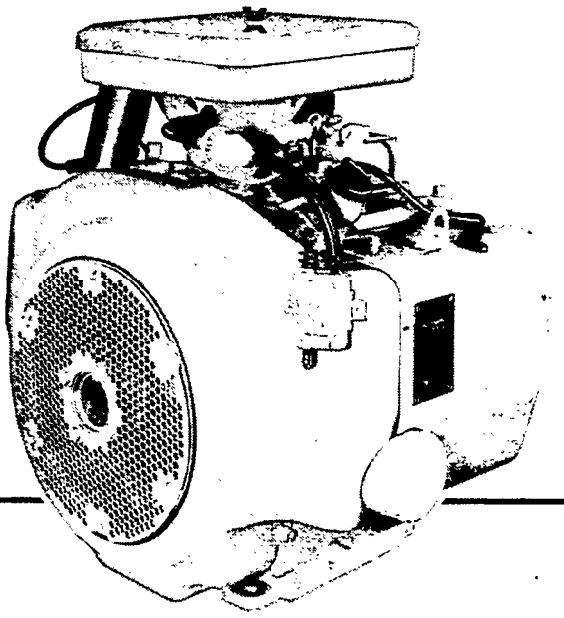
Onan

# Operator's Manual

## T-260G
## Engine



965-0160
T-260G
10-88
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# Safety Precautions

It is recommended that you read your engine manual and become thoroughly acquainted with your equipment before you start the engine.

**⚠DANGER** ***This symbol if used warns of immediate hazards which will result in severe personal injury or death.***

**⚠WARNING** ***This symbol refers to a hazard or unsafe practice which can result in severe personal injury or death.***

**⚠CAUTION** ***This symbol refers to a hazard or unsafe practice which can result in personal injury or product or property damage.***

Fuels, electrical equipment, batteries, exhaust gases and moving parts present potential hazards that can result in serious, personal injury. Take care in following these recommended procedures. All local, state and federal codes should be consulted and complied with.

**⚠WARNING** ***This engine is not designed or intended for use in any type of aircraft. Use of this engine in aircraft can result in engine failure and causes serious personal injury or death.***

**General**

- Provide appropriate fire extinguishers and install them in convenient locations. Use an extinguisher rated ABC by NFPA.
- Make sure that all fasteners on the engine are secure and accurately torqued. Keep guards in position over fans, driving belts, etc.
- If it is necessary to make adjustments while the engine is running, use extreme caution when close to hot exhausts, moving parts, etc.

**Protect Against Moving Parts**

- Do not wear loose clothing in the vicinity of moving parts, such as PTO shafts, flywheels, blowers, couplings, fans, belts, etc.
- Keep your hands away from moving parts.

**Batteries**

- Before starting work on the engine, disconnect batteries to prevent inadvertent starting of the engine.
- DO NOT SMOKE while servicing batteries. Lead acid batteries give off a highly explosive hydrogen gas which can be ignited by flame, electrical arcing or by smoking.
- Verify battery polarity before connecting battery cables. Connect negative cable last.

**Fuel System**

- DO NOT fill fuel tanks while engine is running.
- DO NOT smoke or use an open flame in the vicinity of the engine or fuel tank. Internal combustion engine fuels are highly flammable.
- Fuel lines must be of steel piping, adequately secured, and free from leaks. Piping at the engine should be approved flexible line. Do not use copper piping for flexible lines as copper will work harden and become brittle enough to break.
- Be sure all fuel supplies have a positive shutoff valve.

**Exhaust System**

- Exhaust products of any internal combustion engine are toxic and can cause injury, or death if inhaled. All engine applications, especially those within a confined area, should be equipped with an exhaust system to discharge gases to the outside atmosphere.
- Do not use exhaust gases to heat a compartment.
- Make sure that your exhaust system is free of leaks. Ensure that exhaust manifolds are secure and are not warped by bolts unevenly torqued.

