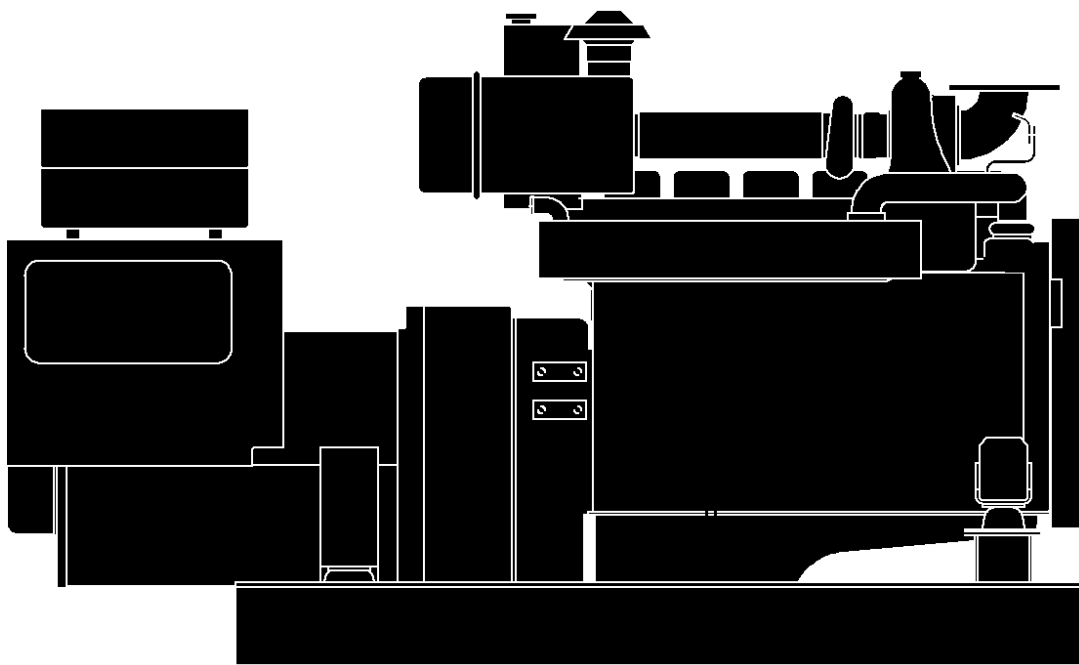




OPERATOR'S MANUAL

**MARINE GENERATOR SET MODELS MDGBA,
MDGCA, MDGCB, MDGGA, MDGDA and MDGDB**



Safety Precautions

Before operating the generator set, read the Operator's Manual and become familiar with it and your unit. **Safe and efficient operation can be achieved only if the unit is properly operated and maintained.** Many accidents are caused by failure to follow fundamental rules and precautions.

Throughout this manual you will notice symbols which alert you to potentially dangerous conditions to the operator, service personnel, or the equipment itself.

⚠ DANGER *This symbol 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.*

FUEL, ENGINE OIL, AND FUMES ARE FLAMMABLE AND TOXIC. Fire, explosion, and personal injury can result from improper practices.

- Benzene and lead, found in some gasoline, have been identified by some state and federal agencies as causing cancer or reproductive toxicity. When checking, draining or adding gasoline, take care not to ingest, breathe the fumes, or contact gasoline.
- Used engine oils have been identified by some state or federal agencies as causing cancer or reproductive toxicity. When checking or changing engine oil, take care not to ingest, breathe the fumes, or contact used oil.
- Do not fill fuel tanks with the engine running. Do not smoke around the generator set area. Wipe up any oil or gas spills. Do not leave oily rags in engine compartment or on the generator set. Keep this and surrounding area clean.
- Inspect fuel system before each operation and periodically while running.
- Equip the engine fuel supply with a positive fuel shutoff.
- Always disconnect the battery ground (–) lead first and reconnect it last. Make sure you connect the battery correctly. A direct short across the battery terminals can cause an explosion. Do not smoke while servicing batteries. Hydrogen gas given off during charging is very explosive.
- Keep a fire extinguisher available in or near the engine compartment and in other areas throughout the vessel. Use the correct extinguisher for the area. For most types of fires, an extinguisher rated ABC by the NFPA is available and suitable for use on all types of fires except alcohol.

EXHAUST GASES ARE DEADLY

- Provide adequate ventilation. Equip the bilge with a power exhauster.
- Be sure propulsion and generator set engine exhaust systems are free of leaks. Perform thorough, periodic inspections of the exhaust system and repair leaks immediately. Exhaust gases are deadly.
- Never sleep in the vessel with the generator set running unless the vessel is equipped with an operating carbon monoxide detector.

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.

MOVING PARTS CAN CAUSE SEVERE PERSONAL INJURY OR DEATH

- Do not remove any belt guards or covers with the generator set running.
- Keep hands and loose clothing away from moving parts. Do not wear jewelry while servicing any part of the generator set.
- Never step on the generator set (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.
- Before performing any maintenance on the generator set, disconnect its batteries to prevent accidental starting. do not disconnect or connect battery cables if fuel vapors are present. Ventilate the generator set compartment or bilge thoroughly with the power exhauster.

ELECTRICAL SHOCK WILL CAUSE SEVERE PERSONAL INJURY OR DEATH

- Do not make adjustments in the control panel or on 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 standing on dry surfaces to reduce shock hazard.
- **DO NOT CONNECT THE GENERATOR SET TO THE PUBLIC UTILITY OR TO ANY OTHER ELECTRICAL POWER SYSTEM.** Electrocutation or damage to property can occur at a site remote from the boat where line or equipment repairs are being made if the set is connected to the power system. An approved transfer switch must be used if more than one power source is to be made available to service the boat.
- Do not work on this equipment when mentally or physically fatigued, or after consuming any alcohol or drug that makes the operation of equipment unsafe.

