



## AIRCRAFT MAINTENANCE MANUAL

### FLUX DETECTOR UNIT - ADJUSTMENT/TEST

EFFECTIVITY: AIRCRAFT WITH AHRS AH-800

#### 1. General

- A. This section gives the procedures for the compensation and functional test of the Flux Detector Unit.
- B. The procedures in this section are given in the sequence below. The tasks identified with (♦) are part of the Scheduled Maintenance Requirements Document (SMRD).

TASK NUMBER	DESCRIPTION	EFFECTIVITY
34-21-02-700-801-A	FLUX DETECTOR UNIT - FUNCTIONAL TEST	AIRCRAFT WITH AHRS AH-800
34-21-02-820-801-A	FLUX DETECTOR UNIT - COMPENSATION	AIRCRAFT WITH AHRS AH-800



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TASK 34-21-02-700-801-A

EFFECTIVITY: AIRCRAFT WITH AHRS AH-800

2. FLUX DETECTOR UNIT - FUNCTIONAL TEST

A. General

- (1) The purpose of this test is to make sure that the magnetic heading reference given by the Flux Detector Unit is properly compensated.

B. References

REFERENCE	DESIGNATION
AMM SDS 31-42-00/1	
AMM SDS 34-15-00/1	
AMM SDS 34-22-00/1	
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE

C. Zones and Accesses

Not Applicable

D. Tools and Equipment

ITEM	DESCRIPTION	PURPOSE	QTY
GSE 005	Plumb, aircraft leveling	To align the aircraft	
GSE 342	Landing Compass	To get the magnetic heading of the aircraft (only used for the alternative method when the compass rose cannot be used)	
GSE 343	Tripod	To support the landing compass (only used for the alternative method when the compass rose cannot be used)	

E. Auxiliary Items

Not Applicable

F. Consumable Materials

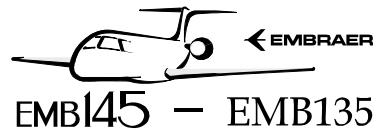
Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	FUNCTION	PLACE
1	Control in the cockpit	Cockpit
1	External aid	Ramp



## I. Preparation

## SUBTASK 841-002-A

- (1) Energize the aircraft ([AMM TASK 20-40-01-860-801-A/200](#)).
- (2) Make sure that the systems below are serviceable:
  - Electronic Flight Instrument System (EFIS) ([AMM SDS 34-22-00/1](#)).
  - Air Data System ([AMM SDS 34-15-00/1](#)).
  - Integrated Computer System ([AMM SDS 31-42-00/1](#)).

J. Functional Test ([Figure 501](#)) ([Figure 502](#))

## SUBTASK 720-002-A

- (1) Make sure that these conditions occur:
  - Engines in operation and throttles in the idle position.
  - Panel lights off and radios on.
  - Magnetic materials removed in a radius of 60 meters (197 feet) and from the personnel outside the aircraft.
  - Make sure that this area is free of buried metal objects.
  - Generators on and air conditioning off.
  - Navigation lights and strobe lights on.
  - All the heating must be off.
- (2) Turn on all the systems of the aircraft, but do not turn on the systems recommended above to be off.
- (3) On the control panels of AHRS1 and 2, put the DG/SLVD switch to the SLVD position.
- (4) Head the aircraft to the North as follows:

NOTE: If the compass rose is not available, use the landing compass (GSE 342) as an alternative method.

  - (a) (If the compass rose is available) With the aircraft in position on the compass rose, tie plumb bobs to each main landing gear, and head the aircraft to the North. For this, use the East-West reference line with the plumb bobs aligned with it (GSE 005) with a tolerance of 0.5 degrees ([Figure 501](#)).
  - (b) (If the compass rose is not available) Use the landing compass (GSE 342) as an alternative method ([Figure 502](#)) to assure the heading of the aircraft as follows:
    - 1 Put the non-magnetic tripod (GSE 343) on the same line as the longitudinal axis of the aircraft and within 20 to 25 meters (66 to 82 feet) of the nose of the aircraft.

NOTE: You can use the plumb bobs (GSE 005) at points 1 (Zone 123 and 124) and 3 (Zone 141 and 142) under the fuselage of the aircraft and use a line to connect their projections on the ground and

extend this line until the necessary distance to put the tripod, to make easier the alignment of the tripod with the longitudinal axis of the aircraft.

