



The popular Car Care Guide has been redesigned, updated and extended! The 75-page guide, presented here in an electronic format, includes an extended section covering car care and the environment and new sections on understanding your warranty, finding a repair shop and more. The guide covers the most common preventative maintenance occasions and procedures that need to be performed to keep cars safe, dependable and efficient. It also includes descriptions of 12 major vehicle systems and parts, with diagrams and example questions to ask your technician.



CAR CARE GUIDE

MAINTAINING YOUR VEHICLE FOR SAFETY, DEPENDABILITY AND VALUE

THIS CAR CARE GUIDE BELONGS TO:

Owner Name:

Vehicle Year:

Make:

Model:

Color:

Engine:

Fuel Type:

SERVICE PROVIDER INFORMATION:

Name:

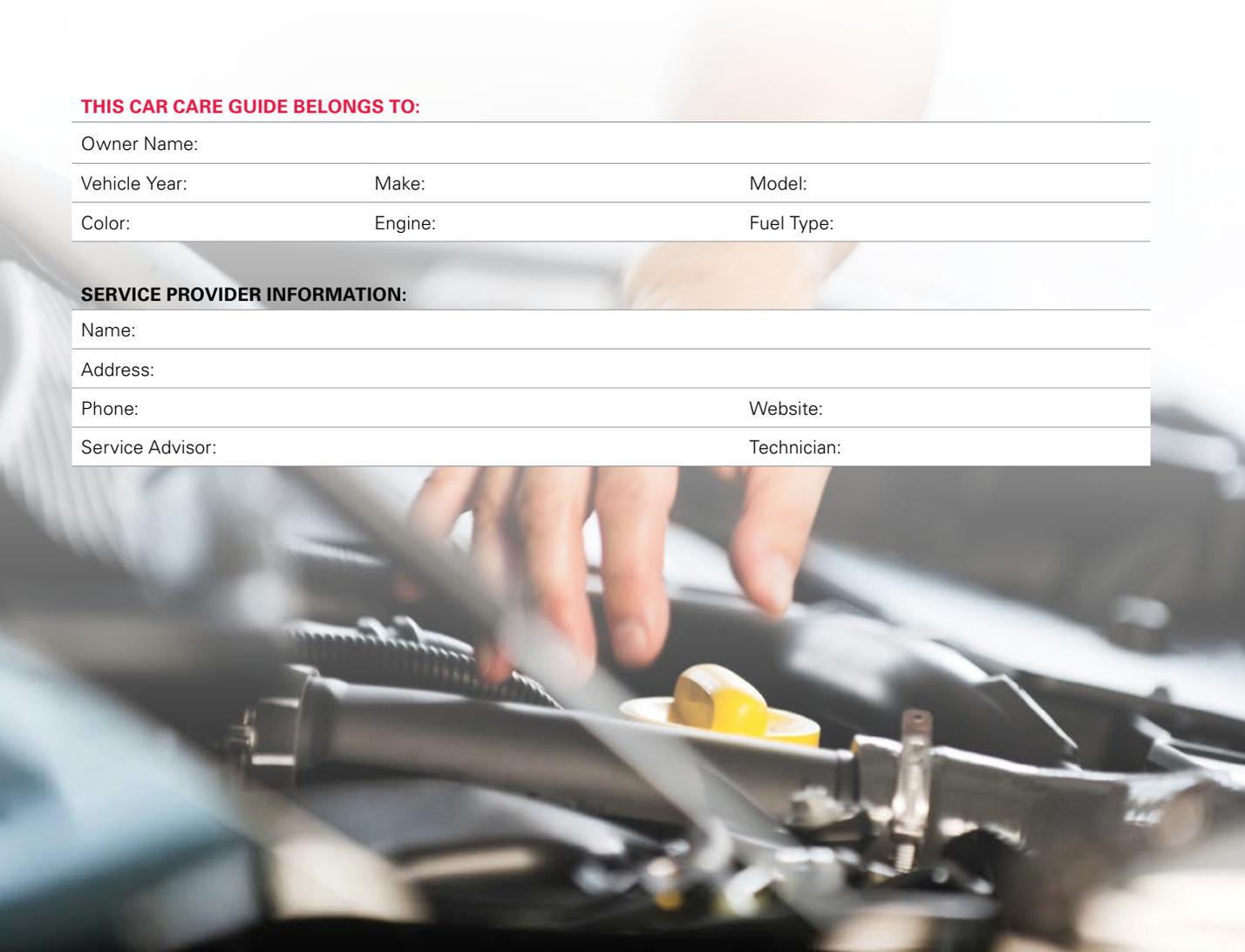
Address:

Phone:

Website:

Service Advisor:

Technician:



YOUR CAR CARE GUIDE

Chances are, your car is the second largest investment next to your home. Care for it properly and it will deliver the performance, lasting value and enjoyment you need and expect. A properly maintained car offers the greatest return on investment by performing safely and dependably for you and your family. Proper maintenance also helps you avoid more costly repairs down the road.

The first step toward proper maintenance is to “Be Car Care Aware” – to understand your car, the care it needs, when it needs it and why. That’s why we’ve created this easy-to-use Car Care Guide. The guide explains typical preventive maintenance repairs in everyday language and takes the mystery out of major car systems and parts.

You should expect to change the oil and filter regularly, check tire pressure, fluid levels, filters, belts, wiper blades, brakes and other parts and components, and replace them when necessary. The guide includes a simple checklist to remind you when to perform and check for important maintenance.

Keep this guide in your glove box. It’s a great reference tool that you can refer to whether you’re performing your own car maintenance or dropping your car off at a repair facility.

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TODAY'S DRIVING

Things change – including the way we use our cars, how we drive them and the condition of our roads. Normal driving is defined as steady driving in non-extreme weather or environments. Today, being a severe driver is more the rule than the exception. The automotive industry refers to **“severe driving”** as:

- Stop-and-go traffic;
- Short commutes;
- Heavier loads: cargo, passenger or towing a trailer;
- Rough or mountainous roads;
- Dusty or salty environments;
- Driving the car before it's had a chance to warm up; and/or
- Driving in extremely hot or cold weather.

As a driver, you should be aware of your vehicle and properly maintain and repair it as outlined in this guide. If you do, your car will perform safely and dependably for years to come.



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MAINTAINING YOUR VEHICLE: WHAT TO CHECK AND WHEN

The Car Care Council has developed a service interval schedule with general guidelines for the regular maintenance of **passenger cars, minivans, pick-ups and SUVs.**

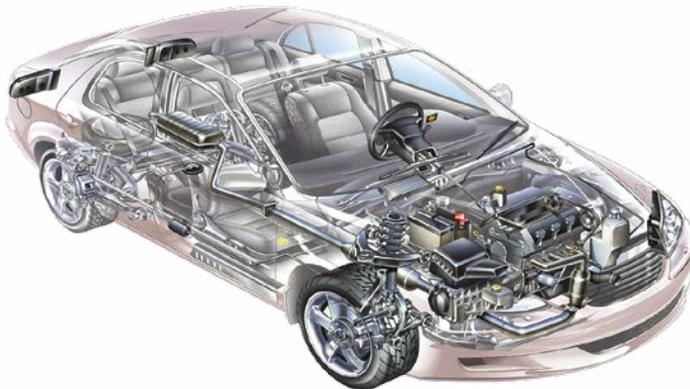
This schedule is customary for the majority of drivers and vehicles. However, always consult your owner's manual for specific recommendations from your vehicle manufacturer.

CHECK FREQUENTLY

- Dashboard Indicator Lights On
- Lights
- Tire Inflation and Condition
- Windshield Washer Fluid
- Engine Oil Level

CHECK EVERY 3 MONTHS/ 3,000 MILES

- Automatic Transmission Fluid
- Battery and Cables
- Belts
- Dashboard Indicator Light On
- Engine Air Filter
- Engine Oil
- Exhaust
- Hoses
- Lights
- Power Steering Fluid
- Tire Inflation and Condition
- Windshield Washer Fluid



CHECK EVERY 6 MONTHS/ 6,000 MILES

Automatic Transmission Fluid
Battery and Cables
Belts
Chassis Lubrication
Dashboard Indicator Light On
Engine Air Filter
Engine Oil
Exhaust
Hoses
Lights
Power Steering Fluid
Tire Inflation and Condition
Windshield Washer Fluid
Wiper Blades

CHECK EVERY 9 MONTHS/ 9,000 MILES

Automatic Transmission Fluid
Battery and Cables
Belts
Dashboard Indicator Light On
Engine Air Filter
Engine Oil
Exhaust
Hoses
Lights
Power Steering Fluid
Tire Inflation and Condition
Windshield Washer Fluid

CHECK EVERY 12 MONTHS/ 12,000 MILES

Automatic Transmission Fluid
Battery and Cables
Belts
Brakes
Cabin Air Filter
Chassis Lubrication
Dashboard Indicator Light On
Coolant (Antifreeze)
Engine Air Filter
Engine Oil
Exhaust
Hoses
Lights
Power Steering Fluid
Steering and Suspension
Tire Inflation and Condition
Wheel Alignment
Windshield Washer Fluid
Wiper Blades

VEHICLE SYSTEM/COMPONENT SERVICE NOTES

AUTOMATIC TRANSMISSION FLUID

Check fluid level with engine running and transmission in park or neutral (vehicle specific). If low, add the type of automatic transmission fluid specified in the owner's manual and/or on dipstick. For maximum performance, change every two to three years or 24,000 miles to 36,000 miles, or as directed in owner's manual.

