



MAINTENANCE INSTRUCTION

SCHEDULED MAINTENANCE PROGRAM SW1000 — SW1001 — SW1500 SW1504 — MP15(DC)

INTRODUCTION

This Maintenance Instruction provides average recommendations which should ensure satisfactory locomotive operation and economical maintenance cost where average load factors and average climatic conditions are encountered. It is intended to serve as a guide when establishing maintenance schedules that will meet the particular requirements of individual operations, and planned economic life of the locomotive.

These recommendations are based on the following conditions:

1. Fuel oil used will meet the specifications of Maintenance Instruction 1750.
2. Lubricating oil used will meet the specifications of the applicable Maintenance Instructions, and will be changed at the intervals specified in this M.I.

3. Engine coolant used will meet the specifications in Maintenance Instruction 1748.
4. Lubricating oil filters will be of a quality equal to original equipment and will be changed at the intervals specified in this M.I.
5. Procedures listed in M.I. 1705 or 1707 will be followed for new locomotives and newly installed replacement assemblies.

INSTRUCTION REFERENCES

Abbreviations are used in this instruction to reference publications that contain information related to maintenance. The following examples are provided to aid in understanding the abbreviations used.

LSM	means Locomotive Service Manual
EMM	means Engine Maintenance Manual
M.I.	means Maintenance Instruction

AFTER FIRST WEEK OF OPERATION

COOLING FAN

Check "V" belt tension.

M.I. 1216

AFTER FIRST MONTH OF OPERATION

COOLING FAN

Check "V" belt tension.

M.I. 1216

EVERY WEEK

LUBE OIL FILTERS

Check lube oil filter tank pressure.

Checks can be made weekly or oftener at fueling or turnaround points. Replace filter elements if tank pressure so indicates.

FUEL FILTER

Check pressure differential at rack mounted filter gauge. (Where Used.)

Same note as immediately above. Use only pleated cotton-paper elements.

TRACTION MOTOR SUPPORT BEARING

Check lubricant level.

Fill to overflow. M.I. 1756

TRACTION MOTOR GEAR CASE

Maintain lubricant at sufficient level to provide full gear tooth dip into grease.

**AUTOMATIC COOLING SYSTEM DRAIN
(Where Used)**

Check drain valve operation.

M.I. 582

EVERY MONTH

LUBE OIL

Take sample for analysis.

The services of a competent laboratory may help to monitor the suitability of the oil for continued use.

ENGINE PROTECTOR

Check operation.

EMM, M.I. 259, or M.I. 260

GENERATOR PIT DRAINS

Inspect and clean, if needed.

AIR BOX DRAINS

Check operation and clean, if needed.

EMM

EVERY MONTH (CONT'D)**BATTERY**

- Check electrolyte level.
- Check specific gravity.
- Wash out battery boxes.

RADIATORS

- Clean air passages.

Operation in certain sections of the country and during certain seasons will require more frequent cleaning due to airborne seeds and leaves.

**ENGINE AIR FILTER-PANEL TYPE OIL BATH
(Where Used)**

- Check oil level.

M.I. 440

**ENGINE AIR FILTER-PAPER OR FIBERGLASS
TYPE (Where Used)**

- Check indicator. If tripped, take manometer readings and renew elements, if necessary.

**CARBODY AIR FILTERS-IMPINGEMENT TYPE
(Where Used)**

- Remove, clean, and reinstall.

**CARBODY AIR FILTERS-FIBERGLASS TYPE
(Where Used)**

- Replace.

LSM

JOURNAL BOX

- Maintain lubricant to full level on gauge.

M.I. 1756, M.I. 1552, M.I. 1553

EVERY TWO MONTHS**LUBE OIL FILTER**

- Change filter elements.
- Clean lube oil strainer.

Fill strainer housing with oil before starting engine.

FUEL FILTERS

- Clean or replace suction strainer element.
- Change engine mounted filter elements.
- Change rack mounted primary filter. (Where Used.)

LSM

EMM. Use only elements equal to original equipment.

LSM. Use only pleated cotton-paper elements.

EVERY THREE MONTHS**COOLING SYSTEM**

Check inhibitor concentration. M.I. 1748

Check for proper automatic cooling system drain operation. (Where Used.)

