



Post Installation Troubleshooting Guide

Display Reads

Cause

L-Bad

The indicator cannot read the GPS/Loran serial data information. Verify wiring.

L-OFF

The indicator is not receiving signal from GPS/Loran. If this is the initial after a new installation, it may take as long as 20 minutes of searching before the Shadin system "locks on" to what GPS/Loran system it is listening to. If the problem continues, verify your wiring and make sure the GPS/Loran is configured properly for the Shadin system.

LS-1,2,3

This stands for "Loran Search". The indicator is searching for correct signal to Double check for proper wiring (if wiring RS422/485, try reversing the RS422 + and -). If the display is alternating between LS3, LOFF, LS4, LOFF etc, see L-OFF above.

Loran or GPS signal understood. No meaningful numbers will appear until the Nav has acquired and a destination is selected (final waypoint). Other requirements are 26Kts of groundspeed and operational fuel flow.

E-1

The indicator has lost memory and will need to be reprogrammed. This can be accomplished in the field without sending the unit back to the factory. The K-factor and total useable fuel are the minimal parameters needed for reprogramming.

Rambad

Read-only memory has been corrupted. The unit must be returned to the factory for service.

CH1Bd

This happens when either Channel 1 or Channel 2 is inoperative. The circuit to (internal) is open. The unit must be sent back to the factory for service.

ERR1

Only found on older Shadin fuel systems. If message disappears after initial warm-up, then this is only a "check-sum" error and will not interfere with the operation of your fuel system. If the message does not go away, check with the factory to see if the unit can be serviced.

Display blank

This message will only appear on the Digidata. If after 20 minutes the message does not go away, it means that the internal heater circuit for either the PALT or IAS transducer has failed the warm-up calibration routine. Check for proper power input (14-28VDC) from A/C circuit breaker and also a proper ground.

No fuel flow display

Check your fuel flow transducer signal wire (white wire) for proper 0-5VDC square wave signal going into correct pin of the Shadin indicator. Additionally, 12VDC on the power line (red wire) and for proper ground (black wire)

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Tips2

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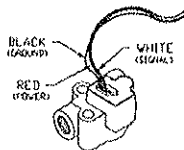
1



Shadin Technical Support hours are 8AM to 6PM CST, M-F
 Phone: 800-388-2849 or 952-927-6500 Fax: 952-924-1122 Email: repair@Shadin.com

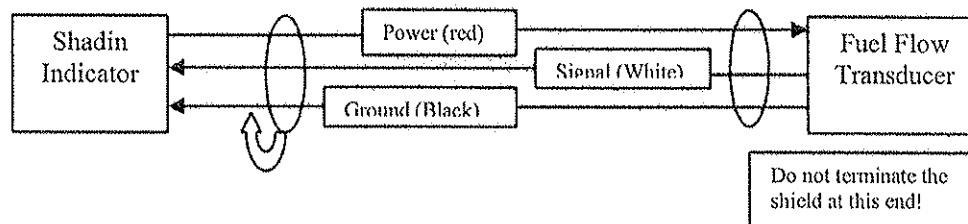
Tips to review when installing a Shadin Fuel Flow system

- 1) When installing a "bare" Floscan transducer (Shadin P/N 68050X), make sure the transducer is in a horizontal position with the 3 wires pointing directly up. Failure to follow this tip will result in premature failure of the transducer and erratic readings.



Remember: Horizontal, with wires straight up!

- 2) When tightening the AN fittings on the Floscan transducer (Shadin P/N 68050X), the maximum torque pressure to be used is 15ft/Lbs!
- 3) Do not ground the black wire (Ground) at the engine block. Carry the Ground back the Shadin fuel flow indicator. Failure to follow this suggestion may result in inaccurate fuel readings (because of differences in Ground potential).
- 4) When installing a Shadin Fuel system, it is recommended that the installer use 3 conductor, 22 gauge, shielded wire to run between the transducer(s) and the Shadin fuel indicator. The shield should be terminated at the indicator end, not at the transducer end. Failure to follow this recommendation will result in the possibility of a 10-16% error (on the high side) caused by electronic "noise" on board the aircraft.



