

Unit/Standard Number	<p align="center"><b>High School Graduation Years 2019, 2020 and 2021 Automobile/Automotive Mechanics Technology/Technician CIP 47.0604 Task Grid</b></p>	<p align="center">Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level</p>
<b>Secondary Competency Task List</b>		
100	<b>ORIENTATION</b>	
101	Explain and follow all lab rules.	
102	Participate in basic shop management.	
103	Participate in parts ordering.	
104	Demonstrate auto shop safety and hygiene.	
105	Demonstrate the use of service information.	
106	Demonstrate proper telephone courtesy.	
107	Identify vehicle by: sight, V.I.N. and/or ID tag.	
108	Identify career paths within the career and technical education program.	
109	Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction.	
110	Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins.	
111	Locate and interpret vehicle and major component identification numbers.	
200	<b>SAFETY</b>	
201	Identify and follow all safety rules.	
202	Demonstrate the ability to secure vehicles on jack stands and hydraulic lifts.	
203	Demonstrate the ability to safely set-up/shut-down oxygen acetylene welding equipment.	
204	Identify chemical safety, "Right-To-Know Laws" and Safety Data Sheets (SDS).	
205	Identify and demonstrate the safe use of hand tools.	
206	Identify and demonstrate the safe use of power tools.	
207	Identify and demonstrate the safe use of protective clothing and equipment.	
208	Identify and demonstrate the safe use of fire protection equipment.	
209	Identify and demonstrate the safe use of shop equipment.	
210	Explain EPA and OSHA Regulations.	
300	<b>TOOLS/FASTENERS</b>	
301	Identify and use fasteners and bolts.	
302	Demonstrate the ability to correctly drill and use re-threading tools.	
303	Demonstrate the ability to correctly read and interpret precision automotive measuring tools.	
304	Demonstrate the ability to correctly use automotive tools.	
305	Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal threads with a threaded insert.	
400	<b>CERTIFICATIONS</b>	
401	Prepare to obtain PA Safety Inspection Certification.	
402	Prepare to obtain EPA 609 Refrigerant Recovery, Recycling Certification.	
403	Prepare to obtain Emission Inspection Certification.	
460	Obtain PA Emissions Certification	

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500	<b>SUSPENSION AND STEERING</b>	
501	RESERVED	
502	Identify and interpret suspension and steering system concerns; determine necessary action.	
503	RESERVED	
504	RESERVED	
505	RESERVED	
506	RESERVED	
507	Inspect rack and pinion steering gear; inspect mounting bushings and brackets.	
508	Inspect rack and pinion steering gear inner tie rod ends (sockets) and bellows boots.	
509	Determine proper power steering fluid type; inspect fluid level and condition.	
510	Flush, fill, and bleed power steering system.	
511	Diagnose power steering fluid leakage; determine necessary action.	
512	RESERVED	
513	Remove and reinstall power steering pump.	
514	Remove and reinstall press fit power steering pump pulley; check pulley and belt alignment.	
515	Inspect and replace power steering hoses and fittings.	
516	Inspect and replace pitman arm, relay (centerlink/intermediate) rod, idler arm and mountings, and steering linkage damper.	
517	Inspect, replace, and adjust tie rod ends (sockets), tie rod sleeves, and clamps.	
518	RESERVED	
519	Inspect, and/or replace upper and lower control arms, bushings, shafts, and rebound bumpers.	
520	Inspect, and/or replace strut rods and bushings.	
521	Inspect, and/or replace upper and/or lower ball joints.	
522	Inspect, and/or replace steering knuckle assemblies.	
523	Inspect, and/or replace short and long arm suspension system coil springs and spring insulators.	
524	Inspect, and/or replace, and adjust suspension system torsion bars; inspect mounts.	
525	Inspect, and/or replace stabilizer bar bushings, brackets, and links.	
526	Inspect, and/or replace strut cartridge or assembly, strut coil spring, insulators (silencers), and upper strut bearing mount.	
