

Transportation Education: Automotive Maintenance and Light Repair Sections A, B, C, & D

Identify general shop safety rules and procedures. [AMLR1](#)

1 Identify general shop safety rules and procedures. [AMLR1](#)

Utilize safe procedures for handling of tools and equipment. [AMLR2](#)

2 Utilize safe procedures for handling of tools and equipment. [AMLR2](#)

Identify and use proper placement of floor jacks and jack stands [AMLR3](#)

3 Identify and use proper placement of floor jacks and jack stands [AMLR3](#)

Identify and use proper procedures for safe lift operation. [AMLR4](#)

4 Identify and use proper procedures for safe lift operation. [AMLR4](#)

Utilize proper ventilation procedures for working within the lab/shop area. [AMLR5](#)

5 Utilize proper ventilation procedures for working within the lab/shop area. [AMLR5](#)

Identify marked safety areas. [AMLR6](#)

6 Identify marked safety areas. [AMLR6](#)

Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers

7 Identify the location and the types of fire extinguishers and other fire safety equipment; demonstrate knowledge of the procedures for using fire extinguishers and other fire safety equipment. [AMLR7](#)

and other fire safety equipment. [AMLR7](#)

Identify the location and use of eye wash stations. [AMLR8](#)

8 Identify the location and use of eye wash stations. [AMLR8](#)

Identify the location of the posted evacuation routes. [AMLR9](#)

9 Identify the location of the posted evacuation routes. [AMLR9](#)

Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. [AMLR10](#)

10 Comply with the required use of safety glasses, ear protection, gloves, and shoes during lab/shop activities. [AMLR10](#)

Identify and wear appropriate clothing for lab/shop activities. [AMLR11](#)

11 Identify and wear appropriate clothing for lab/shop activities. [AMLR11](#)

Secure hair and jewelry for lab/shop activities [AMLR12](#)

12 Secure hair and jewelry for lab/shop activities [AMLR12](#)

Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. [AMLR13](#)

13 Demonstrate awareness of the safety aspects of supplemental restraint systems (SRS), electronic brake control systems, and hybrid vehicle high voltage circuits. [AMLR13](#)

Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, and injection systems). [AMLR14](#)

14 Demonstrate awareness of the safety aspects of high voltage circuits (such as high intensity discharge (HID) lamps, ignition systems, and injection systems). [AMLR14](#)

Locate and demonstrate knowledge of material

15 Locate and demonstrate knowledge of material safety data sheets (MSDS). [AMLR15](#)

**safety data sheets
(MSDS).** [AMLR15](#)

**Identify tools and their
usage in automotive
applications.** [AMLR16](#)

16 Identify tools and their usage in automotive applications. [AMLR16](#)

**Identify standard and
metric
designation.** [AMLR17](#)

17 Identify standard and metric designation. [AMLR17](#)

**Demonstrate safe
handling and use of
appropriate
tools.** [AMLR18](#)

18 Demonstrate safe handling and use of appropriate tools. [AMLR18](#)

**Demonstrate proper
cleaning, storage, and
maintenance of tools
and equipment.** [AMLR19](#)

19 Demonstrate proper cleaning, storage, and maintenance of tools and equipment. [AMLR19](#)

**Demonstrate proper use
of precision measuring
tools (for example,
micrometer,
dialindicator, and dial-
caliper).** [AMLR20](#)

20 Demonstrate proper use of precision measuring tools (for example, micrometer, dialindicator, and dial-caliper). [AMLR20](#)

**Identify information
needed and the service
requested on a repair
order.** [AMLR21](#)

21 Identify information needed and the service requested on a repair order. [AMLR21](#)

**Identify purpose and
demonstrate proper use
of fender covers,
mats.** [AMLR22](#)

22 Identify purpose and demonstrate proper use of fender covers, mats. [AMLR22](#)

**Demonstrate use of the
three C's (concern,
cause, and
correction).** [AMLR23](#)

23 Demonstrate use of the three C's (concern, cause, and correction). [AMLR23](#)

**Review vehicle service
history.** [AMLR24](#)

24 Review vehicle service history. [AMLR24](#)

Complete Work Order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. [AMLR25](#)

25 Complete Work Order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. [AMLR25](#)

Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover). [AMLR26](#)

26 Ensure vehicle is prepared to return to customer per school/company policy (floor mats, steering wheel cover). [AMLR26](#)

