FORM NO.

DATE ORDERED 3-3-80 FORM NO. 927-0152

DATE REQUIRED 3-4-80 DATED

DESCRIPTION RCCK F/6

☑ RERUN ☐ REVISED ☐ NEW ☐ IN COMPUTER ☐ VT. ☐ PT.

NO. of COPIES 800

RUNNING SIZE

CUT SIZE

NO. of PLATES — Itek — Metal

PAPER STOCK
COLOR

COVER STOCK
COLOR

COLOR of INK

Use existing plates

Rush Please!

		Date
☐	Total Running Time	
☐	Folding Time	
☐	Collating with MSS ____ OTHER	
☐	Stapling	
☐	Trimming	
☐	Drilling — No. Holes ____ Size ____	
☐	Padding	
☐	Other	

DISTRIBUTION: ☐ Domestic ☐ Canada ☐ Foreign None

REMARKS: ~~Go to Jim Nelson~~ ~~Shipping~~ Sent.

OFFICE SUPPLIES (Fill in)
Completion Date 3/4/80
By D.H.

DISPOSAL OF OLD STOCK
☐ Scrap
☐ Use First
☐ Inventory

Print Record Card	
Month Report Tab.	
Print Order Copy	
File Copy	

Issued By Paul Markenhoff? Technical Publications Dept.

CC: Lit. List Notification

SAFETY PRECAUTIONS

The following symbols in this manual signal potentially dangerous conditions to the operator or equipment. Read this manual carefully. Know when these conditions can exist. Then, take necessary steps to protect personnel as well as equipment.

WARNING **Onan uses this symbol throughout this manual to warn of possible serious personal injury.**

CAUTION **This symbol refers to possible equipment damage.**

Fuels, electrical equipment, batteries, exhaust gases and moving parts present potential hazards that could result in serious, personal injury. Take care in following these recommended procedures.

- **Use Extreme Caution Near Gasoline, Gaseous Fuel And Diesel Fuel. A constant potential explosive or fire hazard exists.**

  Do not fill fuel tank near unit with engine running. Do not smoke or use open flame near the unit or the fuel tank.

  Be sure all fuel supplies have a positive shutoff valve.

  Fuel lines must be of steel piping, adequately secured and free from leaks. Do not use copper piping on flexible lines as copper becomes hardened and brittle. Use black pipe on natural gas or gaseous fuels, not on gasoline or diesel fuels. Piping at the engine should be approved flexible line.

  Have a fire extinguisher nearby. Be sure extinguisher is properly maintained and be familiar with its proper use. Extinguishers rated ABC by the NFPA are appropriate for all applications. Consult the local fire department for the correct type of extinguisher for various applications.

- **Guard Against Electric Shock**

  Remove electric power before removing protective shields or touching electrical equipment. Use rubber insulative mats placed on dry wood platforms over floors that are metal or concrete when around electrical equipment. Do not wear damp clothing (particularly wet shoes) or allow skin surfaces to be damp when handling electrical equipment.

  Jewelry is a good conductor of electricity and should be removed when working on electrical equipment.

  Use extreme caution when working on electrical components. High voltages cause injury or death.

  Follow all state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician.

- **Do Not Smoke While Servicing Batteries**

  Lead acid batteries emit a highly explosive hydrogen gas that can be ignited by electrical arcing or by smoking.

- **Exhaust Gases Are Toxic**

  Provide an adequate exhaust system to properly expel discharged gases. Check exhaust system regularly for leaks. Ensure that exhaust manifolds are secure and not warped.

  Be sure the unit is well ventilated.

- **Keep The Unit And Surrounding Area Clean.**

  Remove all oil deposits. Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and subsequent engine damage and may present a potential fire hazard.

  Dispose of oily rags. Keep the floor clean and dry.

- **Protect Against Moving Parts.**

  Avoid moving parts of the unit. Loose jackets, shirts or sleeves should not be permitted because of the danger of becoming caught in moving parts.

