AIRCRAFT ALIGNMENT - MAINTENANCE PRACTICES

EFFECTIVITY: ACFT MODEL(S) EMB-145

1. General

A. The alignment checks include: aircraft alignment, main and nose landing gear alignment, main landing gear wheel alignment, wheel camber, engine alignment, engine incidence, dihedral and incidence of horizontal stabilizer and dihedral and incidence of wings.

B. The values got in these checks must be compared to the allowable limits specified in the respective tables. If differences are found, refer to EMBRAER Customer Support Division.

C. 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*
51-50-01-820-801-A	AIRCRAFT ALIGNMENT - CHECK	ACFT MODEL(S) EMB-145

TASK 51-50-01-820-801-A
EFFECTIVITY: ACFT MODEL(S) EMB-145

2. AIRCRAFT ALIGNMENT - CHECK

A. General

(1) The check points used for the aircraft alignment, main and nose landing gear alignment, wheel alignment and engine alignment are projected on the ground, and are identified by a prime written above and to the right of the number (Ex.: 1').

B. References

REFERENCE	*DESIGNATION*
AMM TASK 08-20-00-500-801-A/200	AIRCRAFT LEVELING IN THE PASSENGER CABIN
AMM TASK 12-11-01-600-802-A/300	FUEL-TANK PRESSURE DEFUELING - SERVICING
AMM TASK 12-11-02-600-802-A/300	FUEL TANK GRAVITY DEFUELING - SERVICING
AMM TASK 27-40-02-700-801-A/500	ADJUSTMENT OF THE ELECTRICAL ZERO POSITION OF THE HORIZONTAL STABILIZER ACTUATOR

C. Zones and Accesses

Not Applicable

D. Tools and Equipment

ITEM	*DESCRIPTION*	*PURPOSE*	*QTY*
GSE 005	Plumb - Aircraft Leveling	For the aircraft leveling and alignment check	
GSE 099	Kit - Parallelism Checking Gauge	To check the wheel parallelism at the wheel axle	
GSE 205	Support-Toe In/Camber Check, NLG Wheel	To check the wheel parallelism at the wheel axle	
GSE 070	Protractor - Digital	To measure camber, dihedral, incidence and horizontal control surface deflections	
GSE 141	Straightedges - Symmetry, Aircraft	To check angular symmetry	

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	*FUNCTION*	*PLACE*
8	Do the task	Aircraft

I. Preparation

SUBTASK 841-007-B

(1) The alignment check must be done with no person on board, and the incidence of wind must be prevented.

(2) The alignment check must be done after the defueling of the aircraft (AMM TASK 12-11-01-600-802-A/300) or (AMM TASK 12-11-02-600-802-A/300), and after leveling of the aircraft (AMM TASK 08-20-00-500-801-A/200).

NOTE: After the aircraft is leveled, keep the aircraft lifted on jacks.

J. Alignment Check

SUBTASK 820-007-B

(1) Aircraft Alignment (Figure 201) (Figure 202).

(a) To do the check of the aircraft alignment, do as follows:

1 Keep leveling plumb GSE 005 tightly attached to point 1 on the fuselage; the distance between the ground and the plumb bob tip must be approximately 3 mm (See Figure 201, Figure 202 - sheets 1 and 2).

2 Put a strip of masking tape on the ground under plumb bob tip in point 1.

3 When the plumb bob has no movement, very carefully let it down to mark the point on the masking tape, and find point 1' on the ground.

4 Keep leveling plumb GSE 005 tightly attached to point 9 on the fuselage; so that the distance between the ground and the plumb bob tip must be approximately 3 mm (See Figure 201, Figure 202 - sheets 1 and 4).

5 Put a strip of masking tape on the ground under plumb bob tip in point 9.

6 When the plumb bob has no movement, very carefully let it down to mark a point on the masking tape, and find point 9' on the ground.

7 Keep leveling plumb GSE 005 tightly attached to point 3 on the fuselage; the distance between the ground and the plumb bob tip must be approximately 3 mm (See Figure 201, Figure 202 - sheets 1 and 2).

8 Put a strip of masking tape on the ground, under plumb bob tip, in point 3.

9 When the plumb bob has no movement, very carefully let it down to mark a point on the masking tape, and find point 3' on the ground.

10 Keep leveling plumb GSE 005 tightly attached to point 7 on the fuselage; the distance between the ground and the plumb bob tip must be approximately 3 mm (See Figure 201, Figure 202 - sheets 1 and 3).

11 Put a strip of masking tape on the ground, under plumb bob tip, in point 7.

12 When the plumb bob has no movement, very carefully let it down to mark a point on the masking tape, and find the point 7' on the ground.

13 Mark the fuselage center line (Y = 0), through points 1' and 9' on the ground. For this, extend a thread from point 1' to point 9'. The thread must go a little beyond points 1' and 9'. Pass chalk along the thread. Tightly hold the thread with the finger against the ground; the thread must be accurately at points 1' and 9'. With the thread attached at each point, pull and release thread which will mark the fuselage center line on the ground (See Figure 201, sheet 2).

14 Measure and write in table 1 the distance between point 3' and Y = 0 and between point 7' and Y = 0; obey the allowable limits shown in table 201.

Table 201 - FUSELAGE ALIGNMENT CHECK

VALUES FOUND	ALLOWABLE LIMITS
Point 3' to Y = 0 = _____ mm	± 12 mm
Point 7' to Y = 0 = _____ mm	± 8 mm

15 Keep leveling plumb GSE 005 tightly attached to points 5 and 6, on the wings; the distance between the ground and the plumb bob tip must be approximately 3 mm (See Figure 201, Figure 202 - sheets 1 and 3).

16 Put a strip of masking tape on the ground, under the plumb bob tip, at points 5 and 6.

17 When the plumb bob has no movement, very carefully let it down to mark a point on the masking tape, and find points 5' and 6' on the ground.

18 Measure and write in table 202 the distances between points 1' and 5' (A), 1' and 6' (B), 5' and 9' (C), and 6' and 9' (D) (See Figure 202, sheet 1).

19 Calculate the differences A - B, and C - D, and compare the distances, obey the allowable limits shown in table 202.

Table 202 - AIRCRAFT ALIGNMENT CHECK

VALUES FOUND	DIFFERENCES FOUND	ALLOWABLE LIMITS
A = 1' to 5' =_____mm B = 1' to 6' =_____mm	A - B = _____mm	A ≠ B max. 25 mm
C = 5' to 9' =_____mm D = 6' to 9' =_____mm	C - D = _____mm	C ≠ D max. 19 mm

20 Keep leveling plumb GSE 005 tightly attached to points 11 and 12, on the horizontal stabilizer; so that the distance between the ground and the plumb bob tip must be approximately 3 mm (See Figure 201, Figure 202 - sheets 1 and 4).

21 Put a strip of masking tape on the ground, under the plumb bob tip, at points 11 and 12.

22 When the plumb bob has no movement, very carefully let it down to mark a point on the masking tape, and find the points 11' and 12' on the ground.

23 Measure and write in table 203 the distances between points 7' to 11' (E) and 7' to 12' (F) (See Figure 202, sheet 1).

24 Calculate the difference E - F, and compare the distances; obey the allowable limits shown in table 203.

Table 203 - AIRCRAFT ALIGNMENT CHECK

VALUES FOUND	DIFFERENCES FOUND	ALLOWABLE LIMITS
E = 7' to 11' =_____mm F = 7' to 12' =_____mm	E - F = _____mm	E ≠ F max. 13 mm

25 Keep leveling plumb GSE 005 tightly attached to points 13 and 14, on the horizontal stabilizer; the distance between the ground and the plumb bob tip must be approximately 3 mm (See Figure 201, Figure 202, sheet 1 and 5).

26 Put a strip of masking tape on the ground, under the plumb bob tip, at points 13 and 14.

27 When the plumb bob has no movement, very carefully let it down to mark a point on the masking tape, and find points 13' and 14' on the ground.

28 Measure and write in table 204 the distances between point 13' and Y = 0 and between point 14' and Y = 0; obey the allowable limits shown in table 204.

Table 204 - FIN ALIGNMENT CHECK

VALUES FOUND	DIFFERENCE FOUND	ALLOWABLE LIMIT
G = 13' to Y = 0 = _____mm H = 14' to Y = 0 = _____mm	G - H = _____mm	G ≠ H max. 16 mm

29 Calculate the difference G - H, and compare the distances; obey the allowable limits shown in table 204.

(2) Main Landing Gear Alignment (Figure 203) (Figure 204).

(a) To do the check of the main landing gear alignment, do as follows:

1 Install GSE 099 on the left and right main landing gears, respectively (See Figure 203).

NOTE: This device is installed at the same wheel cap attachment points at the wheels 14 or 16 inches, for checking the wheel parallelism and toe-in at the wheel axle of the main landing gear.
Install the shoulders at the proper location to match the applicable wheel.