**Exhaust Gas is Deadly!**

Exhaust gases contain carbon monoxide, a poisonous gas that can cause unconsciousness and death. It is an odorless and colorless gas formed during combustion of hydrocarbon fuels. Symptoms of carbon monoxide poisoning are:

- Dizziness
- Headache
- Weakness and Sleepiness
- Vomiting
- Muscular Twitching
- Throbbing in Temples

If you experience any of these symptoms, get out into fresh air immediately, shut down the unit and do not use until it has been inspected.

The best protection against carbon monoxide inhalation is proper installation and regular, frequent inspections 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 and repaired at once by a competent mechanic.

**Cooling System**

- Coolants under pressure have a higher boiling point than water. DO NOT open a radiator pressure cap when coolant temperature is above 212°F (100°C) or while engine is running.

**Keep the Unit and Surrounding Area Clean**

- Make sure that oily rags are not left on or near the engine.
- Remove all unnecessary grease and oil from the unit Accumulated grease and oil can cause overheating and subsequent engine damage and present a potential fire hazard.

# Important Safety Precautions

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. Electrocution 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.

# Table of Contents



**⚠WARNING**

***INCORRECT SERVICE OR REPLACEMENT OF PARTS CAN RESULT IN SEVERE PERSONAL INJURY AND/OR EQUIPMENT DAMAGE. SERVICE PERSONNEL MUST BE QUALIFIED TO PERFORM ELECTRICAL AND/OR MECHANICAL SERVICE.***

# Introduction

## KNOW YOUR ENGINE

Read this manual carefully, observing all *WARNINGS* and *CAUTIONS*. Operating instructions, adjustments and periodic maintenance procedures are given so you . . . the owner, can keep your unit running like new and expect many years of dependable service from it. Remember . . . any machine, regardless of design or type, will perform only in relation to the service it receives. Regularly scheduled maintenance lowers operating costs.

## 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.

If a major repair or an overhaul is necessary, Onan recommends that a competent mechanic either do the job or supervise and check the work of the mechanic assigned to do the job to ensure that all dimensions, clearances and torque values are within the specified tolerances.

An engine service manual and complete parts catalog are available at additional cost. Contact your nearest authorized dealer or Onan Parts and Service Center.

## REFERENCE MANUALS

| | |
|---|---|
| Parts Catalog | 965-0260 |
| Major Service Manual | 965-0760 |

This manual contains the SI metric equivalents following immediately in parentheses after the U.S. customary units of measure.

## SPECIFICATIONS

| | |
|---|---|
| Engine Design | Opposed two cylinder, four cycle, and air cooled |
| Bore | 3.56 inch (90.48 mm) |
| Stroke | 3.0 inch (76 mm) |
| Displacement | 59.8 CID (980 $cm^3$) |
| Horsepower (3600 RPM) | 24.0 BHP (17.9 kW) |
| Oil Capacity | 2.5 qt (2.4 litre) |
| Oil Capacity with filter change | 3.0 qt (2.8 litre) |
| Compression Ratio | 7.0 to 1 |

### TUNE-UP SPECIFICATIONS

| | |
|---|---|
| Spark Plug Gap | 0.025 inch (0.635 mm) |
| Valve Lash | |
| Intake | 0.005 inch (0.13 mm) |
| Exhaust | 0.013 inch (0.33 mm) |
| Ignition Timing (static setting) | 20°BTC |

# Engine Set-Up

Inspect the engine visually. Check for loose or missing parts and any damage that may have occurred in shipment.

**⚠CAUTION** ***Starting engine without oil will result in severe engine damage. Add oil prior to starting engine.***

## BATTERY

The battery and battery cables used for starting the engine should be of sufficient size to provide prompt starting. Undersized battery will result in poor starter operation and a very short starter service life.

