

FL-100-R Installation Checklist and Guide

WARNING

**YOU MUST READ THIS DOCUMENT
AND PERFORM THE TASKS LISTED
BEFORE INSTALLING THE FL-100-R
INSTRUMENT**

READ THIS FIRST

Aerospace Logic Inc.

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FL-100-R Installation Checklist and Guide – Ver. 1.0 – October 24, 2004

Are You Qualified to Install this Instrument?

The installation of this instrument will require a thorough understanding of the aircraft fuel sender and tank systems as well as sufficient knowledge of the aircraft electrical system to perform the necessary tasks. It will also require tools and equipment commonly found in an appropriately licensed maintenance facility.

DO NOT INSTALL THIS INSTRUMENT IF YOU DO NOT HAVE THIS KNOWLEDGE AND/OR NECESSARY EQUIPMENT

General:

The FL-100-R instrument series requires that the aircraft fuel senders and associated wiring be in correct operating condition as defined by the manufacturer and within tolerances specified by both the manufacturer and the FAA.

Prior to starting the installation of the FL-100-R instrument you **MUST** confirm the correct operation of these systems.

NOTE

The fuel senders do not have to be in a perfect working condition but they MUST meet the operational specifications and regulations as required for the specific aircraft.

This brief document will assist you in preparing the aircraft for the installation of the instrument. By following these procedures you will save many hours of work and frustration plus you will find that the installation and calibration of the instrument will be within the specific time allocations.

In the pages that follow we will outline the steps to be taken ***prior to the installation and calibration of this instrument.***

On the last page of this document you will find a checklist for the installation. We encourage you to complete the necessary sections as some of the information will be required as part of the installation. Other sections can also be used to assist you in the location of problems with the fuel indicating system should they exist.

WARNING:

This document is not an approved or controlled document. All items in this document refer to normal maintenance practices and/or regulations. These sources take precedent over any and all statements. When performing any of these actions refer to the specific manufacturing procedures and/or regulatory requirements.

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Time Requirements

The following are realistic time estimates for carrying out the various tasks associated with the installation of the instrument. They are based upon a large cross-section of aircraft installations and where procedures are followed correctly will yield accurate estimates. Where repair work is required, you must budget times and costs for these tasks. Times are based on all systems being in an operational condition.

By performing the tasks in the order listed, costs will be kept to a minimum and any additional costs will be known before installation and calibration of the instrument.

TASK	TIME (hrs)
<p>Installation Qualification:</p> <ul style="list-style-type: none"> • Confirmation of eligibility for installation. • Determination of fuel sender parameters. • Validation of correct functionality of fuel senders required for installation. 	1.0
<p>Aircraft Preparation for Installation and Calibration:</p> <ul style="list-style-type: none"> • Setup and preparation. • Removal of existing fuel level indicators. 	1.0
<p>Installation of FL-100-R Instrument</p> <ul style="list-style-type: none"> • Perform the actual installation as noted in SECTION 2 of the installation manual. 	0.5
<p>Instrument Calibration</p> <ul style="list-style-type: none"> • Provided you have followed the procedures as outlined in this document you can budget the time taken for instrument calibration as 3 minutes X number of gallons of fuel indicated by the fuel senders. 	
<p>Documentation and Testing</p> <ul style="list-style-type: none"> • Post installation flight testing is not a requirement for aircraft return to service. Perform this function if your procedures require it. • Complete documentation as required. 	

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Installation Qualification

STEP 1

Review the STC AML and confirm that the aircraft type is eligible for installation. If it is not on the AML and you are not seeking a field approval then terminate the process at this point.

STEP 2

Confirm the **operating parameters** of the fuel senders. This procedure need only be carried out on ONE of the fuel senders. While aircraft data specifies the parameters for the fuel senders, we have found that in many cases the senders and/or fuel level instruments have been replaced with different products over the years. Performing this task will confirm this information beyond any doubt. There are two ways of performing this task. **Perform either procedure (1) or (2) below.**

1. Remove the fuel sender from the tank
 - a. Measure the resistance in the full position and note it in **BOX 1** on the checklist.
 - b. Measure the resistance in the empty position and note it in **BOX 2** on the checklist.
 - c. **NOTE:** For fuel tanks with multiple senders; these must be wired in series to provide an effective circuit as on Page 4 of the installation manual. Thus when reading resistances these values must be added in each condition for each sender.