Copy and post these suggestions in potential hazard areas of the vessel.

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Section 1. Introduction

GENERAL

Each operator should read this manual before operating the set for the first time. A generator set must be operated and maintained properly if you are to expect safe, reliable and quiet operation. The manual includes a troubleshooting guide and a maintenance schedule.

The engine manual is included with the set. Where there is conflicting information, this manual takes precedence over the engine manual.

⚠WARNING *Improper operation and maintenance can lead to severe personal injury or loss of life and property by fire, electrocution, mechanical breakdown or exhaust gas asphyxiation. Read the safety precautions inside the front cover and carefully observe all instructions and precautions in this manual.*

HOW TO OBTAIN SERVICE

When the generator set requires servicing, contact your nearest dealer or distributor. Factory-trained representatives are ready to handle all your needs for parts and service.

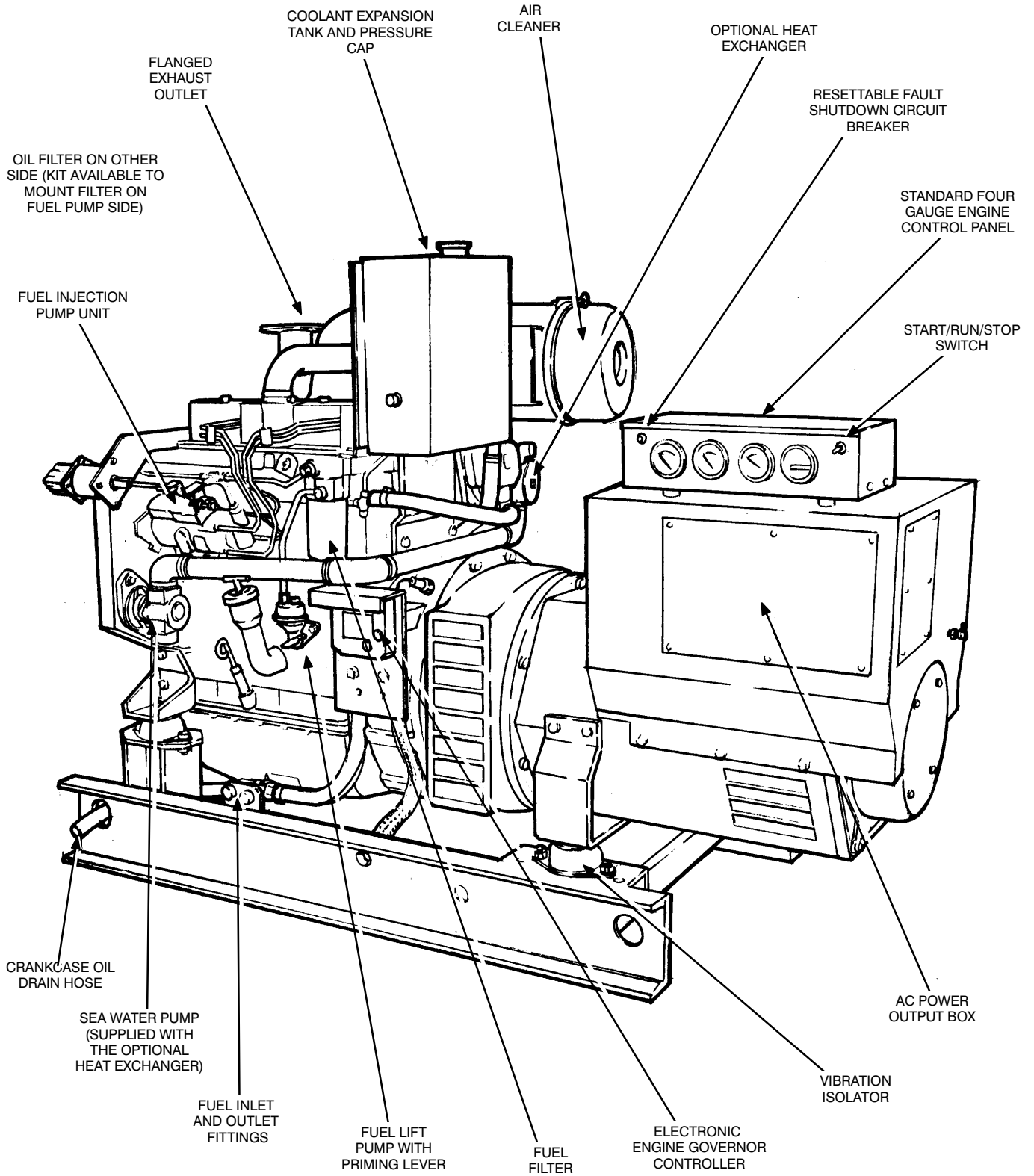
If unable to locate a dealer or distributor, consult the Yellow Pages. Typically, our distributors are listed under:

GENERATORS-ELECTRIC,
ENGINES-GASOLINE OR DIESEL, OR
RECREATIONAL VEHICLES-EQUIPMENT,
PARTS AND SERVICE.

For the name of your local Cummins/Onan or Onan-only distributor in the United States or Canada, call 1-800-888-ONAN (This automated service utilizes touch-tone phones only). By entering the area code and first three digits of your local telephone number, you will get the name and telephone number of the distributor nearest you.

For the name of your local Cummins-only distributor, or if you need more assistance, please call Onan Corporation, 1-612-574-5000, 7:30 AM to 4:00 PM, Central Standard Time, Monday through Friday.

When contacting your distributor, always supply the complete Model Number and Serial Number as shown on the generator set nameplate.



