You should avoid running out of fuel or turning off the ignition while the vehicle is in motion, especially at high speeds.



WARNING: Because of high engine compartment and exhaust system temperatures resulting from emissions equipment, do not park, idle or operate your vehicle in dry grass or other dry ground cover where the possibility of ground fire exists.

Do not make unauthorized modifications to the engine or vehicle. Modifications causing increased amounts of unburned fuel to reach the exhaust system can significantly increase the temperature of the engine compartment and/or the exhaust system.

Avoid driving your vehicle if it does not operate properly. If the engine diesels (more than five seconds of engine run-on after shut-off), misfires, surges, stalls or backfires, see your dealer. Be alert for fluid leakage, odor, smoke, loss of oil pressure, or charge indicator or over temperature warning.

Vehicles equipped with a diesel engine CANNOT use diesel fuel blended with waste oil if equipped with a catalytic converter-muffler. Waste lube oil blending in fuel plugs the catalytic converter-muffler, resulting in a significant loss of engine power.

Noise emissions warranty, prohibited tampering acts and maintenance

On January 1, 1978, Federal regulations became effective governing the noise emissions on trucks over 10,000 lb. (4,536 kg) GVWR. The following statements concerning prohibited tampering acts and maintenance and the noise warranty are found in the Warranty Guide, and are applicable to completed trucks.

Tampering with noise control system prohibited

Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative, by any person other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use, or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

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Among those acts presumed to constitute tampering are the following acts listed:

Vehicle system	Acts
Acoustical shielding	Removal of noise shields, hood blanket, tunnel liner or acoustical absorptive material.
Engine	Removal or rendering inoperative the engine speed governor so as to allow engine speed to exceed manufacturer specifications. Removal of engine mounted noise shield or oil pan enclosure.
Engine air induction	Removal of the air duct, silencer, air cleaner, and/or air cleaner element and baffle in air cleaner; re-indexing of air cleaner.
Exhaust	Removal or rendering inoperative exhaust system components including the catalytic converter - muffler assembly, inlet pipe, outlet pipe, resonator and flexpipe. Rotation of horizontal exhaust system directional outlet pipe to cause the exhaust to be emitted in a direction other than the orientation the vehicle was originally produced with.
Engine cooling	Removal or rendering inoperative the fan clutch. Removal or modification of the fan shroud. Replacing a fixed fan with a fan of increased diameter, different number of blades or different pitch width.
DEF (Diesel exhaust fluid)	Removal or rendering inoperative DEF system components including the DEF tank, dosing module, dosing supply module, dosing control unit, NOx electronic module or NOx sensor.

Emissions control system(s) laws

Federal law prohibits vehicle manufacturers, dealers and other persons engaged in the business of repairing, servicing, selling, leasing or trading motor vehicles, as well as fleet operators from knowingly removing or rendering an emissions control device or system inoperative. Further, modifications of the emissions control system(s) could create liability on the part of individual owners under the laws of some states. In Canada, modification of the emissions control system could create liability under applicable Federal or Provincial laws.

Scheduled Maintenance Guide

Maintenance

Instructions for maintenance and service of the noise control system have been included in the required maintenance services and in the general maintenance section. To further help minimize noise emissions degradation throughout the life of the vehicle, Ford Motor Company recommends that this vehicle should be operated in the manner described within this owner guide. Caution should be exercised by the owner when installing replacement parts to be sure that a tampering act (as outlined above) is not committed. Note any inspection and service performed in the maintenance log.

Emissions information label

Emissions information appears on the Important Engine Information decal located on or near the engine.

SCHEDULED MAINTENANCE SERVICES

Maintenance service adjustments must conform to specifications contained in this manual, and those shown on the Important Engine Information decal. The following services are to be performed at scheduled intervals because they are considered essential to the life and performance of your vehicle. Ford recommends that you perform maintenance on all designated items to achieve best vehicle operation.

Maintenance intervals are provided for three types of general vehicle environments: On-Highway, City and Severe Service. In all applications, the actual interval is determined by monitoring miles (kilometers) and time and when the engine is due for an oil change. When the engine oil change is required prior to the truck lubrication interval, it is recommended that the lubrication be performed at the same time in order to reduce your vehicle's time out of service.

- **On-Highway:** 60,000 miles (96,000 km) or more annually.
- **City:** 60,000 miles (96,000 km) or fewer annually.
- **Severe Service:** 20,000 miles (32,000 km) or fewer annually on/off road in dirty conditions.

Scheduled maintenance beyond 100,000 miles (160,000 km) should be continued as before 100,000 miles (160,000 km).

Scheduled Maintenance Guide

Air brake adjustment



WARNING: Failure to maintain proper air brake adjustment can result in reduction or loss of braking ability.

Air brake inspection and adjustment or repairs should be performed by a qualified service technician in accordance with the instructions in the service manual.

Cam brakes - automatic slack adjusters

Inspect standard air brakes equipped with automatic slack adjusters for proper brake adjustment as listed in the maintenance schedule charts.

However, more frequent inspection is required if your vehicle's brakes are subjected to heavy use or adverse operating conditions such as:

- Frequent brake applications while fully loaded.
- Operation on hilly or mountainous terrain.
- Frequent operation on dirt, gravel or mud.