2 Put the plumb-bob line in the grooves (points 53 and 54) at the middle of straightedge of the GSE 099. The distance between the ground and the

plumb bob tip must be approximately 3 mm. The plumb-bob line must go outboard of the straightedge held on the side of the outer wheel (See Figure 203).

3 Put a strip of masking tape on the ground, under the plumb-bob tip, at points 53 and 54.

4 When the plumb bob has no movement, very carefully let it down to mark a point on the masking tape, and find the points 53' and 54', respectively, on the ground.

5 Measure and write in table 205 the distances between points 3' and 53' (N), 3' and 54' (P), 7' and 53' (Q), and 7' and 54' (R) (See Figure 204).

Table 205 - MAIN LANDING GEAR ALIGNMENT

VALUES FOUND	DIFFERENCES FOUND	ALLOWABLE LIMITS
N = 3' to 53' =_____mm P = 3' to 54' =_____mm	N - P = _____mm	N ≠ P max. 10 mm
Q = 7' to 53' =_____mm R = 7' to 54' =_____mm	Q - R = _____mm	Q ≠ R max. 7 mm

6 Calculate the differences N - P and Q - R, and compare the distances, obey the allowable limits in table 205.

(3) Nose Landing Gear Alignment (Figure 205) (Figure 206).

(a) Install GSE 205 on the nose landing gear (See Figure 205, sheet 1).

(b) Put the plumb-bob line in the grooves (points YA and YB) at the ends of straightedge of the GSE 205. The distance between the ground and the plumb bob tip must be approximately 3 mm. The plumb-bob line must go outboard of the straightedge held on the side of the outer wheel (See Figure 206).

(c) Put a strip of masking tape on the ground, under plumb bob tip, at points YA and YB.

(d) When the plumb bob has no movement, very carefully let it down to mark a point on the masking tape, and find the points YA and YB, respectively, on the ground.

(e) Measure and write in table 206 the distances between the points YA and YB to Y = 0, respectively.

Table 206 - NOSE LANDING GEAR ALIGNMENT

VALUES FOUND	DIFFERENCE FOUND	ALLOWABLE LIMIT
YA = point YA to Y = 0 = _____mm YB = point YB to Y = 0 = _____mm	YA - YB = _____mm	YA ≠ YB max. 10 mm

(f) Calculate the difference YA - YB; obey the allowable limit in table 206.

(4) Main Landing Gear Wheels Alignment (Figure 203) (Figure 207).

(a) Install GSE 099 on the left and right main landing gears, respectively.

(b) Put the plumb-bob line in the grooves (points 55, 57, 56, and 58) at the ends of straightedge GSE 099. The distance between the ground and the plumb bob tip must be approximately 3 mm. The plumb-bob line must go outboard of the straightedge held on the side of the outer wheel (See Figure 203).

(c) Put a strip of masking tape on the ground, under the plumb bob tip, at points 55, 56, 57, and 58.

(d) When the plumb bob has no movement, very carefully let it down to mark a point on the masking tape, and find the points 55', 57', 56', and 58', respectively, on the ground.

(e) Measure and write in table 207 the distances between points 55', 57', 56', and 58', respectively for Y = 0.

Table 207 - MAIN LANDING GEAR WHEEL ALIGNMENT

VALUES FOUND	DIFFERENCES FOUND	ALLOWABLE LIMITS
S = 55' to Y = 0 =_____mm T = 57' to Y = 0 =_____mm	S - T = _____mm	S ≠ T max. 10 mm
U = 56' to Y = 0 =_____mm V = 58' to Y = 0 =_____mm	U - V = _____mm	U ≠ V max. 10 mm

(f) Calculate the differences S - T and U - V, and compare the distances; obey the allowable limits in table 207.

(5) Wheel Camber (Figure 203) (Figure 205) (Figure 208).

(a) Install GSE 099 without the straightedge. Put protractor-digital GSE 070 on GSE 099 at the outer wheels of the left and right main landing gears. Put the protractor-digital perpendicularly to the wheels (See Figure 203, sheet 2).

(b) Measure and write in table 208 the respective angles found.

Table 208 - WHEELS CAMBER

WHEEL	VALUES FOUND	ALLOWABLE LIMITS
Outer - left MLG		0 degrees ± 30 min
Outer - right MLG		0 degrees ± 30 min
NLG		0 degrees ± 20 min

(c) Install GSE 205 without the straightedge. Put protractor-digital GSE 070 on GSE 205 on the wheel of the nose landing gear. Put the protractor-digital perpendicularly to the wheel (See Figure 205, sheet 2).

(d) Measure and write in table 208 the angle found.

(6) Engine Alignment (Figure 209) (Figure 210)

(a) Install straightedge GSE 141 on the left and right engines as follows:

1 Put straightedge GSE 141 on the engine and install the bolts in the forward and aft lower mounts. Refer to Figure 209, Sheet 1.

2 Install the bolts of plumbs GSE 005 in straightedge GSE 141. Refer to Figure 209, Sheet 2.

(b) Keep leveling plumb GSE 005 tightly attached to straightedge GSE 141; the distance between the ground and the plumb bob tip must be 3 mm.

(c) Put a strip of masking tape on the ground, under the plumb bob tip, at points 15, 16, 17, and 18.

(d) When the plumb bob has no movement, very carefully let it down to mark a point on the masking tape, and find the points 15', 17', 16', and 18', respectively, on the ground.

(e) Measure and write in table 209 the distances between the points 7' and 15' (J), 7' and 16' (K), 9' and 17' (L), and 9' and 18' (M), respectively (See Figure 210).

Table 209 - ENGINE ALIGNMENT

VALUES FOUND	DIFFERENCES FOUND	ALLOWABLE LIMITS
J = 7' to 15' =_____mm K = 7' to 16' =_____mm	J - K = _____mm	J ≠ K max. 5 mm
L = 9' to 17' =_____mm M = 9' to 18' =_____mm	L - M = _____mm	L ≠ M max. 6 mm

(f) Calculate the differences J - K and L - M, and compare the distances; obey the allowable limits given in table 209.

(7) Engine Incidence (Figure 209) (Figure 211).

(a) Install straightedge GSE 141 and protractor-digital GSE 070 on the left and right engines (See Figure 209, Sheet 1).

(b) Write in table 210 the respective angles found.

Table 210 - ENGINE INCIDENCE

ENGINE	VALUES FOUND	ALLOWABLE LIMIT
Left		+ 19 min - 1 min
Right		+ 19 min - 1 min

(c) Write in table 211 the angles found, and calculate the asymmetry between the left and right engines.

Table 211 - ASYMMETRY BETWEEN ENGINES

VALUES FOUND	DIFFERENCES FOUND	ALLOWABLE LIMIT
Left engine (A) = _____ Right engine (B) = _____	(A) - (B) = _____	± 10 min

(8) Dihedral and Incidence of Horizontal Stabilizer (Figure 212).

(a) Set the horizontal stabilizer to the electrical zero position. Refer to AMM TASK 27-40-02-700-801-A/500.

(b) Stabilizer straightedge GSE 141 is put on the horizontal stabilizer at four stations. There is one position for installation of the straightedge at each station. Install spindles to the straightedge assembly. Obey the instructions in Figure 212, sheet 2.

NOTE: The spindle number is on the spindle body.

(c) To do the check of the horizontal stabilizer dihedral and incidence, do as follows:

NOTE:
- To measure the left or right stabilizer incidence, the GSE 070 display must always point to the right side of the aircraft.
- To measure the left or right stabilizer dihedral, the GSE 070 display must always point to the trailing edge of the horizontal stabilizer.
- Write down in the tables the measured incidence and dihedral values with their correct mathematical signs.

1 Set digital protractor GSE 070 to true zero.

NOTE: True zero is the factory-adjusted zero of the digital protractor. When the digital protractor is first set to on, the displayed angles will be in true zero.

2 Put straightedge GSE 141 on the left horizontal stabilizer, at station YH = - 350, between stations YH = - 30 and YH = - 670 at the second rivet row. Refer to Figure 212, sheet 2 to the correct setup of the straightedge. Put digital protractor GSE 070 on the straightedge. To measure the horizontal stabilizer dihedral, the digital protractor must be in the direction of the shorter arm of the straightedge. To measure the left horizontal stabilizer incidence, the digital protractor must be in the direction of the longer arm of the straightedge.