OR

2. With the tank at full fuel capacity disconnect the existing fuel indicating instrument.
 - a. Measure the resistance of the sender from the connection point in the cockpit and note it in **BOX 1** on the checklist.
 - b. Drain the tank.
 - c. Add the unusable fuel.
 - d. Measure the resistance in “no usable fuel” condition and note it in **BOX 2** on the checklist.
 - e. **NOTE:** For fuel tanks with multiple senders; these must be wired in series to provide an effective circuit as on Page 4 of the installation manual. Thus when reading resistances these values must be added in each condition for each sender.

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STEP 3

If the maximum resistance of the sender was found to be at the point where the tank was full, write the letter **r** in **BOX 3** of the checklist.

If the maximum resistance of the sender was found to be at the point where the tank was empty, write the letter **n** in **BOX 3** of the checklist.

STEP 4

Using Table 1 confirm that you have the correct instrument to match your fuel senders. If the instrument is not the matching unit for your fuel senders call our Technical Support department (905.569.3881) for an RMA and to order the correct product.

Maximum Sender Resistance	FL-100 Model Required
44 Ω or less	FL-100-R (44)
45 Ω to 67 Ω	FL-100-R (67)
68 Ω to 109 Ω	FL-100-R (109)
110 Ω to 300 Ω	FL-100-R

Table 1

STEP 5

Confirm the correct operation of the fuel senders for **both LEFT and RIGHT tanks** as follows:

1. With the unusable fuel in the tank, read the resistance of the fuel sender. Note this value in **BOX 4** on the checklist.
2. Add one gallon of fuel to the tank.
3. Was there a change in resistance of at least 1.5 Ω for a sender qualified with the FL-100-R (0-300 Ω) instrument or at least 0.75 Ω for all other senders?
 - a. Yes. Then note this value in **BOX 5** on the checklist.
 - b. No. Repair or adjust the senders as necessary before continuing with the installation.
4. Add one more gallon of fuel (total 2 gallons) to the tank.
5. Was there a change in resistance of at least 1.5 Ω for a sender qualified with the FL-100-R (0-300 Ω) instrument or at least 0.75 Ω for all other senders?
 - a. Yes. Then note this value in **BOX 6** on the checklist.
 - b. No. Repair or adjust the senders as necessary before continuing with the installation.

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STEP 6

DO NOT CONTINUE WITH THE INSTALLATION OF THE FL-100-R INSTRUMENT UNTIL THE CONDITIONS OF STEP 5 HAVE BEEN MET.

Until the fuel senders are operating as noted, they are out of specification and do not meet the requirements of FAR 23 for operation, both for the FL-100-R instrument AND the existing instruments.

FAR 23, Subpart F, Section 23.1337, requirement (b) (1) states:

"Each fuel quantity indicator must be calibrated to read "zero" during level flight when the quantity of fuel remaining in the tank is equal to the unusable fuel supply determined under [Sec. 23.959(a);]"

The instrument will check this condition when installed and if the sender/s are not operating according to legal requirements, the software within the instrument will not allow it to be calibrated and thus it will not be legal for airborne use.

Aircraft Preparation for Installation and Calibration

Prepare the aircraft for installation and calibration of the instrument as follows:

STEP 7

Remove the existing fuel indicating instruments. The FL-100-R instrument is STC'd as a primary replacement. It will not work in conjunction with any other fuel indicating instrument. **Connection of the FL-100-R instrument without disconnecting the existing instruments will damage the electronic circuitry. Such damage is easily identified and is not covered under the product warranty.**

STEP 8

Install the instrument into the aircraft as per the **SECTION 2** of the manual.

