

## 2008 NATEF AUTOMOBILE STANDARDS CORRELATIONS

### **ELECTRICAL/ELECTRONIC SYSTEMS**

**For every task in Electrical/Electronic Systems, the following safety requirement must be strictly enforced:** Comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage, and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

<b>A. General Electrical System Diagnosis</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Complete work order to include customer information, vehicle identifying information, customer concern, related service history, cause, and correction. (P-1)	HB-44	Job Sheet EL-1
2. Identify and interpret electrical/electronic system concern; determine necessary action. (P-1)	EL-243 through EL-246	Job Sheet EL-12
3. Research applicable vehicle and service information, such as electrical/electronic system operation, vehicle service history, service precautions, and technical service bulletins. (P-1)	HB-44, EP-372, SS-548, SS-592	Job Sheet HB-4
4. Locate and interpret vehicle and major component identification numbers. (P-1)	HB-44, EP-410 through EP-411, SS-528	Job Sheets HB-1, HB-2
5. Diagnose electrical/electronic integrity of series, parallel and series-parallel circuits using principles of electricity (Ohm's Law). (P-1)	EL-231 through EL-233	Job Sheets EL-2, EL-13, EL-28
6. Use wiring diagrams during diagnosis of electrical circuit problems. (P-1)	EL-239 through EL-240, EL-243 through EL-246	Job Sheets EL-13, EL-15, EL-28
7. Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems, including: source voltage, voltage drop, current flow, and resistance. (P-1)	EL-240 through EL-245, EL-282 through EL-283, EL-300 through EL-302	Job Sheets EL-7, EL-8
8. Check electrical circuits with a test light; determine necessary action. (P-2)	EL-240 through EL-245	Job Sheet EL-14
9. Check electrical/electronic circuit waveforms; interpret readings and determine needed repairs. (P-2)	EL-242	

<b>A. General Electrical System Diagnosis (continued)</b>	<b>Student Edition</b>	<b>Technical Applications</b>
10. Check electrical circuits using fused jumper wires; determine necessary action. (P-2)	EL-243	Job Sheet EL-15
11. Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action. (P-1)	EL-243 through EL-245, EL-335	Job Sheets EL-7, EL-8, EL-15
12. Measure and diagnose the cause(s) of excessive parasitic draw; determine necessary action. (P-1)	EL-253, EL-261 through EL-263	Job Sheet EL-19
13. Inspect and test fusible links, circuit breakers, and fuses; determine necessary action. (P-1)	EL-237 through EL-238, EL-313	Job Sheet EL-5
14. Inspect and test switches, connectors, relays, solenoid, solid state devices, and wires of electrical/electronic circuits; perform necessary action. (P-1)	EL-236 through EL-238, EL-243 through EL-245, EL-276, EL-284, EP-400 through EP-401	Job Sheet EL-31
15. Remove and replace terminal end from connector; replace connectors and terminal ends. (P-1)	EL-236 through EL-237	Job Sheet EL-4
16. Repair wiring harness (including CAN/BUS systems). (P-1)	EL-235	Job Sheet EL-3
17. Perform solder repair of electrical wiring. (P-1)	EL-246	Job Sheet EL-16
18. Identify location of hybrid vehicle high-voltage circuit disconnect (service plug) location and safety procedures. (P-2)	HB-104	
<b>B. Battery Diagnosis and Service</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Perform battery state-of-charge (conductance) test; determine necessary action. (P-1)	EL-261	Job Sheet EL-20
2. Perform battery capacity test; confirm proper battery capacity for vehicle application; determine necessary action. (P-1)	EL-260	Job Sheet EL-18
3. Maintain or restore electronic memory functions. (P-1)	EL-265 through EL-266	Job Sheets EL-22, EL-32

<b>B. Battery Diagnosis and Service (continued)</b>	<b>Student Edition</b>	<b>Technical Applications</b>
4. Inspect, clean, fill, and/or replace battery, battery cables, connectors, clamps, and hold-downs. (P-1)	EL-258 through EL-266	Job Sheet EL-17
5. Perform battery charge. (P-1)	EL-265	Job Sheet EL-21
6. Start a vehicle using jumper cables or auxiliary power supply. (P-1)	EL-267 through EL-269	Job Sheet EL-23
7. Identify high-voltage of electric or hybrid electric vehicle and related safety precautions. (P-3)	EL-268	
8. Identify electric modules, security systems, radios, and other accessories that require reinitialization or code entry following battery disconnect. (P-1)	EL-265	Job Sheet EL-22
9. Identify hybrid vehicle auxiliary (12v) battery service, repair, and test procedures. (P-3)	EL-255, EL-268	
<b>C. Starting System Diagnosis and Repair</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Perform starter current draw tests; determine necessary action. (P-1)	EL-280 through EL-282	Job Sheets EL-24, EL-25
2. Perform starter circuit voltage drop tests; determine necessary action. (P-1)	EL-282 through EL-283	Job Sheets EL-25, EL-27
3. Inspect and test starter relays and solenoids; determine necessary action. (P-2)	EL-284	Diagnostic Sheet EL-1 Job Sheet EL-25
4. Remove and install starter in a vehicle. (P-1)	EL-283 through EL-284	Job Sheets EL-25, EL-30
5. Inspect and test switches, connectors, and wires of starter control circuits; perform necessary action. (P-2)	EL-284	Diagnostic Sheet EL-2 Job Sheets EL-25, EL-33
6. Differentiate between electrical and engine mechanical problems that cause a slow-crank or no-crank condition. (P-2)	EL-281 through EL-282	Job Sheets EL-25, EL-26