ENGINE REPAIR: [AMLR27](#)

a Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR27A](#)

b Verify operation of the instrument panel engine warning indicators. [AMLR27B](#)

c Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action. [AMLR27C](#)

d Install engine covers using gaskets, seals, and sealers as required. [AMLR27D](#)

e Remove and replace timing belt; verify correct camshaft timing. [AMLR27E](#)

f Perform common fastener and thread repair to include remove broken bolt, restore internal and external threads, and repair internal threads with thread insert. [AMLR27F](#)

g Identify hybrid vehicle internal combustion engine service precautions. [AMLR27G](#)

h Adjust valves (mechanical or hydraulic lifters). [AMLR27H](#)

i Perform cooling system pressure and dye tests to identify leaks; check coolant condition and level; inspect and test radiator, pressure cap, coolant recovery tank, and heater core; determine necessary action. [AMLR27I](#)

j Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. [AMLR27J](#)

k Remove, inspect, and replace thermostat and gasket/seal. [AMLR27K](#)

l Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required. [AMLR27L](#)

m Perform engine oil and filter change. [AMLR27M](#)

**AUTOMATIC
TRANSMISSION AND
TRANSAXLE:** [AMLR28](#)

- a** Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. [AMLR28A](#)
- b** Check fluid level in a transmission or a transaxle equipped with a dipstick. [AMLR28B](#)
- c** Check fluid level in a transmission or a transaxle not equipped with a dipstick. [AMLR28C](#)
- d** Check transmission fluid condition; check for leaks. [AMLR28D](#)
- e** Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch. [AMLR28E](#)
- f** Inspect for leakage at external seals, gaskets, and bushings. [AMLR28F](#)
- g** Inspect power train mounts. [AMLR28G](#)
- h** Drain and replace fluid and filter(s). [AMLR28H](#)
- i** Describe the operational characteristics of a continuously variable transmission (CVT). [AMLR28I](#)
- j** Describe the operational characteristics of a hybrid vehicle drive train. [AMLR28J](#)

**MANUAL DRIVE TRAIN
AND AXLES:** [AMLR29](#)

- a** Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. [AMLR29A](#)
- b** Drain and refill manual transmission/transaxle and final drive unit. [AMLR29B](#)
- c** Check fluid condition; check for leaks. [AMLR29C](#)
- d** Check and adjust clutch master cylinder fluid level. [AMLR29D](#)
- e** Check for system leaks. [AMLR29E](#)
- f** Describe the operational characteristics of an electronically controlled manual transmission/transaxle. [AMLR29F](#)
- g** Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals. [AMLR29G](#)
- h** Inspect, service, and replace shafts, yokes, boots, and universal/CV joints. [AMLR29H](#)
- i** Clean and inspect differential housing; check for leaks; inspect housing vent. [AMLR29I](#)
- j** Check and adjust differential housing fluid level. [AMLR29J](#)
- k** Drain and refill differential housing. [AMLR29K](#)

l Inspect and replace drive axle wheel studs. [AMLR29L](#)

m Inspect front-wheel bearings and locking hubs. [AMLR29M](#)

n Check for leaks at drive assembly seals; check vents; check lube level. [AMLR29N](#)

**SUSPENSION AND
STEERING
SYSTEMS:** [AMLR30](#)

a Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR30A](#)

b Disable and enable supplemental restraint system (SRS). [AMLR30B](#)

c Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots. [AMLR30C](#)

d Determine proper power steering fluid type; inspect fluid level and condition. [AMLR30D](#)

e Flush, fill, and bleed power steering system. [AMLR30E](#)

f Inspect for power steering fluid leakage; determine necessary action. [AMLR30F](#)

h Inspect and replace power steering hoses and fittings. [AMLR30H](#)

i Replace power steering pump filter(s). [AMLR30I](#)

j Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper. [AMLR30J](#)

k Inspect tie rod ends (sockets), tie rod sleeves, and clamps. [AMLR30K](#)

l Inspect upper and lower control arms, bushings, and shafts. [AMLR30L](#)

m Inspect and replace rebound and jounce bumpers. [AMLR30M](#)

n Inspect track bar, strut rods/radius arms, and related mounts and bushings. [AMLR30N](#)

o Inspect upper and lower ball joints (with or without wear indicators). [AMLR30O](#)

p Inspect suspension system coil springs and spring insulators (silencers). [AMLR30P](#)

q Inspect suspension system torsion bars and mounts. [AMLR30Q](#)

r Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links. [AMLR30R](#)

s Inspect strut cartridge or assembly. [AMLR30S](#)

t Inspect front strut bearing and mount. [AMLR30T](#)

