



INSTRUCTION MANUAL

Digivac Model 500

Fail-Safe Filter Alert

Revision 1.0.4.2

YOU MUST READ THIS MANUAL BEFORE USE

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1.0 DESCRIPTION AND PRINCIPLE OF OPERATION.

The DigiVac Model 500 Fail-Safe 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 500 Fail-Safe 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 500 Fail-Safe 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 500 Fail-Safe 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.

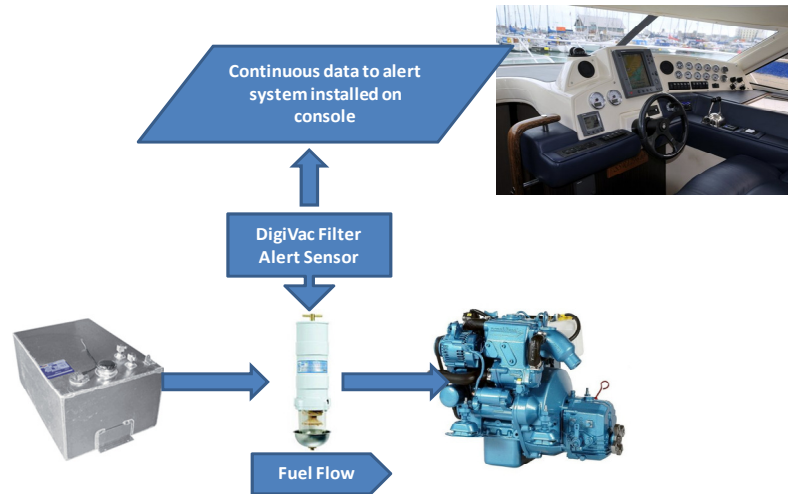
The DigiVac Model 500 Fail-Safe Filter Alert System includes:

- A straightforward vacuum instrument designed to detect fuel filter degradation and alert the operator so action can be taken before loss of power.
- 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 back-lit Display or Sunlight Readable Green Display	Displays vacuum levels for Sensor A , Sensor B and Sensor C in shaded or bright areas
Green, Yellow and Red progressive visual indicators	Visually informs operator know in a quick glance if filters are good (green), getting dirty (yellow) or may cause an engine failure (red).
Audible Alarm	Loud Alarm to alert operator when Filter becomes seriously degraded
Settable Critical Pressure	Allows user to set vacuum level that triggers alarm
12VDC or 24VDC operation	Power conditioning circuitry to insure smooth and reliable operation in a variety of environments
Triple Sensor operation	Allows the operator to Monitor 3 filters through two distinct sensors
Internally fused and reverse polarity protected	Insures robust protection of instrument
Buzzer silence	Enables the user to silence the buzzer while the indicator lights still indicate an obvious filter emergency
Alternate Display	Allows one set of sensors to be displayed at 2 different helm stations
Relay Contact	Optional 2 Amp contact closes upon alarm for integration in central alarm systems or additional lights or audible devices
No complex bulky connectors	The devices are designed with the use of industry standard weather-pack connectors to make field installation easy and marine grade
Compact Design	Easily fits in available console space and surface mount configuration only requires holes for mounting screws and wires. Flush-mount configuration is also available.

How does the The DigiVac Model 500 Fail-Safe Filter Alert System Work?

The DigiVac Fail-Safe 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 500 Fail-Safe Filter Alert System not only gives a remote indication, but also shows a trend of a filter getting clogged. Healthy systems show up as “all green”, marginal systems show up as “all yellow” and systems that are in danger of starving the engine are “in the red,” activating a loud auditory alarm. Before the model 500, 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 Fail-Safe 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 rugged free-standing plastic enclosure rated waterproof at IP67. It is intended to be surface mounted on the system console. 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 500 Fail-Safe Filter Alert comes with:

