

# Bus Maintenance Technician Apprenticeship OJL Task Book

Prepared by  
International Transportation Learning Center

Apprentice: \_\_\_\_\_

Transit  
Agency: \_\_\_\_\_

Assessor(s)  
/Mentor(s): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Apprenticeship  
Period: \_\_\_\_\_

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\* Fundamental Skills is an optional skill area because it is expected that most agencies will hire candidates that already have these basic skills. They are included in this Task Book for those wanting to include fundamental skills as part of their overall apprenticeship program, or to verify existing competency as a condition of entry into the apprenticeship program.

# How to Use This Book

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## Preface

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The Registered Bus Maintenance Technician apprenticeship program developed by the Transportation Learning Center and sponsored by the US Department of Labor mandates apprentices to demonstrate competency within a specified time as outlined in the work process scheduled of the Apprentice Contract/Agreement developed by the agency's Joint Apprenticeship Committee (JAC). The JAC is comprised of equal labor and management representation and is responsible for jointly developing and managing the apprenticeship program.

This Job Book was created to record the apprentice's progress in meeting competency requirements. It serves as a useful checklist to make certain mentors have provided adequate on the job learning (OJL) for each job task, and apprentices have benefitted from that learning by demonstrating they are capable of performing those tasks safely and effectively on their own. The use and preservation of the Job Book are the responsibility of both parties.

The Job Book is aligned with tasks identified in the National Bus Maintenance Apprentice Framework, which is based on the Automotive Service Excellence (ASE) task list and APTA training standards, which the Center helped to develop. However, under the Contract/Agreement established by the JAC, each agency is free to add, delete or modify these tasks to suit their unique operating conditions and bus equipment. Because this OJL Task Book contains all of the job tasks listed in the original Framework, it must be modified by each agency to correspond with work tasks adopted by the JAC. In other words, if tasks were either added or removed from the National Framework by the JAC, the same must be done here. In the end, the tasks listed in this OJL Task Book must align with the tasks identified by each agency's JAC.

Once this OJL Task Book has been modified to reflect tasks agreed upon by the JAC, agencies are required to instruct apprentices to perform those tasks. This is done through providing a combination of related technical instruction (RTI), typically consisting of classroom and lab instruction, as well as OJL. This OJL Task Book serves as a convenient checklist, confirming that the training has been effective and apprentices are in fact competent to perform all required job tasks. If apprentices want to opt out of certain training because they feel they are already competent, the apprentice must still demonstrate competency in those tasks to the satisfaction of the mentor.

The Task Book has 10 job function areas that follow the National Bus Maintenance Apprentice Framework. Space is provided for both the mentor and apprentice to indicate that competency has been achieved in each job task. Apprentices must prove competency in all job tasks in the time allotted by the JAC Agreement to complete the program and receive certification.

## Important Instructions for the Trainer & Mentor

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Agencies are required to instruct apprentices in all competencies by providing both RTI and OJL. That training could be performed through a variety of resources including the agency itself, local community colleges or trade schools, equipment suppliers, or through training provided by other agencies and organizations. The competencies do not need to be instructed or completed in any specific order. It is the agencies responsibility to coordinate RTI with OJL so the

appropriate background training is provided before the apprentice and mentor begin to work together on actual bus equipment.

The apprentice must demonstrate competency in each job task. Once the mentor and apprentice are satisfied in the apprentice's abilities, both are required to initial each task. It is recommended that the apprentice discuss and perform each task several times. Use the column marked "MENT" for the mentor to initial; the column marked "APR" is for the apprentice to initial. If apprentices feel that they are already competent in specific job tasks, they can select to forgo the training, but must first perform those tasks to the mentor's satisfaction. If the task is successfully demonstrated by the apprentice, the mentor and apprentice both add their initials.

Review the Task Book with the apprentice's supervisor on a regular basis to ensure that the apprentice has a sufficient variety of work to complete all competencies by the end of the apprenticeship program.

Use this book with the JAC Contract/Agreement and in accordance with employer policies and procedures. The apprentice must comply with all applicable federal, state, local and employer safety and health standards. All work shall be performed in a professional manner and in accordance with any applicable building codes and professional industry standards.

## **Important Instructions for the Apprentice**

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This Task Book has been developed to identify skills required for you to reach journey worker status as a transit bus technician. You are required to meet all competencies in this book by successfully demonstrating your ability to perform all required tasks. You do not need to meet the competencies in any specific order.

Tasks included in the book have been jointly selected by the JAC. Review this Task Book with your supervisor on a regular basis. Keep a journal of your daily work, including hours, why a task was not completed, and conversations regarding job details. On occasion, these detailed notes can be used to resolve any disputes.

Mentor(s) will initial a task only after you have demonstrated an acceptable skill level. You must also feel confident that you can perform the task in a safe and effective manner. When both parties are satisfied, each must initial and date the task in ink. Mentors uses the column marked "MENT" to initial; you will initial the column marked "APR" to indicate that you feel competent in each job task.

Use this book in accordance with the JAC Apprentice Contract/Agreement and with employer policies and procedures. You must comply with all applicable federal, state, local and employer safety and health standards, including any applicable building codes and professional industry standards.

**Job Function 1:  
Demonstrates Mastery of Fundamental Skills\***

Duties and Tasks		Date	MENT Initials	Date	APR Initials
<b>1a</b>	<b>Competency 1a: Follows Safe Procedures</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Properly lifts heavy objects				
2	Properly handles chemicals, hazards, and bloodborne pathogens				
3	Wears proper attire and personal protective equipment (PPE)				
4	Utilizes Safety Data Sheet (SDS) when handling chemicals				
5	Properly stores, dispenses, transports and disposes of waste materials				
6	Properly applies fall protection				
7	Properly protects against high voltage and amperage hazards - lockout/tagout procedures				
8	Keep safe work environment - Safe Housekeeping practices - free of slip, trip and fall situations				
9	Properly works in confined spaces				
10	Other (please specify):				
11	Other (please specify):				
12	Other (please specify):				
<b>1b</b>	<b>Competency 1b: Correctly Applies Hand Tools, Power Tools and Fasteners</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Demonstrates tool hazards and safety				
2	Correctly uses hand and power tools (including cordless tools)				
3	Correctly uses pneumatic tools				
4	Applies correct fasteners - SAE standard and metric				
5	Applies correct fastener locking device(s)				
6	Applies correct fastener torque and tension				
7	Correctly forms and cuts fastener threads				
8	Other (please specify):				
9	Other (please specify):				
<b>1c</b>	<b>Competency 1c: Demonstrates Basic Rigging and Hoisting Ability</b>				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Locates safe jacking points on a vehicle				
2	Demonstrates safe hoisting and jacking procedures				
3	Demonstrates safe hoisting and jacking procedures relative to each vehicle section on articulated vehicles (if applicable)				
4	Positioning/moving vehicles in a shop environment (including Lifts/Hoists and Pits)				
5	Other (please specify):				
6	Other (please specify):				
	<b>Competency 1d: Demonstrates Ability to Apply Basic Industrial Mathematics</b>				
1d	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Adds and subtracts numbers				
2	Multiplies and divides numbers				
3	Applies fractions, percents, decimals, proportions, and angles				
4	Demonstrates understanding of metric system				
5	Demonstrates understanding of formulas				
6	Other (please specify):				
7	Other (please specify):				
	<b>Competency 1e: Demonstrates Basic Mechanical Ability</b>				
1e	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Demonstrate working knowledge and identification of power transmission such as gears, sprockets, chains, tensioners, belts, pulleys, and ratios				
2	Demonstrate working knowledge and identification of power translation such as cams and cam followers, linkages, and springs				
3	Demonstrate working knowledge and identification of friction reduction such as bushings and bearings				
4	Demonstrate working knowledge and identification of fasteners such as screws, nuts and bolts, pins, rings, clips, and couplings				
5	Demonstrate working knowledge of levers, wheel and axle, inclined plane, and wedge				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
6	Other (please specify):				
7	Other (please specify):				
<b>Competency 1f: Demonstrates Basic Hydraulic &amp; Pneumatic Ability</b>					
1f	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Demonstrate working knowledge of hydraulic principals				
2	Identifies common bus hydraulic applications				
3	Troubleshoot basic hydraulic faults				
4	Demonstrate working knowledge of pneumatic principals				
5	Identifies common bus pneumatic applications				
6	Troubleshoot basic pneumatic faults				
7	Ability to read hydraulic and pneumatic schematics				
8	Other (please specify):				
9	Other (please specify):				
<b>Competency 1g: Demonstrates Basic Electrical and Electronic Ability</b>					
1g	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Read basic electrical schematics and related symbols				
2	Demonstrates basic understanding of electricity and relationship between voltage, resistance and current				
3	Demonstrates basic understanding of direct current voltage and alternating current voltage				
4	Demonstrates basic understanding of conductors and non conductors				
5	Demonstrates basic understanding of series and parallel circuits				
6	Demonstrates basic understanding of electrical measurement and use of electrical meters				
7	Other (please specify):				
8	Other (please specify):				
<b>Competency 1h: Demonstrates Basic Welding Precautions (Optional)</b>					
1h	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Demonstrate safe procedures to avoid primary and secondary electrical shocks				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
2	Demonstrate safe procedures to minimize overexposure to welding fumes and gases				
3	Correctly uses personal protective equipment (PPE) to avoid injuries from burns and exposure to arc rays				
4	Demonstrate ability to safeguard all onboard electrical and electronic equipment during the welding process				
5	Other (please specify):				
6	Other (please specify):				
	Note: also see Competency 8j				
<b>Competency 1i: Demonstrates basic vehicle towing</b>					
1i	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Competency 1i: Demonstrates basic vehicle towing				
2	Identifies all equipment needed to tow a bus from the front and rear				
3	Correctly and safely connects tow vehicle to front and rear of bus				
4	Other (please specify):				
5	Other (please specify):				
	Note: may need to obtain proper towing endorsements based on state requirements				

\* Fundamental Skills is optional because it is expected that most agencies will hire candidates that already have these skills. Tasks are included in this Task Book for those wanting to include fundamental skills as part of their apprenticeship program or to verify existing competency as a condition of entry into the apprenticeship program.