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- u** Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms. [AMLR30U](#)
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- v** Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts. [AMLR30V](#)
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- w** Inspect, remove, and replace shock absorbers; inspect mounts and bushings. [AMLR30W](#)
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- x** Inspect electric power-assisted steering. [AMLR30X](#)
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- y** Identify hybrid vehicle power steering system electrical circuits and safety precautions. [AMLR30Y](#)
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- z** Describe the function of the power steering pressure switch. [AMLR30Z](#)
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- aa** Perform pre-alignment inspection and measure vehicle ride height; determine necessary action. [AMLR30AA](#)
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- bb** Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action. [AMLR30BB](#)
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- cc** Rotate tires according to manufacturer's recommendations. [AMLR30CC](#)
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- dd** Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic). [AMLR30DD](#)
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- ee** Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. [AMLR30EE](#)
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- ff** Inspect tire and wheel assembly for air loss; perform necessary action. [AMLR30FF](#)
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- gg** Repair tire using internal patch. [AMLR30GG](#)
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- hh** Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps. [AMLR30HH](#)
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- ii** Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system. [AMLR30II](#)
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BRAKES: [AMLR31](#)

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- a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR31A](#)
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- b** Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS). [AMLR31B](#)
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- c** Measure breaks pedal height, travel, and free play (as applicable); determine necessary action. [AMLR31C](#)

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- d** Check master cylinder for external leaks and proper operation. [AMLR31D](#)
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- e** Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action. [AMLR31E](#)
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- f** Select, handle, store, and fill brake fluids to proper level. [AMLR31F](#)
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- g** Identify components of brake warning light system. [AMLR31G](#)
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- h** Bleed and/or flush brake system. [AMLR31H](#)
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- i** Test brake fluid for contamination. [AMLR31I](#)
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- j** Remove, clean, inspect, and measure brake drum diameter; determine necessary action. [AMLR31J](#)
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- k** Refinish brake drum and measure final drum diameter; compare with specifications. [AMLR31K](#)
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- l** Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/selfadjusters, other related brake hardware, and backing support plates; lubricate and reassemble. [AMLR31L](#)
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- m** Inspect wheel cylinders for leaks and proper operation; remove and replace as needed. [AMLR31M](#)
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- n** Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments. [AMLR31N](#)
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- o** Install wheel and torque lug nuts. [AMLR31O](#)
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- p** Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action. [AMLR31P](#)
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- q** Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action. [AMLR31Q](#)
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- r** Remove, inspect, and replace pads and retaining hardware; determine necessary action. [AMLR31R](#)
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- s** Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks. [AMLR31S](#)
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- t** Clean and inspect rotor, measure rotor thickness, thickness variation, and lateral runout; determine necessary action. [AMLR31T](#)
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- u** Remove and reinstall rotor. [AMLR31U](#)
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- v** Refinish rotor on vehicle; measure final rotor thickness and compare with specifications. [AMLR31V](#)
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- w** Refinish rotor off vehicle; measure final rotor thickness and compare with specifications. [AMLR31W](#)
- x** Retract and re-adjust caliper piston on an integral parking brake system. [AMLR31X](#)
- y** Check brake pad wear indicator; determine necessary action. [AMLR31Y](#)
- z** Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations. [AMLR31Z](#)
- aa** Check brake pedal travel with, and without, engine running to verify proper power booster operation. [AMLR31AA](#)
- bb** Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster [AMLR31BB](#)
- cc** Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings. [AMLR31CC](#)
- dd** Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed. [AMLR31DD](#)
- ee** Check parking brake operation and parking brake indicator light system operation; determine necessary action. [AMLR31EE](#)
- ff** Check operation of brake stop light system. [AMLR31FF](#)
- gg** Replace wheel bearing and race. [AMLR31GG](#)
- hh** Identify traction control/vehicle stability control system components. [AMLR31HH](#)
- ii** Identify traction control/vehicle stability control system components. [AMLR31II](#)

ELECTRICAL/ELECTRONIC SYSTEMS: [AMLR32](#)