1. A display device with wire pigtails for options ordered
2. A stainless steel sensor
3. A set of male and female Weather Pack connectors to easily field customize installation
 - a. 2 position set for power, installed
 - b. 3 position weather pack connectors for pigtail, extension cable and sensor, installed
 - c. 3 position set of Weather Pack connectors for relay with 5' pigtail
 - d. Qty 2 sets of 4 position connectors for remote display units, installed
4. Cable
 - a. 15 feet of 2 conductor grounded cable (white) for each sensor ordered
 - b. 5 feet of 2 conductor cable for power, Weatherpack on one end, tinned on other
5. # 6 screws, #6 washers and nylon insert lock nuts, qty 2
6. This quick start guide. See the full manual at: <http://www.digivac.com/contents/manuals.html>
7. Drill template
8. Weather Pack sheet

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:

- Find a secure place on the dash that has room sufficient for wiring
- Install Sensor on the top of the filter by replacing the T handle with the sensor. Use Racor recommended torque instructions. Clearly label the sensor “A”, “B”, or “C”. For installations where there will be multiple displays, further label the sensors “Port” and “Starboard”.
- Verify that the filter or plumbing fittings that the sensor attaches to is grounded. For maximum noise immunity, it is important that the sensor housing is grounded.
- Make mounting and wire holes. Feel free to use the drill template that came with your unit.

NIFC Model 500 Wiring														
Inside of Display			Display Side Connector			Extension Cable				Sensor Side Connector				
Term #	Label	Description	Wire Color	WP sleeve	WP Shell	Wire Side Connector WP Shell	WP sleeve	Wire	Wire Side Connector WP sleeve	WP shell	Sensor Side Connector WP shell	WP sleeve		
X1-1	V+	+12/24V	Red	Male	Male - A	Female - A	Female	Red						
X1-2	GND	12/24V GND	Yellow	Male	Male - B	Female - B	Female	Yellow						
X1-3	NO	Relay Normally Open	Bare	Female	Male - A	Female - A	Male	Bare						
X1-4	COM	Relay Common	Red	Female	Male - B	Female - B	Male	Red						
X1-5	NC	Relay Normally Closed	Black	Female	Male - C	Female - C	Male	Black						
X1-6	A+	Sensor A +	Red	Female	Female - B	Male - B	Male	Red	Female	Female - B	Male - B	Male		
X1-7	A-	Sensor A -	Black	Female	Female - C	Male - C	Male	Black	Female	Female - C	Male - C	Male		
X1-8	AS	Sensor A Shield	Bare	Female	Female - A	Male - A	Male	Bare	Female	Female - A	Male - A	Male		
X1-9	B+	Sensor B+	Red	Female	Female - B	Male - B	Male	Red	Female	Female - B	Male - B	Male		
X2-1	B-	Sensor B-	Black	Female	Female - C	Male - C	Male	Black	Female	Female - C	Male - C	Male		
X2-2	BS	Sensor B Shield	Bare	Female	Female - A	Male - A	Male	Bare	Female	Female - A	Male - A	Male		
X2-3	C+	Sensor C+	Red	Female	Female - B	Male - B	Male	Red	Female	Female - B	Male - B	Male		
X2-4	C-	Sensor C-	Black	Female	Female - C	Male - C	Male	Black	Female	Female - C	Male - C	Male		
X2-5	CS	Sensor C Shield	Bare	Female	Female - A	Male - A	Male	Bare	Female	Female - A	Male - A	Male		
X2-6	TX	RS232 TX	Black	Male	Female - B	Male - B	Female	Black						
X2-7	RX	RS232 RX	Red	Male	Female - C	Male - C	Female	Red						
X2-8	SG	RS232 Signal Gnd	Bare	Male	Female - A	Male - A	Female	Bare						
				N/C	Female - D	Male - D	N/C							
X2-9	N/C	Not Connected	N/A											
For NIFC SLAVE UNIT, WIRE THIS WAY														
X2-6	TX	RS232 TX	Red	Male	Female - C	Male - C	Female	Red						
X2-7	RX	RS232 RX	Black	Male	Female - B	Male - B	Female	Black						
X2-8	SG	RS232 Signal Gnd	Bare	Male	Female - A	Male - A	Female	Bare						
				N/C	Female - D	Male - D	N/C							

