

# Automotive Service Technician Program

## Competency Profile - Electrical/Electronic Systems-A6

### Student Information

Last Name
First Name
Telephone

**Directions:** Evaluate the student according to the rating scale to indicate the degree of competency. The rating for each competency should indicate employability readiness, rather than the grades given in class.

### 2012 NATEF Standards for Automotive Service Technology

#### Student Rating Scale:

- 1 = NO EXPOSURE - no experience or knowledge in this area
- 2 = KNOWLEDGE - can recall, explain, or has been exposed to this information
- 3 = LIMITED SKILLED - requires instruction and close supervision
- 4 = MODERATELY SKILLED - can perform job completely with limited supervision
- 5 = SKILLED - can work independently with no supervision

	<b>Score A. General: Electrical System Diagnosis</b>	<b>Date Completed</b>
	1. Research applicable vehicle and service information, vehicle service history, service precautions, and technical service bulletins. P1	
	2. Demonstrate knowledge of electrical/electronic series, parallel, and series-parallel circuits using principles of electricity (Ohm's Law). P1	
	3. Demonstrate proper use of a digital multimeter (DMM) when measuring source voltage, voltage drop (including grounds), current flow and resistance. P1	
	4. Demonstrate knowledge of the causes and effects from shorts, grounds, opens, and resistance problems in electrical/electronic circuits. P1	
	5. Check operation of electrical circuits with a test light. P1	
	6. Check operation of electrical circuits with fused jumper wires. P1	
	7. Use wiring diagrams during the diagnosis (troubleshooting) of electrical/electronic circuit problems. P1	
	8. Diagnose the cause(s) of excessive key-off battery drain (parasitic draw); determine necessary action. P1	
	9. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. P1	
	10. Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; determine necessary action. P1	
	11. Replace electrical connectors and terminal ends. P1	
	12. Repair wiring harness. P3	
	13. Perform solder repair of electrical wiring. P1	

#### ***B. Battery Diagnosis and Service***

	1. Perform battery state-of-charge test; determine necessary action. P1	
	2. Confirm proper battery capacity for vehicle application; perform battery capacity test; determine necessary action. P-1	
	3. Maintain or restore electronic memory functions. P1	
	4. Inspect and clean battery; fill battery cells; check battery cables, connectors, clamps, and hold-downs. P1	
	5. Perform slow/fast battery charge according to manufacturer's recommendations. P1	
	6. Jump-start vehicle using jumper cables and a booster battery or an auxiliary power supply. P1	

## Automotive Service Technician Program Competency Profile - Electrical/Electronic Systems-A6

7. Identify high-voltage circuits of electric or hybrid electric vehicle and related safety precautions. P3	
8. Identify electronic modules, security systems, radios, and other accessories that require reinitialization or code entry after reconnecting vehicle battery. P1	
9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures. P3	

### ***C. Starting System Diagnosis and Repair***

1. Perform starter current draw tests; determine necessary action. P1	
2. Perform starter circuit voltage drop tests; determine necessary action. P1	
3. Inspect and test starter relays and solenoids; determine necessary action. P2	
4. Remove and install starter in a vehicle. P1	
5. Inspect and test switches, connectors, and wires of starter control circuits; determine necessary action. P2	
6. Differentiate between electrical and engine mechanical problems that cause a slow-crank or a no-crank condition. P2	

### ***D. Charging System Diagnosis and Repair***

1. Perform charging system output test; determine necessary action. P1	
2. Diagnose (troubleshoot) charging system for causes of undercharge, no-charge, or overcharge conditions. P1	
3. Inspect, adjust, or replace generator (alternator) drive belts; check pulleys and tensioners for wear; check pulley and belt alignment. P1	
4. Remove, inspect, and re-install generator (alternator). P1	
5. Perform charging circuit voltage drop tests; determine necessary action. P1	

### ***E. Lighting Systems Diagnosis and Repair***

1. Diagnose (troubleshoot) the causes of brighter-than-normal, intermittent, dim, or no light operation; determine necessary action. P1	
2. Inspect interior and exterior lamps and sockets including headlights and auxiliary lights (fog lights/driving lights); replace as needed. P1	
3. Aim headlights. P2	
4. Identify system voltage and safety precautions associated with high-intensity discharge headlights. P2	

### ***F. Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair***

1. Inspect and test gauges and gauge sending units for causes of abnormal gauge readings; determine necessary action. P1	
2. Diagnose (troubleshoot) the causes of incorrect operation of warning devices and other driver information systems; determine necessary action. P2	

### ***G. Horn and Wiper/Washer Diagnosis and Repair***

1. Diagnose (troubleshoot) causes of incorrect horn operation; perform necessary action. P1	
2. Diagnose (troubleshoot) causes of incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action. P-1 2	
3. Diagnose (troubleshoot) windshield washer problems; perform necessary action. P2	

### ***H. Accessories Diagnosis and Repair***

1. Diagnose (troubleshoot) incorrect operation of motor-driven accessory circuits; determine necessary action. P2	
2. Diagnose (troubleshoot) incorrect electric lock operation (including remote keyless entry); determine necessary action. P2	
3. Diagnose (troubleshoot) incorrect operation of cruise control systems; determine necessary action. P3	

**Automotive Service Technician Program**  
**Competency Profile - Electrical/Electronic Systems-A6**

	4. Diagnose (troubleshoot) supplemental restraint system (SRS) problems; determine necessary action. P2	
	5. Disable and enable an airbag system for vehicle service; verify indicator lamp operation. P1	
	6. Remove and reinstall door panel. P1	
	7. Check for module communication errors (including CAN/BUS systems) using a scan tool. P2	
	8. Describe the operation of keyless entry/remote-start systems. P3	
	9. Verify operation of instrument panel gauges and warning/indicator lights; reset maintenance indicators. P1	
	10. Verify windshield wiper and washer operation, replace wiper blades. P1	