- 2 Install the landing compass (GSE 342) on the tripod.
- 3 Lift the sight of the landing compass.
- 4 Level the landing compass. For this, use its spirit level.
- 5 Adjust the landing compass to view the center of the windshield and the vertical stabilizer through its sight.
- 6 Make sure that the landing compass is still leveled. If not, do steps d and e again to aim at the center of the windshield and at the vertical stabilizer with the landing compass leveled.

**NOTE:** Make sure that there is no magnetic material or metallic object (for example, vehicle, hangar or other aircraft) next to the landing compass that can interfere with its reading.

- 7 Read (up to one decimal place) and write down the heading indicated on the reverse reading card of the landing compass. This reading is the magnetic heading of the aircraft.

**NOTE:** The magnetic heading must have an accuracy of  $\pm 0.5$  degrees for the results of the compass swing to give a system accuracy of  $\pm 1.0$  degrees.

- 8 Remove the landing compass from the tripod.
- 9 Disassemble the tripod.

- (5) Make sure that the heading presented on MFD is within  $\pm 2$  degrees of the magnetic heading of the aircraft.

- (6) Head the aircraft to East as follows:

**NOTE:** If the compass rose is not available, use the landing compass (GSE 342) as an alternative method.

- (a) (If the compass rose is available) With the aircraft in position on the compass rose, tie plumb bobs to each main landing gear, and head the aircraft to the East. For this, use the North-South reference line with the plumb bobs aligned with it (GSE 005) with a tolerance of 0.5 degrees ([Figure 501](#)).

- (7) Make sure that the heading presented on MFD is within  $\pm 2$  degrees of the magnetic heading of the aircraft.

