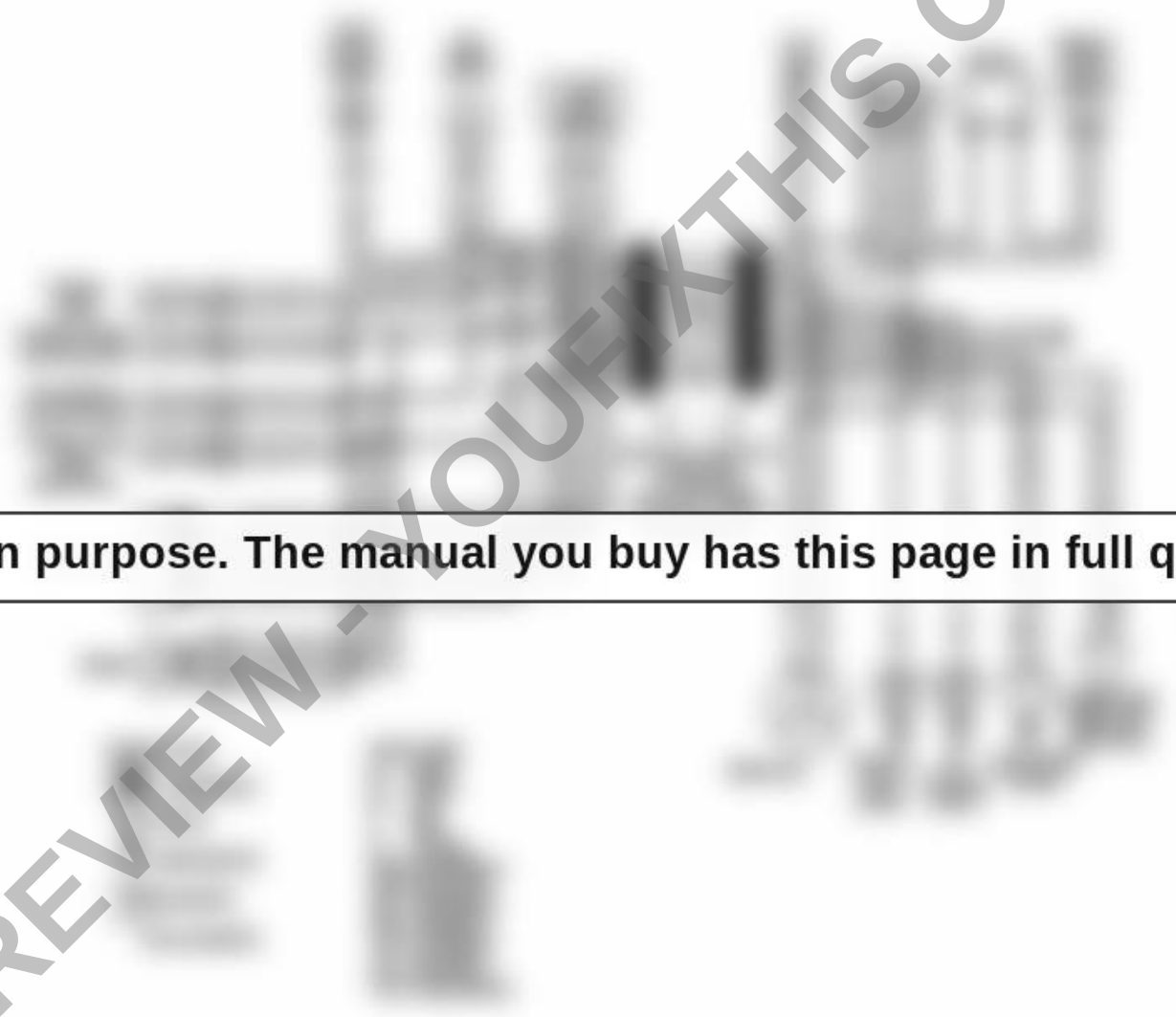
EARLY MODELS WITH LARGE INSTRUMENT PANEL



