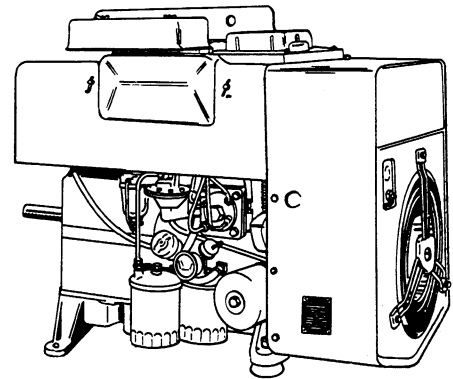
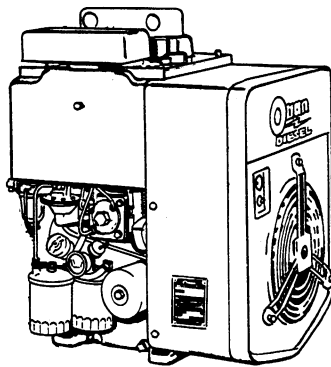




# **OPERATING AND MAINTENANCE INSTRUCTIONS**

## **DJB-DJC**

### **INDUSTRIAL ENGINES**



**ONAN**

**1400 73RD AVENUE N.E. • MINNEAPOLIS, MINNESOTA 55432**  
*A DIVISION OF ONAN CORPORATION*

967-0150

11-77  
(SPECS A THROUGH V)

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# 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.

# Important Safety Precautions

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Read and observe these safety precautions when using or working on electric generators, engines and related equipment. Also read and follow the literature provided with the equipment.

Proper operation and maintenance are critical to performance and safety. Electricity, fuel, exhaust, moving parts and batteries present hazards that can cause severe personal injury or death.

## FUEL, ENGINE OIL, AND FUMES ARE FLAMMABLE AND TOXIC

Fire, explosion, and personal injury can result from improper practices.

- Used engine oil, and benzene and lead, found in some gasoline, have been identified by government agencies as causing cancer or reproductive toxicity. When checking, draining or adding fuel or oil, do not ingest, breathe the fumes, or contact gasoline or used oil.
- Do not fill tanks with engine running. Do not smoke around the area. Wipe up oil or fuel spills. Do not leave rags in engine compartment or on equipment. Keep this and surrounding area clean.
- Inspect fuel system before each operation and periodically while running.
- Equip fuel supply with a positive fuel shutoff.
- Do not store or transport equipment with fuel in tank.
- Keep an ABC-rated fire extinguisher available near equipment and adjacent areas for use on all types of fires except alcohol.
- Unless provided with equipment or noted otherwise in installation manual, fuel lines must be copper or steel, secured, free of leaks and separated or shielded from electrical wiring.
- Use approved, non-conductive flexible fuel hose for fuel connections. Do not use copper tubing as a flexible connection. It will work-harden and break.

## EXHAUST GAS IS DEADLY

- Engine exhaust contains carbon monoxide (CO), an odorless, invisible, poisonous gas. Learn the symptoms of CO poisoning.
- Never sleep in a vessel, vehicle, or room with a genset or engine running unless the area is equipped with an operating CO detector with an audible alarm.
- Each time the engine or genset is started, or at least every day, thoroughly inspect the exhaust system. Shut down the unit and repair leaks immediately.

- Warning: Engine exhaust is known to the State of California to cause cancer, birth defects and other reproductive harm.

*Make sure exhaust is properly ventilated.*

- Vessel bilge must have an operating power exhaust.
- Vehicle exhaust system must extend beyond vehicle perimeter and not near windows, doors or vents.
- Do not use engine or genset cooling air to heat an area.
- Do not operate engine/genset in enclosed area without ample fresh air ventilation.
- Expel exhaust away from enclosed, sheltered, or occupied areas.
- Make sure exhaust system components are securely fastened and not warped.

## MOVING PARTS CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

- Do not remove any guards or covers with the equipment running.
- Keep hands, clothing, hair, and jewelry away from moving parts.
- Before performing any maintenance, disconnect battery (negative [-] cable first) to prevent accidental starting.
- Make sure fasteners and joints are secure. Tighten supports and clamps, keep guards in position over fans, drive belts, etc.
- If adjustments must be made while equipment is running, use extreme caution around hot manifolds and moving parts, etc. Wear safety glasses and protective clothing.