#### K. Follow-on

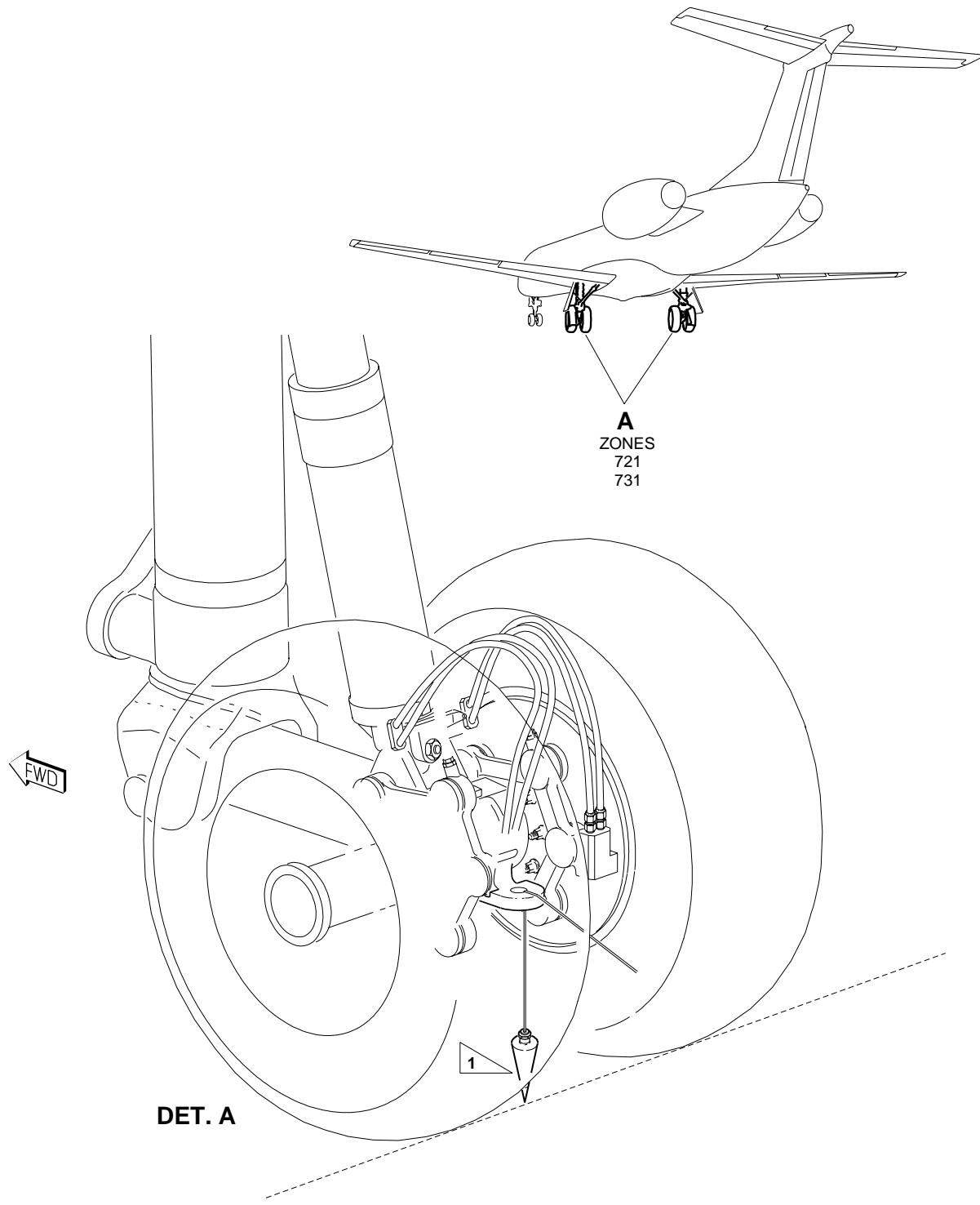
##### SUBTASK 842-002-A

- (1) Deenergize the aircraft ([AMM TASK 20-40-01-860-801-A/200](#)).
- (2) Remove the plumb bobs from each main landing gear ([Figure 501](#)).