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Inaccurate fuel flow readings

On reciprocating engines (Continental/Lycoming) using
Shadin Fuel transducer P/N 680501



- 5) See items # 1, 3, & 4 as they apply
- 6) No 90 degree fittings within 3" of the inlet side of the transducer. This creates cavitations in the fuel and will result in inaccurate fuel flow readings.
- 7) Readings are 50% of what they should be. Check that your fuel flow transducer has not been installed backwards.
- 8) **Consistent high fuel flow reading (on Lycoming powered product).**
Check # 4 first, if that checks out, then.....
If this aircraft has an auxiliary pump, try turning the Aux pump on next time the aircraft is being flown in "cruise". If the fuel flow drops (after about minute), this is an indication that air is leaking into the fuel line upstream of the transducer. Check gaskets for stains (this has only been observed in Lycoming powered aircraft). It is possible that no staining will be observed because the pressure is great enough to pull air into the system but not let fuel escape. If the customer chooses not to replace the gaskets go to # 9 of this section for K-Factor setting instructions for more accurate fuel flow.
- 9) **Aircraft gauge formula to correct minor fuel flow errors:**

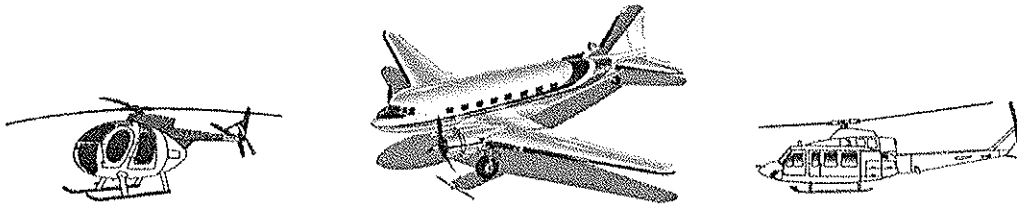
$$\frac{\text{Total Fuel Used (from fill-up to fill-up)}}{\text{As displayed under "fuel Used" on Shadin Indicator}} = \text{Correction multiplier}$$

$$\frac{\text{Actual fuel filled up after the flight}}{\text{Correction Multiplier}} \times \text{Existing K-Factor} = \text{New Corrected K-Factor}$$
- 10) **No fuel flow on right engine (in twin applications).**
Make sure the unit is properly programmed for twin application. If programming is not the cause, make sure the transducer power, signal and ground lines are correctly wired. Remember that in some of the systems left and right power is shared and left and right grounds are shared.

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Fuel flow inaccuracies when using the larger Shadin fuel flow transducers (P/N 6605XX-XX) (for turbine and radial engine applications)

There are 3 pins associated with the coil top

Pin

- A** Regulated 12 VDC from the indicator out to the transducer (to set up the magnetic field)
- B** Signal (0-5 VDC Square wave)
- C** Ground



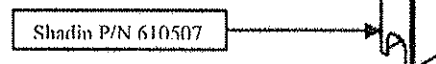
The indicator in the cockpit does not always come pre-programmed to match the K-Factor of the transducer. **Remember:** Transducers are individual, hand made items. When they go through the calibration procedure, whatever K-Factor they flow out at is what they will be; there is no changing this number. The indicator in the cockpit is the system which can be changed to any k-factor setting.

11) **Fuel reading inaccurate (always check this first)**

For newer systems (after 1991), make sure the indicator is calibrated to the correct K-Factor by holding in the Enter/Test button on the indicator. 88888 will flash across the screen, release the button. The word "Good" will appear. The next value(s) which appear will be what the K-Factor is set to (i.e. 41.2 = 41,200 pulses). Compare this number with the red calibration tag on the side of the 6605XX transducer. They should be the same.

12) **Fuel indicator reading erratic or high. (Also see items 3, 4, 7 & 10)**

Try re-clocking the transducer 90 degrees and retightening. As the black magnetic pick-up coil (which is attached to the top of the stainless steel transducer) is susceptible to EMI, changing the orientation will sometimes make the problem go away. The Shadin fuel flow transducer will perform the same regardless of which direction the coil top is pointing. If this does not solve the problem, purchase Shadin P/N 610507 (straight) or P/N 610508 (right angle) magnetic shield, this will protect the coil top from EMI.



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- 13) **If you are not getting any flow reading on your indicator.**
Disconnect, inspect, and re-connect the MS connector attached to the top of the transducer. You may even try checking continuity of the 3 wires to the cockpit.
- 14) **If you are not getting any flow reading on your indicator.**
Remove the 4 allen screws holding the black coil-top in place. With the indicator power on, wave a magnetic screwdriver back and forth across the face of the coil top. **If there is no flow indicated**, either replace the coil top with a new one (Shadin P/N 690501 – straight coil top or Shadin P/N 690502 – right angle coil top). The coil top is a part which can be re-built, so if you chose that option, contact the Technical Support Department.
If there is flow indicated, there is a problem with the bearings or turbine inside the transducer and will have to come back to Shadin for service

Miscellaneous problems seen in the past.....

