



## SCHEDULED MAINTENANCE PROGRAM EXPORT STATIONARY POWER UNITS WITH BLOWER-TYPE ENGINES

### INTRODUCTION

This Maintenance Instruction provides average recommendations which should ensure satisfactory engine 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 engine and associated equipment.

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 Maintenance Instructions 1762 and 1764 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. Operation load limitations will be adhered to.
6. Torquing procedures contained in this M.I. will be followed for new engines and newly installed replacement assemblies.

This Maintenance Instruction is divided into three sections. The first section is maintenance performed before and after each start, the second section is performed on "calendar period" basis, and the third section is performed on a "running time" basis. Because operating requirements for this equipment can vary from standby, to periodic, to continuous usage, the maintenance procedures must be modified to suit individual requirements.

### 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.

EMM	means Engine Maintenance Manual
OM	means Operating Manual
M.I.	means Maintenance Instruction

\*This bulletin is intended for export application only, and supersedes information contained in M.I. 1718.

**NOTE**

The following recommendations are applicable to stationary power units used for emergency power.

1. Unit should be operated at least once a week.
2. Operate unit at idle for a sufficient period of time to allow coolant temperature to stabilize at 49° C (120° F) or higher.

If minimum temperature cannot be obtained at idle speed, gradually apply load until minimum temperature is obtained.

- 3: Operate unit at full speed, full load for a minimum of one hour after temperature stabilizes.

**BEFORE EACH START****LUBE OIL SYSTEM**

Check for lube oil in pan and strainer housing. Add oil if required.	EMM
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**COOLING SYSTEM**

Check coolant level and add coolant if required.	OM
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**FUEL SYSTEM**

Check fuel supply and open fuel supply valves.	OM
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Prime system.	OM
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**AIR SYSTEM**

Drain Condensate.	OM
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Check system pressure.	OM
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Check oil supply in air line lubricator.	EMM
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**ENGINE**

Open cylinder test valves and manually bar over engine one complete revolution, check for liquid ejected from valves, and close test valves.	If fluid discharge is observed from any cylinder, find the cause and make the necessary repairs prior to starting the engine.
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Pre-lube engine if unit has been shut down for over 48 hours.	EMM
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**GOVERNOR**

Check lube oil level.	EMM
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**IMMEDIATELY AFTER EACH START****INSPECT FOR LEAKS**

Cooling system.  
 Fuel system.  
 Lube oil system.  
 Exhaust system.

**LUBE OIL SYSTEM**

Check lube oil level in pan with engine at idle. EMM

Check lube oil pressure at engine. OM

**ENGINE**

Check cylinder test valves for leakage. Tighten if required. EMM

Check handhole covers for leakage. Tighten if required. EMM

Check air box drains for proper operation and clean, if needed. If drains are kept closed, drain every 4 hours. EMM

**PERFORM THE FOLLOWING ITEMS ON CALENDAR TIME BASIS****DAILY****INSPECT FOR LEAKS**

Cooling system.  
 Fuel system.  
 Lube oil system.  
 Exhaust system.  
 Air system.

**LUBE OIL SYSTEM**

Check lube oil level in pan. EMM

**COOLING SYSTEM**

Check coolant level. OM

**FUEL SYSTEM**

Check fuel supply.

**AIR SYSTEM**

Drain condensate from lines and tanks.

**GOVERNOR**

Check oil level and add oil if required. EMM

**EVERY TWO WEEKS**

**CAUTION**

Perform the following maintenance at this time if the only available fuel oil does not meet the sulfur content or distillation recovery specifications contained in M.I. 1750.

The use of good quality, high alkaline reserve lubricating oils is strongly recommended where only high sulfur fuels are available.

**LUBE OIL SYSTEM**

Take sample for analysis.

The services of a competent laboratory should be used to monitor the suitability of the oil for continued use according to M.I. 1762.

**EVERY MONTH**

**LUBE OIL SYSTEM**

Take sample for analysis.

The services of a competent laboratory should be used to monitor the suitability of the oil for continued use according to M.I. 1762.

**LUBE OIL CIRCULATING PUMP AND MOTOR (Where Used)**

Check for proper operation.

OM

**IMMERSION HEATER (Where Used)**

Check for proper operation.

OM

**EVERY TWO MONTHS**

**IN-LINE "Y" OIL STRAINER (Where Used)**

Clean strainer screen.

**EVERY YEAR**

**LUBE OIL CIRCULATING PUMP AND MOTOR (Where Used)**

Inspect and clean with dry air.

Replace brushes.

If equipped with DC motor.

Remove and clean check valve.

**EVERY TWO YEARS****LUBE OIL FILTERS**

Change filter elements.

EMM. Unless filter change, on a running time basis, has occurred first.

Clean lube oil strainer.