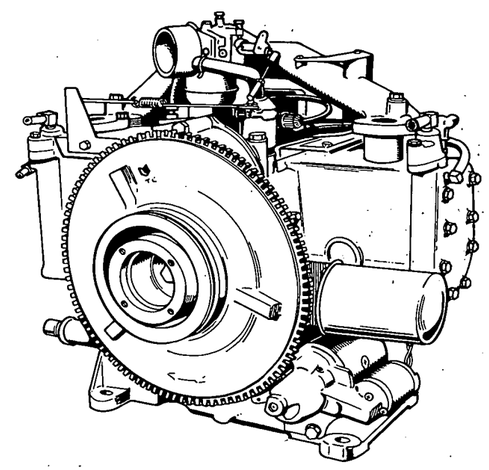
  Make sure all nuts and bolts are secure. Keep power shields and guards in position.

  If adjustments *must* be made while the unit is running, use extreme caution around hot manifolds, moving parts, etc.

  Do not work on this equipment when mentally or physically fatigued.

Onan®

OPERATING AND MAINTENANCE INSTRUCTIONS



RCCK SERIES

LIQUID-COOLED INDUSTRIAL ENGINES

ONAN 1400 73RD AVENUE N.E. • MINNEAPOLIS, MINNESOTA 55432

FORM NUMBER
927-0152

Printed in U.S.A.

ISSUE DATE
4-76
(SPEC A)

ADJUSTMENTS

CARBURETOR ADJUSTMENTS

The carburetor has a fuel, idle adjustment which affects operation under light or no load conditions. If the adjustment has been disturbed, turn the idle adjustment screw (needle off its seat) 1 to 1-1/2 turns to permit starting. Then, readjust for smooth idle condition.

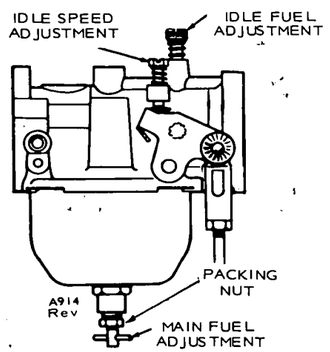
CAUTION **Forcing the needle against its seat will damage it. The needle does not completely shut off fuel when turned fully in.**

Adjust the carburetor fuel-to-air mixture for smooth, efficient operation. Always adjust in two steps, first the load adjustment and then the idle adjustment.

Before adjusting the carburetor, be sure the ignition system is working properly and the governor is adjusted. Allow the engine to warm-up before starting carburetor adjustments.

1. Start engine and allow it to warm up.
2. Push in on governor mechanism to slow engine down to about 400 to 500 rpm.
3. With no load, set idle adjustment screw for even operation so engine is firing on both cylinders and running smoothly.
4. Loosen main adjustment packing nut.
5. Release governor mechanism to allow the engine to accelerate. If engine accelerates evenly and without lag, main adjustment is correct. If not, adjust main fuel adjust needle outward about 1/2 turn and again slow down engine and release mechanism. Continue until engine accelerates evenly and without a time lag after.
6. Tighten packing nut.
7. Readjust idle, if necessary.

CAUTION **Loosen the packing nut before making main fuel adjustment and then tighten the nut to a snug fit after the adjustment has been made. This procedure makes it easier to use the carburetor adjusting tool and prevents fuel leaks around the packing nut. Fuel leaks cause hard starting because the float level becomes lower than normal.**



CARBURETOR

GOVERNOR ADJUSTMENT

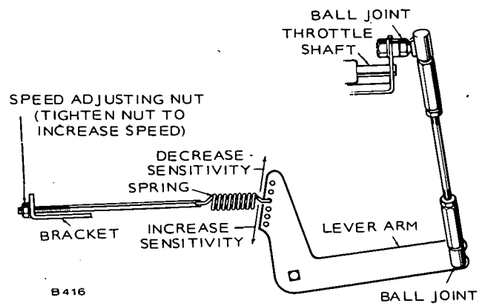
The governor is set at the factory to allow a nominal engine speed of 2,400 rpm at no load operation (unless another speed is specified when the engine is ordered). Proper governor adjustment is one of the most important factors in maintaining desired engine power and speed.