Some aftermarket brake linings also require more frequent inspections.



WARNING: Do not manually adjust the automatic slack adjusters to correct excessive push rod stroke as it may result in reduced brake effectiveness and a vehicle crash. Excessive push rod stroke indicates that a problem exists with the automatic adjuster, with the installation of the adjuster, or with foundation brake components that manual adjustment does not remedy. Seek service from a qualified facility for excessive push rod stroke.

Scheduled Maintenance Guide

Maintenance intervals

ON-HIGHWAY - 60,000 MILES (96,000 KM) OR MORE ANNUALLY (Miles, kilometers or months - whichever occurs first)													
Miles (x 1,000)	15	30	45	60	75	90	105	120	135	150			
Kilometers (x 1,000)	24	48	72	96	120	144	168	192	216	240			
Months	3	6	9	12	15	18	21	24	27	30			
Engine													
Engine oil and filter - change (diesel engine)	Refer to manufacturer's recommendation												
Engine oil and filter - change (gasoline engine)	Every 7,500 miles (12,000 km) or 6 months												
Engine coolant - check level	•	•	•	•	•	•	•	•	•	•	•	•	•
Engine coolant - check freeze-protection and additive strength (corrosion inhibitor) (diesel engine)	•	•	•	•	•	•	•	•	•	•	•	•	•
Extended life engine coolant - add extender (diesel engine)	Refer to manufacturer's recommendation												
Extended life engine coolant - replace (diesel engine)	Refer to manufacturer's recommendation												
Engine coolant - replace (gasoline engine)	Initial change at 6 years or 100,000 miles (160,000 km) (whichever occurs first); every 3 years or 50,000 miles (80,000 km) thereafter												
Engine air filter - inspect (gasoline engine)	•	•	•	•	•	•	•	•	•	•	•	•	•
Engine air filter - replace (gasoline engine)		•		•		•		•		•		•	•
Replace spark plugs				•									
Inspect accessory drive belt(s)	Inspect at 100,000 miles (160,000 km) and 120,000 miles (192,000 km); replace at 150,000 (240,000 km) miles if not replaced in the last 100,000 miles (160,000 km)												

Scheduled Maintenance Guide

ON-HIGHWAY - 60,000 MILES (96,000 KM) OR MORE ANNUALLY (Continued)																
(Miles, kilometers or months - whichever occurs first)																
Miles (x 1,000)	15	30	45	60	75	90	105	120	135	150						
Kilometers (x 1,000)	24	48	72	96	120	144	168	192	216	240						
Months	3	6	9	12	15	18	21	24	27	30						
Non-driving front axle																
Drag link - lubricate	•	•	•	•	•	•	•	•	•	•						
Kingpin and bushing - lubricate	•	•	•	•	•	•	•	•	•	•						
Tie rod ends - lubricate	•	•	•	•	•	•	•	•	•	•						
Wheel bearing - grease type - repack		•		•		•		•		•						
Wheel bearing - oil type - change oil																
Wheel bearing - oil type - check level	•	•	•	•	•	•	•	•	•	•						
Brake system - air																
S-cam - lubricate	•	•	•	•	•	•	•	•	•	•						
Slack adjusters - lubricate																
Brake system - hydraulic																
Master cylinder - check level	•	•	•	•	•	•	•	•	•	•						
Parking brake relay lever/linkage - lubricate						•							•			
Steering																
Power steering filter - replacement	Every 5 years or 500,000 miles (800,000 km)															
Power steering fluid - change						•										
Power steering fluid - check level	•	•	•	•	•	•	•	•	•	•						
Steering column U-joints/slip joint - lubricate	•	•	•	•	•	•	•	•	•	•						
Steering gear Ross TAS - output shaft - lubricate			•													•

Scheduled Maintenance Guide

ON-HIGHWAY - 60,000 MILES (96,000 KM) OR MORE ANNUALLY (Continued)														
(Miles, kilometers or months - whichever occurs first)														
Miles (x 1,000)	15	30	45	60	75	90	105	120	135	150				
Kilometers (x 1,000)	24	48	72	96	120	144	168	192	216	240				
Months	3	6	9	12	15	18	21	24	27	30				
Driveshaft														
U-joint - lubricate (SPL)	Every 100,000 miles (160,000 km) or 6 months													
U-joint and slip joint - lubricate (non-SPL)	Every 10,000–15,000 miles (16,000–24,000 km) or 3 months													
Clutch														
Release bearing/shafts/forks - lubricate	•	•	•	•	•	•	•	•	•	•				
Transmission														
Automatic and Auto-shift	Refer to transmission operator's manual													
Eaton-Fuller manual - petroleum oil - change				•					•					
Eaton-Fuller manual - synthetic oil - change	At 500,000 miles (800,000 km) if factory-filled with synthetic At 250,000 miles (400,000 km) if converted to synthetic													
Non-Eaton-Fuller manual - check level	•	•	•	•	•	•	•	•	•	•				
Rear axle														
Eaton/Dana/Spicer - check level	•	•	•	•	•	•	•	•	•	•				
Eaton/Dana/Spicer - petroleum oil - change					•				•					
Eaton/Dana/Spicer - synthetic oil - change	At 500,000 miles (800,000 km) if factory-filled with synthetic At 250,000 miles (400,000 km) or 3 years if converted to synthetic													
Meritor - check level	Every 25,000 miles (40,000 km) or fleet maintenance interval													
Meritor - filter change	Every 100,000 miles (160,000 km)													
Meritor - petroleum oil - change	Every 100,000 miles (160,000 km) or annually													