527	Inspect, remove, and replace shock absorbers.	
528	RESERVED	
529	Lubricate suspension and steering systems.	
530	Perform pre-alignment inspection and measure vehicle ride height; perform necessary action.	
531	Prepare vehicle for wheel alignment on the alignment machine; describe alignment angles and perform four wheel alignment by checking and adjusting front and rear wheel caster, camber; and toe as required; center steering wheel.	
532	RESERVED	
533	RESERVED	
534	RESERVED	
535	Check front and/or rear cradle (subframe) alignment; determine necessary action.	
536	Inspect tire condition; identify tire wear patterns; check and adjust air pressure; determine necessary action.	
537	Diagnose wheel/tire vibration, shimmy, and noise; determine necessary action.	
538	Rotate tires according to manufacturer's recommendations.	

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539	Measure wheel, tire, axle flange, and hub runout; determine necessary action.	
540	Diagnose tire pull problems; determine necessary action.	
541	Dismount, inspect, and remount tire on wheel; balance wheel and tire assembly (static and dynamic).	
542	Dismount, inspect, and remount tire on wheel equipped with tire pressure monitoring system sensor.	
543	RESERVED	
544	Inspect tire and wheel assembly for air loss; perform necessary action.	
545	Repair tire using internal patch.	
546	Identify indirect and direct tire pressure monitoring systems (TPMS) calibrate system; verify operation of instrument panel lamps.	
547	Identify steps required to remove and replace sensors in a tire pressure monitoring system (TPMS) including relearn procedure.	
560	Inspect steering shaft universal-joint(s), flexible coupling(s), collapsible column, lock cylinder mechanism, and steering wheel; perform necessary action.	
561	Adjust non-rack and pinion worm bearing preload and sector lash.	
562	Diagnose short and long arm suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	
563	Diagnose strut suspension system noises, body sway, and uneven ride height concerns; determine necessary action.	
564	Describe the function of the idle speed compensation switch.	
565	Diagnose vehicle wander, drift, pull, hard steering, bump steer, memory steer, torque steer, and steering return concerns; determine necessary action.	
600	<b>BRAKES</b>	
601	RESERVED	
602	Identify and interpret brake system concern; determine necessary action.	
603	RESERVED	
604	RESERVED	
605	Measure brake pedal height, travel, and free play (as applicable); determine necessary action.	
606	Check master cylinder for internal/external leaks and proper operation; determine necessary action.	
607	Remove, bench bleed, and reinstall master cylinder.	
608	Inspect brake lines, flexible hoses, and fittings for leaks, dents, kinks, rust, cracks, bulging or wear; tighten loose fittings and supports; determine necessary action.	
609	Replace brake lines, hoses, fittings, and supports.	
610	Fabricate brake lines using proper material and flaring procedures (double flare and ISO types).	
611	Select, handle, store, and fill brake fluids to proper level.	
612	Inspect, test, and/or replace components of brake warning light system.	
613	Bleed and/or flush brake system.	
614	Diagnose poor stopping, noise, vibration, pulling, grabbing, dragging or pedal pulsation concerns; determine necessary action.	
615	Remove, clean, inspect, and measure brake drums; determine necessary action.	
616	Refinish brake drum; measure final drum diameter.	
617	Remove, clean, and inspect brake shoes, springs, pins, clips, levers, adjusters/self-adjusters, other related brake hardware, and backing support plates; lubricate and reassemble.	
618	Inspect and install wheel cylinders.	
619	Pre-adjust brake shoes and parking brake; install brake drums or drum/hub assemblies and wheel bearings.	
620	Install wheel, torque lug nuts, and make final checks and adjustments.	

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621	RESERVED	
622	Remove caliper assembly; inspect for leaks and damage to caliper housing; determine necessary action.	
623	Clean and inspect caliper mounting and slides/pins for operation, wear, and damage; determine necessary action.	
624	Reassemble, lubricate, and reinstall caliper, pads, and related hardware; seat pads, and inspect for leaks.	
625	Clean, inspect, and measure rotor thickness, lateral runout, and thickness variation; determine necessary action.	
626	Remove and reinstall rotor.	
627	Refinish rotor on vehicle; measure final rotor thickness.	
628	Refinish rotor off vehicle; measure final rotor thickness.	
629	RESERVED	
630	Check brake pad wear indicator system operation; determine necessary action.	
631	RESERVED	
632	Check vacuum supply to vacuum-type power booster and check power assist operation.	
633	Remove, clean, inspect, repack, and install wheel bearings, RACES and replace seals; install hub and adjust bearings.	
