

Diesel Engine Tips

TRIMMING THE "IRON GENOA": DIESEL ENGINE TIPS for the HUNTER 376 and 380

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Editor's Note: Although this document is directed to owners of the 376 and 380, we feel it is good reading for any owner with a Yanmar auxiliary diesel engine. However, be advised that we have not edited this submission nor have we verified its content with Yanmar, Hunter Marine, or any other manufacturer, service technician, or authority. As with all information on this site, you use it at your own risk.

PURPOSE

This unofficial operators tips paper is designed to be a ready reference for the 3JH2E diesel engine used in the Hunter 376 and 380. Much of what is presented is also applicable to other Yanmar engines used in various Hunter sailboat models.

The material is presented by major topic and the text is intentionally synoptic to get to the bottom line.

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This tips paper grew out of my own need to know more about the engine in my boat and is the result of personal research and discussions and input from other Hunter sailors and knowledgeable diesel experts. As such, the tips paper is unofficial and not a publication of Yanmar or Hunter Marine. Everyone I talked to thought the material should be shared; so here it is. Since it is unofficial, no liability is assumed or implied by me, Yanmar, Hunter, or any other company or person. The reader assumes all risks and is of course free to consult with Yanmar, Hunter, or other authority.

THE "IRON GENOA" FROM A SYSTEMS VIEWPOINT

ENGINE SERIES / PARTS

- The model 3JH2E is the H-376, 36hp diesel (3 cylinder freshwater model with heat exchanger).
- Use engine model number, or serial number, to get parts (numbers are located on an ID plate on the heat exchanger). The transmission serial number is located on the side or back. The numbers may be covered by gray paint.

WARRANTY

- One year total except consumables (belts, etc.)/ second year all but fuel injectors and electrics
- 1998 boats - a five year warranty was being considered - check to confirm

MANUALS / TOOLS / SPARE PARTS / ADDITIVES

- Follow at least the minimum maintenance schedule in the Hunter-provided Yanmar Operator Manual
- Consider buying Yanmar Service Manual, Yanmar Diesel Engine Parts Manual (has all parts and torque pressure specifications etc.), and a metric ratchet head set (everything on the engine is metric except the engine mount bolts)
- Consider a 3JH2E Minor Spares Kit with a impeller rebuild kit (cover plate included) to augment the impeller included in the minor spares kit
- Recommend buying FPPF fuel additives and Yanmar 30wt oil

MAINTENANCE SERVICE INTERVALS

- [Maintenance checklist](#)
- [Renault RC8D marine diesel manual](#)

- 10 hour, 25 hour and 50 hour. Follow the manuals (this is a maintenance intensive approach)
- First use of the day - engine check: belts, fuel/oil/transmission/coolant fluid levels (full); bolts secure on engine-shaft coupling; 12vdc availability (see volt and amp meters) (check battery fluid once a month if not using gel cells etc.); no evidence of coolant/transmission/oil/fuel leaks

FUEL INJECTION SYSTEM / FUEL LINE / FIXING FUEL LINE AIR LOCK / FUEL FILTER

- Fuel flows from tank to Primary Racor 110 filter with a 10 micron insert to the secondary filter on the engine (10 micron).
- Rigid fuel lines and injector feed lines cannot be bent unnaturally.
- Prevent air lock by keeping enough fuel in the tank. The H-376 is baffled so when the boat heels the tank delivers fuel rather than air on the high side of the tank.
- Clear an air lock by using a 10mm wrench to bleed the secondary filter by pumping the fuel lift pump. When you have fuel flow, open the fuel rack fully. Shut the engine seawater cooling hull valve. Crank the engine. Upon starting open the hull valve and reduce engine RPM gradually to idle. Start engine using pre-lube sequence if engine has been idle for 48 hours.
- The Yanmar secondary filter is top starboard of the engine; primary is in the fuel line after the tank before the engine use Yanmar filters for the 3JH2E engine.