**Comments and notes:**



## Job Function 2:

### Maintains and Repairs Low Voltage Electrical and Electronic Systems

Duties and Tasks		Date	MENT Initials	Date	APR Initials
<b>2a</b>	<b>Competency 2a: Follows Safe Procedures</b>  <b>Prerequisite:</b> Performance Standards identified in Job Function 1: Demonstrates Mastery of Fundamental Skills, Competency 1a: Follows Safe Procedures				
	<i>The apprentice shall properly perform the following:            (delete any tasks that do not apply)</i>				
1	Utilizes shock protection tools and equipment when required				
2	Properly use test equipment to confirm an electrically safe work condition				
3	Plans electrical jobs in advance of performing the work to insure safe working conditions				
4	Properly performs lock-out, tag-out procedures				
5	Proper use and knowledge of specific high voltage PPE, including 1,000 volt gloves and fire protective clothing Note: may defer to Competency 4j: Maintains, Diagnoses and Repairs Items Specific to Electric Propulsion Systems (Optional)				
6	Other (please specify):				
7	Other (please specify):				
<b>2b</b>	<b>Competency 2b: Performs General Electrical/Electronic Diagnosis</b>  <b>Prerequisite:</b> Performance Standards identified in Job Function 1: Demonstrates Mastery of Fundamental Skills, Competency 1a: Follows Safe Procedures				
	<i>The apprentice shall properly perform the following:            (delete any tasks that do not apply)</i>				
1	Verify operator complaint, reproduce the condition (including intermittent problems), and/or road test vehicle; determine necessary action.				
2	Check continuity in electrical/electronic circuits using appropriate test equipment.				
3	Check applied voltages, circuit voltages, and voltage drops in electrical/ electronic circuits using a digital multimeter (DMM), or a graphing multimeter (GMM).				
4	Check current flow in electrical/electronic circuits and components using an ammeter, DMM, clamp-on ammeter, or GMM.				
5	Check electronic circuit waveforms using an oscilloscope; interpret readings and determine needed repairs.				
6	Check resistance in electrical/electronic circuits and components using an ohmmeter, DMM or GMM.				
7	Locate shorts, grounds and opens in electrical/electronic circuits.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
8	Diagnose battery drain problems with the master/key switch off.				
9	Inspect and test fusible links, circuit breakers, solid-state current limiters and fuses; replace as required.				
10	Inspect and test spike suppression diodes/resistors and capacitors; replace as required.				
11	Inspect and test relays and solenoids; replace as required.				
12	Read and interpret electrical schematic diagrams and symbols.				
13	Remove, replace, and adjust electrical/electronic switches, sensors, and other electrical/electronic components.				
14	Demonstrate proper care and handling of electrical/electronic components.				
15	Other (please specify):				
16	Other (please specify):				
<b>Competency 2c: Performs Battery Diagnosis and Repair</b>					
<b>2c</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Perform battery tests (load and capacitance); determine needed repairs.				
2	Determine battery state of charge by measuring terminal post voltage using a DMM.				
3	Inspect, clean, and service battery, cables, terminal connections and disconnects; replace as required.				
4	Inspect, clean and repair battery boxes, mounts and hold downs; replace as required.				
5	Charge battery(s), using slow or fast charge method as appropriate.				
6	Jump-start a transit bus using jumper cables and a booster battery or auxiliary power				
7	Identify different battery types				
8	Other (please specify):				
9	Other (please specify):				
<b>Competency 2d: Performs Starting System Diagnosis and Repair</b>					
<b>2d</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Perform starter circuit voltage drop tests and current draw; determine needed repairs.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
2	Inspect and test components of the starter control circuit (key switch, push button and/or magnetic switch and wires); replace as required.				
3	Remove and replace starter; inspect flywheel ring gear or flex plate.				
4	Inspect, clean, repair or replace cranking circuit battery cables and connectors.				
5	Differentiate among electrical, multiplex or mechanical problems that cause a slow cranking, no cranking, extended cranking or cranking noise conditions.				
6	Other (please specify):				
7	Other (please specify):				
<b>Competency 2e: Performs Charging System Diagnosis and Repair</b>					
<b>2e</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose the cause of a no-charge, low-charge, or overcharge condition and source voltage; determine needed repairs.				
2	Inspect and adjust alternator drive belts/gears, pulleys, fans, mounting brackets, and tensioners; replace as required.				
3	Perform charging system output tests (12-volt and 24-volt); determine needed repairs.				
4	Perform charging circuit voltage drop tests; determine needed repairs.				
5	Test, adjust or replace voltage regulator.				
6	Maintain, remove, and replace alternator.				
7	Inspect, repair or replace charging circuit connectors and wires.				
8	Check battery equalizer output, check wiring and mounting; determine needed repairs.				
9	Beltless alternator - verify operation				
10	Verify operation of charging system circuit monitor; determine needed repairs.				
11	Other (please specify):				
12	Other (please specify):				
<b>Competency 2f: Performs Lighting Systems Diagnosis and Repair</b>					
<b>2f</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
1	Diagnose the cause of brighter than normal, intermittent, dim, or no headlight and daytime running light (DRL) operation.				
2	Test, aim, and replace headlights.				
3	Test headlight and dimmer switches, wires, connectors, terminals, sockets, relays and control components; repair or replace as required.				
4	Inspect, test and repair parking, clearance and taillight circuit switches, bulbs, sockets, connectors, terminals, relays, wires and light-emitting diodes (LEDs); replace as required.				
5	Inspect, test and repair dash light circuit switches, bulbs, sockets, connectors, terminals, wires and printed circuits; replace as required.				
6	Inspect, test and repair interior and exterior light circuit switches, bulbs, sockets, connectors, terminals, ballasts and wires; replace as required. Including Multiplex controlled LEDs.				
7	Inspect and test stoplight circuit switches, bulbs, sockets, connectors, terminals, relays, control components and wires; repair or replace as required.				
8	Diagnose the cause of turn signal and hazard flasher light system malfunctions; determine needed repairs.				
9	Inspect and test turn signal and hazard circuit flashers, switches, bulbs, sockets, connectors, terminals, relays, wires and LEDs; repair or replace as required.				
10	Inspect, test and adjust backup light and warning devices, circuit switches, bulbs, sockets, connectors, terminals and wires; repair or replace as required.				
11	Other (please specify):				
12	Other (please specify):				
<b>Competency 2g: Performs Gauge and Warning Device Diagnosis and Repair</b>					
<b>2g</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose the cause of intermittent, high, low or no gauge readings; determine needed repairs.				
2	Diagnose the cause of control area network (CAN) driven gauge malfunctions; determine needed repairs.				
3	Inspect, test and adjust gauge circuit sending units, sensors, gauges, connectors, terminals and wires; repair or replace as required.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
4	Inspect and test warning device (lights and audible) circuit sending units, sensors, bulbs, audible component, sockets, connectors, terminals, wires and printed circuits/control modules; repair or replace as required.				
5	Inspect and test electronic speedometer and odometer systems; replace as required; verify proper calibration for vehicle application.				
6	Inspect, test and diagnose multi-functional displays and instrument clusters				
7	Other (please specify):				
8	Other (please specify):				
<b>Competency 2h: Diagnoses and Repairs Related Electrical/Electronic Systems</b>					
<b>2h</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Inspect and test horns, horn circuit relays, switches, connectors, terminals and wires; repair or replace as required.				
2	Diagnose the cause of constant, intermittent or no wiper operation; diagnose the cause of wiper speed control and/or park problems.				
3	Inspect and test wiper motor, resistors, park switch, relays, switches, connectors, terminals and wires; repair or replace as required.				
4	Inspect and test side view mirror motors, heater circuit grids, relays, switches, connectors, terminals and wires; repair or replace as required.				
5	Inspect and test HVAC electrical components, including A/C clutches, motors, drivers, resistors, relays, switches, controls, connectors, terminals, and wires; repair or replace as required.				
6	Inspect and test engine cooling fan electrical control components; replace as required.				
7	Other (please specify):				
8	Other (please specify):				
<b>Competency 2i: Maintains, Diagnoses and Repairs Data Communications Systems (CAN, J1939, J 1708, etc.)</b>					
<b>2i</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Inspect, test, and diagnose data communication backbone				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
2	Repair and replace data communication cables, connectors and terminals per manufacturer standards				
3	Inspect, test, diagnose, and repair/replace data communication gateway modules				
4	Inspect, test, diagnose, verify, and repair/replace vehicle telematics				
5	Other (please specify):				
6	Other (please specify):				
<b>Competency 2j: Maintains, Diagnoses, and Repairs Multiplex systems</b>					
<b>2j</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Inspect, test, and diagnose multiplex specific data communication cables, connectors, terminals per manufacturer standards				
2	Read and interpret ladder logic diagrams.				
3	Using a laptop computer, establish communication with a multiplex control system. Verify that the needed ladder logic inputs are active to control an individual/specific ladder logic output.				
4	Interpret LEDs for diagnostic purposes				
5	Upload/download system programs				
6	Other (please specify):				
7	Other (please specify):				
<b>Competency 2k: Maintains, Diagnoses, and Repairs Fire Suppression/ Detection Systems</b>					
<b>2k</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Identify location and purpose of various detectors and sensors				
2	Inspect, diagnose and repair inspect electronic control system.				
3	Proper testing of system and connection procedure (simulator)				
4	Inspect, repair and replace heat sensors				
5	Inspect, repair and replace fire dispersment hoses and hardware				
6	Inspect, repair and replace cabling, resistors, and connectors				
7	Identify location and purpose of various detectors and sensors				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
8	Inspect, diagnose and repair and replace optical detectors, thermal detectors and end of line device				
9	Inspect, diagnose and repair interfaces with the I/O control system				
10	Inspect and replace fire suppression agent, bottle and activation device				
11	Perform distribution restriction blow-down test, replace caps				
12	Other (please specify):				
13	Other (please specify):				
<b>Competency 2l: Maintains, Diagnoses and Repairs (Electronic) Signage Systems</b>					
2l	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Inspect functionality of the destination sign system				
2	Inspect, test, remove, and replace circuit boards and hardware				
3	Inspect, test, remove, and replace driver display				
4	Inspect, test, remove, and replace wiring and connectors				
5	Update destination sign program and firmware				
6	Use of static straps during repairs				
7	Other (please specify):				
8	Other (please specify):				
<b>Competency 2m: Maintains, Diagnoses and Repairs Fare Collection Equipment</b>					
2m	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Inspect functionality trim units				
2	Inspect functionality of circuit boards				
3	Check and replenish fare card stock if equipped				
4	Inspect functionality of the fare collection system				
5	Verify communication between farebox and control unit				
6	Log into farebox using correct log-in procedure				
7	Identify fault codes, initiate additional diagnostic procedures, and make repairs as needed				
8	Inspect functionality of passenger display, transfer issue mechanism, coin bypass mechanism and magnetic card swipe reader and smart card processor if equipped				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
9	Other (please specify):				
10	Other (please specify):				
<b>Competency 2n: Maintains, Diagnoses and Repairs Radio Communications Systems</b>					
2n	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Perform mechanical inspection of microphone, amplifier, radio, vehicle-mounted controls, speakers, emergency alarms, information signs, antennae, GPS equipment and any other equipment related to the vehicle communication systems. Repair as required				
2	Perform electrical inspection of wiring (chafed or cut insulation, loose crimps or worn or corroded lugs, loose terminals, heat fatigue, connectors for damage), relay contacts for burns/pitting or other deformities), and fuses for burned, separated or otherwise damaged elements. Repair as required				
3	Perform an operational (functional) check of the PA Announcement System including microphone, push-to-talk control, interior speakers, and exterior speaker(s).				
4	Other (please specify):				
5	Other (please specify):				
<b>Competency 2o: Maintains, Diagnoses and Repairs Automatic Stop Announcement Systems</b>					
2o	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Perform an operational (functional) check of the Automatic Stop Request System including stock activation devices (switches), visual display unit(s), audio equipment and announcement messages, dash indicators, and door controls to extinguish visual displays and audio announcements. Repair as required.				
2	Other (please specify):				
3	Other (please specify):				
<b>Competency 2p: Maintains, Diagnoses and Repairs Video Surveillance Equipment (optional)</b>					
2p	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Perform an operational (functional) check of video surveillance equipment. Clean cameras and lenses, inspect cameras and mounting devices for proper angle positioning, check the recording systems for proper connectivity and cleanliness, and				