634	Check parking brake cables and components including integral parking brake system for wear, binding, and corrosion; clean, lubricate, adjust or replace as needed.	
635	Check parking brake and indicator light system operation; determine necessary action.	
636	Check operation of brake stop light system; determine necessary action.	
637	RESERVED	
638	Inspect and replace wheel studs.	
639	Remove and reinstall sealed wheel bearing assembly.	
640	Identify and inspect electronic brake control system components; determine necessary action.	
641	Diagnose electronic brake control system electronic control(s) and components by retrieving diagnostic trouble codes, and/or using recommended test equipment; determine necessary action.	
642	RESERVED	
643	Bleed the electronic brake control system hydraulic circuits.	
644	Identify traction control/vehicle stability control system components.	
645	Describe the operation of a regenerative braking system.	
660	Diagnose pressure concerns in the brake system using hydraulic principles (Pascal's Law).	
661	Test brake fluid for contamination.	
662	Remove, inspect and replace pads and retaining hardware; determine necessary action.	
663	Disassemble and clean caliper assembly; inspect parts for wear, rust, scoring, and damage. Replace seal, boot and damaged or worn parts.	
664	Inspect the vacuum-type power booster unit for leaks; inspect the check valve for proper operation; determine necessary action.	
665	Diagnose wheel bearing noises, wheel shimmy, and vibration concerns; determine necessary action.	
666	Remove and install electronic brake control system electrical/electronic and hydraulic components.	
667	Test, diagnose, and service electronic brake control system speed sensors (digital and analog), toothed ring (tone wheel), and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO) (includes output signal, resistance, shorts to voltage/ground, and frequency data).	
700	<b>ELECTRICAL/ELECTRONIC SYSTEMS</b>	
701	RESERVED	
702	Identify and interpret electrical/electronic system concern; determine necessary action.	

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703	RESERVED	
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705	Use wiring diagrams during diagnosis of electrical circuit problems.	
706	Check electrical circuits with a test light; determine necessary action.	
707	Check electrical circuits using fused jumper wires; determine necessary action.	
708	Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.	
709	Measure and diagnose the cause(s) of excessive parasitic draw; determine necessary action.	
710	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.	
711	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action.	
712	Remove and replace terminal end from connector; replace connectors and terminal ends.	
713	Repair wiring harness and/or solder (including CAN/BUS systems) repair	
714	RESERVED	
715	Identify location of hybrid vehicle high voltage circuit disconnect (service plug) location and safety procedures.	
716	Perform battery state-of-charge test; determine necessary action.	
717	Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action.	
718	Maintain or restore electronic memory functions.	
719	Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps, and hold-downs.	
720	Perform battery charge.	
721	Start a vehicle using jumper cables or an auxiliary power supply.	
722	Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect.	
723	Perform starter current draw tests; determine necessary action.	
724	Perform starter circuit voltage drop tests; determine necessary action.	
725	Inspect and test starter relays and solenoids; determine necessary action.	
726	Remove and install starter in a vehicle.	
727	Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action.	
728	Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition.	
729	Perform charging system output test; determine necessary action.	
730	Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions.	
731	RESERVED	
732	Remove, inspect, and install generator (alternator).	
733	RESERVED	
734	RESERVED	
735	Inspect, replace, and aim headlights and bulbs.	
736	RESERVED	
737	RESERVED	
738	RESERVED	
739	Diagnose the cause of incorrect operation of warning devices and other driver information systems.	
740	Diagnose incorrect horn operation; perform necessary action.	
741	Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action.	