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FIGURE 1-1. TYPICAL GENERATOR SET

Section 2. Operation

GENERAL

These sets are started and stopped by the manually operated **Start / Run / Stop** switch. The engine control automatically disconnects the starter when the engine starts up, and shuts down the engine when a fault condition is reached (low oil pressure, for example). An electronic governor provides isochronous engine governing. An automatic voltage regulator regulates AC output voltage.

The engine control and speed governing systems are powered by the cranking battery. They are protected by a 30 amp cartridge fuse (**F101**) which has a twist-lock holder tied into the engine wiring harness above the flywheel housing. The set cannot start and operate without the fuse in place.

The engine control panel is usually mounted on top of the generator. A plug-in extension harness is available so that the panel can be mounted at a convenient location in the generator room. A supplementary pilot house control panel with a plug-in extension harness is also available.

STANDARD ENGINE CONTROL COMPONENTS

The four gauge engine control panel (Figure 1-1) is standard and has the following components.

Start / Run / Stop Switch (S103). The set will start up when the switch is held in the **Start** position and will continue to run when the switch is released to the **RUN** position. The starter will be automatically disconnected. The set will come to a stop when the switch is pushed to **Stop**.

Oil Pressure Gauge (M124). The oil pressure gauge indicates engine oil pressure.

Coolant Temperature Gauge (M127). The coolant temperature gauge indicates engine coolant temperature.

DC Voltmeter (M121). The DC voltmeter indicates battery charging voltage.

Running Time Meter (M119). The running time meter indicates the accumulated number of hours the set has run. It cannot be reset.

Common Fault Circuit Breaker (CB115). The common fault circuit breaker shuts down the engine when any fault shutdown sensor functions. Fault shutdown is indicated when the breaker reset button extends out past normal. Push the button to restore operation (after the engine has been properly serviced).

The standard fault shutdowns are:

- **Low Oil Pressure** (lower than 14 PSI)
- **High Engine Temperature** (higher than 220°F).

OPTIONAL ENGINE CONTROL COMPONENTS

The optional engine control panel can hold six gauges and include the following components in addition to the standard components.

Oil Temperature Gauge (M129). The oil temperature gauge indicates engine oil temperature.

Tachometer (M131). The tachometer indicates engine speed in RPM.

Individual Fault Circuit Breakers (CB109 through CB114). An individual fault circuit breaker is provided in connection with each fault shutdown sensor to shut down the engine when the sensor functions. Each breaker is identified according to fault by marking next to it on the panel. Fault shutdown is indicated when the breaker reset button extends out past normal. Push the button to restore operation (after the engine has been properly serviced).

The optional fault shutdowns are:

- **Low Coolant Level**
- **Low Oil Level**
- **Low Sea Water Flow** (for engines with a heat exchanger and sea water pump)
- **High Exhaust Temperature** (for engines connected to a wet exhaust system)
- **Overspeed.**

Fault Bypass Switch (S117). This switch is used to bypass the fault shutdown circuit to keep the set running for the sake of a critical operation. Visual and remote indications of the fault, while the set is running, are provided by the fault circuit breaker and the alarm relay.

⚠ CAUTION *This switch is for emergencies only—where it has been decided that the generator set must run to continue a critical operation, even though it might result in destruction of the set. Read the Warranty regarding possible exclusions when operating the set under these conditions.*

Alarm Relay (K109). The alarm relay closes a set of contacts to provide remote annunciation of a fault shutdown.

GOVERNOR

The engine is equipped with an electronic governor. See *Adjustments* if output frequency needs to be adjusted.

AC METER PANEL

The optional AC meter panel is mounted on top of the engine control panel and may also be connected by a plug-in extension harness so that it can be mounted at a convenient location in the generator room. It includes the following components.

AC Voltmeter (M21). The voltmeter indicates output voltage for the phase selected.

AC Ammeter (M22). The ammeter indicates output amperage for the phase selected. Input to the ammeter is from current transformers CT21, CT22 and CT23 inside the AC power output box.

Frequency Meter (M23). The frequency meter indicates output frequency in Hertz (Hz). Note that engine RPM is 30 times Hz.

Phase Selector Switch (S21). The selector switch is used to select the phase for voltage and amperage readings.

AUTOMATIC VOLTAGE REGULATOR

The generator is equipped with an automatic voltage regulator. See *Adjustments* if AC output voltage needs to be adjusted.

PRESTART CHECKS

1. Check to see that an approved fuel / water separator has been installed upstream of the engine-mounted fuel lift pump. A fuel / water separator kit that mounts

on the flywheel housing is available from your distributor.

⚠ CAUTION *Failure to provide an approved fuel/water separator and filter upstream of the engine-mounted fuel lift pump can lead to pump and injection unit failures and consequent disabling of the set.*

2. Check the **Fuel Supply**. Prime the engine fuel system, if necessary, as described in *Maintenance*.
3. Always check engine **Oil** and **Coolant** levels before starting the set. See *Maintenance*.

⚠ WARNING *To prevent severe scalding, always let the engine cool down before removing the coolant pressure cap. Turn the cap slowly, and do not open it fully until the pressure has been relieved.*

4. Make sure the **Sea Water Cock** is open when operating a heat exchanger-cooled set. Prime the sea water pump if prime has been lost. See *Maintenance*.

⚠ CAUTION *The sea water pump has a neoprene impeller that can disintegrate in a matter of seconds after the engine starts if pump prime has been lost.*

STARTING

Press the local or the pilot house control panel switch to **Start** and hold it there until the engine starts up.

⚠ CAUTION *Excessive cranking can overheat the starter motor and cause it to fail. Do not crank the engine for more than 30 seconds at a time. Wait two minutes before trying again.*

Watch the engine gauges after the engine has started up. Normal oil pressure is 35 to 60 psi at normal operating temperature. Normal charging voltage is 26 to 28 volts for 24 volt systems and 13 to 14 volts for 12 volt systems. Engine coolant temperature should be between 170°F and 210°F during operation.