3 Write down the dihedral and incidence angles found in tables 212 and 213, respectively.

Table 212 - HORIZONTAL STABILIZER DIHEDRAL

POSITION	VALUES FOUND	PERMITTED LIMITS
At station YH = - 350	LHS1 = _____	± 20 min
At station YH = - 2270	LHS2 = _____	± 20 min

Table 212 - HORIZONTAL STABILIZER DIHEDRAL (Continued)

POSITION	VALUES FOUND	PERMITTED LIMITS
At station YH = 350	RHS1 = _____	± 20 min
At station YH = 2270	RHS2 = _____	± 20 min

Table 213 - HORIZONTAL STABILIZER INCIDENCE

POSITION	VALUES FOUND	ALLOWABLE LIMITS
At station YH = - 350	LHS1 = _____	+ 30 min - 0 min
At station YH = - 2270	LHS2 = _____	+ 30 min - 0 min
At station YH = 350	RHS1 = _____	+ 30 min - 0 min
At station YH = 2270	RHS2 = _____	+ 30 min - 0 min

NOTE:
- For the dihedral, values from - 20' to + 20' (- 0.3° to + 0.3°) are acceptable and, for the incidence angles, values from 0' to - 30' (0° to + 0.5°).
  The pitch up value is considered positive and the pitch down value is considered negative.
- If the value of a station is out of this range, contact the Embraer Technical Support Department.

4 Also at station YH = - 350, put digital protractor GSE 070 on the straightedge, in the direction of the longer arm of the straightedge.

5 Set digital protractor GSE 070 to relative zero.

NOTE:
- Relative zero is the inclination of a surface, used as a new (temporary) reference. In this case, we define the inclination of the longer arm of the straightedge as the new zero of the protractor.
- To set the relative zero, put the protractor on the straightedge, wait 5 seconds and push the ALT ZERO button once. "Alt" will come into view on the display, followed by "-0-". The digital protractor will then show angles with the use of the new reference and a flashing dash will come into view on the lower right corner of the display.
- Keep this adjustment to measure the relative incidence deviation at station YH = + 350.

6 Put straightedge GSE 141 on the right horizontal stabilizer, at station YH = + 350, between stations YH = + 30 and YH = + 670 at the second rivet row. Refer to Figure 212, sheet 2 to the correct setup of the straightedge. Put digital protractor GSE 070 on the straightedge, in the direction of the longer arm of the straightedge. With the same adjustment of zero as adjusted at

station YH = - 350, measure the incidence relative deviation between the left and right horizontal stabilizers.

7 Negative or positive values smaller than 20' (0.3° on the GSE display) are acceptable.

8 If the value is out of this range, contact the Embraer Technical Support Department.

9 Set digital protractor GSE 070 to true zero.

NOTE: Push the ALT ZERO button again to go back to true zero. The protractor digital also goes back to standard reference (true zero) when it is set to off or shuts off automatically.

10 Also at station YH = + 350, put digital protractor GSE 070 on the straightedge. To measure the horizontal stabilizer dihedral, the digital protractor must be in the direction of the shorter arm of the straightedge. To measure the right horizontal stabilizer incidence, the digital protractor must be in the direction of the longer arm of the straightedge.

11 Write the dihedral and incidence angles found in tables 212 and 213, respectively.

12 Put straightedge GSE 141 on the right horizontal stabilizer, at station YH = + 2270, between stations YH = + 1950 and YH = + 2590 at the eighth rivet row. Refer to Figure 212, sheet 2 to the correct setup of the straightedge. Put digital protractor GSE 070 on the straightedge. To measure the horizontal stabilizer dihedral, the digital protractor must be in the direction of the shorter arm of the straightedge. To measure the right horizontal stabilizer incidence, the digital protractor must be in the direction of the longer arm of the straightedge.

13 Write the dihedral and incidence angles found in tables 212 and 213, respectively.

14 Also at station YH = + 2270, put digital protractor GSE 070 on the straightedge, in the direction of the longer arm of the straightedge.

15 Set digital protractor GSE 070 to relative zero.

NOTE:
- Relative zero is the inclination of a surface, used as a new (temporary) reference. In this case, we define the inclination of the longer arm of the straightedge as the new zero of the protractor.
- To set the relative zero, put the protractor on the straightedge, wait 5 seconds and push the ALT ZERO button once. "Alt" will come into view on the display, followed by "-0-". The digital protractor will then show angles with use of the new reference and a flashing dash will come into view on the lower right corner of the display.
- Keep this adjustment to measure the relative incidence deviation at station YH = - 2270.

16 Put straightedge GSE 141 on the left horizontal stabilizer, at station YH = - 2270, between stations YH = - 1950 and YH = - 2590 at the eight rivet row. Refer to Figure 212, sheet 2 to the correct setup of the straightedge. Put digital protractor GSE 070 on the straightedge, in the direction of the longer arm of the straightedge. With the same adjustment of zero as adjusted at station YH = + 2270, measure the incidence relative deviation between the left and right horizontal stabilizers.

17 Negative or positive values smaller than 20' (0.3° on the GSE display) are acceptable.

18 If the value is out of this range, contact the Embraer Technical Support Department.

19 Set digital protractor GSE 070 to true zero.

NOTE: Put the ALT ZERO button again to go back to true zero. The protractor digital also goes back to standard reference (true zero) when it is set to off or shuts off automatically.

20 Also at station YH = - 2270, put digital protractor GSE 070 on the straightedge. To measure the horizontal stabilizer dihedral, the digital protractor must be in the direction of the shorter arm of the straightedge. To measure the left horizontal stabilizer incidence, the digital protractor must be in the direction of the longer arm of the straightedge.

21 Write the dihedral and incidence angles found in tables 212 and 213, respectively.

22 Write down in table 214 the dihedral angles found, and calculate the dihedral relative deviation between the left and right horizontal stabilizers.

NOTE: For this calculation, obey the correct mathematical signs of the values.

Table 214 - HORIZONTAL STABILIZER DIHEDRAL RELATIVE DEVIATION

VALUES FOUND	RELATIVE DEVIATION	PERMITTED LIMITS
LHS1 = _____ RHS1 = _____	LHS1 - RHS1 = _____	LHS1 ≠ RHS1 max. 20 min
LHS2 = _____ RHS2 = _____	LHS2 - RHS2 = _____	LHS2 ≠ RHS2 max. 20 min

23 For the dihedral relative deviation angles found, values from - 20' to + 20' (- 0.3° to + 0.3°) are acceptable.

24 If the value is out of this range, contact the Embraer Technical Support Department.

(9) Dihedral and Incidence of Wings (Figure 213).

(a) To do the check of the wing dihedral and incidence, do as follows:

1 To measure the left wing dihedral, put straightedge GSE 141 on the left wing, over the sixth rivet row, over the fifteenth rivet row and over the

twenty-second rivet row, respectively. Refer to Figure 213, sheet 2, sheet 3, and sheet 4 to the correct setup of the straightedge. Put protractor-digital GSE 070 on the straightedge. It must be in the direction of the shorter arm of the straightedge. To measure the wing incidence, the protractor-digital must be in the direction of the longer arm of the straightedge.

2 To measure the right wing dihedral, put straightedge GSE 141 on the right wing, over the sixth rivet row, over the fifteenth rivet row and over the twenty-second rivet row, respectively. Refer to Figure 213, sheet 2, sheet 3, and sheet 4 to the correct setup of the straightedge. Put protractor-digital GSE 070 on the straightedge. It must be in the direction of the shorter arm of the straightedge. To measure the wing incidence, the protractor must be in the direction of the longer arm of the straightedge.

3 Write in tables 215 and 216 the respective dihedral and incidence angles found.

Table 215 - WING DIHEDRAL

POSITION	VALUES FOUND	ALLOWABLE LIMITS
Between ribs 5 & 7	LW1 = _____	+ 34 min - 6 min
Between ribs 14 & 16	LW2 = _____	+ 33 min - 7 min
Between ribs 21 & 23	LW3 = _____	+ 24 min - 16 min
Between ribs 5 & 7	RW1 = _____	+ 34 min - 6 min
Between ribs 14 & 16	RW2 = _____	+ 33 min - 7 min
Between ribs 21 & 23	RW3 = _____	+ 24 min - 16 min

Table 216 - WINGS INCIDENCE

POSITION	VALUES FOUND	ALLOWABLE LIMITS
Left wing - Rib 6	LW1 = _____	+ 1 min - 19 min
Left wing - Rib 15	LW2 = _____	- 3 min - 23 min
Left wing - Rib 22	LW3 = _____	- 1 min - 21 min
Right wing - Rib 6	RW1 = _____	+ 1 min - 19 min
Right wing - Rib 15	RW2 = _____	- 3 min - 23 min
Right wing - Rib 22	RW3 = _____	- 1 min - 21 min

4 Write in table 217 the respective dihedral angles found, and calculate the dihedral asymmetry between the left and right wings.

Table 217 - WING DIHEDRAL ASYMMETRY

VALUES FOUND	ASYMMETRY FOUND	ALLOWABLE LIMITS
LW1 = _____ RW1 = _____	LW1 - RW1 = _____	± 20 min
LW2 = _____ RW2 = _____	LW2 - RW2 = _____	± 20 min
LW3 = _____ RW3 = _____	LW3 - RW3 = _____	± 20 min

NOTE:
- For dihedral values of a same station (left/right) with equal signs, the asymmetry is got as follows: subtract the smaller value from the larger, independently of the sign.
- For dihedral values of a same station (left/right) with different signs, the asymmetry is got as follows: add together the absolute dihedral values of the stations (independently of the signs).

