



1. CENTROID'S PROGRAMMABLE FUEL AND WATER SENDERS

Centroid's new microcontroller-based senders can be distinguished from our older analog style by a "P" in the part number : ie CGFP or CGWP. Senders with aluminum tubing are for oil, diesel, or gasoline of up to 10% ethanol; and senders with PVC tubing are for potable water. We don't make units for non-potable water, which leaves conductive deposits on the sense wire.

2. HOW THE SENDERS MEASURE LIQUID LEVEL

Centroid's senders work by measuring capacitance. This means no moving parts are required. 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 requires the fluid to be non-conductive. In water senders, capacitance is measured between the inner insulated sense wire and the water, which is grounded by the outer wire.

3. SHORTENING SENDERS (if required)

A fuel sender's outer tube can be shortened using a tubing cutter, and the inner tube snipped. Unless the sender was ordered as bendable, bending the tubing risks shorting the inner to outer tube, which causes a false Empty reading. A sender ordered as bendable can be safely bent above the black bend line on the tubing because it is insulated internally above that line.

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 off the black sealing piece at the end of 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 on the outer tube and rewrap the outer ground wire.

4. CONNECTIONS

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

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 Centroid 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 240/33 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.

ALARM (if ordered): The ALARM output switches to ground when the sender is in a factory-programmed alarm state, meaning a low or high level. A DC load which requires 0.3A or less can be connected to this output, with the far side of the load connected to battery voltage. Typically the load is an alarm light. During an alarm, If the ALARM output is momentarily shorted to NEG by a pushbutton switch, the alarm will turn off until a new alarm condition occurs. This is convenient for audible alarms.

5. CALIBRATION

A. OUTPUT RANGE AND ALARM LEVELS ARE NOT CHANGEABLE BY THE CUSTOMER

The output range (eg 240/33 ohms) and alarm levels (if ordered) are set at the factory per the customer's order. They cannot be changed by the end user. They can be changed back at the factory if needed, however.

B. EMPTY LEVEL ON SENDERS WITH THREE OR FOUR SCREW TERMINALS

The Empty level will already be calibrated to be the bottom of the sender if you use the sender at its factory length. If you've shortened the sender, the Empty should be recalibrated with the following steps. The timing is important. 1) have the sender out of tank and wired normally, but power off; 2) have SEND temporarily jumpered to NEG; 3) turn the power on, but remove the SEND/NEG jumper after TWO SECONDS (1000-1, 1000-2). The needle will then do some bouncing and finish on Empty. If it finishes somewhere other than E or lower, there is a wiring problem or mismatched output range. Please email/fax for help.

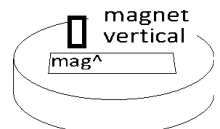
C. FULL LEVEL ON SENDERS WITH THREE OR FOUR SCREW TERMINALS

For fuel senders with "-FD" in the part number, the Full level is automatically detected by a special sensor each time you fill the tank. So the Full level does not have to be set manually. If you'd prefer to set it manually, follow the underlined steps in the previous paragraph, using the appropriate fuel rather than water. The automatic mode helps the sender respond correctly to gasoline with ethanol or biodiesel, however.

Full will be calibrated at the factory a couple inches below the sender's head. If you've shortened the sender, or prefer a different Full height, the Full can be recalibrated with the following steps: 1) have sender in full tank (or tube) of the appropriate liquid, and wired normally, but power off; 2) have SEND temporarily jumpered to NEG; 3) turn the power on, but remove the SEND/NEG jumper after FIVE SECONDS (1000-1, 1000-2, 1000-3, 1000-4, 1000-5). The needle will then do some bouncing and finish on Full. If it finishes somewhere other than F or higher, there is a wiring problem or mismatched output range.

D. SENDERS WITH TWO SCREW TERMINALS, AND SENDERS WITH WIRES OR CONNECTORS

A rare-earth **magnet** (provided with the sender, or use Radio Shack 64-1895) is used to set Empty and/or Full on senders with two terminals, or with wires or connectors. The word MAG with an arrow should be found on the label. Instead of shorting terminals in steps 5B and 5C, place the magnet *vertically* on the surface of the epoxy, above the MAG arrow, for the seconds listed. That will internally cause the desired short.



6. HELP

We provide free tech support, but by email or fax only. You'll always get an answer the same working day, and usually within an hour.