BATTERY AND CABLES

Battery should be securely mounted. Battery connections should be clean, tight and corrosion-free. If the battery is three years old or more, it should be tested and replaced if necessary.

BELTS

Noise in the belt system is a sign of wear. Check serpentine and V-belts for looseness and condition. It is important to check all the components in the serpentine system. Tensioners and pulleys wear at the same rate as the belt and should be inspected. Typical serpentine replacement is 60,000 to 90,000 miles. Replace V-belts when cracked, frayed,

glazed or showing signs of excessive wear. Typical replacement is 40,000 to 50,000 miles. Replace timing belt per interval specified in the owner's manual.

BRAKES

Check the entire brake system every year, including brake pads, shoes, rotors, drums, calipers and brake fluid. Brake fluid should be changed every two to three years or 24,000 miles to 36,000 miles, or as directed in owner's manual.

CABIN AIR FILTER

Replace annually, or more often in areas with heavy airborne contaminants or whenever heating or cooling efficiency is reduced.

CHASSIS LUBRICATION

Many newer cars are lubed-for-life; some still require this service. Check owner's manual. Replacement steering and suspension components may require periodic lubrication.

DASHBOARD INDICATOR LIGHTS

If the check engine light comes on while driving or remains on, your vehicle may have an emissions or sensor problem and should be analyzed. If the light flashes, the condition is more severe and must be checked immediately to prevent catalytic converter damage. Numerous sensors in the vehicle monitor and send a continuous flow of data to any one of several electronic control units for various systems. While there is no maintenance required for these sensors and control units, they continuously monitor for a malfunction. If a malfunction is detected it will trigger the Check Engine light or other dashboard indicators.

CLEANING AND POLISHING

To prevent stripping the vehicle's wax finish, use only automotive car wash products, not dishwashing liquids. Polish at least twice a year to maintain and protect the finish.

COOLANT (ANTIFREEZE)

Check level at reservoir. Never open a hot radiator cap. If low, add 50/50 mix of

approved antifreeze and distilled water. If there is consistent fluid loss, cooling system should be checked for leaks. Change coolant at the interval and with the correct fluid as specified in the owner's manual (coolant is vehicle specific).

ENGINE AIR FILTER

Inspect filter at each oil change. Replace annually or when leaking, torn, water or oil soaked, restricted or showing other signs of wear.

ENGINE OIL AND FILTER

The Car Care Council recommends changing your vehicle's engine oil every 3,000 to 5,000 miles depending on the vehicle's make and model, how you drive the vehicle and the condition under which you drive. Always consult the owner's manual.

EXHAUST

Inspect for leaks, damage and broken supports or hangers if there is an unusual noise. Exhaust leaks can be dangerous and must be corrected without delay.

HOSES

Inspect hoses at each oil change and replace when leaking, brittle, cracked, rusted, swollen or restricted.

LIGHTS

Replace bulb immediately if light is out. Check fuses first.

POWER STEERING FLUID

Check the fluid with the car warmed up. Add correct type of fluid if low. If frequent topping off is required, inspect for leaks and replace if contaminated. Consult owner's manual for vehicle specific service requirements.

SPARK PLUGS

Typical replacement intervals range between 30,000 and 100,000 miles, depending on the vehicle and type of spark plug. Always consult your owner's manual for your specific vehicle.

STEERING AND SUSPENSION

Inspect system annually, including wheel alignment, shock absorbers, struts and

chassis parts like ball joints, tie rod ends and other related components. Replace if leaks, damage and loose mounting hardware are found. Symptoms of worn suspension include uneven tire wear, excessive bouncing and unusual noises.

TIRE INFLATION AND CONDITION

Check the pressure of all tires, including the spare, monthly and more often with colder temperatures. Check the tread for uneven or irregular wear and cuts or bruises along sidewalls. Inflate tires and maintain at recommended pressure. Rotate tires every 6,000 miles. Replace tires if worn or damaged.

WINDSHIELD WASHER FLUID

Check fluid level monthly. Some vehicles have two reservoirs. Do not use water. Use washer fluid only.

WIPER BLADES

Replace every six months or when cracked, cut, torn, streaking or chattering.

TYPICAL MAINTENANCE AND REPAIR

The key to a car running at its best is basic maintenance. Keeping up with fluid changes, tire checks, filter changes and other services will help avoid bigger and more expensive repairs. Over time, some car parts and components wear out or become damaged. Being aware of your car will help you address any issues before they become bigger problems.

This section outlines some of the most common maintenance procedures and repairs to keep your car operating safely and reliably while maintaining its long-term value.

ENGINE PERFORMANCE



OIL, FILTERS AND FLUIDS



WHEELS AND TIRES



CHECK ENGINE LIGHT



BELTS AND HOSES



BRAKE SERVICE



AIR CONDITIONING



APPEARANCE



ENGINE PERFORMANCE



Service to maintain engine performance, sometimes known as a tune-up, keeps your engine working hand-in-hand with the rest of your car's powertrain. This is how optimum car performance is achieved.

WHY DO I NEED THIS SERVICE?

A well-tuned engine delivers the best balance of power and fuel economy and produces the lowest level of emissions. Modern engines compensate for worn parts to a degree, giving you the sense that everything is fine with your car. Keeping your engine tuned will restore your car to its normal operating state, and contribute to the overall efficiency of the engine and emissions system. The Environmental Protection Agency (EPA) says a well-maintained car is more fuel-efficient, produces fewer greenhouse gas emissions, is more reliable and is safer!

TYPICAL SERVICE

- Based on spark plug type, the replacement interval can range from 30,000 to 100,000 miles.
- Replace any other ignition system and/or emissions system parts that may be needed or recommended.
- Replace the fuel and air filters.

QUESTIONS TO ASK

- » How often does my car need a tune-up?
- » Are there other services that need to be performed at this time?
- » If the “Check Engine” or “Service Engine Soon” light comes on, is it the same as saying it’s time for a tune-up?

OIL, FILTERS AND FLUIDS



Critical parts of your engine are lubricated, cleaned and cooled by your car's oil and filter. Other specifically formulated fluids are used for the operation and protection of systems and components such as brakes, cooling, power steering, automatic and manual transmissions, and transfer cases. Your car may also be equipped with a variety of filters including those for the transmission, fuel system and interior ventilation.

WHY DO I NEED THIS SERVICE?

Periodic oil and filter changes help keep your engine clean on the inside. Dust, metallic shavings, condensation and even antifreeze can contaminate motor oil. Additives, which break down over time, are also subject to contamination. Other fluids in your vehicle may require periodic replacement. For example, the majority of automatic transmission failures are heat-related, and automatic transmission fluid breaks down rapidly when subjected to high temperatures. Your car owner's manual may specify periodic flushing and filling of the brake hydraulic system because contaminated brake fluid may lead to corrosion and other problems in the hydraulic system, especially on vehicles with anti-lock brakes (ABS).

TYPICAL SERVICE

- Oil level should be checked frequently and changed every 3,000 - 5,000 miles or as directed in the owner's manual.
- If you regularly make short trips in your car, drive in stop-and-go traffic, idle for extended periods, drive in dusty or dirty air conditions, tow a trailer or live in a cold-weather region, stay with the 3,000-mile/three-month schedule because you are considered a severe driver.
- Many car manufacturers recommend extended oil drain intervals for some drivers.
- For automatic transmissions, brakes, power steering and axles, vehicle-specific fluids should be used.
- Coolant should be changed periodically as specified in the owner's manual. Coolant fluid type and interval schedule will vary by vehicle.

QUESTIONS TO ASK

- » What fluids will you be checking?
- » Is the oil you're putting in my car the right type for the way I drive?
- » Is an oil filter change included with this service?
- » When should I get my next oil change?
- » How often should my fluid levels be checked?
- » Will my car's instrument panel alert me if fluids are low?

BELTS AND HOSES



Many experts recommend replacing belts, radiator and heater hoses at specific intervals to prevent your car from breaking down. Losing a belt today can mean big trouble for the engine because serpentine belts are used on most engines to turn the water pump, alternator, power steering and air-conditioning compressor. If the serpentine belt fails or breaks, the engine will fail to run and you may be stranded. Older cars use V-belts for various accessories and failure of this belt could also strand you. A blown hose could result in an overheated engine and can cause additional engine damage.

WHY DO I NEED THIS SERVICE?

It's not easy to know the true condition of a belt or hose by its outward appearance, because most belts and hoses fail from the inside out. Rubber hoses can become hard and brittle, deteriorating with age and exposure to heat, causing the hose to split, blister or leak. Belts also break down with heat, mileage and age. Every time a belt passes around a pulley, it bends. Flexing produces heat that causes the rubber to harden over time. In addition, if the belt is loose or slips, the wear process can be accelerated.

TYPICAL SERVICE

- Hoses should be inspected at each oil change for leaking, cracks, discoloration or any other visual sign of wear. Squeezing the hose can also indicate need for replacement. Any hose that feels rock-hard or mushy should be replaced.
- Hoses should always be replaced with a new radiator or water pump installation.
- Clamps should be replaced when new hoses are installed.
- V-belts should be inspected for looseness, cracks, frays or glazing. Typical replacement is every three to four years or 40,000 to 50,000 miles.
- The serpentine belt system should be inspected for looseness and signs of wear. Tensioners and pulleys should be inspected for noise and wear. Typical replacement is 60,000 to 90,000 miles. The system may also require replacement of a tensioner or pulley.
- Replace timing belts based on the interval specified in the owner's manual, typically between 60,000 and 90,000 miles. During a timing belt service it may be recommended to replace tensioner, pulleys, and water pump.

