



INSTRUCTION MANUAL

Digivac Model 501

Fuel Filter Alert

Revision 0.0.4

YOU MUST READ THIS MANUAL BEFORE USE



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1.0 DESCRIPTION AND PRINCIPLE OF OPERATION.

The DigiVac Model 501 Fuel Filter Alert System is a very simple revolutionary breakthrough approach to avoiding engine failure due to clogged fuel filters. This system notifies the operator of a clogged fuel filter. It uses a waterproof robust sensor mounted directly on the fuel filter, as well as a waterproof clear character display, descriptive lights, and a loud alarm at the helm so the operator can be sure what the system is indicating.

One of the worst fears of any boater is losing an engine during inclement weather, especially when making landfall in adverse conditions. Any engine failure could mean the loss of the boat and personal danger. This system is one way to avoid the common causes of engine failure by monitoring fuel filter health. It greatly improves safety of passengers and other motorists.

The DigiVac Model 501 Fuel Filter Alert System enables the operator to have additional key input to the engine's health, and allows the operator to focus on other critical safety factors. It mitigates the fear that the next rough sea could kick up enough muck to stop the boat in a crowded waterway.

The device continuously monitors differential pressure in the fuel filter to raise an alarm for a pending starvation of fuel flow to the engine. When the alarm sounds the potential for loss of fuel flow into the engine is critical, and action must be taken to prevent the involuntary shutdown of the engine.

Why use the DigiVac Model 501 Fuel Filter Alert System? The answer is simple: SAFETY.

- ⤴ This system increases operating safety margins by giving more time to make better decisions about the vessel.
- ⤴ Clogged fuel filters are responsible for entirely too many engine failures, and they are now avoidable with DigiVac Model 501 Fuel Filter Alert System.
- ⤴ With information that engines are about to fail, action can be taken to avoid a dangerous engine failure in a crowded seaway during deteriorating weather.
- ⤴ The sensor combined with the visual feedback presented by the display allows the operator to see gradual degradation of the filter and thus leaves plenty of time for corrective maintenance.

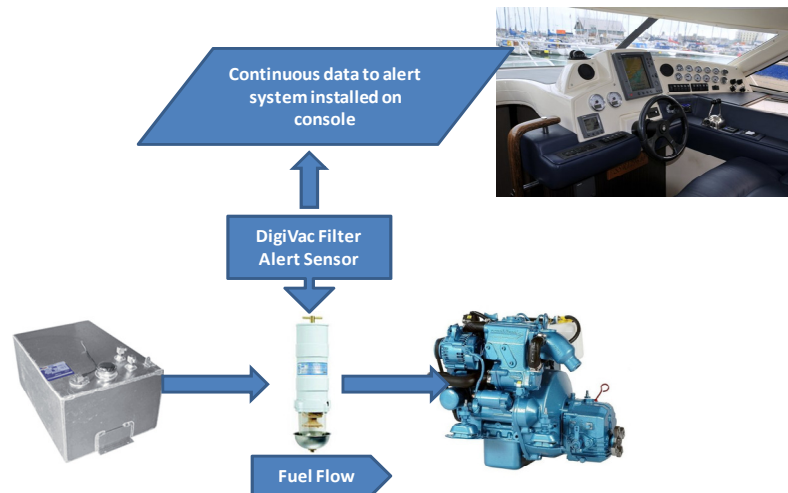
The DigiVac Model 501 Fuel Filter Alert System includes:

- 1) A straightforward vacuum instrument designed to detect fuel filter degradation and alert the operator so action can be taken before loss of power.
- 2) Audible and Visual Alarm to Alert the operator that there is a problem before the filters reach their failure point in order to help avoid costly repairs and potential injury to passengers.