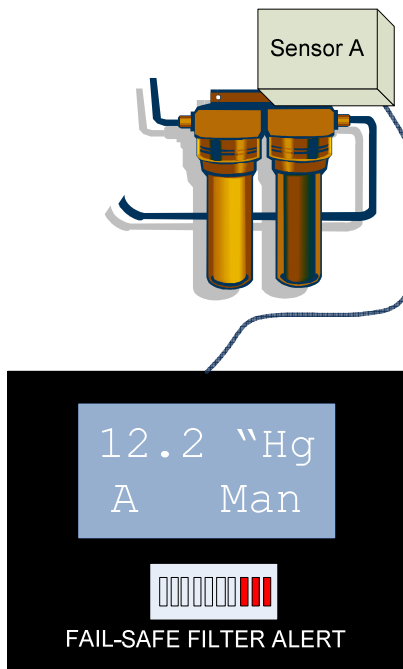
Revision T&R 3/5/2012

- Run Wires
 - Run standard 20 gauge marine grade wire from an ignition key activated fused power source to device – red should be used for +12/+24VDC, and black or yellow should be used for ground
 - Run wires for sensors using supplied wire, or standard shielded 2 conductor 18 gauge marine grade wire
- Connect Wires
 - Connect each sensor using the supplied Weather Pack connectors
 - Note all supplied wires will have one side of the cable run fully assembled, and the other will have weather pack terminals installed, but will leave the connector off to facilitate easier running of wires. Consult the Weather Pack quick start guide that came with your unit, or consult <http://www.weatherpackkits.com/how-to-assemble-weather-pack/> and <http://connectors2.delphi.com/dcsdmc/del/attachments/Assembly%20Instructions/WeatherPackAssemblyInstructions.pdf> To install Weather Pack seals and sleeves on wire, use Delphi/Packard part 12014254 crimping tool available from www.mouser.com or any number of electronic supply stores.
 - The red sensor wire should be connected to the red sensor wire on the desired sensor cable pigtail (A, B or C) coming from the display.

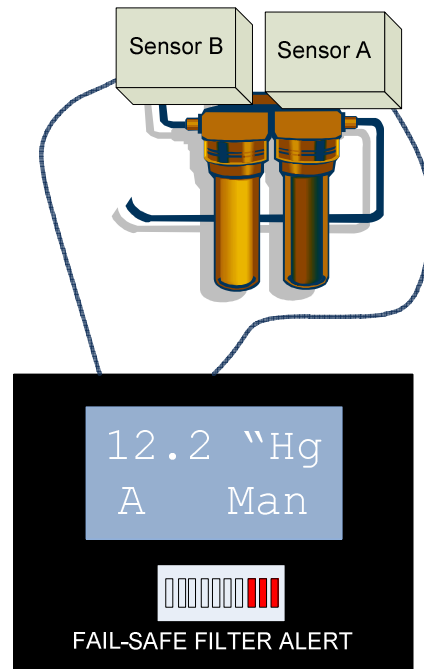
- The black sensor wire should be connected to the black sensor cable pigtail.
- The shield sensor wire should be connected to the shield cable pigtail.
- Connect the communication cable for the remote display if applicable.
 - The red wire of the display should be connected to the red wire of the remote display
 - The black wire of the display should be connected to the black wire of the remote display
 - The bare wire of the display should be connected to the bare wire of the remote display
- Connect the Relay wires.
 - Note the relay will trip if any one of the sensors alarm.
 - The relay is a type C contact rated for 50V at 1amp. Normally Open, Normally Closed and Relay common is brought out. Do not put more than rated current or voltage through the Relay.
- Connect the power wires
- Alternatively, the device can be disassembled and the installer can use the terminal blocks in the display unit itself to make the termination. The terminal blocks are labeled on the circuit board.
- Mount device in dash with supplied hardware (# 6 screws, #6 washers and nylon insert lock nuts, qty 2)
- Power on the device (with the key switch) and note the Display splash screen with “DigiVac” painted across it
- Hold the button down for 4 seconds, then release to toggle between displaying sensors A & B.