5 Write in table 218 the respective incidence angles found, and calculate the incidence asymmetry between the left and right wings.

Table 218 - WING INCIDENCE ASYMMETRY

VALUES FOUND	ASYMMETRY FOUND	ALLOWABLE LIMITS
LW1 = _____ RW1 = _____	LW1 - RW1 = _____	± 20 min
LW2 = _____ RW2 = _____	LW2 - RW2 = _____	± 20 min
LW3 = _____ RW3 = _____	LW3 - RW3 = _____	± 20 min

NOTE:
- For incidence values of a same station (left/right) with equal signs, the asymmetry is got as follows: subtract the smaller value from the larger value, independently of the signal.
- For incidence values of a same station (left/right) with different signs, the asymmetry is got as follows: add together the absolute incidence values of the stations (independently of the signs).

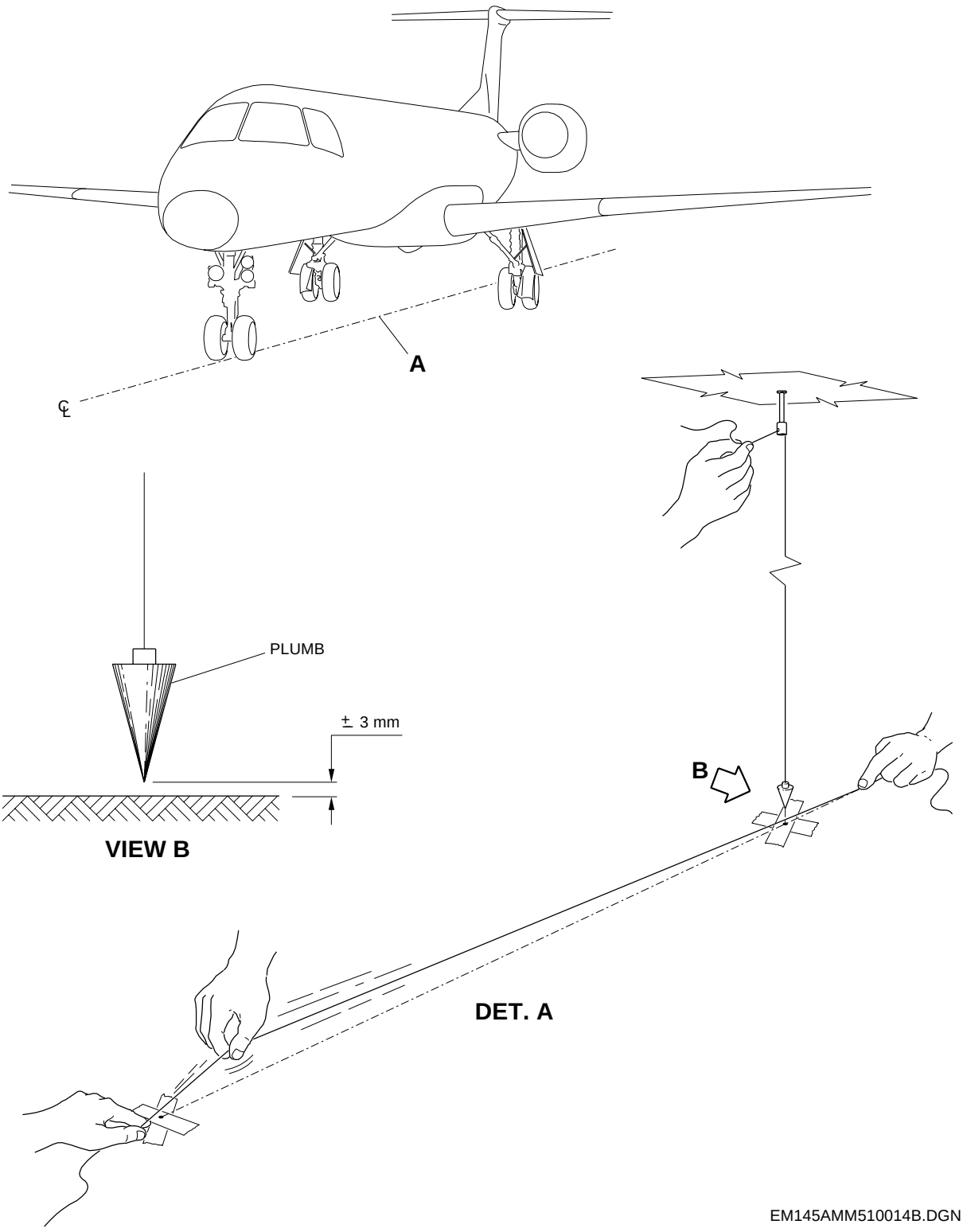
K. Follow-on

SUBTASK 842-007-B

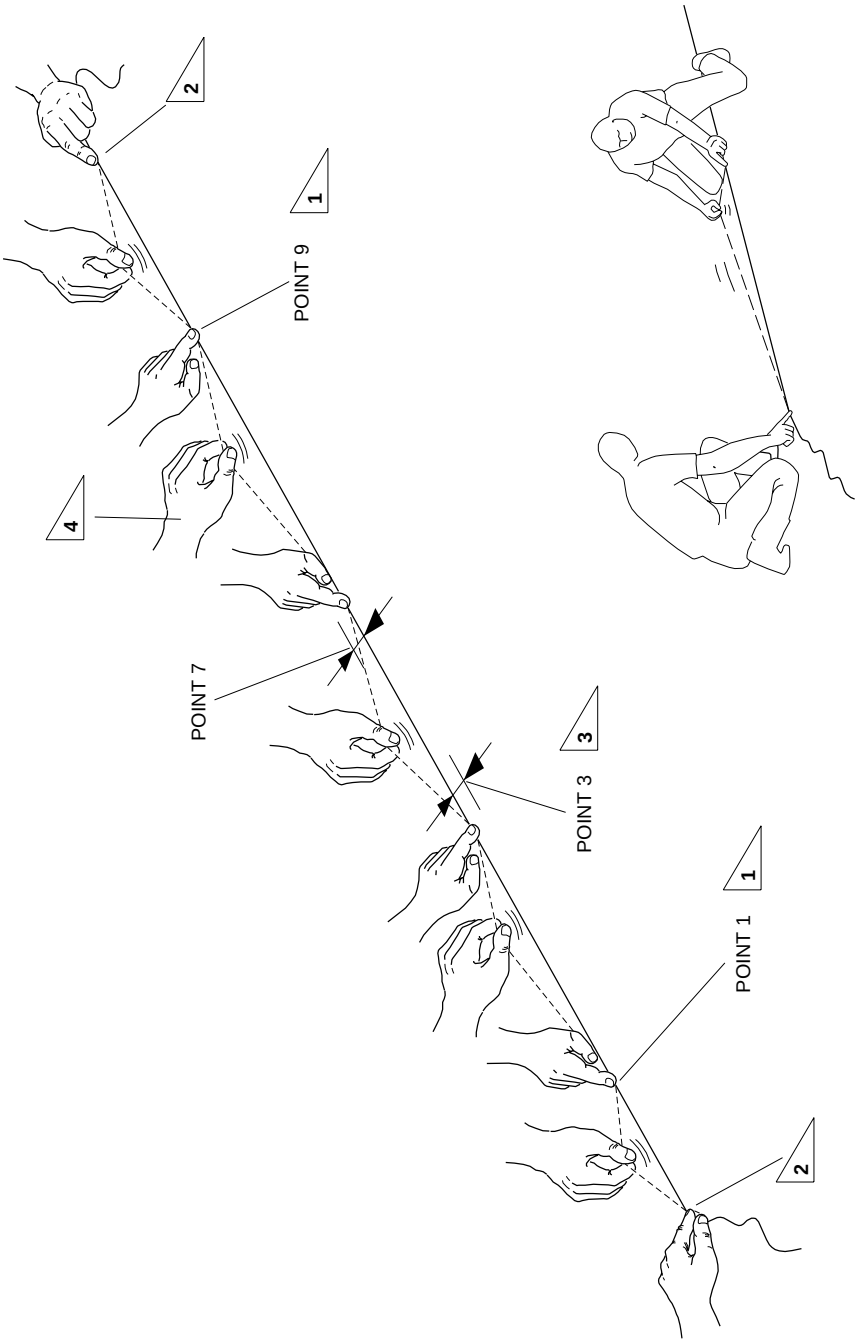
(1) Remove all the GSEs from aircraft.

(2) Lower the aircraft from the jacks if no other maintenance action is to be done after alignment check.