Scheduled Maintenance Guide

ON-HIGHWAY - 60,000 MILES (96,000 KM) OR MORE ANNUALLY (Continued)														
(Miles, kilometers or months - whichever occurs first)														
Miles (x 1,000)	15	30	45	60	75	90	105	120	135	150				
Kilometers (x 1,000)	24	48	72	96	120	144	168	192	216	240				
Months	3	6	9	12	15	18	21	24	27	30				
Meritor - synthetic oil - change	Linehaul: Every 500,000 miles (800,000 km) or 4 years													
	Intercity coach: Every 250,000 miles (400,000 km) or 4 years													
Cab components														
Door hinges/latches/strikers - lubricate, check link				•					•					
Door lock cylinders - lubricate				•					•					
Seat adjuster slides - lubricate				•					•					
Diesel exhaust fluid (DEF) system														
Check and refill DEF system	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Scheduled Maintenance Guide

ON-HIGHWAY - 60,000 MILES (96,000 KM) OR MORE ANNUALLY (Miles, kilometers or months - whichever occurs first)												
Miles (x 1,000)	165	180	195	210	225	240	255	270	285	300		
Kilometers (x 1,000)	264	288	312	336	360	384	408	432	456	480		
Months	33	36	39	42	45	48	51	54	57	60		
Engine												
Engine oil and filter - change (diesel engine)	Refer to manufacturer's recommendation											
Engine oil and filter - change (gasoline engine)	Every 7,500 miles (12,000 km) or 6 months											
Engine coolant - check level	•	•	•	•	•	•	•	•	•	•	•	•
Engine coolant - check freeze-protection and additive strength (corrosion inhibitor) (diesel engine)	•	•	•	•	•	•	•	•	•	•	•	•
Extended life engine coolant - add extender (diesel engine)	Refer to manufacturer's recommendation											
Extended life engine coolant - replace (diesel engine)	Refer to manufacturer's recommendation											
Engine coolant - replace (gasoline engine)	Initial change at 6 years or 100,000 miles (160,000 km) (whichever occurs first); every 3 years or 50,000 miles (80,000 km) thereafter											
Engine air filter - inspect (gasoline engine)	•	•	•	•	•	•	•	•	•	•	•	•
Engine air filter - replace (gasoline engine)		•		•		•		•		•		•
Replace spark plugs		•				•						•
Inspect accessory drive belt(s)	Inspect at 100,000 miles (160,000 km) and 120,000 miles (192,000 km); replace at 150,000 (240,000 km) miles if not replaced in the last 100,000 miles (160,000 km)											

Scheduled Maintenance Guide

ON-HIGHWAY - 60,000 MILES (96,000 KM) OR MORE ANNUALLY (Continued)														
(Miles, kilometers or months - whichever occurs first)														
Miles (x 1,000)	165	180	195	210	225	240	255	270	285	300				
Kilometers (x 1,000)	264	288	312	336	360	384	408	432	456	480				
Months	33	36	39	42	45	48	51	54	57	60				
Non-driving front axle														
Drag link - lubricate	•	•	•	•	•	•	•	•	•	•				
Kingpin and bushing - lubricate	•	•	•	•	•	•	•	•	•	•				
Tie rod ends - lubricate	•	•	•	•	•	•	•	•	•	•				
Wheel bearing - grease type - repack		•		•		•		•		•				
Wheel bearing - oil type - change oil		•						•						
Wheel bearing - oil type - check level	•	•	•	•	•	•	•	•	•	•				
Brake system - air														
S-cam - lubricate	•	•	•	•	•	•	•	•	•	•				
Slack adjusters - lubricate		•				•				•				
Brake system - hydraulic														
Master cylinder - check level	•	•	•	•	•	•	•	•	•	•				
Parking brake relay level/linkage - lubricate		•					•							
Steering														
Power steering filter - replacement											5 years or 500,000 miles (800,000 km)			
Power steering fluid - change		•								•				
Power steering fluid - check level	•	•	•	•	•	•	•	•	•	•				
Steering column U-joints/slip joint - lubricate	•	•	•	•	•	•	•	•	•	•				
Steering gear Ross TAS - output seal - lubricate		•								•				