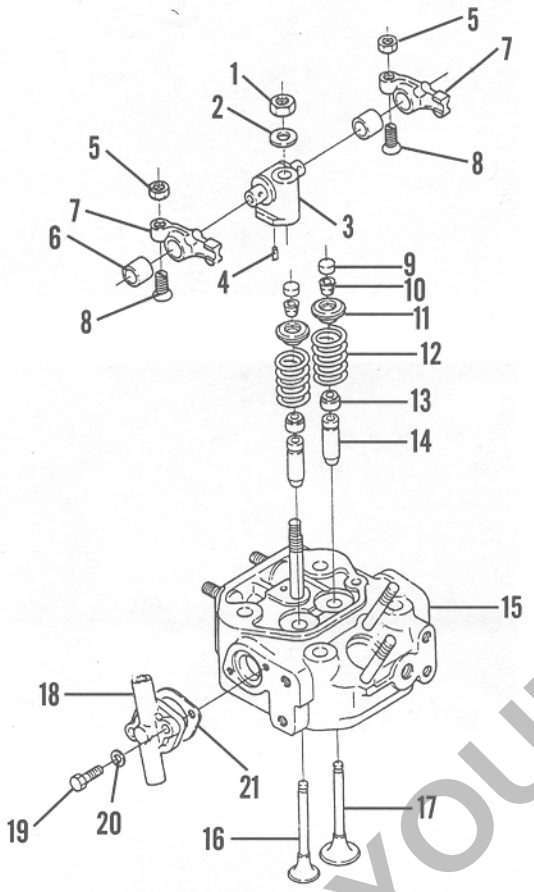
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10

CYLINDER HEAD



1. Nut
2. Washer
3. Rocker shaft stand
4. Pin
5. Nut
6. Bushing
7. Rocker arm
8. Adjuster
9. Wear cap
10. Keys
11. Valve spring retainer
12. Valve spring
13. Valve seal
14. Valve guide
15. Cylinder head
16. Exhaust valve
17. Intake valve
18. Thermostat housing
19. Bolt
20. Washer
21. Gasket

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DECOMPRESSION MECHANISM

The decompression mechanism on the valve cover forces the exhaust valve open to reduce compression pressure in the cylinder. Reducing compression pressure enables the starter to rotate the crankshaft faster during starting.

If the mechanism must be repaired, proceed as follows:

1. Remove the valve cover as previously described.

NOTE
*The lever retaining pin (17, **Figure 5**) is tapered. Drive the pin out toward top of lever.*

2. Using a suitable punch, drive out the retaining pin.
3. Remove the shaft assembly from the valve cover.
4. Inspect the mechanism and replace any damaged parts.
5. Reverse the removal procedure to reassemble the decompression mechanism. Note the following:
   a. The straight end of the spring must sit behind the lug on the valve cover. Position the hooked spring end on top of the lever.
   b. The shaft and lever must be properly assembled or the taper pin and tapered holes in the shaft and lever will not align. The cutout portion of the shaft must be down when the lever points toward the pulley end of the engine.

CYLINDER HEAD

Removal

In some instances, it may be possible to remove the cylinder head for service without removing the engine. If engine removal is necessary, refer to the previous engine removal procedure. Refer to **Figure 10** for an exploded view of the cylinder head assembly.

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ing it out with an appropriate size drift or pin punch. When removing a large core plug, the use of a universal impact slide hammer is recommended.

3. Clean the plug bore thoroughly to remove all traces of the old sealer. Inspect the bore for any damage that might interfere with proper sealing of the new plug.
4. Coat the inside diameter of the plug bore and the outer diameter of the new plug with sealer. Use an oil-resistant sealer if the plug is to be installed in an oil gallery or a water-resistant sealer for plugs installed in the water jacket.
5. Install the new core plug with an appropriate size core plug installation tool (**Figure 92**), driver or socket. The outside edge of the plug should be 2-3 mm (0.08-0.12 in.) inside the block.
6. Repeat Steps 1-5 to replace each remaining core plug.

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cusses the tools and techniques for preventive maintenance, troubleshooting and repair.

Chapter Two provides methods and suggestions for quick and accurate problem diagnosis and repair. Troubleshooting procedures discuss typical symptoms and logical methods to pinpoint the trouble.