Features	Benefits
Stainless Steel hermetically sealed double walled electronic sensor designed for the marine industry	Maintains the required air free fuel environment necessary with redundancy while providing precise vacuum levels
Bright Blue Display	Displays vacuum levels for filter in wheel house
Progressive visual indicator bar	Visually informs operator know in a quick glance if filters are good, getting dirty or may cause an engine failure (alarm).
Audible Alarm	Loud Alarm to alert operator when Filter becomes seriously degraded
12VDC or 24VDC operation	Power conditioning circuitry to insure smooth and reliable operation in a variety of environments
Reverse polarity protected	Insures robust protection of instrument
No complex bulky connectors	The devices are designed with the use of industry standard butt splice
Compact Design	Easily fits in available console space.

How does the The DigiVac Model 501 Fuel Filter Alert System Work?

The DigiVac Fuel Filter Alert System works on the principal of maintaining fuel flow. In a healthy fuel system, the engine low pressure pump will pull fuel from the tank through a filter. As the filter does its job and collects contaminants, the flow is reduced. As the flow is reduced, the lift pump has to work harder to pull fuel to the engine. There is a point where the filter is too clogged to support the flow necessary for proper engine function. When there is not enough fuel flow, the engine stops. Unfortunately, a filter is very likely to clog more rapidly in precisely the kind of situation when a reliable running engine is needed most. When rough seas toss a boat, they also mix up the contents of the fuel tank, and more contaminants are likely to find their way to the fuel filter.



The DigiVac Model 501 Fuel Filter Alert System not only gives a remote indication, but also shows a trend of a filter getting clogged. Before the model 501, an operator would have to choose a filter replacement interval that would keep the engine running, and frequently visually inspect the engine and filter for debris in the fuel bowls as an indication that the filters may be marginal. The Fuel alert allows the operator to constantly monitor the filter status while at the helm, and while the engines are powering.

2.0 CONSTRUCTION.

The instrument is housed in a free-standing plastic enclosure. It is intended to be flush mounted on the system console in a standard round 2 inch - 52mm hole. The sensor is a Stainless Steel hermetically sealed double walled electronic sensor designed for the marine industry that maintains the required air free fuel environment necessary with redundancy while providing precise vacuum levels.

3.0 UNPACKING AND INSPECTION.

After the DIGIVAC is received, it should be carefully unpacked and inspected for damage during shipment and for completeness. The package should contain at a minimum the instrument, a sensor and an instruction manual. In the event of a loss during shipment, a claim should immediately be made to the common carrier or the postal service, as applicable. The DigiVac warranty pertains only to the instrument, and does not cover losses in shipping.

Each DigiVac Model 501 Fuel Filter Alert comes with:

1. A display device with:
 - a. "U" mounting bracket
 - b. wire pigtail
 - c. tinned wires, labeled "Batt (+), Batt (-), +5V, Sig, S-gnd, +H2O, -H2O
2. A stainless steel sensor
3. 10' Sensor cable with Sensor connector on one side, Tinned conductors on the other
4. Qty 5 Butt Splice connectors
5. This manual