Scheduled Maintenance Guide

ON-HIGHWAY - 60,000 MILES (96,000 KM) OR MORE ANNUALLY (Continued)													
(Miles, kilometers or months - whichever occurs first)													
Miles (x 1,000)	165	180	195	210	225	240	255	270	285	300			
Kilometers (x 1,000)	264	288	312	336	360	384	408	432	456	480			
Months	33	36	39	42	45	48	51	54	57	60			
Driveshaft													
U-joint - lubricate (SPL)	Every 100,000 miles (160,000 km) or 6 months												
U-joint and slip joint - lubricate (non-SPL)	Every 10,000–15,000 miles (16,000–24,000 km) or 3 months												
Clutch													
Release bearing/shafts/fork - lubricate	•	•	•	•	•	•	•	•	•	•			
Transmission													
Automatic and Auto-shift	Refer to transmission operator's manual												
Eaton-Fuller manual - petroleum oil - change		•				•							
Eaton-Fuller manual - synthetic oil - change	Factory fill w/synthetic at 500,000 miles (800,000 km); Converted to synthetic at 250,000 miles (400,000 km)												
Non-Eaton-Fuller manual - check level	•	•	•	•	•	•	•	•	•	•			
Rear axle													
Eaton/Dana/Spicer - check level	•	•	•	•	•	•	•	•	•	•			
Eaton/Dana/Spicer - petroleum oil - change		•				•							
Eaton/Dana/Spicer - synthetic oil - change	At 500,000 miles (800,000 km) if factory-filled with synthetic At 250,000 miles (400,000 km) or 3 years if converted to synthetic												
Meritor - check level	Every 25,000 miles (40,000 km), or fleet maintenance interval												
Meritor - filter change	Every 100,000 miles (160,000 km)												
Meritor - petroleum oil - change	Every 100,000 miles (160,000 km) or annually												

Scheduled Maintenance Guide

ON-HIGHWAY - 60,000 MILES (96,000 KM) OR MORE ANNUALLY (Continued)													
(Miles, kilometers or months - whichever occurs first)													
Miles (x 1,000)	165	180	195	210	225	240	255	270	285	300			
Kilometers (x 1,000)	264	288	312	336	360	384	408	432	456	480			
Months	33	36	39	42	45	48	51	54	57	60			
Meritor - synthetic oil - change	Linehaul: Every 500,000 miles (800,000 km) or 4 years												
	Intercity coach: Every 250,000 miles (400,000 km) or 4 years												
Cab components													
Door hinges/latches/strikers - lubricate, check link		•				•				•			•
Door lock cylinders - lubricate		•				•				•			•
Seat adjuster slides - lubricate		•				•				•			•
Diesel exhaust fluid (DEF) system													
Check and refill DEF system	•	•	•	•	•	•	•	•	•	•	•	•	•

Scheduled Maintenance Guide

CITY - 60,000 MILES (96,000 KM) OR FEWER ANNUALLY (Miles, kilometers or months - whichever occurs first)													
Miles (x 1,000)	10	20	30	40	50	60	70	80	90	100			
Kilometers (x 1,000)	16	32	48	64	80	96	112	128	144	160			
Months	3	6	9	12	15	18	21	24	27	30			
Engine													
Engine oil and filter - change (diesel engine)	Refer to manufacturer's recommendation												
Engine oil and filter - change (gasoline engine)	Every 5,000 miles (8,000 km) or 6 months												
Engine coolant - check level	•	•	•	•	•	•	•	•	•	•	•	•	•
Engine coolant - check freeze-protection and additive strength (corrosion inhibitor) (diesel engine)	•	•	•	•	•	•	•	•	•	•	•	•	•
Extended life engine coolant - add extender (diesel engine)	Refer to manufacturer's recommendation												
Extended life engine coolant - replace (diesel engine)	Refer to manufacturer's recommendation												
Engine coolant - replace (gasoline engine)	Initial change at 6 years or 100,000 miles (160,000 km) (whichever occurs first); every 3 years or 50,000 miles (80,000 km) thereafter												
Engine air filter - inspect (gasoline engine)	•	•	•	•	•	•	•	•	•	•	•	•	•
Engine air filter - replace (gasoline engine)			•			•				•			•
Replace spark plugs													
Inspect accessory drive belt(s)	Inspect at 100,000 miles (160,000 km) and 120,000 miles (192,000 km); replace at 150,000 (240,000 km) miles if not replaced in the last 100,000 miles (60,000 km)												

Scheduled Maintenance Guide

CITY - 60,000 MILES (96,000 KM) OR FEWER ANNUALLY (Continued)																
(Miles, kilometers or months - whichever occurs first)																
Miles (x 1,000)	10	20	30	40	50	60	70	80	90	100						
Kilometers (x 1,000)	16	32	48	64	80	96	112	128	144	160						
Months	3	6	9	12	15	18	21	24	27	30						
Non-driving front axle																
Drag link - lubricate	•	•	•	•	•	•	•	•	•	•						
Kingpin and bushing - lubricate	•	•	•	•	•	•	•	•	•	•						
Tie rod ends - lubricate	•	•	•	•	•	•	•	•	•	•						
Wheel bearing - grease type - repack				•												
Wheel bearing - oil type - change oil					•											
Wheel bearing - oil type - check level	•	•	•	•	•	•	•	•	•	•						
Brake system - air																
S-cam - lubricate	•	•	•	•	•	•	•	•	•	•						
Slack adjusters - lubricate				•												
Brake system - hydraulic																
Master cylinder - check level	•	•	•	•	•	•	•	•	•	•						
Parking brake relay lever/linkage - lubricate			•							•						
Steering																
5 years or 50,000 miles (80,000 km)																
Power steering filter - replacement				•												
Power steering fluid - change					•											
Power steering fluid - check level	•	•	•	•	•	•	•	•	•	•						
Steering column U-joints/slip joint - lubricate	•	•	•	•	•	•	•	•	•	•						
Steering gear Ross TAS - output seal - lubricate				•												