Speed

Turn speed adjusting nut in to increase speed or out to decrease speed. See Figure.

Sensitivity

Referring to Figure, move spring toward governor shaft to increase sensitivity and away from governor shaft to decrease sensitivity. The engine speed drop from no load to full load should not be less than 100 rpm.



GOVERNOR

BREAKER POINTS—TIMING

To maintain maximum engine efficiency, change the breaker points every 200 hours of operation. Proceed as follows:

1. Remove breaker box cover and spark plugs.
2. Remove two mounting screws (A) and pull point set out of box just far enough so screw (B) can be removed. See Figure. Replace points and condenser set. Do not completely tighten mounting screws (A).
3. Rotate crankshaft clockwise (facing flywheel) until points are fully open. Turn screw (C) until point gap measures 0.020 inch (0.51 mm) with a flat thickness gauge.
4. Tighten mounting screws (A) and recheck point gap. Place one drop of oil on breaker point pivot.
5. Replace spark plugs (gapped at 0.025 inch [0.58 mm]).
6. Start engine and check timing.
7. Replace breaker box cover.

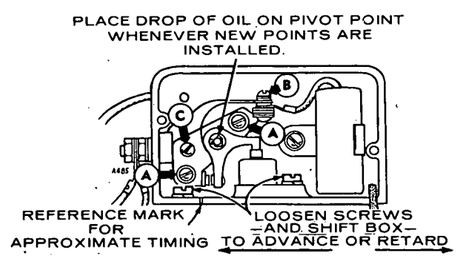
PERIODIC SERVICE GUIDE

SERVICE THESE ITEMS	AFTER EACH CYCLE OF INDICATED HOURS						
	8	50	100	200	500	1000	2000
Inspect Engine Generally*	x						
Check Fuel Supply and Coolant Level	x						
Check Oil Level	x						
Clean Governor Linkage		x*					
Change Crankcase Oil			x*				
Check Breaker Points				x			
Check Battery Electrolyte Level			x				
Check Valve Clearance				x1			
Replace Spark Plugs				x			
Replace Oil Filter				x*			
Replace Air Cleaner				x*			
Inspect Valves, Grind if Necessary						x1	
Complete Reconditioning							x1

* - Check for exhaust leaks, fuel leaks, proper mounting, etc.
x* - Perform more often under dusty or extreme cold weather conditions.
x1 - For detailed maintenance—contact your Onan Service Center.

PERIODIC MAINTENANCE SCHEDULE

Regularly scheduled maintenance is the key to lower operating costs and longer service life for the unit. The schedule can be used as a guide. However, actual operating conditions under which a unit is run should be the determining factor in establishing a maintenance schedule. When operating in very dusty or dirty conditions, some of the service periods may have to be reduced. Check the condition of the crankcase oil, the filters, etc., frequently until the proper service time periods can be established. When any abnormalities occur in operation—unusual noises from engine or accessories, loss of power, overheating, etc.,—contact your Onan Service Center.



BREAKER POINT ADJUSTMENT

EXHAUST SYSTEM

Make regular inspections of the exhaust system throughout the entire life of the engine. Locate leaks in muffler and piping while the engine is operating. Repair all leaks immediately after they are detected for personnel safety.

WARNING **Leaky exhaust systems emit noxious carbon monoxide fumes which are a potential safety hazard in enclosed areas.**

BATTERY

Check charge condition. Check electrolyte level. Add distilled water to keep electrolyte at its proper level. In freezing weather, run engine immediately after adding water. Keep battery connections tight and clean.

OPERATION

BREAK-IN PROCEDURE

Controlled break-in with proper oil and a conscientiously applied maintenance program will help assure satisfactory service for many hours from your Onan engine.