STEP 9

Place the aircraft in a level flight attitude. For tricycle gear aircraft, bleeding a sufficient amount of air from the nose wheel will usually provide sufficient pitch angle adjustment. For conventional gear aircraft the tail wheel must be supported.

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STEP 10

Where necessary, support the aircraft wings using wing jacks or appropriate supports. This will almost always be required for high wing type aircraft and may only be required in some cases for low wing aircraft. Where time and costs allow, we recommend wing supports irrespective of the aircraft wing configuration.

STEP 11

Drain the fuel tanks if they are not empty.

STEP 12

Add the unusable fuel to each tank.

STEP 13

Prepare the necessary safety equipment for working with aircraft fuel. Plan an escape strategy in the event of fire and discuss this with all staff involved in the process or in the vicinity of the aircraft. Always work in a well vented area when working with fuel.

STEP 14

Complete the instrument calibration as per the supplied manual.

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TECHNICAL SUPPORT

We have dedicated technical support staff that are able to assist you in the installation and calibration of the instrument.

1. We provide support for:
 - a. All aspects of operation of the instrument.
 - b. Any task or question relating specifically to the FL-100-R series instruments.
 - c. Problem resolution beyond that stated in the manual but only as it relates to the instrument.

2. We do not provide support for:
 - a. The repair, calibration or setup of fuel senders.
 - b. Your specific aircraft electrical system.
 - c. Shop procedures.
 - d. Regulatory information other than information that pertains directly to the instrument.

3. Where the instrument is being installed in a certified aircraft, we reserve the right to provide support only to appropriately licensed individuals or licensed facilities where unlicensed individuals are working under direct supervision of an appropriately licensed person in accordance with the necessary regulations.

4. Product returns, whether for replacement due to defect or for refund, require Return Material Authorizations (RMA's).

**For Technical Support on this product call
905.569.3881**

Monday to Friday 9:00 a.m. to 5:00 p.m. EST

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FL-100-R Installation Checklist – Page 1

#	TASK	OK	DATA						
1	STEP 1 : STC and AML eligibility								
2	STEP 2: Sender minimum and maximum resistances		<table border="1"> <tr> <td>BOX 1</td> <td>BOX 2</td> </tr> <tr> <td></td> <td></td> </tr> </table>	BOX 1	BOX 2				
BOX 1	BOX 2								
3	STEP 3: Sender orientation BOX 1 less than BOX 2; Place n in BOX 3 BOX 1 larger than BOX 2; Place r in BOX 3		<table border="1"> <tr> <td>BOX 3</td> </tr> <tr> <td></td> </tr> </table>	BOX 3					
BOX 3									
4	STEP 4: Matching instrument confirmation								
5	STEP 5: (FOR LEFT TANK) Sender resistance change confirmation		<table border="1"> <tr> <td>BOX 4</td> <td></td> </tr> <tr> <td>BOX 5</td> <td></td> </tr> <tr> <td>BOX 6</td> <td></td> </tr> </table>	BOX 4		BOX 5		BOX 6	
BOX 4									
BOX 5									
BOX 6									
6	STEP 5: (FOR RIGHT TANK) Sender resistance change confirmation		<table border="1"> <tr> <td>BOX 4</td> <td></td> </tr> <tr> <td>BOX 5</td> <td></td> </tr> <tr> <td>BOX 6</td> <td></td> </tr> </table>	BOX 4		BOX 5		BOX 6	
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FL-100-R Installation Checklist – Page 2

#	TASK	OK	DATA
7	STEP 6 : Confirm operation of senders before continuing		
8	STEP 7: Remove existing fuel level indicators		
9	STEP 8: Install FL-100-R instrument		
10	STEP 9: Place the aircraft in a level flight attitude		
11	STEP 10: Support aircraft wings		
12	STEP 11: Drain fuel tanks		
13	STEP 12: Add unusable fuel to each tank		
14	STEP 13: Safety plan and working environment		
15	STEP 14: Calibration as per installation manual		
16	STEP 15: Documentation and regulatory signoff		

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