Scheduled Maintenance Guide

CITY - 60,000 MILES (96,000 KM) OR FEWER ANNUALLY (Continued)												
(Miles, kilometers or months - whichever occurs first)												
Miles (x 1,000)	10	20	30	40	50	60	70	80	90	100		
Kilometers (x 1,000)	16	32	48	64	80	96	112	128	144	160		
Months	3	6	9	12	15	18	21	24	27	30		
Driveshaft												
U-joint - lubricate (SPL)	Every 25,000 miles (40,000 km) or 6 months, whichever comes first											
U-joint and slip joint - lubricate (non-SPL)	Every 5,000-8,000 miles (8,000 km-12,000 km) or 3 months, whichever comes first											
Clutch												
Release bearing/shafts/forks - lubricate	•	•	•	•	•	•	•	•	•	•		
Transmission												
Automatic and Auto-shift	Refer to transmission operator's manual											
Eaton-Fuller manual - petroleum oil - change					•					•		
Non-Eaton-Fuller manual - check level	•	•	•	•	•	•	•	•	•	•		
Rear axle												
Eaton/Dana/Spicer - check level	•	•	•	•	•	•	•	•	•	•		
Eaton/Dana/Spicer - petroleum oil - change					•					•		
Meritor - check level	Every 10,000 miles (16,000 km), once a month or fleet maintenance interval, whichever comes first											
Meritor - filter change	Every 100,000 miles (160,000 km)											
Meritor - petroleum oil - change	Every 50,000 miles (80,000 km) or annually, whichever comes first											

Scheduled Maintenance Guide

CITY - 60,000 MILES (96,000 KM) OR FEWER ANNUALLY (Continued)																				
(Miles, kilometers or months - whichever occurs first)																				
Miles (x 1,000)	10	20	30	40	50	60	70	80	90	100										
Kilometers (x 1,000)	16	32	48	64	80	96	112	128	144	160										
Months	3	6	9	12	15	18	21	24	27	30										
Meritor - synthetic oil - change	Every 250,000 miles (400,000 km) or every 3 years, whichever comes first																			
Cab components																				
Door hinges/latches/strikers - lubricate, check link			•				•				•				•					
Door lock cylinders - lubricate			•				•				•				•					
Seat adjuster slides - lubricate			•				•				•				•					
Diesel exhaust fluid (DEF) system																				
Check and refill DEF system	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•					

Scheduled Maintenance Guide

CITY - 60,000 MILES (96,000 KM) OR FEWER ANNUALLY (Miles, kilometers or months - whichever occurs first)																
Miles (x 1,000)	110	120	130	140	150	160	170	180	190	200						
Kilometers (x 1,000)	176	192	208	224	240	256	272	288	304	320						
Months	33	36	39	42	45	48	51	54	57	60						
Engine																
Engine oil and filter - change (diesel engine)	Refer to manufacturer's recommendation															
Engine oil and filter - change (gasoline engine)	Every 5,000 miles (8,000 km) or 6 months															
Engine coolant - check level	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Engine coolant - check freeze-protection and additive strength (corrosion inhibitor) (diesel engine)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Extended life engine coolant - add extender (diesel engine)	Refer to manufacturer's recommendation															
Extended life engine coolant - replace (diesel engine)	Refer to manufacturer's recommendation															
Engine coolant - replace (gasoline engine)	Initial change at 6 years or 100,000 miles (160,000 km) (whichever occurs first); every 3 years or 50,000 miles (80,000 km) thereafter															
Engine air filter - inspect (gasoline engine)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Engine air filter - replace (gasoline engine)		•			•											
Replace spark plugs		•														
Inspect accessory drive belt(s)	Inspect at 100,000 miles (160,000 km) and 120,000 miles (192,000 km); replace at 150,000 (240,000 km) miles if not replaced in the last 100,000 miles (160,000 km)															

Scheduled Maintenance Guide

CITY - 60,000 MILES (96,000 KM) OR FEWER ANNUALLY (Continued)															
(Miles, kilometers or months - whichever occurs first)															
Miles (x 1,000)	110	120	130	140	150	160	170	180	190	200					
Kilometers (x 1,000)	176	192	208	224	240	256	272	288	304	320					
Months	33	36	39	42	45	48	51	54	57	60					
Non-driving front axle															
Drag link - lubricate	•	•	•	•	•	•	•	•	•	•					
Kingpin and bushing - lubricate	•	•	•	•	•	•	•	•	•	•					
Tie rode ends - lubricate	•	•	•	•	•	•	•	•	•	•					
Wheel bearing - grease type - repack		•				•									
Wheel bearing - oil type - change oil		•													
Wheel bearing - oil type - check level	•	•	•	•	•	•	•	•	•	•					
Brake system - air															
S-cam - lubricate	•	•	•	•	•	•	•	•	•	•					
Slack adjusters - lubricate		•				•									
Brake system - hydraulic															
Master cylinder - check level	•	•	•	•	•	•	•	•	•	•					
Parking brake relay lever/linkage - lubricate		•										•			
Steering															
5 years or 50,000 miles (80,000 km)															
Power steering filter - replacement		•				•									
Power steering fluid - change		•				•									
Power steering fluid - check level	•	•	•	•	•	•	•	•	•	•					
Steering column U-joints/slip joint - lubricate	•	•	•	•	•	•	•	•	•	•					
Steering gear Ross TAS - output seal - lubricate		•				•									