**EFFECTIVITY: AIRCRAFT WITH AHRS AH-800**

Determination of the Magnetic Heading of the Aircraft with a Compass Rose

Figure 501



1

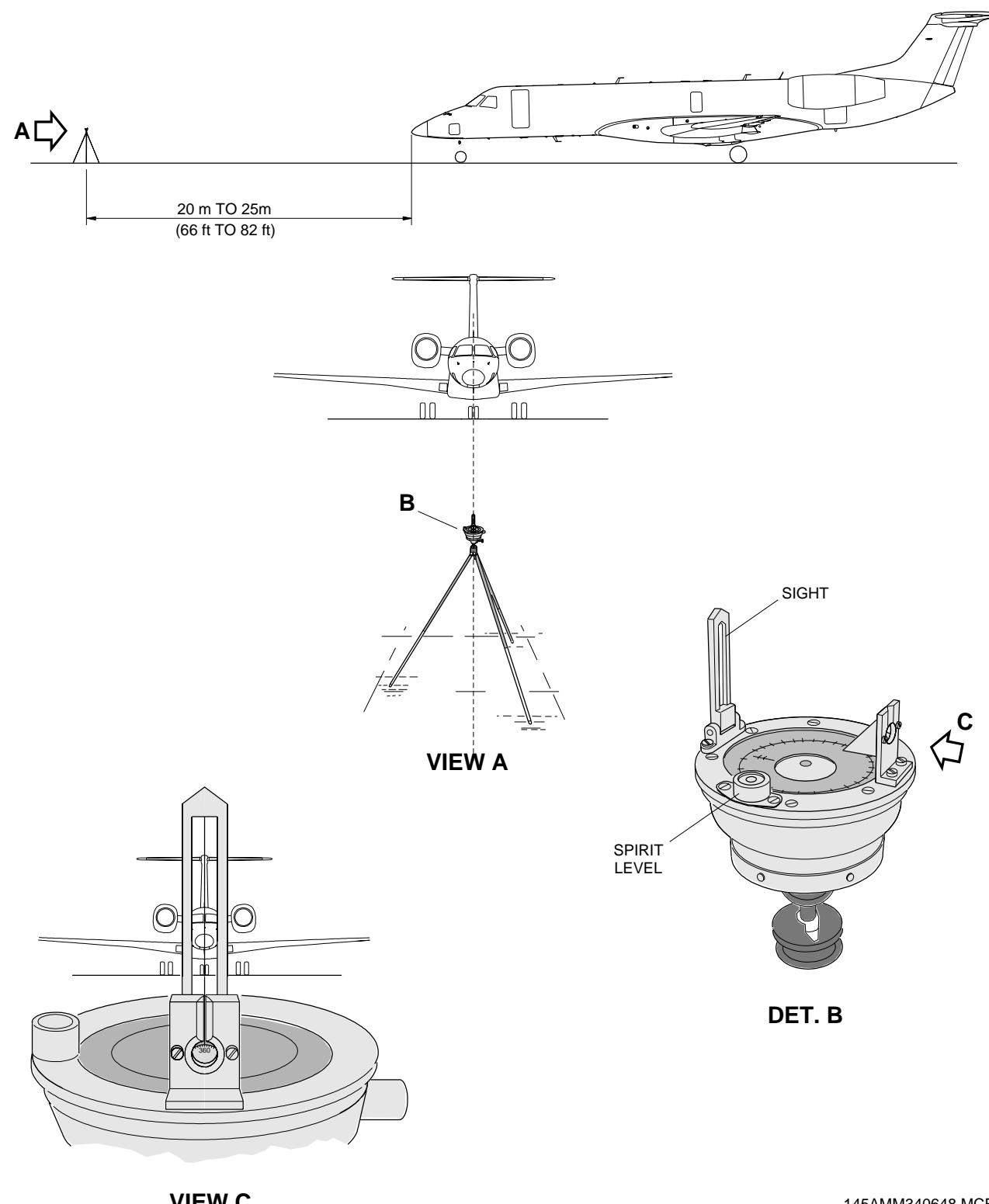
PUT THE PLUMB BOBS IN THE SAME POSITION ON THE RH/LH MLG

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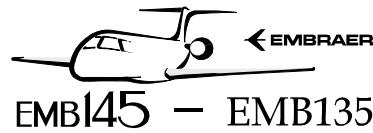
**EFFECTIVITY: AIRCRAFT WITH AHRS AH-800**

Determination of the Magnetic Heading of the Aircraft with a Landing Compass

Figure 502



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TASK 34-21-02-820-801-A

EFFECTIVITY: AIRCRAFT WITH AHRS AH-800

3. FLUX DETECTOR UNIT - COMPENSATION

A. General

(1) This task gives the procedures for the compensation of the Flux Detector Unit.

B. References

REFERENCE	DESIGNATION
AMM MPP 06-41-03/100	- COMPONENT LOCATION
AMM TASK 20-40-01-860-801-A/200	ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE
AMM TASK 34-21-00-700-805-A/500	AHRS ATTITUDE INDICATION CHECK
AMM TASK 34-21-02-700-801-A/500	FLUX DETECTOR UNIT - FUNCTIONAL TEST

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
223	223LZ	Maintenance panel

D. Tools and Equipment

ITEM	DESCRIPTION	PURPOSE	QTY
GSE 305	AHRS Calibration Software version 1.8 (DOS version)	To compensate the flux detector	
GSE 526	AHRS Calibration Software (Windows version)	To compensate the flux detector	
GSE 130	Laptop Computer with software	To compensate the flux detector	
GSE 135	Interface Test Box, Maintenance panel/PC	To connect the PC to the AHRS	
GSE 005	Plumb, aircraft leveling	To align the aircraft	
GSE 342	Landing Compass	To get the magnetic heading of the aircraft (only used for the alternative method when the compass rose cannot be used)	
GSE 343	Tripod	To support the landing compass (only used for the alternative method when the compass rose cannot be used)	

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

**H. Persons Recommended**

<i>QTY</i>	<i>FUNCTION</i>	<i>PLACE</i>
1	Control in the cockpit	Cockpit
1	Laptop Computer control	Cockpit
1	External aid	Ramp

**I. Preparation**
**SUBTASK 841-003-A**

- (1) Open access door 223LZ ([AMM MPP 06-41-03/100](#)).
- (2) On the circuit breaker panel, open the AHRS1 and AHRS2 circuit breakers.
- (3) On the ELECTRICAL panel, on the overhead panel, push the BACKUP pushbutton (striped bar comes on).
- (4) Connect the interface box (GSE 135) to the maintenance panel and to the PC comm port.
- (5) Energize the aircraft ([AMM TASK 20-40-01-860-801-A/200](#)).
- (6) Get the initial magnetic heading of the aircraft as follows:

**NOTE:** To get the initial magnetic heading of the aircraft, you can use the compass rose or if it is not available you can use the landing compass (GSE 342) as an alternative method.

- (a) (If the compass rose is available) With the aircraft in position on the compass rose, tie plumb bobs to each main landing gear, and head the aircraft to the North. For this, use the East-West reference line with the plumb bobs aligned with it (GSE 005) with a tolerance of 0.5 degrees (Figure 501).

**NOTE:** (AHRS Calibration Software DOS version) In this case, with the aircraft headed to North, the initial magnetic heading is 360 degrees, which will be the first heading to be used for the compensation of the flux detector units.

- (b) (If the compass rose is not available) Use the landing compass (GSE 342) as an alternative method (Figure 502) to get the initial magnetic heading of the aircraft as follows:

- 1 Put the aircraft in a flat area free of electromagnetic interference.