EFFECTIVITY: ACFT MODEL(S) EMB-145
Fuselage Center Line Marking
Figure 201 - Sheet 1



EFFECTIVITY: ACFT MODEL(S) EMB-145
Fuselage Center Line Marking
Figure 201 - Sheet 2



1 THE THREAD MUST GO FROM POINT 1' TO POINT 9' IN A STRAIGHT LINE.

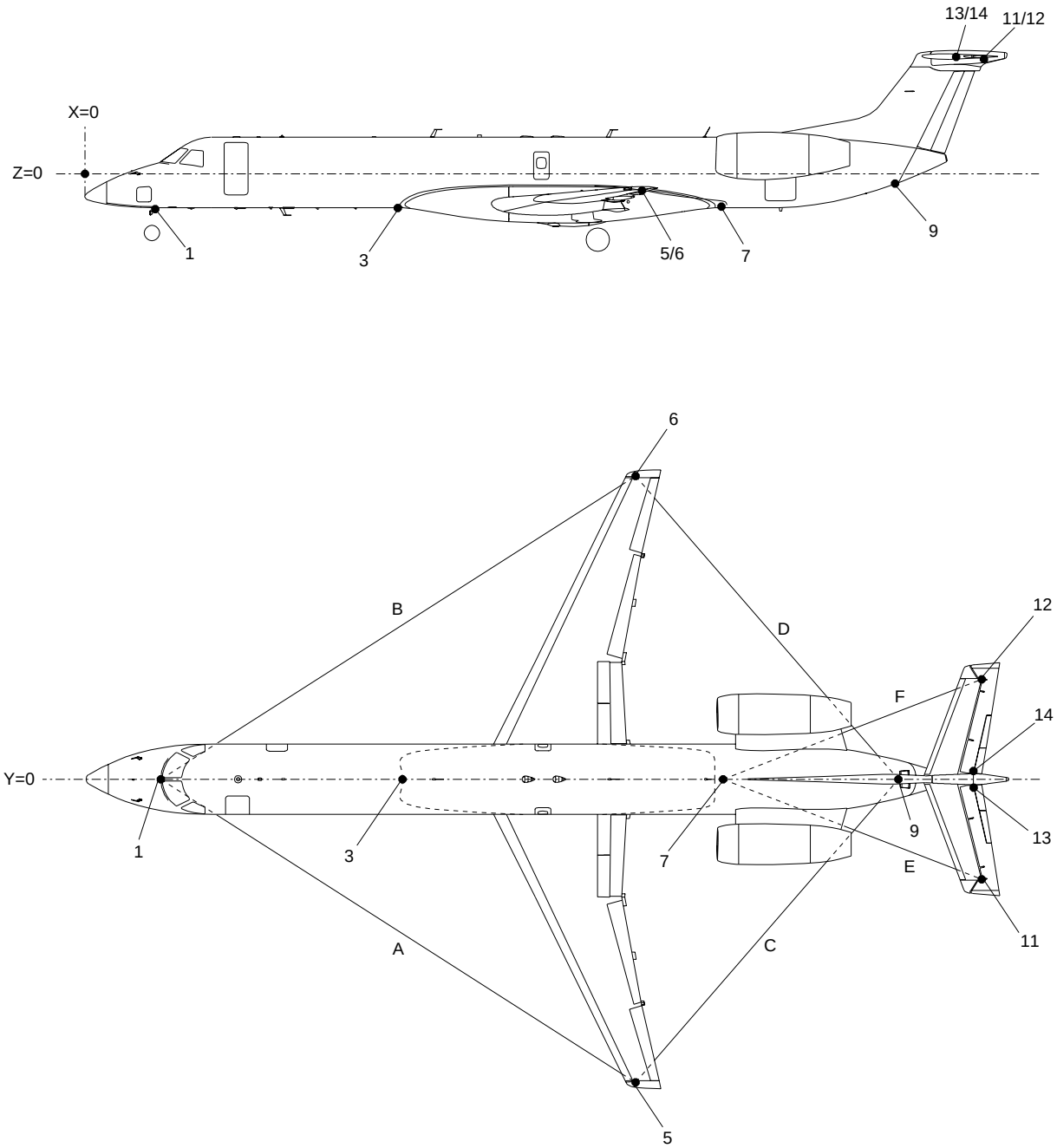
2 THE THREAD MUST GO A LITTLE BEYONG POINTS 1' AND 9'. (AS SUFFICIENTLY TO PERMIT THE MEASUREMENTS AT POINTS 13 AND 14 AND AT THE NOSE LANDING GEAR).

3 DISTANCE BETWEEN POINTS 3' AND 7' FOR Y=0. THE THREAD MUST NOT TOUCH POINTS 3' AND 7'.

4 WITH THE THREAD HELD, PULL AND LET IT DOWN AGAINST THE GROUND.

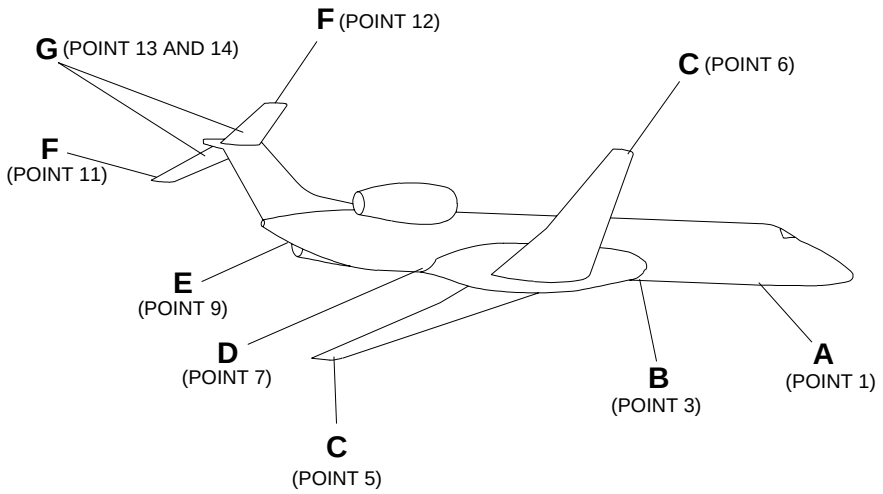
EM145AMM510119A.DGN

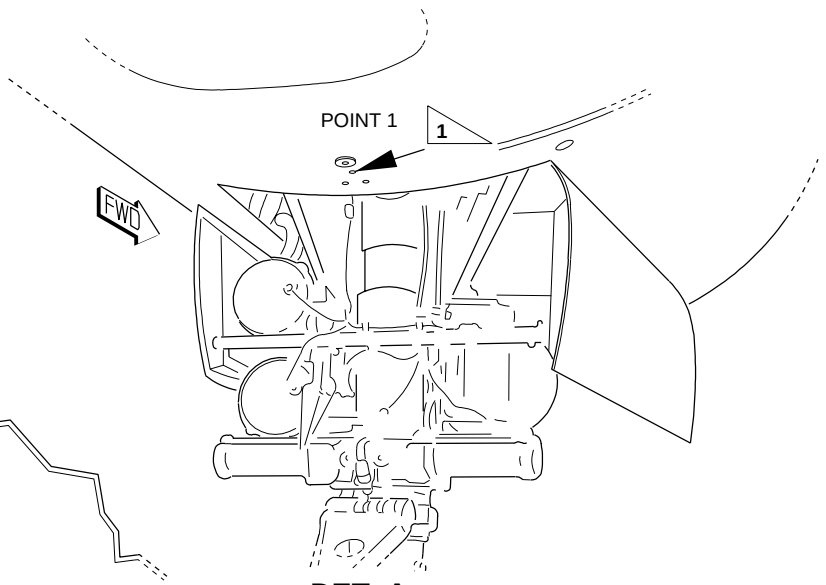
EFFECTIVITY: ACFT MODEL(S) EMB-145
Aircraft Alignment
Figure 202 - Sheet 1



