

DC400/A Adapter Module

**USER INSTRUCTION SUPPLEMENT
M/N DC400/A, P/N 101-00802**

*Doc. P/N: 61-101-00802.EF2
Revision G
January 7, 2015*

MOD C, used with
DC400 OR DC400A
P/N's 101-00800 or 101-00850
Digital DC Fuel Quantity Test Sets
For
BEEHCRAFT MODELS
1900/1900C, UA and UB
and
1900C/1900D, UC and UE

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APPLICABILITY

This manual is one of a family of manuals, each developed to address an individual Adapter Module especially designed for the DC-400 / DC-400A Digital Fuel Quantity Test Sets. It contains complete instructions for the maintenance, inspection, testing, troubleshooting, and calibration of the Gull Airborne and Ragen Data Fuel Quantity Systems.

These aircraft include (at the time of this writing):

1900	S/N UA
1900C	S/N UB
1900C	S/N UC
1900D	S/N UE

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REVISION RECORD

REV.	ECO #	REV. DATE	DESCRIPTION OF CHANGE
A	N/A	Mar/17/03	First Issue. This supplement replaces 56-101-00802 manual and covers MOD B (or earlier) releases of 101-00802.
B	260-00617	May/20/03	For Mod C or later releases of adapter module.
C	260-00678	Sep/15/06	Modifications to the company logo, company contact information and listed part 101-00814 were implemented. Beech probe adapter cable 101-00829 is a reflection of the said changes to adapter cable 101-00814.
D	260-00729	Jan/23/09	Updated Company Logo
E	260-00779	Apr/29/10	List of Approved Repair Facilities and Recertification Information were added (page <i>iv</i>)
F	260-01003	Apr/29/14	Revised per feedback from Beech and added section 7. System Wiring Integrity Test.
G	260-01076	Jan/07/15	Updated Barfield logos.

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LIST OF APPROVED REPAIR FACILITIES

The manufacturer of this equipment does not recommend the user to attempt any maintenance or repair. In case of malfunction, contact the manufacturer, to obtain the list of approved repair facilities worldwide, ensuring that this equipment will be serviced using proper procedures and certified instruments. A Return Maintenance Authorization (RMA) number will be assigned during this call, to keep track of the shipment and the service.

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RECERTIFICATION

Barfield Adapter Module, P/N 101-00802, has a one-year recertification requirement. Qualified technicians in a shop equipped with the necessary tooling, facilities, and Barfield-approved procedures must perform the maintenance required by this unit.

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CONTACT INFORMATION

**USERS ARE REQUESTED TO
NOTIFY THE MANUFACTURER OF
ANY DISCREPANCY, OMISSION OR
ERROR FOUND IN THIS SUPPLEMENT.**

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CHAPTER 1 DESCRIPTION

A. Capabilities

- (1) Complete testing of fuel quantity system.
- (2) Testing of individual fuel tanks.
- (3) Testing of indicators.
- (4) Dry and wet tank calibration.

B. Panel Controls

- (1) See Instruction Manual 56-101-00850 for details on the DC400A Fuel Quantity Test Set. See Technical Manual 57-101-00800 for information on the DC400 Digital Fuel Quantity Test Set.
- (2) Refer to Aircraft Maintenance Manual for description of the aircraft fuel quantity system.

C. Aircraft System Description

- (1) Refer to the Aircraft Maintenance Manual for specific procedures and maintenance practices.

D. Equipment Required (or equivalent)

- (1) DC400A Digital Fuel Quantity Test Set, P/N 101-00850 or the DC400 Digital Fuel Quantity Test Set, P/N 101-00800
- (2) Barfield Instruction Manual 56-101-00850 (DC400A) or Barfield Technical Manual 57-101-00800 (DC400)
- (3) Fuel Quantity Adapter Module, P/N 101-00802
- (4) Probe Adapter Cable, Barfield P/N 101-00829 or 101-00814
- (5) Test leads, banana plug to alligator clip, P/N 101-01012
- (6) 15-pin adapter cable, Barfield P/N 101-00831 or 101-00817
NOTE: Barfield adapter cables are available as a separate purchase.
- (7) A 1900/1900C/1900D Beech Probe adapter pin
- (8) A 28 VDC Power Supply
- (9) A Probe Selector Unit:

For 1900/1900C, UA and UB: P/N 114-389001/935
For 1900C/1900D (UC, UE): P/N 118-389004/935

E. Precautions

- (1) Refer to Aircraft Maintenance manual for proper fueling and defueling procedures. Observe all safety precautions.
- (2) Refer to the Aircraft Maintenance manual for location of the system components and instructions for removal and replacement.
- (3) Insure fuel quantity circuit breakers are open and they remain open while aircraft and test set connections are broken or made.
- (4) Insure power remains OFF unless otherwise specified.

F. Preliminary

- (1) To insure the integrity of all system components, perform the Insulation, Capacitance tests first. Then, perform one of the Indicator tests (System or Bench) and, if necessary, the Probe Bench test. These tests will provide an effective means for troubleshooting the system.
- (2) After performing an indicator test and before returning the aircraft to service, calibrate the aircraft fuel quantity system using the Preferred (or Alternate) Calibration Test.
- (3) Failure to calibrate the system could result in an inaccurate fuel quantity indication.

G. Disclaimer

- (1) BARFIELD, INC., neither a vendor nor supplier of fuel quantity systems or an airframe manufacturer, has no control over calibration figures or procedures. A variant between actual values and those recommended may exist. However, the information presented is correct to the best of our knowledge at time of publication and is presented for reference only.

CHAPTER 2 OPERATION

1. SYSTEM INSULATION TEST

Note: Refer to PRECAUTIONS and PRELIMINARY sections (Chapter 1).

Note: This test may be performed with either wet or dry tanks.

A. Aircraft Preparation

- (1) Disconnect the aircraft battery.

Caution: When lowering or raising pilot fuel panel, insure aircraft battery is disconnected.

- (2) Access the indicator.
- (3) Open the circuit breakers.

Caution: When breaking or making indicator connections, insure that the applicable circuit breaker(s) are open.

- (4) Disconnect the aircraft wiring plug at the indicator.

B. Test Set Preparation

- (1) Set the ON/OFF switch to OFF.
- (2) Rotate the TEST FUNCTION switch to IND AMP.
- (3) Set the INSULATION/SYSTEM switch to INSULATION.
- (4) Rotate the INS TEST POINTS switch to LO-Z/GND.
- (5) Set the AUX/MAIN switch to MAIN/TOT.

C. Connecting Test Set

- (1) Set up the test set (T/S) as shown in Figures 1 and 2.
- (2) Connect the test set ACFT connector to the aircraft wiring plug removed from the indicator.
- (3) Connect the test set ACFT connector to the ACFT connector of the adapter cable.
- (4) Do not connect the test set IND connector of the adapter cable.
- (5) Do not connect the test set IND connector.

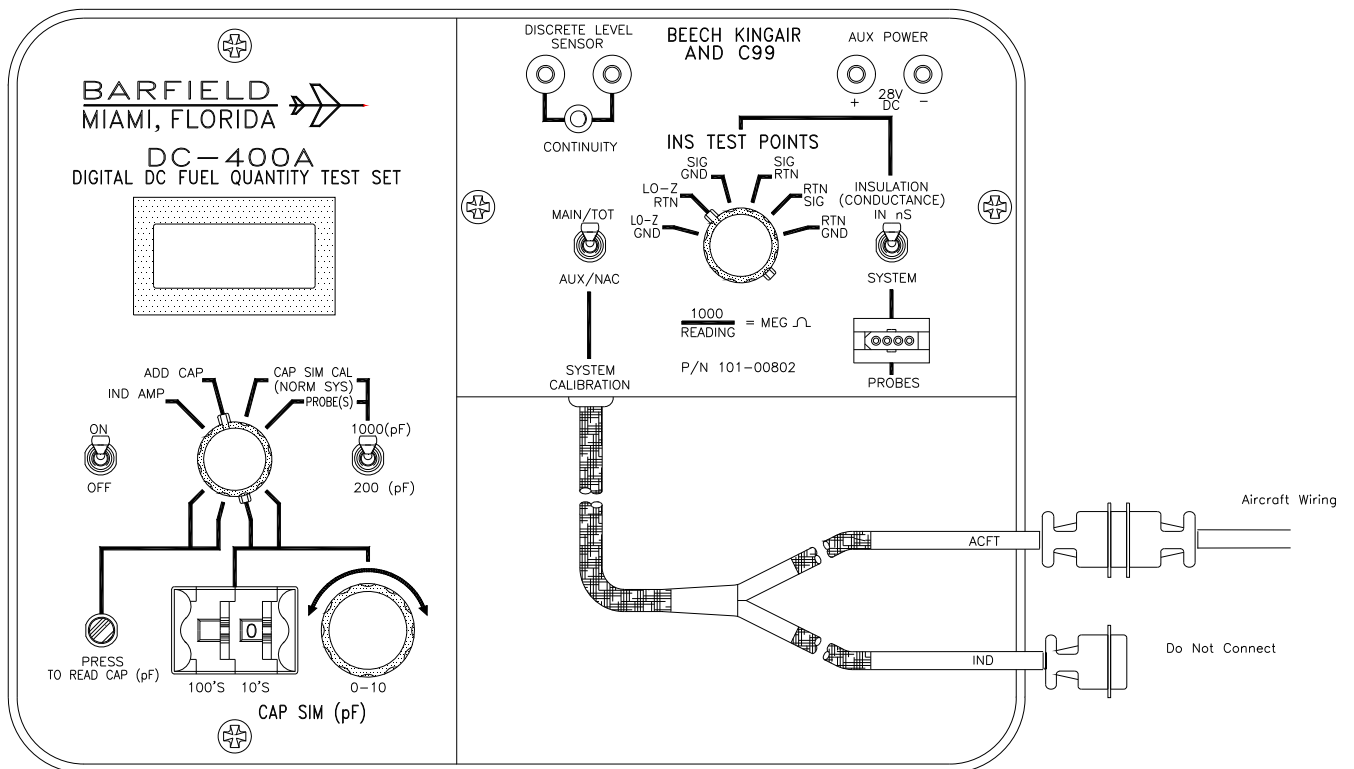


Figure 1 Insulation Test Connector Setup

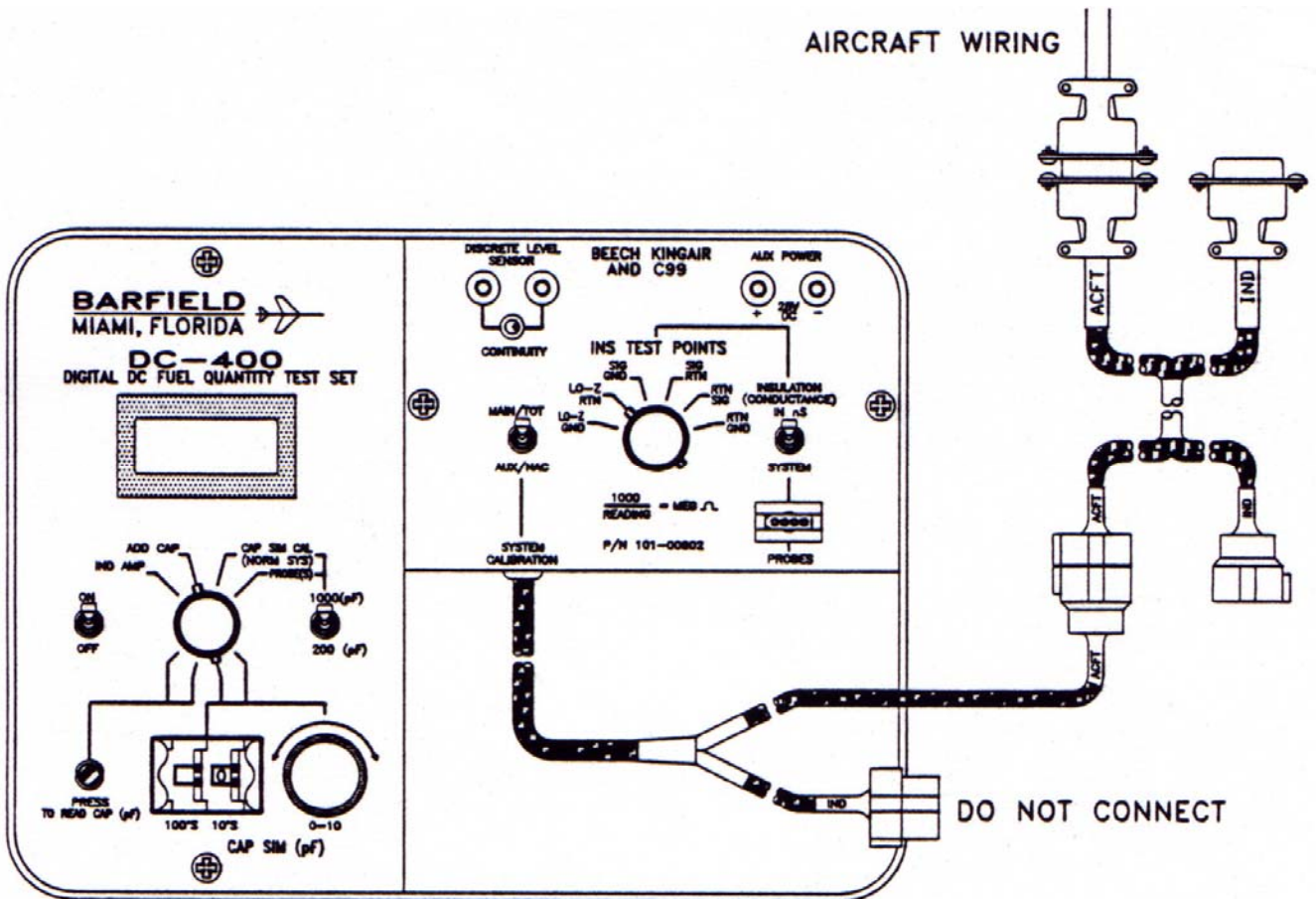


Figure 2 Insulation Test Connector Setup

D. Test

- (1) Set the test set ON/OFF switch to ON.
- (2) Allow time for the test set display to stabilize.
- (3) Verify that the test set reading is less than 50nS.