Possible configurations:

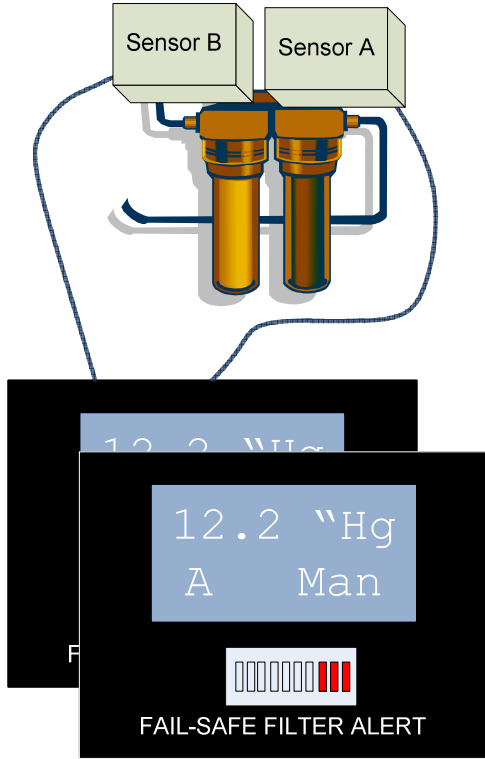
Single Sensor Installation
for Single Engine



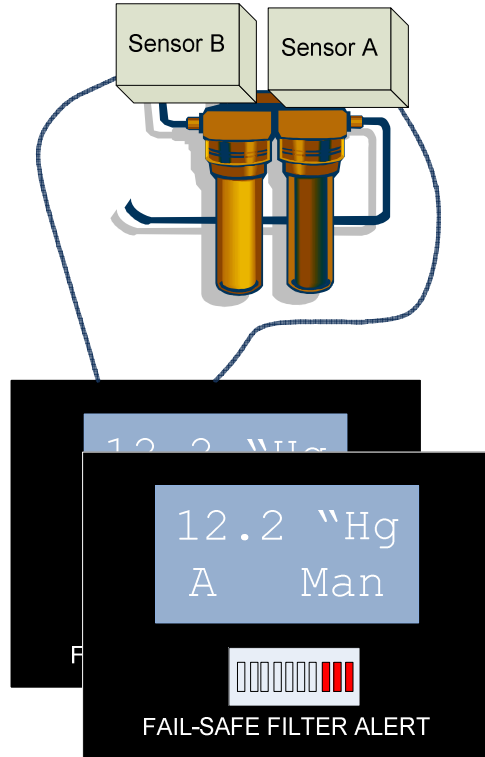
Dual Sensor Installation
for Single Engine