## BATTERY GAS IS EXPLOSIVE

- Wear safety glasses and do not smoke while servicing batteries.
- Always disconnect battery negative (-) lead first and reconnect it last. Make sure you connect battery correctly. A direct short across battery terminals can cause an explosion. Do not smoke while servicing batteries. Hydrogen gas given off during charging is explosive.
- Do not disconnect or connect battery cables if fuel vapors are present. Ventilate the area thoroughly.

## **DO NOT OPERATE IN FLAMMABLE AND EXPLOSIVE ENVIRONMENTS**

Flammable vapor can be ignited by equipment operation or cause a diesel engine to overspeed and become difficult to stop, resulting in possible fire, explosion, severe personal injury and death. **Do not operate diesel equipment where a flammable vapor environment can be created by fuel spill, leak, etc., unless equipped with an automatic safety device to block the air intake and stop the engine.**

## **HOT COOLANT CAN CAUSE SEVERE PERSONAL INJURY**

- Hot coolant is under pressure. Do not loosen the coolant pressure cap while the engine is hot. Let the engine cool before opening the pressure cap.

## **ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH**

- Do not service control panel or engine with unit running. High voltages are present. Work that must be done while unit is running should be done only by qualified service personnel.
- Do not connect the generator set to the public utility or to any other electrical power system. Electrocutation can occur at a remote site where line or equipment repairs are being made. An approved transfer switch must be used if more than one power source is connected.
- Disconnect starting battery (negative [–] cable first) before removing protective shields or touching electrical equipment. Use insulative mats placed on dry wood platforms. Do not wear jewelry, damp clothing or allow skin surface to be damp when handling electrical equipment.
- Use insulated tools. Do not tamper with interlocks.
- Follow all applicable state and local electrical codes. Have all electrical installations performed by a qualified licensed electrician. Tag open switches to avoid accidental closure.
- With transfer switches, keep cabinet closed and locked. Only authorized personnel should have cabinet or operational keys. Due to serious shock hazard from high voltages within cabinet, all service and adjustments must be performed by an electrician or authorized service representative.

If the cabinet must be opened for any reason:

1. Move genset operation switch or Stop/Auto/Handcrank switch (whichever applies) to Stop.
2. Disconnect genset batteries (negative [–] lead first).
3. Remove AC power to automatic transfer switch. If instructions require otherwise, use extreme caution due to shock hazard.

## **MEDIUM VOLTAGE GENERATOR SETS (601V TO 15kV)**

- Medium voltage acts differently than low voltage. Special equipment and training are required to work on or around medium voltage equipment. Operation and maintenance must be done only by persons trained and qualified to work on such devices. Improper use or procedures will result in severe personal injury or death.
- Do not work on energized equipment. Unauthorized personnel must not be permitted near energized equipment. Induced voltage remains even after equipment is disconnected from the power source. Plan maintenance with authorized personnel so equipment can be de-energized and safely grounded.

## **GENERAL SAFETY PRECAUTIONS**

- Do not work on equipment when mentally or physically fatigued or after consuming alcohol or drugs.
- Carefully follow all applicable local, state and federal codes.
- Never step on equipment (as when entering or leaving the engine compartment). It can stress and break unit components, possibly resulting in dangerous operating conditions from leaking fuel, leaking exhaust fumes, etc.
- Keep equipment and area clean. Oil, grease, dirt, or stowed gear can cause fire or damage equipment by restricting airflow.
- Equipment owners and operators are solely responsible for operating equipment safely. Contact your authorized Onan/Cummins dealer or distributor for more information.