Note: The display reading is in nS (nano Siemens). To get an equivalent MΩ (megaohms) measurement, divide 1000 by the test set display reading.

Test Set Display Reading	Equivalent MΩ
1.	Less than 1
1000	1.
500	2.
200	5.
100	10.
050	20.
020	50.
010	100.
005	200.
002	500.
001	1,000.
000	Greater than 1,000

Example: $1000/50 = 20 \text{ M}\Omega$

Table 1 Conductance to Megaohm Conversion

- (4) Rotate the INS TEST POINTS switch through each remaining position.
- (5) Allow test set to stabilize. Sometimes the reading never completely stabilizes. If the reading is in the acceptable range after 30 seconds it should be considered OK.
- (6) Verify T/S reading is less than 50 nS at each position except SIG/RTN.
- (7) With switch rotated to SIG/RTN, verify an “over range” test set reading of “1”.

Note: If P/N 114-389001-17 probe (Gull Airborne) is installed in the collector tank, an “over range” reading also appears when the switch is placed in the LO-Z/RTN position.

- (8) Connect the aircraft battery.
- (9) Close circuit breakers.
- (10) If testing 1900C/1900D, UC and UE aircraft, set the aircraft fuel panel select switch to AUX and maintain.

Note: The fuel quantity select relay shorts the signal lead to return lead of “MAIN/TOTAL” or “AUX/NAC” that is not selected. Also, due to continuity through diodes inside the probe, a short on “RTN/GND” shows as a short on “SIG/GND”.

- (11) Rotate INS TEST POINTS switch through remaining positions.

- (12) Allow test set to stabilize. Sometimes the reading never completely stabilizes. If the reading is in the acceptable range after 30 seconds it should be considered OK.
- (13) Verify the test set reading is less than 50nS at each position except SIG/RTN.
- (14) With switch rotated to SIG/RTN, verify a test set “over range” reading of “1”.
- (15) Release fuel panel select switch.

Note: If a test does not meet specification, repeat test to verify readings. If wrong reading remains, isolate fault by referring to the aircraft wiring drawings and disconnecting the interconnect fuel line receptacle. Then, repeat test. Verify that the reading with the fuel panel select switch in any position is less than 005 nS. If fault remains, the problem may be with the a/c wiring between interconnect fuel line receptacle and the indicator connector. Correct the fault and perform the Insulation Test (Individual Probes). (See section 2. INSULATION TEST (INDIVIDUAL PROBES)). When all problems are corrected, perform the System Insulation Test again.

- (16) Set T/S ON/OFF switch to OFF.
 - (17) Open circuit breakers
 - (18) Disconnect a/c battery.
- Note: If testing the opposite side, repeat procedure.

E. Disconnecting/Reconfiguring

- (1) Disconnect the test set from the aircraft harness.
- (2) Reconnect the aircraft wiring plug to the indicator.
- (3) Return the aircraft to its original configuration.

2. INSULATION TEST (INDIVIDUAL PROBES)

Note: This test may be performed with wet or dry tanks.

A. Aircraft Preparation

- (1) Access the interconnect fuel line receptacle (left or right) which is located under the panel's just outboard of the engine nacelles.

Caution: When breaking or making indicator connections, insure applicable circuit breakers are open.

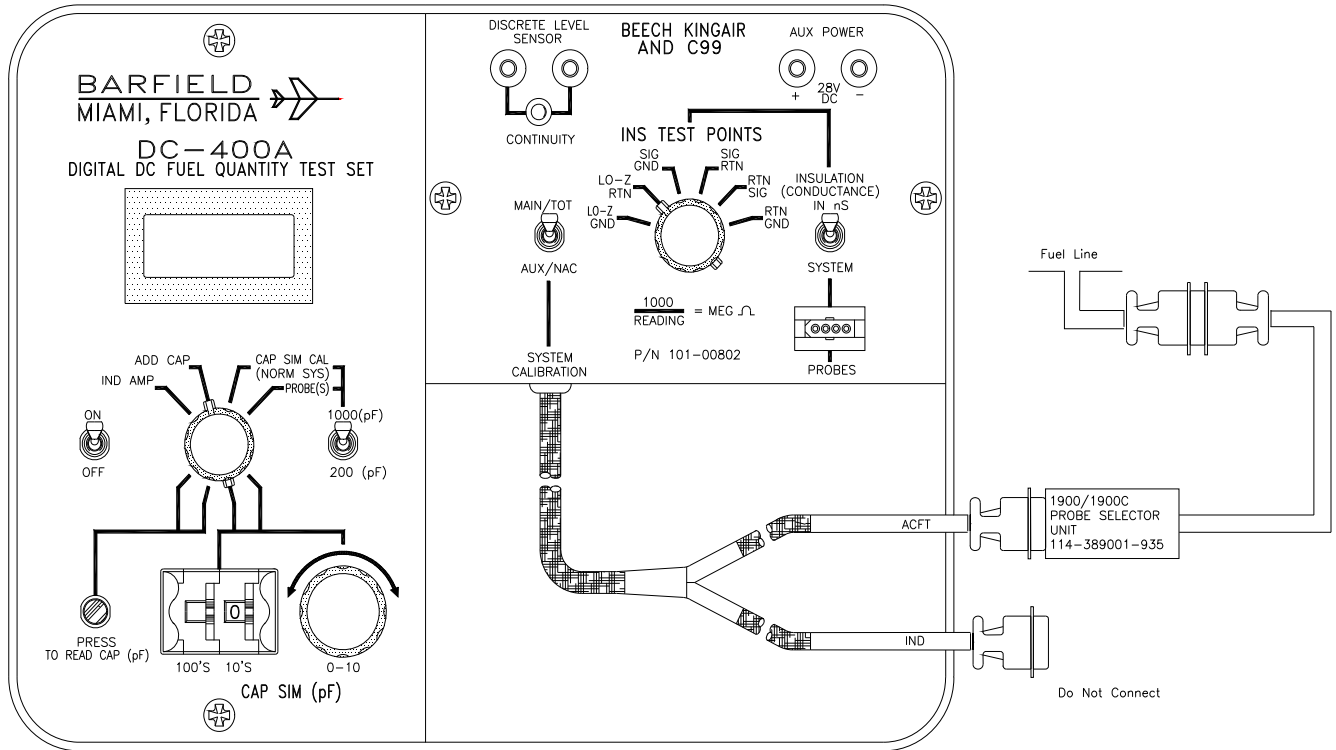
- (2) Open the circuit breakers.
- (3) Disconnect the a/c connector at the interconnect fuel line receptacle.

B. Test Set Preparation

- (1) Set the ON/OFF switch to OFF.
- (2) Rotate the TEST FUNCTION switch to IND AMP.
- (3) Set the INSULATION/SYSTEM switch to INSULATION.
- (4) Rotate the INS TEST POINTS switch to LO-Z/GND.
- (5) Set the AUX/MAIN switch to MAIN/TOT.

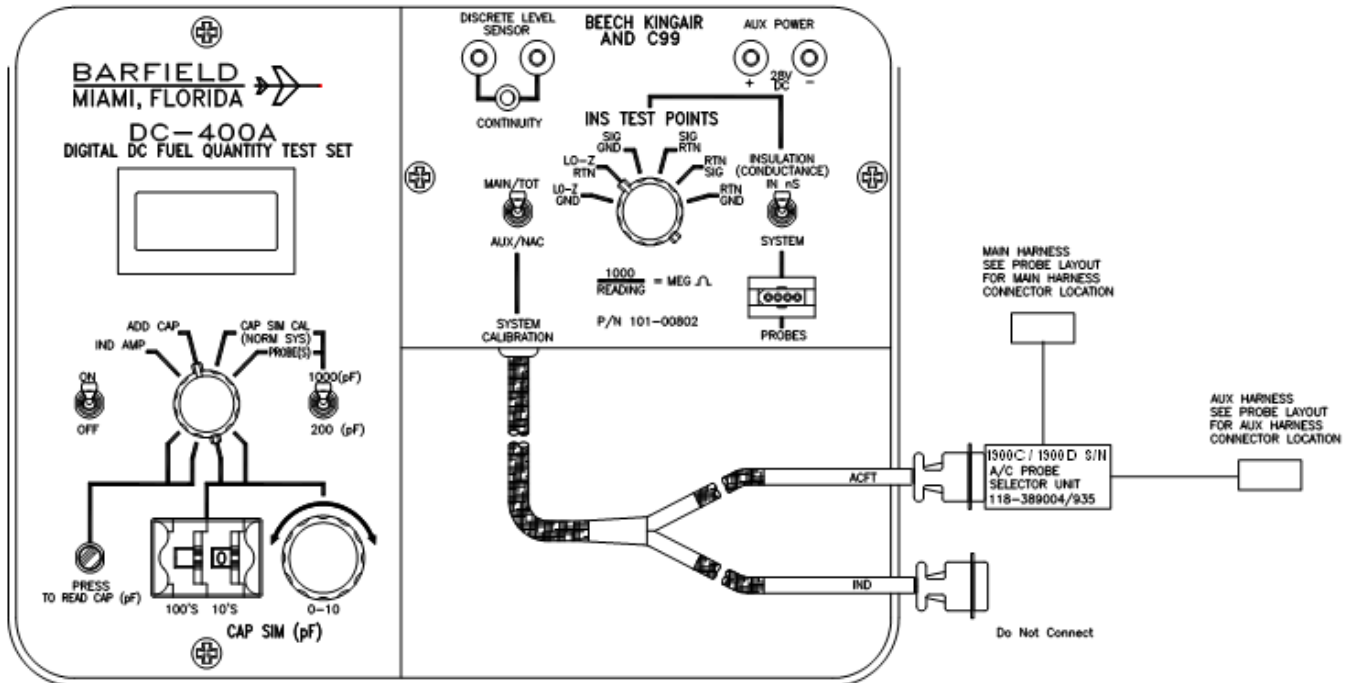
C. Connecting the Test Set

- (1) Set up the T/S as shown in Figure 3 or Figure 4.
- (2) Connect the 1900, 1900C or 1900D Probe Selector Unit (see chapter one, section D, Equipment Required, for the appropriate part numbers) to the Interconnect Fuel Line Receptacle connector (if the aircraft has UA or UB serial numbers) or to the Main Harness disconnect and the Aux Harness disconnect (if the aircraft is UC or UE serial numbers).
- (3) Connect the adapter cable to the Probe Selector unit.
- (4) Connect the T/S ACFT connector to the adapter cable.
- (5) Do not connect the T/S IND connector.



INSULATION TEST

Figure 3 1900 / 1900C (UA & UB) Individual Probes



INSULATION TEST

Figure 4 1900C / 1900D (UC & UD) Individual Probes

D. Test Procedure

- (1) Rotate the 1900/1900C or 1900D Probe Selector Unit switch to the ALL position.
- (2) Set the T/S ON/OFF switch to ON.
- (3) Allow time for the T/S display to stabilize. Sometimes the reading never completely stabilizes. If the reading is in the acceptable range after 30 seconds it should be considered OK.
- (4) Verify that the T/S display reading is less than 50 nS. (Refer to Table 1).
- (5) Rotate the INS TEST POINTS switch through remaining positions and verify that each reading is less than 50 nS EXCEPT when the switch is at the SIG/RTN position.
- (6) With the switch in the SIG/RTN position, the T/S reading will be an "overrange" of 1.

Note: If ALL insulation is out of tolerance, each individual Probe must be tested.

- (7) At the Fuel Probe Selector Unit, select a probe.
- (8) Rotate the INS TEST POINTS selector to each position for each probe and test every probe.

Note: If testing aircraft serial numbers UC or UE and using Probe Selector Unit P/N 118-389004/935, set the ALL/EACH switch to EACH, the MAIN/AUX switch to MAIN. Then, rotate the switch through the MAIN probe positions to take readings. To read the AUX probes, set the ALL/EACH switch to the ALL position, the MAIN/AUX switch to the AUX and the BOTH/EACH switch to BOTH to take readings. If also testing individual AUX probes, set the ALL/EACH switch to EACH, the BOTH/EACH switch to EACH and rotate the switch through the two AUX probe positions and take readings.

- (9) Verify that the T/S reading for each probe is less than 50 nS (the total conductance of ALL probes should not be greater than 50 nS) EXCEPT when the selector is in the SIG/RTN position.

Note: When readings are taken on an individual probe or several probes in parallel, readings when the switch is in the SIG/RTN pos will range between 1500 and an “overrange” of 1.

If P/N 114-389001-17 probe (Gull Airborne) is installed in the collector tank, an “overrange” reading will also appear when the INS TEST POINTS switch is set in the LO-Z/RTN position.