Break-in or ideal fitting of all internal moving metal parts can best be achieved by maintaining proper cooling and correct lubrication during the running-in period. Run the engine at about half load for the first three hours with intermittent periods of full load to control engine break-in. Engine damage can be caused by using the wrong grade and weight of oil and high engine operating temperatures during break-in.

Check the oil level at least every five operating hours. Add oil to keep it at the proper level, but never overfill as overfilling may cause the oil to foam and enter the breather system.

HOT WEATHER OPERATION

When operating the engine in temperatures above 75° F (24° C), pay particular attention to the following items to prevent damage:

1. Keep radiator clean and free of obstruction which would decrease air flow to and from engine.
2. Use proper grade and weight of oil for temperature engine is being used in. Check oil level each time you fill fuel tank.
3. Check battery water level more frequently than every 50 hours which is recommended under normal conditions. High temperatures cause faster evaporation.

COLD WEATHER OPERATION

When the engine is being used in temperatures below 32° F (0° C), check the following items closely:

1. Use correct SAE No. oil for temperature conditions. Change oil only when engine is warm.
2. Use fresh fuel. Protect against moisture condensation.
3. Keep fuel system clean and batteries in a well charged condition.

DUST AND DIRT

1. Keep unit clean. Keep cooling system clean.
2. Service air cleaner as frequently as required.
3. Change crankcase oil and filter more often than recommended under normal conditions.

MAINTENANCE

CRANKCASE OIL

Fill to the "FULL" mark on the oil level indicator.

Oil Capacity

3½ quarts (3.3 litre)
4 quarts (3.8 litre with filter)

Recommended oil numbers for expected ambient temperatures are as follows:

Above 32° F (0° C) ..... SAE 30
0° F to 32° F (-18° C to 0° C) .... SAE 10W or 5W-30
Below 0° F (-10° C) ..... SAE 5W-30

OIL LEVEL

Check oil level at least every eight hours of operation. Check more frequently on a new or overhauled engine as oil consumption is higher until piston rings seat properly.

OIL CHANGE

Change crankcase oil after the first 50 hours of operation; change every 100 hours after that. If operating in extremely dusty conditions, change oil more frequently.

WARNING **Do not remove oil fill cap with engine running; oil will blow out causing possible injury.**

COOLING SYSTEM

Check cooling system at least every 50 hours. Remove any dust, dirt or bugs which may have accumulated on the radiator.

CAUTION **A dirty or leaky radiator, stuck thermostat, or faulty water pump can cause overheating and engine damage when coolant circulation is impaired.**

SPARK PLUGS

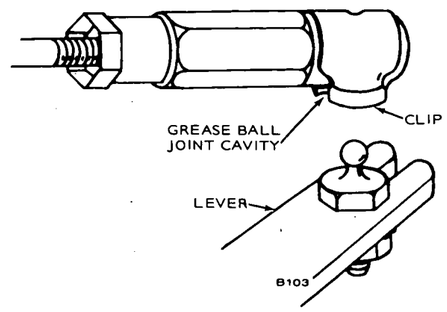
Check, clean and reset spark plugs every 100 operating hours. Replace spark plugs that show signs of fouling or electrode erosion. Replace plugs after 200 hours of operation.

MAINTENANCE

GOVERNOR LINKAGE

The linkage must be able to move freely through its entire travel. Every 50 hours of operation clean the metal joints as shown in Figure. Also inspect the linkage for binding, excessive slack and wear.

Clean and lubricate metal ball joints. Don't lubricate plastic joints.

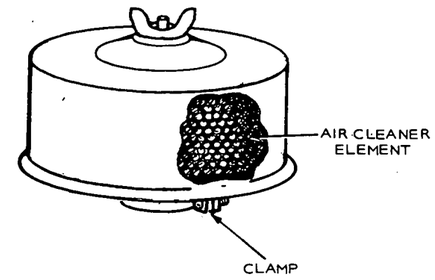


GOVERNOR LINKAGE

CARTRIDGE AIR CLEANER (Optional)

Check and clean air cleaner element every 50 hours. Clean by gently tapping element on a flat surface. Replace element every 200 hours. Clean or replace more frequently in dusty operation conditions.