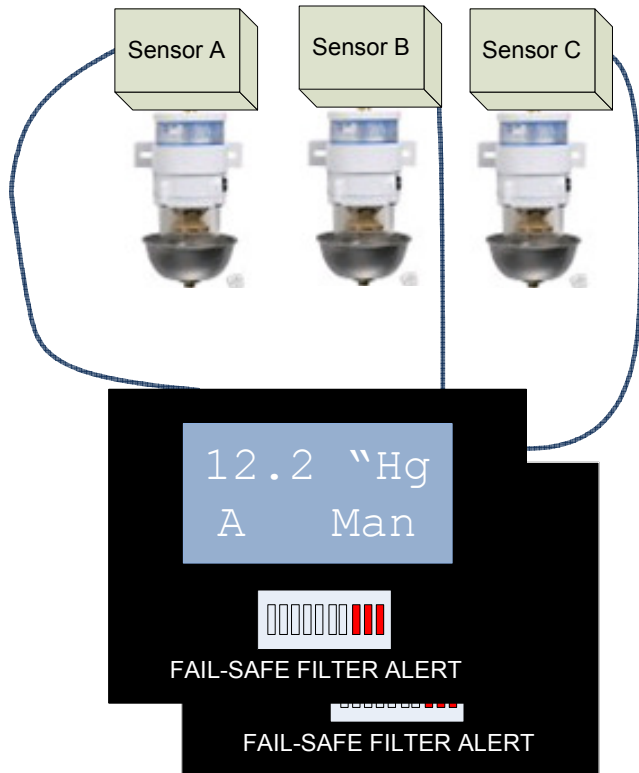
Dual Sensor Dual Display
Installation for Port Engine



Dual Sensor Dual Display
Installation for Starboard
Engine

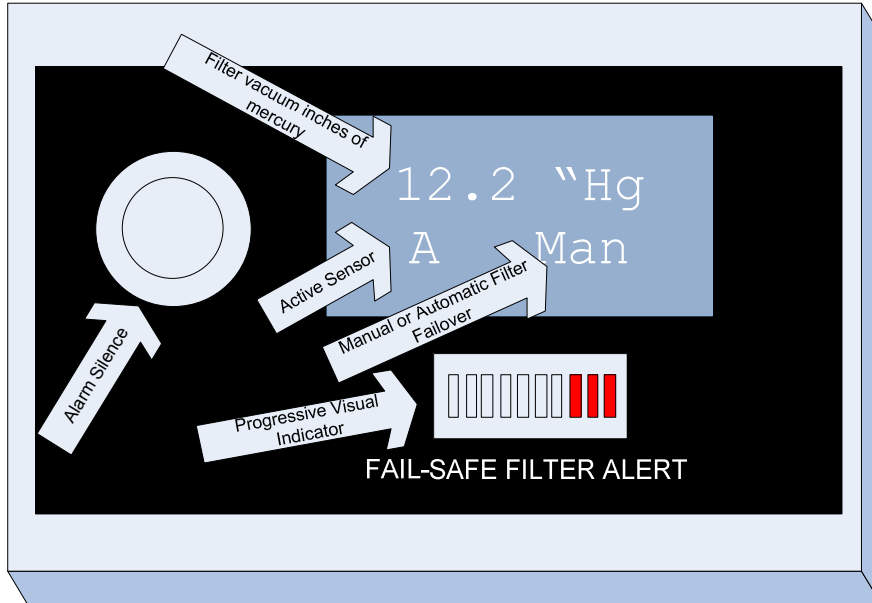


3 Sensor Dual Display
Installation for Multi Engine

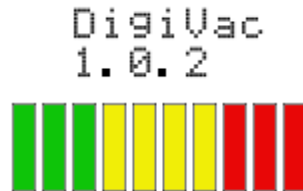


5.0 OPERATION.

After installation, the DigiVac Model 500 Fail-Safe 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 LEDs shifting from all green to all Red. When the vacuum reading exceeds 12 inches of mercury (or the customer defined critical level) for any sensor, a buzzer will sound and the relay will be activated. This is the indication that the filters should be changed to avoid engine failure.



On starting, the device displays its name and version information while the LED Bar strobes three times from Red to Green.

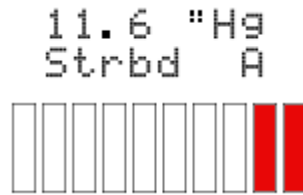


Once started, the device displays differential pressure, Current Sensor (for example "A" or "B") in alternation with its label / name.



A uniform, linear classification of differential pressure is indicated in the LED Bar -- from Green to Red.

When the differential pressure reaches a value greater than the critical figure (for example 11.5" Hg), the LED Bar is in the Red and the Alarm sounds. Hold the button briefly to silence the Alarm.