Duties and Tasks		Date	MENT Initials	Date	APR Initials
	check functionality of system firmware and software and update as needed. Repair as required.				
2	Other (please specify):				
3	Other (please specify):				
2q	<b>Competency 2q: Maintains, Diagnoses and Repairs Automatic Passenger Counters (optional)</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Perform an operational (functional) check of Automatic Passenger Counters including sensors and equipment to detect passenger boarding and alighting, power supply, signal processing equipment, sensor interface, and data transmission equipment. Repair as required.				
2	Other (please specify):				
3	Other (please specify):				
2r	<b>Competency 2r: Maintains, Diagnoses and Repairs Wireless Communication Systems (optional)</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Perform an operational (functional) check of Wireless Communication Systems including modems, antennas, antenna cables, power supply, signal processing equipment, and data transmission equipment. Repair as required.				
2	Other (please specify):				
3	Other (please specify):				

**Comments and notes:**

**Job Function 3:  
Maintains and Repairs Brake and Air Systems**

Duties and Tasks		Date	MENT Initials	Date	APR Initials	
<b>3a</b>	<b>Competency 3a: Follows Safe Procedures</b>					
	<b>Prerequisite:</b> Performance Standards identified in Job Function 1: Demonstrates Mastery of Fundamental Skills, Competency 1a: Follows Safe Procedures					
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>					
	1	Demonstrates proper use of spring parking brake (release and cage)				
	2	Knowledge of de-energizing spring brake chambers				
	3	Protection against brake dust				
4	Other (please specify):					
5	Other (please specify):					
<b>3b</b>	<b>Competency 3b: Maintains, Diagnoses and Repairs Air Supply and Service Systems</b>					
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>					
	1	Diagnose poor stopping, pulling, grabbing, dragging, and air leak (static and applied) problems, caused by supply and service system malfunctions; determine needed repairs.				
	2	Check air system build-up and recovery time; determine needed repairs.				
	3	Drain air reservoir tanks; check for oil, water and foreign material; determine needed repairs.				
	4	Inspect, adjust, align or replace air compressor drive belts, pulleys, tensioners, drive gears and couplings.				
	5	Inspect, repair or replace air compressor, air cleaner, oil and coolant lines and fittings.				
	6	Inspect, test, adjust or replace system pressure controls (governor/relief valve), unloader assembly valves, pressure protection valves and filters.				
	7	Inspect, repair or replace air system lines, hoses, fittings and couplings.				
	8	Inspect, test, clean or replace air tank relief (pop-off) valves, one-way check valves, drain cocks, automatic drain (spitter) valves, heaters, wiring and connectors.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
9	Inspect, clean, repair or replace air drier systems, filters, valves, heaters, wiring and connectors.				
10	Inspect, test, adjust, repair or replace brake application (foot/treadle) valve, fittings, and mounts; check and adjust brake pedal free play.				
11	Inspect, test, clean, or replace two-way (double) check valves and anti-compounding valves.				
12	Inspect, test, repair or replace stop and parking brake light circuit switches, wiring and connectors.				
13	Inspect, test, repair or replace brake relay valve and quick-release valves.				
14	Inspect, test, repair or replace interlock system solenoid valves, regulator valves, pressure switches and related components.				
15	Inspect, test and replace inversion/emergency (spring) brake control valve(s) and emergency brake release system				
16	Inspect, test, repair or replace low-pressure warning devices.				
17	Inspect, test and replace air pressure gauges, lines and fittings.				
18	Inspect, test and replace parking brake override valve.				
19	Inspect, test, repair or replace towing circuit components.				
20	Perform antilock brake system (ABS) warning lamp start-up test; determine needed repairs; diagnose hard fault codes/diagnostic trouble codes (DTCs) using scan tool, PC computer, or LEDs; determine needed repairs.				
21	Diagnose poor stopping and lockup problems on ABS; determine needed repairs.				
22	Test, adjust or replace ABS wheel speed sensors and tone/exciter rings.				
23	Test and replace ABS, electronic control units (ECUs) and modulator valves; test, repair and replace wiring and connectors				
24	Verify proper operation of auxiliary (transmission retarder, driveline, exhaust, and engine) braking systems.				
25	Other (please specify):				
26	Other (please specify):				
3c	<b>Competency 3c: Maintains, Diagnoses and Repairs Mechanical/Foundation Disc and Drum Brakes</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose poor stopping, brake noise, premature wear, pulling, grabbing or dragging complaints caused by foundation brake, slack adjuster and brake chamber problems; determine needed repairs.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
2	Perform deceleration tests on service and parking brake systems.				
3	Inspect, test, adjust, repair or replace service brake chambers, diaphragm, clamp, spring, pushrod, clevis and mounting brackets.				
4	Inspect, test, adjust, repair or replace automatic slack adjusters.				
5	Inspect or replace cams, rollers, shafts, bushings, seals, spacers and retainers.				
6	Inspect, or replace brake spider, shields, anchor pins, bushings and springs.				
7	Inspect, clean, rebuild or replace, and adjust air disc brake caliper assemblies.				
8	Inspect brake shoes, linings, or pads; determine needed repairs.				
9	Inspect brake drums or rotors; determine needed repairs.				
10	Resurface brake drums and linings; resurface rotors.				
11	Other (please specify):				
12	Other (please specify):				
<b>Competency 3d: Maintains, Diagnoses and Repairs Parking Brakes</b>					
<b>3d</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Inspect or replace parking brake chamber; dispose of removed chambers in accordance with local regulations.				
2	Inspect, test or replace parking (spring) brake valves, lines, hoses and fittings.				
3	Manually release and cage parking (spring) brakes.				
4	Other (please specify):				
5	Other (please specify):				
<b>Competency 3e: Maintains, Diagnoses and Repairs Wheel Bearings</b>					
<b>3e</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Remove and replace axle hub and wheel assembly.				
2	Clean, inspect, lubricate or replace wheel bearing assemblies; replace seals and wear rings.				
3	Adjust axle wheel bearings in accordance with manufacturer's procedures.				
4	Inspect or replace extended service (sealed, close-tolerance and unitized) bearing assemblies; perform initial installation in accordance with manufacturer's procedures.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
5	Replace seals and O-rings on planetary axle assemblies; adjust axle endplay.				
6	Other (please specify):				
7	Other (please specify):				

Comments and notes:

### Job Function 4: Maintains, Diagnoses and Repairs Propulsion Systems

Duties and Tasks		Date	MENT Initials	Date	APR Initials
<b>4a</b>	<b>Competency 4a: Follows Safe Procedures</b>				
	<b>Prerequisite:</b> Performance Standards identified in Job Function 1: Demonstrates Mastery of Fundamental Skills, Competency 1a: Follows Safe Procedures  <i>The apprentice shall properly perform the following:  (delete any tasks that do not apply)</i>				
<b>General</b>					
1	Applies lock-out/tag-out procedures				
2	Other (please specify):				
<b>Diesel Propulsion</b>					
1	Identify high pressure and low pressure within fuel system				
2	Demonstrate use of specialized PPE for working on high pressure fuel systems				
3	Other (please specify):				
<b>CNG Propulsion</b>					
1	Identify location and purpose of various detectors and sensors				
2	CNG cylinder and Fuel System inspection				
3	Other (please specify):				
<b>Hybrid/Electric Propulsion</b>					

Duties and Tasks		Date	MENT Initials	Date	APR Initials
1	Fulfills local high-voltage electrical safety certification requirements (if applicable).				
2	Works safely with high-voltage orange cables.				
3	Demonstrate use of specialized tools for high-voltage testing				
4	Demonstrate use of insulated tools in safe condition to work on high-voltage equipment and wiring.				
5	Demonstrate use of specialized PPE for working on hybrids/electric propulsion vehicles				
6	Demonstrate use of fall protection and other equipment for roof access				
7	Demonstrate use of shepherd's hook/hot stick and follows other safety requirements for two-person jobs				
8	Demonstrate ability to correctly enter a battery tub/enclosure				
9	Correctly follows procedures for washing electric propulsion systems.				
10	Other (please specify):				
<b>Fuel Cell Propulsion</b>					
	To be determined (Technology not yet fully developed for transit applications)				
<b>Fire Detection and Suppression</b>					
1	Verify that a bus alarm and safety features have been programmed correctly				
2	Other (please specify):				
<b>4b</b>	<b>Competency 4b: Maintains, Diagnoses and Repairs Internal Combustion (IC) Bus Engines (Note: Applies generally to diesel, CNG and gasoline engines – see unique competencies below for each propulsion type)</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
<b>General IC Engine Diagnosis</b>					
1	Verify the complaint, and road test vehicle; review operator service request and past maintenance documents (if available); determine further diagnosis.				
2	Inspect engine assembly and engine compartment for fuel, oil, coolant, exhaust, or other leaks; determine needed repairs.				
3	Inspect engine compartment wiring harness, connectors, seals, and locks; check for proper routing and terminal/connector condition; determine needed repairs.				
4	Listen for and diagnose engine noises; determine needed repairs.				