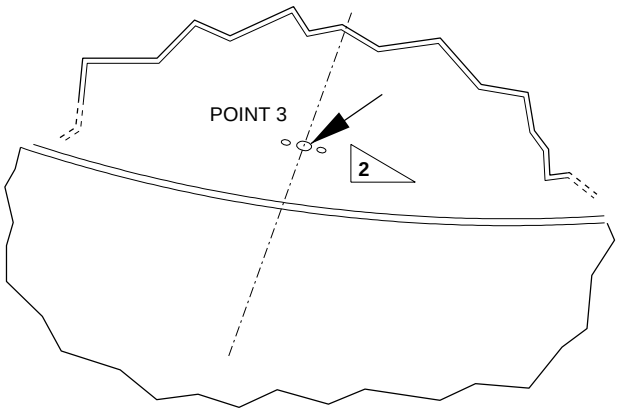
145AMM510015.MCE A

EFFECTIVITY: ACFT MODEL(S) EMB-145
Aircraft Alignment
Figure 202 - Sheet 2





DET. A



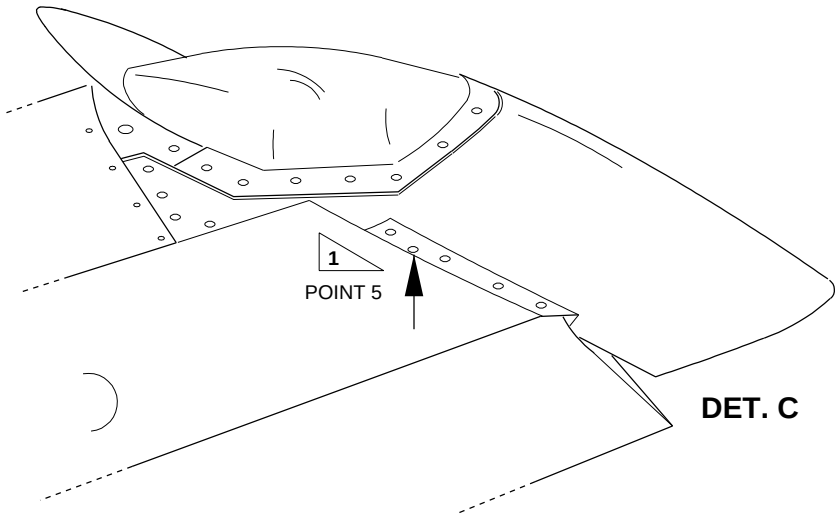
DET. B

1 POINT 1 SHOWN. THIS POINT IS IMMEDIATELY AFT OF THE NOSE LANDING GEAR.

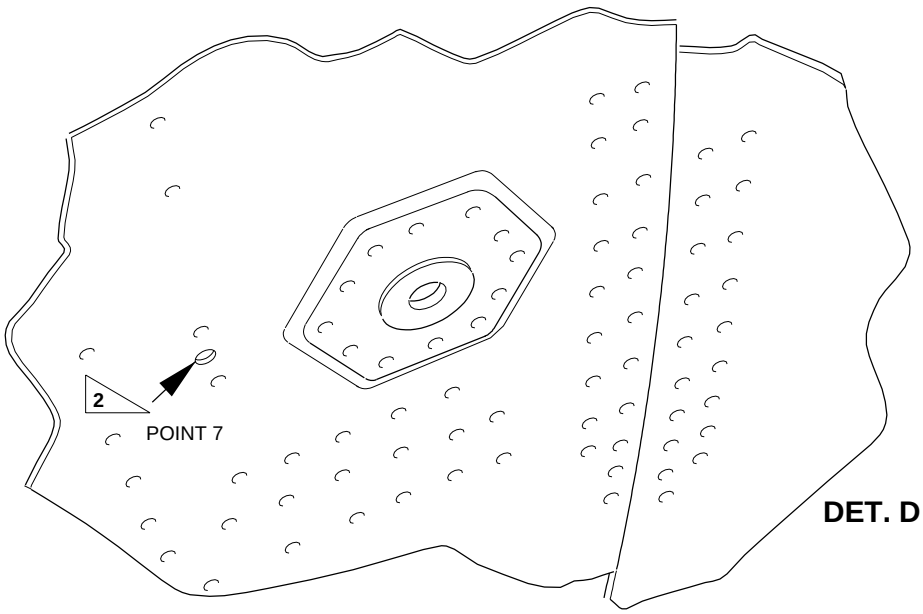
2 POINT 3 SHOWN. THIS POINT IS LOCATED IMMEDIATELY FORWARD OF THE WING STUB.

145AMM510010.MCE

EFFECTIVITY: ACFT MODEL(S) EMB-145
Aircraft Alignment
Figure 202 - Sheet 3



DET. C



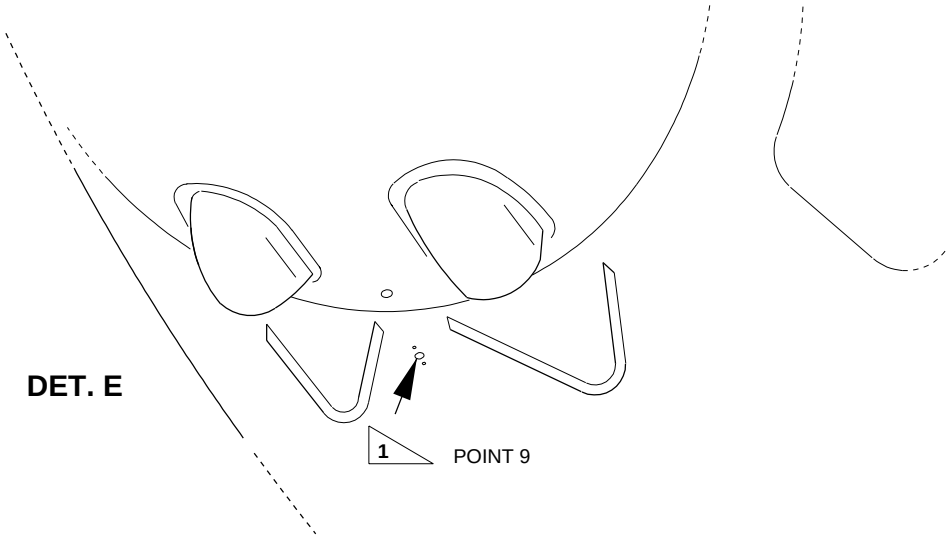
DET. D

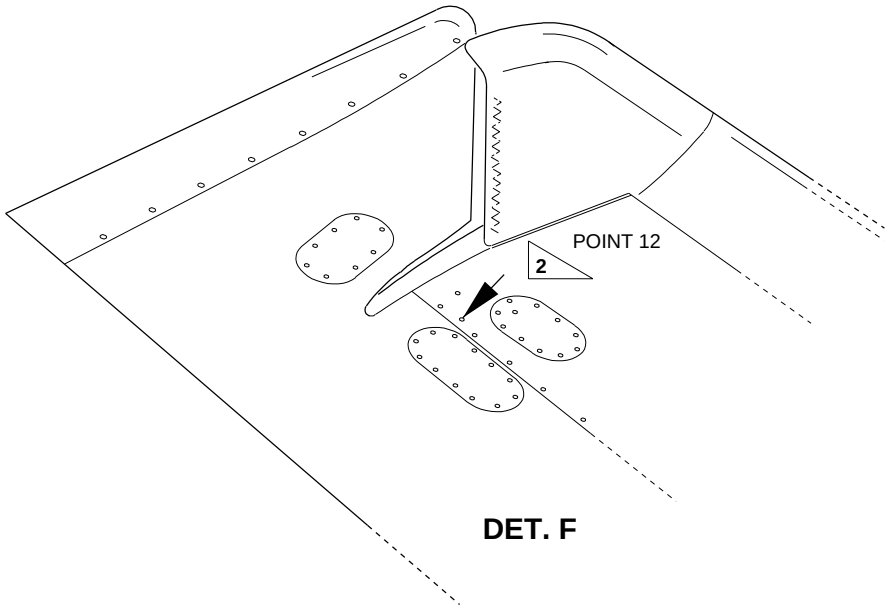
1 POINT 5 SHOWN, POINT 6 HANDED. THE POINT IS THE SECOND (FROM FORWARD AFT) OF THE HOLES OF THE WING TIP FAIRING ATTACHMENT SCREWS. IT CAN BE EASILY SEEN BECAUSE IT IS SLIGHTLY OUT OF THE FASTENER ROW ALIGNMENT.