Chapter Three explains all periodic lubrication and routine maintenance necessary to keep the engine operating well. Chapter Three also includes recommended tune-up procedures, eliminating the need to constantly consult other chapters on the various assemblies.

Subsequent chapters describe specific systems, providing disassembly, repair, assembly and adjustment procedures in simple step-by-step form. If a repair is impractical for a home mechanic, it is so indicated. It is usually faster and less expensive to take such repairs to a dealer or repair shop. Specifications concerning a specific system are included at the end of the appropriate chapter.

NOTES, CAUTIONS AND WARNINGS

The terms NOTE, CAUTION and WARNING have specific meanings in this manual. A NOTE provides additional information to make a step or procedure easier or clearer. Disregarding a NOTE could cause inconvenience but would not cause damage or personal injury.

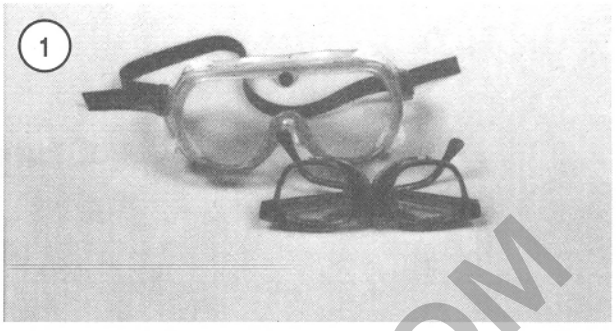
A CAUTION emphasizes areas where equipment damage could occur. Disregarding a CAUTION could cause permanent mechanical damage; however, personal injury is unlikely.

A WARNING emphasizes areas where personal injury or even death could result from negligence. Mechanical damage may also occur. WARNINGS *are to be taken seriously*. In some cases, serious injury or death has resulted from disregarding similar warnings.

SAFETY FIRST

Professional mechanics can work for years and never sustain a serious injury. By observing a few rules of common sense and safety, it is possible to enjoy many safe hours servicing the machine. Ignoring these rules can cause injury or damage to equipment.

1. Never use gasoline as a cleaning solvent.
2. Never smoke or use a torch in the vicinity of flammable liquids, such as cleaning solvent, in open containers.
3. Use proper sized wrenches to avoid damage to fasteners and personal injury.
4. When loosening a tight or stuck nut, remember what could happen if the wrench should slip. Be careful; protect yourself accordingly.





5. When replacing a fastener, make sure to use one with the same measurements and strength as the old one. Incorrect or mismatched fasteners can result in damage to the engine and possible personal injury. Beware of fastener kits that are filled with poorly made nuts, bolts, washers and cotter pins. Refer to *Fasteners* in this chapter for additional information.
6. Keep all hand and power tools in good condition. Wipe greasy and oily tools after using them. They are difficult to hold and can cause injury. Replace or repair worn or damaged tools.
7. Keep the work area clean and uncluttered.
8. Wear safety goggles (**Figure 1**) during all operations involving drilling, grinding, the use of a cold chisel or *any* time the safety of the eyes is compromised. Safety goggles should be worn when using solvent and compressed air.
9. Keep an approved fire extinguisher nearby (**Figure 2**). Make sure it is rated for gasoline (Class B) and electrical (Class C) fires.
10. When drying bearings or other rotating parts with compressed air, never allow the air jet to rotate the bearing or part. The air jet is capable of rotating them at speeds far

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Quick Reference Data

TUNE-UP SPECIFICATIONS

Model	Idle rpm (no-load)	Full throttle rpm (no-load)	Fuel injection timing	Value clearance all models
1GM	850	3750	25° BTDC	0.2 m (0.008 in.)
1GM10	850	3825	15° BTDC	0.2 m (0.008 in.)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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Table 1 YANMAR MODELS