- 1) Interference with indicator caused by incorrect cutting and stowing of an unused RS232/422 transmit line. Make sure that you do not coil this line as it will set up a magnetic field (keep straight).
- 2) **Ground Loop.** The shield on the shielded wire has been terminated at both ends (or sometimes in the middle!). This happens quite often when carrying the shield through a bulkhead connector. The installer must carry through the bulkhead connector with a dedicated pin. What happens sometimes is that the installer will terminate the shield to the mounting screws of the MS bulkhead connector, thus going to ground and creating a “ground loop effect”. **Remember :** The shield on the Shadin system can only be terminated at the indicator to reduce the antenna (or ground loop) effect.

Programming Group 2 configuration

The Shadin fuel flow indicators (Miniflo/Microflo/Digiflo) have 2 different configurations.

- Group 1:** Requires the installer to remove the indicator from the cockpit and reset operation switches prior to recalibrating/reprogramming the unit. Contact Technical Support if Group 1 reprogramming required.
- Group 2:** Settings can be done from the face of the indicator without instrument removal.

GROUP 1

GROUP 2

Left & Right K-Factors Fuel Units Single or Twin Low Flow Cutoff + Plus all Group 2 functions	Output Type Loran Input Endurance Warning Time Filter Type Low fuel level Ignore Loran Warning
---------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------

- Access Group 2 by holding in the enter/test button. The system will go through an internal self test then begin to count down from 15. Once the word "ENT" appears, you may release the button. You are now in Group 2 entry mode.
- The USED/REM toggle switch is used to page through the options. The ADD/FULL switch is used to scroll through the selections (within each option)
- Once the desired selections have been made, press and hold the ENTER/TEST button. The system will count down from "5". Release the button when the word "SET" appears. The new configurations are now in effect.

OPTION	SELECTION	OPTION	SELECTION
0	Loran/GPS Output 0 = Off (all Northstar Products) 1 = Bendix/King KLN series 2 = Shadin Airdata 3 = Arnav/Magellan 4 = Trimble 5 = Generic/Garmin	1	LORAN/GPS Input 0 = OFF (without knob) 1 = ON (with knob)
F	Filter Type 0 = Injected/Turbine engines 1 = Carbureted engines	d	Endurance Warning Time 0 = 45 Minutes 1 = 5 Minutes 2 = 10 Minutes 3 = 20 Minutes 4 = 30 Minutes
U	Ignore Loran Warning 0 = No (Default – all but Foster systems) 1 = Yes Old Foster – Call Shadin	S	Low fuel level warning (display in units)

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Troubleshooting the Floscan Transducer (No Fuel Flow)

- 1) The Floscan transducer (Shadin P/N 68050X) has three wires coming out of the top – Red, White, and Black.
- 2) The Red wire should have 8 to 12 volts on it with respect to the black wire.
- 3) If 8 to 12 volts is not present, check the wiring back to the Fuel Flow Indicator. If the wiring is good, the Fuel Flow Indicator needs repair.
- 4) The White wire should be disconnected at the splice between the transducer pigtail and the wiring harness going back to the Fuel Flow Indicator. 5 volts should be present on the wire that goes back to the Fuel Flow Indicator.
- 5) If the 5 volts is not present, check the wiring back to the Fuel Flow Indicator. If the wiring is good, then the Fuel Flow Indicator needs repair.
- 6) If the 5 volts is present, proceed to step 7.
- 7) Tap the wire with the 5 volts on it very rapidly to ground. A few tenths of fuel flow should be observed on the Fuel Flow Indicator.
- 8) If a few tenths of fuel flow is observed, then the transducer needs to be replaced.

Digiflo-L™

Digital Fuel Management System

RS-232 and RS-422 output format
with interface to LORAN-C and GPS receivers



OPERATING MANUAL

Single and Twin Engine Indicators

For P/N: 91053XP

Shadin Avionics

Digiflo-L™
Operating Manual



PIN ASSIGNMENTS:

PIN	Digiflo-L™ P/N 91053XP	Transducer 68050X	Transducer 6605xx
1	+28VDC (2A Circuit breaker)		
2	Airframe Ground		
3	FF Transducer Power (+12VDC to Transducer)	Red Wire	Pin A
4	NC		
5	TX RS-232		
6	TX RS-422 (+)		
7	NC		
8	TX RS-422 (-)		
9	RX RS-422(+)		
10	Right/Rear Fuel Flow Signal Ground	Black Wire	Pin C
11	Left/Front Fuel Flow Signal Ground	Black Wire	Pin C
12	RX RS-232 or RX RS-422 (-)		
13	Right/Rear Fuel Flow Input (NC for single engine)	White Wire	Pin B
14	NC		
15	Left/Front Fuel Flow Input (Use for single engine)	White Wire	Pin B

2.4 FUEL TANKS FULL

There are two methods to enter full fuel: the ramping method and the FULL/ADD toggle switch method.