<b>Duties and Tasks</b>		<b>Date</b>	<b>MENT Initials</b>	<b>Date</b>	<b>APR Initials</b>
5	Check engine exhaust emissions, odor, smoke color, opacity (density) and quantity; determine needed repairs.				
6	Perform air intake system restriction and leakage tests; determine needed repairs.				
7	Perform intake manifold pressure tests; determine needed repairs.				
8	Perform exhaust backpressure and temperature tests; determine needed repairs.				
9	Perform crankcase pressure test; determine needed repairs.				
10	Diagnose no cranking, cranks but fails to start, hard starting, and starts but does not continue to run problems; determine needed repairs.				
11	Diagnose surging, rough operation, misfiring, low power, slow deceleration, slow acceleration, and shutdown problems; determine needed repairs.				
12	Isolate and diagnose engine related vibration problems; check engine mounts; determine needed repairs.				
13	Check cooling system for temperature protection level, contamination, coolant type and level, temperature, pressure, supplemental coolant additive (SCA) concentration, filtration, and fan operation; determine needed repairs.				
14	Check lubrication system for contamination, oil level, quality, temperature, pressure, filtration, and oil consumption; determine needed repairs.				
15	Check, record, and clear electronic diagnostic codes; monitor electronic data; determine needed repairs.				
16	Perform visual inspection for physical damage and missing, modified, or tampered components; determine needed repairs.				
17	Research applicable vehicle and service information, service precautions, and technical service bulletins; determine needed actions.				
18	Other (please specify):				
<b>IC Engine Fuel System Diagnosis and Repair - Mechanical Components</b>					
1	Inspect, repair or replace fuel tanks, vents, cap(s), mounts, valves, screens, crossover system, supply and return lines, and fittings				
2	Inspect, adjust, repair or replace mechanical engine throttle and controls.				
3	Inspect, test, repair or replace fuel injection nozzles.				
4	Inspect, test, adjust, repair or replace engine fuel shut-off devices and controls, including engine protection shut-down devices, circuits and sensors.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
5	Other (please specify):				
<b>IC Engine Fuel System Diagnosis and Repair - Electronic Components</b>					
1	Inspect and test for missing, modified, or damaged, engine control components and programmed parameters (factory and customer).				
2	Interpret diagnostic scan tool data to determine program parameters (factory and customer) and engine control system condition.				
3	Establish relative importance and accuracy of displayed data.				
4	Determine if the control system problem is electrical/electronic or mechanical.				
5	Determine appropriate electronic engine control diagnostic procedures based on vehicle data, operational complaint, and utilize relevant service information and diagnostic tools.				
6	Perform digital multimeter tests on circuits.				
7	Test input sensors/circuits using displayed data.				
8	Test output actuators/circuits using displayed data.				
9	Test and confirm operation of electrical/electronic circuits not displayed on diagnostic tools.				
10	Diagnose performance complaints caused by non-engine electronic control system problems.				
11	Determine root cause of current, multiple, and repeated failures.				
12	Other (please specify):				
<b>IC Engine Cylinder Head and Valve Train Diagnosis and Repair</b>					
1	Remove, inspect, disassemble, and clean cylinder head assembly(s).				
2	Inspect threaded holes, studs, and bolts for serviceability; service or replace as needed.				
3	Measure cylinder head-to-deck thickness, and check mating surfaces for warpage and surface finish; inspect for cracks and damage; check condition of passages; inspect core and gallery plugs; service as needed.				
4	Inspect valves, guides, seats, springs, retainers, rotators, locks and seals; determine serviceability and needed repairs.				
5	Inspect, reinstall or replace injector sleeves and seals; pressure test to verify repair (if applicable); measure injector tip or nozzle protrusion where specified by manufacturer.				
6	Inspect, reinstall or replace valve bridges (crossheads) and guides; adjust bridges (cross-heads).				
7	Clean components; reassemble, check, and install cylinder head assembly as specified by the manufacturer.				



Duties and Tasks		Date	MENT Initials	Date	APR Initials
8	Inspect, measure, reinstall, or replace pushrods, rocker arms, rocker arm shafts, and supports for wear, bending, cracks, looseness, and blocked oil passages. Visually inspect for wear and correct routing				
9	Inspect, install, and adjust cam followers.				
10	Adjust valve clearances and injector settings.				
11	Inspect, measure, and reinstall or replace overhead camshaft and bearings; measure and adjust endplay and backlash.				
12	Other (please specify):				
<b>IC Engine Lubrication and Cooling Systems Diagnosis and Repair</b>					
1	Verify engine oil pressure and check operation of pressure sensor, pressure gauge, and sending unit.				
2	Inspect measure, repair or replace oil pump, drives, pipes, and screens.				
3	Inspect, repair or replace oil pressure regulator valve(s), by-pass valve(s), and filters.				
4	Inspect, clean, test, reinstall or replace oil cooler, by-pass valve, oil thermostat, lines and hoses.				
5	Inspect turbocharger lubrication system (if applicable); repair or replace as needed.				
6	Change oil and filter, verify oil level and condition.				
7	Inspect, reinstall or replace drive belts, pulleys and tensioners; adjust drive belts and check alignment.				
8	Verify coolant temperature, and check operation of temperature and level sensors, temperature gauge, and sending unit.				
9	Inspect and replace cooling system thermostat(s), by-passes, housing(s), and seals.				
10	Flush and refill cooling system; bleed air from system; recover coolant.				
11	Inspect, repair or replace coolant conditioner/filter, check valves, lines, shutoff valves, and fittings.				
12	Inspect, repair, or replace water pump, housing, hoses, idler pulley and drives.				
13	Inspect radiator, pressure cap, and tank(s); determine needed service.				
14	Inspect, repair, or replace fan hub, fan, and fan clutch; inspect mechanical, hydraulic, and electronic fan controls, fan thermostat, and fan shroud.				
15	Pressure test cooling system and radiator cap; determine needed repairs.				
16	Other (please specify):				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
<b>IC Engine Air Induction and Exhaust Systems Diagnosis and Repair</b>					
1	Inspect, service or replace air induction piping, air cleaner, and element; check for air restriction or contamination.				
2	Inspect, test, and replace turbocharger, wastegate, and wastegate controls (if applicable).				
3	Inspect and replace intake manifold and gaskets; test temperature and pressure sensors; check connections.				
4	Inspect, test, clean, repair or replace aftercooler or charge-air cooler and piping system (if applicable).				
5	Inspect, repair or replace exhaust manifold, gaskets, piping, mufflers, insulation/heat shield and mounting hardware; inspect, replace, or repair exhaust after treatment devices				
6	Inspect, repair or replace preheater/inlet air heater, starting aids, and controls.				
7	Inspect, test, service, and replace EGR system components; including EGR valve, variable ratio/geometry turbocharger, cooler, piping, filter, electronic sensors, controls, system air pressure solenoids, and wiring (if applicable).				
8	Inspect and repair exhaust brake system (if applicable).				
9	Determine root cause of current, multiple, and repeated failures.				
10	Other (please specify):				
<b>IC Engine Block Diagnosis, Repair and Overhaul</b>					
1	Remove, inspect, service, and reinstall pans, covers, breathers, gaskets, seals, and wear rings.				
2	Disassemble, clean, and inspect engine block for cracks; check mating surfaces for damage or warpage and surface finish; check deck height; check condition of passages, core, and gallery plugs; inspect threaded holes, studs, dowel pins and bolts for serviceability; service, reinstall or replace as needed.				
3	Inspect cylinder sleeve counterbore and lower bore; check bore distortion; determine needed service.				
4	Inspect and measure cylinder walls or liners for wear and damage; determine needed service.				
5	Replace/reinstall cylinder liners and seals; check and adjust liner heights.				
6	Inspect in-block camshaft bearings for wear and damage; replace as needed.				
7	Inspect measure, reinstall or replace in-block camshaft; measure and adjust end play; inspect, reinstall or replace, and adjust cam followers (if applicable).				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
8	Clean and inspect crankshaft and journals for surface cracks and damage; check condition of oil passages; check passage plugs; measure journal diameters; check mounting surfaces; determine needed service.				
9	Inspect, reinstall or replace main bearings; check cap fit and bearing clearances; check and correct crankshaft endplay.				
10	Inspect, reinstall, and time the drive gear train (check timing sensors, gear wear and back-lash of crankshaft, camshaft, balance shaft, auxiliary drive, and idler gears); service shafts, bushings, and bearings.				
11	Clean, inspect measure, reinstall or replace pistons, pins, and retainers.				
12	Measure piston-to-cylinder wall clearances.				
13	Check ring-to-groove clearances and end gaps; install piston rings.				
14	Identify piston, connecting rod bearing, and main bearing wear patterns that indicate connecting rod and crankshaft alignment or bearing bore problems; check bearing bore and bushing condition; determine needed repairs.				
15	Assemble pistons and connecting rods and install in block; check piston height; replace rod bearings and check clearances; check condition, position, and clearance of piston cooling jets (nozzles - if applicable).				
16	Inspect and measure crankshaft vibration damper; determine needed repairs.				
17	Inspect, install, and align flywheel housing.				
18	Inspect flywheel or flex-plate (including ring gear) and mounting surfaces for cracks, wear, and runout; determine needed repairs.				
19	Other (please specify):				
<b>Competency 4c: Maintains, Diagnoses and Repairs Items Specific to Diesel Engines</b>					
4c	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
<b>Diesel Fuel System Diagnosis and Repair - Mechanical Components</b>					
1	Inspect, clean, test, repair or replace fuel transfer pump, lift pump, drives, screens, fuel/water separators/indicators, filters, heaters, coolers, ECM cooling plates, and mounting hardware.				
2	Check fuel system for air and temperature; determine needed repairs; prime and bleed fuel system; check, repair or replace primer pump.				
3	Inspect, test, repair or replace low/high pressure systems (check valves, pressure regulator valves and restrictive fittings).				
4	Perform on-engine inspections, tests, adjustments, and time, or replace and time, distributor type injection pumps.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
5	Perform on-engine inspections, tests, and adjustments, or replace mechanical unit injectors.				
6	Inspect, adjust, repair or replace smoke limiters (air/fuel ratio controls).				
7	Inspect, reinstall or replace high-pressure injection lines, fittings, seals, and mounting hardware.				
8	Inspect and test high pressure fuel system (common rail) including pump, relief valve, and injectors.				
9	Other (please specify):				
<b>Diesel Fuel System Diagnosis and Repair - Electronic Components</b>					
1	Same as IC Engine Fuel System Diagnosis and Repair - Electronic Components				
2	Other (please specify):				
<b>Diesel Engine Air Induction and Exhaust Diagnosis</b>					
1	Properly diagnose engine performance issues due to boost pressure, pressure test the air induction system, Charge Air cooler and Bellows and perform exhaust restriction testing.				
2	Perform emission related diagnostics per troubleshooting manuals, pull ECM images and perform regeneration to evaluate emissions aftertreatment regeneration times/temperatures				
3	Isolate failed components (diesel oxidation catalyst [DOC], diesel particulate filter [DPF] or selective catalytic reduction [SCR]) using laptop diagnostics.				
4	Perform bi-lateral functions to test/diagnose Diesel Exhaust Fluid (DEF) system failures.				
5	Same as IC Engine Air Induction and Exhaust Systems Diagnosis and Repair				
6	Other (please specify):				
4d	<b>Competency 4d: Maintains, Diagnoses and Repairs Items Specific to Gasoline Engines (Optional)</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Inspect and replace spark plugs and ignition wires				
2	Inspect and diagnose primary and secondary ignition systems				
3	Diagnose and replace mass air flow sensors, throttle actuators, pressure density switches, cam and crank sensors, throttle valves, and other gasoline related engine parts				
4	Perform gasoline fuel supply and fuel return system tests; check fuel for contamination, Quality/type/grade, and consumption; determine needed repairs.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
5	Other (please specify):				
4e	<b>Competency 4e: Maintains, Diagnoses and Repairs Items Specific to CNG Engines and Related Systems (Optional)</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
<b>General</b>					
1	Perform gaseous fuel delivery system tests; check fuel for contamination, Quality/type/grade, and consumption; determine needed repairs.				
2	Use detection equipment to locate leaks				
3	Inspect and replace spark plugs and ignition wires				
4	Inspect and diagnose primary and secondary ignition systems				
5	Diagnose and replace mass air flow sensors, throttle actuators, pressure density switches, cam and crank sensors, throttle valves, and other CNG related engine parts				
6	Other (please specify):				
<b>CNG Fuel Storage Cylinders and related components</b>					
1	Perform system inspections (annually, and after low clearance accidents)				
2	Inspect cylinder mountings for security, gouges, rubs, etc.; inspect lines and fittings; inspect for UV damage using tool; inspect all pressure relief devices/tank isolation valves; inspect high pressure regulator; and inspect routing of vent lines				
3	Use OEM specifications to evaluate and measure fuel storage tank scratches and gauges				
4	Other (please specify):				
<b>CNG Fuel Distribution Systems</b>					
1	Demonstrates the ability to correctly fabricate/bend replacement lines with proper fittings (Swagelock)				
2	Other (please specify):				
4f	<b>Competency 4f: Maintains, Diagnoses and Repairs Items Specific to Hybrid Propulsion Systems (Optional)</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
<b>Energy Storage System (ESS)</b>					
1	Use a laptop to identify ESS faults				