**KEEP THIS DOCUMENT NEAR EQUIPMENT FOR EASY REFERENCE.**

# 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.

D J C - M S / 8 6 6 V  
1        2        3        4

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

## RUNNING REPLACEMENT PARTS

Oil Filter (If equipped) .....	122-0185
Air Filter Element .....	140-0636
Primary Fuel Filter .....	122-0325
Secondary Fuel Filter .....	122-0326

## SPECIFICATIONS

Dimensions (inches)	
Height .....	
Width .....	
Length .....	
Weight .....	
Number of Cylinders .....	
Displacement (cu in.) .....	
Bore .....	
Stroke .....	
HP at 2400 rpm .....	
Injection Order .....	
Primary and Secondary Fuel Filters .....	
Fuel Pump Lift (feet) .....	
Oil Pump (gear type) .....	
Oil Filter (full flow) .....	
Oil Capacity (U.S. quarts) * .....	
Nominal Battery Voltage .....	
Battery Size	
SAE Group 1H, 6 Volt .....	
Amp/Hr SAE 20 hr (minimum) .....	
Engine cooling air CFM at 1890 rpm .....	
Total cu ft per min of air required .....	
Combustion Air (cfm) .....	
Cooling Air (cfm) .....	
Inlet Vent (sq ft) .....	
Outlet Vent (sq in) .....	

\* - Add 1/2 quart for oil filter.

**NOTE:** Values in parentheses ( ) are metric equivalents.

## PRE-STARTING

Preparations for the initial and each additional starting operation should include careful checks of the oil, fuel, cooling, and electrical systems. The cylinder air housing door should be closed with all air shrouds in place.

Before engine is put in operation, check all components for mechanical security. If an abnormal condition, defective part, or operating difficulty is detected, repair or service as required. The engine should be kept free of dust, dirt, and spilled oil or fuel.

**Crankcase Oil:** Use an oil with the API designation CD/SD or CD/SE. However, to reduce oil consumption to a normal level in the shortest time possible on a new or rebuilt engine, use CC oil for the first fill only (50 hours). Then use the recommended oil only. Select the correct SAE grade oil by referring to the following:

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 (-18° C) .....	SAE 5W-30

DJB	DJC
28-1/2 (723.9 mm)	26 (660.4 mm)
18-3/8 (337.6 mm)	19-1/2 (358.3 mm)
24-9/16 (451.3 mm)	34-1/2 (634.9 mm)
270	440
2	4
60	120 (1966.80 CC)
3-1/4 (59.7 mm)	3-1/4 (59.7 mm)
3-5/8 (66.60 mm)	3-5/8 (66.60 mm)
12.7	23.8
1-2	1-2-4-3
yes	yes
3 (2.84 litre)	6 (5.68 litre)
yes	yes
yes	yes
3 (1.42 l)	6 (2.84 l)
12	12
two	two
105 (378 kC)	120 (432 kC)
590 (16.71 m³)	900 (25.49 m³)
613.8 (17.38 m³)	947 (28.81 m³)
32 (0.91 m³)	64 (1.81 m³)
790 (22.37 m³)	1135 (32.14 m³)
7 (0.64 m²)	12 (1.12 m²)
80 (516 cm²)	160 (1032 cm²)

Multigrade oils are recommended for temperatures of 30° F (-2° C) and below, but they are not recommended for temperatures above 30° F (-2° C). When adding oil between oil changes, it is preferable to use the same brand as various brands of oil may not be compatible when mixed together.

#### **WARNING**

Never check oil level while engine is running. Hot oil discharged from the engine could cause personal injury.

### **Recommended Fuel**

Use ASTM 2-D or 1-D fuel with minimum Cetane number of 45. Although number 2 diesel fuel gives the best economy for most operating conditions, number 1 diesel fuel can be used:

1. When ambient temperatures are below 32° F (0° C);
2. During long periods of light engine load; or no load.

**NOTE:** Fuels with Cetane numbers higher than 45 may be needed in higher altitudes or when extremely low ambient temperatures are encountered to prevent misfires.

Use low sulfur content fuel having a pour point (ability to filter) of at least 10° F (6° C) below the lowest expected temperature. Keep the fuel clean and protected from adverse weather. Leave some room for expansion when filling the fuel tank.

#### **CAUTION**

Due to the precise tolerances of diesel injection systems, it is extremely important the fuel be kept clean. Dirt in the system can cause severe damage to both the injection pump and the injection nozzles.

## **PRE-HEATING AND STARTING**

Extremes in starting temperatures may require additional preheating. If engine fails to start quickly, rest engine several seconds and repeat starting sequence.

#### **CAUTION**

Do not exceed the one minute preheat periods; longer preheating time prior to cranking the engine can ruin the manifold heater and glow plugs because there is no incoming air flow to cool them. Additional operation of the preheaters for a few seconds during cranking in cold weather may help to preheat the incoming combustion air and prevent misfires as the engine starts running.