**NOTE:**

- Make sure that there is no magnetic material or metallic object (for example, vehicle, hangar or other aircraft) in a radius of 60 meters (197 feet) from the aircraft.
- Make sure that this area is free of buried metal objects.

- 2 Do these steps to read the initial magnetic heading of the aircraft with the landing compass:

**NOTE:** (AHRS Calibration Software Windows version) For the AHRS Calibration Software Windows version, the initial magnetic heading must be North.

- a Put the non-magnetic tripod (GSE 343) on the same line as the longitudinal axis of the aircraft and within 20 to 25 meters (66 to 82 feet) of the nose of the aircraft.

**NOTE:** You can use the plumb bobs (GSE 005) at points 1 (Zone 123 and 124) and 3 (Zone 141 and 142) under the fuselage of the aircraft and use a line to connect their projections on the ground and extend this line until the necessary distance to put the tripod, to make easier the alignment of the tripod with the longitudinal axis of the aircraft.

- b Install the landing compass (GSE 342) on the tripod.
- c Lift the sight of the landing compass.
- d Level the landing compass. For this, use its spirit level.
- e Adjust the landing compass to view the center of the windshield and the vertical stabilizer through its sight.
- f Make sure that the landing compass is still leveled. If not, do steps d and e again to aim at the center of the windshield and at the vertical stabilizer with the landing compass leveled.
- g **NOTE:** Make sure that there is no magnetic material or metallic object (for example, vehicle, hangar or other aircraft) next to the landing compass that can interfere with its reading.

Read (up to one decimal place) and write down the heading indicated on the reverse reading card of the landing compass. This reading is the magnetic heading of the aircraft which must be used as the initial magnetic heading for the compensation of the flux detector units.

- NOTE:**
- (AHRS Calibration Software Windows version) For the AHRS Calibration Software Windows version, the initial magnetic heading must be North (0 or 360 degrees).
  - The initial magnetic heading must have an accuracy of  $\pm$  0.5 degrees for the results of the compass swing to give a system accuracy of  $\pm$  1.0 degrees.

- 3 Remove the landing compass from the tripod.
- 4 Disassemble the tripod.

#### J. Compensation ([Figure 503](#)) [Figure 501](#) [Figure 502](#)

##### SUBTASK 820-002-A

- (1) Make sure that the velocity of the wind is less than 25 knots. If the velocity is higher, do not do the calibration.

- (2) **NOTE:** If the wind velocity is higher than 15 knots and less than 25 knots, do the Flux Valve Functional Test after the accomplishment of the Flux Valve Calibration. Refer to [AMM TASK 34-21-02-700-801-A/500](#).

Make sure that these conditions occur:

- Engines in operation and throttles in the idle position.
- Panel lights off and radios on.
- Magnetic materials removed in a radius of 60 meters (197 feet) and from the personnel outside the aircraft.
- Generators on and air conditioning off.
- Navigation lights and strobe lights on.
- All the heating must be off.

- (3) On GSE 135, set the rotary selector to the AHRS 1 position.
- (4) On GSE 135, set the MEMORY ACCESS switches to the ON position (ground).
- (5) Turn on all the systems of the aircraft, but do not turn on the systems recommended above to be off.
- (6) On the circuit breaker panel, close the AHRS1 and AHRS2 circuit breakers.
- (7) Stop for approximately two minutes until the AHRSs initialize.
- (8) Stop for approximately two minutes after the AHRSs are in full performance mode.
- (9) Turn the PC on.

**NOTE:** (AHRS Calibration Software DOS version) The MS-DOS mode is necessary for the AHRS Calibration Software DOS version to operate. Select: "Restart the computer in the MS-DOS mode" (do not use the MS-DOS prompt icon of the Windows Desktop).

- (10) Start the AHRS Calibration Software.
- (a) (AHRS Calibration Software DOS version) Go to the directory where the AHRS Calibration Software is installed. Type "MA" and then push the ENTER key to run the AHRS software.
- NOTE:** If the program is installed in the "C:\AHRS" directory, type "cd C:\AHRS" to go to this directory.
- (b) (AHRS Configuration Software Windows version) Click on the link to the AHRS Calibration Software.
- NOTE:** Typically the name of the software link on the Start menu is "pcma\_cal".
- (11) From the main menu, choose MEMORY ACCESS TESTS and then INTERFACE TEST. Make sure that the tests for memory access writing and reading passed.
- (12) On GSE 135, move the AHRS 1/2 switch to 2 and do the INTERFACE TEST again. Make sure that the tests for memory access write and read passed.