- (10) Set the T/S ON/OFF switch to OFF.

E. Disconnecting/Reconfiguring

- (1) Disconnect the T/S ACFT connector from the adapter cable.
- (2) Disconnect the adapter cable from the Fuel Probe Selector Unit.
- (3) Disconnect the Fuel Probe Selector Unit from the Interconnect Fuel Line Receptacle connector (for 1900/1900C, UA and UB aircraft serial numbers) or from the Main and Aux Harness disconnects (for 1900D and UC and UE aircraft serial numbers).
- (4) Connect the Interconnect Fuel Line Receptacle connector to the aircraft wiring plug (for UA and UB S/N's) or connect the MAIN and ZUX Harness disconnects to aircraft wiring plugs (UC and UE S/N's and 1900D)
- (5) Return the aircraft to its original configuration.

Note: Repeat procedure to test the opposite side.

3. SYSTEM CAPACITANCE TEST

Note: Refer to PRECAUTIONS and PRELIMINARY sections (Chapter 1).

A. Aircraft Preparation

- (1) Disconnect aircraft battery.

Caution: When lowering or raising pilot fuel panel, insure aircraft battery is disconnected.

- (2) Access the indicator.
- (3) Open the circuit breakers.
- (4) Disconnect the aircraft wiring plug located at the indicator.

B. Test Set Preparation

- (1) Set the test set ON/OFF switch to OFF.
- (2) Rotate the TEST FUNCTION switch to PROBE(S).
- (3) Set the INSULATION/SYSTEM switch to SYSTEM.
- (4) Set the MAIN/TOT-AUX/NAC switch to MAIN/TOT.
- (5) Set the 200 (pF)/1000 (pF) switch to 200 (pF) if empty, or 1000 (pF) if FULL.

C. Connecting Test Set

- (1) Connect the test set as shown in Figures 5 and 6.

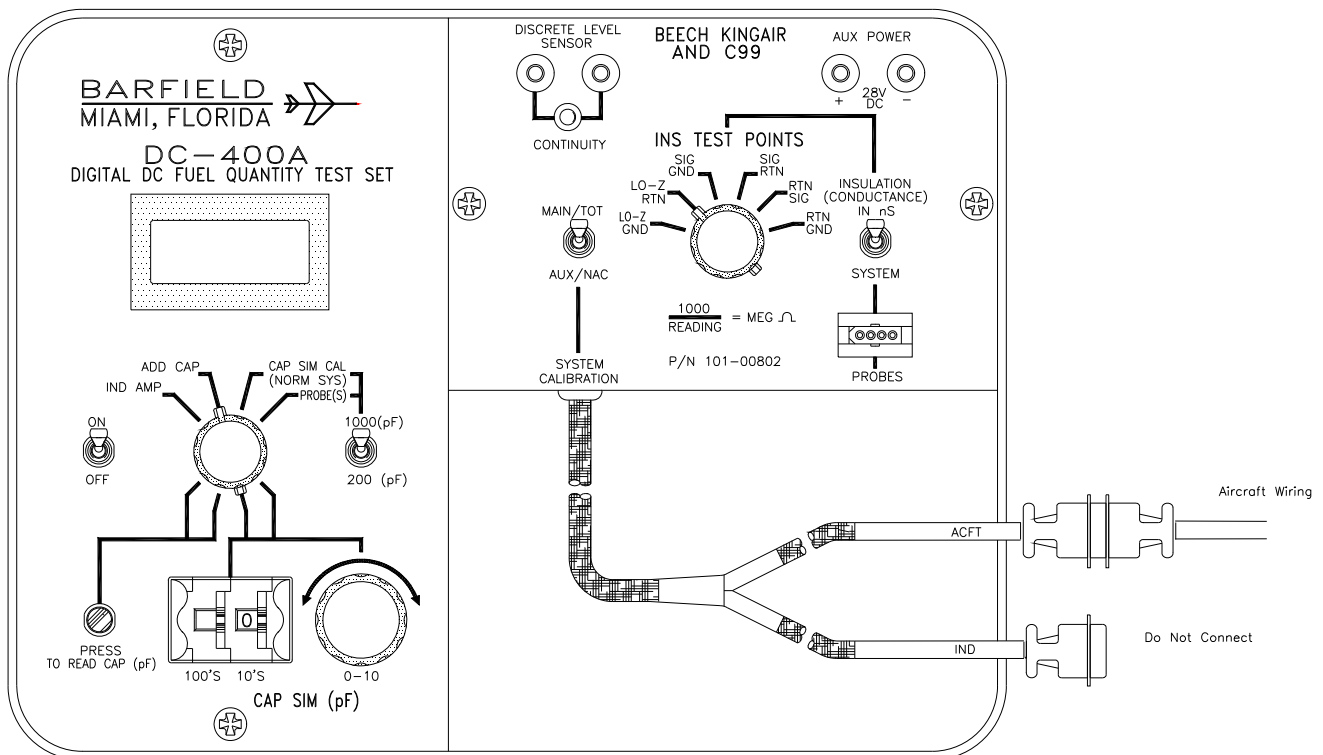


Figure 5 System Capacitance Test Connector Setup

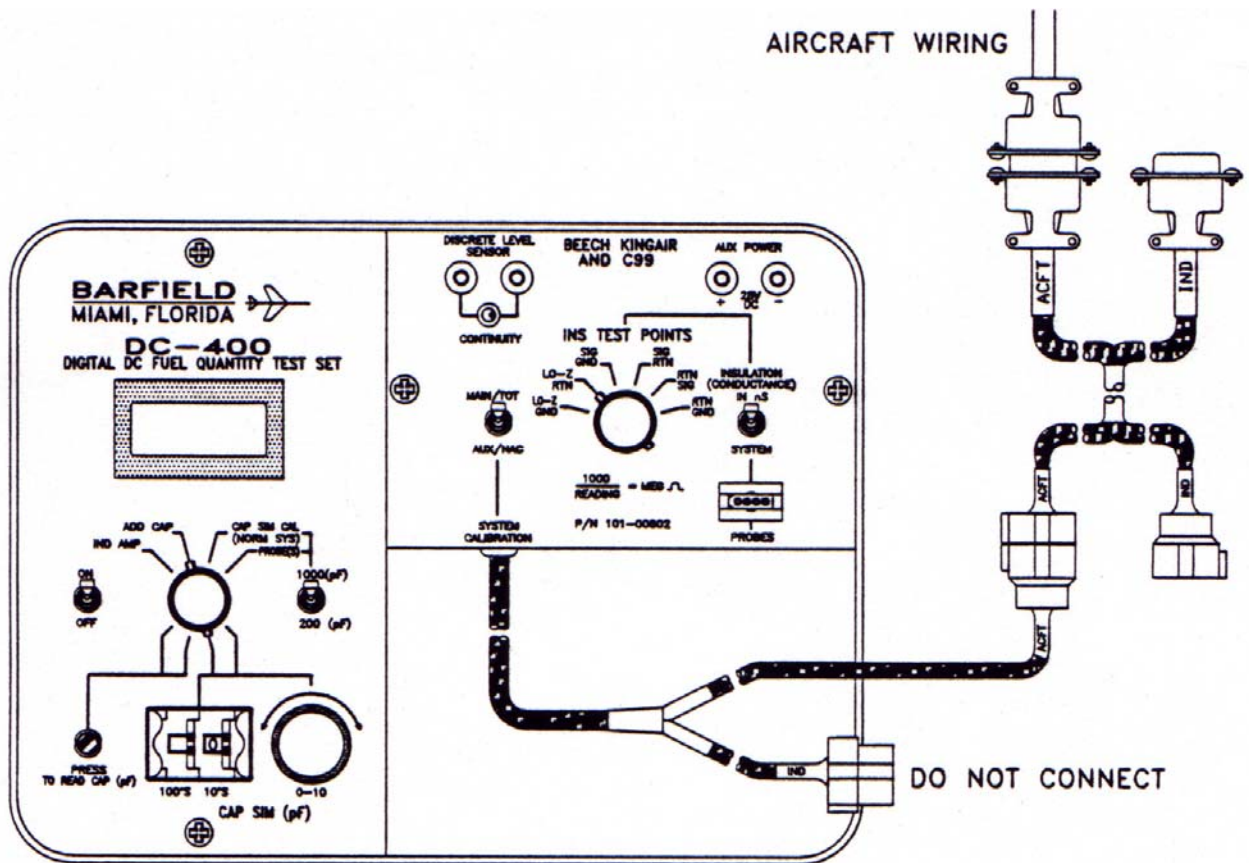


Figure 6 Figure System Capacitance Test Connector Setup

- (2) Connect the test set ACFT connector to the aircraft wiring plug removed that is from indicator.
- (3) Do not connect the test set IND connector.

D. Test

- (1) Set the test set ON/OFF switch to ON.
- (2) If testing aircraft S/N's UC or UE, set the aircraft fuel panel select switch to MAIN or TOTAL.
- (3) Push and hold the test set PRESS TO READ CAP (pF) pushbutton.
- (4) Verify that the tanks' value is within tolerances as specified in Table 2 (Tank Capacitance Empty) or Table 3 (Tank Capacitance Full).

Note: The following values are valid as of this publication's release date and provided as reference. Refer to the Aircraft Maintenance Manual for actual test values.

Aircraft Type	MAIN/TOTAL			AUX/NAC		
	Min	Nom	Max	Min	Nom	Max
1900 (UA) 1900C (UB)	141.6	157.7	173.0	---	---	---
1900C (UC) 1900D (UE)	156.3	159.3	162.2	63.1	64.1	65.1

Table 2 Tank Capacitance Empty

Aircraft Type	MAIN/TOTAL			AUX/NAC		
	Min	Nom	Max	Min	Nom	Max
1900 (UA) 1900C (UB)	233.3	259.2	285.1	----	----	----
1900C (UC) 1900D (UE)	292.6	295.6	298.6	114.2	115.2	116.2

Table 3 Tank Capacitance Full

- (5) Release pushbutton.
- (6) If testing serial numbers UC or UE, set the aircraft fuel panel select switch to AUX.
- (7) Push and hold the PRESS TO READ CAP (pF) pushbutton.
- (8) Verify that the tanks' value is within tolerances as specified in Table 2 (Empty) and Table 3 (Full).

Note: Ensure that capacitance is within specifications. If a test is not within specification, perform the Capacitance Test for Individual Probes (Section 4). When all faults are corrected, restart this System Capacitance Test.

- (9) Set the test set ON/OFF switch to OFF.

Note: If testing the opposite side, repeat procedure.

E. Disconnecting/Reconfiguring

- (1) Disconnect the test set from the aircraft harness.
- (2) Reconnect the aircraft wiring plug to the indicator.
- (3) Reconnect the aircraft battery.
- (4) Close the circuit breakers.
- (5) Return the aircraft to its original configuration.

4. **CAPACITANCE TEST (INDIVIDUAL PROBES)**

Note: Refer to PRECAUTIONS and PRELIMINARY sections (Chapter 1).

A. Aircraft Preparation

Caution: When breaking or making indicator connections, insure that the applicable circuit breaker(s) are open.

- (1) Access the Interconnect Fuel Line Receptacle, left or right, located under the panel's just outboard of the engine nacelles (if testing UA or UB serial numbers) or, access the Main Harness disconnect and Aux Harness disconnect (if testing the UC or UE serial numbers).
- (2) Open the circuit breakers.
- (3) Disconnect the aircraft connector at the Interconnect Fuel Line Receptacle (if testing UA or UB serial numbers) or the Main Harness disconnect and Aux Harness disconnect (if testing the UC or UE serial number).
- (4) If testing UC and UE serial numbers, connect P/N 118-389004/935 between the Aux harness disconnect and the Main harness disconnect. If testing UA or UB serial numbers, connect probe selector unit 114-389001/935 between the interconnect fuel line receptacle and the connection in the fuel line.

B. Test Set Preparation

- (1) Set the ON/OFF switch to OFF.
- (2) Rotate the TEST FUNCTION switch to PROBE(S).
- (3) Set the INSULATION/SYSTEM switch to SYSTEM.
- (4) Set the MAIN/TOT-AUX/NAC switch to MAIN/TOT.
- (5) Set the 200 (pF)/1000 (pF) switch to 200 (pF).