QUESTIONS TO ASK

- » What's the difference between a V-belt and a serpentine belt?
- » Why does my V-belt have notches?
- » Do you recommend replacing the water pump and tensioners while replacing my belt(s)?

BRAKE SERVICE



The brake system is your car's most important safety system. Never put off routine brake inspections or any needed repair.

WHY DO I NEED THIS SERVICE?

Brakes are a normal wear item for any car. Eventually, they're going to need to be replaced for both performance and safety reasons. Don't let your brakes get to the "metal-to-metal" point, which usually means more expensive rotor or drum replacement. Your car owner's manual might specify periodic flushing and filling of the brake hydraulic system. Contaminated brake fluid may lead to corrosion and other problems in the hydraulic system, especially on cars with anti-lock brakes (ABS).

TYPICAL SERVICE

- Have your brake pads and shoes, drums and rotors, master cylinders, wheel cylinders, brake hoses, calipers, brake hardware and brake fluid inspected.
- Depending on the condition or thickness of the drums or rotors, resurfacing or replacement may be necessary.
- The parking brake should also be checked for proper operation and adjustment. In some cases, the parking brake shoes/pads may need replacement.

QUESTIONS TO ASK

- » Is there anything I can do to help the brakes on my car last longer?
- » Are there any related services my car needs while this service is being performed?
- » What does the brake warning light mean on my car's dashboard?

WHEELS AND TIRES



Tires are your car's critical connection to the road and can affect your ride, handling, traction and safety. Maintaining tire balance and wheel alignment reduces tire wear and improves handling and fuel economy.

WHY DO I NEED THIS SERVICE?

Tire replacement is necessary if the tread depth is below the minimum legal requirement, or the sidewalls are severely cracked or punctured. In some cases, tread punctures cannot be repaired. Normal wear and road conditions can take their toll on your car's steering and suspension system, and can disrupt the alignment settings. Ball joints, tie rods, steering arms, bushings and other suspension parts all wear gradually over time. Springs will gradually sag and age as miles accumulate. All of these will affect alignment angles and adjustments need to be made or components replaced to restore optimum handling.

TYPICAL SERVICE

- Have your car's alignment (all four wheels) checked at least annually and also at the first sign of improper handling or uneven wear. Your technician will make adjustments to the camber, caster, toe and thrust angle as needed.
- Request a wheel alignment when you purchase a set of new tires.
- Check inflation pressure at least once a month (including the spare).
- Have the tires rotated every 6,000 miles. Consult your owner's manual, tire dealer or manufacturer for the correct rotation pattern for your tires.
- Rotation time also serves as a good opportunity to have the wheels balanced. Unbalanced wheels can cause rapid wear of shock absorbers and struts, and wheel balance can change as a result of normal tire wear. Rotating the tires to keep their sizes equal is critical on full-time four-wheel drive vehicles, and replacing all four tires at the same time, is highly recommended.
- The Tire Pressure Monitoring System (TPMS) may need to be replaced when servicing or installing new tires.

QUESTIONS TO ASK:

- » What type of tires should go on my vehicle based on my driving?
- » What can happen if I install a set of tires having a size not recommended for my car?
- » Why does my car shake at certain speeds?
- » Can my driving habits affect tire life?
- » Do tires have to be replaced in pairs?
- » Is this a four-wheel alignment?

CHECK ENGINE LIGHT



In 1996, an orange light on your car's dashboard labeled "Check Engine" or "Service Engine Soon" became standard on all car makes and models. The light tells you there's a problem with your car's engine and powertrain control system.

WHY DO I NEED THIS SERVICE?

An illuminated "Check Engine" or "Service Engine Soon" light indicates that a vehicle system, such as the ignition, fuel injection or emission control, is not operating properly, even if the vehicle appears to be running normally. Only the right diagnostic equipment can determine the problem detected by your car's on-board diagnostic system (OBD). Ignoring a check engine light can negatively impact your fuel economy or cause damage resulting in more costly repairs.



TYPICAL SERVICE

- A steady light should be diagnosed at the first convenient opportunity.
- A flashing light indicates a problem that is currently happening and may require immediate attention, such as catalytic converter damage.
- A technician connects a diagnostic scan tool to your car's computer system to determine the problem.
- Further testing and diagnosis may be required to pinpoint the exact cause of the problem.
- Once the problem is pinpointed, repairs are made and the light is reset.

QUESTIONS TO ASK

- » When checking out the cause of the light, are there any other services that need to be performed at the same time?
- » Is it normal for the light to come on briefly when I start my car?
- » What happens if I just ignore the light?
- » Will the light eventually turn off by itself?
- » Will my car pass an emissions test if the light is on?
- » Are you trained and certified in OBDII diagnosis and repair?

AIR CONDITIONING SERVICE



Your car's heating, ventilating and air conditioning system (HVAC) keeps your car interior comfortable in any season by providing the right temperature and humidity level. The HVAC system also helps improve defroster operation.

WHY DO I NEED THIS SERVICE?

Proper heating and cooling performance is critical for interior comfort and for safety reasons such as defrosting. The HVAC system will work as designed if properly serviced.

TYPICAL SERVICE

- A thorough inspection of your car's HVAC system should be performed annually.
- A service technician checks pressures to test operation, refrigerant charge and outlet temperatures.
- If the system is found to be low on refrigerant, a leak test is performed to find the source of the leak.
- A technician may also check for evidence of refrigerant cross-contamination, which is the mixing of refrigerants.
- A/C service should also include a check of the compressor's drive belt and tension.

QUESTIONS TO ASK

- » What happens if I continue to use my car's A/C system, even though it's not cooling properly?
- » Water drips underneath my car when I use the A/C system. Is this normal?
- » A musty odor comes out of the A/C vents at times. Can anything be done about this?
- » My car's A/C system seems to cool intermittently and I hear a clicking on and off from underneath the hood. What does this mean?

APPEARANCE



Keeping a vehicle looking new is tough, even with today's long-lasting finishes. Dents, dings, cracked glass and dirty upholstery are several items that age the appearance of a vehicle. Fortunately, technology and advances in vehicle protectants have helped rectify these problems, making the fixes quicker and less expensive.

WHY DO I NEED THIS SERVICE?

Caring for your car's appearance helps you protect your investment. Appearance problems left unattended, like breaks in glass or body damage, can lead to larger problems and repairs.

TYPICAL SERVICE

- Frequent washing and periodic vehicle polishing go a long way toward protecting your investment.
- Keeping your vehicle consistently clean prevents the buildup of damaging chemicals and dirt that may damage your car's finish.
- In areas of the country that use road salt in winter months, frequent washing can reduce the corrosive effects of salt that cause body rust-through.
- Always use a different mitt for the tires and wheels than is used for the body and paint.
- To prevent stripping the vehicle's finish, only soap specified for automotive cleaning should be used.

QUESTIONS TO ASK

- » How do I get my tires to have a shine?
- » What can I use to remove small scratches in the paint?
- » Why shouldn't I wash my car with dishwashing soap?

VEHICLE SYSTEMS

Your car has many parts and systems that work alone or together to perform important driving functions. Over time, these components are subject to wear and tear or severe driving conditions that might create the need for repair or replacement.

Become more familiar with each of your car's systems and parts so you can make informed decisions about needed maintenance and repairs.

The descriptions and depictions in this section can vary depending on car make, model and type.

BELTS AND HOSES



BRAKE SYSTEM



FUEL SYSTEM



LIGHTING AND WIPERS



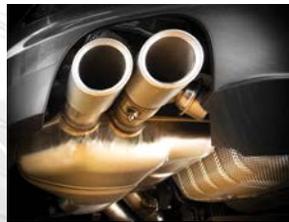
EMISSION SYSTEM



ENGINE COOLING SYSTEM



EXHAUST SYSTEM



FILTERS AND FLUIDS



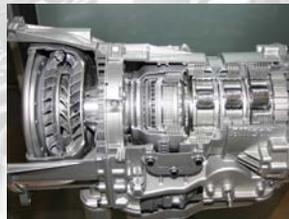
BATTERIES



STEERING AND SUSPENSION



TRANSMISSION



BELTS AND HOSES

WHAT IS IT?

Your car's belts and hoses are essential to the cooling, air conditioning and charging systems, and the engine. Don't ignore these routine replacement intervals because they can break down and leave you stranded.



WHAT DOES IT DO?

The timing belt keeps the crankshaft and camshaft mechanically synchronized to maintain engine timing. Whether serpentine, V-belt or fan belt (the belts on the outside of the engine), they all transmit power from the front of the engine to accessories that need to be driven, such as the air conditioning, the charging system and fans. Radiator and heater hoses carry coolant to and from the engine, radiator and heater core.