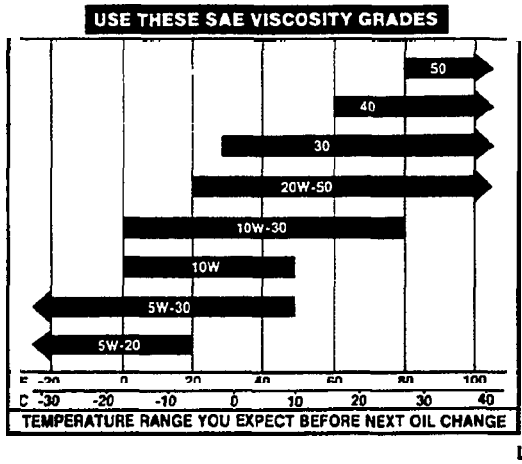
**⚠WARNING** ***Ignition of explosive battery gases can result in severe personal injury. Do not smoke or allow any ignition source near the battery.***

**⚠CAUTION** ***Reversing positive and negative battery connections or allowing engine to run without being connected to the alternator will result in engine electrical system damage. Do not switch battery connections or allow engine to run without being connected to the alternator.***

## CRANKCASE OIL RECOMMENDATIONS

Fill crankcase with correct amount of oil. Refer to *Specifications* for crankcase capacity. Use oils meeting the API classification SF, SF/CC, or SF/CD. Refer to chart below to determine the proper viscosity grade of oil to use. Straight weight oils are recommended for severe duty use and at temperatures above 32°F (0°C) for minimum oil consumption.

**⚠WARNING** ***Crankcase pressure can blow out hot oil, which can cause severe personal injury. Do not check oil while the engine is running.***




LS-1170

**⚠CAUTION** ***Excess oil can cause high oil consumption, high operating temperatures, and oil foaming. Do not overfill crankcase.***

### Oil Level

Check oil level at least every 8 hours of operation. Check more frequently on a new or reconditioned engine as oil consumption is higher until the piston rings seat properly.

When adding oil between oil changes, it is preferable to use the same brand, as various brands of oil may not be compatible together. Refer to *MAINTENANCE* for recommended oil change intervals and procedures.

## FUEL RECOMMENDATIONS

**⚠WARNING** ***Ignition of fuel can result in severe personal injury or death. Do not smoke or allow any spark, pilot light, or arcing equipment near the fuel system.***

Use clean, fresh, unleaded gasoline. Regular leaded gasoline may also be used but is not a preferred fuel. Do not use highly leaded premium gasoline. Use of unleaded gasoline results in less maintenance.

**⚠CAUTION** ***Gasoline de-icers and fuel containing alcohol can cause poor engine performance and engine damage. Do not use fuel system de-icers. Do not use gasoline containing alcohol concentrations greater than ten percent.***

If regular leaded gasoline is used continually, carbon and lead deposits should be removed from the cylinder heads as required because of engine power loss. Unleaded gasoline may be used safely after lead deposits have been removed.

**⚠WARNING** ***Ignition of fuel can result in severe personal injury or death. Thoroughly clean up any spilled fuel.***

## EXHAUST SYSTEM

Exhaust products of any internal combustion engine are toxic and can cause injury, or death if inhaled. All engine applications, especially those within a confined area, should be equipped with an exhaust system to discharge gases to the outside atmosphere.

**⚠WARNING** ***Breathing exhaust gases can result in severe personal injury or death. Use extreme care during installation to ensure a leak-free exhaust system.***

# Operation

## STARTING

Most engines are equipped with a start-stop switch and cable controlled choke and throttle.

1. Place the throttle control in the *SLOW* position and the choke into the *FULL* choke position.
2. Turn the ignition switch on and engage starter. If engine fails to start after 30 seconds determine the cause. Wait one minute before recranking. If the engine fails to start at first attempt, rust inhibitor oil used at the factory may have fouled the plugs. Remove the plugs, clean in a suitable solvent, dry thoroughly and reinstall. Heavy exhaust smoke when the engine is initially started is normal and usually caused by rust inhibitor oil.
3. When the engine starts, gradually push the choke lever in until the engine runs smoothly. Black smoke from the exhaust and a rough running engine usually indicate over-choking.
4. To stop the engine, turn the ignition switch to the *OFF* position.

## BREAK-IN PROCEDURE

Controlled break-in is the ideal fitting of all internal moving metal parts. Using the proper oil and applying a conscientious maintenance program during this period helps assure satisfactory service from your Onan engine.