<b>Duties and Tasks</b>		<b>Date</b>	<b>MENT Initials</b>	<b>Date</b>	<b>APR Initials</b>
2	Inspect, maintain and repair: ESS cooling system, control system (internal to ESS), disconnect features (shunt disconnects), mechanical enclosure, isolation system, and cables in the ESS.				
3	Inspect, repair, overhaul, and rebuild ESS				
4	Diagnose and repair ESS end of life condition				
5	Other (please specify):				
<b>Power Inverter/Power Electronics</b>					
1	Use a laptop to identify Power Inverter/Power Electronics faults				
2	Inspect, maintain and repair: inverter and related control system, high-voltage cables, DC-to-DC converter, cooling system, and communication between components.				
3	Diagnoses and repair High Voltage Interlock Loop (HVIL) problems				
4	Diagnoses and repair ESS problems associated with fuses, relays, contactors, and wiring				
5	Other (please specify):				
<b>Power Generation</b>					
1	Use a laptop to identify Power Generation faults				
2	Inspect and maintain generator/motor.				
3	Use OEM schematics to determine fault in Propulsion system				
4	Other (please specify):				
<b>High-Voltage Cables</b>					
1	Inspect and maintain shielded and non-shielded cables.				
2	Inspect and test for opens, shorts, and EMI problems				
3	Uses DVOM and MEGGER to diagnose/test cables, terminal ends and connections				
4	Other (please specify):				
<b>Electric Drive/Traction Motor</b>					
1	Inspect, maintain and repair: AC induction motors, wheel motors (if present), regenerative braking function, cooling system and cables.				
2	Diagnoses and repair speed sensors, temp sensors, associated with the Drive/Traction Motor				
3	Diagnoses and repair Drive/Traction Motor including stator problems				
4	Pressure check Drive when applicable				
5	Other (please specify):				
<b>Data Communication Networks</b>					

Duties and Tasks		Date	MENT Initials	Date	APR Initials
1	Verify communication between components on data network.				
2	Inspect, maintain and repair: terminating resistors, gateways, interface with engine control module or unit (ECM/ECU), shielded and non-shielded data cables, shielded and non-shielded data cables				
3	Diagnose and repair the High Voltage Interlock Loop (HVIL)				
4	Verify integrity of control area network (CAN) and other applicable networks				
5	Inspect and repair terminals and connector used on CAN and other applicable networks				
6	Diagnoses CAN and other applicable network errors and faults				
7	Other (please specify):				
4g	<b>Competency 4g: Maintains, Diagnoses and Repairs Items Specific to Electric Propulsion Systems (Optional)</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
<b>Energy Storage System (ESS)</b>					
1	Diagnoses and repair ESS end of life condition				
2	ESS R&R				
3	Diagnoses and repair ESS problems associated with fuses, relays, contactors, and wiring				
4	Other (please specify):				
<b>Data Communication Networks</b>					
1	Verify communication between components on data network.				
2	Inspect, maintain and repair: terminating resistors, gateways, interface with engine control module or unit (ECM/ECU), shielded and non-shielded data cables, shielded and non-shielded data cables				
3	Diagnose and repair the High Voltage Interlock Loop (HVIL)				
4	Verify integrity of control area network (CAN) and other applicable networks				
5	Inspect and repair terminals and connector used on CAN and other applicable networks				
6	Diagnoses CAN and other applicable network errors and faults				
7	Other (please specify):				
<b>Power Inverter/Power Electronics</b>					
1	Use a laptop to identify Power Inverter/Power Electronics faults				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
2	Inspect, maintain and repair: inverter and related control system, high-voltage cables, DC-to-DC converter, cooling system, and communication between components.				
3	Diagnoses and repair High Voltage Interlock Loop (HVIL) problems				
4	Diagnoses and repair ESS problems associated with fuses, relays, contactors, and wiring				
5	Other (please specify):				
<b>High-Voltage Cables</b>					
1	Inspect and maintain shielded and non-shielded cables.				
2	Inspect and test for opens, shorts, and EMI problems				
3	Uses DVOM and MEGGER to diagnose/test cables, terminal ends and connections				
4	Other (please specify):				
<b>Chillers</b>					
1	Familiarization				
2	Maintenance				
3	Other (please specify):				
<b>Electric Drivetrain Traction Motor</b>					
1	Inspect, maintain and repair: AC induction motors, wheel motors (if present), regenerative braking function, cooling system and cables.				
2	Diagnoses and repair speed sensors, temp sensors, associated with the Drive/Traction Motor				
3	Diagnoses and repair Drive/Traction Motor including stator problems				
4	Pressure check Drive when applicable				
5	Other (please specify):				
4h	<b>Competency 4h: Maintains, Diagnoses and Repairs Items Specific to Fuel Cell Propulsion Systems (Optional)</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
	To be determined (Technology not yet fully developed for transit applications)				
4i	<b>Competency 4i: Overhaul of Engine (Optional)</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Overhaul engine				



Duties and Tasks		Date	MENT Initials	Date	APR Initials
2	Other (please specify):				

Comments and notes:

**Job Function 5:  
Maintains, Diagnoses and Repairs Automatic Transmissions and  
Drivetrains**

Duties and Tasks		Date	MENT Initials	Date	APR Initials
<b>5a</b>	<b>Competency 5a: Follows Safe Procedures</b>				
	<b>Prerequisite:</b> Performance Standards identified in Job Function 1: Demonstrates Mastery of Fundamental Skills, Competency 1a: Follows Safe Procedures				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Uses manufacturers or approved lifting/support/removal devices for proper weight ratings and component being removed/installed.				
2	Other (please specify):				
3	Other (please specify):				
<b>5b</b>	<b>Competency 5b: Maintains, Diagnoses and Repairs Automatic Transmissions</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose noise, vibration, and shifting problems; determine needed repairs.				
2	Check transmission fluid level; check dipstick calibration; diagnose fluid usage, leaks, and condition; determine needed repairs.				
3	Perform transmission pressure tests; determine needed repairs.				
4	Perform stall tests; determine needed repairs.				
5	Perform lock-up converter system tests; determine needed repairs.				
6	Diagnose mechanical control systems; determine needed repairs.				
7	Replace fluid and internal/external filter(s).				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
8	Inspect, test, adjust, and/or replace retarder controls, valves, air lines, sensors, and components.				
9	Inspect and replace external seals and gaskets.				
10	Inspect, test, flush, transmission, transmission cooler and lines; inspect breathers, filters, and fittings; service as required.				
11	Inspect, test, reinstall or replace internal or external vehicle speed sensors				
12	Inspect and test transmission temperature circuit for accuracy; determine needed repairs.				
13	Inspect, test, diagnose, adjust, repair, or replace electrical/electronic components including the transmission control module (TCM), electronic modulators, solenoids, sensors, relays, switches, lights, fuses/breakers, wiring and connectors.				
14	Inspect, replace, and align drivetrain mounts.				
15	Remove and replace transmission; inspect flex plate.				
16	Inspect engine block, flywheel housing, and transmission mating surfaces; check runout; check engine-to-transmission mounting adapters; determine needed repairs.				
17	Inspect, test, repair, or replace electronic shift selectors, switches, displays and indicators, and wiring harnesses.				
18	Diagnose automatic transmission and retarder problems using appropriate diagnostic tools and software, procedures, and service information/flow charts; perform TCM flash programming/updates; check and record diagnostic trouble codes; clear codes; interpret digital multimeter (DMM) readings.				
19	Diagnose automatic transmission problems caused by data link/bus interfaces with the transmission control module (TCM); identify electrical interference problems; determine needed repairs.				
20	Inspect, adjust, service, repair, or replace power take-off assemblies and controls.				
21	Other (please specify):				
22	Other (please specify):				
<b>Competency 5c: Maintains, Diagnoses and Repairs Drive Shafts and Universal Joints</b>					
<b>5c</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose drive shaft and universal joint noise and vibration problems; determine cause of failure and needed repairs.				
2	Inspect, service, or replace driveshaft, slip joints, yokes, drive flanges, universal joints, and vibration dampers; phase drive shaft yokes.				
3	Measure driveline angles; determine needed adjustments.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
4	Other (please specify):				
5	Other (please specify):				
<b>Competency 5d: Maintains, Diagnoses and Repairs Drive Axles</b>					
5d	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose rear axle drive unit noise, vibration, and overheating problems; determine needed repairs.				
2	Check and repair fluid leaks; inspect and replace rear axle drive unit cover plates, gaskets, breathers, magnetic plugs, and pinion seals.				
3	Check rear axle drive unit fluid level and condition; determine needed service; add proper type of lubricant.				
4	Remove and replace differential carrier assembly, check ring and pinion backlash, inspect rear axle housing mating surfaces; determine needed repairs.				
5	Remove, inspect, and replace axle shafts.				
6	Remove and replace rear wheel hub assembly; inspect ABS tone/exciter ring and wheel speed sensor; determine needed repairs.				
7	Diagnose wheel bearing noises and damage; determine needed repairs. Demonstrate wheel bearing preload adjustment.				
8	Clean, inspect, lubricate, and replace wheel bearing cones and races (cups); clean and inspect locking plates and nuts; replace seals, wear rings, and axle flange gasket; adjust rear wheel bearings.				
9	Inspect, adjust, repair, or replace planetary axle assemblies including case, idler pinion, pins, gears, thrust washers, shims, seals, cover, and springs.				
10	Other (please specify):				
11	Other (please specify):				
<b>Competency 5e: Overhaul of Transmission (optional)</b>					
5e	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Overhaul transmission				
2	Other (please specify):				
3	Other (please specify):				

**Comments and notes:**

**Job Function 6:  
Maintains, Diagnoses and Repairs Steering and Suspension Systems**

Duties and Tasks		Date	MENT Initials	Date	APR Initials	
<b>6a</b>	<b>Competency 6a: Follows Safe Procedures</b>					
	<b>Prerequisite:</b> Performance Standards identified in Job Function 1: Demonstrates Mastery of Fundamental Skills, Competency 1a: Follows Safe Procedures					
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>					
1	Other (please specify):					
2	Other (please specify):					
<b>6b</b>	<b>Competency 6b: Maintains, Diagnoses and Repairs Steering Systems</b>					
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>					
	1	Diagnose steering column (tilt, telescoping, or fixed) shaft noise, looseness, and binding problems; determine needed repairs.				
	2	Inspect and replace steering shaft U-joint(s), slip joint(s), bearings, bushings, and seals; phase steering shaft U-joints.				
	3	Diagnose power steering system noises, steering binding, uneven turning effort, looseness, hard steering, overheating, fluid leakage, and fluid aeration problems; determine needed repairs.				
	4	Inspect power steering fluid level and condition; determine fluid type and needed service.				
5	Purge air from the power steering system.					