<b>D. Charging System Diagnosis and Repair</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Perform charging system output test; determine necessary action. (P-1)	EL-301 through EL-302	Job Sheet EL-34
2. Diagnose charging system for the cause of undercharge, no-charge, and overcharge conditions. (P-1)	EL-302 through EL-303	Job Sheet EL-35
3. Inspect and adjust, or replace generator (alternator) drive belts; pulleys, and tensioners; check pulley and belt alignment. (P-1)	EL-303 through EL-304	Job Sheet EL-36
4. Remove, inspect, and install generator (alternator). (P-1)	EL-303 through EL-304	Job Sheets EL-36, EL-37
5. Perform charging circuit voltage drop tests; determine necessary action. (P-1)	EL-300 through EL-301	Job Sheet EL-34
<b>E. Lighting Systems Diagnosis and Repair</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Diagnose the cause of brighter than normal, intermittent, dim, or no light operation; determine necessary action. (P-1)	EL-316 through EL-318	Job Sheet EL-40
2. Inspect, replace, and aim headlights and bulbs. (P-2)	EL-318 through EL-319	Diagnostic Sheet EL-3 Job Sheet EL-42
3. Inspect and diagnose incorrect turn signal or hazard light operation; perform necessary action. (P-2)	EL-316 through EL-318	Job Sheets EL-38, EL-39
4. Identify system voltage and safety precautions associated with high intensity discharge headlights. (P-2)	EL-311	
<b>F. Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Inspect and test gauges and gauge sending units for cause of abnormal gauge readings; determine necessary action. (P-1)	EL-324	Job Sheet EL-43
2. Inspect and test connectors, wires, and printed circuit boards of gauge circuits; determine necessary action. (P-3)	EL-236 through EL-237	

<b>F. Gauges, Warning Devices, and Driver Information Systems Diagnosis and Repair (continued)</b>	<b>Student Edition</b>	<b>Technical Applications</b>
3. Diagnose the cause of incorrect operation of warning devices and other driver information systems; determine necessary action. (P-1)	EL-324	Job Sheet EL-41
4. Inspect and test sensors, connectors, and wires of electronic (digital) instrument circuits; determine necessary action. (P-3)	EL-236 through EL-237	
<b>G. Horn and Wiper/Washer Diagnosis and Repair</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Diagnose incorrect horn operation; perform necessary action. (P-1)	EL-348 through EL-349	Job Sheet EL-53
2. Diagnose incorrect wiper operation; diagnose wiper speed control and park problems; perform necessary action. (P-1)	EL-333	Job Sheet EL-45
3. Diagnose incorrect washer operation; perform necessary action. (P-2)	EL-333	Job Sheet EL-45
<b>H. Accessories Diagnosis and Repair</b>	<b>Student Edition</b>	<b>Technical Applications</b>
1. Diagnose incorrect operation of motor-driven accessory circuits; determine necessary action. (P-1)	EL-333 through EL-336	Job Sheet EL-45
2. Diagnose incorrect heated glass, mirror, or seat operation; determine necessary action. (P-3)	EL-333 through EL-335	Job Sheet EL-44
3. Diagnose incorrect electric lock operation (including remote keyless entry); determine necessary action. (P-1)	EL-336; for additional coverage, click on the standard number on the 2008 NATEF Automobile Standards Correlations page on the OLC.	Job Sheet EL-47
4. Diagnose incorrect operation of cruise control systems; determine necessary action. (P-3)	EL-337 through EL-340	

<b>H. Accessories Diagnosis and Repair (continued)</b>	<b>Student Edition</b>	<b>Technical Applications</b>
5. Diagnose supplemental restraint system (SRS) concerns; determine necessary action. (P-1)	EL-341 through EL-347, SS-546	Job Sheet EL-49
6. Disarm and enable the airbag system for vehicle service. (P-1)	SS-532	Job Sheets EL-50, EL-51, EL-52
7. Diagnose radio static and weak, intermittent, or no radio reception; determine necessary action. (P-3)	The standard is not currently correlated to the textbook. For coverage of this standard, click on the standard number on the 2008 NATEF Automobile Standards Correlations page on the OLC.	
8. Remove and reinstall door panel. (P-1)	EL-336	Job Sheet EL-48
9. Diagnose body electronic system circuits using a scan tool; determine necessary action. (P-2)	EL-242, EP-483	Job Sheets EL-11, EL-46
10. Check for module communication (LAN/CAN/BUS) errors using a scan tool. (P-2)	EP-391	Job Sheet EL-96
11. Diagnose the cause of false, intermittent, or no operation of anti-theft system. (P-3)	EL-239 through EL-245	Job Sheet EL-6
12. Describe the operation of keyless entry/remote-start systems. (P-3)	The standard is not currently correlated to the textbook. For coverage of this standard, click on the standard number on the 2008 NATEF Automobile Standards Correlations page on the OLC.	

<b>H. Accessories Diagnosis and Repair (<i>continued</i>)</b>	<b>Student Edition</b>	<b>Technical Applications</b>
<p>13. Perform software transfers, software updates, or flash reprogramming on electronic modules. (P-3)</p>	<p>The standard is not currently correlated to the textbook. For coverage of this standard, click on the standard number on the 2008 NATEF Automobile Standards Correlations page on the OLC.</p>	