STOPPING

Remove all loads from the set and let it run for five minutes to allow it to cool down before stopping. Momentarily press the control panel switch to **STOP**.

BREAK-IN

Change engine oil after the first 50 hours of operation. See *Maintenance*.

Section 3. Troubleshooting

The following table is a guide to help you think through problems with the engine and generator. You can save

time if you read this manual ahead of time. Call your Distributor if you have questions, or if service is required.

SYMPTOMS	CHECKS AND CORRECTIVE MEASURES
1. The engine does not crank.	1a. Service the battery and battery terminals and cables. See <i>Maintenance</i> . b. Replace control circuit fuse F101 if it has blown.
2. The engine cranks, but does not start.	2a. Check the fuel supply. b. If a fault circuit breaker has tripped, service the fault, and reset the circuit breaker. c. Service the battery if the engine cranks too slowly to start, refill with engine oil of suitable viscosity and plug in or service the engine coolant heater, if provided. Install an engine coolant heater if necessary. See <i>Maintenance</i> .
3. The engine coolant temperature gauge indicates 220°F or more while the engine is running.	3a. Shut down the set if possible. See <i>Maintenance</i> for servicing the cooling system. b. Disconnect as many non-critical loads as possible so that the engine will run cooler, and service as soon as possible.
4. The engine shuts down due to high engine temperature or low coolant level.	4a. Fill coolant, if necessary, after the engine has cooled down, and fix any leaks. b. See <i>Maintenance</i> for servicing the cooling system. c. Reset the tripped fault circuit breaker.
5. The engine oil pressure gauge indicates less than 20 psi.	5a. Shut down the set if possible. Fill oil, if necessary. b. Disconnect as many non-critical loads as possible so that the engine will run cooler, and service as soon as possible.
6. The engine shuts down due to low oil pressure or low oil level.	6a. Fill oil, if necessary. See <i>Maintenance</i> . b. Call your distributor to service the engine lubrication system. c. Reset the tripped fault circuit breaker.
7. The engine shuts down due to over-speed.	7a. Check the governor-throttle linkage. See <i>Adjustments</i> . b. Reset the tripped fault circuit breaker.
8. There is no output because the line circuit breaker (if provided) or the field circuit breaker has tripped.	8a. Determine the cause (overload or short circuit) and clear the fault. b. Reset the line circuit breaker. c. Reset the field circuit breaker.

⚠WARNING *There are hazards present in troubleshooting that can cause equipment damage, severe personal injury or death. Troubleshooting must be performed by qualified persons who know about fuel, electrical and machinery hazards. Read the safety precautions inside the front cover and carefully observe all instructions and precautions in this manual.*

Section 4. Maintenance

Maintenance must be performed periodically. The following table is a recommended schedule. Perform the specified maintenance when the time interval has elapsed or running time has accumulated, whichever occurs first. Running time is recorded by a meter on the control panel.

Keep an accurate log of maintenance to support warranty claims. See *Introduction* for contacting help when service or repair has to be performed.

TABLE 4-1. MAINTENANCE SCHEDULE

INTERVAL	MAINTENANCE TASK
One Day or 8 Hours of Running	Check the engine oil level. Check the engine coolant level. Drain water from the fuel filter. Drain the exhaust system condensate trap. Check for abnormal operation (noise, vibration, overheating, etc.) and for oil, fuel, coolant and exhaust leaks.
One Month or 100 Hours of Running	Check the battery fluid level and specific gravity.
Three Months or 250 Hours of Running	Change the engine oil and oil filter. Check the heat exchanger corrosion protection plug (if provided).
Six Months or 500 Hours of Running	Check the anti-freeze concentration. Change the air cleaner element. Change the fuel filters.
One Year or 1000 Hours of Running	Adjust the engine valve clearances.* Check the engine accessory drive belt and pulleys.*
Two Years or 2000 Hours of Running	Change the engine coolant.
*- See the engine Operation Manual	

GENERAL INSPECTION

Always be alert when the set is running for problems that could lead to equipment damage or personal injury. If it is necessary to perform maintenance or service, always disconnect the starting battery cables (negative (-) cable first) to prevent accidental starting while working on the set.

▲WARNING *Accidental starting of the generator set while working on it can cause severe injury or death. Prevent accidental starting by disconnecting the starting battery cables (negative (-) first).*

Always remove the negative (-) cable first, and reconnect it last, to prevent arcing if a tool accidentally touches the frame or other grounded metal part while removing the positive (+) battery cable. Arcing can ignite the explosive hydrogen gas given off by the batteries, causing severe injury.

Check the following daily.

Engine Oil and Coolant Levels

Maintain engine oil and coolant at the prescribed levels. Always check before starting the set. See Engine Lubrication and Engine Cooling in this section.

Control Panel

Check the control panel engine gauges and AC meters (if provided) for indications of abnormal operation. Also, be alert for unusual noises, vibrations, smells and other indications that something may be going wrong.

Exhaust System

Look and listen for exhaust leaks, especially at joints in the system. Make sure the exhaust pipe or muffler is not overheating surrounding materials. Replace exhaust hose (wet exhaust systems) if it appears damaged from heat.

▲WARNING *Exhaust gas is deadly. All exhaust leaks must be fixed before running the set.*

Fuel System

Check the supply tank, fuel lines, fittings, shutoff valves and filters for leaks before and while running the set. Check flexible fuel lines for cuts, cracks and abrasions.

▲WARNING *Diesel fuel is highly combustible. Even a small leak can lead to an uncontrollable fire aboard the vessel. Fix fuel leaks immediately.*

Battery Terminals and Cables

Check for loose or corroded cable connectors and broken cable strands.