Scheduled Maintenance Guide

CITY - 60,000 MILES (96,000 KM) OR FEWER ANNUALLY (Continued)													
(Miles, kilometers or months - whichever occurs first)													
Miles (x 1,000)	110	120	130	140	150	160	170	180	190	200			
Kilometers (x 1,000)	176	192	208	224	240	256	272	288	304	320			
Months	33	36	39	42	45	48	51	54	57	60			
Driveshaft													
U-joint - lubricate (SPL)	Every 25,000 miles (40,000 km) or 6 months, whichever comes first												
U-joint and slip joint - lubricate (non-SPL)	Every 5,000-8,000 miles (8,000 km-12,000 km) or 3 months, whichever comes first												
Clutch													
Release bearing / shafts / fork - lubricate	•	•	•	•	•	•	•	•	•	•			
Transmission													
Automatic and Auto-shift	Refer to transmission operator's manual												
Eaton-Fuller manual - petroleum oil - change					•						•		
Eaton-Fuller manual - synthetic oil - change		•											
Non-Eaton-Fuller manual - check level						•					•		
Rear axle													
Eaton/Dana/Spicer - check level	•	•	•	•	•	•	•	•	•	•	•		
Eaton/Dana/Spicer - petroleum oil - change						•					•		
Eaton/Dana/Spicer - synthetic oil - change		•											
Meritor - check level	Every 10,000 miles (16,000 km), once a month, or fleet maintenance interval, whichever comes first												
Meritor - filter change	Every 100,000 miles (160,000 km)												

Scheduled Maintenance Guide

CITY - 60,000 MILES (96,000 KM) OR FEWER ANNUALLY (Continued)																
(Miles, kilometers or months - whichever occurs first)																
Miles (x 1,000)	110	120	130	140	150	160	170	180	190	200						
Kilometers (x 1,000)	176	192	208	224	240	256	272	288	304	320						
Months	33	36	39	42	45	48	51	54	57	60						
Meritor - petroleum oil - change	Every 50,000 miles (80,000 km) or annually, whichever comes first															
Meritor - synthetic oil - change	Every 250,000 miles (400,000 km) or every 3 years, whichever comes first															
Cab components																
Door hinges/latches/strikers - lubricate, check link		•			•					•						
Door lock cylinders - lubricate			•							•					•	
Seat adjuster slides - lubricate				•						•					•	
Diesel exhaust fluid (DEF) system																
Check and refill DEF system	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Scheduled Maintenance Guide

SEVERE SERVICE - ON/OFF ROAD IN DIRTY CONDITIONS OR 20,000 MILES (32,000 KM) OR FEWER ANNUALLY																
(Miles, kilometers or months - whichever occurs first)																
Miles (x 1,000)	5	10	15	20	25	30	35	40	45	50						
Kilometers (x 1,000)	8	16	24	32	40	48	56	64	72	80						
Months	3	6	9	12	15	18	21	24	27	30						
Engine																
Engine oil and filter - change (diesel engine)	Refer to manufacturer's recommendation															
Engine oil and filter - change (gasoline engine)	Every 5,000 miles (8,000 km) or 3 months (see note at end of table regarding alternate schedule)															
Engine coolant - check level	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Engine coolant - check freeze-protection and additive strength (corrosion inhibitor) (diesel engine)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Extended life engine coolant - add extender (diesel engine)	Refer to manufacturer's recommendation															
Extended life engine coolant - replace (diesel engine)	Refer to manufacturer's recommendation															
Engine coolant - replace (gasoline engine)	Initial change at 6 years or 100,000 miles (160,000 km) (whichever occurs first); every 3 years or 50,000 miles (80,000 km) thereafter															
Engine air filter - inspect (gasoline engine)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Engine air filter - replace (gasoline engine)						•										
Non-driving front axle																
Drag link - lubricate	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Kingpin and bushing - lubricate	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Tie rod ends - lubricate	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Scheduled Maintenance Guide

SEVERE SERVICE - ON/OFF ROAD IN DIRTY CONDITIONS OR 20,000 MILES (32,000 KM) OR FEWER ANNUALLY (Continued)														
(Miles, kilometers or months - whichever occurs first)														
Miles (x 1,000)	5	10	15	20	25	30	35	40	45	50				
Kilometers (x 1,000)	8	16	24	32	40	48	56	64	72	80				
Months	3	6	9	12	15	18	21	24	27	30				
Wheel bearing - grease type - repack				•					•					
Wheel bearing - oil type - change oil				•					•					
Wheel bearing - oil type - check level	•	•	•	•	•	•	•	•	•	•				•
Brake system - air														
S-cam - lubricate	•	•	•	•	•	•	•	•	•	•				•
Slack adjusters - lubricate				•					•					
Brake system - hydraulic														
Master cylinder - check fluid level	•			•										
Parking brake relay lever/linkage - lubricate			•							•				
Steering														
Power steering fluid - change				•					•					
Power steering fluid - check level	•	•	•	•	•	•	•	•	•	•				•
Steering column U-joints/slip joints - lubricate	•	•	•	•	•	•	•	•	•	•				•
Steering gear Ross TAS - output seal - lubricate			•							•				•
Driveshaft														
Slip joint - inspect boot; U-joint - lubricate (SPL)	Every 25,000 miles (40,000 km) or 6 months, whichever comes first													
U-joint and slip joint - lubricate (non-SPL)	Every 5,000-8,000 miles (8,000-12,800 km) or 3 months, whichever comes first													