- (13) Go back to the main menu.
- (14) On GSE 135, move the AHRS 1/2 switch back to 1.
- (15) (AHRS Calibration Software DOS version) From the main menu, select the CALIBRATION option.
  - (a) Select the MULTIPLE FLUX VALVE CALIBRATION option.
  - (b) Make sure that the configuration is as follows:  
AHRS 1: COM 1 AHRS 3: NOT USED  
AHRS 2: COM 1 AHRS 4: NOT USED
 

NOTE: If other COM port is used, different from COM1, this port must be selected for AHRS 1 and AHRS 2.
- (16) (AHRS Calibration Software Windows version) From the main menu, select the CALIBRATION option.
  - (a) Select COM 1 port for AHRS 1 and AHRS 2 and click on the "Save Port Selection" button.
 

NOTE: If other COM port is used, different from COM1, this port must be selected for AHRS 1 and AHRS 2.
  - (b) Select the "Multiple Flux Valve Calibration" option.
- (17) On the control panels of AHRS1 and 2, put the DG/SLVD switch to the DG position and use the CW/CCW switch to adjust the initial magnetic heading of the aircraft on the MFD or in the field PRI HDG on the REFERENCE DATA page of the PFD (on this page you can get the magnetic heading with one decimal place).
 

NOTE: From this point, the calibration must be done as quickly as possible, according to the local latitude. If this time is more than the maximum specified time, start the calibration again.

Table 501

LATITUDE (degrees)	MAXIMUM TIME (minutes)
0	60
10	39
20	30
30	24
40	21
50	18
60	17

- (18) To get the magnetic heading shown on the REFERENCE DATA page of the PFD, do the following steps:
  - (a) On the DC-550, set the decision height knob to 690 on the PFD to show the REFERENCE DATA page.

- (b) Push and hold the TEST button on the DC-550 for approximately 5 to 7 seconds.
- (c) While you hold the TEST button, momentarily push the ET button on the DC-550.
- (d) Release the TEST button.

NOTE: The IC-600 must now be in the maintenance test mode and will stay in test (via software) until it is canceled. It will occur if you push the TEST button again or select an RA setting below 600.

- (19) (AHRS Calibration Software DOS version) Calibrate the AHRS as follows:
- (a) Push ESC to save the configuration and start the calibration.
  - (b) The PC shows that you must enter the present heading.
  - (c) Type the value of the initial magnetic heading of the aircraft and push ENTER.
  - (d) The PC shows that you must connect AHRS 1 to the selected COM port. On GSE 135, if the switch is already at AHRS 1, push ENTER. If the switch is at AHRS 2, turn it to AHRS 1 and push ENTER.
  - (e) The PC shows "INITIALIZING FLUX VALVE CALIBRATION ON AHRS 1" and then tells you to connect AHRS 2.
  - (f) On GSE 135, set the switch to AHRS 2 and then confirm the message.
  - (g) The PC shows "INITIALIZING FLUX VALVE CALIBRATION ON AHRS 2".
  - (h) The PC shows all cardinal and the intercardinal headings to which to move the aircraft.
  - (i) Put the aircraft in other cardinal or intercardinal heading shown (you can choose any order). For this, use the magnetic heading shown on the MFD or in the field PRI HDG on the REFERENCE DATA page of the PFD. Do the steps below again for each cardinal and intercardinal heading:
    - 1 Wait a minimum of 20 seconds for the AHRS to stay in a stable condition.
    - 2 With the UP or DOWN arrows on the PC, select the cardinal or intercardinal heading that agrees with the new heading of the aircraft and push ENTER.
    - 3 The PC shows that you must connect AHRS #1 to the selected COM port. On GSE 135, set the switch to AHRS 1 and then confirm the message.
    - 4 The PC shows that you must connect AHRS #2 to the selected COM port. On GSE 135, set the switch to AHRS 2 and then confirm the message.
  - (j) The PC shows a new screen with the final heading to which to move the aircraft.
  - (k) Put the aircraft in the final heading.
  - (l) Wait a minimum of 20 seconds for the AHRS to stay in a stable condition and then push ENTER.

