FUEL QUANTITY (CAN BUS) - TROUBLESHOOTING

1. General

A. This section gives the troubleshooting procedures for the CAN Bus fuel level sensors. For a general overview of the Can Bus level fuel sensors refer to Indicating - Description and Operation.

2. Can Bus Level Sensors Troubleshooting

A. Tools and Equipment

NOTE: For the supplier publication part number and manufacturer data, refer to the Introduction - Supplier Publication List.

(1) Tools and Equipment

- Multi-meter.

(2) Special Consumables

- None.

(3) Reference Material

- Chapter 6, Access Plates And Panels Identification - Description and Operation
- Chapter 24, Electrical Distribution System - Maintenance Practices
- Indicating - Description and Operation
- CAN Bus Level Sensors - Removal/Installation
- Fuel Quantity (CAN BUS) - Adjustment/Test
- Model 208 Wiring Diagram Manual.

B. CAN Bus Level Sensors Troubleshooting. Refer to Table 101.

Table 101. CAN Level Sensors Troubleshooting Table

TROUBLE	PROBABLE CAUSE	CORRECTIVE ACTION
RED Xs OVER THE FUEL QUANTITY INDICATORS.	1. Correct software configuration not loaded.	Check the software configuration. Refer to CAN Bus Level Sensors Software Configuration Check.
	2. No information transmitted between the fuel level sensor and the Integrated Avionics Unit (GIA) or sensor sending wrong sensor CAN ID.	Check the system wiring. Refer to the Fuel Quantity Wiring Continuity and Resistance Check.
	3. No electrical power to the fuel level sensors.	Check for power to the applicable sensor. Refer to System Electrical Power Check..
	4.Unserviceable fuel level sensor.	Remove the fuel level sensor in question and connect it to the connector of a different CAN bus level sensor. If the problem follows the sensor, replace it. Refer to CAN Bus Fuel Level Sensors - Removal/Installation. If the problem does not follow the sensor, contact Cessna Customer Services at 316-517-5800.
Questionable Fuel Quantity Indication Value	1. Correct software configuration not loaded.	Check the software configuration. Refer to CAN Bus Fuel Level Sensors Software Configuration Check.
	2. A Fuel Quantity Calibration is necessary.	Do a fuel quantity calibration. Refer to Fuel Quantity (CAN Bus) - Adjustment/Test.

C. CAN Bus Fuel Level Sensors Software Configuration Check.

(1) On the Avionics circuit breaker panel disengage the circuit breakers that follow:
- PFD1
- PFD2
- MFD.

(2) Put the switches that follow in the positions given:
(a) Connect external electrical power to the airplane.
(b) External POWER switch to the BUS position.
(c) BATTERY switch to the ON position.
(d) Avionics 1 and 2 switches to the ON position.

(3) Put he G1000 in configuration mode (maintenance) as follows:
(a) Push and hold the ENT key on PFD1 one while you engage the PFD1 circuit breaker.
1 When 'INITIALIZING SYSTEM' shows on the upper left corner of the display release the ENT key.
(b) Push and hold the ENT key on PFD2 one while you engage the PFD2 circuit breaker.
1 When 'INITIALIZING SYSTEM' shows on the upper left corner of the display release the ENT key.
(c) On the MFD push and hold the number 12 softkey while you engage the MFD circuit breaker.
1 When 'INITIALIZING SYSTEM' shows on the upper left corner of the display release the number 12 softkey.

(4) On PFD1 do the steps that follow:
(a) Use the FMS knobs to navigate to the GIA page group.
(b) Use the FMS knobs to scroll to the CAN CONFIGURATION page.
(c) On the CAN CONFIGURATION page push the FMS knob to highlight the cursor.
(d) Put the cursor over CHNL 1.
(e) Turn the inner FMS knob until CHNL 2 is selected.
(f) Push the ENT button and make sure that:
1 There is a green box next to CHNL 2 on GIA1. A green box shows that the selected GIA is receiving CAN communication from any sensor.

NOTE: It will be green even if a sensor has detected an internal problem and is sending an invalid bit, or if a sensor is sending messages using the wrong CAN ID. A red box shows that the selected GIA is not receiving any CAN communication from any sensor.

