

Troubleshooting a Non-starting Universal M3-20B Diesel Engine: Three Solutions

Randy Katz, #249 *Simple Gifts*

Bellingham/Seattle

See also a related article on preheat solenoids at

<http://www.alberg30.org/maintenance/MechanicalPropulsion/Diesel/GlowPlugSolenoid.html>

ENGINE TURNS OVER BUT WON'T START

In a lonely cove at the end of the summer, after two days of windless, sunny bliss in the islands, the engine doesn't start and the skipper's adrenaline spikes. The dang thing turns over fine, as usual, but it doesn't fire up. Air and fuel filters are known to be clean and clear having all been very recently replaced and tested.

HMMMM, THIS SORT OF THING HAS HAPPENED BEFORE

A similar problem was resolved at another time by replacing the glow-plug preheat solenoid. (The solenoid is a heavy duty switch which is turned off and on from the control panel. The M3-20B has second solenoid at the starter motor.) Then, a new solenoid additionally remedied a related problem-- the preheat alarm failing to shut off as it should when the glow plug button was pressed.

The glow plug solenoid is mounted aft at the top of the engine facing the stern. (It's next to a red reset button—for the solenoid--with a "20" on it, for 20 amps.) The solenoid is easy enough to remove and replace.

One of the solenoid's two large threaded terminals connects to the battery, the other runs to the glow plugs. A wire from the control panel to one of the two smaller solenoid terminals (the "S" stud, in this case) is powered when the glow-plug button is pressed. The solenoid clicks when activated and internally connects the larger terminals to each other allowing 12 v. current to reach the glow plugs and heat them.

TWO POSSIBLE CAUSES OF THE PROBLEM

The cause of this no-start problem is narrowed down to glow plugs failing to heat and/or the fuel pump not working. To test the fuel pump, a jumper wire is run from a 12 v. battery directly to the fuel pump lead. (The fuel pump lead is simply unclipped from it's connector and the test lead stuck inside. The ground is provided via the pump's mounting bracket bolted to the engine block.) When tested in this manner, the fuel pump runs fine.



SOLUTION #1 DOES THE TRICK— AND WE'RE UNDER WAY AGAIN

Since the fuel pump is now ruled out as the problem, glow plugs failure is assumed. Incredibly enough, I have a spare solenoid on board, and replacing the old one with the spare does the trick. It takes about a half-hour to unbolt the existing unit, remove wires, and hook up the new part.

Preheat solenoid mounted on the back of the M3-20B, next to reset button. Wires are labeled with tags. This shot looks towards the bow; the solenoid faces aft.

SOLUTION #2-- AN ALTERNATIVE, TEMPORARY FIX

I learn later at my Westerbeke/Universal parts supply outlet (Gallery Marine in Seattle) that it's possible, in a pinch, to jump the solenoid in order to get a start. With power off, a length of heavy wire (solid 8 or 10 gauge wire is easiest, not the stranded type shown here) is run from one large terminal to the other. Turning on the power "jumps" current directly from the battery to the glow plugs: the solenoid switch function is bypassed.



SOLUTION #3—INSTALL A NEW FUEL PUMP

It could very well have been that the fuel pump was a goner: it can happen. If the pump fails its test, replacing it is simple enough—as long as one has a spare on hand.



Category:

Manufacturer: Universal

Part Number: 301385

Description:

Fuel Lift Pump, 12Volt DC, Cylindrical, 6-8 PSI

CONSIDERING WHICH SPARE PARTS TO BRING ALONG

What about carrying a spare solenoid and a spare fuel pump?

Preheat solenoids sold by Westerbeke (the manufacturer of Universal engines) may be of somewhat inconsistent quality. A few years back, I replaced two of them in quick succession when the first only partly solved the problem. In any case, at \$37 apiece it's probably worth carrying at least one solenoid as a spare, especially on longer trips—along with some heavy wire in case a jumper wire is needed.

SHOPPING FOR SOLENOIDS

Some of these LOOK the same as the \$37 Westerbeke/Universal solenoid—would they work?



Tru-Tech SS588T Starter Solenoid

★★★★☆ (3)

\$11.99



Motorcraft SW3 Starter Solenoid Relay

★★★★☆ (5)

\$25.02 \$20.49



Tru-Tech SS581T Starter Solenoid

\$11.75



Victory Lap F496 Starter Solenoid for...

★★★★☆ (1)

\$42.95 \$10.67



Ford 12 Volt SW3 Starter Solenoid Relay
Crank-n-Charge

★★★★☆ (2)

\$17.49

It's worth finding out if a less expensive part is available from somewhere other than Westerbeke. However, shopping for these parts is challenging because finding specifications for originals or replacements is difficult. Amazon.com has several solenoids (above) that appear identical to the Westerbeke parts, but how does one know if they would work with marine

diesel engine glow plugs? Ford makes an identical-looking solenoid for its trucks that may work. At \$10-14, these alternatives cost a fraction of the Universal engine manufacturer's price.

SHOPPING FOR FUEL PUMPS



For around \$100 is it worth carrying a spare fuel pump—just in case?

The Facet electronic fuel pump (476459N) is a standard electric pump used for automotive as well as marine purposes. Westerbeke charges \$237 for this pump. (Their model number for this Facet pump runs according to their in-house part numbering system.) A bit of Internet shopping shows the same model available from \$85 and up from a variety of mostly automotive sources—it's the same pump!

(By the way, if you ever try to remove and clean the filter inside this pump, be careful when unscrewing the bottom. The several spring-loaded parts are aimed right at the bilge, which is where they can easily end up complicating reassembly—If you can find all the parts! Removing the pump for table-top servicing is worth considering.)

While there are a number of websites which advertise parts for Universal engines, Toad Marine, the online branch of Torrensen Marine, is one that carries a substantial inventory of parts specifically for the Universal M3-20B:

http://shop.toadmarinesupply.com/marine_diesel_direct/Universal/index.php?p=include&contentsection=universal&contentname=engine&engine=M320B

Toad Marine also lists plenty of parts for a variety of engines by other manufacturers:

http://shop.toadmarinesupply.com/ships_store/?p=categorydetails1&defaultbrand=Ships+Store&defaultstore=Ships+Store§ionid=3075&name=Engine+Parts+%26+Accessories&parentid=2512

PRINTED RESOURCES

The Universal M3-20B diesel is one of the common replacements for the original gas powered Universal Atomic 4 engines that came as standard equipment with the Alberg-30 sailboats. Though many Atomic 4s continue to push Alberg's up and down the seaways, some owners have switched over to diesel at end of the gas engines' lifetimes.

Two useful diesel maintenance and troubleshooting guides to have on board are:

Peter Compton's Troubleshooting Marine Diesels
and

Nigel Calder's Boatowner's Mechanical & Electrical Manual: How to Maintain, Repair, and Improve Your Boat's Essential Systems.