TYPICAL WEAR AND TEAR

Key items that affect the replacement interval for belts and hoses:

- Vehicle age
- Electrolytic corrosion
- Mileage
- Oil contamination
- Belt tension
- Failed hose clamps

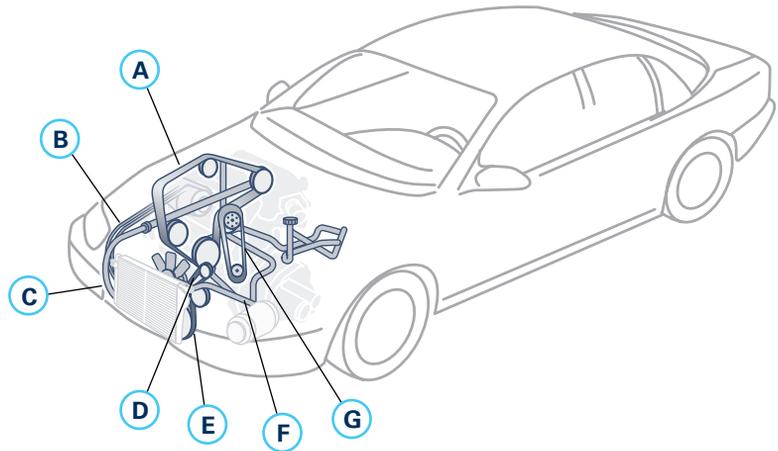
SYMPTOMS

- Squeaking noise from under the hood during start-up or operation
- Coolant leaks
- Dashboard light will illuminate
- A/C system may fail
- Engine overheating
- Smell of burnt rubber

THE BELTS AND HOSES MOST FREQUENTLY USED ARE:

- A. Serpentine belt
- B. Heater hoses
- C. Lower radiator hose
- D. Drive belt (V-belt)
- E. Fan belt
- F. Upper radiator hose
- G. Timing belt

Not all cars use timing belts. Also, some cars may use one serpentine belt for all accessories, others may use a combination of serpentine and V-belts, while others may use only V-belts.



BRAKE SYSTEM

WHAT IS IT?

Your car's brake system is its most critical safety system and you should check it immediately if you suspect any problems. A properly operating brake system helps ensure safe vehicle control and operation under a wide variety of conditions.



WHAT DOES IT DO?

When you push the brake pedal, the force generates hydraulic pressure in the master cylinder. This pressure flows through the hydraulic lines and hoses to the wheel cylinders and calipers, forcing the shoes against the drums (drum brakes) and the pads against the rotors (disc brakes). The resulting friction slows the vehicle and is relative to the amount of force applied at the brake pedal.

TYPICAL WEAR AND TEAR

Brakes are a normal wear item for any car and eventually they're going to need replacement. Avoid letting your brakes get to the "metal-to-metal" point, which usually means expensive rotor or drum

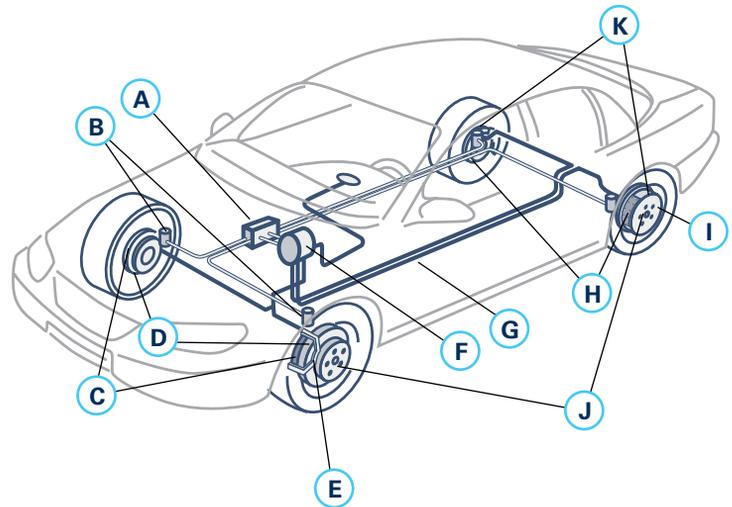
replacement. Factors that affect wear include driving habits and quality of brake pads and shoes.

SYMPTOMS

- Car pulls to one side during braking
- Pulsating brake pedal or steering wheel shake
- Brake pedal feels "mushy"
- Unusual noise when you step on the brake pedal
- Repeatedly need to add brake fluid to the master cylinder
- Brake fluid sprayed onto outside of wheel
- Unusual odor or smoke

YOUR CAR'S BRAKE SYSTEM INCLUDES:

- A. ABS modulator
- B. Wheel speed sensors
- C. Pads
- D. Rotors
- E. Brake calipers (disc brakes)
- F. Master cylinder
- G. Hydraulic lines and hoses
- H. Shoes
- I. Wheel cylinders (drum brakes)
- J. Bearings, seals or hub units
- K. Drums (not shown – would cover H)



EMISSION SYSTEM

WHAT IS IT?

Your car's emission system keeps the engine running cleanly and efficiently in all sorts of operating conditions. A steady or flashing warning light on your vehicle dashboard indicates a problem that is currently happening and



may require immediate attention. Failure to do so can reduce your gas mileage or cause your vehicle to pollute.

WHAT DOES IT DO?

Your car's emission system controls the emissions, exhaust and pollutants (including gasoline vapors escaping from the fuel tank), using an array of sensors, computerized engine controls and the exhaust components. The emission system substantially reduces harmful gases such as carbon monoxide (CO), unburned hydrocarbons (HC) and oxides of nitrogen (NOx) and, by law, must be maintained in operating condition.

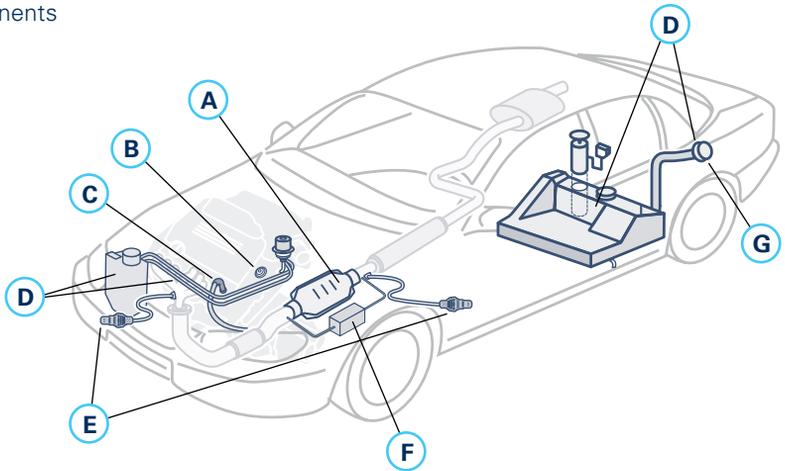
TYPICAL WEAR AND TEAR

Some factors affecting the emission system include:

- Driving and atmospheric conditions
- Mileage
- Vehicle age
- Type of spark plug electrode material
- Poor vehicle maintenance
- Poor quality fuel
- Damaged or worn sensors
- Dry-rotted or cracked vacuum hoses

YOUR CAR'S EMISSION SYSTEM CONSISTS OF:

- A. Catalytic converter and exhaust components
- B. EGR valve and related components
- C. PCV valve
- D. Evaporative system
- E. Oxygen sensors
- F. Control Module
- G. Gas cap



ENGINE COOLING SYSTEM

WHAT IS IT?

The engine cooling system affects your car's overall dependability and engine longevity. Cooling systems have advanced over the years with new coolant formulations and new radiator designs and materials. If you suspect a problem with

your cooling system, you should have it checked immediately.

WHAT DOES IT DO?

The key parts of the cooling system remove heat from the engine and automatic transmission and dissipate heat to the air outside. The water pump circulates coolant through the engine. The coolant absorbs heat and returns it to the radiator where heat is dissipated. The thermostat regulates the coolant temperature to keep it consistent for efficient engine operation.

TYPICAL WEAR AND TEAR

Factors that affect the replacement of cooling system parts include:

- Driving habits
- Operating conditions
- Type of vehicle
- Type of coolant
- Frequency of regular maintenance such as coolant changes

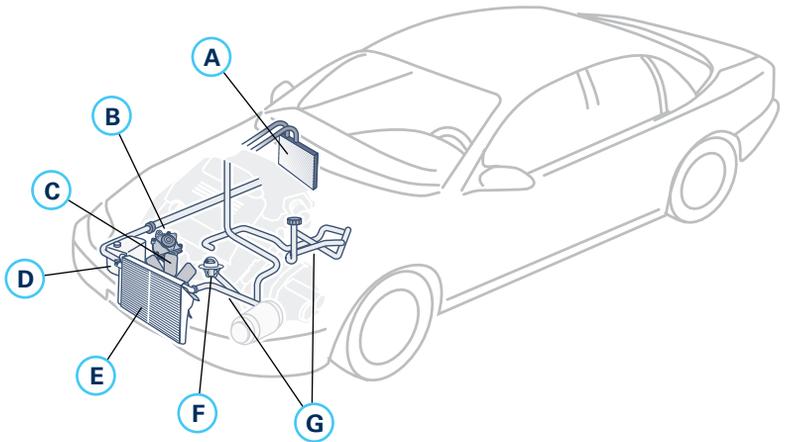
SYMPTOMS

- Overheating
- Sweet smell
- Leaks
- Repeatedly needing to add fluid



YOUR CAR'S COOLING SYSTEM CONSISTS OF:

- A. Heater core
- B. Water pump
- C. Cooling fan
- D. Coolant reservoir
- E. Radiator
- F. Thermostat
- G. Hoses



EXHAUST SYSTEM

WHAT IS IT?

Exhaust systems have come a long way from the old days of exhaust pipes and mufflers. Today, the exhaust system is safety and emissions control rolled into one. Have your car's exhaust system inspected regularly



and check it immediately if you suspect any problems.

WHAT DOES IT DO?