742	Diagnose incorrect washer operation; perform necessary action.	

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743	Diagnose incorrect operation of motor-driven accessory circuits; determine necessary action.	
745	RESERVED	
746	Remove and reinstall door panel.	
747	Use a digital multimeter (DMM).	
760	Diagnose electrical/electronic integrity of series, parallel and series-parallel circuits using principles of electricity (Ohm's Law).	
761	Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems, including: source voltage, voltage drop, current flow, and resistance.	
762	Identify high voltage circuits of electric or hybrid electric vehicle and related safety precautions.	
763	Identify hybrid vehicle auxiliary (12v) battery service, repair and test procedures.	
764	Identify system voltage and safety precautions associated with high intensity discharge headlights.	
765	Inspect and test sensors, connectors, and wire of electronic (digital) instrument circuits; determine necessary action.	
766	Diagnose incorrect electric lock operation (including remote keyless entry); determine necessary action.	
767	Diagnose supplemental restraint system (SRS) concerns; determine necessary action.	
768	Describe the operation of keyless entry/remote-start systems.	
800	<b>ENGINE PERFORMANCE</b>	
801	RESERVED	
802	Identify and interpret engine performance concern; determine necessary action.	
803	RESERVED	
804	RESERVED	
805	Identify components and inspect engine assembly for fuel, oil, coolant, and other leaks, determine necessary action.	
806	Diagnose abnormal engine noise or vibration concerns; determine necessary action.	
807	Diagnose abnormal exhaust color, odor, and sound; determine necessary action.	
808	Perform engine absolute (vacuum/boost) manifold pressure tests; determine necessary action.	
809	Perform cylinder power balance test; determine necessary action.	
810	Perform cylinder cranking and running compression tests; determine necessary action.	
811	Perform cylinder leakage test; determine necessary action.	
812	Diagnose engine mechanical, electrical, electronic, fuel, and ignition concerns; determine necessary action.	
813	Verify engine operating temperature; determine necessary action.	
814	Perform cooling system pressure tests; check coolant condition; inspect and test radiator, pressure cap, coolant recovery tank, and hoses;	
815	RESERVED	
816	Retrieve and record diagnostic trouble codes, OBD monitor status, and freeze frame data; clear codes when applicable.	
817	Diagnose the causes of emissions or drivability concerns with stored or active diagnostic trouble codes; obtain, graph, and interpret scan tool data.	
818	Access and use service information to perform step-by-step diagnosis.	
819	Perform active tests of actuators using a scan tool; determine necessary action.	
820	Describe the importance of running all OBDII monitors for repair verification.	
821	RESERVED	
822	Inspect and test ignition primary and secondary circuit wiring and solid state components; test ignition coil(s); perform necessary action.	
823	Inspect and test crankshaft and camshaft position sensor(s); perform necessary action.	

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824	Inspect, test, and/or replace ignition control module, powertrain/engine control module; reprogram as necessary.	
825	Diagnose hot or cold no-starting, hard starting, poor drivability, incorrect idle speed, poor idle, flooding, hesitation, surging, engine misfire, power loss, stalling, poor mileage, dieseling, and emissions problems; determine necessary action.	
826	Inspect and test fuel pumps and pump control systems for pressure, regulation, and volume; perform necessary action.	
827	Replace fuel filters.	
828	Inspect throttle body, air induction system, intake manifold and gaskets for vacuum leaks and/or unmeasured air.	
829	Inspect and test fuel injectors.	
830	Verify idle control operation.	
831	Inspect the integrity of the exhaust manifold, exhaust pipes, muffler(s), catalytic converter(s), resonator(s), tail pipe(s), and heat shield(s); perform necessary action.	
832	RESERVED	
833	Inspect, test and service positive crankcase ventilation (PCV) filter/breather cap, valve, tubes, orifices, and hoses; perform necessary action.	
834	RESERVED	
835	Inspect, test, service and replace components of the EGR system, including electrical/electronic sensors, controls, and wiring, EGR tubing, exhaust passages, vacuum/pressure controls, filters and hoses; perform necessary action.	
