



1. HARDIN'S PROGRAMMABLE FUEL SENDERS

HARDIN's new microcontroller-based senders. These senders have aluminum tubing and are for diesel or gasoline of up to 10% ethanol.

2. HOW THE SENDERS MEASURE LIQUID LEVEL

HARDIN's senders work by measuring capacitance without moving parts. Electronics in the head convert this measured capacitance to the programmed output of ohms or volts. In fuel senders, capacitance is measured between the inner sensing tube and the grounded outer tube, and the fluid must be non-conductive. In water senders, capacitance is measured between the inner insulated sense wire and the water, with the water being grounded by a wire wrapped around the outer tube.

3. SHORTENING FUEL SENDER (if required)

A fuel sender's outer tube can be shortened using a tubing cutter, and the inner tube snipped.

4. SHORTENING WATER SENDER (if required)

Shortening a water sender requires the following steps: 1) unwind the outer ground wire; 2) pull the PVC tube from its friction fit on the head, to expose the white sense wire; 3) use a heat gun to soften and pull the black sealing piece from the white wire; 4) shorten both wires and the tube; 5) put the black sealing piece back on the shortened white wire and heat it to get a good seal again (**important!**); 6) put the outer tube back on and rewrap the outer ground wire.

5. CONNECTIONS

NEG: Connect this to DC ground. NOTE: our senders only work with *negative-ground* systems.

SEND: Connect this to the Send input of your gauge or display. NOTE: this is an electronic output which will confuse your ohmmeter if you try to take a resistance reading. Instead we troubleshoot by voltages, while connected to the gauge.

POS (most senders): Most HARDIN senders have an ignition-voltage POS terminal to run their electronics. A fused voltage between 11-28vdc should be wired to the POS connection. The voltage should turn off when the system is turned off, both for safety and to avoid running down the battery. For a number of brands of E240/F33 ohm gauge (not all), we can make a special sender that doesn't have this POS connection. These senders run their electronics from voltage on the Send connection.

6. CALIBRATION

The output range (eg E240/F33 ohms) is set at the factory per the customer's order. They cannot be changed by the end user.

IF YOU DID NOT NEED TO SHORTEN THE SENDER, THE FACTORY EMPTY AND FULL SETTINGS WILL BE CORRECT!

ONLY if you shorten, calibrate per the steps below, and don't calibrate fuel senders in water.

A. AUTOCAL for senders with an AutoCal stamp on the head

EMPTY: After shortening the sender, connect the empty sender to the system wiring, and turn on the power. The gauge needle should bounce between Empty and Full a couple of times and return to Empty as the sender discovers its shorter length.

FULL: Turn **OFF** the power and install the sender into a full tank of the appropriate liquid. Turn **ON** the power. The reading should go above Full and then finish on Full. This Autocal Full will use Full Detection at each fillup.

Email: Jeff@hardin-marine.com for advice promptly if you have trouble—DO NOT SPEND HOURS ON IT.