Duties and Tasks		Date	MENT Initials	Date	APR Initials
6	Perform power steering system pressure and flow tests; determine needed repairs.				
7	Inspect, service, or replace power steering reservoir including filter, seals, and gaskets.				
8	Inspect, adjust, align, or replace power steering pump belt(s), pulley(s), and tensioner(s).				
9	Inspect power steering pump drive gear and coupling; replace as required.				
10	Inspect, adjust, or repair, power steering pump, diverter valves, mountings, and brackets; replace as required.				
11	Inspect power steering system cooler, lines, hoses, and fittings; replace as required.				
12	Inspect, and adjust integral-type power steering gear; replace as required.				
13	Inspect and replace pitman arm; center steering linkage.				
14	Inspect, adjust/service, or replace drag link/center link, tie rods and tie rod ends; position adjusting sleeves, clamps, and retainers.				
15	Inspect idler arm; replace as required.				
16	Inspect steering arm and tie rods; replace as required.				
17	Check and adjust steering linkage or wheel stops (axle stops).				
18	Check and adjust steering gear poppet/relief valves.				
19	Diagnose problems in the articulation system electronic controls, and mechanical and hydraulic components; determine needed repairs.				
20	Other (please specify):				
21	Other (please specify):				
<b>Competency 6c: Maintains, Diagnoses and Repairs Independent Front Suspensions</b>					
<b>6c</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose front suspension system noises, looseness, body sway, and rough ride; determine needed repairs.				
2	Inspect upper and lower control arms, strut rods/radius arms, bushings, shafts, and rebound/jounce bumpers on short and long arm (SLA) suspension systems; replace as required.				
3	Inspect upper and lower ball joints and/or kingpins; replace as required.				
4	Inspect steering knuckle/spindle assemblies; replace as required.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
5	Measure and adjust ride height.				
6	Inspect front suspension system air bags; replace as required.				
7	Inspect operation of kneeling system; perform necessary repairs.				
8	Inspect stabilizer bar (sway bar) bushings, brackets, and links; replace as required.				
9	Inspect shock absorbers, bushings, brackets, and mounts; replace as required.				
10	Check and adjust steer axle wheel bearings, replace as needed				
11	Other (please specify):				
12	Other (please specify):				
<b>Competency 6d: Maintains, Diagnoses and Repairs Straight/I-Beam Axles</b>					
<b>6d</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose front suspension system noises, looseness, body sway, and rough ride; determine needed repairs.				
2	Inspect front axle, U-bolts, and nuts; service or replace as required.				
3	Inspect, kingpins, steering knuckle bushings, locks, bearings, shims, seals, and covers; service or replace as required.				
4	Inspect shock absorbers, bushings, brackets, and mounts; replace as required.				
5	Inspect front suspension air bags; replace as required.				
6	Measure vehicle ride height; determine needed adjustments or repairs.				
7	Inspect, repair, and/or replace radius rods, lateral/torque rods, stabilizer bar (sway bar), bushings, brackets, and mounts, and air/walking beams; adjust as necessary.				
8	Check and adjust steer axle wheel bearings, replace as needed				
9	Inspect operation of kneeling system; perform necessary repairs.				
10	Other (please specify):				
11	Other (please specify):				
<b>Competency 6e: Maintains, Diagnoses and Repairs Rear Suspensions</b>					
<b>6e</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose suspension system noises, looseness, rough ride, and body sway problems; determine needed repairs.				
2	Inspect rear axle housing, U-bolts, and nuts; service or replace as required.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
3	Inspect shock absorbers, bushings, brackets, and mounts; replace as required.				
4	Measure vehicle ride height; determine needed adjustments or repairs.				
5	Inspect and adjust rear axle aligning devices such as radius rods, lateral rods, torque rods, stabilizer bars, and related bushings, mounts, shims, and links; replace as required.				
6	Inspect, test, adjust, or repair air suspension pressure regulator, pressure protection valve(s), height control valve(s), lines, hoses, and fittings; replace as required.				
7	Inspect, test, or repair, air bags, mounting plates, suspension arms, and bushings; replace as required.				
8	Check and adjust drive axle wheel bearings replace as needed				
9	Other (please specify):				
10	Other (please specify):				
<b>Competency 6f: Diagnoses, Adjusts and Repairs Wheel Alignment</b>					
<b>6f</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose vehicle wandering, pulling, shimmy, bump steer, and steering effort problems; determine needed adjustments or repairs.				
2	Check and adjust camber; determine needed repairs.				
3	Check and adjust caster; determine needed repairs.				
4	Check SAI (steering axis inclination)/KPI (kingpin inclination) and included angle; determine needed repairs.				
5	Check and adjust toe.				
6	Diagnose toe-out-on-turn (Ackerman angle) problems; determine needed repairs.				
7	Check rear axle alignment (thrustline/centerline) and tracking; adjust or determine needed repairs.				
8	Other (please specify):				
9	Other (please specify):				
<b>Competency 6g: Maintains, Diagnoses and Repairs Wheels and Tires</b>					
<b>6g</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose tire wear patterns; determine needed repairs.				
2	Inspect, repair, or replace tires, valve stems, and caps; check and adjust air pressure.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
3	Diagnose wheel/tire vibration and shimmy problems; determine needed repairs.				
4	Inspect and replace wheels (rims), wheel spacers, studs, and nuts.				
5	Measure wheel and tire radial and lateral run out; determine needed repairs.				
6	Balance wheel and tire assembly.				
7	Measure tire diameter and/or circumference; match tires and rims.				
8	Other (please specify):				
9	Other (please specify):				

**Comments and notes:**

### Job Function 7: Maintains, Diagnoses and Repairs Heating, Ventilation and Air Conditioning (HVAC) Systems

Duties and Tasks		Date	MENT Initials	Date	APR Initials
<b>7a</b>	<b>Competency 7a: Follows Safe Procedures</b>				
	<b>Prerequisite:</b> Performance Standards identified in Job Function 1: Demonstrates Mastery of Fundamental Skills, Competency 1a: Follows Safe Procedures				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Follows all EPA requirements for handling, labeling and storing refrigerant and storage containers				
2	Demonstrate ability to safely use recycle/recovery equipment				
3	Fire safety and MSDS as applies to soldering repairs.				
4	Other (please specify):				
5	Other (please specify):				
<b>7b</b>	<b>Competency 7b: Performs Basic HVAC System Verifications and Testing</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Verify the need for service or repair of HVAC systems based on operating noises; determine appropriate action.				



Duties and Tasks		Date	MENT Initials	Date	APR Initials
2	Verify the need of service or repair of HVAC systems based on sight, odor, and other conditions; determine appropriate action.				
3	Identify HVAC system components and refrigerant type (R-22, R-134a, R-407c); conduct performance tests; determine appropriate action.				
4	Use a data reader/computer to determine fault codes and perform system tests; check and adjust system parameters; clear fault codes.				
5	Other (please specify):				
6	Other (please specify):				
<b>Competency 7c: Maintains, Diagnoses and Repairs A/C System and Related Components</b>					
7c	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
	NOTE: The following competencies should be accomplished in accordance with published EPA and appropriate SAE "J" standards for R-22, R-134a, R-407c, and EPA approved refrigerant blends. Service must be performed by EPA certified technicians.				
<b>A/C System—General</b>					
1	Diagnose the cause of A/C system temperature control problems; determine needed repairs.				
2	Identify A/C refrigerant type; check for contamination; determine appropriate action.				
3	Diagnose the cause of A/C system problems indicated by pressure gauge readings and sight glass/moisture indicator conditions (where applicable); determine needed service or repairs.				
4	Diagnose the cause of A/C system problems indicated by sight, audible, odor, and touch conditions; determine needed repairs.				
5	Perform A/C system leak test; determine needed repairs.				
6	Evacuate A/C system using appropriate equipment.				
7	Remove contaminants from the A/C system.				
8	Test recycled refrigerant for non-condensable gases.				
9	Label and store refrigerant.				
10	Charge A/C system with refrigerant.				
11	Identify A/C system lubricant type needed for system application.				
12	Maintain and verify correct operation of certified equipment.				
13	Other (please specify):				
14	Other (please specify):				
<b>Compressor and Clutch</b>					