C. Connecting Test Set

- (1) Connect the T/S as shown in Figure 7 or Figure 8.
- (2) Connect the appropriate Probe Selector Unit to the Interconnect Fuel Line Receptacle connector (if testing 1900/1900C, UA and UB) or to the Main Harness disconnect and Aux Harness disconnect (if testing UC and UE).
- (3) Connect the adapter cable to the Probe Selector Unit.
- (4) Connect the T/S ACFT connector to the adapter cable. *Do not connect the T/S IND connector.*

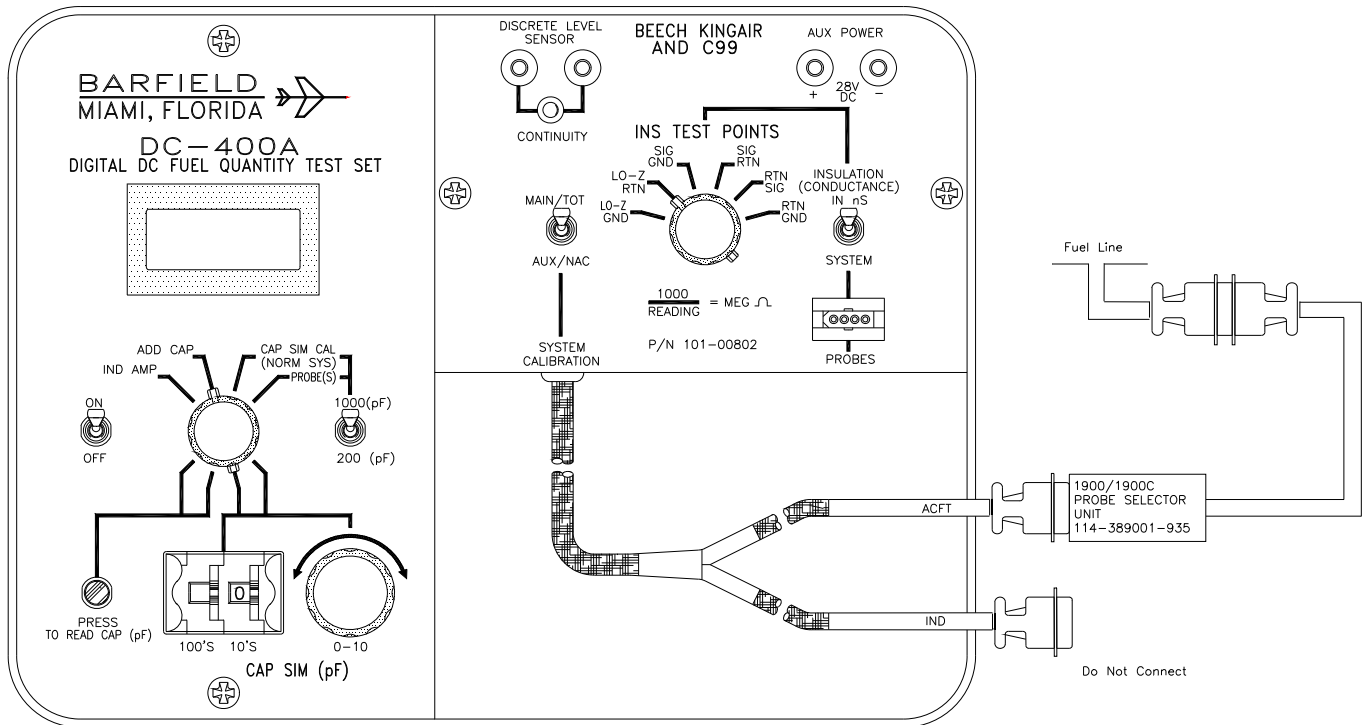


Figure 7 Capacitance Test 1900 / 1900C, UA and UB Individual Probes

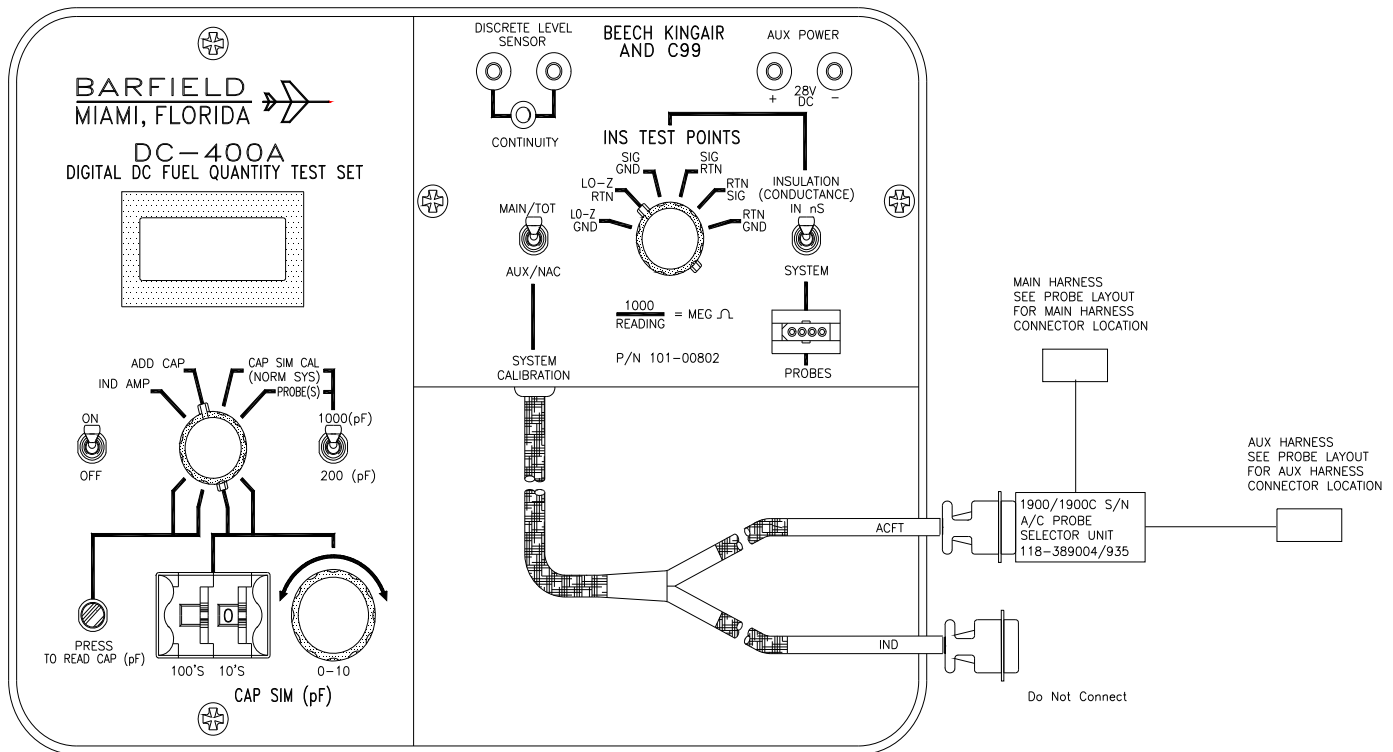


Figure 8 Capacitance Test 1900C / 1900D, UC and UE Individual Probes

D. Test Procedure

- (1) Rotate the Probe Selector Unit switch to ALL.
- (2) Set the T/S switch to ON.
- (3) Press and hold in the PRESS TO READ CAP (pF) pushbutton.
- (4) Verify that the value shown is within tolerances specified in Table 4, Table 5 (for empty tanks) or Table 6, or Table 7 (for full tanks).
- (5) Release the pushbutton.

Note: The following values are valid as of this publication's release date and provided as reference. Refer to the Aircraft Maintenance manual for actual test values.

AIRCRAFT 1900/1900C, UA and UB				
TANK UNIT	BEECH PROBE P/N	MIN	NOM	MAX
Integral Outboard	114-389001-29, -31	17.91	19.90	21.89
Integral Inboard	114-389001-25, -27	20.03	22.25	24.48
Integral Combined	114-389001-25, -27 or -29 and -31	37.94	42.15	46.37
Leading Edge Outboard	114-389001-1, -3	21.01	23.34	25.67
Leading Edge Inboard	114-389001-9, -11	24.75	27.50	30.25
Box Section	114-389001-13, -15	15.89	17.66	19.43
Center Section Outboard	114-389001-5, -7	19.82	22.02	24.22
Center Section Inboard	114-389001-21, -23	14.91	16.57	18.23
Collector Tank	114-389001-17, -19	7.24	8.04	8.84

Table 4 Probe Capacitance Empty (in pF)

AIRCRAFT 1900C/1900D, UC and UE				
TANK UNIT LOCATION WING STATION	BEECH PROBE P/N (Ragen P/N)	MIN	NOM	MAX
41.85	118-389004-41 (75-134-9)	36.6	37.1	37.6
79.65	118-389004-43 (75-134-10)	26.5	27.0	27.5
124.59	118-389004-45 (75-134-11)	6.7	7.2	7.7
135.86	118-389004-13 (75-134-4)	48.2	48.7	49.3
171.29	118-389004-47 (75-134-12)	23.6	24.1	24.6
194.85	118-389004-21 (75-134-6)	23.0	23.5	24.0
223.49	118-389004-25 (75-134-7)	28.6	29.1	29.6
276.01	118-389004-49 (75-134-13)	26.4	26.9	27.4

Table 5 Probe Capacitance Empty (in pF)

AIRCRAFT 1900/1900C, UA and UB				
TANK UNIT	BEECH PROBE P/N	MIN	NOM	MAX
Integral Outboard	114-389001-29, -31	26.4	29.36	32.3
Integral Inboard	114-389001-25, -27	31.2	34.68	38.1
Integral Combined	114-389001-25, -27 or -29 and -31	57.6	64.04	70.4
Leading Edge Outboard	114-389001-1, -3	32.1	35.65	39.2
Leading Edge Inboard	114-389001-9, -11	40.3	44.77	49.2
Box Section	114-389001-13, -15	24.4	27.19	29.9
Center Section Outboard	114-389001-5, -7	39.1	43.46	47.8
Center Section Inboard	114-389001-21, -23	29.1	32.35	35.6
Collector Tank	114-389001-17, -19	10.5	11.71	12.9

Table 6 Probe Capacitance Full (in pF)

AIRCRAFT 1900C/1900D, UC and UE				
TANK UNIT LOCATION WING STATION	BEECH PROBE P/N (Ragen P/N)	MIN	NOM	MAX
41.85	118-389004-41 (75-134-9)	66.0	66.5	67.0
79.65	118-389004-43 (75-134-10)	48.2	48.7	49.2
124.59	118-389004-45 (75-134-11)	13.8	14.3	14.8
135.86	118-389004-13 (75-134-4)	90.5	91.0	91.5
171.29	118-389004-47 (75-134-12)	42.2	42.7	43.2
194.85	118-389004-21 (75-134-6)	43.0	43.5	44.0
223.49	118-389004-25 (75-134-7)	52.6	53.1	53.6
276.01	118-389004-49 (75-134-13)	50.5	51.0	51.5

Table 7 Probe Capacitance Full (in pF)

- (6) Set the 200 (pF)/1000 (pF) switch to 200 (pF).
- (7) Press and hold the PRESS TO READ CAP (pF) pushbutton.
- (8) If testing 1900/1900C, UA and UB, rotate the Probe Selector Unit switch until all probes are tested.
- (9) If testing a/c serial numbers UC and UE, and using Probe Selector Unit P/N 118-389004/935, set the ALL/EACH switch to EACH, the MAIN/AUX switch to MAIN. Then, rotate the switch through the MAIN probe positions to take readings. To read the AUX probes, set the ALL/EACH switch to the ALL position, the MAIN/AUX switch to the AUX and the BOTH/EACH switch to BOTH to take readings. If also testing individual AUX probes, set the ALL/EACH switch to EACH, the BOTH/EACH switch to EACH and rotate the switch through the two AUX probe positions and take readings.
- (10) Verify that the value shown for each probe is within the tolerances specified in Table 4, or Table 5 (for empty tanks) or Table 6, or Table 7 (for full tanks).

Note: If any probe capacitance is out of specifications, refer to the A/C Maintenance Manual for proper procedures.

- (11) Set the T/S ON/OFF switch to OFF.

E. Disconnecting/Reconfiguring

- (1) Disconnect the test set ACFT connector from the adapter cable.
- (2) Disconnect the adapter cable from the Fuel Probe Selector Unit.
- (3) If testing 1900/1900C, UA and UB serial numbers, disconnect the Fuel Probe Selector Unit from the Interconnect Fuel Line Receptacle connector. If testing serial numbers 1900C/1900D, UC and UE serial numbers, disconnect the Fuel Probe Selector Unit from the Main and Aux Harness.
- (4) Connect the Interconnect Fuel Line receptacle connector to the aircraft wiring plug (1900/1900C, UA and UB or connect the Main and Aux Harness disconnect to the aircraft wiring plugs 1900C/1900D, UC and UE).
- (5) Return the aircraft to its original configuration.

Note: If testing the opposite side of the a/c, repeat and follow same procedure.

5. INDICATOR TEST

Note: Refer to PRECAUTIONS and PRELIMINARY sections (Chapter 1).

Note: The Indicator Bench Test (Chapter 3, Section 1) may be performed in place of the Indicator Test.

A. Aircraft Preparation

- (1) Disconnect the aircraft battery.

Caution: When lowering or raising the pilot fuel panel, insure aircraft battery is disconnected.

- (2) Access the indicator.
- (3) Open the appropriate circuit breakers.
- (4) Disconnect the aircraft wiring plug located at the indicator.

B. Test Set Preparation

- (1) Set the ON/OFF switch to OFF.
- (2) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (3) Set the INSULATION/SYSTEM switch to SYSTEM.
- (4) Set the MAIN/TOT-AUX/NAC switch to MAIN/TOT.
- (5) Set the 200 (pF)/1000 (pF) switch to 200 (pF).

C. Connecting Test Set

- (1) Determine the number of pins on connector. Connect test set as shown in Figure 9 or Figure 10 accordingly.

