



M AINTENANCE I NSTRUCTION

M.I. 1740

* Rev. A

SERVICE DEPARTMENT · ELECTRO-MOTIVE DIVISION · GENERAL MOTORS · LAGRANGE, ILLINOIS

SCHEDULED MAINTENANCE PROGRAM GP40 - SD40 - SDP40 - SD45

INTRODUCTION

This Maintenance Instruction comprises average recommendations which we believe will insure satisfactory locomotive operation and economical maintenance cost where average load factors and average climatic conditions are encountered. It is intended to serve as a basis which owners of GP40, SD40, SDP40, and SD45 locomotives can use to establish maintenance schedules that will meet the particular requirements of their own operation.

These recommendations are based on the following conditions:

1. All work scheduled will be done in a workmanlike manner under qualified supervision with the proper tools, and adequate facilities.
2. Fuel oil used will meet the specifications of Maintenance Instruction 1750.
3. Lubricating oil will be qualified for use in 645E3 engines.
4. Lubricating oil filters will be changed in accordance with Items 7 and 8, at 2 months or 30,000 mile intervals, and filters must be of quality equal to original equipment.
5. Lubricating oil will be changed in accordance with Item 16, at 6 months or 90,000 mile intervals.

*This bulletin is revised and supersedes previous issues of this number.

MECHANICAL AND ELECTRICAL MAINTENANCE SCHEDULE

ONE MONTH OR 15,000 MILES	REMARKS
1. LUBE OIL a. Take sample for analysis	The services of a competent laboratory may help to monitor the suitability of the oil for continued use.
2. ENGINE AIR FILTER a. Check oil level with engine shut down.	Add SAE 10 non-additive mineral oil to middle of sight glass if necessary. Check for cause of loss of oil if frequent additions are required.
3. ENGINE PROTECTOR a. Test operation	Engine must be running.
4. GENERATOR PIT DRAIN ASPIRATOR a. Inspect and clean if needed	
5. BATTERY a. Check water level b. Check gravity	
6. MAIN GENERATOR a. Inspect diode fuses and replace diodes and fuses as indicated.	

TWO MONTHS OR 30,000 MILES	REMARKS
7. TURBOCHARGER AND SOAK BACK OIL FILTERS a. Replace elements	Filter elements must be of a quality equal to original equipment. The interval of change for both Items 7 and 8 is influenced by the load factor, kind of lubricating oil, type of operation and climatic conditions. Where these factors are favorable it may be possible to extend the periods to 3 months or 45,000 miles.

8. LUBE OIL FILTER - SEVEN ELEMENT

- a. Change filter elements.
- b. Clean lube oil strainer.

See "Remarks" Item 7

THREE MONTHS OR 45,000 MILES**REMARKS**

9. FUEL FILTER

- a. Change rack mounted fuel filter
- b. Clean suction strainer
- c. Change engine mounted filter.

Use only approved filter elements.

10. ENGINE

- a. Inspect crankcase.
- b. Inspect pistons and piston rings.
- c. Inspect cylinder liners.
- d. Inspect cylinder head mechanism with engine idling and at operating temperature.
- e. Inspect engine fuel lines and connections for leaks.
- f. Inspect engine water system for leaks.

Engine Maintenance Manual

11. COOLING WATER

- a. Check inhibitor concentration.

M.I. 1748

12. FUEL TANK

- a. Drain condensate.

More frequently during periods of rapid temperature changes or high humidity.

13. STARTING MOTORS (TWO)

- a. Inspect brushes and blow out with dry air.

14. TRACTION MOTOR

- a. Inspect and replace brushes when required. Replace in sets.

Experience should govern the frequency of this item. Brush life will range from 3 to 6 months, depending on the type of service and operating conditions.

15. INERTIAL FILTER BLOWER MOTOR

- a. Check operation.

16. AIR FILTERS - ENGINE CYCOIL

- a. Change oil.

Drain and refill only. Sump need not be cleaned.

SIX MONTHS OR 90,000 MILES	REMARKS
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17. ENGINE

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| <ul style="list-style-type: none"> a. Change engine oil. b. Clean oil suction screens. c. Clean scavenging oil screens. d. Clean oil pan. e. Change filter elements. f. Clean filter housing. g. Remove oil filter relief valve, clean and replace. | <p>Evaluation of engine and oil condition should dictate the frequency of this item.</p> <p>Type of service, type of oil, quality of filter elements and condition of engine will influence the frequency of oil change.</p> |
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18. RADIATOR

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| <ul style="list-style-type: none"> a. Clean air passages. | <p>Use clean dry air. Operating conditions will determine frequency of this item.</p> |
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19. MAIN GENERATOR

- a. Reverse polarity of slip rings.