ENGINE LUBRICATION

Engine Oil Level

Wait at least 10 minutes to check the oil level if the engine has been running so that the oil can drain back into the

crankcase. Keep the oil level just below the high level mark on the dipstick.

CAUTION *Running the engine when the oil level is low can lead to shutdown because of loss of oil pressure and to degradation of the oil because of high oil temperature. Overfilling can lead to foaming, which also degrades engine oil.*

Engine Oil Specifications

Use API (American Petroleum Institute) Class CC/CD engine oil. The oil should not contain more than 1.85 percent (by weight) of sulfated ash. Do not mix different classes or brands of oil since they can react chemically to form products harmful to the engine.

Temperature affects oil viscosity. Multi-grade oils are designed for ease of starting in cold weather as well as good lubrication at high operating temperatures. SAE (Society of Automotive Engineers) multi-grade 15W40 or 20W40 engine oil is recommended for temperatures down to 14°F (-10°C), and 10W30 engine oil for temperatures below that. See your distributor regarding oil for Arctic conditions.

Engine Oil and Filter Change

Change the engine oil and filter in accordance with the Maintenance Schedule in this section. Proceed as follows:

5. Run the engine until it is up to operating temperature and shut it off.
6. Open the oil drain valve and drain the oil into a suitable container.
7. Remove the oil filter with a filter wrench.
8. Fill the new filter with oil and apply a film of oil to the gasket. Screw the filter on by hand until the gasket just touches the filter head. Tighten the filter another 3/4 turn.
9. Close the oil drain valve and fill with oil to the high mark (H) on the dipstick.
10. Start the engine and check for leaks.
11. Shut off the engine and wait for 10 minutes. Refill with oil to the high mark (H), if necessary.

THE OIL FILTER IS ON THE OTHER SIDE OF THE ENGINE UNLESS A KIT HAS BEEN PROVIDED TO MOUNT IT ON THE FUEL PUMP SIDE

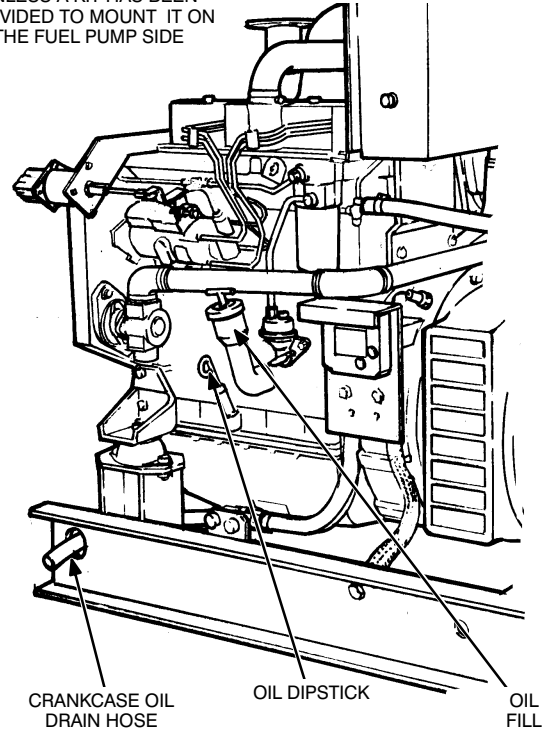


FIGURE 4-1. OIL DIPSTICK, FILL, DRAIN AND FILTER

ENGINE COOLING

Filling Coolant

It is recommended that the engine-heat exchanger or engine-keel cooler system be filled with a 50-50 mixture of fresh water and ethylene glycol antifreeze. Proceed as follows.

1. If the set is heat exchanger cooled, prime the sea water pump by disconnecting the pump outlet hose and pouring water into the pump outlet (Figure 4-2). Reconnect the hose and open the sea cock.

CAUTION *The sea water pump has a neoprene impeller that can disintegrate in a matter of seconds after the engine starts if pump prime has been lost.*

2. Fill coolant until the expansion tank is approximately half full. Bleed air from any air vents in the system while filling coolant.

DISCONNECT THE HOSE FROM THE PUMP OUTLET TO PRIME THE SEA WATER PUMP

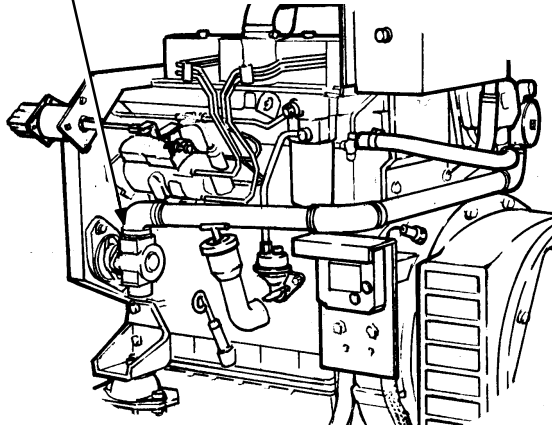


FIGURE 4-2. PRIMING THE SEA WATER PUMP

- Run the engine while watching the coolant level in the expansion tank. (The level will drop as remaining air in the system escapes). Add coolant as necessary so that the expansion tank is full when the engine reaches normal operating temperature. Secure the pressure cap.