Display Brightness

Hold and release the button for one second to change the display brightness.

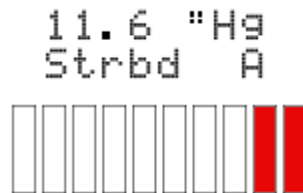
Manual Mode

In Manual Mode, the device only monitors the current sensor.

Change the current sensor by a four second button press (and release).

Automatic Mode

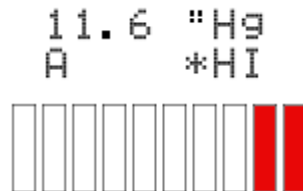
In Automatic Mode, the device rotates the monitoring of the configured set of sensors in a periodic sequence as displayed.



The automatic process is equivalent to changing sensors periodically in manual mode.

High Mark

The device records the maximum reading on each sensor. These figures are displayed on the detection of engine stop, and reset with each operating power cycle.

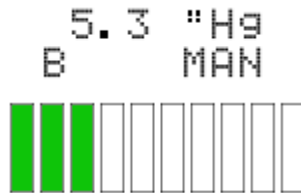


The detection of engine stop is defined as the measurement of a fuel pressure less than a third of the maximum recorded fuel pressure. That is, when the fuel pressure drops below a third of the maximum recorded pressure the NIFC device will display the maximum recorded pressure as shown in the example above.

Each configured sensor has a unique and independent high mark and engine stop process. It is possible that one sensor will display its high mark while another will not, due to the present state of measured and recorded pressures.

Change Sensors

Hold and then release the button for four seconds to change the current sensor. For example, from “A” to “B”.



In Slave Mode, the Wheelhouse unit will cause the Engine room unit to change sensors -- with no effect on the current operating mode (automatic or manual sensor selection).

Reboot

Hold and then release the button for eight seconds to restart the device.

In Slave Mode, the Wheelhouse unit initiates the Reboot Protocol for both units -- Engine room and Wheelhouse. Without communication with the Engine room unit, the Wheelhouse unit will not reboot (displaying version and LED Bar strobing).

Alarm

The Alarm condition is met with a sensor (pressure) reading greater than the configured critical value (for example 11.5" Hg). In the Alarm Mode, the Alarm will sound.

When the Alarm sounds, holding the button briefly will silence it and translate the device into Silent Alarm Mode. The Silent Alarm Mode is indicated by a flashing LED Bar.

The Silent Alarm Mode clears when the differential pressure returns to an acceptable level, as defined in the Configuration.

In Slave Mode, the Wheelhouse unit will terminate the alarm on both units -- Wheelhouse and Engine room.

Configuration

To enter the Configuration sequence, hold the button (pressed down) while the LED Bar is strobing -- on startup or reboot.

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The Configuration sequence is navigated with one or more brief button press and release inputs.

Modifying the device configuration requires input (button press).

The next process in the sequence will continue after a timeout for input.

Each of the following choice selection processes will indicate selection, accept modification, and then report the configuration.

During the Configuration sequence, the whole LED Bar (every segment) is lit.



This has no significance other than to indicate the configuration sequence, generally.

The configuration is saved or stored after the “EXIT” step, when the LED Bar is unlit. *The entire configuration sequence must be completed for the configuration to be saved. Likewise, cutting power before “EXIT” discards any configuration changes.*

A loss of power during the configuration save step will require a review of the configuration settings.

Configuring Wheelhouse and Engine room

The Engine room unit requires a full configuration, while the Wheelhouse unit requires only to be configured as “Slave”. The Wheelhouse unit follows the configuration of the Engine room unit.

Primary changes to configuration must be performed on the Engine room unit. For example changes to (default startup) Mode, Sensors, Labels, or Critical Pressure Figures must be performed on the Engine room unit.

Operating changes and selections made from the Wheelhouse unit are temporary, and remain effective until reboot or power off.