1. For cold engine starting below 55° F (13° C), depress manifold heater switch for one minute only.
2. Push START-STOP switch to its START position.
3. Release switches after engine starts and reaches speed.
4. Oil pressure should read at least 20 psi (pressure relief valve is not adjustable).

On "standard" model, depress preheat switch for one minute and then push start switch. Both switches must be engaged for starting.

#### **CAUTION**

Do not apply overvoltage to the starting circuit at any time. Overvoltage will destroy the glow plugs and air heater in 2 to 3 seconds. If it becomes necessary to use an additional source of power to start the set—use a 12 volt battery connected in parallel.

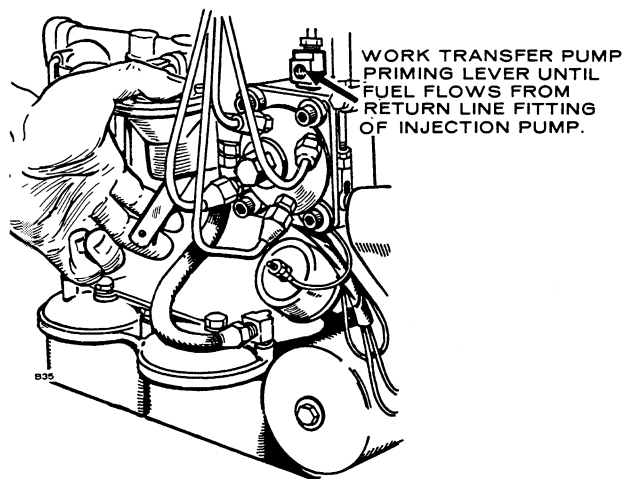
### **BLEEDING FUEL SYSTEM**

Before initial start or after replacing or cleaning the filters, bleed the fuel system of air.

**Beginning Spec S:** The fuel filtration system has both primary and secondary fuel filters on a common mounting which is bolted to the oil fill tube. The engine cannot be run with either filter loose or missing, thus assuring proper filtration at all times.

Bleed air from fuel system as follows: Disconnect the fuel return line. See Figure. Operate the hand priming lever on diaphragm type fuel transfer pump until there are no air bubbles in fuel flowing from the fuel return line fitting. Then connect the fuel return line.

If the camshaft pump lobe is up, crank engine one revolution to permit hand priming. When finished, return priming lever inward (disengaged position) to permit normal pump operation.



**BLEEDING FUEL SYSTEM**

# OPERATION

Operation, following prestart, preheat, and starting, involves several checking and servicing procedures that will help the owner-operator extend the engine's life.

## STOPPING

1. Push fuel solenoid switch to *stop* position.
2. Release switch when set stops. If stop circuit fails, close fuel valve.

## INSPECTION

Check for alignment of engine and load. Misalignment will cause excessive vibration and bearing wear. Make a visual inspection of the entire installation.

## APPLYING LOAD

If practicable, allow engine to warm up before connecting a heavy load. Continuous overloading causes high operating temperatures that can damage the engine. The exhaust system may form carbon deposits during operation at light loads; apply full load occasionally before shut-down to prevent excessive carbon accumulations.

Try to connect the load in steps instead of full load at one time.

## EXERCISE

Infrequent use results in hard starting. Operate at least 30 minutes each week. Run longer if battery needs charging.

## BREAK-IN PROCEDURE

The unit should be run in the following sequence:

1. One half hour at 1/2 load.
2. One half hour at 3/4 load.
3. Full load.

Continuous running under one half load during the first few hundred hours usually results in poor piston ring seating, causing higher than normal oil consumption and blowby.

**Drain and replace the crankcase oil after first 50 hours of operation; drain while the engine is still hot.**

## HIGH TEMPERATURES

1. See that nothing obstructs air flow to and from the set.
2. Keep cooling fins clean. Air housing should be properly installed and undamaged.

**CAUTION** The air housing, including the door, must be on when operating the engine. Overheating and permanent damage can result from as little as one minute of operation without it.