Model	Number of cylinders	Displacement	Horsepower /rpm	Transmission	Transmission ratio (forward gear)
1GM	1	293 cc (17.9 cu. in.)	6.5 hp/3400 rpm	KM2A	2.21, 2.62 or 3.22
1GM10	1	318 cc (19.4 cu. in.)	8 hp/3400 rpm	KM2C or KM2P	2.21, 2.62 or 3.22
2GM	2	586 cc (35.7 cu. in.)	13 hp/3400 rpm	KM2A	2.21, 2.62 or 3.22
2GMF	2	586 cc (35.7 cu. in.)	13 hp/3400 rpm	KM2A	2.21, 2.62 or 3.22
2GM20	2	636 cc (38.8 cu. in.)	16 hp/3400 rpm	KM2C or KM2P	2.21, 2.62 or 3.22
2GM20F	2	636 cc (38.8 cu. in.)	16 hp/3400 rpm	KM2C or KM2P	2.21, 2.62 or 3.22
3GM	3	879 cc (53.6 cu. in.)	20 hp/3400 rpm	KBW10D	2.14, 2.63 or 2.83
3GMF	3	879 cc (53.6 cu. in.)	20 hp/3400 rpm	KBW10D	2.14, 2.63 or 2.83

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flush it down a drain or pour it on the ground. Put it in suitable containers and dispose of it according to local regulations.

CAUTION

Be careful not to spill antifreeze on painted surfaces, as it may damage the surface. Wash any spilled antifreeze immediately with soapy water, then rinse the area thoroughly with clean water.

Flushing and refilling freshwater coolant system

Use the following procedure to flush and refill the freshwater coolant system. Refer to the preceding section to flush the seawater portion of a freshwater coolant system.

Replace the coolant in the freshwater coolant system after every 500 hours of operation or annually, whichever occurs first.

CAUTION

Perform the following procedure when the engine is cold.

1. Remove the pressure fill cap (**Figure 24**).

NOTE

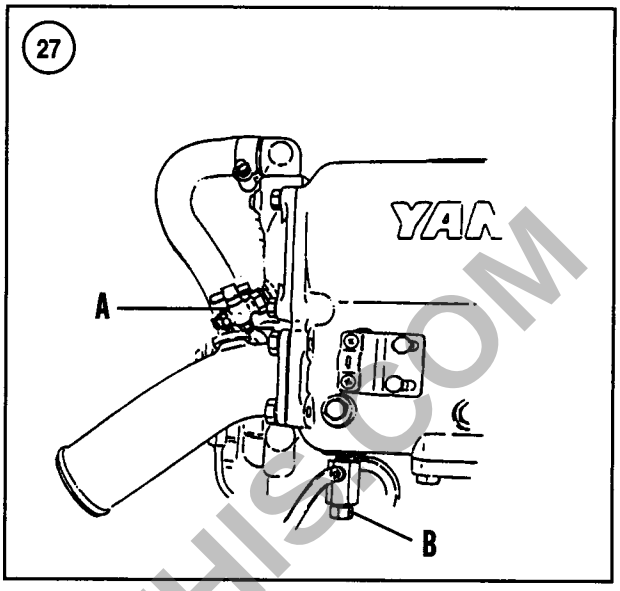
Position the drain hoses in suitable containers to catch coolant when draining the coolant from the exhaust manifold and engine.

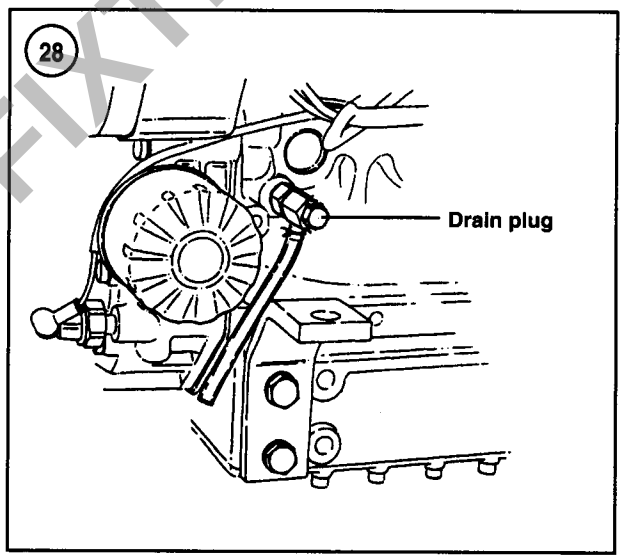
2. Open the drain valve at the end of the heat exchanger (A, **Figure 27**) and the drain plug on the underside of the exhaust manifold (B).
3. Unscrew the drain plug on the side of the engine block (**Figure 28**, typical).
4. If an excessive accumulation of scale is apparent on the interior of the cooling system, use an automotive cooling system cleaner. Be sure to thoroughly flush out the cooling system with freshwater afterward.
5. Close the drain plug on the exhaust manifold and the drain plug on the engine block.