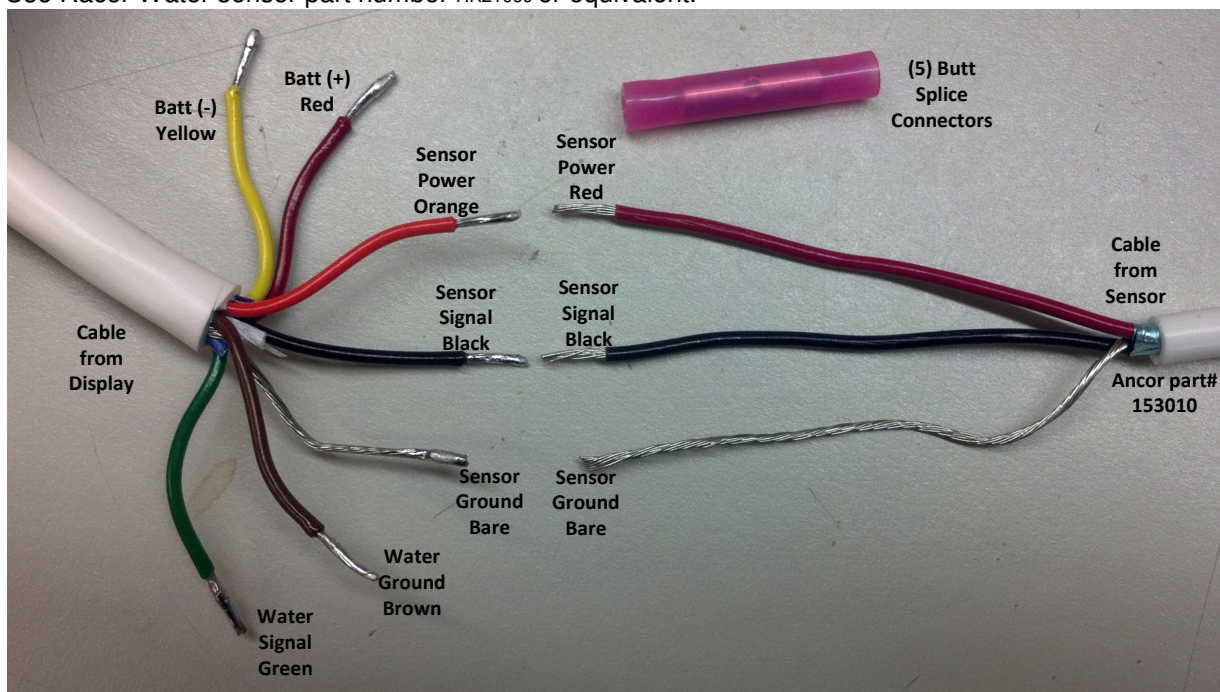
4.0 INSTALLATION.

The installation is fairly straight forward and can be performed by a marine electronics technician. Choose a mounting location for the display unit that will be visible to the operator when the vessel is under way. Make sure all of the cabling is securely fastened to insure a robust installation.

General Instructions:

- 1) Find a secure place on the dash that has room sufficient for wiring. Gauge placement should be in a place that can be easily seen and heard while underway.
- 2) Install Sensor
 - a) Sensors should be mounted vertically so the wire exits from the top and the threads are on the bottom. This will allow sensor to drain and not collect contaminants.
 - b) 1/4" NPT sensor can be installed inline anywhere between Secondary filter (Racor, Separ, etc..) and engine.
 - c) 1/4" NPT sensor can also be installed on a Racor manifold system
 - d) UNF sensor (has o – ring) can replace the "T" handle on a Racor 500, 900 or 1000 series filter.
- 3) Make mounting hole. This gauge fits in a standard 2 - 1/16" / 52mm hole
- 4) Run Wires
 - a) Run standard 18/20 gauge marine grade wire from an ignition key activated fused power source to device – red should be used for +12/+24VDC, and yellow should be used for Batt (-) / ground
 - b) Run wires for sensor using supplied wire, or standard 3 conductor 20 gauge marine grade wire Ancor part# 153010 or equivalent.
 - (1) 6 inch pig tails from display unit
 - (a) Red is Batt (+)
 - (b) Yellow is Batt (-)
 - (c) Orange is for Sensor Power
 - (d) Black is for Sensor Signal
 - (e) Bare is for Sensor Ground
 - (f) Green is for Water Sensor Signal
 - (g) Brown is for Water Sensor Ground
 - (2) White jacket 10' cable is for sensor, Ancor part# 153010
 - (a) Orange from Display goes to red on the sensor cable
 - (b) Black from Display goes to black on sensor cable

- (c) Bare wire from Display goes to bare wire on sensor cable (will have black shrink tube)
- c) Run wires for Water Sensor (not necessary if option is not used)
 - i) Standard marine wiring to the engine room is appropriate. Maximum current on these lines is 2 microamps.
 - ii) Use Racor Water sensor part number RK21069 or equivalent.