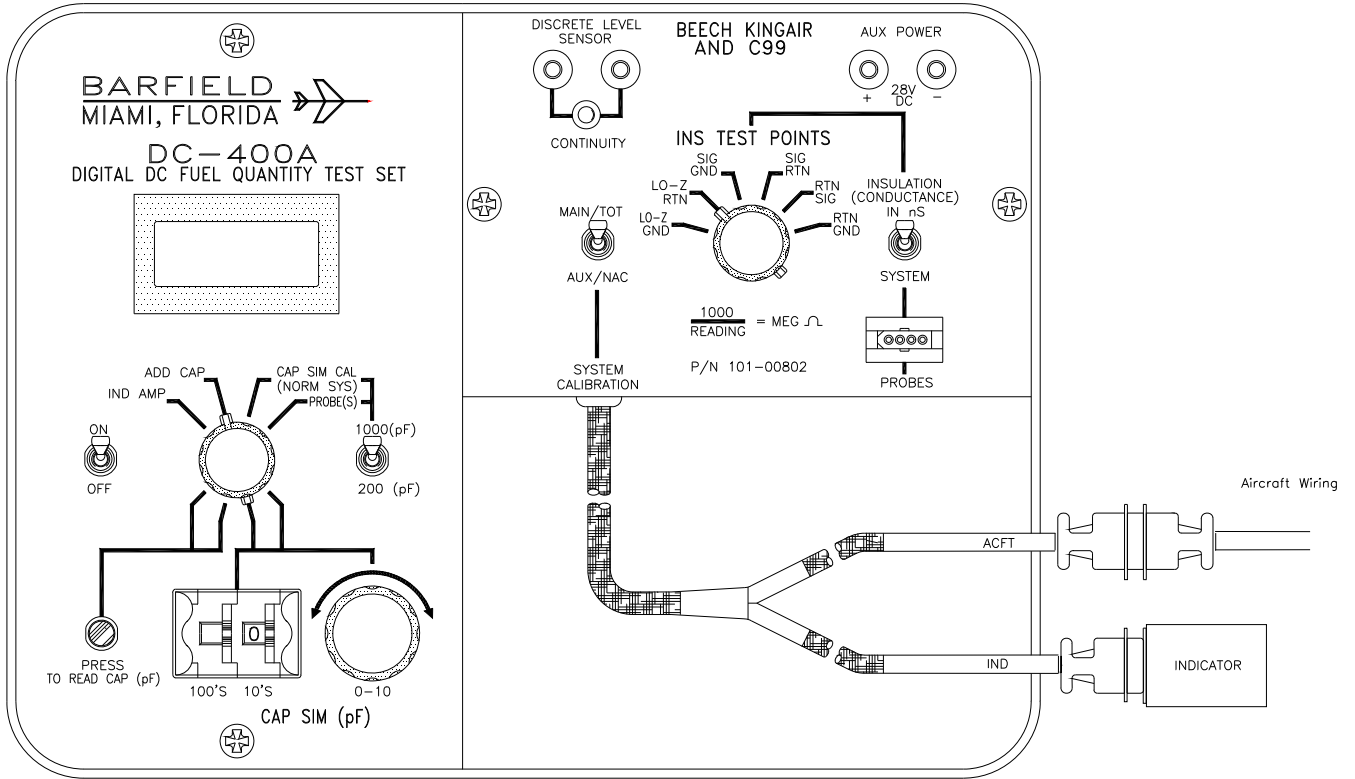


Figure 9 Indicator Test Set Connection

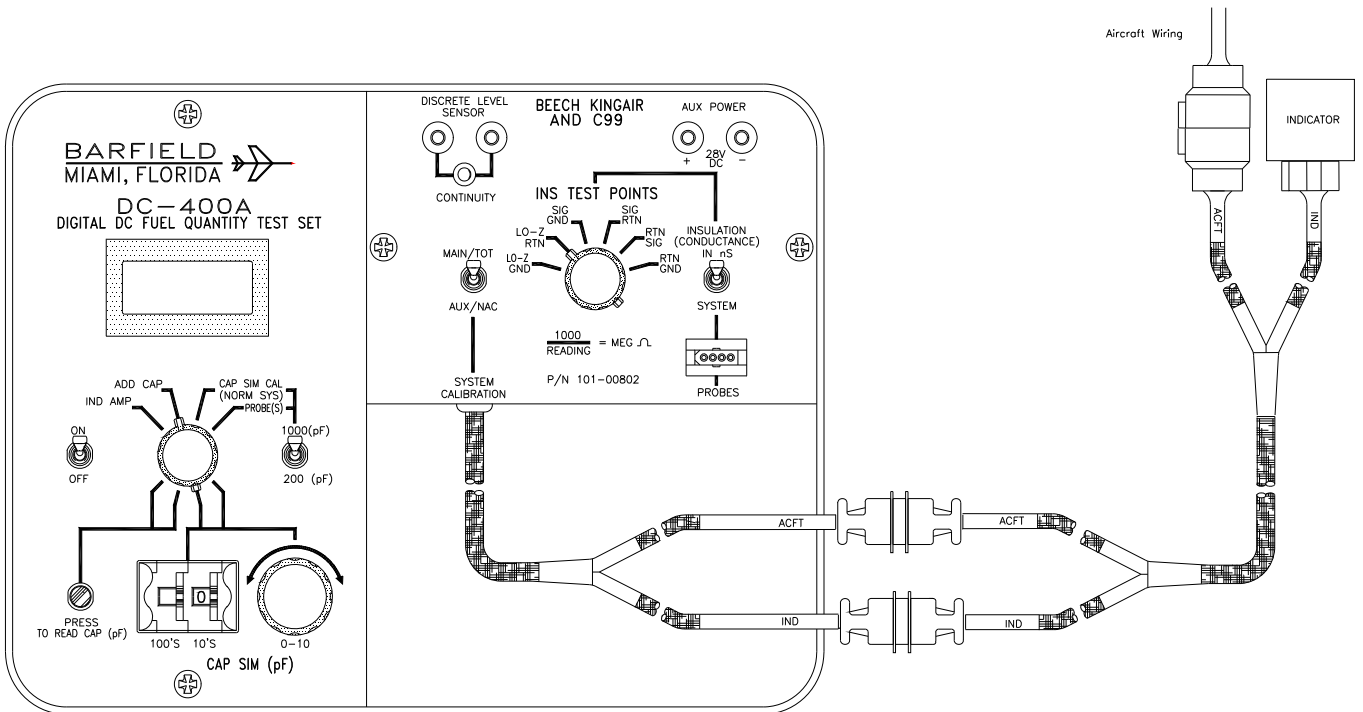


Figure 10 Indicator Test Set Connection

D. Test Procedure

- (1) Set the test set ON/OFF switch to ON.
- (2) Set the CAP SIM (pF) 100's to 1. Set the 10's thumbwheels to 5 for all 1900 models.
- (3) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting CAP SIM (pF) control knob to obtain a test set reading of 156.5 pF (for UA or UB) or a reading of 159.4 pF (for UC or UE)
- (4) Rotate the TEST FUNCTION switch to IND AMP.
- (5) Connect the aircraft battery.
- (6) Close the circuit breakers.
- (7) Turn the aircraft battery ON/OFF switch ON.

Caution: Do not tap bezel of instrument to vibrate. To remove friction, gently tap adjacent panel or rear housing of indicator before taking readings.

- (8) Verify that the indicator reads zero lbs.
- (9) If reading is not zero, adjust EMP 1/E 1 or E located at rear of the indicator.
- (10) If the indicator will not give a zero reading, replace the indicator.
- (11) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (12) Set the 200 (pF)/1000 (pF) switch to 1000 (pF).
- (13) Set the CAP SIM (pF) 100's thumbwheel to 2. Set the 10's thumbwheel to 6 (UA or UB) or to 9 (UC or UE).
- (14) Push and hold the PRESS TO READ CAP (pF) pushbutton while adjusting CAP SIM (pF) control knob to obtain a test set reading of 260.9 pF (for UA or UB) or 295 pF (UC or UE).
- (15) Release the pushbutton.
- (16) Rotate the TEST FUNCTION switch to IND AMP.
- (17) The indicator will read 1400 lbs (UA or UB) or 1600 lbs (UC or UE).
- (18) If the indicator does not show 1400 (UA or UB) or 1600 (UC or UE), adjust FULL adjustment located at rear of the indicator.
- (19) If the indicator still does not give the appropriate reading, replace the indicator.

Note: The following "Aux Empty Adjustment" is applicable for serial numbers UC and UE only. For serial numbers UA or UB, skip to step 31.

- (20) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (21) Set the 200 (pF)/1000 (pF) switch to 200 (pF).
- (22) Set the CAP SIM (pF) 100's thumbwheel to "-". Set the 10's thumbwheel to 6.

- (23) Push and hold the PRESS TO READ CAP (pF) pushbutton while adjusting CAP SIM (pF) control knobs. Verify that the T/S displays 64.1 pF.
- (24) Release pushbutton.
- (25) Set the MAIN/TOT-AUX/NAC switch to AUX/NAC.
- (26) Rotate TEST FUNCTION switch to IND AMP.
- (27) Verify the indicator reads 0 lbs.
- (28) If reading is not 0 lbs., adjust the indicator using the EMP 2/E 2 switch located at rear of indicator.
- (29) If the indicator still does not read 0, replace the indicator.
- (30) Repeat steps (1) thru (29) until an accurate gage adjustment is obtained.
- (31) Set the MAIN/TOT – AUX/NAC switch to MAIN/TOT.
- (32) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (33) Set the 200 (pF)/1000 (pF) switch to 1000 (pF).
- (34) Set the CAP SIM (pF) 100's thumbwheel to 1 and the 10's thumbwheel to 7 (UA and UB). Set 100's and 10's thumbwheels to 1 and 8 (UC and UE).
- (35) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain a test set reading of 178.9 pF (UA and UB) or 185.0 pF (UC and UE).
- (36) Rotate the TEST FUNCTION switch to IND AMP.
- (37) Verify the indicator reads 300 ±35 lbs.
- (38) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (39) Set the CAP SIM (pF) 100's thumbwheel to "2". Set the 10's thumbwheel to "0" (UA and UB) or to "1" (UC and UE).
- (40) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain a test display of 201.2 pF (UA and UB) or 210.0 pF (UC and UE).
- (41) Rotate the TEST FUNCTION switch to IND AMP.
- (42) Verify the indicator reads 600 ±35 lbs.
- (43) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (44) Set the CAP SIM (pF) 100's thumbwheels to "2". Set the 10's thumbwheel to "2" (UA and UB) or to "3" (UC and UE).
- (45) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting CAP SIM (pF) control knob to obtain a test set display of 223.6 pF (UA and UB) or 236.0 pF (UC and UE).
- (46) Rotate the TEST FUNCTION switch to IND AMP.
- (47) Verify the indicator reads 900 ±35 lbs.
- (48) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (49) Set the CAP SIM (pF) 100s thumbwheel to "2". Set the 10s thumbwheel to "4" for the UA and UB or "6" for the UC and UE serial numbers.

- (50) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain a test set display of 246.0 pF for the UA and UB or 261.0 pF for the UC and UE serial numbers.
- (51) Rotate the TEST FUNCTION switch to IND AMP.
- (52) Verify the indicator reads 1200 +/-35 lbs.
- (53) Set the test set ON / OFF switch to OFF.

E. Disconnecting / Reconfiguring

- (1) Open the circuit breakers.
- (2) Disconnect the test set ACFT connector from aircraft wiring plug or adapter cable.
- (3) Disconnect the test set IND connector from the indicator or adapter cable.
- (4) Connect the aircraft wiring plug to the indicator.
- (5) Return the aircraft to its original configuration.

6. **PREFERRED CALIBRATION TEST (WITH DRY TANKS)**

Note: See PRECAUTIONS and PRELIMINARY sections (Chapter 1).

Note: When draining facilities are not readily available, the Alternate Calibration Test (Chapter 3, Section 2) may be used as a temporary measure.

The preferred calibration is done with dry tanks. This method is the most accurate for calibration since the indicator zero reading is set to the actual empty tank condition. A capacitance value, applied to system by the test set, is substituted for an equivalent quantity of fuel in the tanks. The indicator is adjusted to read the substituted fuel quantity.

A. Aircraft Preparation

CAUTION: Refer to the Aircraft Maintenance Manual for proper defueling and fueling procedures. Observe all safety precautions.

- (1) Ensure aircraft is defueled. Drain sumps.
- (2) Disconnect the aircraft battery.
- (3) Maintain the circuit breakers open.
- (4) Access the indicator.
- (5) Disconnect the aircraft wiring plug from the indicator.

B. Test Set Preparation

- (1) Insure the test set ON/OFF switch is OFF.
- (2) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (3) Set the INSULATION/SYSTEM switch to SYSTEM.
- (4) Set the MAIN/TOT-AUX/NAC switch to MAIN/TOT.
- (5) Set the 200 (pF)/1000 (pF) switch to 200 (pF).
- (6) Set the CAP SIM (pF) 100's thumbwheels to "1". Set the 10's to "0" for the UA & UB serial numbers and "3" for the UC and UE serial numbers.

C. Connecting Test Set

- (1) Determine number of pins on indicator connector and connect test set as shown in Figure 9 or Figure 10 accordingly.

D. Test

- (1) Set test set ON/OFF switch to ON.
- (2) Press and hold PRESS TO READ CAP (pF) pushbutton while adjusting CAP SIM (pF) control knob to obtain a test set reading according to the following table.

Aircraft	Add For Full Simulator (pF)
1900/1900C, UA and UB	104.0
1900C/1900D, UC and UE	135.9

Table 8 Add for Full

- (3) Release the pushbutton.
- (4) Connect the aircraft battery.
- (5) Close the circuit breakers.

Caution: Do not tap bezel of instrument to vibrate. To remove friction, gently tap adjacent panel or rear housing of indicator before taking readings.