- (m) The PC shows that you must connect AHRS #1 to the selected COM port. On GSE 135, set the switch to AHRS 1 and then push ENTER.
  - (n) The PC shows that you must connect AHRS #2 to the selected COM port. On GSE 135, set the switch to AHRS 2 and push ENTER.
  - (o) The PC shows that the calibration was done correctly.
- (20) (AHRS Calibration Software Windows version) Calibrate the AHRS as follows:
- (a) The PC shows that you must connect AHRS 1 to the selected COM port. On GSE 135, if the switch is already at AHRS 1, push ENTER. If the switch is at AHRS 2, turn it to AHRS 1 and push ENTER.
  - (b) The PC shows "INITIALIZING FLUX VALVE CALIBRATION ON AHRS #1" and then tells you to connect AHRS 2.
  - (c) On GSE 135, set the switch to AHRS 2 and then confirm the message.
  - (d) The PC shows "INITIALIZING FLUX VALVE CALIBRATION ON AHRS #2" and then tells you to put the aircraft at 0 degrees to start the calibration.
  - (e) Put the aircraft in the necessary cardinal or intercardinal heading. For this, use the magnetic heading shown on the MFD or in the field PRI HDG on the REFERENCE DATA page of the PFD. Do the steps below again for each cardinal and intercardinal heading:
    - 1 Wait a minimum of 20 seconds for the AHRS to stay in a stable condition.
    - 2 The PC shows that you must connect AHRS #1 to the selected COM port. On GSE 135, set the switch to AHRS 1 and then confirm the message.
    - 3 The PC shows that you must connect AHRS #2 to the selected COM port. On GSE 135, set the switch to AHRS 2 and then confirm the message.
  - (f) The PC shows that the calibration was done correctly and that you must to cycle the power on the AHRS units..
  - (g) Click on the OK button.
- (21) On the AHRS 1 and 2 control panel, move the DG/SLVD switch back to SLVD.
- (22) On the PC, exit the AHRS Test Software.
- (23) Do the steps below to go out of the memory access mode and update the calibration coefficients:
- (a) On GSE 135, set the MEMORY ACCESS switches to the OFF position.
  - (b) On the circuit breaker panel, open the AHRS1 (Location tip: ESSENTIAL DC BUS1/NAV/AHRS1) and AHRS2 (Location tip: DC BUS2/NAV/AHRS2) circuit breakers.
  - (c) On the circuit breaker panel, close the AHRS1 and AHRS2 circuit breakers.



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- (d) On the ELECTRICAL panel, on the overhead panel, push the BACKUP pushbutton (striped bar comes off).

K. Follow-on

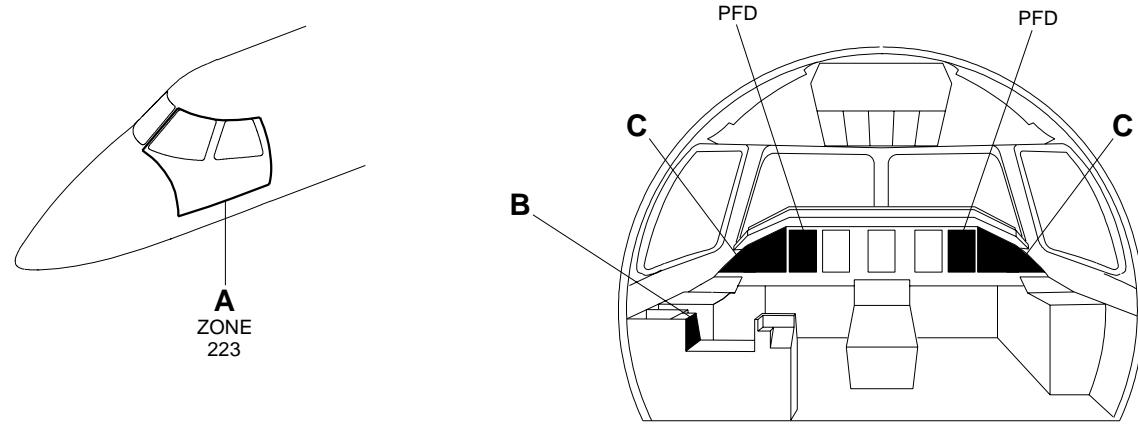
SUBTASK 842-003-A

- (1) Disconnect the interface box (GSE 135) from the maintenance panel and from the PC comm port.
- (2) If wind velocity was higher than 15 knots during the Flux Valve Compensation, do the Flux Valve Functional Test ([AMM TASK 34-21-02-700-801-A/500](#)).

