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## Installation Guide for the “Auxiliary Fuel Pump Relay” Model: APFR

Thank you for purchasing the “Auxiliary Fuel Pump Relay” (model: AFPR) manufactured by Aircraft Extras, Inc. The AFPR is a “Smart” Auxiliary Fuel Pump Relay. This device allows the pilot to flip one switch and quickly drain the contents of the auxiliary fuel tank without over stressing the fuel pump. The AFPR will pump down the auxiliary fuel tank, then automatically shut the fuel pump off when no fuel is detected. The AFPR is normally used with a very reliable optical fuel level sensor (optional) that can be easily installed in the auxiliary fuel tank. If the user is not able to install a fuel sensor in the auxiliary fuel tank, the AFPR can be set up to utilize a time delay for turning off the fuel pump. The AFPR can be operated in one of four modes of operation. The unit also has an output that can be used for a light to indicate when the fuel pump-down has been completed. The system can be powered by +12V or +24V electrical systems.

## SAFETY

### (PLEASE READ THIS SECTION CAREFULLY BEFORE PROCEEDING!)

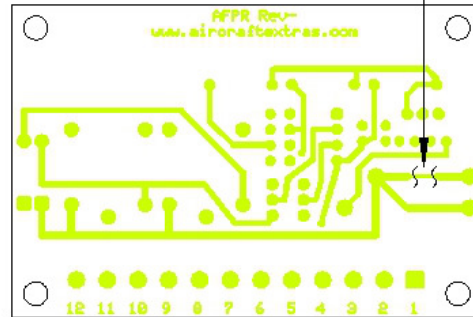
Installing the AE Fuel Guardian is easy and safe as long as you make sure that you do it properly. Please follow these recommended guidelines.

- 1.) Consult your local aviation expert. Discuss the safety aspects of installing anything into or around aircraft fuel tanks.
- 2.) Take precautions to prevent any of the wiring of this system to come in direct contact with the aircraft fuel, even in the event of a fuel tank leak.
- 3.) After the sensor has been installed, seal around the outside and inside of the sensor & tank with Proseal or equivalent fuel tank sealant in order to guarantee no leaks. If a metal sensor nut is utilized, cover it with sealant to prevent corrosion contaminating the tank. This also prevents the nut from backing off.
- 4.) Route the wiring immediately exiting the sensor “up” and then out of the fuel area, and into a safe area. This will prevent the fuel (if a fuel leak should occur) from migrating down the inside of the sensor wiring cable.
- 5.) Seal around the sensor and the sensor exiting cable to guarantee no fuel migrates into the cable in case of a fuel leak.
- 6.) If you are installing this system into a fuel tank that has already contained fuel, consult your local aviation expert on the precautions you should take to prevent a fire or possible explosion during installation.
- 7.) Avoid using tools that will generate sparks or high heat during installation if your fuel tanks have previously contained fuel.
- 8.) Make sure the cable exiting the sensor is brought out, and well away from the fuel tank area before terminating the wires or installing a “quick disconnect” connector of any sort.
- 9.) Make sure that your installation does not leave any debris inside the fuel tank or clog the fuel intake.
- 10.) Install the electronics enclosure well away from any area that may become soaked in fuel. This area should be vented and free of any fuel vapor.
- 11.) Use recommended fusing for the electronics. Refer to all appropriate system wiring & assembly diagrams.
- 12.) Keep any fusing or circuit breakers away from any area that may contain fuel or fuel vapor.

# IMPORTANT for +24V OPERATION

The AFPR can be operated with **+24V system power**. In order to do this, a foil on the back of the PC Board ***MUST BE CUT***. Remove the foil section in between these two cuts. If this is not accomplished, it could damage the unit when power is applied. After this is accomplished, you can wire per the connection diagram. The lamp and fuel pump should be designed for 24V operation.

CUT FOIL JUMPER ON BACK OF BOARD HERE FOR +24V OPERATION



## FUEL SENSOR INSTALLATION

**WARNING:** The installation instructions for installing the Low Fuel Sensors were written for tanks that have not yet had fuel in them. The fuel sensor installation may be a bit tricky if you have already had fuel in your tanks! You should consult your local A&P for safe methods in order to accomplish this. Please read our SAFETY tips!

