

# **2013 Maintenance and Light Repair (MLR) Task List**

## **ENGINE REPAIR**

**For every task in Engine Repair, the following safety requirement must be strictly enforced:**

**Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.**

### **I. ENGINE REPAIR**

#### **A. General**

1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1
2. Verify operation of the instrument panel engine warning indicators. P-1
3. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine necessary action. P-1
4. Install engine covers using gaskets, seals, and sealers as required. P-1
5. Remove and replace timing belt; verify correct camshaft timing. P-1
6. Perform common fastener and thread repair, to include: remove broken bolt, restore internal and external threads, and repair internal threads with thread insert. P-1
7. Identify hybrid vehicle internal combustion engine service precautions. P-3

### **I. ENGINE REPAIR**

#### **B. Cylinder Head and Valve Train**

1. Adjust valves (mechanical or hydraulic lifters). P-1

### **I. ENGINE REPAIR**

#### **C. Lubrication and Cooling Systems**

1. 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 and galley plugs; determine necessary action. P-1

2. Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment. P-1
3. Remove, inspect, and replace thermostat and gasket/seal. P-1
4. Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required. P-1
5. Perform engine oil and filter change. P-1

ER Total Tasks	
P-1	12
P-2	0
P-3	1
	13

## AUTOMATIC TRANSMISSION AND TRANSAXLE

**For every task in Automatic Transmission and Transaxle, the following safety requirement must be strictly enforced:**

**Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.**

### II. AUTOMATIC TRANSMISSION AND TRANSAXLE

#### A. General

1. Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Check fluid level in a transmission or a transaxle equipped with a dip-stick. P-1
3. Check fluid level in a transmission or a transaxle not equipped with a dip-stick. P-1
4. Check transmission fluid condition; check for leaks. P-2

### II. AUTOMATIC TRANSMISSION AND TRANSAXLE

#### B. In-Vehicle Transmission/Transaxle

1. Inspect, adjust, and replace external manual valve shift linkage, transmission range sensor/switch, and park/neutral position switch. P-2
2. Inspect for leakage at external seals, gaskets, and bushings. P-2
3. Inspect replace and align power train mounts. P-2
4. Drain and replace fluid and filter(s). P-1

## II. AUTOMATIC TRANSMISSION AND TRANSAXLE

### C. Off-Vehicle Transmission and Transaxle

1. Describe the operational characteristics of a continuously variable transmission (CVT).
2. Describe the operational characteristics of a hybrid vehicle drive train.

AT Total Tasks	
P-1	4
P-2	4
P-3	2
P-3	10

## MANUAL DRIVE TRAIN AND AXLES

For every task in Manual Drive Train and Axles, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

## III. MANUAL DRIVE TRAIN AND AXLES

### A. General

1. Research applicable vehicle and service information, fluid type, vehicle service history, service precautions, and technical service bulletins. P-1
2. Drain and refill manual transmission/transaxle and final drive unit. P-1
3. Check fluid condition; check for leaks. P-2

## III. MANUAL DRIVE TRAIN AND AXLES

### B. Clutch

1. Check and adjust clutch master cylinder fluid level. P-1
2. Check for system leaks. P-1

## III. MANUAL DRIVE TRAIN AND AXLES

### C. Transmission/Transaxle

1. Describe the operational characteristics of an electronically-controlled manual transmission/transaxle. P-3

### III. MANUAL DRIVE TRAIN AND AXLES

#### D. Drive Shaft, Half Shafts, Universal and Constant-Velocity (CV) Joints

1. Inspect, remove, and replace front wheel drive (FWD) bearings, hubs, and seals. P-2
2. Inspect, service, and replace shafts, yokes, boots, and universal/CV joints. P-2

### III. MANUAL DRIVE TRAIN AND AXLES

#### E. Differential Case Assembly

1. Clean and inspect differential housing; check for leaks; inspect housing vent. P-2
2. Check and adjust differential housing fluid level. P-1
3. Drain and refill differential housing. P-1

##### E.1 Drive Axles

1. Inspect and replace drive axle wheel studs. P-2

### III. MANUAL DRIVE TRAIN AND AXLES

#### F. Four-wheel Drive/All-wheel Drive

1. Inspect front-wheel bearings and locking hubs. P-3
2. Check for leaks at drive assembly seals; check vents; check lube level. P-2