▲WARNING *To prevent severe scalding, always let the engine cool down before removing the coolant pressure cap. Turn the cap slowly, and do not open it fully until the pressure has been relieved.*

Changing Coolant

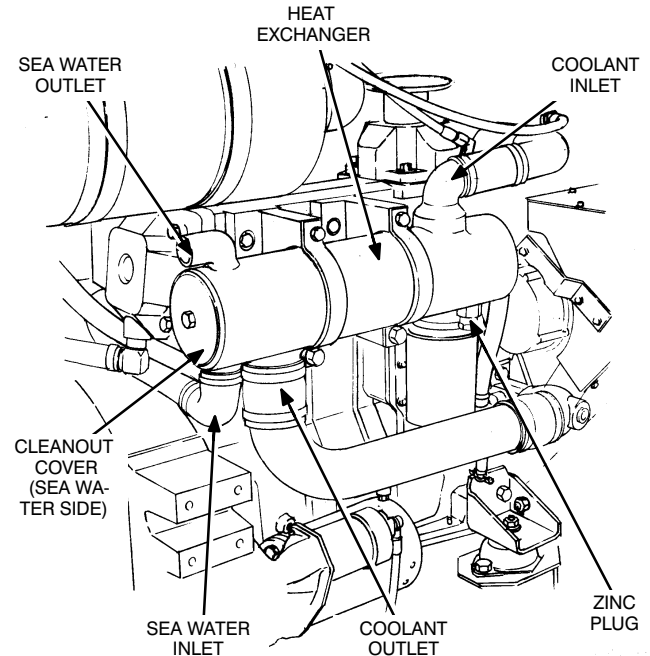
Change the coolant in accordance with the Maintenance Schedule in this section. Follow the instructions in the engine Operation Manual for cleaning the system.

Heat Exchanger

Heat exchanger cooled engines are equipped with a shell-and-tube heat exchanger that segregates the sea water and coolant (Figure 4-3). Coolant flows inside the shell, around the tubes. Sea water flows through one pass of tubes and returns by the other.

Remove the end cap and drain plug to clean the sea water side of the heat exchanger. Follow the instructions in the engine Operation Manual for cleaning the heat exchanger. Take the heat exchanger to a radiator shop if it is badly fouled. Also, if the sea water pump impeller disintegrates (as a result of dry operation), remove the end cap of the heat exchanger to remove impeller debris.

Replace the drain plug if the zinc anode is more than half consumed. See the Maintenance Schedule in this section.



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FIGURE 4-3. HEAT EXCHANGER

FUEL

The engine runs on No.2 diesel fuel. See the engine Operation Manual for specifications for other acceptable fuels.

▲WARNING *Diesel fuel is highly combustible. Do not smoke near fuel tanks and fuel lines. Keep flames and other ignition sources well away from fuel.*

Fuel Filters

Change the fuel filters and drain water in accordance with the Maintenance Schedule in this section. When replacing filters, fill them with fuel and apply a film of fuel to the gasket. Screw the filter on by hand until the gasket just touches the filter head. Tighten the filter another 3/4 turn. See Figure 4-4.

Bleeding System Air

If it is necessary to bleed the fuel system of air (because of running out of fuel, changing filters, loose connections, etc.) loosen the fuel line fitting at the filter head and pump the priming lever on the fuel lift pump until fuel starts flowing from the fitting and is free of air.

The fuel injection system is self venting and will probably not need to be bled. See the engine Operation Manual if it is necessary to bleed the fuel injection system.

LOOSEN THIS
FITTING TO
BLEED AIR

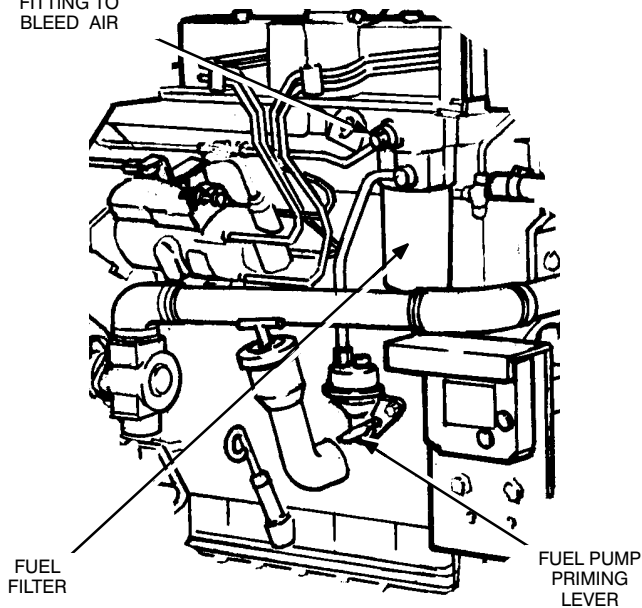


FIGURE 4-4. BLEEDING THE FUEL SUPPLY LINE AND FILTERS
AIR FILTER

Change the disposable air filter element in accordance with the Maintenance Schedule. The filter element is accessible by removing the end cover (Figure 4-5).

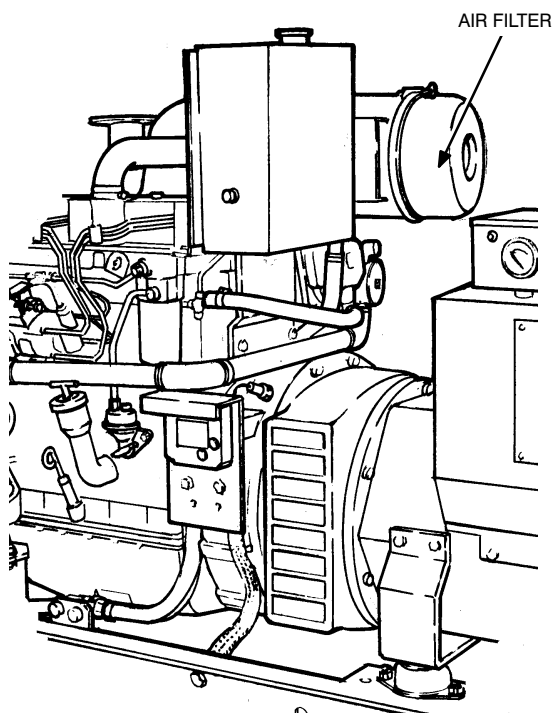
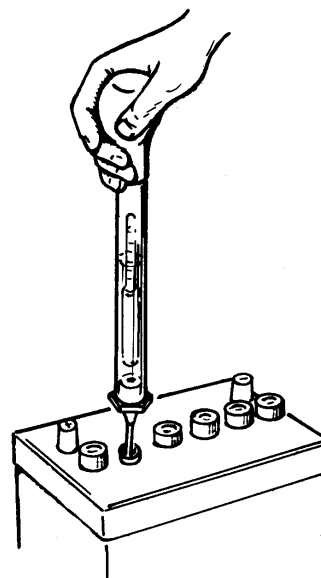