## LOW TEMPERATURES

1. Use correct SAE No. oil for temperature conditions. Change oil only when engine is warm. If

an unexpected temperature drop causes an emergency, move engine to a warm location or apply heated air (never use open flame) externally until oil flows freely.

2. Use fresh fuel. Protect against moisture condensation.
3. Keep fuel system clean, and batteries in a well charged condition.
4. Partially restrict cool air flow but use care to avoid overheating.
5. Use additional preheat cycles during cold starts.



heater elements.

**Do not exceed one minute preheat periods; longer periods can ruin the**

## DUST AND DIRT

1. Keep set clean. Keep cooling fins free of dirt, etc.
2. Service air cleaner as frequently as necessary.
3. Change crankcase oil every 50 operating hours.
4. Keep oil and fuel in dust-tight containers.
5. Keep governor linkage clean.

## HIGH ALTITUDE

Maximum power will be reduced approximately 4 percent for each 1000 feet (310 m) above sea level, after the first 1000 feet (310 m).

## OUT-OF-SERVICE PROTECTION

The natural lubricating qualities of No. 2 diesel fuel should protect a diesel engine for at least 30-days when unit is not in service. To protect an engine that will be out of service for more than 30 days, proceed as follows:

1. Run engine until thoroughly warm; under at least 50 percent load.
2. Shut down engine and drain oil base while still warm. Refill and attach a warning tag indicating viscosity of oil used.
3. Remove glow plugs. Pour 1-ounce of rust inhibitor (or SAE #10 oil) into each cylinder. Install glow plugs.



**Crank engine by hand only to distribute oil in cylinder. Starter cranking is too fast; oil or inhibitor fluid will fire if cranked with starter at normal room temperature.**

4. Service air cleaner per *Maintenance Schedule*.
5. Clean throttle and governor linkage and protect by wrapping with a clean cloth.
6. Plug exhaust outlets to prevent entrance of moisture, bugs, dirt, etc.
7. Clean and wipe entire unit. Coat parts susceptible to rust with a light coat of grease or oil.
8. Disconnect battery and follow standard battery storage procedure.
9. Provide a suitable cover for the entire unit.

# MAINTENANCE

## GENERAL

Follow a regular schedule of inspection and servicing, based on operating hours (Table ). Keep an accurate logbook of maintenance, servicing, and operating time. Use the running time meter (optional equipment) to keep a record of operation and servicing. Regular service periods are recommended for normal service and operating conditions. For continuous duty, extreme temperature, etc., service more frequently. For infrequent use, light duty, etc., service periods can be lengthened accordingly.

**WARNING** Before commencing any maintenance work on the engine, control panel, or associated equipment, disconnect batteries. Failure to do so could result in damage, serious personal injury in the event of inadvertent starting.

Operator should periodically make a complete visual inspection with engine running at rated load. Some of the things to check for are as follows:

1. Check all fuel and oil lines for possible leakage.
2. Inspect exhaust lines and mufflers for possible leakage and cranks.
3. Periodically or daily, drain moisture from condensation traps (if equipped).
4. Inspect air shrouds for leaks and security. Be sure cooling fins are clean.

## BATTERIES

Check the condition of the starting batteries at least every two weeks. See that connections are clean and tight. A light coating of nonconductive grease will retard corrosion at terminals. Keep the electrolyte at the proper level above the plates by adding distilled water. Check specific gravity; recharge if below 1.280.

## MAINTENANCE SCHEDULE

Use this factory recommended maintenance schedule (based on favorable operating conditions) to serve as a guide to get long and efficient set life. Neglecting routine maintenance can result in failure or permanent damage to the set.

## OIL FILTER CHANGE

Place pan under old filter and remove by screwing counterclockwise. Clean filter mounting area. Install new filter. Grease filter gasket, and screw filter on clockwise until gasket touches mounting base, then tighten 1/4 to 1/2 turn.

**CAUTION** A diesel engine cannot tolerate dirt in the fuel system. It is one of the major causes of diesel engine failure. A tiny piece of dirt in the injection system may stop your unit. When opening any part of the fuel system beyond the secondary fuel filter, place all parts in a pan of clean diesel fuel as they are removed. Before installing new or used parts, flush them thoroughly, and install while still wet.