Configuration changes to the Wheelhouse unit are ignored while properly configured to “Slave” mode (YES). Configuration changes to the Engine room unit are not reflected in the persistent configuration of the Wheelhouse unit, but are established dynamically as the two units communicate via their shared RS-232 link.

Communication Errors

Communication errors are indicated on the LCD momentarily to report the receipt of unrecognized messages. Communication error reports are displayed for roughly four seconds.

Generally they indicate moments of communication loss, while persistent problems may indicate a serial line issue. *An open (cut) serial communication circuit will be indicated by a continuous “Not Connected” status for pressure readings, rather than a momentary communication error report.*

There are two communication error reporting formats.

Two Engine room / Master units connected together will display an “Error 07”, which will appear with the offending message description as follows.

```
Error 07  
EA,0048  
■■■■■■■■■■
```

This is normal, and will clear once the Wheelhouse unit is configured as a Slave.

Error code numbers are hexadecimal. Error codes “01” through “07” are reported only in Master mode, while codes “08” through “FF” are reported only in Slave mode. These errors are specific kinds of received message recognition failures.

Error code “12” is common to both Master and Slave modes to denote a garbled (unrecognized) message receipt. *An occasional error code “12” report (once per 100 hours) should be considered normal because error “12” may result from a mismatched serial bit communication sequence.* More frequent errors indicate a problem such as a source of EMF noise located near the serial cable.

Slave errors have another display format for errors in the internal structure of received messages.

```
E28 0F ,  
EX,1.0.2  
■■■■■■■■■■
```

This format describes Error “28” in detail, with the offending message string offset and character in the first line.

Configuration

The Wheelhouse / Slave unit receives its configuration from the Engine room / Master on start or reboot. The configuration information includes the set of critical pressures (one per sensor) that determine the LED Bar display and Alarms. *After a change to critical pressures in the Engine room, the Wheelhouse will be out of sync until a power cycle or reboot.*

Mode

Select Automatic or Manual mode. The Manual and Automatic modes are described above. Automatic and Manual modes are equivalent for devices configured with one sensor.



Press and hold briefly to change value.



Default Automatic.

Demo

The Demonstration Mode employs a single fictitious sensor named "Z", which simply cycles up and down a fixed pressure scale continuously. The fictitious Sensor "Z" employs a fixed critical pressure figure of 11.5" Hg. When the device reads 11.6" Hg from the fictitious sensor, the Alarm will sound.



This mode is useful for getting to know the behavior of the device. For interaction purposes, the demonstration cycle is slow. Each demonstration cycle takes a couple minutes. To exit the Demonstration Mode, reconfigure the device via power cycle or reboot.



Press once to change value.

Default Normal Operating Mode.

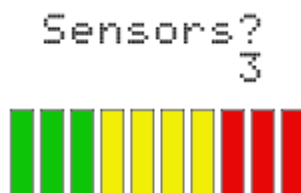
Slave (Wheelhouse)

In Wheelhouse Mode the unit will accept input from another, identical unit on its RS-232 Serial line. The unit configured for Slave Mode is in the wheelhouse, listening to a Master unit in the engine compartment. The Wheelhouse / Slave unit has no sensors of its own, but copies information from the Engine room / Master unit in the engine compartment.



Number of Sensors

Select one, two, or three sensors.



Default three sensors.

Sensor Labels

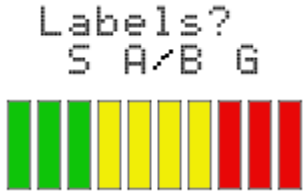
For the configured number of sensors, select a set of sensor labels from those available. The default labels are based on the fixed sensor identifiers, "A", "B", and "C".



Number Sensors	Selection Indication	Operating Label (A)	Operating Label (B)	Operating Label (C)
1,2,3	Norm	Norm	Norm	Norm
1,2	Main	Main	Genset	
1,2	S/P	Strbd	Port	
1,2	Strbd	Strbd	Strbd	

1,2	Port	Port	Port	
1,2,3	S/P/G	Strbd	Port	Genset

Press once to step to the next available set, given the configured number of sensors. Each set will wrap around from end to start and back again.