- (6) Verify the indicator reads slightly *below* zero (approximately one needle width).
- (7) If pointer position is not acceptable, use the EMP 1/E 1 or E/EMP adjustment on rear of indicator to obtain the correct pointer position.
- (8) Rotate the TEST FUNCTION switch to ADD CAP.
- (9) Verify the indicator reads 1400 lbs (UA and UB) or 1600 lbs (UC and UE).
- (10) If the indicator does not give the appropriate reading, use the F/FULL adjustment located on the rear of the indicator to obtain correct reading.

Note: **AUX calibration** is applicable only for 1900C/1900D (UC and UE). If testing 1900/1900C (UA and UB) skip to step (16).

- (11) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (12) Set the aircraft fuel panel select switch to AUX/NAC and hold.
- (13) Verify the indicator shows zero lbs
- (14) If pointer position is not acceptable, use the EMP 2/E 2 adjustment located at rear of the indicator to obtain a desirable pointer position.
- (15) Repeat steps (2) thru (14) until an accurate calibration is obtained.
- (16) Set the test set ON/OFF switch to OFF.

E. Disconnecting or reconfiguring

- (1) Open the circuit breakers.
- (2) Disconnect the test set ACFT connector from aircraft wiring plug or the adapter cable.
- (3) Disconnect the test set IND connector from the indicator or adapter cable.
- (4) Disconnect the adapter cable from the aircraft wiring and indicator.
- (5) Connect the aircraft plug to indicator.
- (6) Return the aircraft to original configuration.

7. **SYSTEM WIRING INTEGRITY TEST**

Note: Refer to PRECAUTIONS and PRELIMINARY sections (Chapter 1).

Note: Insure that the Insulation, Capacitance, Indicator test and Preferred Calibration have all been accomplished with satisfactory results and that the tanks are still dry prior to attempting this test.

This test is used to determine whether there exists an inline (series) resistance problem in the aircraft wiring. It will be accomplished by a comparison of the aircraft empty probes capacitance versus a simulated capacitance from the Test Set to drive the cockpit indicator to the same point. No adjustment of the Indicator should be made during this test or based on the outcome of this test. If repairs are made to the harness following this test, then the Preferred Calibration must be repeated and subsequently this integrity test.

A. Aircraft Preparation

- (1) Disconnect aircraft battery.

Caution: When lowering or raising the fuel panel, ensure aircraft battery is disconnected.

- (2) Access the indicator.
- (3) Open the circuit breakers.
- (4) Disconnect the aircraft wiring plug located at the indicator.

B. Test Set Preparation

- (1) Set the test set ON/OFF switch to OFF.
- (2) Rotate the TEST FUNCTION switch to PROBE(S).
- (3) Set the INSULATION/SYSTEM switch to SYSTEM.
- (4) Set the MAIN/TOT-AUX/NAC switch to MAIN/TOT.
- (5) Set the 200 (pF)/1000 (pF) switch to 200 (pF).

C. Connecting Test Set

- (1) Connect the test set as shown in either Figure 3 or 4. Figure 3 depicts using Adapter Cable 101-00831 for conversion to systems with circular style connectors.
- (2) Connect the test set ACFT connector to the aircraft wiring plug removed from indicator.
- (3) Do not connect the test set IND connector.

D. Test

- (1) Set the test set ON/OFF switch to ON.
- (2) Set the aircraft fuel panel select switch to MAIN or TOTAL.
- (3) Push and hold the test set PRESS TO READ CAP (pF) pushbutton.
- (4) Record the capacitance value measured.
- (5) Release the pushbutton.
- (6) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (7) Set the CAP SIM (pF) 100's and the 10's thumbwheels to the closest approximation of the recorded value of step 4.
- (8) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain the recorded value of step 4.
- (9) Set the test set ON/OFF switch to OFF.
- (10) Connect the test set to the Indicator as shown in either Figure 5 or 6. Figure 5 depicts using Adapter Cable 101-00831 for conversion to systems with circular style connectors.
- (11) Connect the aircraft battery if not already connected.
- (12) Close the circuit breakers.
- (13) Turn the aircraft battery ON/OFF switch ON.
- (14) Set the test set ON/OFF switch to ON.

Caution: Do not tap bezel of instrument to vibrate. To remove friction, gently tap adjacent panel or rear housing of indicator before taking readings.

- (15) Verify the indicator reads slightly below zero (approximately one needle width).
- (16) Rotate the TEST FUNCTION switch to IND AMP.

Caution: Do not tap bezel of instrument to vibrate. To remove friction, gently tap adjacent panel or rear housing of indicator before taking readings.

- (17) Verify the indicator reads the same as in step 15 within one needle width.

Note: Failure to obtain the correct indication may indicate the possibility of in-line resistance in the aircraft wiring between the Indicator and the probes. If this condition is found to exist, disconnect and clean the wing harness connector with contact cleaner and gently blow dry. If the condition persists disconnect and clean the fuel panel connector behind the LH sidewall below the fuel panel in the same manner. When cleaning the connectors be sure to include the test sets connectors.

- (18) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (19) Set the CAP SIM (pF) 100's and the 10's thumbwheels to the closest approximation of the required value as per Table 4.
- (20) Press and hold PRESS TO READ CAP (pF) pushbutton while adjusting CAP SIM (pF) control knob to obtain a test set reading according to Table.4.
- (21) Release the pushbutton.
- (22) Rotate the TEST FUNCTION switch to ADD CAP.
- (23) Verify the indicator reads 1400 lbs. for the UA & UB serial numbers and 1600 lbs. for the UC and UD serial numbers.
Caution: Do not tap bezel of instrument to vibrate. To remove friction, gently tap adjacent panel or rear housing of indicator before taking readings.
- (24) Record the exact indicator reading.
- (25) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (26) Set the CAP SIM (pF) 100's and the 10's thumbwheels to the closest approximation of the sum of aircraft capacitance from step 4 and value used from Table 4.
- (27) Press and hold PRESS TO READ CAP (pF) pushbutton while adjusting CAP SIM (pF) control knob to obtain the summed value.
- (28) Release the pushbutton.
- (29) Rotate the TEST FUNCTION switch to IND AMP.
Caution: Do not tap bezel of instrument to vibrate. To remove friction, gently tap adjacent panel or rear housing of indicator before taking readings.
- (30) Verify the indicator reads the same as in step 24 \pm 40 lbs.
Note: Failure to obtain the correct indication may indicate the possibility of in-line resistance in the aircraft wiring between the Indicator and the probes. If this condition is found to exist, disconnect and clean the wing harness connector with contact cleaner and gently blow dry. If the condition persists disconnect and clean the fuel panel connector behind the LH sidewall below the fuel panel in the same manner. When cleaning the connectors be sure to include the test sets connectors.
- (31) Set the test set ON/OFF switch to OFF.
- (32) For 1900 / 1900C (UA and UB) proceed to step E.(1) to disconnect the test equipment.
- (33) Turn the aircraft battery ON/OFF switch OFF.
- (34) Open the circuit breakers.

- (35) Disconnect the aircraft battery if previously connected.
- (36) Connect the test set as shown in either Figure 3 or 4 as applicable.

Note: The battery must be connected; the battery switch set to ON position and the circuit breakers closed for this test.
- (37) Rotate the TEST FUNCTION switch to PROBE(S).
- (38) Set the test set ON/OFF switch to ON.
- (39) Set the aircraft fuel panel select switch to AUX / NAC and hold if applicable.
- (40) Push and hold the test set PRESS TO READ CAP (pF) pushbutton.
- (41) Record the capacitance value measured.
- (42) Release the pushbutton.
- (43) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (44) Set the CAP SIM (pF) 100's and the 10's thumbwheels to the closest approximation of the recorded value of step 40.
- (45) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain the recorded value of step 40.
- (46) Set the test set ON/OFF switch to OFF.
- (47) Turn the aircraft battery ON/OFF switch to OFF if applicable.
- (48) Disconnect the aircraft battery if previously connected.
- (49) Connect the test set to the Indicator as shown in either Figure 5 or 6 as applicable.
- (50) Reconnect the aircraft battery.
- (51) Close the circuit breakers.
- (52) Turn the aircraft battery ON/OFF switch ON.
- (53) Set the test set ON/OFF switch to ON.
- (54) Set the aircraft fuel panel select switch to AUX / NAC and hold, if applicable.

Caution: Do not tap bezel of instrument to vibrate. To remove friction, gently tap adjacent panel or rear housing of indicator before taking readings.

- (55) Verify the indicator reads zero pounds.
- (56) Rotate the TEST FUNCTION switch to IND AMP.

Caution: Do not tap bezel of instrument to vibrate. To remove friction, gently tap adjacent panel or rear housing of indicator before taking readings.

- (57) Verify the indicator reads the same as in step 55 within one needle width.

Note: Failure to obtain the correct indication may indicate the possibility of in-line resistance in the aircraft wiring between the Indicator and the probes. If this condition is found to exist, disconnect and clean the wing harness connector with contact cleaner and gently blow dry. If the condition persists disconnect and clean the fuel panel connector behind the LH sidewall below the fuel panel in the same manner. When cleaning the connectors be sure to include the test sets connectors.

(58) Set the test set ON/OFF switch to OFF.

E. Disconnecting or reconfiguring

(1) Open the circuit breakers.

Caution: When lowering or raising the fuel panel, ensure aircraft battery switch is OFF and this battery is disconnected.

(2) Disconnect the test set ACFT connector from aircraft wiring plug or the adapter cable.

(3) Disconnect the test set IND connector from the indicator or adapter cable.

(4) Disconnect the adapter cable from the aircraft wiring and indicator.

(5) Connect the aircraft plug to indicator.

(6) Return the aircraft to original configuration.

CHAPTER 3 ALTERNATE TESTS

1. PROBES BENCH TEST

Note: See PRECAUTIONS and PRELIMINARY sections (Chapter 1).

A. Test Set Preparation

- (1) Set the test set ON/OFF switch to OFF.
- (2) Rotate the TEST FUNCTION switch to PROBE(S).
- (3) Set the INSULATION/SYSTEM switch to SYSTEM.
- (4) Set the MAIN/TOT-AUX/NAC switch to MAIN/TOT.
- (5) Set the 200 (pF)/1000 (pF) switch to 200 (pF).

B. Connecting Test Set

- (1) Refer to Figure 11 and connect the test set to the probe as shown.
- (2) Connect the Beech probe adapter, P/N 101-00829 or 101-00814, to the test set PROBES receptacle as shown in the Figure 11.
- (3) If necessary, use the Beech made alligator clip adapters (UA and UB) or adapter pins (UC and UE) to attach P/N 101-00829 harness to the probes as shown in Figure 12.

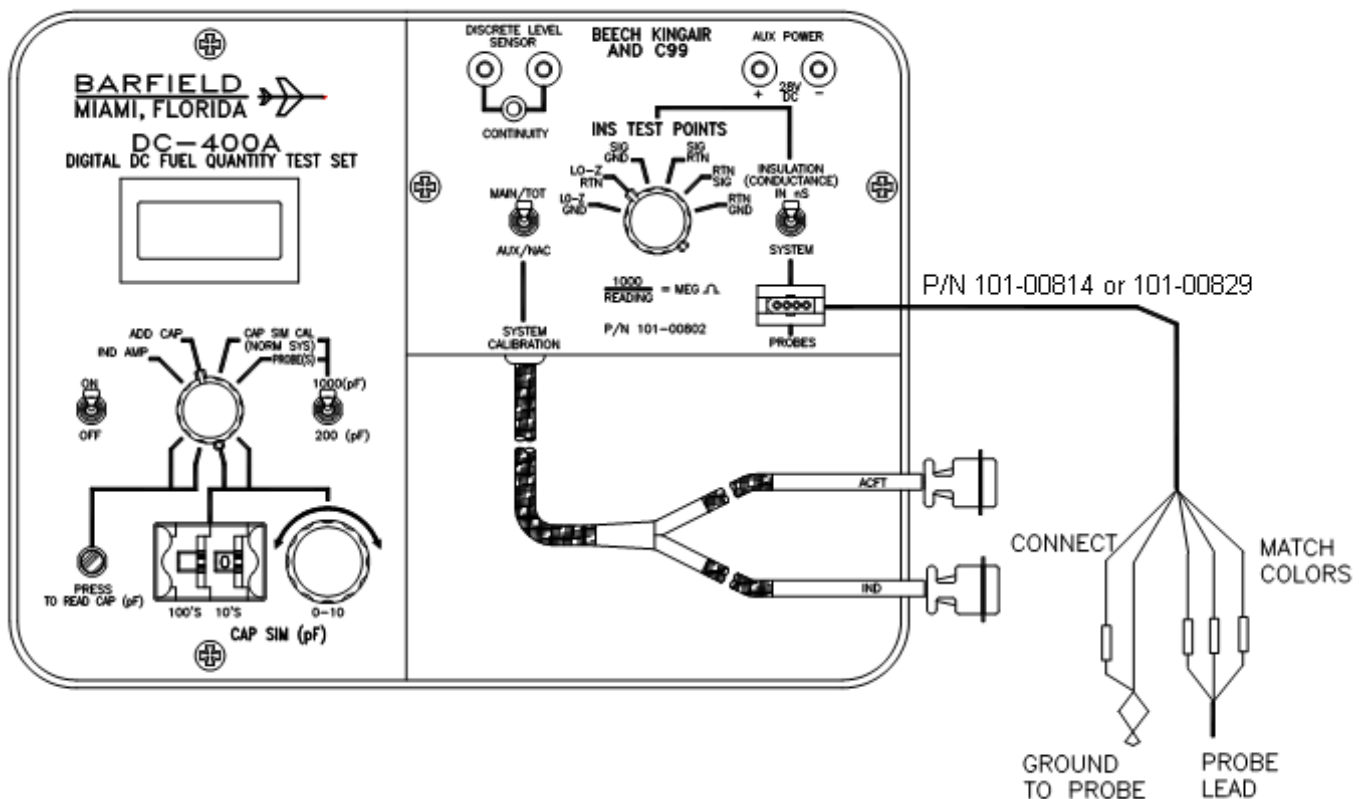


Figure 11 Bench Probe Interface

- (4) Determine the P/N and physical makeup of the probe-under-test.
- (5) Connect the color-coded pin sockets from the probe adapter to the matching color of the probe lead wire pins or the alligator clips or probe threaded terminals by thread size and color as applicable.
- (6) Connect the socket pin ground lead of the probe adapter to the ground clip pigtail of the probe adapter. Attach the ground clip to the grounding area on the probe.