## OPERATOR AND SERVICE MAINTENANCE SCHEDULE

HOURS OF OPERATION	MAINTENANCE TASK
8	<ul style="list-style-type: none"><li>• Inspect engine</li><li>• Check fuel supply, see Note 1</li><li>• Check oil level.</li></ul>
50 (more often in dusty conditions)	<ul style="list-style-type: none"><li>• Check air cleaner.</li></ul>
100	<ul style="list-style-type: none"><li>• Clean governor linkage,</li><li>• Change crankcase oil</li><li>• Drain fuel condensation traps in lines and filters, see Note 1</li></ul>
200	<ul style="list-style-type: none"><li>• Clean crankcase breather</li><li>• Replace oil filter</li><li>• Check battery condition</li></ul>
500 Call Onan service person	<ul style="list-style-type: none"><li>• Check start-disconnect circuit</li><li>• Check valve clearances</li></ul>
600	<ul style="list-style-type: none"><li>• Change primary filter</li></ul>
2000 Call Onan service person	<ul style="list-style-type: none"><li>• Grind valves (if required)</li><li>• Clean holes in rocker box oil line</li><li>• Check nozzle spray pattern, see Note 2</li></ul>
3000	<ul style="list-style-type: none"><li>• Change secondary fuel filter</li></ul>
5000 Call Onan service person	<ul style="list-style-type: none"><li>• General overhaul (if required) see Note 3</li></ul>

- NOTE 1.** Water or foreign material in fuel can ruin the injection system. If daily inspection shows water or excessive dirt in sediment bowl fuel, handling and storing facilities should be checked and situation corrected. Primary and secondary fuel filters must be replaced following correction of fuel contamination problem.
- 2.** This service must be conducted by trained diesel injection equipment personnel with suitable test facilities. Omit this service until these conditions can be met.
- 3.** Tighten head bolts and adjust valve clearance after first 50 hours on an overhauled engine.

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.

## WATER IN FUEL FILTERS

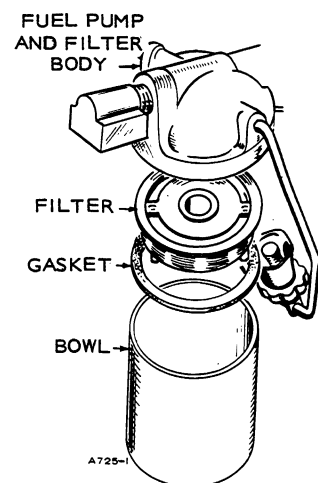
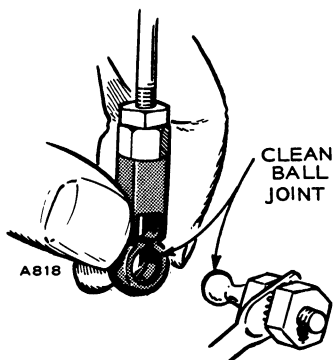
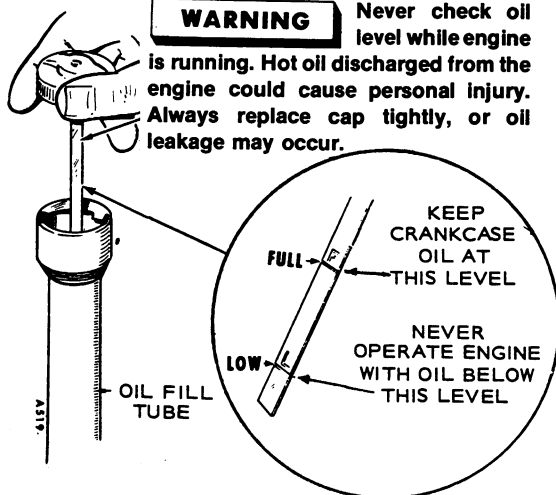
Drain water periodically as required from both filters. Replace primary filter every 600 hours and secondary filter every 3000 hours. When replacing filter, tighten screw until gaskets touch base, then tighten screw 1 to 1-1/2 turns.

In addition to the regular service periods (3000 hours), change the secondary fuel filter whenever the engine shows signs of starving from lack of fuel.