FUEL TANK

Drain condensate. LSM. More frequently during periods of high humidity or rapid temperature change.

TRACTION MOTORS

Replace brushes (in sets only). M.I. 3900. Depending upon type of service and operating conditions, brush life will range from 3 to 6 months.

Clean creepage areas and blow out with clean dry air.

Visually inspect suspension bearing wick lubricators for dirt plugging of the wick and for excessive wear. Clean and replace as necessary.

ENGINE AIR FILTERS-PANEL TYPE OIL BATH (Where Used)

Change oil. Drain and fill only. LSM

ENGINE AIR FILTERS-PAPER (Where Used)

Take manometer readings. Renew elements if necessary. LSM

ENGINE AIR FILTERS-FIBERGLASS

Replace elements.

BATTERY

Wash cell tops and apply petroleum jelly to terminals.

Inspect battery boxes for damage or rust. Repair and paint if necessary.

LOW VOLTAGE ELECTRICAL SYSTEM

Check for grounds. LSM

EVERY THREE MONTHS (CONT'D)**ENGINE**

Inspect air box.	EMM
Inspect crankcase.	EMM
Inspect crankshaft and connecting rods.	EMM
Inspect pistons and piston rings.	EMM
Inspect cylinder liners.	EMM
Inspect cylinder head mechanism with engine idling and at operating temperature.	EMM
Inspect engine fuel lines and connections for leaks.	EMM
Inspect engine water system for leaks.	EMM, LSM

**SPEED RECORDER AND DRIVE CABLE
(Where Used)**

Lubricate.	This item is not required for grease lubricated recorders. Refer to speed recorder manufacturer's bulletins.
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DOOR HARDWARE

Lubricate hinges, latches, and linkage.	M.I. 1756
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EVERY SIX MONTHS**OIL SYSTEM**

Change engine oil.	LSM, EMM. Evaluation of engine and oil condition should dictate the frequency of this item. Type of service, type of oil, quality of filter elements, and condition of engine will influence the frequency of oil change.
Clean oil suction screens.	EMM
Clean scavenging oil screens.	EMM. Fill strainer housing with oil before starting engine.
Clean oil pan.	EMM
Clean filter housing.	

ENGINE

Check exhaust manifold base flange bolts for proper tightness.	EMM
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EVERY SIX MONTHS (CONT'D)**COOLING FAN**

Grease pedestal bearings.	LSM
Check "V" belt tension.	M.I. 1216

MAIN GENERATOR

Inspect commutator brushes.	M.I. 3302 or M.I. 3304
Blow out with air and clean creepage surfaces.	

MAIN RESERVOIR

Replace air filter element. (Where Used.)	LSM
Check operation of automatic drain valves. (Where Used.)	LSM

VOLTAGE REGULATOR

Check auxiliary generator output voltage.	LSM
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GROUND RELAY

Check ground relay action.	LSM
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HANDBRAKE

Check operation and lubricate.	M.I. 1577
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CAB SEATS

Lubricate cab seat post and guide rails.	Lubriplate 630-2 or equivalent.
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EVERY YEAR**ENGINE BOLT AND NUT RETORQUING**

Cylinder head crab nuts.	Follow torquing procedures as outlined in the EMM.
Main lube oil and piston cooling oil pump shaft nut.	EMM
Head frame to crankcase bolts.	EMM

ENGINE

Replace top deck cover seals and check latches.	EMM
Qualify injectors.	EMM
Set injector timing and injector rack length.	EMM
Check engine speed.	EMM

EVERY YEAR (CONT'D)**ENGINE (CONT'D)**

Check overspeed trip.	EMM
Check governor pilot valve setting.	EMM. If engine speed is changed, reset on governor stand.
Remove and clean oil separator element.	EMM
Inspect harmonic balancer.	EMM

GOVERNOR

Change oil.	M.I. 1764
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EXHAUST SYSTEM

Clean spark retention trap.	
Tighten bands connecting manifold sections.	

AIR COMPRESSOR

Clean air intake screen. (Where Used.)	LSM
Clean air filter housing and replace air filter elements. Do not attempt to clean elements.	LSM
Change oil.	M.I. 1756

ENGINE AIR FILTERS-PANEL TYPE OIL BATH

Change oil. Clean sump and filter media.	M.I. 440
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LUBE OIL FILTER

Remove oil filter bypass valve, clean, inspect, and test.	M.I. 926
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MAGNET VALVES

Clean and replace seats.	M.I. 4707
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ELECTRICAL CABINETS

Air Filter (Where Used)

Change filter element.