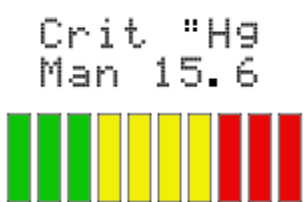
Default "Norm" labels.

Sensor Critical Pressures

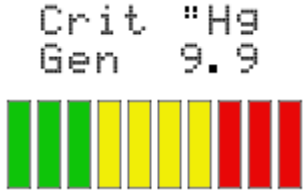
For each sensor, select the critical pressure figure.

For convenience, this process employs truncated forms of labels defined in the previous configuration process. These indicators are defined in the following table.

Label Selection	Config Label A	Config Label B	Config Label C
Norm	NrA	NrB	NrC
Main	Man	Gen	
S P	Std	Prt	
Stbd	StA	StB	
Port	PtA	PtB	
S/P/G	Std	Prt	Gen



Press once to increment the value over the fixed scale range from 1.0" to 23.0" Hg. From 12" this procedure will wrap around to 2.3" Hg.



Hold the button to continuously cycle this increment step.

Release the button to accept the indicated value (by timeout), and proceed to the next sensor.

Default 11.5" Hg.

Exit

Press once to exit the Configuration sequence, or twice to return to the start of the Configuration sequence.



Default exit.

Relay

The relay switch control is engaged and disengaged with the audible alarm.

Messaging

RS-232 Serial Communications defines the following messages. A *request* is sent to a unit not in Wheelhouse / Slave mode (Master), and a *response* is sent from a unit not in Wheelhouse / Slave mode (Master).

The following messaging format and protocol is modeled on the NMEA-183 standard. All messages are line oriented ASCII text in the fixed formats detailed below. Each message must be followed by a conventional CR LF (ASCII 0x0D, 0x0A) line terminal sequence -- complete with both CR and LF, and ordered CR then LF.

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 500 Fail-Safe 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 accessory equipment or field-installed modifications:

- Alternate Display for dual helm configurations
- Additional sensors to monitor multiple filters

10.0 ATTACHMENTS AND ILLUSTRATIONS.

Below is a table of how the multi-color LEDs will light based on different pressure levels.

Pressure	LE <=	State	Alarm	j-G	i-G	h-G	g-Y	f-Y	e-Y	d-Y	c-R	b-R	a-R
7.0	0	LO	on	on	on	off	off	off	off	off	off	off	off
7.5	1	LO	off	on	on	off	off	off	off	off	off	off	off
8.0	2	LO	off	off	on	off	off	off	off	off	off	off	off
8.5	3	LO	off	off	on	on	off	off	off	off	off	off	off
9.0	4	LO	off	off	off	on	off	off	off	off	off	off	off
9.5	5	LO	off	off	off	on	on	off	off	off	off	off	off
10.0	6	LO	off	off	off	on	on	on	off	off	off	off	off
10.5	7	LO	off	off	off	on	on	on	on	off	off	off	off
11.0	8	LO	off	off	off	off	off	off	off	on	on	off	off
11.5	9	LO	off	off	off	off	off	off	off	off	on	on	off
12.0	10	HI	off	off	off	off	off	off	off	off	on	on	off
99.9	11	HI	off	off	off	off	off	off	off	off	on	on	on

Below are the Specifications of the system:

Range: 0-20

Units: inches of Hg

Accuracy: 0.3" Hg

Vac Interface: 9/16" -18 UNF

Sensor: DigiVac 72-501

Sensor Cable Length: 15 feet

Display: 2x8 character + progressive lights

Dimensions: 2.6" x 4.8" x 1.7"

Power: 12-24VDC

Environmental: IP65

11.0 TERMS AND CONDITIONS

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