2 The values on the PFD match the values in Table 102 and Table 103.

Table 102. CAN I/O (Inputs/Outputs)

	SET	ACTIVE
INPUT DATA (CAN CHNL 2)	VIBRO-METER FUEL PROBE	VIBRO-METER FUEL PROBE
OUTPUT DATA	OFF	OFF
SPEED	0000125000	0000125000

Table 103. FUEL PACKETS PRESENT

	SET	ACTIVE
FUEL QNTY L #1	ON	ON
FUEL QNTY L #2	ON	ON
FUEL QNTY L #3	OFF	OFF
FUEL QNTY L #4	OFF	OFF
FUEL QNTY L #5	OFF	OFF
FUEL QNTY C #1	OFF	OFF

FUEL QNTY C #2	OFF	OFF
FUEL QNTY R #1	ON	ON
FUEL QNTY R #2	ON	ON
FUEL QNTY R #3	OFF	OFF
FUEL QNTY R #4	OFF	OFF
FUEL QNTY R #5	OFF	OFF

(5) Push the FMS knob to highlight the cursor.

(6) With the cursor over GIA1 turn the inner FMS knob to select GIA2.

(7) Push the ENT button and make sure that:

(a) The fuel quantity indicators on the GRS/GMU CALIBRATION page on the MFD do not have Red X's over them.

(b) The values on the PFD match the values in Table 102 and Table 103.

(8) On the PFD1 use the FMS knobs to scroll to the CAL page group and then to the FUEL TANK CALIBRATION page.

(a) Make sure that there are several calibration points in approximately 67 pound increments in the CALIBRATION TABLE to make sure that the DEFAULT FUEL CALIBRATION configuration has been loaded on the aircraft, if applicable (The DEFAULT FUEL CALIBRATION configuration should only be loaded before a fuel calibration is planned).

NOTE: It overwrites any pre-existing fuel calibration data for the aircraft and makes a new fuel calibration necessary.

D. Fuel Tank Calibration Check

NOTE: There are only two sensors in each tank (1 and 2).

(1) For fuel tank calibration troubleshooting refer to Table 104.

Table 104. FUEL TANK CALIBRATION Page Troubleshooting Table

INDICATION	PROBABLE CAUSE	CORRECTIVE ACTION
Red X on the left or right fuel quantity Indicator and no numbers next to sensor on the FUEL TANK CALIBRATION Page.	1. No communication from sensor. 2. Sensor has internal anomaly. 3. Sensor reporting incorrect CAD ID.	1. Do a continuity and resistance check. Table 105. 2. Replace the sensor. CAN Bus Fuel Level Sensors - Removal/Installation.

E. Fuel Quantity Wiring Continuity and Resistance Check. Refer to Model 208 Wiring Diagram Manual.

(1) Put the switches that follow in the positions given:

(a) Connect external electrical power to the airplane.

(b) External POWER switch to the OFF position.

(c) BATTERY switch to the OFF position.

(d) Avionics 1 and 2 switches to the OFF position.

(2) Remove external electrical power from the airplane.

(3) Remove the applicable access panels 523BB and 511AB (left wing) or 623BB and 611AB (right wing). Refer to Chapter 6, Access Plates And Panels Identification - Description and Operation.

(4) Do a continuity and resistance check. Refer to Table 105.

(a) If necessary, repair the damaged wiring.

Table 105. Continuity and Resistance Test

CAN FUEL LEVEL SENSOR CONFIGURATION	ELECTRICAL CONNECTOR PINS TO MEASURE		ACCEPTABLE RESISTANCE (OHMS)
	Positive meter lead	Negative meter lead	