6A. Engines without a remote reservoir—Fill the exhaust manifold with coolant. The coolant should be level with the iron plate at the bottom of the filler neck.

6B. Engines with a remote reservoir—Pour coolant into the exhaust manifold so it is full. Install the pressure fill cap, then add coolant to the remote reservoir tank to the proper level.

7. Run the engine until it reaches normal operating temperature, then let the engine cool. Recheck the coolant level and, if necessary, add coolant.





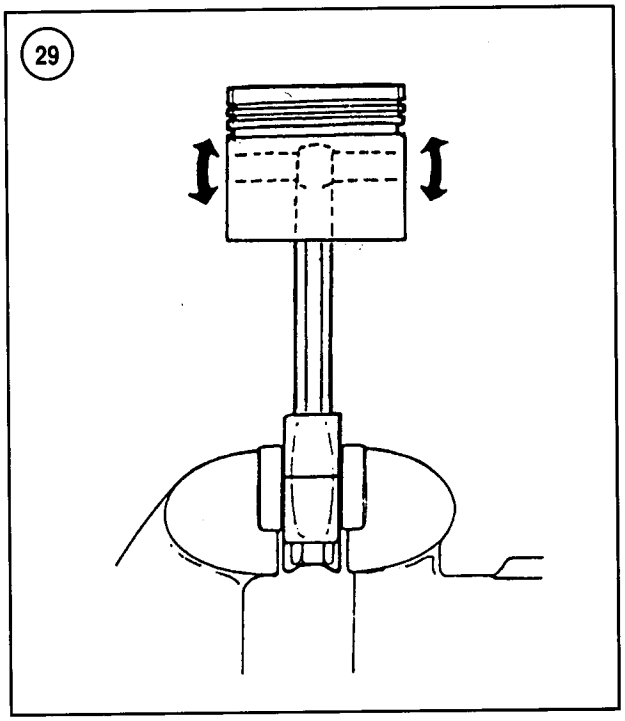
BATTERY

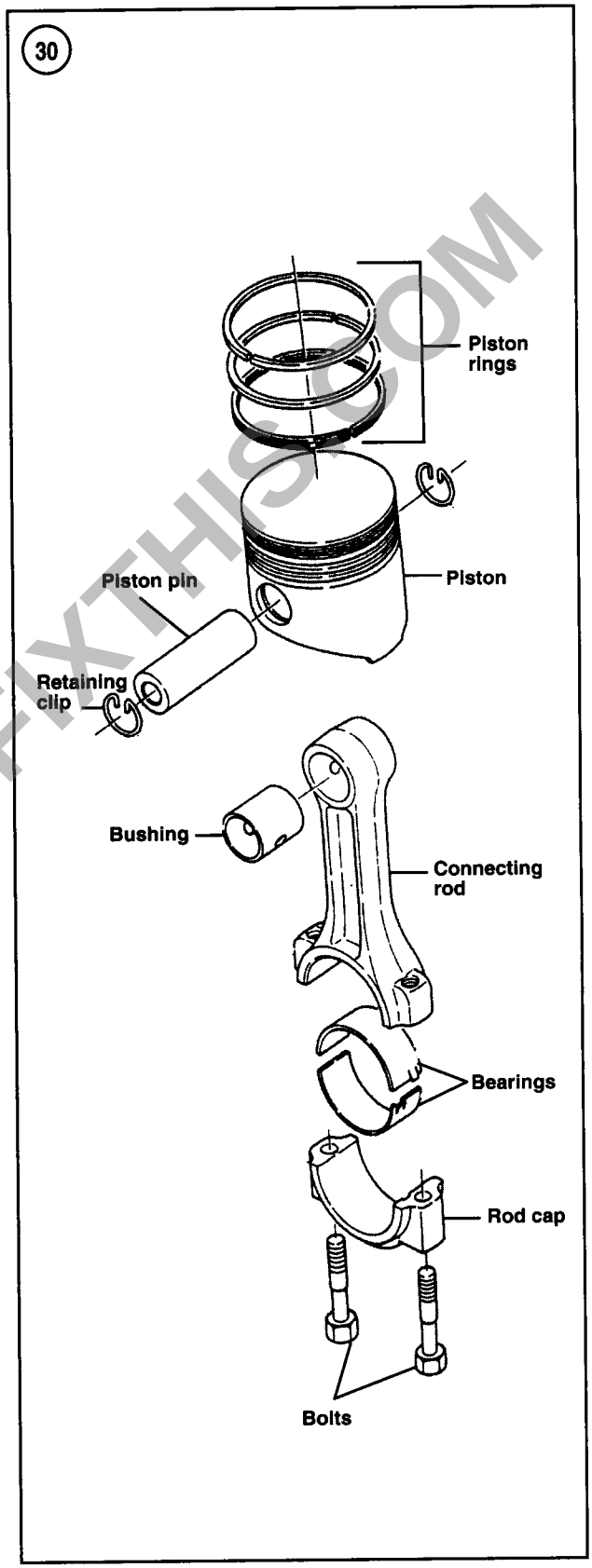
Inspect the electrical connections and make sure they are secure and corrosion-free. If corrosion is present at the terminal ends, detach the wires, clean the corrosion and reattach. Make sure that wires are correctly routed and will not contact moving parts or touch hot (especially exhaust) parts.

Remove the battery vent caps and check battery electrolyte level. It should be about 3/16 in. above the plates or even with the bottom of the filler wells. See **Figure 29**. Test the battery condition with a hydrometer (**Figure 30**). See Chapter Nine.

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Piston Pin Removal/Installation

The steel piston pin rides directly in the piston and in a bushing in the connecting rod. Circlips at each end retain the piston pin in the piston.

1. Before removing the piston, place the crankshaft end of the connecting rod in a vise with soft jaws. Rock the piston as shown in **Figure 29**. Any rocking motion (do not confuse with the normal sliding motion) indicates wear on the piston pin, piston pin bore or connecting rod small end bore (or combination of these).
2. Remove the clip from each side of the piston pin bore (**Figure 30**) with a small screwdriver or scribe. Hold a thumb over one edge of the clip when removing it to prevent the clip from springing out.
3. Use a wooden dowel or suitable tool and push out the piston pin. If the pin is difficult to remove, heat the piston with a hair dryer. Separate the piston from the connecting rod.