CAUTION **Do not run engine with air cleaner removed. Intake of dirty air or solid materials could cause severe damage to engine parts.**

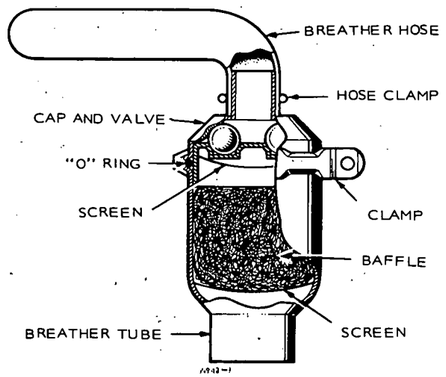


AIR CLEANER

CRANKCASE BREATHER

This engine uses a crankcase breather valve for maintaining crankcase vacuum. If the crankcase becomes pressurized as evidenced by oil leaks at the seals, clean baffle and valve in a suitable solvent.

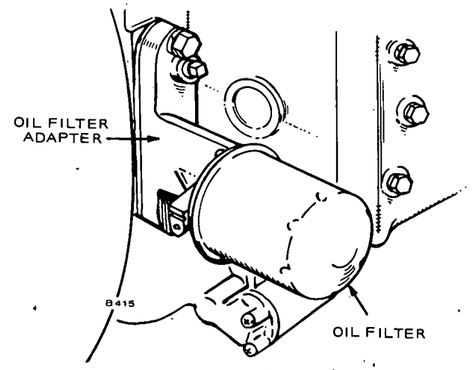
Clean or replace crankcase breather baffle periodically. Be sure baffle material doesn't come apart and work into the manifold.



CRANKCASE BREATHER

OIL FILTER

Change the crankcase oil filter every 200 hours. Remove the filter (see Figure) by turning counterclockwise, using a filter wrench. Coat rubber gasket on filter with a film of oil before installing. Install the filter finger-tight plus 1/4 to 1/2 turn. If oil becomes so dirty that the markings on the oil level indicator cannot be seen, change the filter and shorten the filter service period.



OIL FILTER

GENERAL INFORMATION

ENGINE MODEL REFERENCE

Identify your model by referring to the MODEL and SPEC (specification) NO. as shown on the unit nameplate. Always use this number and the engine serial number when making reference to your engine.

How to interpret MODEL and SPEC NO.

RCCK	MS	/	123/1	A
1	2		3	4

1. Factory code for general identification purposes.
2. Specific Type:
   MS—ELECTRIC starting with stub shaft and starter.
3. Factory code for optional equipment supplied.
4. Specification (Spec Letter) advances with factory production modification.

If your engine needs service or repair, contact an Onan Service Center. Trained mechanics will assure expert repair service on your Onan engine.

OUT-OF-SERVICE PROTECTION

Protect an engine that will be out-of-service for more than 30 days as follows:

1. Run engine until thoroughly warm (5 to 10 minutes).
2. Turn off fuel supply; run engine until it stops.
3. Drain oil from oil base while still warm. Refill and attach a warning tag stating oil viscosity used.
4. Remove spark plugs. Pour one ounce (two tablespoons) of rust inhibitor (or SAE #50 oil) into the cylinders. Crank engine over a few times. Install spark plugs.
5. Service air cleaner per maintenance schedule.
6. Clean governor linkage and protect by wrapping with a clean cloth.
7. Plug exhaust outlet to prevent entrance of moisture, dirt, bugs, etc.
8. Wipe entire unit. Coat rustable parts with a light film of grease or oil.
9. Provide a suitable cover for entire unit.
10. If battery is used, disconnect and follow standard battery storage procedure.