Maintain the proper cooling and lubrication during break-in. Run the engine at half load for the first three hours with intermittent periods of full load to control engine break-in.

**⚠CAUTION** ***Using the wrong grade and weight of oil and high engine operating temperatures during break-in can cause engine damage. Use correct oil grade and weight and provide adequate engine cooling during engine 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, resulting in high oil consumption and oil accumulation in air cleaner housing.

## HOT WEATHER OPERATION

When operating the engine in temperatures above 100°F (38°C), pay particular attention to the following items to prevent damage:

1. Keep the engine cooling fins clean and free of obstruction.

**⚠CAUTION** ***Plugged or clogged cooling fins can cause overheating and engine damage. Ensure cooling fins are kept clean and debris does not accumulate.***

**⚠WARNING** ***Contact with rotating machinery can result in severe personal injury or death. Stay clear of rotating components and ensure protective shields and guards are in place and secured before operating machinery.***

2. See that nothing obstructs air flow to and from the engine.
3. Ensure that you are using the proper grade and weight of oil for ambient temperatures. Check the oil level each time you fill the fuel tank.
4. Check the battery water more frequently. High temperatures cause faster evaporation.
5. Change crankcase oil and filter more frequently.

## COLD WEATHER OPERATION

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

1. Use the correct grade and weight of oil for the temperature conditions. Change the oil only when the engine is warm. If an unexpected temperature drop occurs when the engine is filled with summer oil, before starting the engine, move it to a warm location until the oil will flow freely.
2. Use fresh fuel. Fill the fuel tank after each day's use to protect against moisture condensation.
3. Keep the battery 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.

## OUT-OF-SERVICE PROTECTION

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

1. Run the engine until it reaches normal operating temperature.
2. Turn off the fuel supply and run the engine until it stops.
3. Drain oil from oil base while the engine is still warm. Refill with fresh crankcase oil and attach a tag stating viscosity used.

4. Remove spark plugs. Pour 1 ounce (2 tablespoons or 28 grams) of rust inhibitor or SAE #50 oil into the cylinders. Crank the engine over a few times. Reinstall spark plugs.
5. Service air cleaner as outlined in *MAINTENANCE.*
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 the entire unit.
10. If battery equipped, disconnect and follow standard battery storage procedure.

## RETURNING UNIT TO SERVICE

1. Remove cover and all protective wrapping. Remove plug from exhaust outlet.
2. Check tag on oil base and verify that oil viscosity is still correct for existing ambient temperatures.
3. Clean and check battery. Measure specific gravity (1.260 at 77°F [25°C]) and verify level to be at split ring. If specific gravity is low, charge until correct value is obtained. If the level is low, add distilled water and charge until specific gravity is correct.
4. Check that fuel filter and fuel lines are secure, with no leaks.
5. Check that carburetor throttle lever and governor linkage move freely.
6. Connect battery.
7. Start Engine. Exhaust smoke is normal when the engine is started and is usually caused by the rust inhibitor oil.

**⚠WARNING**

### *EXHAUST GAS IS DEADLY!*

***Exhaust gases from all fuels (including diesel, gasoline, liquid propane, natural gas) contain carbon monoxide, an odorless and colorless gas. Carbon monoxide is poisonous and can cause unconsciousness and death. Symptoms of carbon monoxide poisoning can include:***

- ***Dizziness***
- ***Nausea***
- ***Headache***
- ***Weakness and Sleepiness***
- ***Throbbing in Temples***
- ***Muscular Twitching***
- ***Vomiting***
- ***Inability to Think Coherently***

***IF YOU OR ANYONE ELSE EXPERIENCE ANY OF THESE SYMPTOMS, GET OUT INTO THE FRESH AIR IMMEDIATELY. If symptoms persist, seek medical attention. Shut down the unit and do not operate until it has been inspected and repaired.***

***Protection against carbon monoxide inhalation includes proper installation, ventilation and regular, frequent visual and audible inspections of the complete exhaust system.***