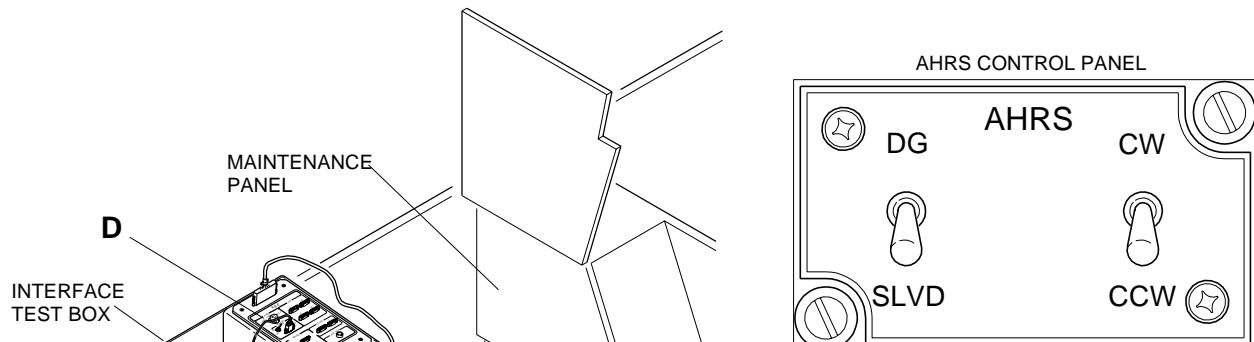
**WARNING: (AHRS CALIBRATION SOFTWARE DOS VERSION) THIS STEP IS MANDATORY TO MAKE SURE THAT THE AHRS ORIENTATION IS NOT INVERTED.**

- (3) (AHRS Calibration Software DOS version) Do the AHRS Attitude Indication Check ([AMM TASK 34-21-00-700-805-A/500](#)).
- (4) Deenergize the aircraft ([AMM TASK 20-40-01-860-801-A/200](#)).
- (5) Close access door 223LZ ([AMM MPP 06-41-03/100](#)).
- (6) If the compass rose was used to get the initial magnetic heading of the aircraft, remove the plumb bobs from each main landing gear (Figure 501).

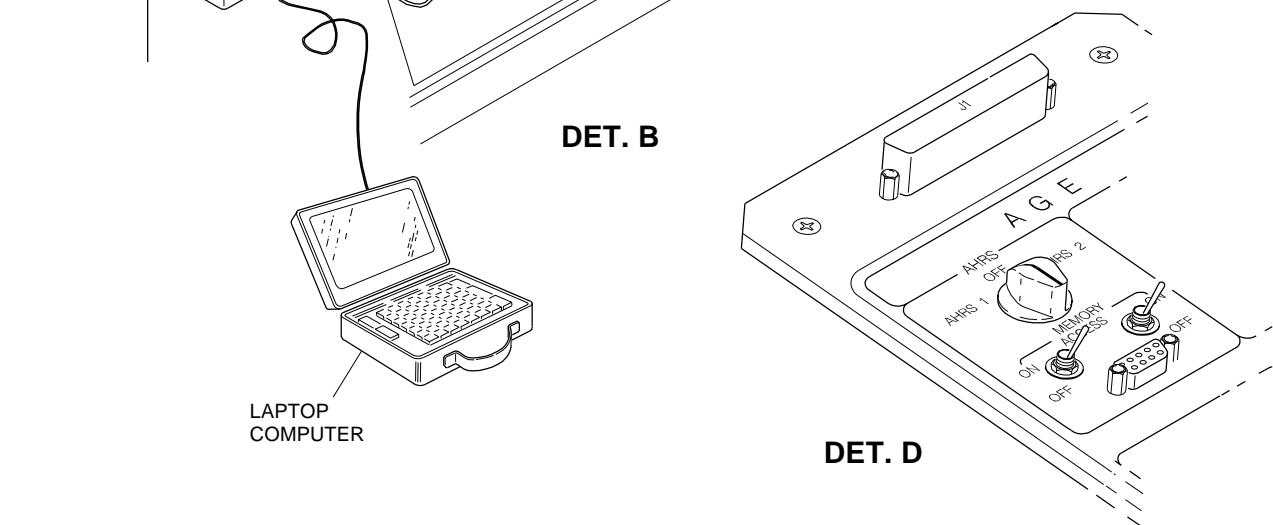
**EFFECTIVITY: AIRCRAFT WITH AHRS AH-800**  
**Flux Detector Compensation**  
**Figure 503**



**DET. A**



**DET. C**



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