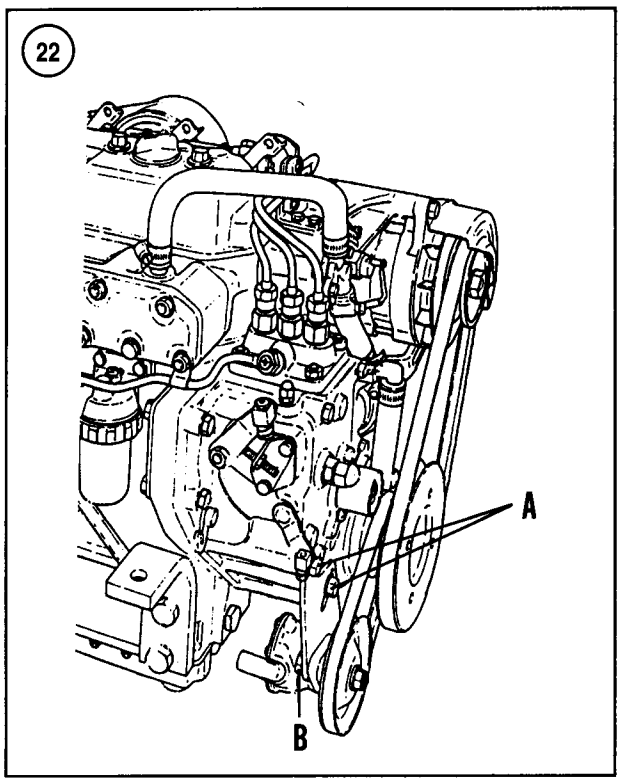
Piston/Cylinder Bore Check

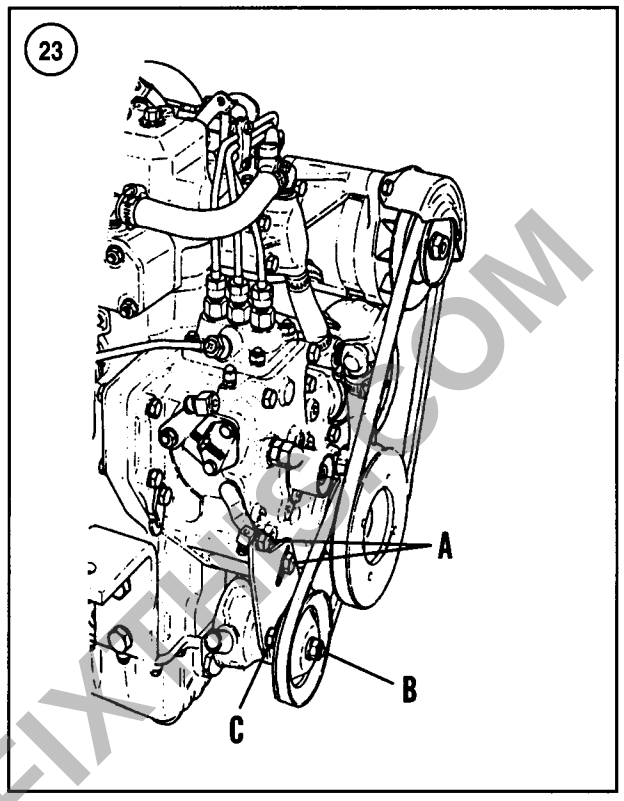
Unless precision measuring equipment is available, have this procedure done by a machine shop.

1. Measure the piston diameter with a micrometer (**Figure 31**) at a right angle to the piston pin bore 9 mm (0.35 in.) from the bottom of the piston skirt.

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equipped. Some engines are equipped with an O-ring that seals between the pump and engine.

5. Reverse the removal steps to install the pump. Refer to **Table 1** for the tightening torque of the pump retaining screws.

2GM, 2GM20, 3GM and 3GM30

1. If the boat is in water, make sure the seacock is closed.
2. Drain the seawater from the engine as described in Chapter Four.
3. Loosen the hose clamps, then detach the water hoses from the seawater pump.
4. Loosen the seawater pump bracket and pivot bolts (A, **Figure 22**).
5. Move the seawater pump toward the engine and slip the drive belt off the pump pulley.
6. Remove the pump mounting bolts (B, **Figure 22**), then separate the pump from the mounting bracket.
7. Reverse the removal steps to install the pump. Refer to **Table 1** for the tightening torque of the pump mounting bolts. Adjust the belt tension as described in Chapter Three.

3HM and 3HM35

1. If the boat is in water, make sure the seacock is closed.
2. Drain the seawater from the engine as described in Chapter Four.
3. Loosen the hose clamps, then detach the water hoses from the seawater pump.
4. Loosen the seawater pump bracket and pivot bolts.
5. Move the seawater pump toward the engine and slip the drive belt off the pump pulley.
6. Unscrew the pulley retaining nut (B, **Figure 23**), then remove the pulley for access to the pump mounting bolts.
7. Remove the mounting bolts (C, **Figure 23**), then separate the pump from the mounting bracket.
8. Reverse the removal steps to install the pump. Refer to **Table 1** for the tightening torque of the pump mounting bolts. Adjust the belt tension as described in Chapter Three.

Disassembly/Reassembly

1GM and 1GM10

1. Remove the three screws securing the pump cover to the body (1, **Figure 24**).

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