MD Total Tasks	
P-1	6
P-2	6
P-3	2
	14

## SUSPENSION AND STEERING

For every task in Suspension and Steering, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

### IV. SUSPENSION AND STEERING SYSTEMS

#### A. General

1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1
2. Disable and enable supplemental restraint system (SRS). P-1

#### **IV. SUSPENSION AND STEERING**

##### **B. Related Suspension and Steering Service**

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|---|-----|
| 1. Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.                          | P-1 |
| 2. Determine proper power steering fluid type; inspect fluid level and condition.                                 | P-1 |
| 3. Flush, fill, and bleed power steering system.  | P-2 |
| 4. Inspect for power steering fluid leakage; determine necessary action.  | P-1 |
| 5. Remove, inspect, replace, and adjust power steering pump drive belt.   | P-1 |
| 6. Inspect and replace power steering hoses and fittings.   | P-2 |
| 7. Inspect pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper. | P-1 |
| 8. Inspect tie rod ends (sockets), tie rod sleeves, and clamps.   | P-1 |
| 9. Inspect upper and lower control arms, bushings, and shafts.  | P-1 |
| 10. Inspect and replace rebound and jounce bumpers.   | P-1 |
| 11. Inspect track bar, strut rods/radius arms, and related mounts and bushings.                                   | P-1 |
| 12. Inspect upper and lower ball joints (with or without wear indicators).  | P-1 |
| 13. Inspect suspension system coil springs and spring insulators (silencers).                                     | P-1 |
| 14. Inspect suspension system torsion bars and mounts.  | P-1 |
| 15. Inspect and replace front stabilizer bar (sway bar) bushings, brackets, and links.                            | P-1 |
| 16. Inspect strut cartridge or assembly.  | P-1 |
| 17. Inspect front strut bearing and mount.  | P-1 |
| 18. Inspect rear suspension system lateral links/arms (track bars), control (trailing) arms.                      | P-1 |

19. Inspect rear suspension system leaf spring(s), spring insulators (silencers), shackles, brackets, bushings, center pins/bolts, and mounts. P-1
20. Inspect, remove, and replace shock absorbers; inspect mounts and bushings. P-1
21. Inspect electric power-assisted steering. P-3
22. Identify hybrid vehicle power steering system electrical circuits and safety precautions. P-2
23. Describe the function of the power steering pressure switch. P-3

#### IV. SUSPENSION AND STEERING

##### C. Wheel Alignment

1. Perform prealignment inspection and measure vehicle ride height; determine necessary action. P-1

#### IV. SUSPENSION AND STEERING

##### D. Wheels and Tires

1. Inspect tire condition; identify tire wear patterns; check for correct size and application (load and speed ratings) and adjust air pressure; determine necessary action. P-1
2. Rotate tires according to manufacturer's recommendations. P-1
3. Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic). P-1
4. Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor. P-2
5. Inspect tire and wheel assembly for air loss; perform necessary action. P-1
6. Repair tire using internal patch. P-1
7. Identify and test tire pressure monitoring systems (indirect and direct) for operation; verify operation of instrument panel lamps. P-2
8. Demonstrate knowledge of steps required to remove and replace sensors in a tire pressure monitoring system. P-2

SS Total Tasks	
P-1	26
P-2	6
P-3	2
	34

## **BRAKES**

**For every task in Brakes, the following safety requirement must be strictly enforced:**

**Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.**

### **V. BRAKES**

#### **A. General**

1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1
2. Describe procedure for performing a road test to check brake system operation, including an anti-lock brake system (ABS). P-1
3. Install wheel and torque lug nuts. P-1

### **V. BRAKES**

#### **B. Hydraulic System**

1. Measure brake pedal height, travel, and free play (as applicable); determine necessary action. P-1
2. Check master cylinder for external leaks and proper operation. P-1
3. Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging, wear, loose fittings and supports; determine necessary action. P-1
4. Select, handle, store, and fill brake fluids to proper level. P-1
5. Identify components of brake warning light system. P-3
6. Bleed and/or flush brake system. P-1
7. Test brake fluid for contamination. P-1