## FUEL SENSOR POSITION

The location of the start and finish fuel sensors should be located in a part of the tank where they can positively indicate a low and high fuel value. The sensor must also be mounted horizontally. The reason for this is; if the sensor is mounted in other orientations, a drop of fluid may remain on the sensor tip not allowing the sensor to detect a "no fuel" condition. It must be mounted so that the fuel drains off of the sensor tip. It can be mounted horizontally in a "T" connector in a fuel line if properly done.

## FUEL SENSOR MOUNTING

The sensor is mounted or screwed into a 1/4NPT fitting. You will need to install a female threaded 1/4NPT bung on the inside or the outside of the tank in your selected sensor position. Make sure you seal the attachment points with "ProSeal" or equivalent fuel tank sealant. Using a "small amount" of "Fuel Lube" on the threads **ONLY**, it is to be screwed into a 1/4 NPT female fitting. "Fuel Lube" should guarantee no leaks. Sensor will malfunction if "Fuel Lube" is contacting the sensor tip. **DO NOT** over torque!! 13.26 in.-lbs. (1.5Nm) max. It is **NOT** important that the sensor hex nut bottom out on the female fitting. After installing the sensor, we recommend using a small amount of "Pro-Seal" or another brand of fuel tank sealant to help secure the sensor in place. Applying a small bead around the outside of the sensor should guarantee it won't back out, and may also inhibit future leaks from forming. This suggestion is just a bit of extra insurance. Wire the sensor leads to the electronics. If the wires are not long enough, solder on a longer length of wire. Be sure to electrically insulate the wire junctions and keep them away from any fuel.

## **ELECTRONICS ENCLOSURE INSTALLATION**

The electronics enclosure was designed to mount near the fuel pump/auxiliary fuel tank. Mounting it there eliminates the need for running extra wires thru the wing or fuselage. This mounting method also allows the installer to use a shorter run for the fuel level sensor wiring. Mount the electronics enclosure inside the fuselage or wings. Keep it away from extremely high temperatures and areas of excessive vibration.

## **SYSTEM WIRING & FUSING**

Please follow the wiring diagram provided. We recommend that you size the wiring to the AFPR for your maximum current of the fuel pump. The fuel sensor wires and terminals 3 & 4 can be #18 to #24AWG. For fusing, you should use a circuit breaker or a time delay fuse that is proper for your fuel pump load.

## **MODES OF OPERATION**

The AFPR can be operated in one of the four possible modes of operation. Select one of these modes of operation and wire it according to the diagram.

**Low Fuel Detect** - When energized, the AFPR pumps the auxiliary tank down until it is empty, then quits. (Fuel Sensor required)

**Low Fuel Detect w Maximum Fuel Usage** – Same as Low Fuel Detect except that the pump will continue to pump for 10 seconds, every 3 minutes. This ensures that every drop of fuel in the tank is transferred and used. (Fuel Sensor required)

You do not need to connect a fuel sensor for the next two modes of operation (Model: AFPR-ns)

**Pump Down for 1 Minute** - When energized, the AFPR pumps down the auxiliary tank for 1 minute and stops. (Fuel Sensor not required)

**Pump Down for 3 Minutes** - When energized, the AFPR pumps down the auxiliary tank for 3 minutes and stops. (Fuel Sensor not required)

In all modes of operation, after the AFPR has finished pumping the tank down and stopped, you will need to turn off power to the AFPR before you can restart it. To command the AFPR to repeat the pump-down process, simply turn the AFPR off, then back on. You can also turn the power off to the AFPR to stop the fuel pump at any time.

## **PRODUCT UPDATES and SAFETY INFORMATION**

It is up to the user to PLEASE check our web sight from time to time for changing product information, important safety information software updates and/or manual updates.

All information can be found here: [www.aircraftextras.com/Manuals.htm](http://www.aircraftextras.com/Manuals.htm).

Enjoy!

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