ONE YEAR OR 180,000 MILES	REMARKS
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20. COOLING SYSTEM

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| <ul style="list-style-type: none"> a. Visually inspect for leaks. | <p>Locomotive Manual and Engine Maintenance Manual</p> |
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21. EXHAUST SYSTEM

- a. Remove and clean manifold screen.
- b. Inspect manifold connectors for liner cracks and replace if necessary.
- c. Clean carbon deposit from turbocharger eductor tube.

22. ENGINE PROTECTOR

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| <ul style="list-style-type: none"> a. Replace diaphragms, springs, and "O" rings. | <p>Qualify on test stand.</p> |
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23. AIR COMPRESSOR

- a. Replace secondary filter (paper).

Do not attempt to clean.

24. MAIN RESERVOIR AIR FILTER

- a. Replace element.

25. AIR FILTERS

- a. Carbody (Inertial)
1) Remove, and clean.
2) Check condition of hoses.
- b. Engine (Cycoil)
1) Change oil and clean sump.
2) Check operation of variflow valves.
3) Check condition of hoses.

26. AUXILIARY GENERATOR

- a. Inspect and replace brushes when required. Replace in sets.

In most applications auxiliary generator brush life will be in the range of 21 months to 2 years.

27. ALTERNATOR (D14)

- a. Replace slip ring brushes.

28. STARTING MOTORS

- a. Replace brushes.

29. COOLING FAN AND ENGINE TEMPERATURE SWITCHES

- a. Check for proper operation and setting.

30. LOW VOLTAGE ELECTRICAL SYSTEM

- a. Check for grounds.

31. DYNAMIC BRAKE GRIDS

- a. Clean

Use clean dry air.

32. ELECTRICAL CABINETS

- a. Visually inspect contact tips of all contactors, including start contactors. Replace as required.

Refer to Sept. 22, 1965 Pointers.

33. PROGRAM SWITCH MOTOR

- a. Renew brushes (extended range dynamic brake only).

34. MAIN GENERATOR

- a. Replace slip ring brushes (2 brushes) AR10 only.
- b. Blow out (with dry air) heat sink and diode compartment.

TWO YEARS OR 360,000 MILES	REMARKS
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35. LUBE OIL COOLER

- a. Check temperature differential between lube oil and cooling water into engine.

Clean cooler if required.

36. GOVERNOR

- a. Renew diaphragm.
- b. Check low oil pressure shutdown
- c. Check high oil suction shutdown
- d. Check speed settings.

Engine Maintenance Manual

37. FUEL PUMP AND MOTOR

- a. Recondition.

38. TRANSITION CIRCUIT RELAYS

- a. Check settings and operation of relays.

NOTE: Be certain that known accurate instruments are available.

39. CHECK SETTINGS AND OPERATION OF:

- a. Ground relay.
- b. Fault relay.
- c. No voltage relay.
- d. Voltage regulator.
- e. Dynamic brake regulator.
- f. Excitation circuit.
- g. Performance control circuit.
- h. Time delay relays.
- i. Wheel slip relays.

NOTE: Be certain that known accurate instruments are available.

Chart and Graphs Drawing

40. DYNAMIC BRAKE BLOWER MOTOR

- a. Renew brushes.

M.I. 4104

41. LOAD REGULATOR

- a. Blow out with dry air.
- b. Replace brush.

42. DYNAMIC BRAKE RHEOSTAT

- a. Blow out with dry air.
- b. Replace brush.

43. INJECTORS

- a. Replace or recondition.

Replacement injectors should be the equivalent of EMD Unit Exchange and must have passed leak-off and calibration test.

THREE YEARS OR 540,000 MILES	REMARKS
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44. TURBOCHARGER

- a. Unit exchange.
- b. Inspect exhaust manifolds and connectors for cracks and leaks.

Engine Maintenance Manual

45. AFTERCOOLER ASSEMBLIES

- a. Clean air passages.

46. CYLINDER ASSEMBLIES

- a. Replace grommets, gaskets, and seals.
- b. Inspect and hone liners.
- c. Renew piston rings.
- d. Recondition heads.

Engine Maintenance Manual

47. OIL SEPARATOR

- a. Disassemble and clean screen.

Engine Maintenance Manual

48. WATER PUMPS

- a. Replace seals and all worn parts.