### **V. BRAKES**

#### **C. Drum Brakes**

1. Remove, clean, inspect, and measure brake drum diameter; determine necessary action. P-1

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| 2. Refinish brake drum and measure final drum diameter; compare with specifications.   | P-1 |
| 3. Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble. | P-1 |
| 4. Inspect wheel cylinders for leaks and proper operation; remove and replace as needed.   | P-2 |
| 5. Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings; make final checks and adjustments.   | P-2 |

## **V. BRAKES**

### **D. Disc Brakes**

- |  |     |
|--|-----|
| 1. Remove and clean caliper assembly; inspect for leaks and damage/wear to caliper housing; determine necessary action.              | P-1 |
| 2. Clean and inspect caliper mounting and slides/pins for proper operation, wear, and damage; determine necessary action.            | P-1 |
| 3. Remove, inspect, and replace pads and retaining hardware; determine necessary action.   | P-1 |
| 4. Lubricate and reinstall caliper, pads, and related hardware; seat pads and inspect for leaks.                                     | P-1 |
| 5. Clean and inspect rotor, measure rotor thickness, thickness variation, and lateral runout; determine necessary action.            | P-1 |
| 6. Remove and reinstall rotor.   | P-1 |
| 7. Refinish rotor on vehicle; measure final rotor thickness and compare with specifications.   | P-1 |
| 8. Refinish rotor off vehicle; measure final rotor thickness and compare with specifications.  | P-1 |
| 9. Retract and re-adjust caliper piston on an integral parking brake system.   | P-3 |
| 10. Check brake pad wear indicator; determine necessary action.  | P-2 |
| 11. Describe importance of operating vehicle to burnish/break-in replacement brake pads according to manufacturer's recommendations. | P-1 |



## **V. BRAKES**

### **E. Power-Assist Units**

1. Check brake pedal travel with, and without, engine running to verify proper power booster operation. P-2
2. Check vacuum supply (manifold or auxiliary pump) to vacuum-type power booster. P-1

## **V. BRAKES**

### **F. Miscellaneous (Wheel Bearings, Parking Brakes, Electrical, Etc.)**

1. Remove, clean, inspect, repack, and install wheel bearings; replace seals; install hub and adjust bearings. P-1
2. Check parking brake cables and components for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed. P-2
3. Check parking brake operation and parking brake indicator light system operation; determine necessary action. P-1
4. Check operation of brake stop light system. P-1
5. Replace wheel bearing and race. P-2
6. Inspect and replace wheel studs. P-1

## **V. BRAKES**

### **G. Electronic Brakes, and Traction and Stability Control Systems**

1. Identify traction control/vehicle stability control system components. P-3
2. Describe the operation of a regenerative braking system. P-3

<b>BR Total Tasks</b>	
P-1	26
P-2	6
P-3	4
	36

## **ELECTRICAL/ELECTRONIC SYSTEMS**

**For every task in Electrical/Electronic Systems, the following safety requirement must be strictly enforced:**

**Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.**

### **VI. ELECTRICAL/ELECTRONIC SYSTEMS**

#### **A. General**

1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1
2. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law). P-1
3. Use wiring diagrams to trace electrical/electronic circuits. P-1
4. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow, and resistance. P-1
5. Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. P-2
6. Check operation of electrical circuits with a test light. P-2
7. Check operation of electrical circuits with fused jumper wires. P-2
8. Measure key-off battery drain (parasitic draw). P-1
9. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. P-1
10. Perform solder repair of electrical wiring. P-1
11. Replace electrical connectors and terminal ends. P-1

### **VI. ELECTRICAL/ELECTRONIC SYSTEMS**

#### **B. Battery Service**

1. Perform battery state-of-charge test; determine necessary action. P-1

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|---|-----|
| 2. Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action.  | P-1 |
| 3. Maintain or restore electronic memory functions.   | P-1 |
| 4. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs.   | P-1 |
| 5. Perform slow/fast battery charge according to manufacturer's recommendations.  | P-1 |
| 6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply.   | P-1 |
| 7. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions.  | P-3 |
| 8. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery. | P-1 |
| 9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures.  | P-3 |

