



CENTROID
PRODUCTS

CENTROID PRODUCTS, INC.
WARRANTY DOCUMENT 2/1/14

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ORDERS ONLY: 386-423-3574 TECH SUPPORT: help@centroidproducts.com or fax: 386-423-3709 website: centroidproducts.com

Accepted by (signed): _____ (print) _____ position: _____
company _____ date _____

Centroid Products, Inc. (hereinafter Centroid) warrants for **two years from the date of purchase** the products it manufactures only and solely as set forth in this Warranty document. If a Centroid product is defectively-manufactured, Centroid will repair or replace the defectively-manufactured product if a warranty claim is presented, as required by this Warranty document, during the two year warranty period. Centroid will determine in its sole discretion whether the product is repaired or replaced. If Centroid determines that the product will be repaired, Centroid will repair the product at Centroid's cost at Centroid's facility or another facility selected by Centroid. In its sole discretion, Centroid may have the product repaired by a third party selected by Centroid. If Centroid in its sole discretion determines that the product will be replaced, Centroid in its sole discretion will replace the product with the same or similar Centroid product, and there will be no charge for the replacement product. **This Warranty does not cover and Centroid will not pay the cost of labor, materials or any other expense incurred in the installation, incorporation or connection of the replacement product.**

This Warranty does not cover consequential damages of any type or kind, including but not limited to property damages, bodily injury or wrongful death and such damages, and the remedies therefore, hereby expressly are excluded from this Warranty. This Warranty only protects the original purchaser of the Centroid product and no other.

THE WARRANTY PROVIDED BY CENTROID IN THIS WARRANTY DOCUMENT IS THE SOLE AND EXCLUSIVE WARRANTY GIVEN BY CENTROID FOR ITS PRODUCTS. ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, HEREBY ARE EXCLUDED.

This Warranty does not cover any product that has been modified after its purchase, or has been installed, incorporated or connected improperly or contrary to Centroid's written instructions to other devices, equipment, machinery or other tangible property. This Warranty does not cover any product that has been misused, abused or damaged in its shipment to, delivery to or use by the purchaser or another. This Warranty does not cover any product used in any way other than how the product is designed to be used or any product that is damaged or rendered defective as a result of the condition, operation or maintenance of any other device, equipment, machinery or other tangible property with which the product is used.

A warranty claim must be made within thirty days of the discovery that the Centroid product is defective, and time is of the essence in connection with the timing of the claim. A warranty claim must be in writing, must include the product's serial number, the purchaser's name and contact information, must describe with reasonable particularity the defect in the product and must be delivered along with the defective product within the thirty days to Centroid Products, Inc., 2104 Hibiscus Drive, Edgewater, Florida 32141. Any defective product that is repaired by Centroid or its designee shall be warranted for the greater of the time remaining on the initial two year warranty for the original product or ninety days from the date the repaired product is delivered to the purchaser.

This Warranty shall be interpreted **according to Florida law**. In the event of any litigation over or connected with this Warranty, Centroid, the purchaser and any other party who claims entitlement to warranty coverage from Centroid waives trial by jury, including but not limited to an advisory jury, and agrees that the litigation shall be resolved by the Court in a non-jury trial. Jurisdiction and venue for litigation over or connected with this Warranty shall be exclusively and only either the State Circuit Court for Volusia County, Florida, or the United States Federal District Court for the Middle District of Florida, Orlando Division.

REFERENCE: known limitations of capacitance-based senders

FUEL SENDERS:

Conductivity: Centroid's fuel senders (CGFP-..., CGOP-...) require the fluid being measured to be **non-conductive**. The conductivity of E10, which is gasoline with up to 10% ethanol, is sufficiently small to be acceptable unless the alcohol falls out of solution (phase separation). E85 (85% ethanol) conducts too well for our fuel senders to work with it.

Diesel fuel, which is otherwise non-conductive, can produce conductive coatings inside the sender when the diesel is contaminated by microorganisms which grow in diesel tanks. The contaminated tank might be either the tank being measured or the source tank. When the conductivity is small, the sender readings will be high and unsteady, or pegged. When the conductivity is bigger, the sender reading will be Empty. This conductivity problem is checked for by measuring the voltage between the inner tube of the sender and ground. The fixes are to dry out the sender's tubing and to treat the infected diesel tank(s) with Biobor, Algae-X, or similar biocide.

Dielectric: the capacitance we measure is proportional to both the liquid's height and the *dielectric constant* of the liquid being measured. Gasoline without ethanol has a nominal capacitance of 1.27 picofarads of capacitance per inch with our 1/2 inch tubing. But gasoline with 10% ethanol has twice that capacitance, and the percent ethanol in the United States can be anywhere between 0-10%, ignoring E85. To correct for this variability, in gasoline applications we use a scheme we call Full Detection where the sender detects a fillup and rescales the calibration if the reading would otherwise be something other than Full due to the percentage ethanol. Diesel doesn't contain ethanol and we normally don't turn on Full Detection for diesel, though we can. For a Full Detection to occur the sender must be filled to within several inches of the top with power off. The Full Detection then occurs at powerup.

A liquid's dielectric is affected by the composition of the liquid being measured. Because we don't have control over the dielectric constant of the liquids we measure, we never specify an accuracy figure for measurements with actual fuel. Instead, we calibrate and test senders using capacitors equal to the nominal capacitance of diesel in a diesel application, or the nominal capacitance of E10 (plus turn on Full Detection) in a gasoline application. We've been selling senders successfully for about 25 years, even before we had Full Detection, so historically people have gotten the accuracy they needed without us being able to *promise* a particular accuracy.

WATER SENDERS:

Potable water: our water senders (CGWP-...) are for potable water. The water needs to conduct electricity like tap water does-- ie "water maker" water may not conduct well enough. Non-potable water such as saltwater or rusty water or water with additives or graywater/blackwater may leave a conductive coating on the sense wire of our water sender and thus keep the reading from being able to drop as the liquid level drops. Our warranty in water applications only applies for use in potable water.

GENERAL:

Wiring: Centroid senders with 3 or 4 electrical connections have an ignition voltage connection labeled "POS" to run the sender's electronics. If ignition voltage is accidentally wired to (or touched to) the Send output, or in the case of a sender with an Alarm output, to the Alarm output, it can cause a high current to flow in that output and damage the transistor at that output. The symptom of this miswire is low resistance between the output and ground with power off and unwired (usually below 10 ohms but not 0 ohms) and often there is cracked epoxy above the transistor in question due to overheating. We consider these symptoms (low ohms and/or cracked epoxy) to be "apparent customer damage" when checking a sender for warranty.

YOUR APPLICATION: for advice about your application, email Joel Bahner at joel@centroidproducts.com, and I'll tell you what our experience has been with it. When there's a problem, I've found it most effective for me to write a short procedure to allow someone in the field to make measurements for me while the symptom is actually occurring. Senders with no moving parts should not go bad, so contact us early rather than just buying replacements.