FIGURE 4-5. AIR FILTER

BATTERIES

Check the condition of the starting batteries in accordance with the Maintenance Schedule. Add distilled water as necessary and check the specific gravity. Recharge the batteries if the specific gravity is less than 1.260 (Figure 4-6). Clean and tighten the battery terminals and cable connectors and coat with Vaseline to retard corrosion.

⚠WARNING Battery gases are explosive and can cause severe personal injury if ignited. Do not smoke near batteries. Wear protective goggles, rubber gloves and an apron.



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FIGURE 4-6. CHECKING BATTERY SPECIFIC GRAVITY

Section 5. Adjustments

OUTPUT VOLTAGE ADJUSTMENT

Output voltage can be adjusted plus or minus five percent of nominal voltage by the adjustment screw on the back of the power supply outlet box (Figure 5-1). Call your distributor if the required voltage cannot be obtained by this adjustment.

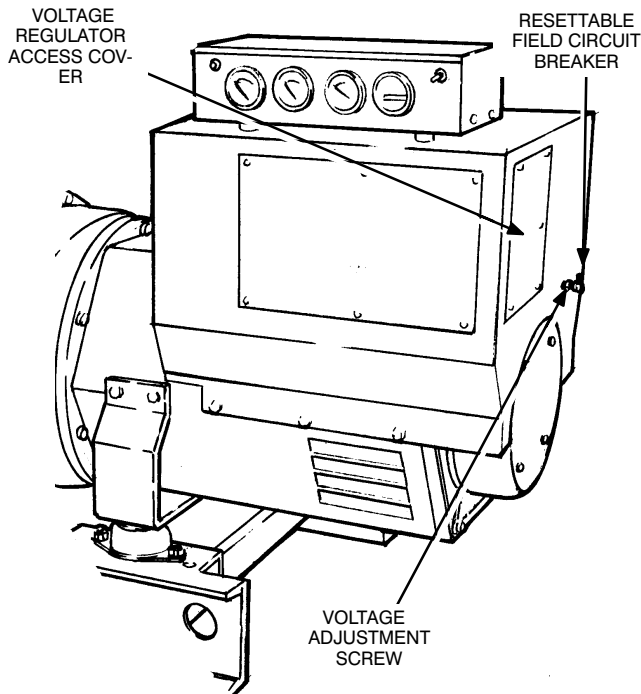


FIGURE 5-1. OUTPUT VOLTAGE ADJUSTMENT

OUTPUT FREQUENCY (GOVERNOR) ADJUSTMENT

An electronic governor with a magnetic speed pickup and linear actuator provides isochronous engine speed governing. See Figure 5-2.

Frequency (Speed) Adjustment

Adjust the electronic governor as follows.

1. Warm up the set under partial load (at least 1/4 rated load).
2. Turn the **Speed** potentiometer to obtain specified power supply frequency (60 Hertz - 1800 RPM or 50 Hertz - 1500 RPM).
3. Turn the **Gain** potentiometer clockwise until the governor begins to hunt. Turn it back until there is no audible hunting.
4. Connect 1/4 rated load and readjust the **Gain** potentiometer (Step 3), if necessary.
5. Connect rated load in one step. Shut down the set if it cannot pick up the load. Lengthen the governor rod by half turns of the swivel ends and repeat the test until the set is able to pick up rated load in one step. Back off the governor full speed stop screw if necessary.
6. Check for stability (no audible hunting) under various loads.
7. Stop the set and wait for 30 seconds for the turbo to coast down (if so equipped). Restart the set and check for speed overshoot. Check for binding in the governor rod if overspeed shutdown occurs.

Magnetic Speed Pickup

To install the magnetic speed sensor, bar the engine until a gear tooth on the flywheel lines up in the center of the mounting hole. Thread the sensor in gently by hand until it just touches the gear tooth. Back it out one quarter turn and set the lock nut.