## **VI. ELECTRICAL/ELECTRONIC SYSTEMS**

### **C. Starting System**

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|--|-----|
| 1. Perform starter current draw test; determine necessary action.  | P-1 |
| 2. Perform starter circuit voltage drop tests; determine necessary action.                                   | P-1 |
| 3. Inspect and test starter relays and solenoids; determine necessary action.                                | P-2 |
| 4. Remove and install starter in a vehicle.  | P-1 |
| 5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action. | P-2 |

## **VI. ELECTRICAL/ELECTRONIC SYSTEMS**

### **D. Charging System**

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|--|-----|
| 1. Perform charging system output test; determine necessary action.  | P-1 |
| 2. Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment. | P-1 |

3. Remove, inspect, and re-install generator (alternator). P-2
4. Perform charging circuit voltage drop tests; determine necessary action. P-1

## VI. ELECTRICAL/ELECTRONIC SYSTEMS

### E. Lighting Systems

1. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed. P-1
2. Aim headlights. P-2
3. Identify system voltage and safety precautions associated with high-intensity discharge headlights. P-2

## VI. ELECTRICAL/ELECTRONIC SYSTEMS

### F. Accessories

1. Disable and enable airbag system for vehicle service; verify indicator lamp operation. P-1
2. Remove and reinstall door panel. P-1
3. Describe the operation of keyless entry/remote-start systems. P-3
4. Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators. P-1
5. Verify windshield wiper and washer operation; replace wiper blades. P-1

EE Total Tasks		
P-1	26	
P-2	8	
P-3	3	
	37	

## HEATING AND AIR CONDITIONING

For every task in Heating and Air Conditioning, the following safety requirement must be strictly enforced:

Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

### VII. HEATING AND AIR CONDITIONING

#### A. General

1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1

### VII. HEATING AND AIR CONDITIONING

#### B. Refrigeration System Components

1. Inspect and replace A/C compressor drive belts, pulleys, and tensioners; determine necessary action. P-1
2. Identify hybrid vehicle A/C system electrical circuits and the service/safety precautions. P-2
3. Inspect A/C condenser for airflow restrictions; determine necessary action. P-1

### VII. HEATING AND AIR CONDITIONING

#### C. Heating, Ventilation, and Engine Cooling Systems

1. Inspect engine cooling and heater systems hoses; perform necessary action. P-1

### VII. HEATING AND AIR CONDITIONING

#### D. Operating Systems and Related Controls

1. Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets; perform necessary action. P-1
2. Identify the source of A/C system odors. P-2

HA Total Tasks	
P-1	5
P-2	2
P-3	0
	7

## **ENGINE PERFORMANCE**

**For every task in Engine Performance the following safety requirement must be strictly enforced:**

**Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.**

### **VIII. ENGINE PERFORMANCE**

#### **A. General**

1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P-1
2. Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action P-1
3. Perform cylinder power balance test; determine necessary action. P-2
4. Perform cylinder cranking and running compression tests; determine necessary action. P-1
5. Perform cylinder leakage test; determine necessary action. P-1
6. Verify engine operating temperature. P-1
7. Remove and replace spark plugs; inspect secondary ignition components for wear and damage. P-1

### **VIII. ENGINE PERFORMANCE**

#### **B. Computerized Controls**

1. Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable. P-1
2. Describe the importance of operating all OBDII monitors for repair verification. P-1

### **VIII. ENGINE PERFORMANCE**

#### **C. Fuel, Air Induction, and Exhaust Systems**

1. Replace fuel filter(s). P-1
2. Inspect, service, or replace air filters, filter housings, and intake duct work. P-1

3. Inspect integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shields; determine necessary action. P-1
4. Inspect condition of exhaust system hangers, brackets, clamps, and heat shields; repair or replace as needed. P-1
5. Check and refill diesel exhaust fluid (DEF). P-3

## VIII. ENGINE PERFORMANCE

### D. Emissions Control Systems

1. Inspect, test, and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action. P-2

EP Total Tasks	
P-1	12
P-2	2
P-3	1
	15

### Grand Total - Tasks

P-1	117
P-2	34
P-3	15

**REQUIRED SUPPLEMENTAL TASKS** 43

209