- a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR32A](#)
- b** Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law). [AMLR32B](#)
- c** Use wiring diagrams to trace electrical/electronic circuits. [AMLR32C](#)
- d** Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance. [AMLR32D](#)
- e** Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. [AMLR32E](#)
- f** Check operation of electrical circuits with a test light. [AMLR32F](#)
- g** Check operation of electrical circuits with fused jumper wires. [AMLR32G](#)

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- h** Measure key-off battery drain (parasitic draw). [AMLR32H](#)
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- i** Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. [AMLR32I](#)
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- j** Perform solder repair of electrical wiring. [AMLR32J](#)
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- k** Replace electrical connectors and terminal ends. [AMLR32K](#)
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- l** Perform battery state-of-charge test; determine necessary action. [AMLR32L](#)
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- m** Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action. [AMLR32M](#)
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- n** Maintain or restore electronic memory functions. [AMLR32N](#)
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- o** Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. [AMLR32O](#)
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- p** Perform slow/fast battery charge according to manufacturer's recommendations. [AMLR32P](#)
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- q** Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. [AMLR32Q](#)
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- r** Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions. [AMLR32R](#)
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- s** Identify electronic modules, security systems, radios, and other accessories that require re-initialization or code entry after reconnecting vehicle battery. [AMLR32S](#)
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- t** Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures. [AMLR32T](#)
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- u** Perform starter current draw test; determine necessary action. [AMLR32U](#)
-
- v** Perform starter circuit voltage drop tests; determine necessary action. [AMLR32V](#)
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- w** Inspect and test starter relays and solenoids; determine necessary action. [AMLR32W](#)
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- x** Remove and install starter in a vehicle. [AMLR32X](#)
-
- y** Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action. [AMLR32Y](#)
-
- z** Perform charging system output test; determine necessary action. [AMLR32Z](#)
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- aa** Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment. [AMLR32AA](#)

- bb** Remove, inspect, and re-install generator (alternator). [AMLR32BB](#)
- cc** Perform charging circuit voltage drop tests; determine necessary action. [AMLR32CC](#)
- dd** Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed. [AMLR32DD](#)
- ee** Aim headlights. [AMLR32EE](#)
- ff** Identify system voltage and safety precautions associated with high-intensity discharge headlights. [AMLR32FF](#)
- gg** Disable and enable airbag system for vehicle service; verify indicator lamp operation. [AMLR32GG](#)
- hh** Remove and reinstall door panel. [AMLR32HH](#)
- ii** Describe the operation of keyless entry/remote-start systems. [AMLR32II](#)
- jj** Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators. [AMLR32JJ](#)
- kk** Verify windshield wiper and washer operation; replace wiper blades. [AMLR32KK](#)

**HEATING AND AIR
CONDITIONING:** [AMLR33](#)

- a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR33A](#)
- b** Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action. [AMLR33B](#)
- c** Identify hybrid vehicle A/C system electrical circuits and the service/safety precautions. [AMLR33C](#)
- d** Inspect A/C condenser for airflow restrictions; determine necessary action. [AMLR33D](#)
- e** Inspect engine cooling and heater systems hoses; perform necessary action. [AMLR33E](#)
- f** Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets; perform necessary action. [AMLR33F](#)
- g** Identify the source of A/C system odors. [AMLR33G](#)

**ENGINE
PERFORMANCE:** [AMLR34](#)

- a** Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. [AMLR34A](#)

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- b** Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action. [AMLR34B](#)
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- c** Perform cylinder power balance test; determine necessary action. [AMLR34C](#)
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- d** Perform cylinder cranking and running compression tests; determine necessary action. [AMLR34D](#)
-
- e** Perform cylinder leakage test; determine necessary action. [AMLR34E](#)
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- f** Verify engine operating temperature. [AMLR34F](#)
-
- g** Remove and replace spark plugs; inspect secondary ignition components for wear and damage. [AMLR34G](#)
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- h** Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable. [AMLR34H](#)
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- i** Describe the importance of operating all OBDII monitors for repair verification. [AMLR34I](#)
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- j** Replace fuel filter(s). [AMLR34J](#)
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- k** Inspect, service, or replace air filters, filter housings, and intake duct work. [AMLR34K](#)
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- l** Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action. [AMLR34L](#)
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- m** Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed. [AMLR34M](#)
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- n** Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed. [AMLR34N](#)
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- o** Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action. [AMLR34O](#)
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