The exhaust system routes dangerous exhaust gas from the engine out and away from the car to keep from affecting the occupants. The exhaust system reduces exhaust noise from the engine. The catalytic converter reduces the level of harmful pollutants in the exhaust. The oxygen sensors mounted in the exhaust system monitor the level of oxygen in the exhaust gases to maintain efficient engine operation and to monitor the converter's operation.

TYPICAL WEAR AND TEAR

Maintain a safe car with regular exhaust system checks. Factors that affect replacement requirements include:

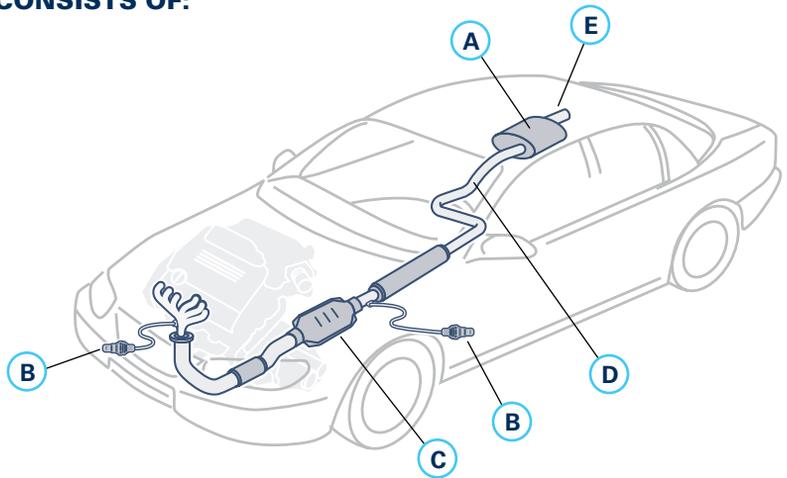
- Driving habits (short trips take their toll on exhaust system life)
- Road conditions (salt, road spray, bumps)
- Vehicle type
- Age of exhaust system parts

SYMPTOMS

- Loud noise
- Rattling noise when starting, accelerating or braking
- Drowsiness while driving
- Rotten eggs smell

YOUR CAR'S EXHAUST SYSTEM CONSISTS OF:

- A. One or more mufflers
- B. One or more oxygen (O₂) sensors
- C. One or more catalytic converters
- D. Exhaust pipe
- E. Tail pipe



FILTERS AND FLUIDS

WHAT IS IT?

Your car's filters are important to the longevity of your car and interior comfort and should be replaced regularly.



WHAT DOES IT DO?

The oil filter traps contaminants, allowing the oil to flow through the engine unrestricted. The fuel filter separates harmful contaminants that may cause problems with carburetors or intricate fuel injectors. The air filter traps dirt particles, which can cause damage to engine cylinders, walls, pistons and piston rings. The air filter also plays a role in keeping contaminants off the airflow sensor (in fuel-injected cars). The cabin filter helps trap pollen, bacteria and dust that may find their way into a car's ventilation system.

TYPICAL WEAR AND TEAR

Filters are normal wear items that require regular checks and replacement. Factors that affect replacement intervals include:

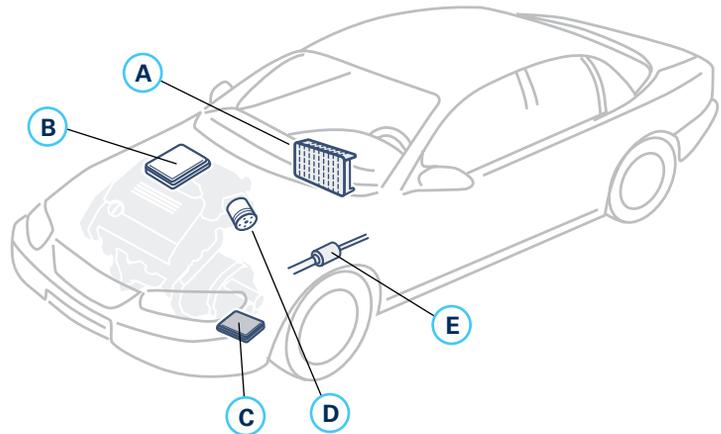
- Mileage/time
- Driving habits
- Driving and road conditions
- Type of filter
- Vehicle type

SYMPTOMS

- Poor gas mileage
- Hesitation while accelerating
- Musty odor in the cabin

YOUR CAR'S FILTERS MOST LIKELY INCLUDE:

- A. Cabin filter
- B. Air filter
- C. Automatic transmission filter
- D. Oil filter
- E. Fuel filter



FUEL SYSTEM

WHAT IS IT?

Your car's fuel system works with the rest of the engine control system to deliver the best performance with the lowest emissions. Check your car's fuel system regularly or immediately if you smell gas or suspect a problem.



WHAT DOES IT DO?

The fuel system transfers fuel from the fuel tank and passes it through a fuel filter for straining before it arrives at the injectors. A pressure regulator controls fuel pressure to ensure good engine performance under a variety of speed and load conditions. Fuel injectors, when activated, spray a metered amount of fuel into the engine. Some vehicles use a return line system to return unused fuel back to the tank.

TYPICAL WEAR AND TEAR

Intervals for fuel system maintenance may be influenced by:

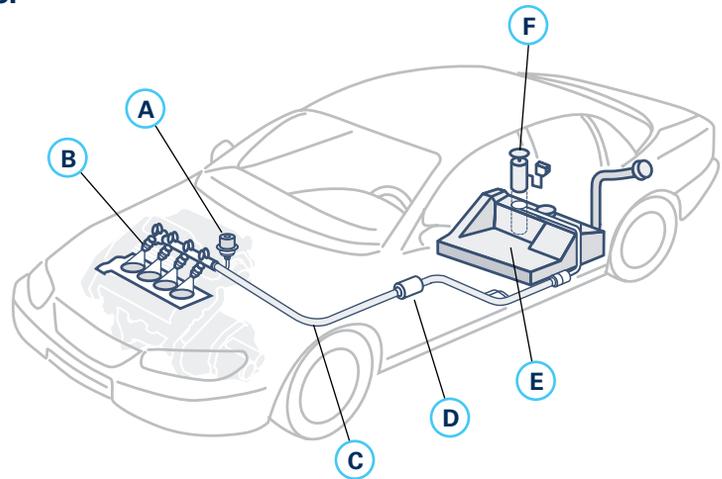
- Fuel quality
- Vehicle age
- Mileage/time
- Operating conditions
- Maintenance history

SYMPTOMS

- Poor fuel economy
- Vehicle won't start
- "Check Engine" light is illuminated

YOUR CAR'S FUEL SYSTEM INCLUDES:

- A. Pressure regulator
- B. Fuel injectors
- C. Lines/hoses
- D. Fuel filter
- E. Fuel tank
- F. One or more fuel pumps



LIGHTING AND WIPERS

WHAT IS IT?

Lights and wipers play a major role in safe driving – the chances for accidents increase if you can't see or be seen. Some states have laws that require the headlights to be on with the wipers. If you detect any problems with your



car's lights or wipers, have them checked out at once.

WHAT DOES IT DO?

The wiper system keeps excessive water, snow or dirt from building up on the windshield and removes them to maintain clear visibility through the windshield. The lighting system provides nighttime visibility, signals and alerts other drivers, and supplies light for viewing instruments and the vehicle's interior.

TYPICAL WEAR AND TEAR

Lights and wipers are normal wear items that require periodic replacement. Factors affecting replacement intervals include:

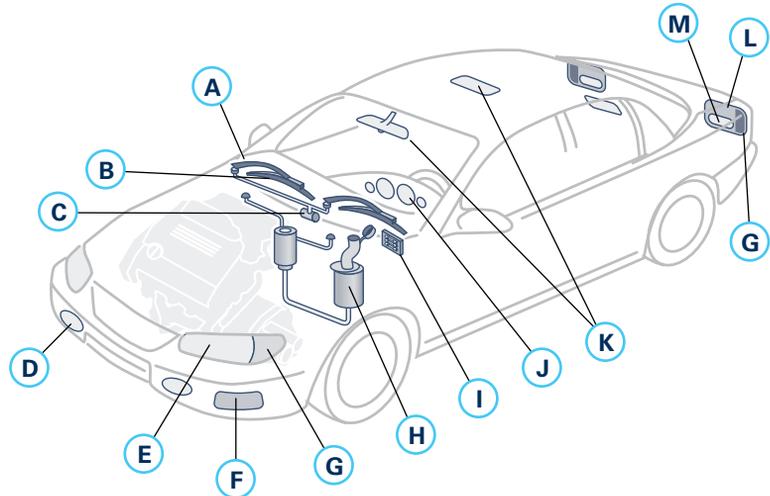
- Operating conditions
- Frequency of use
- Material and type of lights and wipers
- Sunny weather – wiper blades can deteriorate faster and need more frequent replacement in desert states

SYMPTOMS

- Chattering or streaking wiper
- Rapid signal blinking
- Dimming lights

THE LIGHTS AND WIPERS OF YOUR CAR MOST OFTEN INCLUDE:

- A. Wiper arm
- B. Wiper blade
- C. Wiper motor
- D. Fog lights (optional)
- E. Headlights (high and low beam)
- F. Parking lights
- G. Turn signals/emergency flashers
- H. Washer fluid reservoir and fluid
- I. Fuses
- J. Instrumentation lighting
- K. Interior lights
- L. Stoplights, tail and marker lights
- M. Backup lights



STARTING, CHARGING AND BATTERIES

WHAT IS IT?

Your car's starting and charging systems, and the battery, help ensure dependable vehicle operation whenever you drive your car and in all sorts of driving conditions. Make sure to check these systems regularly.