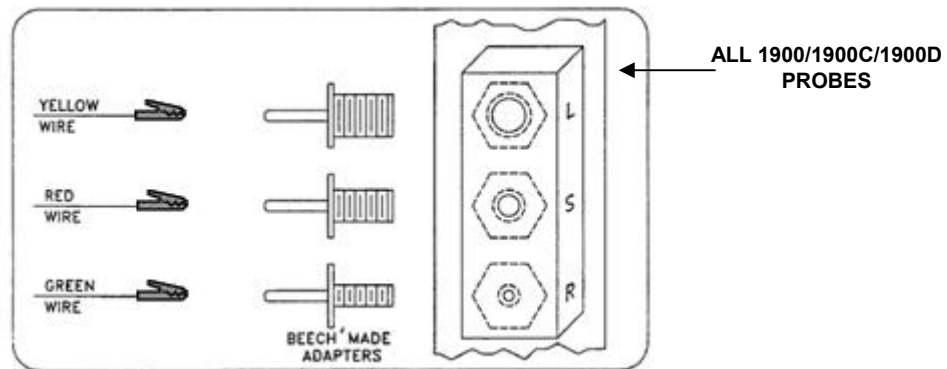


Figure 12 Probes Bench Test

C. Test

- (1) Set the test set switch to ON.
- (2) Press the PRESS TO READ CAP (pF) pushbutton to display probe capacitance.
- (3) Verify probe capacitance is within the tolerance referenced in Table 4 through Table 7.
- (4) If value is not within tolerance, reject probe.
- (5) Set the test set ON/OFF switch to OFF.
- (6) Rotate the TEST FUNCTION switch to IND AMP.
- (7) Set the INSULATION/SYSTEM switch to INSULATION.
- (8) Disconnect the pin socket ground lead of the probe adapter from the ground clip pigtail. Disconnect the small black wire from the ground clip.
- (9) Rotate the INS TEST POINT switch to LO-Z GND.
- (10) Set the ON/OFF switch to ON.
- (11) Allow time for test set display to stabilize.
- (12) Verify the test set display shows less than 50nS. (Refer to Table 1.)
- (13) Rotate the INS TEST POINT switch to each remaining position except SIG/RTN and verify each time that the test set display shows less than 50nS.

- (14) With the INS TEST POINT switch at SIG/RTN position, verify the test set display shows a value between 1500 and an “over range” of 1.

Note: If testing the 1900/1900C, UA and UB, an over range also appears when the INS TEST POINT switch is in LO-Z/RTN position and P/N 114-389001-17 Probe (Gull Airborne) is installed in the collector tank.

- (15) Verify conductance is within specifications. If test results are outside limits, repeat test.
- (16) Set ON/OFF switch to OFF.
- (17) Disconnect Probe adapter from Probe.
- (18) Disconnect Probe adapter from T/S.

2. INDICATOR BENCH TEST

Note: See PRECAUTIONS and PRELIMINARY sections (Chapter 1).

Note: Failure to calibrate the system after performing the indicator bench test will result in an inaccurate fuel quantity reading.

A. Test Set Preparation

- (1) Set the ON/OFF switch to OFF.
- (2) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (3) Set the INSULATION/SYSTEM switch to SYSTEM.
- (4) Set the MAIN/TOT-AUX/NAC switch to MAIN/TOT.
- (5) Set the 200 (pF)/1000 (pF) switch to 200 (pF).

B. Connecting Test Set

- (1) Determine the number of pins on the connector and connect the test set as shown in Figure 13 or Figure 14.
- (2) Connect the 28 VDC power supply to the test set AUX POWER jacks. Observe polarity.

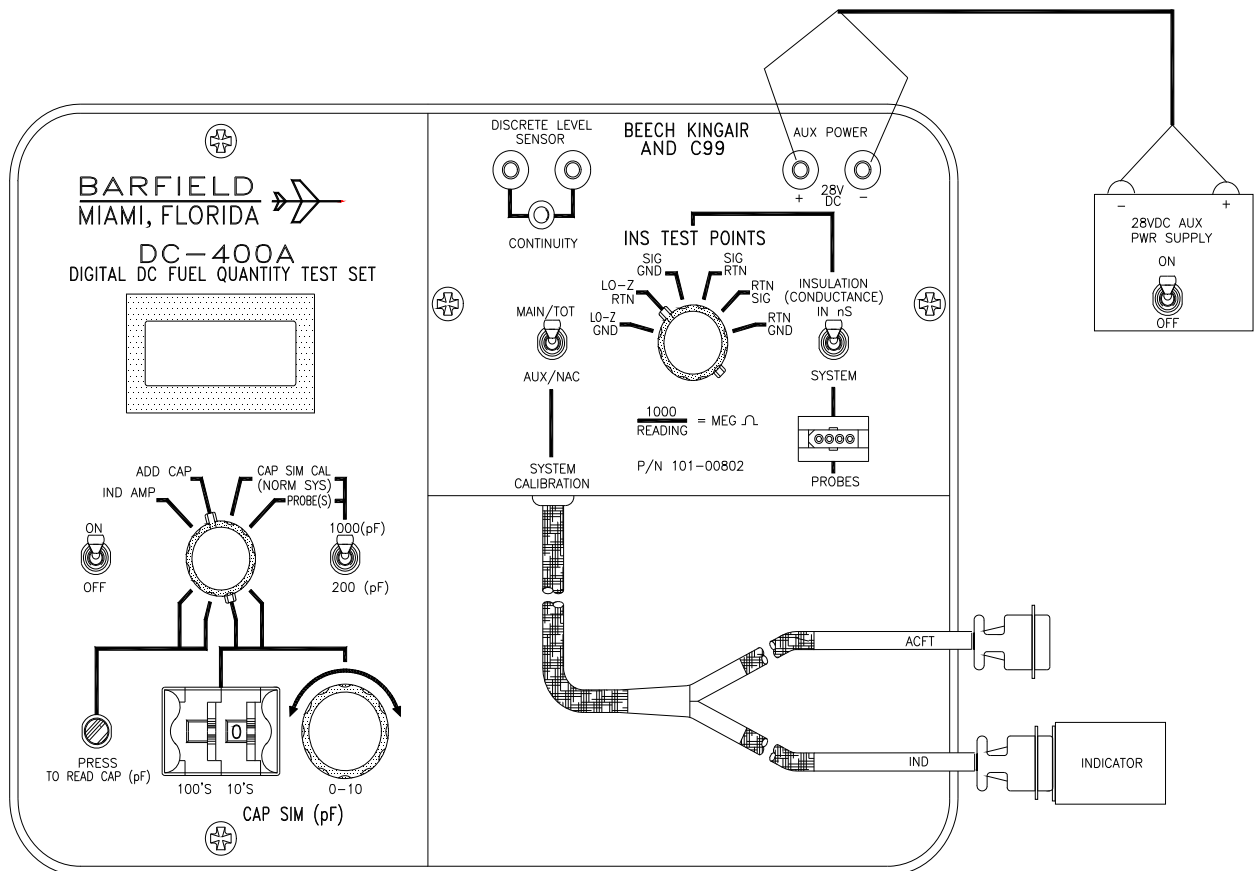


Figure 13 Indicator Bench Test Connection

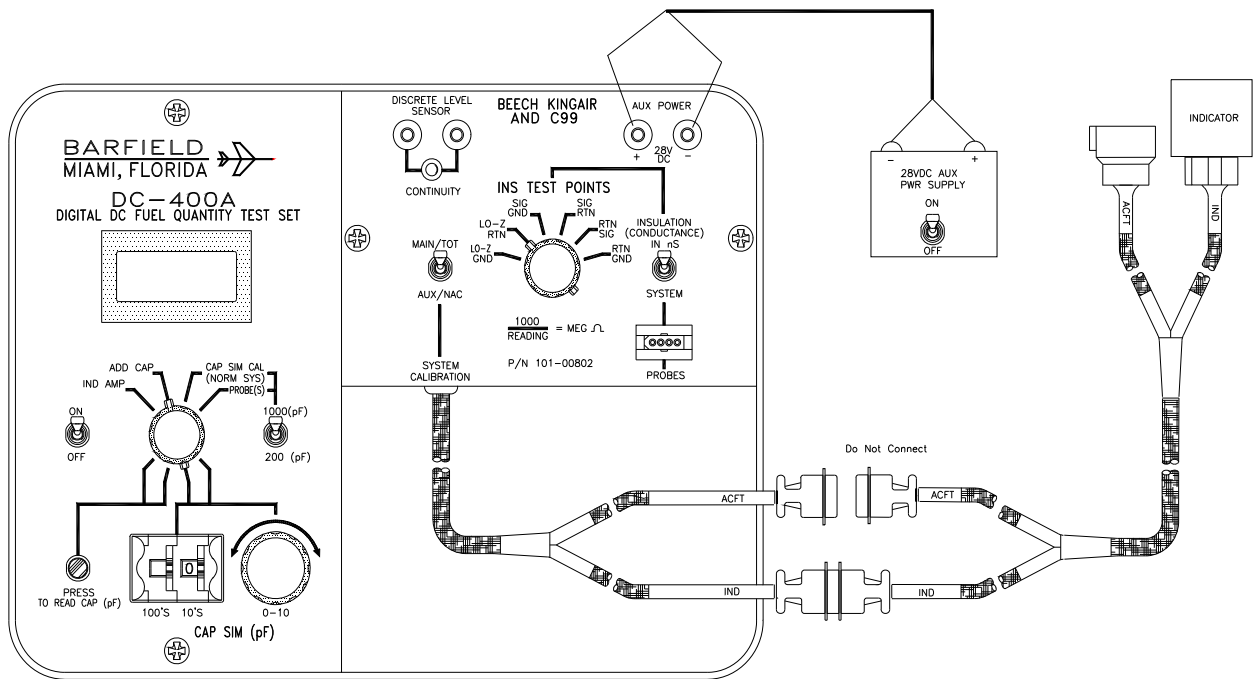


Figure 14 Indicator Bench Test Connection

C. Test Procedure

- (1) Set the test set ON/OFF switch to ON.
- (2) Set the CAP SIM (pF) 100's to 1. Set the 10's thumbwheels to 5 for all 1900 models.
- (3) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting CAP SIM (pF) control knob to obtain a test set reading of 156.5 pF (for UA and UB serial numbers) or 159.4 (for UC and UE serial numbers).
- (4) Release the pushbutton.
- (5) Rotate the TEST FUNCTION switch to IND AMP.
- (6) Set the 28 VDC power supply ON/OFF switch to ON.

Caution: Do not tap bezel of instrument to vibrate. To remove friction, gently tap adjacent panel or rear housing of indicator before taking readings.

- (7) Verify the indicator reads zero lbs.
- (8) If reading is not zero, adjust EMP 1/E 1 or E located at rear of indicator.
- (9) If the indicator will not give a zero reading, replace the indicator.
- (10) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).

- (11) Set the 200 (pF)/1000 (pF) switch to 1000 (pF).
- (12) Set the CAP SIM (pF) 100's thumbwheel to 2. Set the 10's thumbwheel to "5" (for S/N's UA and UB); set to 9 (for UC and UE S/N's).
- (13) Push and hold the PRESS TO READ CAP (pF) pushbutton while adjusting CAP SIM (pF) control knob to obtain a test set reading of 260.9 pF (for S/N's UA and UB); 295 pF (for UC and UE S/N's).
- (14) Release the pushbutton.
- (15) Rotate the TEST FUNCTION switch to IND AMP.
- (16) Verify the indicator reads 1400 lbs. (for UA and UB S/N's) or 1600 lbs. (for UC and UE S/N's).
- (17) If the indicator does not show 1400 lbs (for UA & UB S/N's) or 1600 lbs (for UC and UE S/N's), adjust the F/FULL located at rear of indicator.
- (18) If the indicator still does not give the appropriate reading, replace the indicator.

Note: **AUX calibration** is applicable only for 1900C/1900D, UC and UE. If testing 1900/1900C, UA and UB, skip to step (30).