RUNNING REPLACEMENT PARTS

Oil Filter	122-0323
Breather Tube Filter	123-0865
Spark Plug	167-0241
Breaker Points	160-0002
Condenser (Breaker Box)	312-0069
Spark Plug Cable (23½") L.H.	167-1462
Spark Plug Cable (19") R.H.	167-1578
Ignition Coil	166-0643

Onan recommends that all major service be performed by qualified service personnel. An engine service manual and complete parts catalog is available at additional cost. Contact your nearest authorized dealer or Onan Parts and Service Center.

SPECIFICATIONS

Displacement (cubic inch)	49 (816.2 m³)
Cylinder Bore	3-1/4" (82.6 mm)
Piston Stroke	3" (76.2 mm)
Fuel	Gasoline
Battery	12 Volt

TUNE-UP SPECIFICATIONS

Cylinder Head Torque	29-31 ft. lb. (3.3 - 3.5 N•m)
Spark Plug Gap	0.025 (0.635 mm)
Breaker Point Gap	0.020 (0.51 mm)
Tappets (Cold) Intake	0.006 to 0.008 (0.152 to 0.203)
Exhaust	0.015 to 0.017 (0.381 to 0.432)
Compression PSI	100 - 120
Engine Timing (Static Setting)	20° BTC

PRE-START INSTRUCTIONS

WARNING

ENGINE EXHAUST GAS (CARBON MONOXIDE) IS DEADLY!

Carbon monoxide is an odorless, colorless gas formed by incomplete combustion of hydrocarbon fuels. Carbon monoxide is a dangerous gas that can cause unconsciousness and is potentially lethal. Some of the symptoms or signs of carbon monoxide inhalation are:

- **Dizziness**
- **Intense Headache**
- **Weakness**
- **Vomiting**
- **Muscular Twitching**
- **Throbbing in Temples**

If you experience any of the above symptoms, get out into fresh air immediately.

The best protection against carbon monoxide inhalation is a regular inspection of the complete exhaust system. If you notice a change in the sound or appearance of exhaust system, shut the unit down immediately and have it inspected at once by a competent mechanic.

Crankcase Oil

Be sure the crankcase has been filled with oil to the "FULL" mark on the oil level indicator. Refer to the *MAINTENANCE* section for the recommended oil changes and complete lubricating oil recommendations.

Oil consumption may be higher with a multigrade oil than with a single grade oil if both oils have comparable viscosities at 210°F. Therefore, single grade oils are generally more desirable, unless anticipating a wide range of temperatures. Use the proper grade oil for the expected conditions.

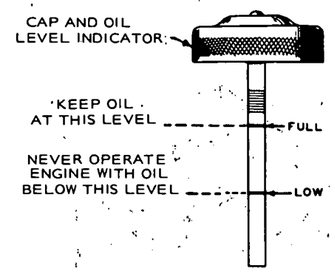
Recommended Fuel

Use clean, fresh, regular grade, automotive gasoline. Do not use highly-leaded premium types.

For new engines, the most satisfactory results are obtained by using nonleaded gasoline. For older engines that have previously used leaded gasoline, heads must be taken off and all lead deposits removed from engine before switching to nonleaded gasoline.

CAUTION **If lead deposits are not removed from engine before switching from leaded to nonleaded gasoline, preignition could occur causing severe damage to the engine.**

WARNING **Never fill the fuel tank when the engine is running as fumes may cause explosion.**



OIL LEVEL INDICATOR

Engine Coolant

Check engine coolant level to ensure proper circulation and cooling during each operating period.

STARTING

Electric Start

1. Move ignition switch to ON.
2. Push START button to crank engine.
3. Position choke about 3/4 of the way closed or as necessary according to temperature conditions.
4. As the engine warms up, adjust choke gradually to its fully open position.
5. Black exhaust smoke or a rough running engine indicates excessive choking.

APPLYING LOAD

Apply load to a new or reconditioned engine gradually in about four steps; not less than 30 minutes running time for each step. Start with 1/4 load, then 1/2, 3/4 and full-load.

STOPPING THE ENGINE

Disconnect all load before stopping the engine. Engines equipped with battery ignition are stopped by positioning the ignition switch to the OFF position.