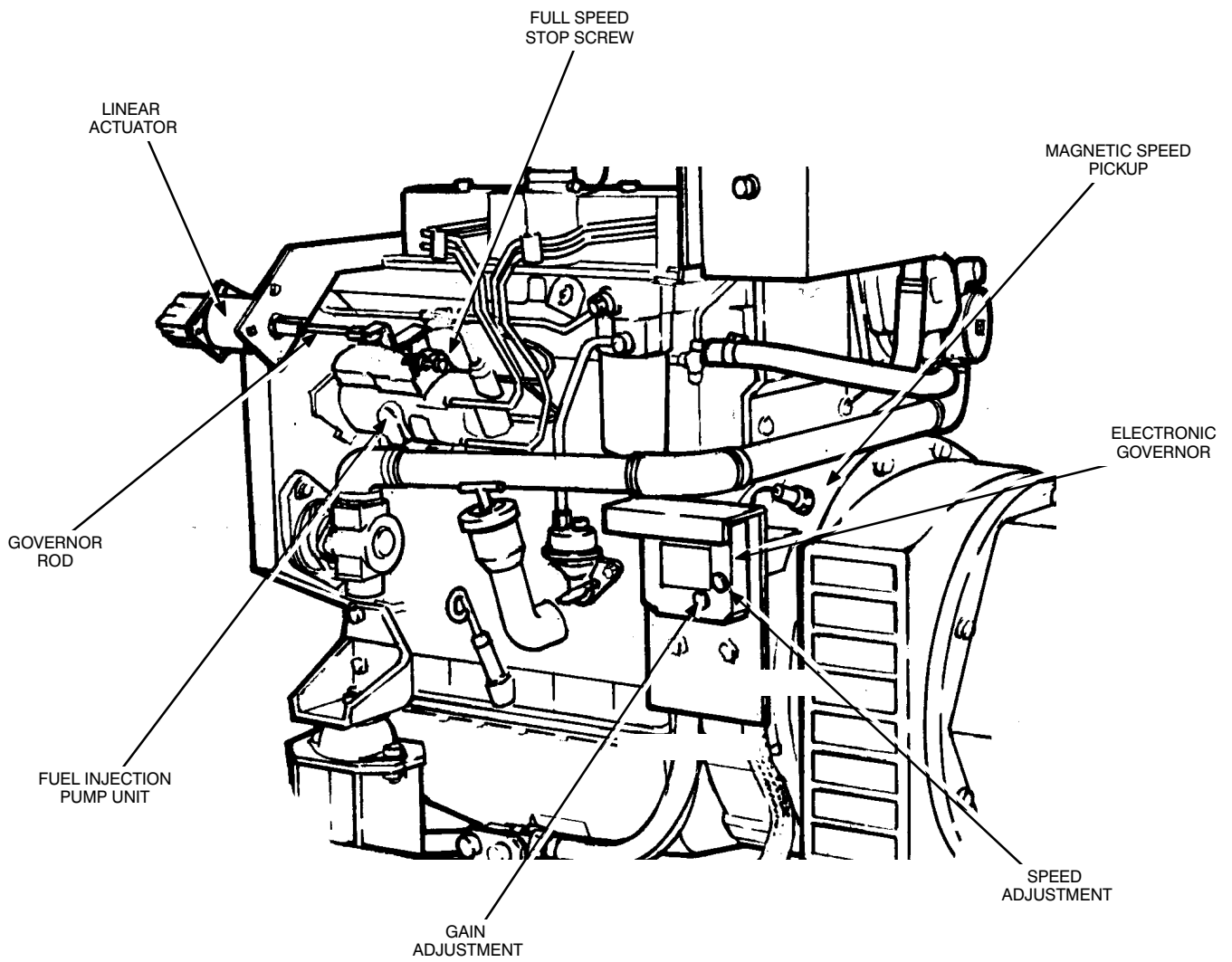


FIGURE 5-2. ELECTRONIC ENGINE GOVERNOR

Section 6. Specifications

MODEL NUMBER	MDGBA	MDGCA	MDGCB	MDGGA	MDGDA	MDGDB
FUEL SPECIFICATION	No. 2 Diesel	No. 2 Diesel	No. 2 Diesel	No. 2 Diesel	No. 2 Diesel	No. 2 Diesel
FUEL SUPPLY AND RETURN FITTINGS	1/4-18 NPTF	1/4-18 NPTF	1/4-18 NPTF	1/4-18 NPTF	1/4-18 NPTF	1/4-18 NPTF
ENGINE OIL CAPACITY	11.5 qts. (11L)	11.5 qts. (11 L)	11.5 qts. (11 L)	16 qts. (15 L)	16 qts. (15 L)	16 qts. (15 L)
BATTERY VOLTAGE*	12 or 24	12 or 24	12 or 24	12 or 24	12 or 24	12 or 24
RECOMMENDED BATTERY RATING**	625	625	625	625	625	625
DRY EXHAUST CONNECTION***	3 in. Pipe Flange	3 in. Pipe Flange	3 in. Pipe Flange	3 in. Pipe Flange	3 in. Pipe Flange	3 in. Pipe Flange
WET EXHAUST HOSE REQUIRED	3-1/2 in. I.D.	3-1/2 in. I.D.	3-1/2 in. I.D.	3-1/2 in. I.D.	3-1/2 in. I.D.	3-1/2 in. I.D.
KEEL COOLING SYSTEM						
COOLANT CAPACITY (Engine Only)	2.1 gal (8 L)	2.2 gal (8 L)	2.2 gal (8 L)	3.1 gal (12 L)	3.4 gal (12 L)	3.4 gal (12 L)
COOLANT INLET HOSE REQUIRED	2-1/4 in. I.D.	2-1/4 in. I.D.	2-1/4 in. I.D.	2-1/4 in. I.D.	2-1/4 in. I.D.	2-1/4 in. I.D.
COOLANT OUTLET HOSE REQUIRED	1-3/4 in. I.D.	1-3/4 in. I.D.	1-3/4 in. I.D.	1-3/4 in. I.D.	1-3/4 in. I.D.	1-3/4 in. I.D.
HEAT EXCHANGER COOLING SYSTEM						
COOLANT CAPACITY (H. E. and Engine)	3.5 gal (13 L)	3.5 gal (13 L)	3.5 gal (13 L)	5.4 gal (20 L)	5.5 gal (21 L)	5.5 gal (21 L)
SEA WATER INLET HOSE REQUIRED	1-1/4 in. I.D.	1-1/4 in. I.D.	1-1/4 in. I.D.	1-1/4 in. I.D.	1-1/4 in. I.D.	1-1/4 in. I.D.
SEA WATER OUTLET HOSE REQUIRED****	1-1/4 in. I.D.	1-1/4 in. I.D.	1-1/4 in. I.D.	1-1/4 in. I.D.	1-1/4 in. I.D.	1-1/4 in. I.D.
<p>* - See Nameplate ** - SAE J537 cold cranking amps (CCA) *** - The flange has four equally spaced 11/16 inch (17.5 mm) holes on a six inch (152.4 mm) bolt hole circle. **** - Not required when the set has a wet exhaust system.</p>						



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