<b>Duties and Tasks</b>		<b>Date</b>	<b>MENT Initials</b>	<b>Date</b>	<b>APR Initials</b>
1	Diagnose A/C system problems that cause protection devices (pressure, thermal, and electronic) to interrupt system operation; determine needed repairs.				
2	Inspect and test A/C system pressure, thermal, and electronic protection devices and connections; replace as required.				
3	Inspect and adjust A/C compressor drives, belts, pulleys, and tensioners; replace as required.				
4	Inspect, test, and service A/C compressor clutch components and clutch assembly; replace as required.				
5	Check and correct A/C compressor lubricant level and condition.				
6	Inspect, test, and replace A/C compressor.				
7	Inspect and repair A/C compressor mountings and hardware; replace as required.				
8	Check operation of A/C compressor unloaders; adjust as required.				
9	Other (please specify):				
10	Other (please specify):				
<b>Evaporator, Condenser, and Related Components</b>					
1	Adjust A/C system lubricant level after replacement of system components.				
2	Inspect and repair A/C system hoses, lines, filters, fittings, and seals; replace as required.				
3	Check air flow through A/C condensers and evaporators; correct as required.				
4	Inspect and test A/C system condenser and mountings; replace as required.				
5	Inspect receiver and filter-drier; replace as required.				
6	Inspect and test refrigerant solenoid, expansion valve(s), and evaporator pressure regulators; check placement of thermal bulb (capillary tube); replace as required.				
7	Inspect and test evaporator core; replace as required.				
8	Inspect, clean, and repair evaporator housing and water drain; inspect and service or replace evaporator air filter.				
9	Identify and inspect A/C system service valves and connections; repair as required.				
10	Diagnose cause of A/C system failures which result in refrigerant loss from the high-pressure relief device.				
11	Other (please specify):				
12	Other (please specify):				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
<b>Solder, Brazing, and Torch use</b>					
1	Proper torch set up and use. Fire prevention and or other component damage. MSDS and PPE				
2	Identify different metal compounds				
3	Identify the correct filler metal, flux and temperature needed for repair.				
4	Job preparation functions (clean, correct solder, heat, flux, cool down, clean and coat.)				
5	Other (please specify):				
6	Other (please specify):				
<b>Competency 7d: Maintains, Diagnoses and Repairs Heating and Engine Cooling Systems</b>					
<b>7d</b>	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose the cause of outlet air temperature control problems in the HVAC system; determine needed repairs.				
2	Diagnose window fogging problems; determine needed repairs.				
3	Perform engine cooling system tests for leaks, protection level, contamination, coolant level, temperature, and conditioner concentration; determine needed repairs.				
4	Inspect engine cooling and heating system hoses, lines, and clamps; replace as required.				
5	Inspect and test radiator, pressure relief devices, and coolant recovery system (surge tank); determine needed repairs.				
6	Inspect water pump and drive system; determine needed repairs.				
7	Inspect and test thermostats, by-passes, housings, and seals; determined needed repairs.				
8	Flush and refill cooling system; bleed air from system.				
9	Inspect and test fan, fan drives, controls, and fan shroud; repair or replace as required.				
10	Inspect and test heating system coolant control valve(s) and manual shut-off valves; re-place as required.				
11	Inspect and flush driver's heater and/or defroster cores; replace as required.				
12	Perform heating system tests to include coolant flow and booster pump(s) operation.				
13	Inspect, test, and diagnose heater/defroster and defogger system problems; check blowers, fans, resistors, switches, relay/modules, sensors, wiring, and protection devices; repair or replace as required.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
14	Inspect, test and diagnose service heating, ventilating, and defrosting control panel assemblies, cables, and linkages; repair or replace as required.				
15	Inspect, test, and diagnose heating, ventilating, and defrosting control switches, hoses, and solenoid valves; repair or replace as required.				
16	Inspect, test, and adjust heating, ventilating, and defrosting ducts, filters, doors, cables, linkages, hoses, and outlets; repair or replace as required.				
17	Test, diagnose, and service fuel-fired auxiliary heater system.				
18	Other (please specify):				
19	Other (please specify):				
7e	<b>Competency 7e: Maintains, Diagnoses and Repairs HVAC Operating Systems and Related Controls</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
<b>Electrical Systems</b>					
1	Electrical Systems				
2	Diagnose the cause of failures in HVAC electrical control systems; determine needed repairs.				
3	Inspect and test HVAC defroster blower motors, resistors, switches, relays, modules, wiring, and protection devices; repair or replace as required.				
4	Inspect and test HVAC compressor clutch relays, modules, wiring, sensors, switches, di-odes, and protection devices; repair or replace as required.				
5	Inspect and test HVAC-related electronic engine control systems; determine needed repairs.				
6	Inspect and test HVAC evaporator/heater and condenser fan motors, motor drivers (alternating current and direct current), relays, modules, switches, sensors, wiring, and protection devices; repair or replace as required.				
7	Other (please specify):				
8	Other (please specify):				
<b>Constant/Automatic Temperature Control Systems</b>					
1	Diagnose constant/automatic temperature control system problems; determine needed repairs.				
2	Inspect and test climate control temperature sensors; repair or replace as required.				
3	Inspect, test, and adjust heater coolant valve and controls; repair or replace as required.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
4	Inspect and test solenoids and switches; repair or replace as required.				
5	Inspect and test constant/automatic temperature control panels; repair or replace as required.				
6	Inspect and test constant/automatic temperature control microprocessor (climate control computer/programmer); repair or replace as required.				
7	Connect data reader/computer to determine fault codes and perform system tests; check and adjust system parameters; clear fault codes.				
8	Other (please specify):				
9	Other (please specify):				

**Comments and notes:**

**Job Function 8:  
Maintains, Diagnoses and Repairs Body and Chassis Equipment and  
Systems**

Duties and Tasks		Date	MENT Initials	Date	APR Initials
8a	<b>Competency 8a: Follows Safe Procedures</b>				
	<b>Prerequisite:</b> Performance Standards identified in Job Function 1: Demonstrates Mastery of Fundamental Skills, Competency 1a: Follows Safe Procedures				
	<i>The apprentice shall properly perform the following: (add any tasks not included in Competency 1a)</i>				
1	Other (please specify):				
2	Other (please specify):				
8b	<b>Competency 8b: Maintains, Diagnoses and Repairs Operator and Passenger Seating</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Remove and replace operator seat and passenger seat				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
2	Repair operator seat and passenger seat				
3	Other (please specify):				
4	Other (please specify):				
8c	<b>Competency 8c: Maintains, Diagnoses and Repairs Stanchions, Grab Rails and Modesty Panels</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Remove and replace stanchions, grab rails/straps and modesty panels				
2	Repair stanchions, grab rails and modesty panels				
3	Other (please specify):				
4	Other (please specify):				
8d	<b>Competency 8d: Maintains, Diagnoses and Repairs Windows</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Remove and replace passenger windows and related seals				
2	Remove and replace front/rear windshield				
3	Other (please specify):				
4	Other (please specify):				
8e	<b>Competency 8e: Maintains, Diagnoses and Repairs Door Systems</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Remove and replace passenger doors				
2	Adjust doors				
3	Diagnose and repair common door faults				
4	Remove and replace door controls				
5	Diagnose and repair common door control faults				
6	Remove and replace operator door/barrier				
7	Adjust operator door/barrier				
8	Diagnose and repair common operator door/barrier faults				
9	Remove and replace door motor(s)				
10	Diagnose and repair common door motor faults				
11	Other (please specify):				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
12	Other (please specify):				
8f	<b>Competency 8f: Maintains, Diagnoses and Repairs Flooring, Paneling and Roof Hatches</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Remove and replace flooring				
2	Remove and replace paneling				
3	Remove and replace roof hatch				
4	Repair flooring				
5	Repair paneling				
6	Repair roof hatches				
7	Other (please specify):				
8	Other (please specify):				
8g	<b>Competency 8g: Maintains, Diagnoses and Repairs Wheelchair lifts, Ramps and Restraints</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Remove and replace wheelchair lift				
2	Remove and replace wheelchair ramp				
3	Adjust wheelchair lift				
4	Adjust wheelchair ramp				
5	Diagnose and repair common wheelchair lift faults				
6	Diagnose and repair common wheelchair lift control faults				
7	Remove and replace wheelchair restraints				
8	Adjust wheelchair restraints				
9	Other (please specify):				
10	Other (please specify):				
8h	<b>Competency 8h: Maintains, Diagnoses and Repairs Passenger Signaling (stop request) Systems (note: also see Destination signs located in JF2)</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Remove and replace stop request system components				
2	Adjust stop request pull cords and push buttons				
3	Diagnose and repair common stop request system component faults				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
4	Other (please specify):				
5	Other (please specify):				
<b>Competency 8i: Inspects and Repairs Frame/Chassis Members</b>					
8i	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Inspect frame and frame members for cracks, breaks, distortion, elongated holes, looseness, and damage; determine needed repairs.				
2	Inspect, install, or repair cradle and cradle mounts, brackets, and crossmembers in accordance with manufacturers' recommended procedures.				
3	Inspect bulkheads for cracks and rust; determine needed repairs.				
4	Other (please specify):				
5	Other (please specify):				
<b>Competency 8j: Welding (optional)</b>					
8j	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Use welding, cutting and heating equipment to carry out frame and chassis repairs.				
2	Obtain American Welding Society (AWS) Certified Welder certification				
3	Other (please specify):				
4	Other (please specify):				
<b>Competency 8k: Collision Repair and Paint Refinishing (optional)</b>					
8k	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Straighten collision damaged sheet metal				
2	Refinish body parts using appropriate paint and coatings				
3	Replace non-structural panels and parts				
4	Repair plastic and composite body parts				
5	Repair and replace fixed and moveable glass and related seals				
6	Other (please specify):				
7	Other (please specify):				

**Comments and notes:**



**Job Function 9:  
Conducts Preventive Maintenance Inspections**

Duties and Tasks		Date	MENT Initials	Date	APR Initials
<b>9a</b>	<b>Competency 9a: Follows Safe Procedures</b>				
	<b>Prerequisite:</b> Performance Standards identified in Job Function 1: Demonstrates Mastery of Fundamental Skills, Competency 1a: Follows Safe Procedures; 1b: Understands Industry Terminology (difference between check, test, inspect)				
	<i>The apprentice shall properly perform the following: (add any tasks not included in Competency 1a)</i>				
1	Other (please specify):				
2	Other (please specify):				
<b>9b</b>	<b>Competency 9b: Inspects Engine Systems</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
<b>Engine</b>					
1	Check engine operation for unusual noises, vibration, and excessive exhaust smoke.				
2	Inspect vibration damper				
3	Inspect belts, tensioners, belt guards, pulleys and alignment; check and adjust belt tension.				
4	Check engine compartment for oil, coolant, air, hydraulic fluid, and fuel leaks (Engine Off and Engine Running).				
5	Inspect engine mounts for looseness and deterioration.				
6	Check engine oil pressure, oil level and condition; check dipstick seal.				
7	Check engine compartment wiring, harnesses, connectors, and seals for damage and proper routing; check engine compartment controls, gauges, and lighting.				
8	Other (please specify):				
9	Other (please specify):				
<b>Fuel System</b>					

