

Analog Tachometer Replacement with Tiny Tach



Late in 2012, the VDO OTA tachometer on *My Cyn* stopped working.

The auxiliary engine on the boat is a Volvo Penta MD11C, a 2-cylinder diesel.

I confirmed the magnetic pickup (proximity) sender (reading gear teeth on the hand starter gear set) was producing proper signal (0.6 AC Volts at idle, increasing with increased RPMs) using a multi-meter.

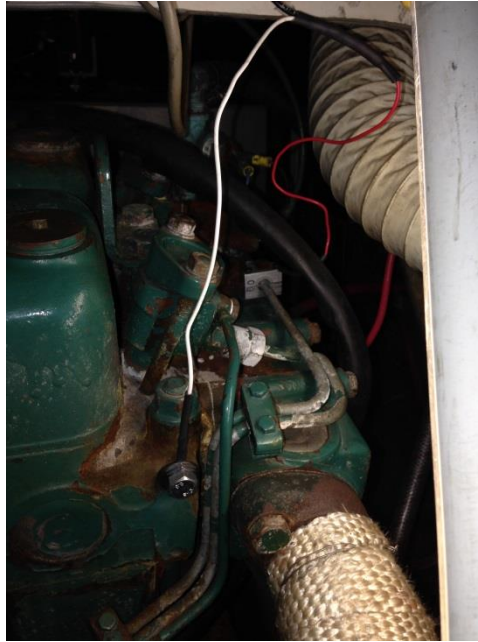
An extensive on-line search showed that the existing gage was now obsolete and a drop-in replacement was not available. A significant amount of time was spent trying to locate a vendor who could repair the gage. No one stated direct experience with this tachometer, and the price quoted was several hundred dollars.

Replacement gages for diesel engines were available from various manufacturers, but only for 4, 6, or 8 cylinder engines. I learned that finding a tachometer for a 2-cylinder diesel was the hard part. I thought that Teleflex Marine part number 82303P was going to work. I purchased the instrument and installed it only to find out that it did not work on any of the gear tooth number settings. A call to V3 Instruments, who distribute Teleflex gages, yielded that the gage needed a 6.0 volt signal. This meant that I would have to replace the magnetic pickup. Considering the cost of this, plus the problems of finding a proximity switch with threads to match the existing made me rethink my course.

While researching tachometers on-line, one product that continued to pop up was the digital Tiny Tach made by Design Technology, Inc. based in Westmont, Illinois. It uses a piezoelectric crystal as a transducer to sense the pressure pulse in a fuel line. The price of a Tiny Tach was approximately \$100, and according to the manufacturer, it would work with a 2-cylinder diesel. A model was available to fit the 6mm fuel line on the MD11C. One downside is that the lighted digital display for the Tiny Tach is listed as water resistant, not water-proof. Installing it in the cockpit would take some extra attention. I planned on mounting it where the current tachometer gage was located.

There seemed to be only one location to mount the transducer on the MD11C: on the span of fuel line between the two cylinders. One concern was whether the transducer could fit, as the line is fairly close to the engine block. It turns out that there is plenty of room. The dimensions of the transducer are .188" thick, .750" tall, and 1.000" wide.





Mounting and wiring the transducer was very straight forward by following the instructions included in the packaging. A few minutes with some emery cloth and a small wire brush had the fuel line down to bare metal. The smaller diameter red wire in the picture above is the signal wire. The white wire in the foreground is the ground for the transducer. I used one of the threaded holes in the engine block. The threads are M8 x 1.25. The 12 mm long bolt I used was too long as it bottomed out in the hole before the underside of the head made contact. I had to use a couple of washers under the head to remedy this. Also, consider chasing the internal screw threads on the block with a tap beforehand. That's one of the tools I did not think to bring to the boat!

The lighted digital display for the Tiny Tach needs a 12 vDC supply and a ground. I simply used the connections that powered the original analog gage. The Tiny Tach functioned wonderfully!

The next challenge was to mount the lighted digital display. The hole in the instrument panel is $\varnothing 3.150''$. The aluminum panel is 0.100'' thick. The face of the original gage was $\varnothing 3.300''$.

I had TAP Plastics Inc. make a disc from 3/16'' thick clear plastic $\varnothing 3.75''$ and drill (2) $\varnothing 3/16''$ holes spaced 2 1/2'' apart to match the hole pattern of the Tiny Tach. The holes had 1/32'' chamfers on one end. (More on this later.) TAP Plastic charged me \$15 for the part, a bit steep considering how simple the part was, but fabricating on my own was one of those things that was tough to fit into a busy schedule.

I bought two nylon bushings at the local hardware store that were $\varnothing 3/8''$ OD and $\varnothing 3/16''$ ID. I cut these down to approximately 9/16'' long and used these as spacers between the Tiny Tach display and the clear plastic. The mounting flange of the digital display is thinner than the body of the device, creating a shoulder feature, hence the need for the spacers.

I used 2'' long #8-32 pan head screws with butyl tape under the head to make this joint water tight. The 1/32'' chamfers on the holes helped ensure a nice amount of butyl tape was in place under the screw

heads. I used Nylok nuts and washers to hold the Tiny Tach to the plastic disc. You will need a deep drive socket to tighten these nuts. That was the second tool I forgot to bring to the boat!

I used the existing sheet metal bracket to pull the plastic disc against the instrument panel. This required shortening the two legs with a hack saw as well as slotting the existing holes (spaced at 70mm) with a small round hand file to match the 2 ½" spacing on the new screws.



I used butyl tape to seal the plastic disc to the instrument panel to make a water-tight seal and used two more Nylok nuts to snug up. Now the digital display is out of the elements yet can be easily read from behind the wheel.



The next page shows an exploded diagram of the assembly of the digital display.