Scheduled Maintenance Guide

SEVERE SERVICE - ON/OFF ROAD IN DIRTY CONDITIONS OR 20,000 MILES (32,000 KM) OR FEWER ANNUALLY (Continued)																
(Miles, kilometers or months - whichever occurs first)																
Miles (x 1,000)	5	10	15	20	25	30	35	40	45	50						
Kilometers (x 1,000)	8	16	24	32	40	48	56	64	72	80						
Months	3	6	9	12	15	18	21	24	27	30						
Clutch																
Release bearing/shafts/forks	•	•	•	•	•	•	•	•	•	•						
Transmission																
Automatic and Auto-shift	Refer to transmission operator's manual															
Eaton-Fuller manual - petroleum oil - change				•					•							
Non-Eaton-Fuller manual - check level	•	•	•	•	•	•	•	•	•	•						
Rear axle																
Eaton/Dana/Spicer - check level	•	•	•	•	•	•	•	•	•	•						
Eaton/Dana/Spicer - petroleum oil - change				•					•							
Eaton/Dana/Spicer - synthetic oil - change											Every 5,000 miles (8,000 km), once a month or fleet maintenance interval, whichever comes first. For continuous heavy-duty operation, check level every 1,000 miles (1,600 km)					
Meritor - check level																
Meritor - filter change	Every 100,000 miles (160,000 km)															
Meritor - petroleum oil - change	Every 25,000 miles (40,000 km) or annually, whichever comes first															
Meritor - synthetic oil - change	Every 100,000 miles (160,000 km) or annually, whichever comes first															

Scheduled Maintenance Guide

SEVERE SERVICE - ON/OFF ROAD IN DIRTY CONDITIONS OR 20,000 MILES (32,000 KM) OR FEWER ANNUALLY (Continued) (Miles, kilometers or months - whichever occurs first)																
Miles (x 1,000)	5	10	15	20	25	30	35	40	45	50						
Kilometers (x 1,000)	8	16	24	32	40	48	56	64	72	80						
Months	3	6	9	12	15	18	21	24	27	30						
Cab components																
Door hinges/latches/strikers - lubricate, check link				•					•							
Door lock cylinders - lubricate				•					•							
Seat adjuster slides - lubricate				•					•							
Diesel exhaust fluid (DEF) system																
Check and refill DEF system	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Note: If your vehicle is equipped with a gasoline engine, the engine oil and filter changes should observe the normal schedule unless conditions such as low-speed operation or stationary use exist where a schedule based on engine hours is recommended. In this type of schedule, the engine oil and filter should be replaced every 250 engine hours.

Scheduled Maintenance Guide

SEVERE SERVICE - ON/OFF ROAD IN DIRTY CONDITIONS OR 20,000 MILES (32,000 KM) OR FEWER ANNUALLY													
(Miles, kilometers or months - whichever occurs first)													
Miles (x 1,000)	55	60	65	70	75	80	85	90	95	100			
Kilometers (x 1,000)	88	96	104	112	120	128	136	144	152	160			
Months	33	36	39	42	45	48	51	54	57	60			
Engine													
Engine oil and filter - change (diesel engine)	Refer to manufacturer's recommendation												
Engine oil and filter - change (gasoline engine)	Every 5,000 miles (8,000 km) or 3 months (see note at end of table regarding alternate schedule)												
Engine coolant - check level	•	•	•	•	•	•	•	•	•	•			
Engine coolant - check freeze-protection and additive strength (corrosion inhibitor) (diesel engine)	•	•	•	•	•	•	•	•	•	•			
Extended life engine coolant - add extender (diesel engine)	Refer to manufacturer's recommendation												
Extended life engine coolant - replace (diesel engine)	Refer to manufacturer's recommendation												
Engine coolant - replace (gasoline engine)	Initial change at 6 years or 100,000 miles (160,000 km) (whichever occurs first); every 3 years or 50,000 miles (80,000 km) thereafter												
Engine air filter - inspect (gasoline engine)	•	•	•	•	•	•	•	•	•	•			
Engine air filter - replace (gasoline engine)		•						•					
Replace spark plugs		•											
Inspect accessory drive belts(s)	Inspect at 100,000 miles (160,000 km) and 120,000 miles (192,000 km); replace at 150,000 (240,000 km) miles if not replaced in the last 100,000 miles (160,000 km)												