EMM. Fill strainer housing with oil before starting engine.

**FUEL FILTERS**

Change engine mounted filter elements.

EMM. Unless filter change, on a running time basis, has occurred first.

Clean or replace suction strainer element.

OM. Unless maintenance, on a running time basis, has occurred first.

**ENGINE PROTECTOR**

Recondition.

M.I. 259. Qualify on test stand after renewing springs, "O" rings, and diaphragms.

**LUBE OIL CIRCULATING PUMP AND MOTOR (Where Used)**

Recondition.

**EVERY THREE YEARS****COOLING SYSTEM THERMOSTATIC VALVE**

Replace "O" rings and thermostatic elements. EMM, M.I. 581

**EVERY FOUR YEARS****COOLING SYSTEM PRESSURE CAP**

Replace. Unless 16,000 hour replacement has occurred first.

**EVERY SIX YEARS****ENGINE**

Replace top deck cover seals and check latches. Unless 8000 hour replacement has occurred first.

Replace cylinder head grommets, inlet and outlet seals, and lower liner seals. EMM. Unless cylinder assembly replacement has occurred first.

**MAIN GENERATOR**

Remove bearing cover and inspect for grease contamination, excessive wear, or overheating. Apply new grease. Unless 48,000 hour lubrication has occurred first. M.I. 3327 for EMD generator. If generator is other than EMD, refer to manufacturer's manual.

## PERFORM THE FOLLOWING ITEMS ON RUNNING TIME BASIS

### AFTER THE FIRST 350 HOURS OF OPERATION

ENGINE NUT AND BOLT TIGHTNESS CHECK      Torque to values specified in EMM.

Cylinder head crab nuts.

Exhaust manifold flange bolts.

Cylinder liner water inlet line nuts and bolts.

Head frame to crankcase bolts.

### EVERY 350 HOURS

#### FUEL FILTER

Check fuel pressure gauge with engine at rated RPM.

On units where gauge is connected to filter input side, change filter elements if pressure is greater than 50 psi.

On units where gauge is connected on filter output side, change filter elements if pressure is less than 12 psi.

#### LUBE OIL FILTER

Check lube oil pressure at filter cover with engine at rated RPM.

Change filter elements if pressure is greater than 25 psi.

### EVERY 700 HOURS

#### ENGINE PROTECTOR

Check operation.

EMM, M.I. 259.

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

Check oil level.

EMM, M.I. 440.

#### ENGINE AIR FILTER -- CYCOIL TYPE (Where Used)

Check oil level.

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

Check indicator. If tripped, take manometer reading and replace elements if necessary.

#### HEAT EXCHANGER

Inspect corrosion zincs.

EMM

**EVERY 700 HOURS (CONT'D)****CAUTION**

Perform the following maintenance at this time if the only available fuel oil does not meet the sulfur content or distillation recovery specifications contained in M.I. 1750.

The use of good quality, high alkaline reserve lubricating oil is strongly recommended where only high sulfur fuels are available.

**LUBE OIL FILTERS**

Change filter elements.

Clean lube oil strainers.

Fill strainer housing with oil before starting engine.

**EVERY 1400 HOURS****LUBE OIL FILTERS**

Change filter elements.

Clean lube oil strainer.

Fill strainer housing with oil before starting engine.

**PROTECTIVE DEVICES**

Check operation.

EMM

**CAUTION**

Perform the following maintenance at this time if the only available fuel oil does not meet the sediment and ash specifications contained in M.I. 1750.

**FUEL FILTERS**

Clean or replace suction strainer element.

OM

Change engine mounted filter elements.

EMM. Use only elements equal to original equipment.

**CAUTION**

Perform the following maintenance at this time if the only available fuel oil does not meet the sulfur content or distillation recovery specifications contained in M.I. 1750.

The use of good quality, high alkaline reserve lubricating oil is strongly recommended where only high sulfur fuels are available.

**EVERY 1400 HOURS (CONT'D)**

**OIL SYSTEM**

Change engine oil.

EMM. Depending upon fuel sulfur content and quality of lubricating oil, it may be necessary to change lube oil even more frequently.

Clean oil pan.

Clean filter housing.

Clean oil suction screens.

Clean scavenging oil screens.

Fill strainer housing with oil before starting engine.

**EVERY 2000 HOURS**

**FUEL FILTERS**

Clean or replace suction strainer element.

OM

Change engine mounted filter elements.

EMM. Use only elements equal to original equipment.

**COOLING SYSTEM**

Check inhibitor concentration.

M.I. 1748

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

Change oil. Drain and fill only.

EMM, M.I. 440.

**ENGINE AIR FILTER -- CYCOIL TYPE (Where Used)**

Change oil. Drain and fill only.