2 POINT 7 SHOWN. THIS POINT IS IMMEDIATELY AFT OF THE WING STUB.

145AMM510011.MCE

EFFECTIVITY: ACFT MODEL(S) EMB-145
Aircraft Alignment
Figure 202 - Sheet 4



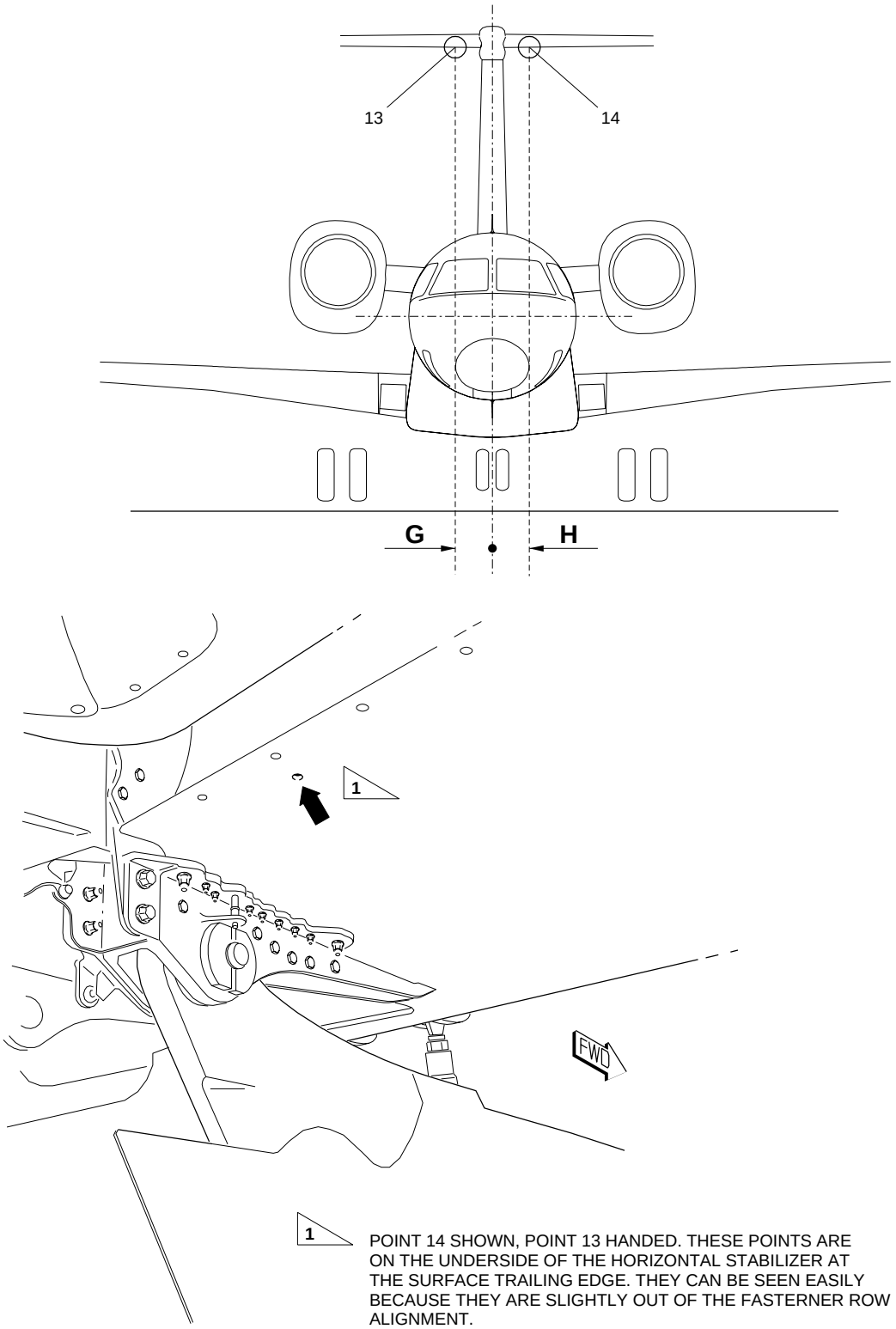


1 POINT 9 SHOWN. THIS POINT IS NEAR THE AIR SCOOPS.

2 POINT 12 SHOWN, POINT 11 HANDED. THE POINT CAN BE SEEN EASILY BECAUSE IT IS SLIGHTLY OUT OF THE FASTENER ROW ALIGNMENT.

145AMM510012.MCE

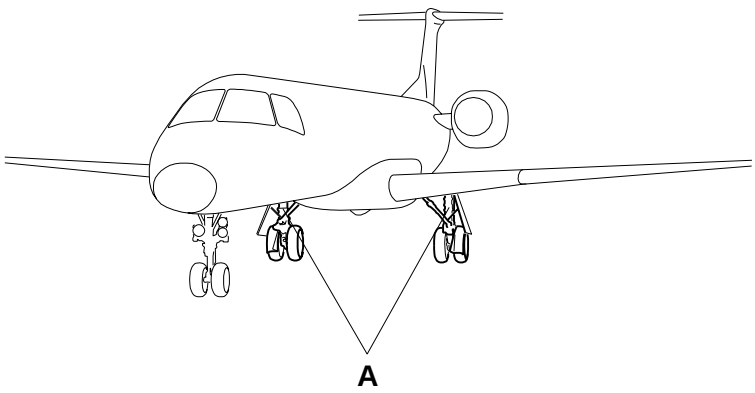
EFFECTIVITY: ACFT MODEL(S) EMB-145
Aircraft Alignment
Figure 202 - Sheet 5

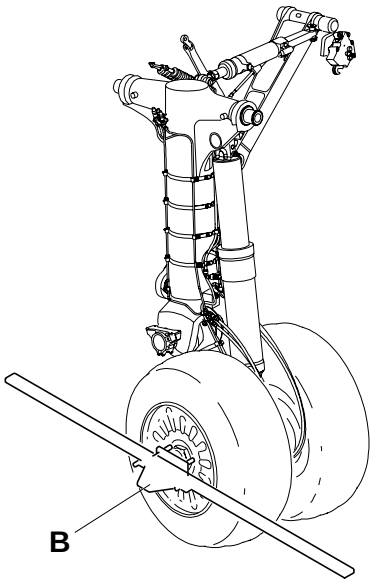


1 POINT 14 SHOWN, POINT 13 HANDED. THESE POINTS ARE ON THE UNDERSIDE OF THE HORIZONTAL STABILIZER AT THE SURFACE TRAILING EDGE. THEY CAN BE SEEN EASILY BECAUSE THEY ARE SLIGHTLY OUT OF THE FASTERNER ROW ALIGNMENT.

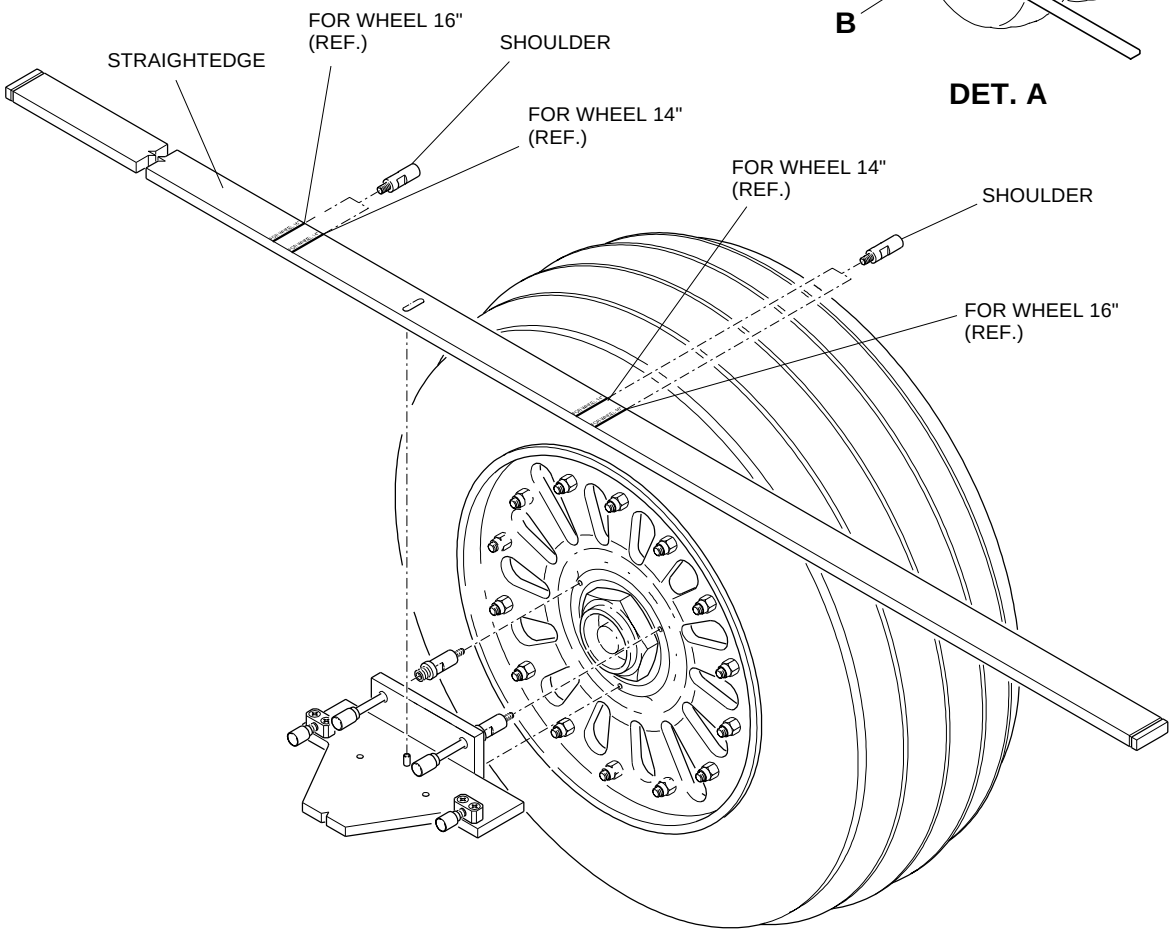
145AMM510009.MCE A

EFFECTIVITY: ACFT MODEL(S) EMB-145
GSE 099 Installation at the Main Landing Gear
Figure 203 - Sheet 1