- 5) Connect Wires with supplied butt splice connectors or other marine grade connection
- 6) Power on the device (with the key switch) and note the Display splash screen with "DigiVac" painted across it

5.0 OPERATION.

After installation, the DigiVac Model 501 Fuel Filter Alert is ready for immediate operation. The unit should be on any time the engines are running to have maximum impact. Generally when the filter is reading below 7 inches of mercury on a large diesel engine, your filters are functioning satisfactorily. When the vacuum reading increases, this correlates to filters getting dirty. This is indicated on your display by increasing vacuum readings, and the yellow bar building from left to right. When the vacuum reading exceeds 10 inches of mercury for any sensor, a buzzer will sound and the message "Filter Dirty" will blink near the bottom of the screen. This is the indication that the filters should be changed to avoid engine failure. If water is present the buzzer will sound and the message "Water in Filter" will appear across the bottom of the screen. If both high suction and water is present, the buzzer will sound, and the messages "Filter Dirty" and "Water in Filter" will alternately flash.

6.0 SERVICING

There are no standard service intervals required for this device.

6.1 FACTORY REPAIR AND CALIBRATION.

The vacuum gauge assembly is designed to provide years of trouble-free service, and the liberal internal use of plug-in components make it easily repairable. No field servicing of the unit is recommended. Factory servicing and calibration are available at a nominal cost and turn-around times of 24 hours are typical.

6.2 FIELD CALIBRATION.

Each Digivac vacuum gauge controller is calibrated to the particular vacuum sensor that is shipped with the unit. If a sensor or display is suspected for accuracy, please send the device back to DigiVac for a recalibration.

7.0 NOTES ON CALIBRATION.

The DigiVac device is calibrated under real vacuum using direct pressure standards traceable back to NIST.

8.0 UNDERSTANDING PRESSURE

Recall that the pressure of the atmosphere is 14.696 or approximately 14.7 pounds per square inch at sea level. This pressure is due to the weight of all of the air in the earth's atmosphere above any particular square inch. This 14.696 psi is equivalent to the pressure produced by a mercury column of approximately 29.92 inches high or .76 meters (about 3/4 of a yard) or 760 millimeters of mercury. Atmospheric pressure varies greatly with altitude. It decreases approximately 1 inch of mercury per thousand feet of altitude. It also varies widely with local weather conditions. (Variations of one half inch in a single day are common.) The word vacuum means pressure lower than atmospheric or "suction," but, in describing negative pressure, the atmosphere is only a satisfactory reference if we are dealing with values of vacuum down to about 27 inches of mercury. Below that, it is much more useful to talk in terms of absolute pressure, starting from absolute zero.

The DigiVac model 501 Fuel Filter Alert measures the pressure inside the filter in gauge pressure, or differential pressure from Atmosphere. This is a useful measure because the important measure is how hard the engine lift pump has to pull relative to the ambient air pressure.

9.0 ACCESSORIES AND MODIFICATIONS.

The following are offered as alternative equipment or field-installed modifications:

- Inclusion of a Racor Water Sensor RK21069 or equivalent to enable filter water detection feature
- For additional feature sets, consider the DigiVac Model 500
 - Has bright red, yellow and green progressive LEDs
 - Can monitor 1, 2 or 3 sensors with descriptive labels
 - Can have multiple displays or a set of sensors
 - Has optional 2 Amp relay output to drive additional alarms or allow integration with other systems
 - Water proof to IP65

10.0 ATTACHMENTS AND ILLUSTRATIONS.



Below are the Specifications of the system:

Range: 0-20

Units: inches of Hg

Accuracy: +/- 1.5% of FS

Vac Interface: 9/16" -18 UNF or 1/4" NPT

Sensor: DigiVac Sen-501

Sensor Cable Length: 10 feet

Display: Graphical OLED 0.96" x 0.53"

Dimensions: 2 1/16" round x 1.61"

Power: 12-24VDC

Environmental: IP20

11.0 TERMS AND CONDITIONS

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