# Maintenance

**⚠WARNING** ***Accidental starting of the engine can result in severe personal injury or death. Disconnect the negative battery cable and spark plug wires while servicing engine, controls, or associated equipment.***

## DAILY CHECKS OR EVERY 8 HOURS

The operator should daily make a complete visual and audible inspection of the engine. Check the following before starting the engine for the first time each day:

1. Check all fuel lines and fittings for possible leakage.
2. Inspect exhaust system for possible leakage and cracks. Locate leaks in muffler and piping while the engine is operating. Repair all leaks immediately after they are detected for personal safety.
3. Inspect air cleaner system for leaks. Make certain all clamps and fittings are tight and free of potential leaks.
4. Check crankcase oil level with the engine off. If engine has been run, allow a minimum of 10 minutes for the oil to drain down before checking. If oil level is at or below ADD mark on dipstick (Figure 1), add sufficient oil of the proper viscosity as specified in *ENGINE SET-UP* to bring oil level to the FULL mark. Do not operate engine with oil level below the ADD mark.

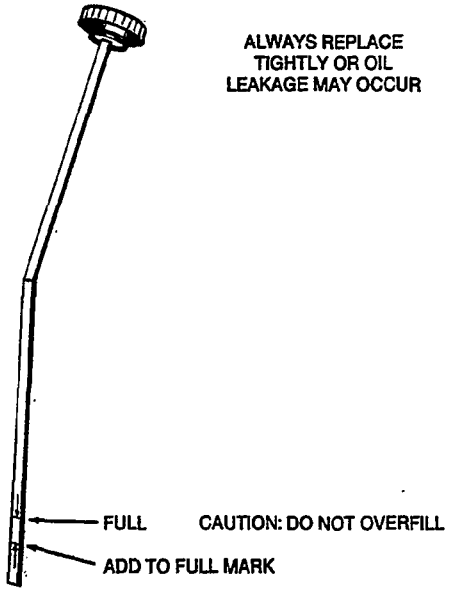



**FIGURE 1. CRANKCASE OIL FILL**

## OIL CHANGE

Refer to the *Periodic Maintenance Schedule* for oil change intervals.

Run engine until thoroughly warm before draining oil. Stop the engine, place a pan under the drain outlet and remove the oil drain plug or open the drain valve. After the oil is completely drained, replace the drain plug or close the drain valve. Refill with oil of the correct API classification and appropriate SAE viscosity grade for the temperature conditions (refer to *ENGINE SET-UP*).

**⚠WARNING** ***Hot crankcase oil can cause burns if it comes in contact with skin. Wear protective clothing and keep fingers and hands clear when draining oil.***

Oil level should be to the FULL mark of the dipstick. Start engine and run for a short time to check for oil leaks around the drain plug.

## OIL FILTER CHANGE

Refer to the *Periodic Maintenance Schedule* for oil filter change intervals.

Spin off oil filter element and discard it. Thoroughly clean filter mounting surface and make sure new gasket is inserted in the element. Apply a thin film of oil to the gasket. Spin element down by hand until gasket just touches mounting pad and then turn down an additional 1/2-3/4 turn. Do not overtighten.

With oil in crankcase, start engine and check for leaks around filter element. Retighten only as much as necessary to eliminate leaks, but do not overtighten.

## IGNITION

### Spark Plugs

Refer to *Periodic Maintenance Schedule* for spark plug service interval. Replace spark plugs that show signs of fouling or electrode erosion. Refer to *Specifications* for spark plug gap.

### Solid State Ignition

Ignition timing is set at the factory and is not adjustable. The solid state ignition components are not adjustable and require no routine maintenance.

## COOLING SYSTEM

Refer to *Periodic Maintenance Schedule* for cooling system service interval. Clean cooling fins and chaff screen sooner if required. Remove any dust, dirt or oil which may have accumulated.

## BATTERY

Disconnect negative ground strap from the battery before working on any part of the electrical system or engine.

Disconnect positive terminals before charging battery to avoid damaging ignition system alternator or regulator.

