Pillar Point Avionics

FSD: Fuel State Detector

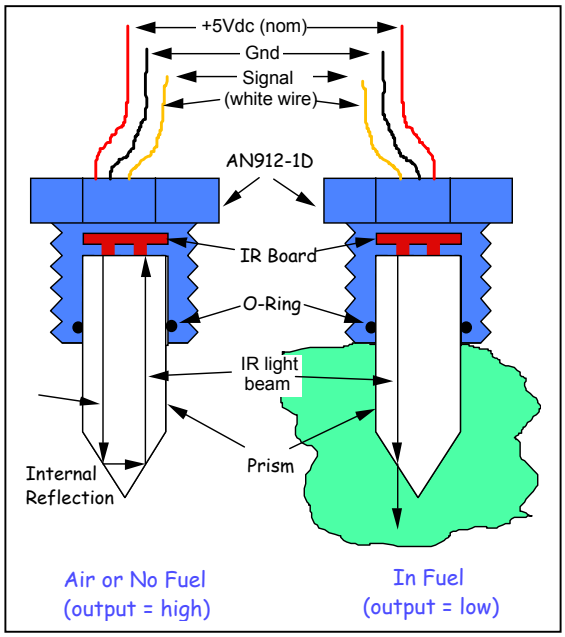
INSTRUCTIONS AND INSTALLATION NOTE

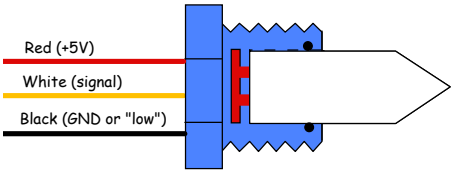
General:

Pillar Point Avionics' FSDs are designed to serve as fuel state detectors. As described below, the output of the FSD, can be used as an input to an external logic-based circuit[1], such as Pillar Point's XFR-12/24-J and XFR-12/24-K fuel pump controllers. Alternatively, the FSD sensors can be used to operate a low-current-draw lamp (such as PPAv's LED Indicator) or other device. Pillar Point Avionics supplies everything you'll need to install and operate your Fuel State Detectors, except for common shop tools.

Operation:

The FSD sensor uses a miniaturized infrared (IR) emitter and detector built into a tiny electronic circuit potted into the upper portion of a standard AN912-1D bushing as shown in the sketch below. A clear, cylindrical cast acrylic prism is potted into the lower portion of the bushing. The detector works on the principle of "total internal reflection" at the 90-degree tapered end of the prism. Since the *index of refraction* of the prism and air are very different, when the end of the prism is *not* immersed in the fuel, the IR light is internally reflected back up towards the IR detector. When the detector "sees" the IR light, the output of the circuit goes logically "HIGH" (+5V) allowing the output signal to serve as an input FLAG to a digital device such as PPAv's XFR controller. When the prism portion of the sensor is immersed in fuel, the IR light propagates down the inside of the prism and passes out through the end of the rod where it is dissipated in the fuel system, and the signal goes logically LOW.



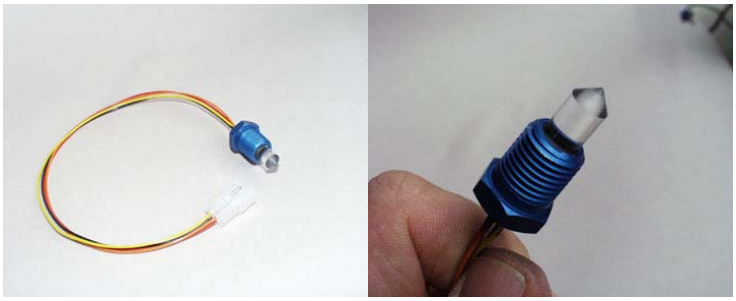


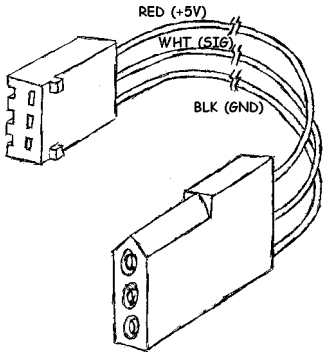
The output wiring of the FSD detector is shown in the drawing at the left. The +5V is provided by the controller (or external device) and the signal line changes state depending on whether the detector senses fuel or air.) When the FSD is installed near the bottom of a fuel tank, a "high" signal from the detector signals a near-empty fuel state. When the FSD is installed near the top of a fuel tank, a "low" signal indicates a near-full fuel state. Alternatively, the output of the FSD detector may be used to illuminate a lamp or provide other similar functions; the use is limited by the 100mA maximum current draw of the FSD circuit.

[1] The FSD detector requires +5V; this input voltage is independent of the aircraft's or the controller's operating voltage. Note that the FSD is **NOT** reverse voltage protected; thus the user must be careful not to reverse the leads.

Installation

The wiring harness provided with the FSD detector is 24ga Tefzel. This is the recommended wire type for your installation. The builder installs the detector into a fuel tank, using a suitable thread lubricant/sealant. (**Caution**: Check the detector and clean the prism carefully if sealant materials are found there.) Be sure the detector is installed so that no air bubbles or fuel "puddles" will persist at the tapered end of the prism; **this is very important for reliable operation of the detector**. Torque the fitting to no more than 85 inch-lbs, as recommended by the FAA. (See AC43.13-1B). Connect the wiring harness to the controller, indicator, or logic device, using the small square Amp connector on the harness, and route the wiring to the FSD. Trim the harness to the desired length. If you are using the FSD with one of PPAv's XFR controllers, crimp the supplied pins onto the end of the wring harness, and insert the pins into the AMP connector supplied with the detector. Be sure that the RED wire is inserted into the top hole (near the triangular portion), the BLACK wire is inserted into the bottom hole, and the WHITE wire is inserted into the middle hole. **Please note that the FSD detector is not reverse-voltage protected; therefore it is important that you connect the wiring carefully and correctly the first time!**





Specifications:

•Supply Voltage: +5V nominal •Supply Current (typical): 11-15 ma •Current Sink (typical): 100ma peak (max) •Temperature: -20°C to +40°C (-4°F to +140°F) •Altitude: Unlimited •Humidity: 100% non-condensing •Fitting: AN912-1D with ¼-NPT male threads.

Warranty: Every Pillar Point Avionics product is warranted unconditionally for 90 days from the date of purchase. During this 90-day period you may return your Pillar Point Avionics product, for any reason, for a full refund provided that the product is returned undamaged.

Every Pillar Point Avionics product is warranted against defects in materials or workmanship for a period of 12 months from the date of purchase. During this period, Pillar Point Avionics will repair or replace, at no charge to the purchaser, any product returned for service during this period, provided that the product hasn't been modified or altered. For warranty returns, please obtain an RMA number from PPAv and enclose a brief note describing the problem and the circumstances under which the problem occurred.

PILLAR POINT AVIONICS, TO THE EXTENT PERMITTED BY LAW, IS NOT RESPONSIBLE FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES CAUSED BY MALFUNCTION OR MISUSE OF THIS PRODUCT.

Pilot Butte Avionics, Inc., DBA Pillar Point Avionics, reserves the right to make product improvements and changes at any time, without warranty or notification.

Contents:

•FSD fuel state detector with 1/4" NPT fitting; wiring harness with one attached AMP connector; one AMP connector and pins.