**ENGINE AIR FILTERS -- PAPER TYPE (Where Used)**

Take manometer readings. Replace elements if necessary.

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

Replace elements.

**EVERY 2000 HOURS (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

**EVERY 4000 HOURS****OIL SYSTEM**

Change engine oil.	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 pan.	
Clean filter housing.	
Clean oil suction screens.	
Clean scavenging oil screens.	Fill strainer housing with oil before starting engine.

**ENGINE**

Check exhaust manifold base flange bolts for proper tightness.	EMM
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**MAIN GENERATOR (Where Used)**

Inspect collector rings and brushes, and replace brushes if required.	M.I. 3327 for EMD generator. If generator is other than EMD, refer to manufacturer's manual.
Reverse polarity of collector rings.	

**GOVERNOR**

Change oil.	EMM
Lubricate linkage moving parts.	EMM
Lubricate governor synchronizing motor, motor bearings (where used).	EMM

**EVERY 8000 HOURS****ENGINE NUT AND BOLT RETORQUING**

Cylinder head crab nuts.	Loosen, and then torque to values specified in 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
Check injector timing and injector rack length.	EMM
Check engine speed.	EMM
Check overspeed trip.	EMM
Remove and clean oil separator element.	EMM
Remove oil pan handhole cover and inspect harmonic balancer while engine is being barred over.	EMM

**EXHAUST SYSTEM**

- Clean spark retention trap (where used).
- Tighten bands connecting manifold sections.

**GENERATOR**

- Replace collector ring brushes. M.I. 3327

**EXCITER**

- Clean and visually inspect. M.I. 3706
- Inspect and replace brushes when required. Replace in sets.

**STARTER MOTORS (Electric)**

- Blow out with dry air.

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

- Change oil. Clean sump and media. M.I. 440

**EVERY 8000 HOURS (CONT'D)****ENGINE AIR FILTER -- CYCOIL TYPE  
(Where Used)**

- Change oil and clean sump.
- Check operation of variflow valves.
- Check condition of hoses.

**COOLING SYSTEM**

- Inspect and perform pressure test. OM
- Replace pressure cap if defective. OM

**LUBE OIL FILTER**

- Remove oil filter bypass valve; clean, inspect and test. M.I. 926

**CAUTION**

Perform the following maintenance at this time if the only available fuel oil does not meet the sulfur content or distillation recovery specifications contained in M.I. 1750.

The use of good quality, high alkaline reserve lubricating oils is strongly recommended where only high sulfur fuels are available.

**ENGINE**

- Recondition cylinder assemblies. EMM

**EVERY 16,000 HOURS****STARTING MOTORS (Air)**

- Disassemble, clean, and lubricate. Renew parts if necessary. EMM

**STARTING MOTOR (Electric)**

- Disassemble, clean, and lubricate. EMM
- Inspect brushes and replace, if necessary. EMM

**FUEL PUMP**

- Replace coupling spider.

**EVERY 16,000 HOURS (CONT'D)****FREQUENCY GENERATOR  
(Where Used)**

Replace coupling spider.

**COOLING SYSTEM**

Replace pressure cap. OM

Inspect filler neck for damage. Replace if damaged. OM

Take cooling water sample for lab analysis and corrosion test.

**ENGINE**

Recondition cylinder assemblies. EMM

Recondition injectors. 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

**EVERY 24,000 HOURS****ENGINE**

Install new thrust collars. EMM

Install new lower main bearings. EMM

Replace water pump seals and all worn parts. EMM

**COOLING SYSTEM**

Replace flexible coupling seals.

**LUBE OIL COOLER**

Inspect, clean, and test. M.I. 927

**HEAT EXCHANGER**

Inspect, clean, and test. EMM

**EVERY 32,000 HOURS****ENGINE BLOWERS**

Recondition. M.I. 430

**BLOWER-TO-FILTER AIR DUCTS  
(Where Used)**

Replace.

**GOVERNOR**

Recondition.

**GOVERNOR BOOSTER SERVO  
(Where Used)**

Disassemble, clean, inspect, and replace O-ring seals. EMM

**FUEL PUMP**

Recondition. M.I. 4110

**EVERY 48,000 HOURS****ENGINE**

Replace crankshaft harmonic balancer. EMM. Recondition and requalify.

Recondition oil pumps. EMM

Remove oil pressure relief valve; clean, inspect, and test. EMM

Replace lower liner inserts. EMM

Inspect injector control linkage. Replace links, seals, and bearings, if required.

**MAIN GENERATOR**

Remove bearing cover and inspect for grease contamination, excessive wear, or overheating. Apply new grease. M.I. 3327 for EMD generator. If generator is other than EMD, refer to manufacturer's manual.

**EVERY 96,000 HOURS****ENGINE**

Recondition.

**GENERATOR**

Recondition.

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