Chapter 9  Electrical System Maintenance

General

All electrical systems require periodic maintenance in addition to non-scheduled maintenance caused by unpredictable events such as storms, accidents, and equipment failure. The intent of periodic maintenance is to keep the system operating at an acceptable level of service to the public.

Certain maintenance activities are common to all systems, regardless of type. These activities should always be performed on the cycle applicable for the system. These activities are defined as follows:

Wiring and Connection Maintenance

- Clean conductors, terminals, and connectors of all corrosion.
- Tighten terminals and connectors including breaker, transformer, and contactor connectors.
- Check the equipment grounding system including conduit end bushing connections, bonds, equipment grounding conductors, enclosure grounding connections, and pole grounding connections.
- Check the grounding electrode, grounding electrode conductor, and associated connections.
- Check conductor insulation for damage, and repair if necessary.
- Replace deteriorated or missing conductor and terminal identification markings.
- Reference Standard Specification 8-20.3(5), 8-20.3(8), 8-20.3(9), and Standard Plan J-9a.

Enclosure Maintenance

- Clean enclosure inside and out.
- Repair corroded surfaces, fasteners, and anchor bolts.
- Lubricate lock, latch assembly, and hinges.
- Check door gaskets and base seals.
- Clean vent filter and replace if necessary.
- Clean drain hole.

Documentation

- Note all checks and repairs that are performed.
- Note major repairs that are required.
Changeable Message Sign Systems  
• Observe operation.  
• Lubricate hinges on varicom signs and check springs.  
• Relamp bulb matrix signs.  
• Spot-paint changeable message sign lamp visors, sunscreen, and background, where necessary.  
• Clean legend on disk signs.

Drain Pump Systems  
• Check pump pit for water.  
• Check water pipes for corrosion.  
• Clean sump.  
• Check high water alarm.  
• Test pump and lubricate.  
• Check heater and thermostat.

Gate and Barrier Systems  

Minor  
• Check relays, test switch, and limit switches.  
• Operate per instructions and check all moving parts.

Major  
• Check relays, test switch, and limit switches.  
• Operate per instructions and check all moving parts.  
• Clean gate surface.  
• Tighten all mechanical connections.  
• Lubricate shear pins, bull gear, and shaft.  
• Check transmission level.  
• Check collars.  
• Check brake.  
• Check heater.  
• Remove flash guards and inspect.

Intersection Control Beacons (Includes Hazard Beacons)  
• Check flasher assembly.  
• Relamp. (Reference Standard Specification 9-29.16(2)A.)  
• Clean lens and reflector.  
• Spot-paint deteriorated areas of visor and head.  
• Check signal mounting.  
• Check signal supports.  
• Check vertical clearance (16’6” minimum for overhead locations).
Illumination Systems

Roadway Illumination Systems

- Relamp.
- Clean reflector and refractor.
- Check bolt torque on slip bases.
- Check if conductors are secured on breakaway base installations at adjacent junction boxes (*Standard Plan* 1e).
- Replace damaged or missing pole identification markings.
- Check junction boxes, adjust if necessary.

Sign Lighting Systems

- Relamp.
- Clean reflector and refractor.
- Check support mountings.
- Check fusing.

Services

- Check photocell.
- Check timers.
- Check contactors.
- Megger test any illumination circuits.
- Replace deteriorated or missing service identification markings.
- Check control transformer on 480 volt services.
- Check test switch.
- Check heater and thermostat.

Signal Systems

(Includes traffic signal systems, reverse lane signals, emergency vehicle signals, data accumulator stations, and ramp meter signals.)

Vehicle Detection Systems

- Check amplifier operation by observing traffic and display panel indicators.
- Check loops and repair if required (*Standard Plan* 8a).
- Megger test loop circuits and record.
Pedestrian Detection and Display System

• Check all buttons for operation.
• Replace damaged buttons and/or signs (*Standard Plan J-5a*).
• Clean lens and reflector.
• Relamp incandescent heads (*Standard Specification 9-29.20*).
• Repair neon grid assemblies as required.
• Spot-paint mounting brackets as required.

Vehicle Display Systems

• Relamp displays. (*Standard Specifications 9-29.16(1)A and 9-29.16(2)A.*)
• Clean lens and reflector.
• Spot-paint steel mounting brackets. Aluminum or bronze mountings will not require painting.
• Check mountings for wear and tightness.
• Check tether cable assemblies.
• Check seals on aerial junction boxes.
• Check vertical clearance (16’6” minimum for overhead displays).
• Check signal supports, messenger cable connections, and back guys.
• Replace missing cable ties on span wire systems.
• Adjust junction boxes, replace missing or damaged lids.

Signal Control Systems

• Observe controller timing functions.
• Check load switches.
• Check display panel, replace burned out indicator lights.
• Check coordination and communication equipment.

Sprinkler Systems

• Cycle controller on 5 minute cycle.
• Check solenoids.
• Adjust junction boxes.

Television Systems

• Lubricate mounting assembly.
• Check operation.
• Remove camera and shop-test.