Left outboard CAN Fuel Level Sensor (UL002) check configuration: • Disconnect the left outboard CAN fuel level sensor electrical connector (PL002) to take measurements on PL002 • Left inboard CAN fuel level sensor electrical connector connected • Airplane BATT and EXTERNAL POWER switches in OFF position.	Pin 3 (CAN BUS HI)	Pin 4 (CAN BUS LO)	Approximately 120?
	Pin3 (CAN BUS HI)	Airplane ground	Greater than 100k? (typical resistance is 1.2M? to 2.0M?)
	Pin 4 (CAN BUS LO)	Airplane ground	Greater than 100k? (typical resistance is 1.2M? to 2.0M?)
	Pin 3 (CAN BUS HI)	Pin 1 (28VDC)	Greater than 100k? (typical resistance is 1.2M? to 2.0M?)
	Pin 4 (CAN BUS LO)	Pin 1 (28VDC)	Greater than 100k? (typical resistance is 1.2M? to 2.0M?)
	Pin 6 (CONFIG 0)	Pin 11 (CONFIG RETURN)	Approximately 0?
	Pin 12 (CAN TERM RES START)	Pin 5 (CAN TERM RES END)	Approximately 0?
	Make sure pins 7, 8, 9, 10, and 13 have no connection.		Infinite resistance measured from specified contacts to ground.
Right outboard CAN Fuel Level Sensor (UR002) check configuration: • Disconnect electrical connector (PR002) to take measurements on PR002 • Left inboard sensor electrical connector connected • Airplane BATT and EXTERNAL POWER switches in OFF position.	Pin 3 (CAN BUS HI)	Pin 4 (CAN BUS LO)	Approximately 120?
	Pin3 (CAN BUS HI)	Airplane ground	Greater than 100k? (typical resistance is 1.2M? to 2.0M?)
	Pin 4 (CAN BUS LO)	Airplane ground	Greater than 100k? (typical resistance is 1.2M? to 2.0M?)
	Pin 3 (CAN BUS HI)	Pin 1 (28VDC)	Greater than 100k? (typical resistance is 1.2M? to 2.0M?)
	Pin 4 (CAN BUS LO)	Pin 1 (28VDC)	Greater than 100k? (typical resistance is 1.2M? to 2.0M?)
	Pin 9 (CONFIG 1)	Pin 11 (CONFIG RETURN)	Approximately 0?
	Pin 12 (CAN TERM RES START)	Pin 5 (CAN TERM RES END)	Approximately 0?
	Make sure pins 6, 7, 8, 10, and 13 have no connection.		Infinite resistance measured from specified contacts to ground.

Left Outboard CAN Fuel Level Sensor and Right Outboard CAN Fuel Level Sensor check configuration: • Disconnect the left outboard CAN fuel level sensor electrical connector (PL002) • Disconnect the right outboard fuel level sensor electrical connector (PR002) • Take measurement on UR002 • Airplane BATT and EXTERNAL POWER switches in OFF position.	Pin3 (CAN BUS HI)	Pin 4 (CAN BUS LO)	Greater than 1k? (typical resistance is 19k?.

(1) Put the CAN fuel level sensors back to original condition.
- Connect the left outboard CAN fuel level sensor electrical connector (PL002)
- Connect the right outboard CAN fuel level sensor electrical connector (PR002).

F. System Electrical Power Check

(1) Disconnect the applicable electrical connector form the fuel level sensor you are troubleshooting. Refer to Table 106.

Table 106. CAN Fuel Sensors Electrical Connectors

FUEL SENSOR	ELECTRICAL CONNECTOR
Left Outboard	PL002
Left Inboard	PL001
Right Outboard	PR002
Right Inboard	PR001

(2) Apply electrical power to the airplane.

(3) Do a check between the applicable electrical connector pins 1 and 2 for 28Vdc.

(4) If there is not 28Vdc remove electrical power from the airplane.

(5) Do a continuity check between pin 2 and the ground block (GC001).

(a) Repair or replace the ground wiring as necessary.

(6) For the left fuel level sensors, do a continuity check of the wiring between pin 1 and the left circuit breaker panel LEFT FUEL QTY circuit breaker.

(a) Repair or replace the wiring as necessary. Refer to the Model 208 Wiring Diagram Manual.

(b) Replace the LEFT FUEL QTY circuit breaker. Chapter 24, Electrical Distribution System - Maintenance Practices.

(7) For the right fuel level sensors, do a continuity check of the wiring between pin 1 and the left circuit breaker panel RIGHT FUEL QTY circuit breaker.

(a) Repair or replace the wiring as necessary. Refer to the Model 208 Wiring Diagram Manual.

(b) Replace the RIGHT FUEL QTY circuit breaker. Chapter 24, Electrical Distribution System - Maintenance Practices.

G. Closeout

(1) Install the access panels 523BB and 511AB (left wing) or 623BB and 611AB (right wing) as necessary. Refer to Chapter 6, Access Plates And Panels Identification - Description and Operation.