<b>Duties and Tasks</b>		<b>Date</b>	<b>MENT Initials</b>	<b>Date</b>	<b>APR Initials</b>
1	Check fuel tanks, filler neck check valve mountings, lines, vents, and caps.				
2	Drain water from fuel system.				
3	Inspect water separator/fuel heater; replace fuel filter(s); prime and bleed fuel system.				
4	Inspect crankcase ventilation system.				
5	Inspect diesel emission control systems and components, including exhaust gas recirculation (EGR) and catalytic converter.				
6	Other (please specify):				
7	Other (please specify):				
<b>Air Induction and Exhaust Systems</b>					
1	Check engine exhaust system mountings for looseness and damage.				
2	Check engine exhaust system for leaks, excessive noise, proper routing, and missing or damaged components (heat shields and guards); perform restriction/backpressure tests.				
3	Check air induction system routing, piping, charge air cooler, hoses, clamps, mountings, and indicators; check for air restrictions and leaks; check operation of cold start aids (heated grid, ether systems).				
4	Inspect turbocharger for noise and leaks; check mountings and connections; check wastegate and controls, variable geometry turbo, linkages, and hoses.				
5	Service or replace air filter(s) as required.				
6	Other (please specify):				
7	Other (please specify):				
<b>Cooling System</b>					
1	Check operation of fan control system.				
2	Inspect radiator for air flow restrictions, leaks, and damage; check mountings.				
3	Inspect fan assembly and fan shroud.				
4	Pressure test cooling system and radiator cap.				
5	Inspect coolant hoses and clamps for leaks, damage, and proper routing.				
6	Check surge tank; check sight glass for leaks, cracks, and discoloration.				
7	Identify coolant type; check coolant for contamination, supplemental additive (SCA) levels, and freeze point protection level.				
8	Service coolant filter/conditioner; check condition of shut-off valve.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
9	Drain and refill cooling system; bleed air from system; recover coolant and dispose of in accordance with federal, state, and local regulations.				
10	Inspect water pump for leaks and bearing play.				
11	Other (please specify):				
12	Other (please specify):				
<b>Lubrication System</b>					
1	Change engine oil and filters; visually check oil for coolant or fuel contamination; inspect and clean magnetic drain plugs; dispose of used oil and/or filters in accordance with federal, state, and local regulations.				
2	Take an engine oil sample (prior to changing oil).				
3	Other (please specify):				
4	Other (please specify):				
<b>Competency 9c: Inspects Body Interior and Exterior</b>					
9c	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
<b>Instruments and Controls</b>					
1	Inspect master control switch and start button; check operation of transmission shift selector.				
2	Check operation of indicator lights, warning lights and/or alarms.				
3	Check operation of instruments, gauges, and panel lighting.				
4	Check operation of fast engine idle and throttle and brake interlock systems.				
5	Check operation of driver's area defroster, heater, ventilation, and A/C (HVAC) controls.				
6	Check operation of driver controlled auxiliary systems, i.e. doors, wheelchair lift, kneeling system, and PA system.				
7	Use a diagnostic tool or the on-board diagnostic system to extract engine, transmission, brake monitoring, and other vehicle diagnostic systems information and codes.				
8	Other (please specify):				
9	Other (please specify):				
<b>Safety Equipment</b>					
1	Check operation of horns.				
2	Check condition of safety equipment including flares, reflective triangles, fire extinguisher, fire suppression system, and all required decals.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
3	Inspect seat belts and wheelchair restraints.				
4	Inspect wiper blades and arms.				
5	Check windshield wiper and washer operation.				
6	Check for all required vehicle permits, registration, decals, and inspection papers.				
7	Check operation of emergency exits (roof hatches, windows, door releases, and switches).				
8	Check operation of entrance and exit doors, sensitive edges and touch bars: check door opening and closing speeds; check operation of rear door interlock.				
9	Other (please specify):				
10	Other (please specify):				
<b>Hardware</b>					
1	Inspect windshield glass for cracks, chips or discoloration; check sun visor operation.				
2	Check driver's seat condition, operation, mounting, and suspension components.				
3	Check passenger seat condition, operation, and mountings.				
4	Check door glass and passenger window operation, condition, and safety stops.				
5	Inspect steps, flooring, and stanchion bars.				
6	Inspect all mirror, mountings, brackets, glass, heaters, and motors.				
7	Inspect and record all observed physical damage.				
8	Inspect and lubricate door and compartment hinges, latches, strikers, gas struts, linkages, and cables.				
9	Check operation and condition of accelerator and brake pedals.				
10	Inspect bicycle rack operation and condition.				
11	Other (please specify):				
12	Other (please specify):				
<b>Heating, Ventilation, and Air Conditioning (HVAC)</b>					
1	Inspect A/C condenser and evaporator lines for condition and visible leaks; check filter/drier, receiver tank, sight glasses and mountings.				
2	Inspect A/C compressor and lines for condition and visible leaks; check clutch and compressor mountings; check sight glass oil level and condition.				
3	Check operation of condenser and evaporator motors.				
4	Check A/C system operation.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
5	Check HVAC air inlet filters and ducts; service as required.				
6	Check operation of boost pump and coolant control valves.				
7	Check operation of auxiliary heater system; check for leaks and damage.				
8	Other (please specify):				
9	Other (please specify):				
<b>Competency 9d: Inspects Electrical/Electronic Systems</b>					
9d	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
<b>Battery and Starting Systems</b>					
1	Inspect battery compartment and doors, trays, slides, covers, and mountings.				
2	Inspect battery disconnect switch, hold downs, connections, cables, and cable routing; service as required.				
3	Check and record battery state of charge (open circuit voltage) and battery condition; check electrolyte level (if applicable).				
4	Perform battery load and capacitance tests.				
5	Inspect starter, mounting, connections, cables, and cable routing.				
6	Engage starter; check for unusual noises, starter drag, and starting difficulty.				
7	Other (please specify):				
8	Other (please specify):				
<b>Charging System</b>					
1	Inspect alternator, mountings, wiring and routing.				
2	Perform alternator current output test.				
3	Perform alternator voltage output test.				
4	Check equalizer function, wiring, and mountings.				
5	Other (please specify):				
6	Other (please specify):				
<b>Lighting and Alarm Systems</b>					
1	Check operation of all interior lights; service as required.				
2	Check all exterior lights, lenses, and reflectors; check headlight alignment; service as required.				
3	Inspect and check operation of exterior warning (back-up, wheel-chair, and kneeler) systems.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
4	Check operation of passenger stop request chimes and lighting systems.				
5	Inspect and check operation of destination sign and GPS locator systems.				
6	Other (please specify):				
7	Other (please specify):				
<b>Competency 9e: Inspects Frame and Chassis</b>					
9e	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
<b>Air Brakes</b> (Include hydraulic brake inspections as needed)					
1	Check parking brake operation.				
2	Check and record air governor cut-in and cut-out settings (psi).				
3	Check operation of air drier purge valve and heater; service air drier as required.				
4	Check air system for leaks (brakes released).				
5	Check air system for leaks (brakes applied).				
6	Test one-way and double-check valves.				
7	Check low air pressure warning devices and brake pressure switches.				
8	Check emergency spring brake control valve.				
9	Test air pressure build-up time.				
10	Perform antilock brake system (ABS) operational self-test; perform automatic traction control (ATC) operational self-test.				
11	Inspect air lines couplings and fittings.				
12	Check brake chambers and air lines for secure mountings, damage, and missing caging plugs and caging bolts.				
13	Inspect and record brake lining/pad condition and thickness on all axles.				
14	Check operation and adjustment of front and rear brake automatic slack adjusters on all axles.				
15	Check condition of foundation brake components and hardware on all axles.				
16	Lubricate all air brake system component grease fittings.				
17	Other (please specify):				
18	Other (please specify):				
<b>Drivetrain</b>					

<b>Duties and Tasks</b>		<b>Date</b>	<b>MENT Initials</b>	<b>Date</b>	<b>APR Initials</b>
1	Check transmission case, seals, filter, retarder components, cooler, and cooler lines for cracks and leaks.				
2	Check transmission wiring, connectors, seals, and harnesses for damage and proper routing.				
3	Inspect transmission breather.				
4	Inspect transmission mounts for looseness and deterioration.				
5	Check transmission oil/fluid level and condition.				
6	Inspect U-joints, yokes, and drive lines for looseness, damage, and correct phasing.				
7	Inspect axle housing for cracks and leaks.				
8	Inspect axle breather.				
9	Lubricate all drive train grease fittings.				
10	Check drive axle oil level.				
11	Change drive axle oil; check and clean magnetic plug.				
12	Change transmission oil/fluid and filters; check and clean magnetic plug.				
13	Take transmission oil/fluid sample.				
14	Other (please specify):				
15	Other (please specify):				
<b>Suspension and Steering Systems</b>					
1	Check steering wheel operation for free play or binding; check tilt and telescoping operations.				
2	Check hydraulic and/or power steering pump and hoses for leaks and mounting; check fluid level.				
3	Change hydraulic and/or power steering fluid and filter.				
4	Inspect steering gear(s) for leaks and mounting.				
5	Inspect steering shaft and U-joints for condition and phasing; inspect pinch bolts, splines, Pitman arm-to-steering sector shaft, steering/Ackerman arms, drag link, tie rod ends and wheel stops.				
6	Check for kingpin and thrust bearing wear.				
7	Check wheel bearings for looseness and noise.				
8	Check oil level and condition in all non-drive axle hubs; check for leaks.				
9	Inspect suspension components (U-bolts, insulators, radius rods, torque rods, walking beams, equalizers, lateral rods, sway bars and links, trunnion bushings, and overload bumpers); retorque U-bolts in accordance with manufacturers' specifications.				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
10	Inspect shock absorbers for leaks and mounting.				
11	Inspect air suspension components (bags/springs, mounts, arms, hoses, valves, linkage, and fittings) for leaks and damage.				
12	Check suspension ride height.				
13	Lubricate all suspension and steering system grease fittings.				
14	Other (please specify):				
15	Other (please specify):				
<b>Tires and Wheels</b>					
1	Inspect tires for irregular wear patterns and proper mounting of tires.				
2	Inspect tires for cuts, cracks, bulges, and sidewall damage.				
3	Inspect valve caps and stems.				
4	Measure and record tire tread depth.				
5	Check and record tire air pressure.				
6	Check for loose or missing lug nuts; check mounting hardware condition; service as required.				
7	Retorque lugs/nuts in accordance with manufacturers' specifications.				
8	Inspect wheels and spacers for cracks or damage.				
9	Check tire matching (diameter and tread) on dual tire installations.				
10	Other (please specify):				
11	Other (please specify):				
<b>Frame and Under Floor Equipment</b>					
1	Check mud flaps and brackets.				
2	Lubricate articulation joint grease fittings (where applicable).				
3	Inspect frame and frame members for cracks and damage.				
4	Inspect body attaching hardware.				
5	Inspect wheelchair lift/ramps, cylinders, controls, linkage chains, hardware, sensitive edges, sensors, proximity switches, hoses, and wiring; check fluid level, and lubricate grease fittings.				
6	Check mounting security of all under floor equipment.				
7	Other (please specify):				
8	Other (please specify):				
<b>Competency 9f: Conducts Road Test</b>					
9f	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				



Duties and Tasks		Date	MENT Initials	Date	APR Initials
1	Check operation of all instruments, gauges, and lights.				
2	Check steering wheel for play, binding and centering.				
3	Check operation of automatic transmission.				
4	Check road speed limiter.				
5	Observe exhaust for excessive smoke.				
6	Test service brakes with regen brake switch off and on, parking brake and interlock				
7	Verify engine/exhaust brake or retarder operation.				
8	Check operation of backup warning.				
9	Observe any unusual noises				
10	After road test check for leaks				
11	Other (please specify):				
12	Other (please specify):				

**Comments and notes:**

### Job Function 10:

#### Maintains, Diagnoses and Repairs Articulated Bus Systems (optional)

Duties and Tasks		Date	MENT Initials	Date	APR Initials
10a	<b>Competency 10a: Follows Safe Procedures</b>				
	<b>Prerequisite:</b> Performance Standards identified in Job Function 1: Demonstrates Mastery of Fundamental Skills, Competency 1a: Follows Safe Procedures				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Applies manufacturer specific safety recommendations regarding articulation joint including turning angles, angles for lifting one vehicle section in relationship to the other, securing lines and harnesses that pass through the joint section, etc.				
2	Other (please specify):				
3	Other (please specify):				
10b	<b>Competency 10b: Maintains, Diagnoses and Repairs Mechanical Components of the Articulation Joint</b>				

Duties and Tasks		Date	MENT Initials	Date	APR Initials
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Proper inspection of the main bearings				
2	Proper inspection of the welding connections				
3	Other (please specify):				
4	Other (please specify):				
10c	<b>Competency 10c: Maintains, Diagnoses and Repairs Hydraulic Components of the Articulation Joint</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnose common hydraulic component faults.				
2	Repair common hydraulic component faults including leaks.				
3	Replace hydraulic components				
4	Other (please specify):				
5	Other (please specify):				
10d	<b>Competency 10d: Maintains, Diagnoses and Repairs the Electronic Control System</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Diagnosis and repair the electronic control system based on manual specifications				
2	Diagnosis and repair the anti-jack-knifing control system				
3	Check and diagnosis proximity sensors				
5	Other (please specify):				
6	Other (please specify):				
10e	<b>Competency 10e: Maintains, Diagnoses and Repairs Articulation Bellows</b>				
	<i>The apprentice shall properly perform the following: (delete any tasks that do not apply)</i>				
1	Remove and replace the articulation bellows				
2	Other (please specify):				
3	Other (please specify):				

**Comments and notes:**