WHAT DOES IT DO?

The battery stores electrical energy and the starter converts that energy into mechanical force to turn the engine for starting. The alternator produces electric current to replace what the starter used from the battery during start-up and to support electrical loads when the engine is running. An ignition module turns the low-voltage supply to the ignition coil on and off, and the coil produces the high voltage for the ignition system. This creates a spark at the spark plugs and ignites the air/fuel mixture in the engine. A belt transmits power from the front of the engine to the alternator's pulley, along with other accessories.

TYPICAL WEAR AND TEAR

Driving habits such as frequent engine on/off cycles will cause more wear on the starter than a simple trip back and forth to work. Other factors include:

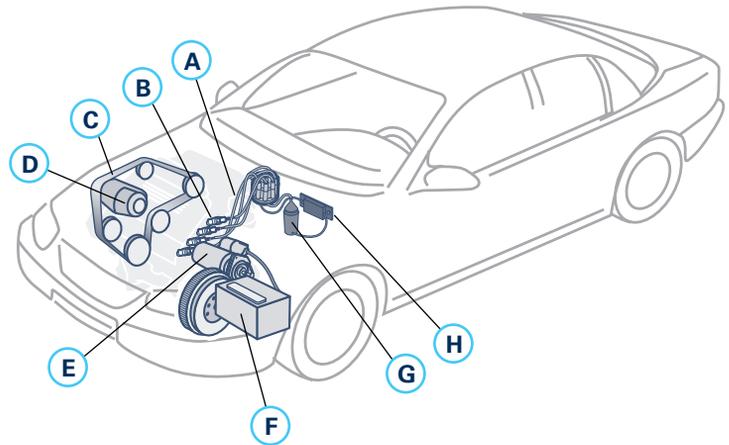
- Driving and weather conditions
- Mileage
- Vehicle age
- Excessive electrical draws like in-vehicle entertainment systems

SYMPTOMS

- Headlights and interior lights dim
- "Check Engine" and/or battery light may come on
- Accessories fail to operate

YOUR CAR'S IGNITION, STARTING, CHARGING AND BATTERY SYSTEM CONSISTS OF:

- A.** Spark plug wires
- B.** Spark plugs
- C.** Belts
- D.** Alternator
- E.** Starter
- F.** Battery
- G.** Ignition coil(s)
- H.** Ignition module



STEERING AND SUSPENSION

WHAT IS IT?

The steering and suspension systems are key safety-related systems that largely determine your car's ride and handling. Have these systems checked regularly, at least once a year and usually with a wheel alignment.



WHAT DOES IT DO?

The suspension maintains the relationship between the wheels and the frame or unibody. The suspension system interacts with the steering system to provide vehicle control. When working properly, the suspension system helps absorb the energy from road irregularities such as potholes and helps to maintain vehicle stability. The steering system transmits your input from the steering wheel to the steering gear and other steering components to control the car's direction.

TYPICAL WEAR AND TEAR

Over time, steering and suspension components wear out and require

replacement. Regular checks are critical to maintain a safe car. Factors that affect wear include:

- Driving habits
- Operating conditions (potholes in roads)
- Vehicle type
- Type of steering and suspension system
- Frequency of regular maintenance such as chassis lubrication and wheel alignment

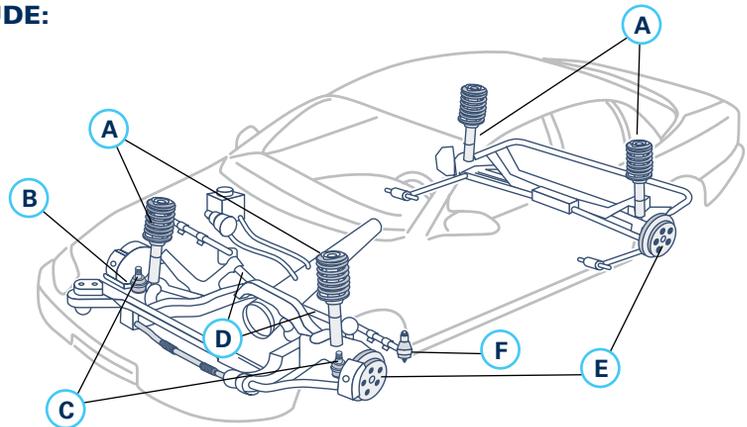
SYMPTOMS

- Car pulls to one side
- Uneven tire wear
- Excessive noise, vibration or bouncing
- Loss of control

THE KEY COMPONENTS IN YOUR CAR'S STEERING AND SUSPENSION SYSTEMS INCLUDE:

- A. Shocks and/or struts
- B. Steering knuckle
- C. Ball joints
- D. Steering rack/box
- E. Bearings, seals or hub units
- F. Tie rod ends

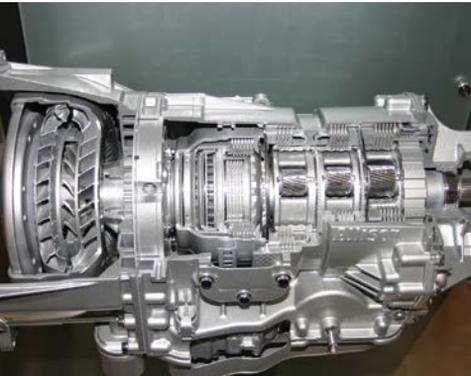
Other main parts of the steering and suspension system include springs, pitman arm and idler arm.



TRANSMISSION

WHAT IS IT?

The transmission works with the engine to provide power to your car's wheels. Whether automatic or manual, the transmission plays a major role in the overall performance of your car. Make sure to check it at the first sign of problems.



WHAT DOES IT DO?

A transmission/transaxle keeps the engine's output optimally matched to the speed and load conditions. The torque converter, connected to the automatic transmission/transaxle input shaft, connects, multiplies and interrupts the flow of engine torque into the transmission. Universal and/or Constant Velocity (CV) joints connect to the driveshaft to transmit output power from the transmission to the rear axle on rear-wheel-drive cars and the front axle on front-wheel-drive cars. These joints also allow the driveshaft and/or CV shaft to work at an angle. The several different types of automatic transmission fluid serve multiple purposes: cleans, cools, lubricates, transmits force, transmits pressure, inhibits

varnish buildup and continually protects the transmission.

TYPICAL WEAR AND TEAR

Wear and tear on the transmission can be influenced by:

- Driving habits
- Towing or excessive loads
- Operating conditions
- Condition of the transmission fluid
- Frequency of regular maintenance

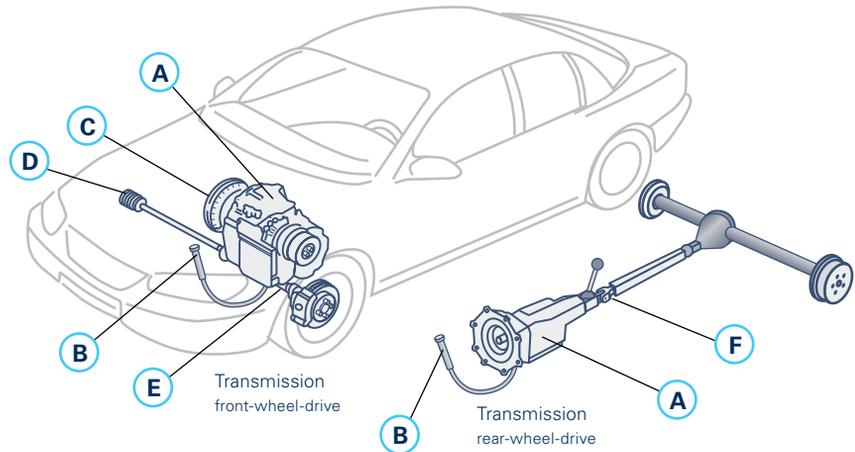
SYMPTOMS

- Slipping
- Hesitation
- Bucking
- Grinding gears
- Difficulty shifting

THE TRANSMISSION IN YOUR CAR INCLUDES:

- A. Automatic transmission/transaxle, or manual transmission/transaxle
- B. Transmission fluid/dipstick
- C. Torque converter
- D. CV joint/axle/boot
- E. Half shaft
- F. Universal joints

Some vehicles with all-wheel-drive or four-wheel-drive will also use a transfer case after the transmission.



CAR CARE AND THE ENVIRONMENT

Living a green lifestyle with your car can be easier than you think. Adjusting driving and car care habits can increase fuel economy and reduce impact on the environment. The auto care industry itself has been green for years by both recycling and reusing materials. This section covers maintenance and driving procedures to increase to improve fuel economy, information on recycling and rebuilt engines and an explanation of alternative fuel options.

The following pages outline some of the most common maintenance procedures and repairs to keep your car operating safely and reliably while maintaining its long-term value.

FUEL ECONOMY



INDUSTRY RECYCLES



REBUILT ENGINES



ALTERNATIVE ENERGIES



FUEL ECONOMY AND ENVIRONMENTAL AWARENESS

Fuel economy is the number of miles/kilometers per gallon your car gets, and this number can vary depending on how you maintain and drive your vehicle. On top of that, good habits of vehicle maintenance and driving can go a long way toward protecting the environment.

Low tire pressure, a clogged air filter, or worn or fouled spark plugs can lower gas mileage, as can aggressive driving, excessive idling, driving over the speed limit and using the car's A/C system.

MAINTENANCE

A properly maintained vehicle can improve its efficiency, reduce emissions and save you money.

