



# Operation and Maintenance Manual

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## **C32 Marine Auxiliary Engine**

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RNE1-Up (Engine)  
RNX1-Up (Engine)

## Engine

### Storage (Less Than One Year)

If an engine is not used, oil can run off the following parts that normally receive lubrication: cylinder walls, piston rings, main bearings, connecting rod bearings, crankshaft, and gears.

This lack of lubricant allows corrosion to begin to appear on the metal. This condition is worse in areas of high humidity.

When the engine is started again, metal to metal contact will cause wear before the surfaces receive oil. To minimize this wear, use the starter to turn the engine with the throttle in the FUEL OFF position. When oil pressure is shown on the pressure gauge, start the engine.

1. Clean the engine of any dirt, rust, grease, and oil. Inspect the exterior. Paint areas that contain paint damage with a good quality paint.
2. Remove any dirt from the air cleaner(s). Check all seals, gaskets, and the filter element for damage.
3. Apply lubricant to all points in this Operation and Maintenance Manual, "Maintenance Interval Schedule".
4. Drain the crankcase oil. Replace the crankcase oil and change the oil filter(s). For the proper procedure, refer to this Operation and Maintenance Manual, "Engine Oil and Filter - Change".
5. If the engine is equipped with an air starting motor, fill the reservoir with a mixture of 50 percent volatile corrosion inhibitor (<nomen>VCI </nomen>) and 50 percent engine oil.
6. Add VCI to the crankcase oil. The volume of VCI in the crankcase oil should be 3 to 4 percent.

**Note:** If the engine crankcase is full, drain enough engine oil so the mixture can be added.

7. Remove the air filter element(s). Turn the engine at cranking speed with the throttle control in FUEL OFF position. Use a sprayer to add a mixture of 50 percent VCI and 50 percent engine oil into the air inlet or turbocharger inlet.

**Note:** The mixture of VCI can be added to the inlet by removing the plug for checking turbocharger boost pressure. The minimum rate of application is 5.5 mL per 1 L (3 oz per 1000 cu in) of engine displacement.

8. Use a sprayer to apply a mixture of 50 percent VCI and 50 percent crankcase oil into the exhaust openings. The minimum application rate for the oil mixture is 5.5 mL per L (3 oz per 1000 cu in) of engine displacement. Seal the exhaust pipe and seal any drain holes in the muffler.
9. Remove the fuel from the secondary fuel filter housing. Alternately, empty and reinstall the spin-on fuel filter element in order to remove any dirt and water. Drain any sleeve metering fuel pump.

Clean the primary fuel filter. Fill with calibration fluid or kerosene. Install the primary fuel filter and operate the priming pump. This will send clean oil to the secondary filter and the engine.

Open the fuel tank drain valve in order to drain any water and dirt from the fuel tank. Apply a spray of calibration fluid or kerosene at the rate of 30 mL per 30 L (1 oz per 7.50 gal US) of fuel tank capacity in order to prevent rust in the fuel tank. Add 0.15 mL per L (.02 oz per 1 gal US) of commercial biocide such as **Biobor JF** to the fuel.

Apply a small amount of oil to the threads on the fuel tank filler neck and install the cap. Seal all openings to the tank in order to prevent evaporation of the fuel and as a preservative.

10. Remove the fuel nozzles or spark plugs. Apply 30 mL (1 oz) of the mixture of oils (50 percent VCI oil and 50 percent engine oil) into each cylinder.

Use a bar or a turning tool in order to turn over the engine slowly. This puts the oil on the cylinder walls. Install all fuel nozzles or spark plugs and tighten to the correct torque.

11. Spray a thin amount of the mixture of oil (50 percent VCI oil and 50 percent engine oil) onto the flywheel, the ring gear teeth, and the starter pinion. Install the covers in order to prevent evaporation of the vapors from the VCI oil.

12. Apply a heavy amount of Cat Multipurpose Grease (MPGM) to all outside parts that move, such as rod threads, ball joints, linkage, etc.

**Note:** Install all covers. Ensure that tape has been installed over all openings, air inlets, exhaust openings, the flywheel housing, the crankcase breather(s), the dipstick tubes, etc.

Ensure that all covers are airtight and weatherproof. Use a waterproof weather resistant tape such as Kendall No. 231 or an equivalent. Do not use duct tape. Duct tape will only seal for a short period of time.