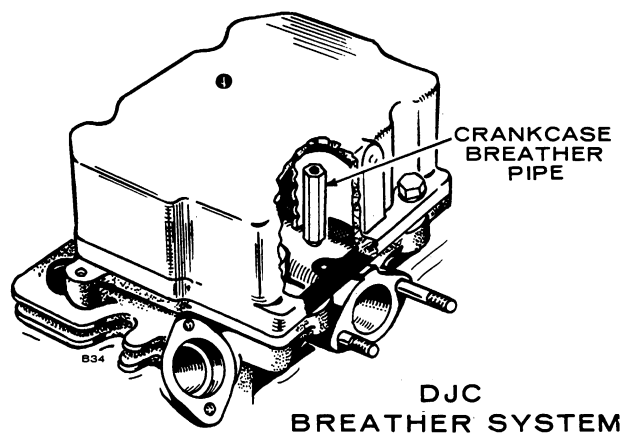
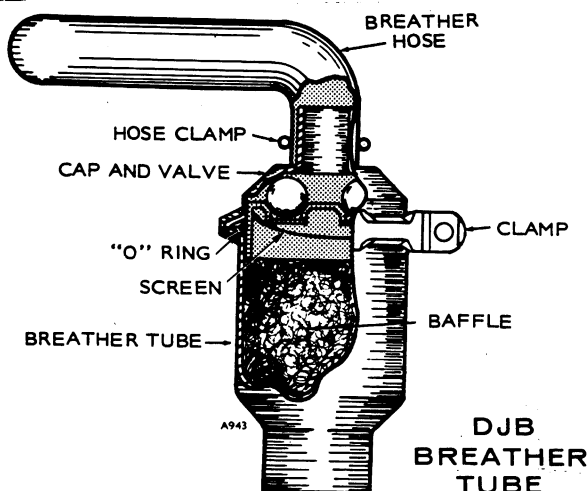
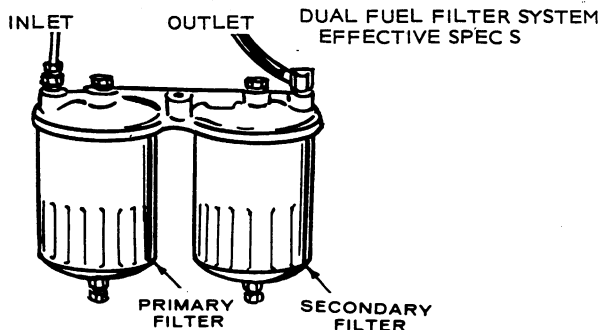
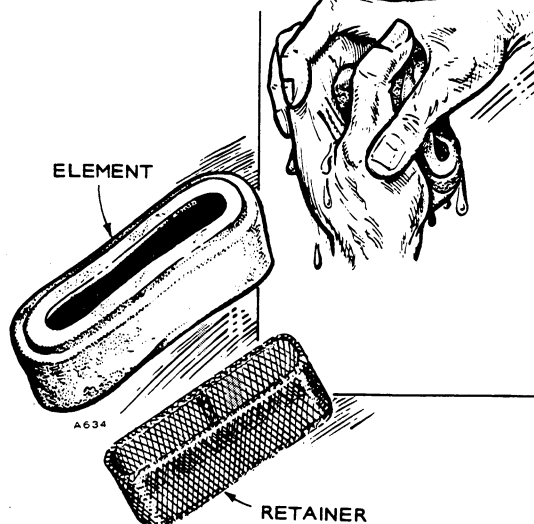


# MAINTENANCE

**WARNING** Never check oil level while engine is running. Hot oil discharged from the engine could cause personal injury. Always replace cap tightly, or oil leakage may occur.



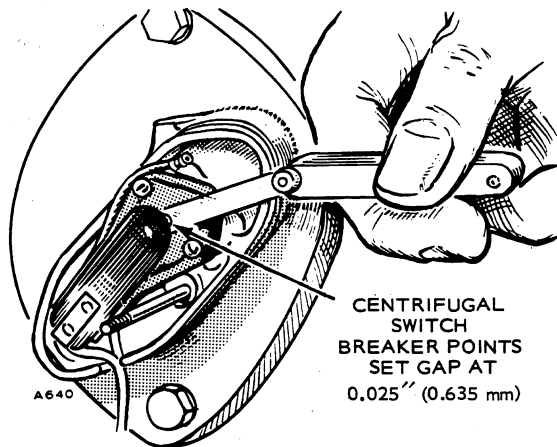
AFTER WASHING ELEMENT IN SOLVENT DIP IN ENGINE OIL AND SQUEEZE AS DRY AS POSSIBLE.