Door Seals

Check for damage and leakage. Replace if necessary. Adjust lock keeper, if required.

EVERY YEAR (CONT'D)**ELECTRICAL CABINETS (CONT'D)****Contact Tips**

Visually inspect tips of all power contactors, reversers, and brake transfer switches. Replace as required.

Check timing of time delay devices.

AUXILIARY GENERATOR

Inspect and replace brushes when required. Replace in sets.

Normal auxiliary generator brush life is between 21 and 24 months.

AUTOMATIC TRANSITION CIRCUIT (Where Used)

Check relay settings.

LOAD REGULATOR

Clean and inspect. Renew brushes if required.

M.I. 4504

FUEL PUMP MOTOR

Inspect and clean with dry air.

M.I. 4101

Replace brushes.

CAB HEATER BLOWER MOTOR (HOT WATER)

Replace brushes.

COOLING FAN AND ENGINE TEMPERATURE SWITCHES

Check for proper operation and setting.

LSM

Replace or recondition shutter magnet valves.

M.I. 4707

RADIATORS

Clean or renew header screens after first year of operation. Condition of screen at this inspection can provide a basis for future cleaning.

The presence of metal chips at first cleaning or after engine parts have been renewed is not an abnormal condition.

MAIN GENERATOR

Replace commutator brushes.

M.I. 3302 or M.I. 3304

TRACTION MOTOR

Check air duct bellows for alignment and leakage. Inspect wear plates and arm.

Replace support bearing wick lubricators.

M.I. 3900

EVERY YEAR (CONT'D)**ALIGNMENT CONTROL COUPLER (Where Used)**

Check for wear and alignment control engagement. M.I. 2703

COOLING SYSTEM

Inspect and perform pressure test. LSM

Replace pressure cap if defective.

BRAKE SLACK ADJUSTER SCREWS

Use graphite grease. Keep surfaces coated.

TRUCK CENTER BEARING

Add two quarts of oil. LSM

MAIN RESERVOIR DRAIN VALVES

Clean and repair.

**AUTOMATIC COOLING SYSTEM DRAIN
(Where Used)**

Recondition automatic drain valve. M.I. 582

EVERY TWO YEARS**LUBE OIL COOLER**

Check temperature differential between lube oil and cooling water into engine. M.I. 928. Clean cooler if necessary, M.I. 927.

HOT OIL DETECTOR (Where Used)

Remove and check for operation at proper temperature. LSM

GOVERNOR

Renew diaphragm. EMM

FUEL PUMP AND MOTOR

Replace coupling spider.

COOLING SYSTEM PRESSURE CAP

Replace cap.

Inspect filler neck for damage. Replace if damaged.

ENGINE PROTECTOR

Replace. Qualify on test stand after renewing springs, "O" rings, and diaphragm. M.I. 259 or M.I. 260.

EVERY TWO YEARS (CONT'D)**ELECTRICAL CONTROL CIRCUITS**

Check settings and operation of protective and regulating devices and circuits.

COOLING FAN SHUTTER

Lubricate blade stems and bearing holes in frame with powdered lubricant.

AIR COMPRESSOR (Gear Type Oil Pump)

Renew oil filter. M.I. 1144

FUEL OIL PREHEATER (Where Used)

Renew thermostatic valve element.

EVERY THREE YEARS**ENGINE**

Replace water pump seals and all worn parts. EMM

Replace injectors. EMM

NOTE

IF LOCOMOTIVE IS BEING USED PRIMARILY FOR ROAD SERVICE, PERFORM THE ADDITIONAL ENGINE MAINTENANCE FUNCTIONS LISTED BELOW:

Replace cylinder assemblies. EMM

Inspect and qualify connecting rod bearings. EMM

Inspect and qualify piston cooling tubes. EMM

Inspect lower liner inserts and replace if required. EMM

Install new thrust collars. EMM

Install new lower main bearings. EMM

Check rocker arms, rocker arm bushings, and cam followers. EMM

Check lash adjusters. EMM

Check exhaust valve timing. EMM

AIR COMPRESSOR

Recondition valves. M.I. 1144

EVERY THREE YEARS (CONT'D)**TRACTION MOTORS**

Replace.