ENGINE STARTING / PRE-LUBE TECHNIQUE / ENGINE STOP CABLES

- Use normal engine starting when it is warm and the engine has been run within the last 48 hours: hull sea cock open; turn key avoid prolonged cranking of the starter.
- Use cold or 48 hour plus engine starting: 1) shut hull sea water sea cock; 2) with stop cable fully engaged (stop cable pulled out); 3) turn key 10 seconds then stop for 5 seconds; 4) turn key 10 seconds then stop for 5 seconds; 5) Then disengage stop cable (push the stop cable in) while turning the key to start 6) subsequently open hull sea water cock
- Check stop cable: Keep it salt free, lubricated and adjusted. If it breaks get a new one.

FUEL

- Use low sulfur diesel (amber), or red, bought at a marina. It is approx. 38 cetane (flash point for ignition). 45 cetane gives the best engine timing and prevents smoking.

- ADD Yanmar FPPF 8 Plus cetane improver. 1/4 ounce per gallon. One bottle treats 120 gallons. It raises the cetane level and stops smoking and engine timing problems.
- ADD Yanmar Biocide KilleM (small amount) to treat tank and prevent algae growth.
- ADD Yanmar FPPF Lubricity 100, 1/8 oz per gallon. A sulfur additive to stabilize fuel and lubricate.
- ADD Yanmar Diesel Fuel Treatment if 45 degrees F or less to keep diesel fuel fluid.

OIL / OIL FILTER / DIP STICK / CHANGING OIL

- Use API rated CD oil at SAE 30 by Yanmar for 3JH2E engine.
- Oil pressure is normal at 36-42 psi.
- Oil pressure alarm sounds at 7psi indicating trouble; shut down immediately!
- Use Yanmar oil filter only for 3JH2E engine. Use a substitute and risk harming the engine.
- Pull dip stick out, wipe it, set it back in. Don't seat it, walk away for 3 minutes, then check it for a true reading. If oil is near full mark, gingerly add a little more and then check level as above. NEVER OVER FILL.
- Change oil with drill-driven pump or other suitable pump; use disposal bucket and have area covered with absorbent rags; change oil when it is warm enough to flow.

AIR INTAKE / EXHAUST ELBOW

- Circular air mesh intake should be cleaned (remove then wipe it off (soap and water) at 10, 25, and 50 hour intervals and when commissioning boat each season. If you get blue smoke and/or your oil dipstick unseats itself, suspect a clogged crankcase breather mesh filter on top of your engine
- Exhaust elbow is "u" shaped and carries the exhaust and used sea water from the engine. It works for 500-700 hours a maximum of 6 years.
- If the elbow goes bad, the engine overheats, is hard starting, has low output (rpms); have a mechanic replace it (\$250 - \$350 w/labor - ouch!). Don't idle your engine more than 2-3 minutes. Put it under load as this extends exhaust elbow and engine cylinder life.

RUNNING THE ENGINE / MOTOR SAILING

- Run the engine with a load except for 2-3 minutes warm up time at idle. 750-850 rpm normal idle; 2500-2800 sustained cruise at desired speed; 2800-3400 to maintain speed in

tough wind/current/wave conditions or to reach hull speed as necessary (approaching 7.6 knots in a steady sea state with normal weight aboard). Red line is 3600 rpm +/- 50 rpm on the Hunter 376 engine tachometer.

- Run the engine once a month during the sailing season with sufficient rpm to reach sustained hull speed for 2 hours (this assumes the boat is not overloaded and the bottom is reasonably clean). The idea is to keep the engine reasonably clean of life-robbing varnish deposits on the cylinders.
- Feeling a harmonic/vibration at 1100-1200 rpm, or at approx. 2350 +/-100 rpm is not unusual. Avoid these engine rpms and the vibration will disappear.
- Motor sailing with the jib works fine, but don't exceed 17 degrees of heel as the engine pickup tube will cease sending oil to the engine oil pump.