Regular engine performance maintenance will help you burn less gas, pollute less, and prevent car trouble down the line. See pages 8-9 for details on engine performance maintenance. This will include checking the spark plugs, replacing the fuel and air filters, replacing ignition system and/or emission system parts if needed and ensuring the onboard computer control system is working properly.



Improve gas mileage by **4 percent** on a proper tune-up and up to **40 percent** when fixing a serious maintenance problem such as a faulty oxygen sensor. Worn or fouled spark plugs can cause the engine to lose power or misfire and waste fuel.

FUEL ECONOMY AND ENVIRONMENTAL AWARENESS

Tire Checks: Tire pressure should be checked at least monthly, including the spare. Tires that are not properly inflated add rolling resistance that makes the engine work harder to move the vehicle. Remember, tires can lose pressure due to seasonal temperature changes. Proper tire pressure can improve gas mileage by 3.3 percent or 10 cents per gallon.

Motor Oil: Using the correct motor oil for your vehicle can improve gas mileage by 1 to 2 percent. Look for oil that says “energy conserving.” Oil and the oil filter should be changed every 3,000 to 5,000 miles or as recommended in the owner’s manual.

Air Filters: Filters can become clogged with dirt, dust or bugs, which choke off the air and create a “rich” mixture that causes the engine to lose power. Replacing a dirty filter will improve performance and acceleration. The air filter should be inspected at each oil change, and replaced annually or when restricted, torn, water or oil-soaked.

A/C Maintenance and Use: The A/C system should be inspected annually, during which a technician checks pressures to test operation, refrigerant charge and outlet temperatures.



Drive Green: Driving technique has a lot to do with your fuel economy. Drive wisely and minimize unnecessary miles by consolidating errands, getting good directions and avoiding excessive idling. Other guidelines to follow include:

- When possible, use your vehicle's cruise control features.
- Use your air conditioning only when needed. Parking in the shade and using a reflective windshield shade can help your car stay cooler when parked, meaning it takes less to cool it off when you get back in.
- Avoid sudden starts and stops and go the speed limit.

Speeding and Aggressive Driving: Most cars lose fuel efficiency over 50 miles per hour (MPH) at a rate of about \$0.24 per gallon for every 5 mph over 50. Aggressive driving (speeding, rapid acceleration and braking) can also reduce gas mileage – as much as 33 percent on the highway and five percent on city streets.

Lighten the Load: Unnecessary items increase your gas usage. This does not mean that you should not keep emergency items such as a spare tire and an emergency first-aid kit.



Gas Caps and Fill-Ups: A loose or cracked gas cap allows gas to escape from your tank as a vapor, wasting fuel and increasing vehicle emissions. Topping off your gas tank once the pump clicks off automatically can release harmful vapors into the environment and increase emissions. In some areas, the automatic shut off means their vapor recovery system will redirect any further fueling back into the pump.

AUTO CARE INDUSTRY RECYCLES

The auto care industry has been green long before it was mainstream! Here are a few examples of their efforts on behalf of the environment:

- **Engine oil:** About 95 percent of companies recycle used engine oil. This oil is sold as combustible fuel for power plants and heating or re-refined back into engine oil. Re-refining takes 85 percent less energy than crude oil.
- **Batteries:** More than 95 percent of an automotive battery can be recycled. Even old battery acid can be turned into chemicals used for laundry detergent, glass and more!
- **Tires:** Approximately 89 percent of scrapped tires are put to new productive uses. You may have seen them as the surface of your local playground or running trail!
- **Refrigerant:** For more than 20 years, the auto care industry has been instrumental in recovering and recycling mobile air conditioning refrigerant to minimize greenhouse gases and is in the process of finding refrigerant alternatives.
- **Plastics:** About 54 percent of companies (mostly repair shops) report recycling plastics
- **Scrap metal:** The energy saved from recycling one ton of aluminum is equal to the amount of electricity an average home uses in 10 years.
- **Cleaning solvents** used by repair shops can be harmful to humans and the environment and have a risk of contaminating water or causing fires. Many shops not only recycle these solvents but follow green practices to minimize their use, including reusing, and choosing less harmful options.

Recycle at home! If you are performing your own oil changes, make sure to dispose of the used oil properly. DO NOT pour the oil down the sink, on the ground or in the storm drain. Many auto repair shops and auto parts stores accept used oil and filters. You can also contact your local government to identify used oil recycling facilities.

A REBUILT ENGINE, THE ULTIMATE IN RECYCLING

Many consumers facing major engine damage think that buying a new vehicle is the only solution when, in fact, a remanufactured or rebuilt engine is a greener and more cost effective option.

What is a Rebuilt Engine? A rebuilt engine is one that is remanufactured to prescribed standards and specifications by highly-skilled machinists using state-of-the-art equipment and components. The engine is completely disassembled, all surfaces and components are machined, cleaned, and reassembled by expert technicians. Critical internal parts are replaced with new ones. Due to redesigning and better quality parts, many times a remanufactured engine will be

more efficient than when it was originally installed brand new.

Rebuilt Options:

- **Factory Remanufactured.** These engines have been rebuilt/remanufactured at a factory. Many internal engine parts have been replaced with new ones. These engines have been tested and come with a warranty that usually covers installation expenses.
- **Custom Remanufactured.** The vehicle's engine is removed and rebuilt. Like the factory version, many internal engine parts get replaced with new ones.

Going Green: A rebuilt engine not only reuses and recycles an engine, it eliminates the energy needed to process discarded car

engines and vehicles, and conserves energy and resources required to manufacture new engines. Rebuilt engines will get better gas mileage and produce fewer emissions than a used engine.

Cost Effective: Repowering a typical car or truck with a rebuilt – remanufactured engine costs between \$2,500 to \$5,000 or about 10 percent to 15 percent of the cost of a new vehicle.

Will it last? A rebuilt/remanufactured engine, with proper maintenance, is capable of lasting as long as a new car engine. They are dependable, reliable and backed by warranty programs.

ALTERNATIVE ENERGIES

More than a dozen alternative fuels are in production or under development for use in alternative fuel vehicles and advanced technology vehicles.



FLEXIBLE FUEL VEHICLES

Flexible fuel vehicles (FFVs) are the most similar to conventional gasoline vehicles. They have an internal combustion engine and are capable of operating on

gasoline, E85 (a gasoline-ethanol blend containing 51 percent to 83 percent ethanol, depending on geography and season), or a mixture of the two. However, many flex fuel vehicle owners

don't realize their car is an FFV and that they have a choice of fuels.

HYBRID AND PLUG-IN ELECTRIC VEHICLES

Hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles



(EVs) —also called electric drive vehicles collectively — use electricity either as their primary fuel or to improve the efficiency of conventional vehicles.

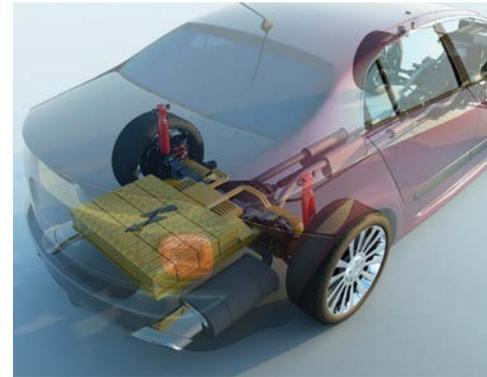
- **Hybrid Electric Vehicles:** HEVs are powered by an internal combustion engine or other propulsion source that runs on conventional or alternative fuel and an electric motor that uses energy stored in a battery. The battery is charged through regenerative braking and by the internal combustion engine and is not plugged in to charge.
- **Plug-In Hybrid Electric Vehicles:** PHEVs are powered by an internal combustion engine that can run on conventional or alternative fuel and an electric motor that uses energy stored

in a battery. The vehicle can be plugged into an electric power source to charge the battery.

- **All-Electric Vehicles:** EVs use a battery to store the electric energy that powers the motor. EV batteries are charged by plugging the vehicle into an electric power source. EVs are sometimes referred to as battery electric vehicles (BEVs).

FUEL CELL ELECTRIC VEHICLES

Fuel cell electric vehicles, powered by hydrogen, are more efficient than conventional internal combustion engine vehicles and produce no harmful tailpipe exhaust — their only emission is water. Fuel cell electric vehicles are fueled with



pure hydrogen gas stored directly on the vehicle and have the capability to refuel in as little as three minutes and can achieve a range of more than 300 miles on a single tank.

ALTERNATIVE ENERGIES

NATURAL GAS VEHICLES

Natural gas vehicles (NGVs) run on compressed natural gas (CNG) and work much like gasoline-powered vehicles with spark-ignited engines. A CNG fuel system transfers high-pressure natural gas from the storage tank to the engine while reducing the pressure of the gas to the operating pressure of the engine's fuel-management system. The natural gas is injected into the engine intake air the same way gasoline is injected into a gasoline-fueled engine. The engine functions the same way as a gasoline engine.

PROPANE VEHICLES

Propane is also known as liquefied petroleum gas (LPG), or autogas. There are two types of propane vehicles: dedicated and bi-fuel. Dedicated propane vehicles are designed to run only on propane, while bi-fuel propane vehicles have two separate fueling systems that enable the vehicle to use either propane or gasoline. A propane vehicle's power, acceleration and cruising speed are similar to those of conventionally-fueled vehicles. Propane vehicles work much like gasoline-powered vehicles with spark-ignited engines. Propane is stored as a liquid in a relatively low-pressure tank.

