ELECTRICAL SYSTEM PREVENTIVE MAINTENANCE SCHEDULE

GENERAL

Preventive maintenance is the systematic approach to keeping the trucks and related systems and components in good operating condition. Proper implementation of a preventive maintenance program should result in improvements in component life, optimum performance, and maximum availability through reduced, unscheduled downtime and repair.

Records of all maintenance should be kept. Information such as the condition of components, brush lengths, components changed or serviced, etc. should be included. Good information can be useful in preventing problems and in troubleshooting improper operation of a system.

It should be noted that the Preventive Maintenance Table included here does not include all of the components in the system. However, the entire system should be checked at intervals based on the operating conditions of the mine. The Pre-Operational Inspection outlined in the Operator's and Mechanical Manuals should be performed as it is part of a good preventive maintenance program.

Some of the components in the items columns are optional equipment. They are included to cover the trucks so equipped.

The hour intervals shown in the Table reflects the maximum hours that preventive maintenance on any part should be performed. The individual mine operating and environmental conditions may require more frequent inspection and service.

For successful truck operation the mine must provide:

1. Knowledgeable workers and supervision.

2. Adequate maintenance facilities, tools, shop supplies, and proper parts.

3. Lubricating oil and greases equal or superior to those specified.

4. Inspection and maintenance to a regular planned schedule with adequate records kept.

When servicing:

1. Never mix lubricants of different brands or grades.

2. Never overfill lubricants - too much lubricant can be as harmful as too little.

3. Clean equipment covers before removal for maintenance to prevent the ingress of contamination.

4. Use only clean containers to handle lubricants.

5. After servicing, operate the truck for at least 30 minutes, unloaded and at low speeds (10 mph (16 km/hr) or less.

The following equipment contains sealed bearings that do not require additional lubrication until the component is overhauled:

1. Wheelmotors

2. Alternator

3. Retarding grid blower motors

⚠WARNING

All checks and inspections should be made with the truck parked in a SAFE POSITON and secured by means other than the trucks friction brake system. Also the truck's engine and battery power should be off except where indicated and required.

⚠ CAUTION

When performing any of the inspections, extra care must be taken to prevent the ingress of contamination into the gearcase or interior or any of the components.

⚠ CAUTION

When welding on the truck:
1. Connect the welding ground as close as possible to the area being welded. Normally this is directly attached to the part being welded.
2. Never connect the welding ground so that the current will pass through the bearings or electrical components of any rotating equipment.
3. Do not pull any cards or remove panel connections. This practice puts unnecessary cycles on connector pins, and may cause loose or dirty pins. These could cause control system problems.

⚠ WARNING

Lethal voltages may be present. Before working on the truck and any of the propulsion or retarding systems or components, always:
1. Turn off and remove the key from the Master Switch and install an appropriate Safety or Lock-out Tag.
2. Turn the battery isolation switch off, lock-out as required, and install an appropriate Safety or Lock-out Tag.

UNIT RIG

ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE

RECOMMENDED MINIMUM SERVICE FREQUENCY ALL STATEX SYSTEMS	LEVEL 1 Operator Shift/Daily L-1	LEVEL 2 250 HOURS L-2	LEVEL 3 500 HOURS L-3	LEVEL 4 1,000 HOURS L-4	LEVEL 5 2,500 HOURS L-5	LEVEL 6 3,000 HOURS L-6	LEVEL 7 AS REQUIRED L-7	LEVEL 8 @ Tire Change Int. L-8
PERFORM DURING (PREFERABLY @ THE BEGINNING OF) EACH OPERATOR'S SHIFT.								
PERFORM EACH 250 HOURS OF OPERATION. INCLUDES LEVEL L-1.		L-2						
PERFORM EACH 500 HOURS OF OPERATION. INCLUDES LEVELS L-1 AND L-2.			L-3					
PERFORM EACH 1,000 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2 AND L-3.				L-4				
PERFORM EACH 2,500 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2, L-3 AND L-4.					L-5			
PERFORM EACH 3,000 HOURS OF OPERATION. INCLUDES LEVELS L-1, L-2, L-3, L-4 AND L-5.						L-6		
PERFORM AS REQUIRED BY OPERATING CONDITIONS AND ENVIRONMENT.							L-7	
PERFORM WHENEVER THE DUAL TIRES ARE REMOVED FROM THE WHEELMOTOR, EASING ACCESS TO THE AREAS REQUIRED.								L-8

PERFORM PREVIOUS INTERVAL ITEMS AT MULTIPLES OF THE ORIGINAL RECOMMENDATION. FOR EXAMPLE, AT 500 HOURS (LEVEL L-3) OF OPERATION, ALSO PERFORM THOSE ITEMS LISTED UNDER SHIFT INSPECTION (LEVEL L-1) AND 250 HOURS INSPECTION (LEVEL L-2) ETC.