Ramping Method

- Press the REM button and hold.
- Press the TEST/ENTER button to increment the fuel remaining until the total usable fuel is reached. (The longer you press, the faster the incrementing.)
- Release the REM button and the TEST/ENTER button to enter the total usable fuel on board into memory.
- If the required figure is exceeded, follow the procedure in this manual, section 2.6 Correcting Fuel on Board Entry Error.

FULL/ADD Toggle Switch Method

- Move the FULL/ADD toggle switch to the FULL position and hold.
- Press the TEST/ENTER button.
- Release the FULL/ADD toggle switch so it returns to the center position.
- To verify, press the REM button. The total usable fuel will be displayed on the upper window.

2.5 PARTIAL FUEL ADDED

There are two methods to enter partial fuel:

Ramping Method

Add the amount of fuel from the refueling meter to the amount of fuel remaining. Enter the total using the following steps:

- Press the REM button and hold.
- Press and hold TEST/ENTER button to increment fuel remaining until figure to be entered is reached; then release button.
- Release the REM button. The displayed figure is entered into memory as fuel remaining on board.
- If the required figure is exceeded, follow the procedure in this manual, section 2.6 Correcting Fuel on Board Entry Error.

FULL/ADD Toggle Switch Method

- Move the FULL/ADD toggle switch to the ADD position and hold.
- Press the REM button to increment the fuel added figure until the amount of fuel added is reached.
- Press the TEST/ENTER button.
- Release the FULL/ADD toggle switch so it returns to the center position. The computer will add the added fuel remaining and use the total as the current fuel remaining.
- To verify, press the REM button. The current usable fuel remaining will be displayed on the upper window.

2.6 CORRECTING FUEL ON BOARD ENTRY ERROR

In case an error has been made by exceeding the correct amount in entering the total usable fuel, press and hold the USED button, and simultaneously press and hold TEST/ENTER button. The fuel remaining figure will appear and pause in the display window for four (4) seconds. The figure will decrement (the longer you press, the faster it decrements). When the correct figure is reached, release both the USED and the TEST/ENTER buttons. To avoid repeating the four-second pause before decrementing, hold the USED button, and use the TEST/ENTER button to control the decrementing.

Note: Adding or subtracting fuel by any method resets the fuel used value to zero.

3. INFLIGHT OPERATIONS

3.1 INSTRUMENT OPERATION

3.1.1 FUEL FLOW

Fuel Flow is displayed continuously on the lower display windows.

3.1.2 FUEL USED

Fuel used is displayed by pressing the USED button. The information is shown on the upper display window as long as the button is held in the USED position. The display represents the fuel used since last reset.

3.1.3 FUEL REMAINING

Fuel remaining is displayed by pressing the REM button. The information is shown on the upper display window as long as the button is held in the REM position. The display represents the fuel remaining on board at the time of reading.

3.1.4 ENDURANCE

Endurance is selected by rotating the rotary switch to the ENDURANCE position. Endurance is displayed in hours and minutes on the upper display window.

3.1.5 NAUTICAL MILES PER GALLON

Nautical miles per gallon is selected by rotating the rotary switch to the NM/GAL position. The information is shown on the upper display window.

3.1.6 FUEL TO DESTINATION

Fuel to destination is selected by rotating the rotary switch to the FUEL TO DESTINATION position. The information is shown on the upper display window and represents the fuel needed to reach either the active waypoint selected on the Loran-C (or GPS receiver) or the final destination (if the total distance record is provided in the serial message.) This assumes the aircraft ground speed and fuel flow remains constant and the aircraft remains on flight plan course. (Readings obtained during climb and descent are invalid.)

3.1.7 FUEL RESERVE

Fuel reserve is selected by rotating the rotary switch to the FUEL RESERVE position. The information is shown on the upper display window and represents the fuel that will be available when the aircraft reaches its destination as indicated on either the selected waypoint or the final destination (if the total distance record is provided in the serial message.) This assumes the aircraft ground speed, altitude, fuel flow, and direction remain constant. (Readings obtained during climb and descent are invalid.)