COOLING SYSTEM / COOLANT / ADDITIVES / OVERHEATING PROBLEMS

- The engine uses a sealed, freshwater cooled system contained in a bundle of cooling tubes. Sea water is pumped over the sealed system to carry away engine heat and then it is piped overboard via the exhaust mixing elbow (the sea water is 13 degrees hotter as a result of absorbing engine heat transferred to the sealed freshwater coolant). Engine heat is transferred via a heat exchanger to heat fresh water (water heater).
- Use only the Yanmar heat exchanger pressure cap for the 3JH2E system.
- Use a low silicone content antifreeze (mix of 60% water / 40% antifreeze solution) such as that made by Prestone or Texaco (ethyl glycol solution).
- Add FPPF 4000 to your antifreeze to improve coolant efficiency; follow the directions on the bottle.
- Change coolant once a year (take out the thermostat, open valves and flush with distilled water). Recharge with fresh coolant mixture and FPPF 4000. Run the engine till it is warm, stop the engine and check the level. When the engine has had a few minutes to cool; add more coolant if the level is still low.
- If the engine overheats the engine overheat sensor will signal a problem. Stop the engine, find the cause and fix. Here are some possibilities: engine sea hull intake is closed / sea water strainer is clogged with debris, or is letting in air (most likely the cause is one of these three culprits); the intake water hose has a leak; bad sensor; the impeller died (hope this does not happen to you in a rolling seaway as the repair is just *so* much fun); faulty heat exchanger pressure cap; bad thermostat; exhaust elbow is clogged and ready to be replaced (this is a major repair effort best left to a qualified mechanic); improper fuel timing; engine to propeller balance is incorrect, possibly

indicating wrong prop.

WATER PUMP IMPELLER

- The impeller should be replaced with the proper Yanmar part; be sure to have the impeller plate, screws and gaskets as provided in the minor repair kit. The starter has to be removed in order to get to the impeller. Do all of this in port. It is just too major of a repair job for the average sailor underway. The prudent sailor might want to replace the impeller every couple of seasons or so to avoid a breakdown.

TRANSMISSION / SHAFT & COUPLING/ TRANSMISSION FLUID / DIPSTICK

- The transmission is located at the rear of the engine in line with the propeller shaft. The small automatic transmission fluid dipstick should be checked periodically to ensure sufficient fluid levels; a groove near the bottom of the stick is the full mark. NEVER overfill with automatic transmission fluid. One-half pint to a quart is maximum. Add fluid gingerly. If you don't you may overfill and then have frothing of the transmission fluid.
- The shaft coupling should drip a drop of water or so an hour when not running. If it drips constantly, the shaft coupling should be tightened. If this does not fix the problem consider repacking the shaft. The drip rate should increase to 2-5 drops a minute when running.
- The engine-to-shaft couplings need to be aligned so that it is straight as the shaft passes through the hull to the propeller. Coupling bolts should be re-torqued once a year to 37.5 foot/pounds. Serious damage can result from running an engine to power a misaligned or partially connected shaft. Note that barnacles on the shaft, a bent shaft, worn cutlass bearing, or bent prop will cause excessive vibration.
- A shaft/propeller encumbered with debris can also cause loss of power and vibration.

ENGINE MOUNTS/ ALIGNMENT

- Keep engine mounts clean as oil will really do some damage over the long-term. Use bilge cleaner.
- Check again to ensure that the mounts and engine alignment are correct if the boat has been in dry storage or the standing rigging has been adjusted. These stresses can affect the alignment.

BATTERIES / 12VDC CHARGER / SOLAR PANEL

- An 80 amp starter battery is normally supplied with the boat and the regulator allows charging at 3 amps per hour. If the battery is drawn down to 60 amps, it will take 6-7 hours of engine running time to come back up to a full charge.
- All battery connections should be clean and tight; otherwise a false high resistance may develop thereby rendering the system ineffective.
- The 12V DC charger will normally keep the battery topped off given normal usage. The engine start battery uses a solar panel to keep the battery topped off at 2 amp per hour...when the sun is shining. The 50 amp alternator provides the main charging to both batteries when the engine is run above 1100rpm.
- The battery selector switches should be in the "on" position to allow the alternator to charge both batteries at the same time.
- Fluid-filled battery levels should be checked once a month. Dry batteries die young.

THE "IRON GENOA" BOTTOM LINE

A well-cared for and properly operated 3JH2E can be counted on to deliver anytime, anywhere, for years before requiring an overhaul.

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