# ADJUSTMENTS

## CENTRIFUGAL SWITCH

The start-disconnect centrifugal switch (see Figure) is located on the gear cover on the side of the engine above the oil filter. The switch opens when the engine stops and closes when engine speed reaches about 900 rpm. If necessary, loosen the stationary contact and adjust the point gap at 0.025 inch (0.635 mm). Replace burned or faulty points.



BREAKER POINT ADJUSTMENT

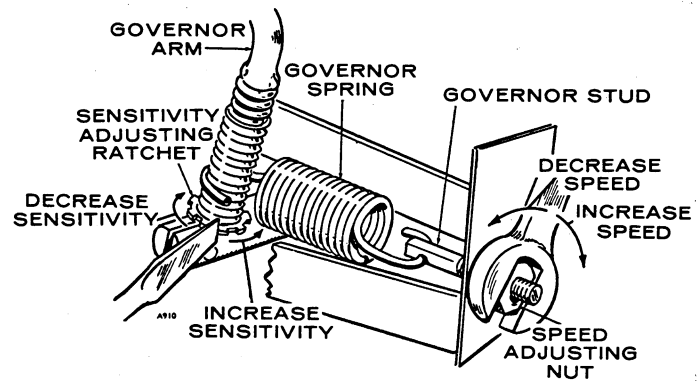
## GOVERNOR

The governor controls engine speed. Rated speed appears on the nameplate (also see *SPECIFICATIONS*). Be sure throttle, linkage, and governor mechanism operate smoothly.

**Speed Adjustment:** To change the governor speed, change the spring tension by turning the governor spring nut (see Figure). Turn the nut clockwise (more spring tension) to increase RPM and counterclockwise to reduce governed speed. Hold a tachometer against flywheel cap screw.

**Sensitivity Adjustment:** To adjust governor sensitivity (no load to full load speed droop) turn the sensitivity adjusting ratchet accessible through a covered access hole on the side of the blower housing. Counterclockwise gives more sensitivity (less speed drop when full load is applied), clockwise gives less sensitivity (more speed drop). If the governor is too sensitive, a rapid hunting condition occurs (alternate increasing and decreasing speed). Adjust for maximum sensitivity without hunting. After sensitivity adjustment, the speed will require readjustment. After adjusting the governor, replace the knockout plug in the blower housing and secure speed stud lock nut.

Excessive droop may be caused by engine misfiring. Correct this condition before adjusting governor.



GOVERNOR ADJUSTMENT

## NOZZLES

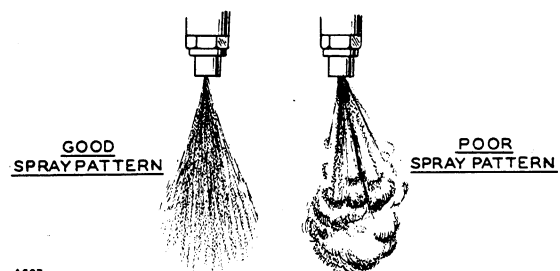
The American Bosch injection nozzles are the conventional inward-opening pintle type with adjustable opening pressure. They are factory adjusted to open at 1900 to 1950 psi (13.110 to 13.455 kPa). However, after several hundred hours of operation the nozzle pressure will decrease to approximately 1750 psi (12.075 kPa). Do not attempt to disassemble the nozzles or adjust nozzle pressure without the proper test equipment. A nozzle pressure tester is essential to do this work.

**Inspection:** To inspect the nozzle spray pattern remove the nozzle from the cylinder head. Crank the engine, let the nozzle spray into the air and watch the pattern. The spray should be cone shaped with a solid appearing center surrounded by cloudlike fog in which the spray is evenly atomized. An apparent chattering of the nozzle is normal.

If streamers are visible, the pattern is badly distorted or the nozzle drips before it reaches opening pressure, it is defective and must be cleaned or replaced.

### WARNING

Do not let the nozzle spray against your skin. The fuel can penetrate flesh and cause a serious infection.





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