836	RESERVED	
837	Inspect and test mechanical components of secondary air injection systems; perform necessary action.	
838	Inspect and test electrical/electronically-operated components and circuits of air injection systems; perform necessary action.	
839	Inspect and test catalytic converter efficiency.	
840	RESERVED	
841	Inspect and test components and hoses of the evaporative emissions control system; perform necessary action.	
842	Interpret diagnostic trouble codes (DTCs) and scan tool data related to the emissions control systems; determine necessary action.	
843	Remove and replace timing belt; verify correct camshaft timing.	
844	Remove and replace thermostat and gasket/seal.	
845	Inspect and test mechanical/electrical fans, fan clutch, fan shroud/ducting, air dams, and fan control devices; perform necessary action.	
846	Perform engine oil and filter change.	
860	Diagnose emissions or drivability concerns without stored diagnostic trouble codes; determine necessary action.	
861	Inspect and test computerized engine control system sensors, powertrain/engine control module (PCM/ECM), actuators, and circuits using a graphing multimeter (GMM)/digital storage oscilloscope (DSO); perform necessary action.	
862	Check fuel for contaminants and quality; determine necessary action.	
863	Perform exhaust system back-pressure test; determine necessary action.	
864	Adjust valves on engines with mechanical or hydraulic lifters.	
865	Perform common fastener and thread repairs, to include: remove broken bolt, restore internal and external threads, and repair internal thread with a threaded insert.	
866	Identify hybrid vehicle internal combustion engine service precautions.	
<b>900</b>	<b>ENGINE REPAIR</b>	
901	RESERVED	
902	Verify operation of the instrument panel engine warning indicators.	
903	Install engine covers using gaskets, seals, and sealers as required.	
904	RESERVED	

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905	Adjust valves (mechanical or hydraulic lifters).	
906	Inspect, replace, and adjust drive belts, tensioners, and pulleys; check pulley and belt alignment.	
907	Inspect and test coolant; drain and recover coolant; flush and refill cooling system with recommended coolant; bleed air as required.	
<b>1000</b>	<b>AUTOMATIC TRANSMISSION AND TRANSAXLE</b>	
1001	RESERVED	
1002	Check fluid level and fluid condition in a transmission or a transaxle equipped with a dip-stick.	
1003	Check fluid level and fluid condition in a transmission or a transaxle not equipped with a dip-stick.	
1004	Drain and replace fluid and filter(s).	
1005	Identify drivetrain components and configuration.	
1006	Inspect, adjust, and/or replace external manual valve shift linkage, transmission range sensor/switch, and/or park/neutral switch.	
1007	Inspect for leakage at external seals, gaskets and bushings.	
1008	Inspect, replace and/or align powertrain mounts.	
<b>1100</b>	<b>MANUAL DRIVE TRAIN AND AXLES</b>	
1101	RESERVED	
1102	Drain and refill manual transmission/transaxle and final drive unit.	
1103	Check and adjust clutch master cylinder fluid level.	
1104	Check for system leaks.	
1105	Check and adjust differential housing fluid level.	
1106	Drain and refill differential housing.	
1107	Identify and inspect and/or replace manual drivetrain and axle components and configuration.	
<b>1200</b>	<b>HEATING AND AIR CONDITIONING</b>	
1201	RESERVED	
1202	RESERVED	
1203	Inspect A/C condenser for airflow restrictions.	
1204	Inspect engine cooling and heater systems hoses.	
1205	Inspect A/C-heater ducts, doors, hoses, cabin filters, and outlets.	
<b>3000</b>	<b>HEATING &amp; AIR CONDITIONING DIAGNOSIS &amp; REPAIR</b>	
3060	Identify and interpret heating and air conditioning concern; determine necessary action	
3061	Research applicable service information, locate and interpret identification numbers, certification, and calibration decals	