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-1

LEVEL 1	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT BEGINNING OF EACH OPERATOR'S SHIFT/DAILY.	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX AREA 1. Check the oil level in the gear sump on each wheelmotor. **NOTE:** *On GE 787 and 788 wheelmotors without histories of oil consumption, this interval may be extended to as much as once a week.*			
2. Check the condition of the dipstick or oil fill cap gasket.			
3. On GE 772 and 776 wheelmotors not equipped with the newer style dirt seals and still having greasing provisions, add 0.5 ounces (14 grams) to each dirt seal grease fitting. **NOTE:** *Those wheelmotors that have the follow-up Felt (FUF) seal do not require this greasing.*			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-2

LEVEL 2	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 250 HOURS OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX AREA			
1. Inspect and clean the magnetic plugs on the sun pinion cover (wheelmotors equipped with mineral based gearcase oil).			
2. Clean or replace the gearcase sump breather filters.			
3. Check the ventilation hoses for evidence of leakage, obstruction, restrictions, or accumulations of oil.			
4. Check the current shunts for proper installation and discoloration or other evidence of damage.			
5. Check all wires, cables and connections for proper installation and discoloration or other evidence of damage.			
6. Check the axlebox door to be in good repair. Closely inspect the seal's ability to properly form a good, air tight seal.			
7. Inspect for oil and grease leaks.			
8. Take a sample of the gearcase lubricant for analysis (776 and 791 wheelmotors using mineral based oil in the gearcase). **NOTE:** *Oil samples on wheelmotors with less than 1,000 hours should be taken at 1/2 this interval.*			
9. Clean the axlebox interior. **NOTE:** *Avoid water contamination of the wheelmotor. If steam or water is used to clean, it could migrate to the wheelmotor through the cooling air passageways.*			
10. On GE 772 and 776 wheelmotors not equipped with the newer style dirt seals and still having greasing provisions, add 1.0 ounce (28 grams) to each dirt seal grease fitting. **NOTES:** *1. Those wheelmotors that have the Follow-up Felt (FUF) seal do not require this greasing. 2. On all GE 787 and 788 wheelmotors except those newer production models with the low maintenance type seals, grease the dirt seals with 2.0 ounces (55 grams) at each fitting at least twice a week. The current production wheels do not include a fitting for greasing the dirt seals. Extreme conditions may require more frequent greasing.*			
ALTERNATOR			
1. Check the brush length, condition and freedom of movement. Record. **NOTE:** *Any brushes with chipping or broken carbon or loose or frayed pigtails should be serviced or replaced immediately.*			
2. Check the brush holder condition, spacing, and tension.			
3. Check the commutator/slip ring condition, film, etc.			
4. Clean the string or Teflon band.			
5. Using clean, dry compressed air (70 psi (485 kPa) maximum), blow out and wipe clean the inside of the alternator including the drain holes. **NOTE:** *When cleaning electrically insulated parts, use a quick drying cleaner which will not leave an oily deposit. Dip a clean, lint free cloth into the cleaner and wipe off the part. Do not dip insulating materials in liquid cleaner.*			
6. Inspect cooling air blower housings for evidence of cracks or damage.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-2

LEVEL 2	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 250 HOURS OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
CONTROL BOX CHECKS			
1. Vacuum the control cabinet. Compressed air should not be used to remove dirt from the compartment.			
2. Inspect all control equipment for evidence of loose connections, clamps, or cable ties.			
3. Check the current shunts for proper installation and discoloration or other evidence of damage.			
4. Check all insulators, terminals and springs, etc. for proper installation and evidence of breakage or damage.			
5. Check the reverser, contactors, interlocks, resistors and relays for proper installation and evidence of tip wear, burning, breakage, over-travel, or improper pressure and frayed, broken or discolored components. Also check that the arc chutes are in good condition, free of cracks or other damage.			
6. Check the operation and sealing of all magnet valves.			
7. Check the doors and door gaskets for proper sealing.			
MISCELLANEOUS AREA			
1. Check the flexible air ducts for evidence of leakage or damage. Run static pressure checks, especially in the axlebox.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-3

LEVEL 3	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 500 HOURS OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX AREA			
1. On GE 772, 776 and 791 wheelmotors (using mineral based gear oil) a. Change the gear sump lubricant. **NOTE:** *On all GE wheelmotors using synthetic gear lubricants, change the oil after the first 500 hours and then at a maximum of 3,000 hours (if oil sampling results will allow). Item 1b should also be performed at this time.*			
b. Clean the sump magnetic plugs when changing the gearcase oil.			
c. Remove and inspect the sun pinion assembly including visually checking: (1) Gear teeth condition. (2) Spline wear. (3) Oil baffle and snap rings for damage. (4) For sufficient clearance from the cover.			
WHEELMOTOR ARMATURE AREA			
1. Check the brush length, condition and freedom of movement. Record the lengths. **NOTE:** *Any brushes with chipping or broken carbon or loose or frayed pigtails should be serviced or replaced immediately.*			
2. Check the brush holder condition, spacing and tension.			
3. Check the commutator condtion and film.			
4. Clean the Teflon band.			
5. Using clean, dry compressed air (70 psi (485 kPa) maximum), blow out the brush holder and commutator area.			
6. Check the brake lines and connection for evidence of leakage or damage. Clean out any fluid found in the motor.			
7. Check the condition of the field coils, particularly the insulation for cracks, damage or other examples of damage			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-3