**⚠WARNING** ***Ignition of explosive battery gases can result in severe personal injury. Do not smoke or allow any ignition source near the battery.***

### Cleaning Battery

Keep the battery clean by wiping it with a damp cloth whenever dirt appears excessive.

If corrosion is present around the terminal connections, remove battery cables and wash the terminals with an ammonia solution or a solution consisting of 1/4 pound of baking soda added to 1 quart of water.

Be sure the vent plugs are tight to prevent cleaning solution from entering the cells.

After cleaning, flush the outside of the battery, the battery compartment, and surrounding areas with clear water.

Keep the battery terminals clean and tight. After making connections, coat the terminals with a light application of petroleum jelly or non-conductive grease to retard corrosion.

### Checking Specific Gravity

Use a battery hydrometer to check the specific gravity of the electrolyte in each battery cell.

Hold the hydrometer vertical and take the reading. Correct the reading by adding four gravity points (0.004) for every five degrees the electrolyte temperature is above 80° F (27°C) or subtracting four gravity points for every five degrees below 80°F (27°C). A fully charged battery will have a corrected specific gravity of 1.260. Charge the battery if the reading is below 1.215.

### Checking Electrolyte Level

Refer to *Periodic Maintenance Schedule* for checking electrolyte level interval.

Fill the battery cells to the bottom of the filler neck. If cells are low on water, add distilled water and recharge. If one cell is low, check case for leaks. Keep the battery case clean and dry. An accumulation of moisture will lead to a more rapid discharge and battery failure.

**⚠CAUTION** ***Water added to battery electrolyte in freezing weather can damage the battery. Do not add water to battery unless the engine is run long enough (two or three hours) to ensure a thorough mixing of water and electrolyte.***

### Storing Battery

If the engine is to be stored for more than 30 days, remove the battery. With the electrolyte level at the bottom of the split ring, charge the battery before storing it. After every 30 days the battery is in storage, bring it back up to full charge. To reduce self-discharge, store the battery in as cool a place as possible so long as the electrolyte does not freeze.

## CRANKCASE BREATHER SERVICE

If the crankcase becomes pressurized as evidenced by oil leaks at the seals, use the following procedure to service.

**⚠WARNING** ***Most parts cleaning solvents are flammable and can cause severe personal injury or death if used improperly. Follow the manufacturer's recommendations when cleaning parts.***

Remove breather hose from cap and valve assembly. Remove cap and valve assembly and wash in solvent. Replace cap and valve assembly if balls do not move freely. Remove screen and pull baffle out and wash in solvent. Assemble components, assuring screen is positioned properly (Figure 2).

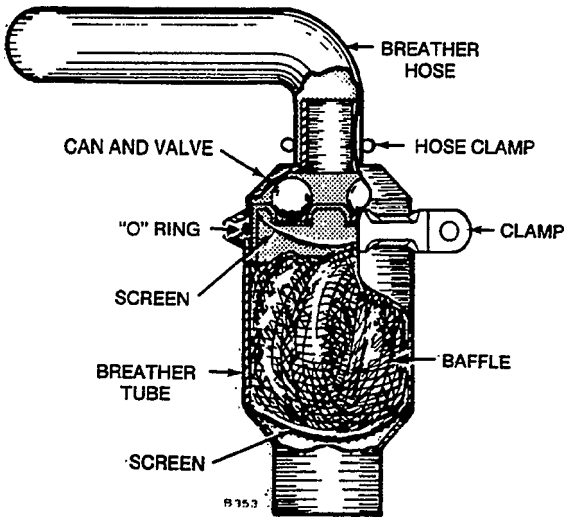



**FIGURE 2. CRANKCASE BREATHER**

## EXHAUST SYSTEM

Make regular visual and audible 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 personal safety.