- (19) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (20) Set the 200 (pF)/1000 (pF) switch to 200 (pF).
- (21) Set the CAP SIM (pF) 100's thumbwheel to "- ". Set the 10's thumbwheel to 6.
- (22) Push the PRESS TO READ CAP (pF) pushbutton and hold while adjusting the CAP SIM (pF) control knob to obtain a test set display reading of 64.1pF.
- (23) Release the pushbutton.
- (24) Set the MAIN/TOT-AUX/NAC switch to AUX/NAC.
- (25) Rotate the TEST FUNCTION switch to IND AMP.
- (26) Verify that the indicator reads 0 lbs.
- (27) If the reading is not 0 lbs., adjust the indicator using the EMP 2/E 2 switch located at rear of the indicator.
- (28) If the indicator still does not read 0, replace the indicator.
- (29) Repeat steps (1) thru (28) until an accurate gage adjustment is obtained.
- (30) Set the MAIN/TOT – AUX/NAC switch to MAIN/TOT.
- (31) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (32) Set the 200 (pF)/1000 (pF) switch to 1000 (pF).
- (33) Set the CAP SIM (pF) 100's thumbwheel to 1 for all 1900 models. Set the 10's thumbwheel to 7 (UA and UB) or 8 (UC and UE).

- (34) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain a test set reading of 178.9 pF (UA and UB) or 185.0 pF (UC and UE).
- (35) Release pushbutton.
- (36) Rotate the TEST FUNCTION switch to IND AMP.
- (37) Verify the indicator reads 300 \pm 35 lbs.
- (38) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (39) Set the CAP SIM (pF) 100's thumbwheel to 2 for all 1900 models. Set the 10's thumbwheel to 0 (UA and UB) or to 1 (UC and UE).
- (40) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain a test display of 201.2 pF (UA and UB) or 210.0 pF (UC and UE).
- (41) Release the pushbutton.
- (42) Rotate the TEST FUNCTION switch to IND AMP.
- (43) Verify the indicator reads 600 \pm 35 lbs.
- (44) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (45) Set the CAP SIM (pF) 100's thumbwheels to 2. Set 10's thumbwheel to 2 (UA and UB), or to 3 (UC and UE).
- (46) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain a test set display of 223.6 pF (UA and UB), or 236.0 pF (UC and UE).
- (47) Release the pushbutton.
- (48) Rotate the TEST FUNCTION switch to IND AMP.
- (49) Verify the indicator reads 900 \pm 35 lbs.
- (50) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (51) Set the CAP SIM (pF) 100s thumbwheel to "2". Set the 10s thumbwheel to "4" for the UA and UB or "6" for the UC and UE serial numbers.
- (52) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain a test set display of 246.0 pF for the UA and UB or 261.0 pF for the UC and UE serial numbers.
- (53) Rotate the TEST FUNCTION switch to IND AMP.
- (54) Verify the indicator reads 1200 \pm 35 lbs.
- (55) Set the 28 VDC power supply to OFF.
- (56) Set the test set ON / OFF switch to OFF.

D. Disconnecting/Reconfiguring

- (1) Disconnect the 28 VDC power supply.
- (2) Disconnect the test set IND connector from the indicator or adapter cable.
- (3) If using a 15 pin connector, disconnect the adapter cable from the indicator.

3. ALTERNATE CALIBRATION (WET TANKS)

Note: The Alternate Calibration should only be used as a temporary measure when draining the facilities is not available. *Recalibrate the aircraft using the Preferred Calibration method at the first opportunity.*

The Alternate Calibration applies the nominal empty tank capacitance value to the system by test set for the indicator zero reading. A second capacitance value, (equal to the combined value of nominal empty tank plus the equivalent quantity of fuel in the tanks), is applied to the system. The indicator is then adjusted to show the substituted fuel quantity.

Note: Measurements close to the Preferred Calibration, may be obtained if the measured dry capacitance for specific serial number aircraft is known and used instead of EMPTY values referenced in Table 2 (Tank Capacitance Empty). The ADD FOR FULL values listed in Table 4 should be added to the known values to obtain the CAP SIM value for FULL.

A. Aircraft Preparation

Note: See PRECAUTIONS and PRELIMINARY sections (Chapter 1).

(1) Insure the aircraft battery is disconnected.

Caution: When lowering or raising the pilot fuel panel, insure that the aircraft battery is disconnected. Observe all safety precautions.

- (2) Access the indicator.
- (3) Insure the circuit breakers are open.
- (4) Insure the aircraft wiring plug at Indicator is disconnected.

B. Test Set Preparation

- (1) Insure the test set switch is OFF.
- (2) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (3) Set the INSULATION/SYSTEM switch to SYSTEM.
- (4) Set the MAIN/TOT-AUX/NAC switch to MAIN/TOT.
- (5) Set the 200 (pF)/1000 (pF) switch to 200 (pF).

C. Connecting the Test Set

- (1) Determine the number of pins on the indicator connector and connect the test set as shown in Figure 15 or Figure 16 accordingly.

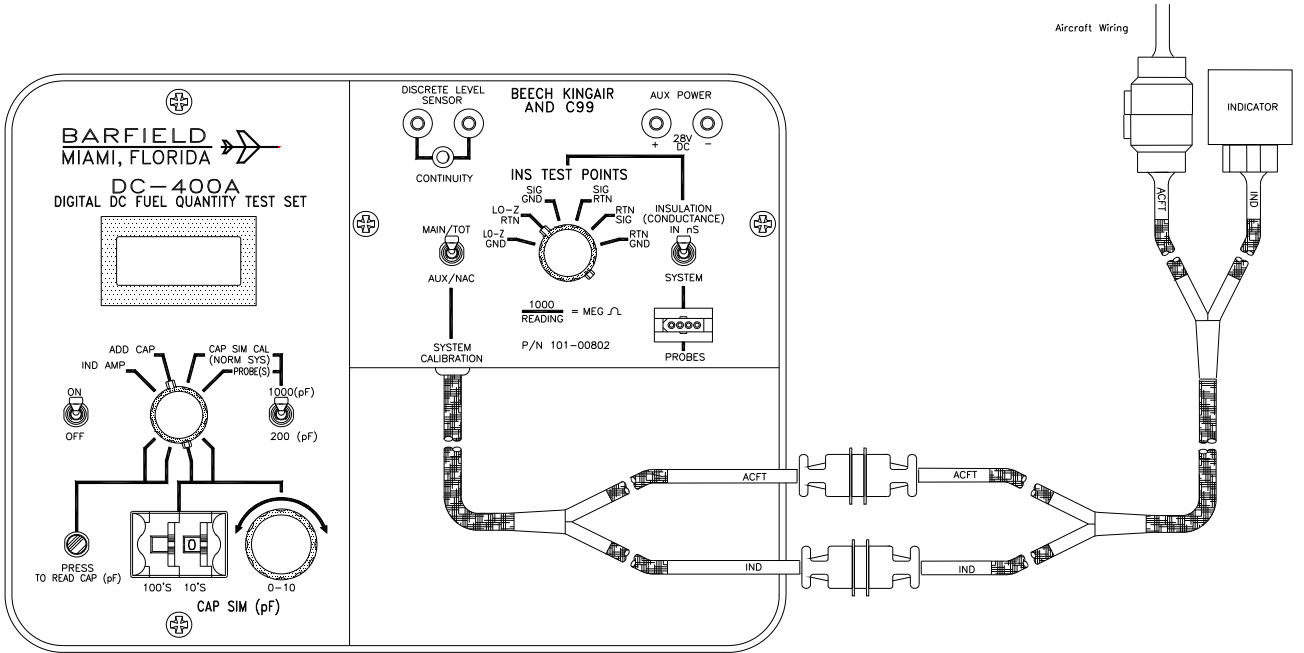


Figure 15 Alternate Calibration Test Set Setup

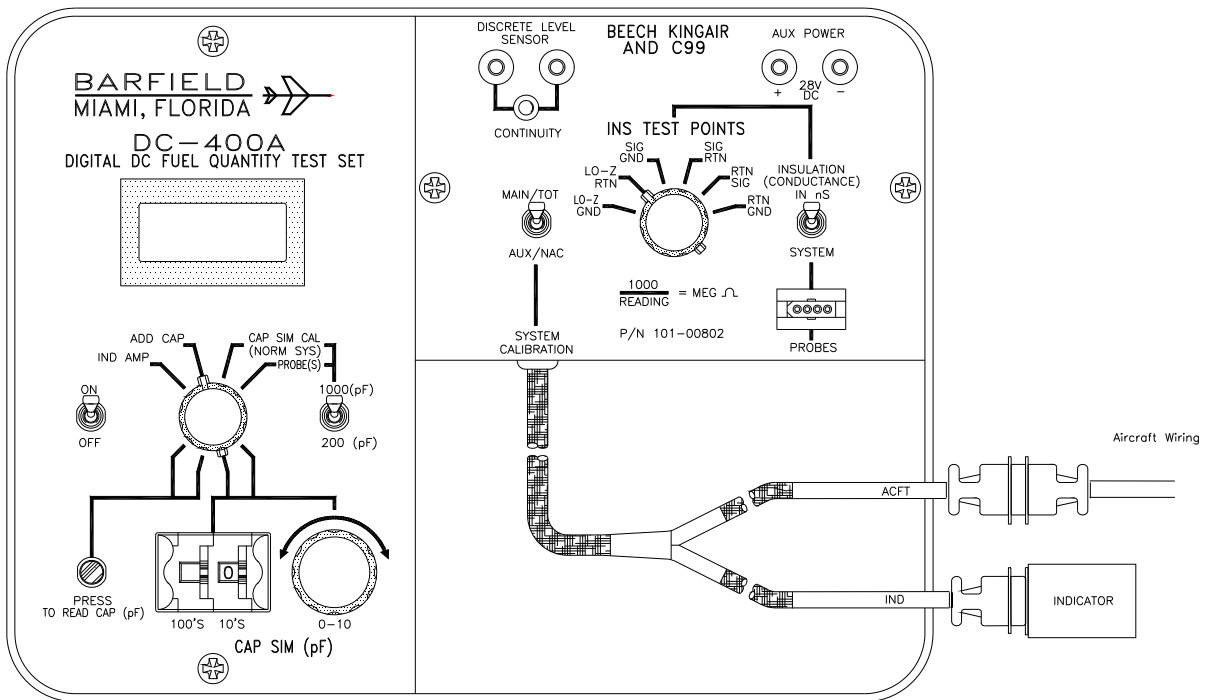


Figure 16 Alternate Calibration Test Set Setup

D. Test

- (1) Set the test set ON/OFF switch to ON.
- (2) Set the CAP SIM (pF) 100's and the 10's thumbwheels to the digits necessary to adjust the test set display to a MAIN/TOTAL nominal value listed in Table 2 for the aircraft-under-test.
- (3) Press and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain a test set reading MAIN/TOTAL Nom (nominal) value reading for the aircraft referenced in Table 2.
- (4) Close the circuit breakers.
- (5) Connect the aircraft battery and turn the battery switch to ON.
- (6) Rotate the TEST FUNCTION switch to IND AMP.

Caution: Do not tap bezel of instrument to vibrate. To remove friction, gently tap adjacent panel or rear housing of indicator before taking readings.

- (7) Verify the aircraft indicator shows a reading slightly below zero (approximately one needle width).
- (8) If pointer position is not acceptable, adjust EMP 1/E 1 or E/EMP adjustment on rear of indicator for the pointer position.
- (9) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (10) Set the 200 (pF)/1000 (pF) switch to 1000 (pF).
- (11) Set the CAP SIM (pF) 100's and the 10's thumbwheels to the digits required to adjust the test set display to a MAIN/TOTAL nominal value referenced in Table 3.
- (12) Push and hold the PRESS TO READ CAP (pF) pushbutton while adjusting the CAP SIM (pF) control knob to obtain the test set reading for the aircraft listed in Table 3.
- (13) Release the pushbutton.
- (14) Rotate the TEST FUNCTION switch to IND AMP.
- (15) Verify the indicator reads 1400 lbs (for serial numbers UA and UB) or 1600 lbs (for UC and UE).
- (16) If the indicator does not give the appropriate reading, adjust the F/FULL at the rear of indicator to obtain the value.

Note: **AUX calibration** is applicable only for 1900C/1900D (SN's UC and UE). If testing UA and UB, skip to step (26).

- (17) Rotate the TEST FUNCTION switch to CAP SIM CAL (NORM SYS).
- (18) Set the 200 (pF)/1000 (pF) switch to 200 (pF).
- (19) Set the MAIN/TOT – AUX/NAC switch to AUX/NAC.

- (20) Set the CAP SIM (pF) 100's and the 10's to the digits required to adjust the test set display to an AUX/NAC nominal value referenced in Table 2.
- (21) Press and hold PRESS TO READ CAP (pF) pushbutton while adjusting CAP SIM (pF) control knob to obtain the test set AUX/NAC nominal value reading for the aircraft listed in Table 2.
- (22) Release the pushbutton.
- (23) Rotate the TEST FUNCTION switch to IND AMP.
- (24) Verify the indicator shows zero lbs.
- (25) If indicator reading is not acceptable, use the EMP 2/E 2 adjustment (located at the rear of the indicator) to obtain the correct reading.
- (26) Repeat steps (2) through (25) until an accurate calibration is obtained.
- (27) Set the test set switch to OFF.

E. Disconnecting or Reconfiguring

- (1) Open the circuit breakers.
- (2) Disconnect the test set ACFT connector from the aircraft wiring plug or adapter cable;
- (3) Disconnect the test set IND connector from the indicator or adapter cable.
- (4) If applicable, disconnect the adapter cable from the aircraft wiring.
- (5) Connect the aircraft wiring plug to the indicator.
- (6) Return the aircraft to its original configuration.