LEVEL 3	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 500 HOURS OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
RETARDING GRIDS AND BLOWER UNIT			
1. Check the brush length, condition and freedom of movement. Record the lengths. **NOTE:** *Any brushes with chipping or broken carbon or loose or frayed pigtails should be serviced or replaced immediately.*			
2. Check the brush holder condition, spacing and tension.			
3. Check the commutator condition and film.			
4. Clean the string/Teflon band.			
5. Using clean, dry compressed air (70 psi (485 kPa) maximum), blow out the brush holder and commutator area.			
6. Check the cables for evidence of abrasion or burning.			
7. Check the condition of the field coils, particularly the insulation for cracks, damage or other examples of damage.			
8. Check the grids for loose connections, shorted turns and overheated, buckled, or otherwise damaged resistors.			
9. Clean the grid insulators and remove any build up.			
10. Check that the securing bolt and insulator assembly on the base of the grids is preloaded.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-4

LEVEL 4	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT 1,000 HOURS OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX			
1. Check the gear end play.			
MISCELLANEOUS EQUIPMENT			
1. Check the rectifier and static exciter air passages.			
2. Check all connections for tightness and evidence of damage.			
3. Check the blower inlet screen or filter to be free of obstruction and foreign objects.			
RETARDING GRIDS AND BLOWER UNIT			
1. Clean and inspect the retarding grids paying particular interest to damaged parts or foreign objects.			
VEHICLE OPERATION TESTS			
NOTE: *If found not to specification, adjust as required.*			
1. Check the battery and battery charging voltage.			
2. Check the speedometer and tachometer calibration.			
3. Check all speed event calibrations.			
4. Check the engine low and high idle, rated, and no load speeds.			
5. Check the operation of the engine's control system high idle and throttle cut-off solenoids or relays.			
6. Check the operation of the Low Blower Pressure indicator and alarm.			
7. Check the operation of the Ground and Diode Fault Detection and alarm systems.			
8. Check the dynamic retarding operating parameters noting: a. Motor field current. b. Motor armature current as a function of speed. c. Alternator voltage.			
9. Check engine and electrical system speed and horsepower operation through either a road test or static load box procedure.			
10. Check the operation of the grid motor in normal truck operation.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-5

LEVEL 5	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 2,500 HOURS (Maximum) OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX 1. On GE 787 and 788 wheelmotors a. Check the gear end play.			
b. Remove and inspect the sun pinion including visually checking: (1) Gear teeth condition. (2) Spline wear. (3) Oil baffle and snap rings for damage. (4) For sufficient clearance from the cover.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-6

LEVEL 6	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AT 3,000 HOURS (Maximum) OF OPERATION	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX/WHEELMOTOR AREA 1. On all GE wheelmotors using approved synthetic lubricants in the gearcase: a. Sample then change the gear sump lubricant. **NOTE:** *On all GE wheelmotors using approved synthetic lubricants in the gearcase, change the oil after the first 500 hours and then at a maximum of 3,000 hours (if oil sampling results will allow). Item 1b. should also be performed at this time.*			
b. Inspect and clean the sump magnetic plugs.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-7

LEVEL 7	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____	
SCHEDULED MAINTENANCE SERVICES PERFORMED AS REQUIRED	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX/WHEELMOTOR AREA 1. Measure armature, commutator, field and tertiary resistances to ground. Record to monitor the degradation of the insulation.			
CONTROL BOX AREA 1. Clean the cards and connections.			

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ELECTRICAL PREVENTIVE MAINTENANCE SCHEDULE L-8

LEVEL 8	TRUCK MODEL ALL STATEX, S/N #_____	DATE:_____ HOURS:_____

SCHEDULED MAINTENANCE SERVICES PERFORMED AT TIRE CHANGE INTERVALS	OK	REPAIRS NEEDED	PERFORMED BY
AXLEBOX AREA 1. Remove dirt and grease build up from the dirt seal area.			
2. 772, 776 and 791 wheelmotors with Triple Lip Dirt Seals only: a. Inspect the wear of the torque tube wear band. b. Inspect the dirt seal grease fittings. c. Lubricate the dirt seal area until purged.			
3. Check all bolts to be tight.			
4. Lubricate Wheel hub bearings (787 and 788 wheelmotors only). a. Remove 6 grease plugs in hub and install zerk grease fittings. b. Add 4 ounces (115 grams) grease to each fitting. c. Remove grease zerks and reinstall plugs.			

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