**⚠WARNING** ***Breathing exhaust gases can result in severe personal injury or death. Inspect exhaust system audibly and visually for leaks daily and repair leaks immediately.***

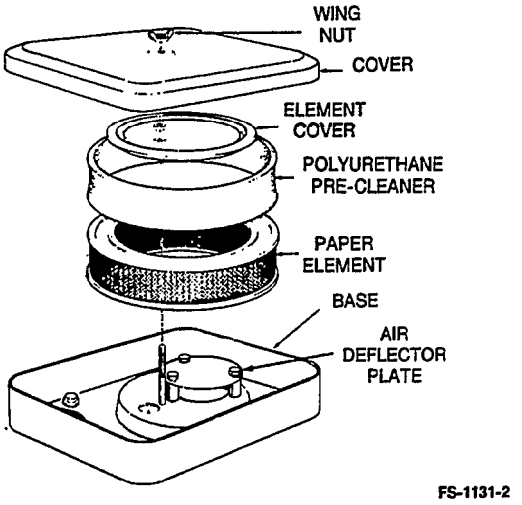
## AIR CLEANER

### Air Cleaner Element

Refer to *Periodic Maintenance Schedule* for air cleaner service and replacement interval. Service or replace more often when operating under severe operating conditions. Service by gently tapping element on a flat surface.

### Element Wrapper (Pre-Cleaner)

Refer to *Periodic Maintenance Schedule* for element wrapper service interval. Wash in water and detergent and squeeze dry like a sponge. Rinse with water (Figure 3). Allow to dry, then coat evenly with two tablespoons (28 grams) of SAE 30 engine oil. Knead into and wring out excess oil from element wrapper. Failure to adequately wring out excess oil from the wrapper may cause drop in engine horsepower due to an increased restriction of inlet air. Install over air cleaner element.




1. WASH
2. SQUEEZE DRY
3. COAT WITH OIL
4. INSTALL OVER PAPER ELEMENT

**FIGURE 3. AIR CLEANER ASSEMBLY**

## PERIODIC MAINTENANCE SCHEDULE

Follow a regular schedule of inspection and servicing, based on operating hours. Keep an accurate logbook of maintenance, servicing, and operating time. Use the factory recommended Periodic Maintenance Schedule (based on favorable operating conditions) to serve as a guide to get long and efficient engine life. 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. Neglecting routine maintenance can result in engine failure or permanent damage.

For any abnormalities in operation, unusual noises from the engine or accessories, loss of power, overheating, etc., contact your nearest Onan Service Center.

## PERIODIC MAINTENANCE SCHEDULE

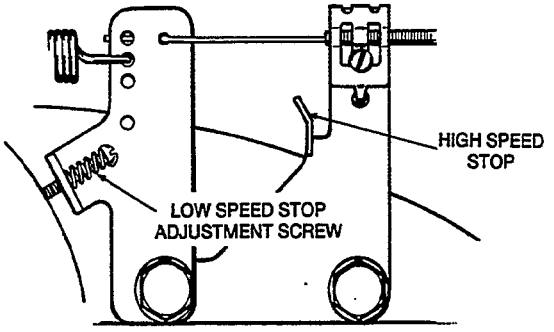
| SERVICE THESE ITEMS | AFTER EACH CYCLE OF INDICATED HOURS | | | | |
|---|---|---|---|---|---|
| | 8 | 25 | 50 | 100 | 200 |
| Inspect Engine Generally | X[1] | | | | |
| Check Oil Level | X | | | | |
| Service Air Cleaner | | X[2] | | | |
| Change Crankcase Oil | | X[3] | X[2] | | |
| Replace Oil Filter | | X[3] | | X[2] | |
| Check Battery Electrolyte Level | | | X | | |
| Clean Cooling Fins | | | X[2] | | |
| Check Valve Clearance | | | X[3] | | X[4] |
| Check or Replace Spark Plugs | | | | | X |
| Clean Breather Valve | | | | | X[2] |
| Replace Air Cleaner Element | | | | | X[2] |
| Compression Check | | | | | X[4] |
| Clean Carbon and Lead Deposits (Cylinder Head) | | | | | X[4,5] |
| Replace Fuel Filter | | | | | X |

1 - Check for fuel leaks.With engine running, visually and audibly check exhaust system for leaks.
2 - Perform more often when running under severe operating conditions.
3 - Initial break-in check only.
4 - For detailed maintenance, contact an Onan Service Center or refer to the 965-0760 SERVICE MANUAL.
5 - For engines running on unleaded fuel this interval may be extended to 400 hours.