DIESEL VEHICLES USING BIODIESEL

Biodiesel and conventional diesel vehicles are one in the same. Although diesel vehicles are not technically "alternative fuel" vehicles, many are capable of running on biodiesel. Biodiesel, which is most often used as a blend with regular diesel fuel.

This information is provided by the U.S. Department of Energy Alternative Fuel Data Center.





THE EXTRA MILE

Go beyond the basics of car maintenance and learn more about your vehicle warranty, telematics and what to look for in a vehicle repair shop. Want to learn more? Stay connected with the Car Care Council beyond the guide and learn about the many way to make a career in the industry.

UNDERSTANDING WARRANTY



FINDING REPAIR SHOPS



CAREERS



VEHICLE TELEMATICS



THE CAR CARE COUNCIL



UNDERSTANDING YOUR WARRANTY

When a manufacturer builds a car, it generally comes with a promise, known as a warranty, to fix certain malfunctions over a set period of time and to pay for the repair and parts needed.

DO I HAVE TO GO TO THE DEALER FOR MAINTENANCE AND REPAIRS?

No, a dealer cannot deny warranty coverage simply because repair or maintenance work was performed by someone else. The Magnuson-Moss Warranty Act, enforced by the Federal Trade Commission (FTC), makes it illegal for a dealer to do this. This allows the vehicle owner to visit the repair shop of their choice or do the work themselves.

WILL DIFFERENT PARTS VOID MY WARRANTY?

The Magnuson-Moss Warranty Act also makes it illegal to deny or void a warranty due to use of an aftermarket part (a part made by a company other than the original equipment manufacturer).

Note: If a problem is not repaired correctly, or if a replaced part is defective, and in turn affects another part of the vehicle, the dealer or manufacturer can deny fixing it under warranty.



WARRANTY TIPS:

- **Familiarize Yourself with the Warranty:** Understand the details of your coverage and be aware of the expiration. Have problems checked before the warranty expires.
- **Regular Vehicle Maintenance:** Regular check-ups will keep your warranty intact. See your owner's manual or our vehicle maintenance schedule (page 2-3) for more information.
- **Keep Records:** Keep receipts for all services, regardless of who performs it. This will be useful if you ever need to use the warranty and will prove you maintained your vehicle.
- **Know Your Rights:** If you think your warranty claim is denied unfairly, you may wish to file a complaint with your state attorney general, local consumer protection office, local Better Business Bureau, or the FTC.



FINDING AN AUTO REPAIR SHOP

From first-time drivers to DIY enthusiasts, everyone will need an auto repair shop they trust for maintenance or repair. The Car Care Council recommends asking a few simple questions when selecting a repair shop.

DOES THE BUSINESS EMPLOY ASE CERTIFIED TECHNICIANS?

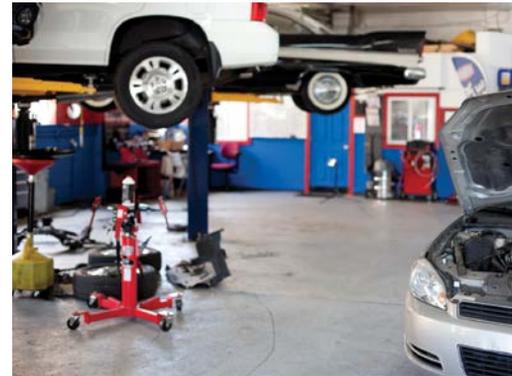
Credentials and affiliations with the National Institute for Automotive Service Excellence (ASE) are indicators of professionalism and the management's commitment to training and education.

IS THE SHOP AND CUSTOMER WAITING AREA CLEAN AND ORGANIZED?

Cleanliness and organization are signs of a well-run business.

ARE CUSTOMERS GREETED AND TREATED IN A FRIENDLY AND RESPECTFUL MANNER?

Many auto repair businesses excel in the area of customer service and satisfaction. A simple phone call to the shop to inquire about their services can give you a glimpse of how they treat customers.



DOES THE BUSINESS PROVIDE A WRITTEN ESTIMATE?

The business should complete a written estimate and request your signature prior to starting any repairs on your car.



DOES THE BUSINESS OFFER A WARRANTY?

Most auto repair businesses offer a warranty on parts and labor and the warranty is usually in writing or posted in the waiting area.

DOES THE BUSINESS HAVE A LIST OF SATISFIED CUSTOMERS OR REFERENCES THAT IT IS WILLING TO GIVE YOU?

Satisfied customers and recommendations from family, friends and neighbors are helpful in finding a good shop. Many auto repair facilities also have company websites that are worth checking out as they often include testimonials and additional information about the business.

CERTIFICATIONS MAY INCLUDE:

- National Institute for Automotive Service Excellence (ASE)
- Motorist Assurance Program (MAP)
- Better Business Bureau (BBB)



CAREERS IN THE AUTO CARE INDUSTRY

Are you interested in a rewarding career? Consider the auto care industry.

A career in the auto care industry is the biggest opportunity you've probably never heard of... until now. This industry keeps our cars and trucks moving, so we can keep our lives moving. This \$318 billion industry is always looking for smart and positive individuals to join a workforce of 4 million at more than 500,000 companies nationwide.

THE INDUSTRY OFFERS CAREER OPPORTUNITIES IN:

- Manufacturing
- Distribution
- Retail
- Service and repair
- Business services

Including:

- Communications
- Engineering
- Marketing and sales
- Environmental, health and safety
- Managerial and executive
- Human resources
- Information technology
- Accounting and finance
- Customer service

Auto care industry careers are diverse, challenging yet rewarding, and dynamic. As an industry that is global in nature, many manufacturers are multi-national, meaning opportunities exist for travel, relocation and conducting business in an international environment.

Due to its importance to everyday lives, the auto care industry is here to stay and, in turn, offers stable jobs. Along with steady employment, the industry offers great earning potential, networking and leadership growth. The auto care industry is always moving forward with leading edge technology, making it a great place to be for technology-lovers.



The road to a great career is wide open – you can work your way up through the ranks within one company or industry segment, or follow your interests and goals to cross over to another company or segment. With so



many opportunities, there is definitely a place for you.

For more information about auto care industry careers, visit www.autocarecareers.org.



Are you a woman interested in or starting in the industry? Visit the Car Care Council Women's Board at www.carcare.org/womens-board/.



VEHICLE TELEMATICS

The connected car is here! Here is what telematics means to your auto care decisions.

“Telematics” commonly refers to the communication of information to and from a vehicle, wirelessly. Familiar examples include navigation systems, Bluetooth connection to your phone or music player, and the automated call for help after a breakdown or accident. Traditionally added as an additional cost, it is becoming more common for telematics or “connected car” technology to be offered (or even standard) on new vehicles.

A new category of telematics services is vehicle management. Think of it as a 24/7 health monitor for your vehicle. Modern vehicles come with computers, electronic controllers and sensors and telematics makes use of that technology to coach drivers about ways to improve fuel economy, alert to unsafe driving behavior and speed, monitor the vehicle for trouble codes or faults, and remind the owner of periodic maintenance intervals.

New aftermarket telematics options are available that don't require you to buy a new car! A new family of devices and services are available that offer many of the safety and convenience services



of the built-in systems. Devices are available that plug in to the on board diagnostic (OBD) port (usually, below the steering wheel). These devices include a phone chip, GPS, accelerometers and computer processors in a package that fits in the palm of your hand.

THE CAPABILITIES OF AFTERMARKET TELEMATICS VARY, BUT THE MOST COMMON FEATURES ARE:

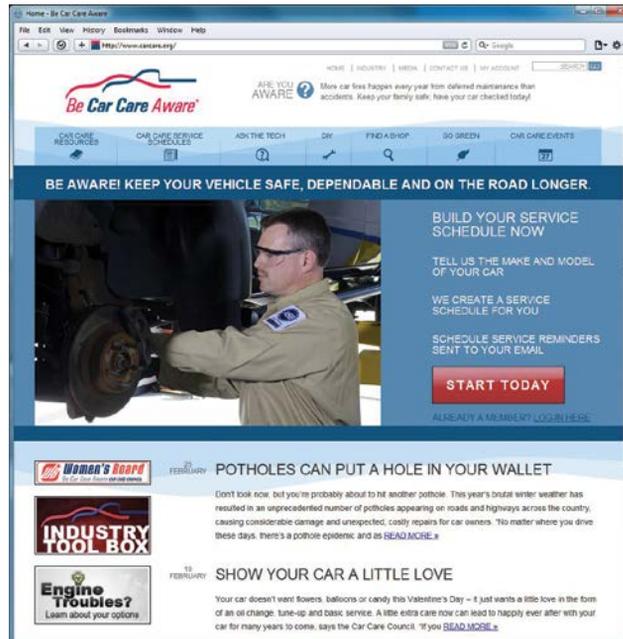
- Driving behavior monitoring and management – leading to more fuel-efficient driving;
- Geo-fencing and stolen vehicle location tracking – popular with parents of new drivers;
- Remote diagnostics of the check engine light – providing peace of mind and safety; and
- Maintenance reminders based on actual odometer and other convenient services

Consumers have a choice in the connected technology they enjoy in their vehicles. It's **your car** and your data. Whether you choose the original equipment system or an aftermarket telematics upgrade, be sure you understand what data is gathered and where it goes. **And always drive distraction-free.**



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The Car Care Council is a national non-profit 501 (c)(3) organization established to educate consumers about the benefits of proper vehicle care, maintenance and repair.