Replacement motors should be EMD Unit Exchange or equivalent. Refer to non-scheduled maintenance portion of this M.I.

MAIN GENERATOR

Jigstone commutator and clean slots.

M.I. 3302 or M.I. 3304

CAUTION

Do not stone commutator by hand.

COOLING SYSTEM

Replace flexible coupling seals.

COOLING FAN

Replace "V" belts.

M.I. 1216

CAB HEATER-BLOWER MOTOR (Electric)

Replace brushes.

BATTERY BOXES

Clean and paint.

SHUTTER AIR CYLINDERS

Replace piston, piston rod, and cylinder seals.

Air test cylinder after seal replacement.

TRUCKS

Replace shock absorbers. (Where Used.)

M.I. 1504

EVERY FOUR YEARS**ENGINE BLOWERS**

Replace.

Replacement should be EMD Unit Exchange or equivalent.

BLOWER-TO-FILTER AIR DUCT (Where Used)

Replace.

GOVERNOR

Replace.

Replacement should be EMD Unit Exchange or equivalent.

FUEL PUMP AND MOTOR

Recondition.

M.I. 4110, M.I. 4101

EVERY FOUR YEARS (CONT'D)**AUXILIARY GENERATOR**

Replace.	M.I. 1753. Replacement should be EMD Unit Exchange or equivalent.
Replace drive couplings.	M.I. 1753

EVERY SIX YEARS**AIR COMPRESSOR**

Recondition.	M.I. 1144
Recondition drive coupling.	M.I. 1753

ENGINE

Install new lower main bearings.	EMM
Install new thrust collars.	EMM
Replace crankshaft harmonic balancer.	Recondition and requalify.
Replace oil pumps.	EMM
Remove oil pressure relief valve; clean, inspect, and test.	EMM
Replace cylinder assemblies.	EMM
Replace lower liner inserts.	EMM
Inspect and qualify connecting rod bearings.	EMM
Inspect and qualify piston cooling tubes.	EMM
Check rocker arms, rocker arm bushings, and cam followers.	EMM
Check lash adjusters.	EMM
Check exhaust valve timing.	EMM
Inspect injector control linkage. Replace links, seals, and bearings, if required.	EMM

MAIN GENERATOR

Remove bearing cover and inspect for grease contamination, excessive wear, and overheating. Apply new grease.	M.I. 3302 or M.I. 3304
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MAIN RESERVOIR SYSTEM

Clean system and recondition valves.	
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EVERY SIX YEARS (CONT'D)**COOLING FAN**

Replace bearings.

Replace flexible drive coupling. (Where Used.)

EVERY TWELVE YEARS**ENGINE**

Replace.

Replacement should be EMD Unit Exchange or equivalent.

MAIN GENERATOR

Replace.

Replacement should be EMD Unit Exchange or equivalent.

HIGH VOLTAGE CABLING

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 Unit Exchange.

LOW VOLTAGE WIRING

Renew.

Same remark as immediately above.

NON-SCHEDULED MAINTENANCE

A definite time or mileage schedule for items listed below cannot be established due to variations in wear and component life related to operating conditions.

The following work is to be performed at wheel change time or when truck is removed for reconditioning.

PINION

Check for involute profile wear. M.I. 1518

Magnaflux.

AXLE GEAR

Check for involute profile wear. M.I. 1518

Magnaflux.

AXLE

Magnaflux with wheels and inner races removed. M.I. 1518

TRACTION MOTOR

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

Jigstone commutator and clean slots. M.I. 3900. Restore smooth and concentric surface when inspection indicates need.

CAUTION

Do not stone commutator by hand.

JOURNAL BOXES/JOURNAL BEARINGS

Clean and recondition. M.I. 1552 or M.I. 1553

TRUCK ASSEMBLIES

Inspect, test, and repair or replace the following items as necessary; frame, bolster, wear plates, liners, springs, spring seats, snubbers, brake rigging, rubber bolster springs, shock absorbers, and sander guides. M.I.'s 1501, 1504, 1507

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