**⚠WARNING** ***Inhalation of exhaust gases can result in serious personal injury or death. Do NOT use the air cleaner or exhaust elbow as a supporting step. Damage to these and connecting parts can cause an exhaust leak.***

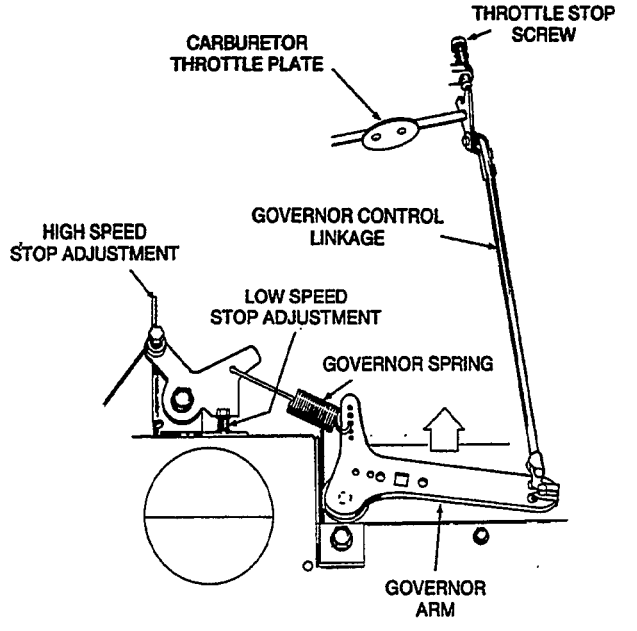
# Adjustments

Carburetor mixture adjustments are set for maximum efficiency at the factory. Idle fuel adjustment is restricted to 1/4 of a turn by a limiting cap. There is no main fuel adjustment screw.




FS-1000

SIDE PULL GOVERNOR ASSEMBLY




FS-1119

FRONT PULL GOVERNOR ASSEMBLY

FIGURE 4. GOVERNOR SPEED ADJUSTMENT

1. Start the engine and allow it to warm up thoroughly (at least 10 minutes).

   Some equipment manufacturers may require higher throttle stop speed and governor low speed rpm settings. Refer to equipment manufacturer's Operator's Manual for the correct rpm settings. When rpm settings are not specified by the equipment manufacturer use the rpm settings listed in Steps 2 and 4.

2. Move the engine speed control to the slow position. Bend or turn the low speed stop on the governor so that the throttle stop screw on the carburetor controls engine speed. Adjust the throttle stop screw for 1000 rpm idle. (Figure 5)

3. Adjust the governor low speed screw for 1100 rpm idle. (Figure 4)

4. Move the engine speed control to the fast position. Bend the high speed stop on the governor so the engine runs at the vehicle manufacturer's recommended speed. (Figure 4)

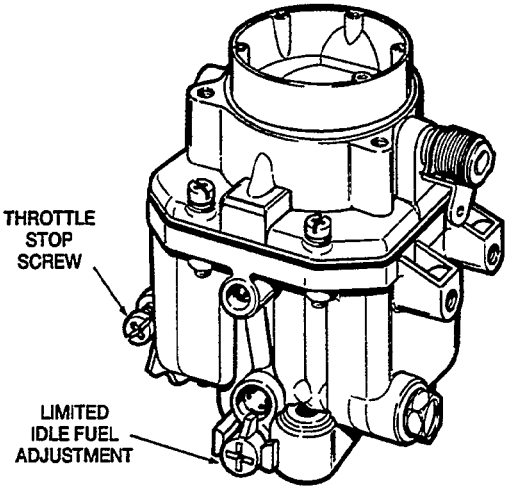



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FIGURE 5. CARBURETOR ADJUSTMENTS

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