Engine Maintenance Manual

49. AIR COMPRESSOR

- a. Recondition valves.

50. TRACTION MOTORS

- a. Recondition or replace.

Replacement motors should be the equivalent of EMD Unit Exchange.

51. BATTERY BOXES

- a. Clean and paint.

52. MAIN GENERATOR

- a. Thoroughly clean diode creepage surfaces and heat sink.

FOUR YEARS OR 720,000 MILES	REMARKS
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53. GOVERNOR

- a. Recondition or replace.

Replacement governor should be EMD Unit Exchange or equivalent.

54. SOAK BACK PUMP AND MOTOR

- a. Recondition.

55. ENGINE

- a. Install new thrust collars.
- b. Install new lower main bearings.

Engine Maintenance Manual

SIX YEARS OR 1,080,000 MILES	REMARKS
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56. AUXILIARY GENERATOR

- a. Recondition or replace.

Replacement should be EMD Unit Exchange or equivalent.

57. DYNAMIC BRAKE BLOWER MOTOR

- a. Recondition or replace.

Replacement should be EMD Unit Exchange or equivalent.

58. INERTIAL AIR FILTER MOTOR

- a. Recondition or replace.

Replacement should be EMD Unit Exchange or equivalent.

59. COOLING FANS

- a. Recondition or replace.

Replacement should be EMD Unit Exchange or equivalent.

60. AIR COMPRESSOR

- a. Recondition.

M.I. 1110

TWELVE YEARS OR 2,160,000 MILES**REMARKS**

61. ENGINE

- a. Unit exchange.

62. MAIN GENERATOR AND ALTERNATOR ASSEMBLY

- a. Unit exchange.

63. HIGH VOLTAGE CABLE

- a. Renew

It is recognized that this work may not be required at this particular time or mileage. However, shop efficiency may require this operation at time of engine and generator exchange.

64. LOW VOLTAGE WIRING

- a. Renew.

See "Remarks" Item 63.

65. CARBODY

- a. Clean and recondition.
- b. Paint.

See "Remarks" Item 63.

NON-SCHEDULED MECHANICAL AND ELECTRICAL MAINTENANCE

A definite time or mileage schedule for the items listed below cannot be established due to variation in wheel life and truck overhaul periods. This rework to be performed at wheel change time or when truck is removed for reconditioning.

1. PINION

- a. Magnaflux.

M.I. 1518

2. AXLE GEAR

- a. Magnaflux.

3. AXLE (WITH INNER RACES REMOVED)

- a. Magnaflux.

4. TRACTION MOTOR

- a. Check bearings using heat and noise test

Whenever truck assembly is removed from locomotive, check traction motors for any unusual bearing noise or heat at not less than 1500 RPM. M.I. 3900.

5. JOURNAL BOXES

- a. Clean and recondition.

LUBRICATION SCHEDULE

ONE MONTH OR 15,000 MILES	REMARKS
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| 1. TRACTION MOTOR SUPPORT BEARINGS | Fill to overflow. |
| 2. TRACTION MOTOR GEAR CASE | Add 2 pounds of jet lube or equivalent. When conscientious control is maintained both as to frequency and quantity of lubricant added, this item can be extended to a 3 month interval. On this basis, add 3 pounds of gear lube every 3 months. |
| 3. JOURNAL BOX - ROLLER BEARING | Maintain to fill plug level. |

THREE MONTHS OR 45,000 MILES	REMARKS
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| 4. SPEED RECORDER AND DRIVE CABLE | This item is not required for grease lubricated recorders. Refer to speed recorder manufacturer bulletins. |
| 5. BRAKE SLACK ADJUSTER SCREWS | Use graphite grease. |
| 6. DOOR HARDWARE | Cab and hood doors. |

SIX MONTHS OR 90,000 MILES	REMARKS
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| 7. ENGINE | |
| a. Change oil. | See Item 16 in Maintenance Schedule. |

ONE YEAR OR 180,000 MILES	REMARKS
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| 8. AIR COMPRESSOR | |
| a. Change oil. | Duro 150 or equivalent. See Sept. 28, 1965 Pointers. |
| 9. GOVERNOR | |
| a. Change oil. | M.I. 1752 |
| 10. SHUTTER AIR CYLINDER | |
| 11. TRUCK CENTER BEARING | Add two quarts of oil. |

SIX YEARS OR 1,080,000 MILES	REMARKS
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| 12. MAIN GENERATOR | |
| a. Repack bearing. | Use Cyprina RA grease - Grade #3. |