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SEVERE SERVICE - ON/OFF ROAD IN DIRTY CONDITIONS OR 20,000 MILES (32,000 KM) OR FEWER ANNUALLY (Continued) (Miles, kilometers or months - whichever occurs first)														
Miles (x 1,000)	55	60	65	70	75	80	85	90	95	100				
Kilometers (x 1,000)	88	96	104	112	120	128	136	144	152	160				
Months	33	36	39	42	45	48	51	54	57	60				
Non-driving front axle														
Drag link - lubricate	•	•	•	•	•	•	•	•	•	•				
Kingpin and bushing - lubricate	•	•	•	•	•	•	•	•	•	•				
Tie rod ends - lubricate	•	•	•	•	•	•	•	•	•	•				
Wheel bearing - grease type - repack		•				•								
Wheel bearing - oil type - change oil		•				•								
Wheel bearing - oil type - check level	•	•	•	•	•	•	•	•	•	•				
Brake system - air														
S-cam - lubricate	•	•	•	•	•	•	•	•	•	•				
Slack adjusters - lubricate		•												
Brake system - hydraulic														
Master cylinder - check fluid level	•	•	•	•	•	•	•	•	•	•				
Parking brake relay lever/linkage - lubricate		•				•								
Steering														
Power steering filter - replacement		•												
Power steering fluid - change		•				•								
Power steering fluid - check level	•	•	•	•	•	•	•	•	•	•				
Steering column U-joints/slip joint - lubricate	•	•	•	•	•	•	•	•	•	•				
Steering gear Ross TAS - output seal - lubricate		•												

Scheduled Maintenance Guide

SEVERE SERVICE - ON/OFF ROAD IN DIRTY CONDITIONS OR 20,000 MILES (32,000 KM) OR FEWER ANNUALLY (Continued)													
(Miles, kilometers or months - whichever occurs first)													
Miles (x 1,000)	55	60	65	70	75	80	85	90	95	100			
Kilometers (x 1,000)	88	96	104	112	120	128	136	144	152	160			
Months	33	36	39	42	45	48	51	54	57	60			
Driveshaft													
Slip joint - inspect boot; U-joint - lubricate (SPL)	Every 25,000 miles (40,000 km) or 6 months, whichever comes first												
U-joint and slip joint - lubricate (non-SPL)	Every 5,000–8,000 miles (8,000–12,800 km) or 3 months, whichever comes first												
Clutch													
Release bearing/shafts/fork - lubricate	•	•	•	•	•	•	•	•	•	•	•	•	•
Transmission													
Automatic and Auto-shift	Refer to transmission operator's manual												
Non-Eaton-Fuller manual - check level	•	•	•	•	•	•	•	•	•	•	•	•	•
Eaton-Fuller manual - petroleum oil - change	•	•				•					•		•
Eaton-Fuller manual - synthetic oil - change		•				•							
Rear axle													
Eaton/Dana/Spicer - check level	•	•	•	•	•	•	•	•	•	•	•	•	•
Eaton/Dana/Spicer - petroleum oil - change		•					•						•
Eaton/Dana/Spicer - synthetic oil - change		•								•			
Meritor - check level	Every 5,000 miles (8,000 km), once a month, or fleet maintenance interval, whichever comes first. For continuous heavy-duty operation, check level every 1,000 miles (1,600 km)												

Scheduled Maintenance Guide

SEVERE SERVICE - ON/OFF ROAD IN DIRTY CONDITIONS OR 20,000 MILES (32,000 KM) OR FEWER ANNUALLY (Continued)													
(Miles, kilometers or months - whichever occurs first)													
Miles (x 1,000)	55	60	65	70	75	80	85	90	95	100			
Kilometers (x 1,000)	88	96	104	112	120	128	136	144	152	160			
Months	33	36	39	42	45	48	51	54	57	60			
Meritor - filter change	Every 100,000 miles (160,000 km)												
Meritor - petroleum oil - change	Every 25,000 miles (40,000 km) or annually, whichever comes first												
Meritor - synthetic oil - change	Every 100,000 miles (160,000 km) or annually, whichever comes first												
Cab components													
Door hinges/latches/strikers - lubricate, check link		•					•				•		•
Door lock cylinders - lubricate		•					•				•		•
Seat adjuster slides - lubricate		•					•				•		•
Diesel exhaust fluid (DEF) system													
Check and refill DEF system	•	•	•	•	•	•	•	•	•	•	•	•	•

Note: If your vehicle is equipped with a gasoline engine, the engine oil and filter changes should observe the normal schedule unless conditions such as low-speed operation or stationary use exist where a schedule based on engine hours is recommended. In this type of schedule, the engine oil and filter should be replaced every 250 engine hours.

Scheduled Maintenance Guide

Maintenance record retention and service log

MAINTENANCE SERVICES AND RECORD RETENTION

The maintenance record form which follows is for your convenience. In addition to recording the services performed, you should retain copies of your receipts for the services. You also should keep records of any emission control systems maintenance services performed on your vehicle.

Maintenance Record

Warranty	_____
Start Date	_____ Engine Displacement _____
Vehicle	_____
Identification	_____
Number	_____ Owner Name _____

IMPORTANT — This document should remain with the vehicle at all times.

Scheduled Maintenance Guide

DEALER VALIDATION: RO#: P&A CODE: HOURS: DATE: MILEAGE:	DEALER VALIDATION: RO#: P&A CODE: HOURS: DATE: MILEAGE:
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Scheduled Maintenance Guide

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Scheduled Maintenance Guide

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