3062	Diagnose and performance test the A/C system using principles of refrigeration; determine necessary action	
3063	Diagnose and repair A/C compressor and clutch components	
3064	Diagnose and repair evaporator, condenser, and related components	
3065	Diagnose the heating system; determine necessary action	
3066	Repair or replace the heating system components	
3067	Operating Systems and related controls diagnosis and repair.	
3068	Diagnose the automatic and electrical temperature controls	
3069	Repair or replace the automatic and electrical temperature controls	



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3070	Demonstrate the proper use and maintenance of refrigerant handling equipment	
3071	Identify, recover, recycle, label, and store refrigerant	
3072	Evacuate and charge the A/C system	
<b>3100</b>	<b>GENERAL ENGINE DIAGNOSIS; REMOVAL AND REINSTALLATION</b>	
3160	Identify and interpret engine concern; determine necessary action	
3161	Remove and replace engine in front-wheel drive vehicle (OBD I or newer)	
3162	Remove and replace engine in rear-wheel drive vehicle (OBD I or newer)	
3163	Remove, inspect, and test the cylinder head(s)	
3164	Install, torque, and adjust the cylinder head(s)	
3165	Recondition the cam in block cylinder head(s)	
3166	Recondition the OHV cylinder head(s)	
3167	Disassemble the engine block	
3168	Inspect and clean the engine block components; determine necessary action	
3169	Inspect, check, and record the short block measurements; determine necessary action	
3170	Assemble the engine according the manufacturer's specifications	
<b>3200</b>	<b>LUBRICATION AND COOLING SYSTEMS DIAGNOSIS AND REPAIR</b>	
3260	Inspect, test, and repair the oil systems and components	
3261	Perform cooling system tests; determine necessary action	
3262	Inspect, replace and adjust the drive belts and hoses	
3263	Inspect, test, and replace cooling system components	
3264	Test coolant, drain, flush, and refill cooling system with recommended coolant; bleed air as required	
<b>3300</b>	<b>GENERAL TRANSMISSION AND TRANSAXLE DIAGNOSIS</b>	
3360	Identify and interpret transmission / transaxle concern; assure proper engine operation; determine necessary action	
3361	Research applicable service information; locate and interpret identification numbers, certification, and calibration decals.	
3362	Diagnosis and performance test transmission / transaxle; determine necessary action	
<b>4000</b>	<b>TRANSMISSION AND TRANSAXLE MAINTENANCE AND ADJUSTMENT</b>	
4060	Inspect, adjust, or replace the throttle valve linkages or cables; manual shift linkages or cables; transmission range sensor; check gear select indicator	
4061	Service transmission; perform visual inspection; replace fluids and filters	
4062	Inspect, adjust, and replace sensors, cables, and actuators	
4063	Inspect and replace external bushings, seals, and gaskets	
4064	Inspect, leak test, flush, and replace cooler, lines, and fittings	
4065	Diagnose electronic transmission control systems using a scan tool; determine necessary action	
4066	Inspect, replace, and align powertrain mounts	
4067	Remove and reinstall transmission / transaxle and torque converter	
4068	Identify and interpret drive train concern; determine necessary action	
4069	Determine proper fluids and fluid levels	
4070	Drain and refill transmission / transaxle and final drive unit	
<b>4100</b>	<b>GENERAL DRIVE TRAIN DIAGNOSIS &amp; REPAIR</b>	
4160	Inspect and diagnose the clutch; determine necessary action	
4162	Remove and replace the clutch assembly and components	

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4163	Inspect and diagnose the drive shaft and universal joints, perform necessary action	
4164	Inspect and diagnose the half shaft and CV joints; perform necessary action	
4165	Diagnose differential assembly; determine necessary action	
4166	Disassemble and inspect the differential; perform necessary action	
4167	Inspect and diagnose the limited slip differential; perform necessary action	
4168	Inspect and diagnose the drive shaft and components; perform necessary action	
4169	Diagnose noise, vibrations, and leaks; determine necessary action	
4170	Inspect, adjust, and repair shift controls	
4171	Disassemble and inspect the transfer case; perform necessary action	
4172	Inspect the front-wheel bearings, hubs, and components; perform necessary action	
4173	Inspect and diagnose electrical components; perform necessary action	