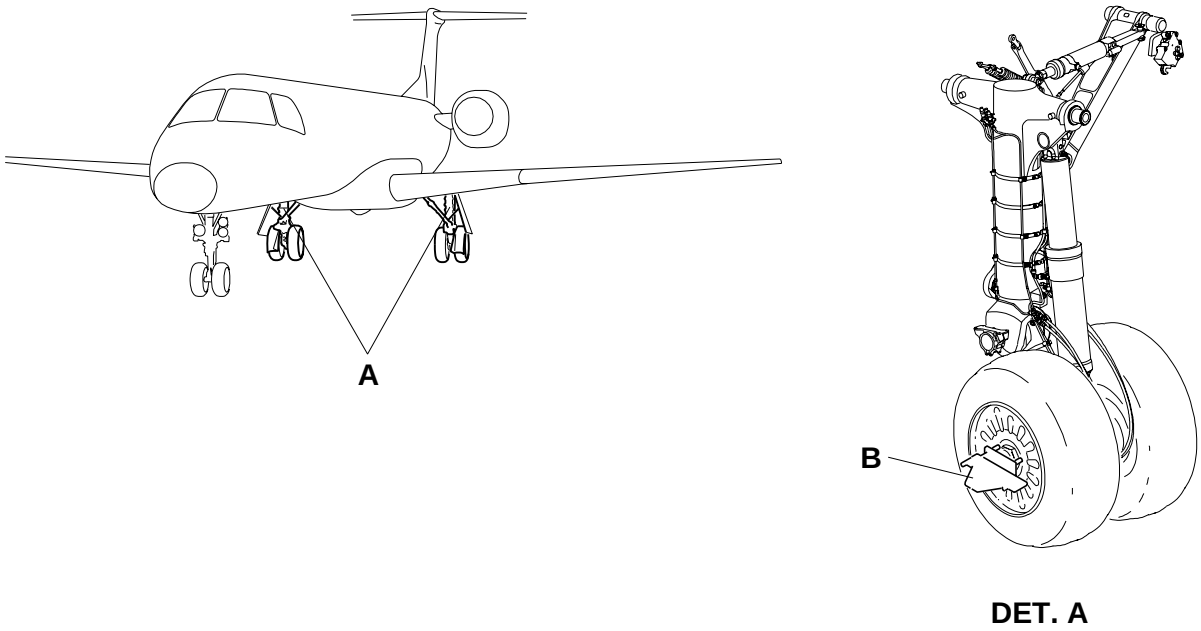
DET. A



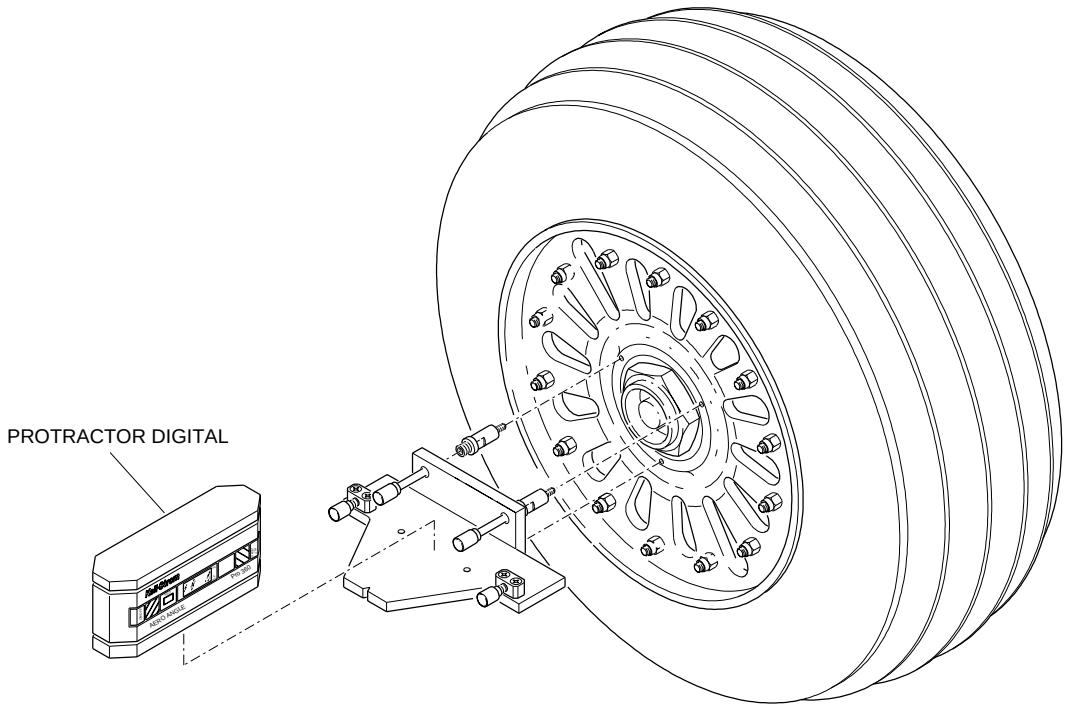
DET. B

EM145AMM510033C.DGN

EFFECTIVITY: ACFT MODEL(S) EMB-145
GSE 099 Installation at the Main Landing Gear
Figure 203 - Sheet 2



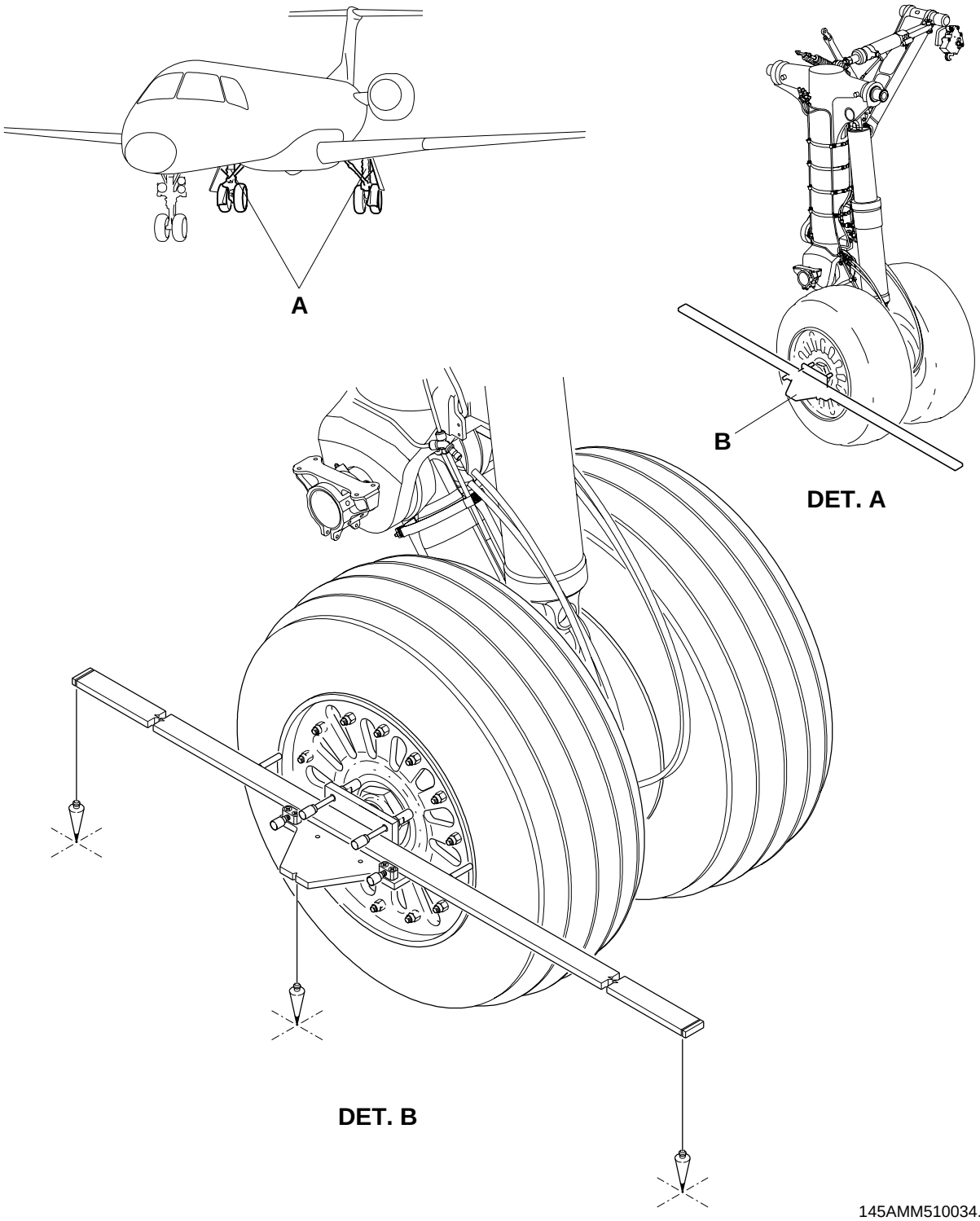
DET. A



DET. B

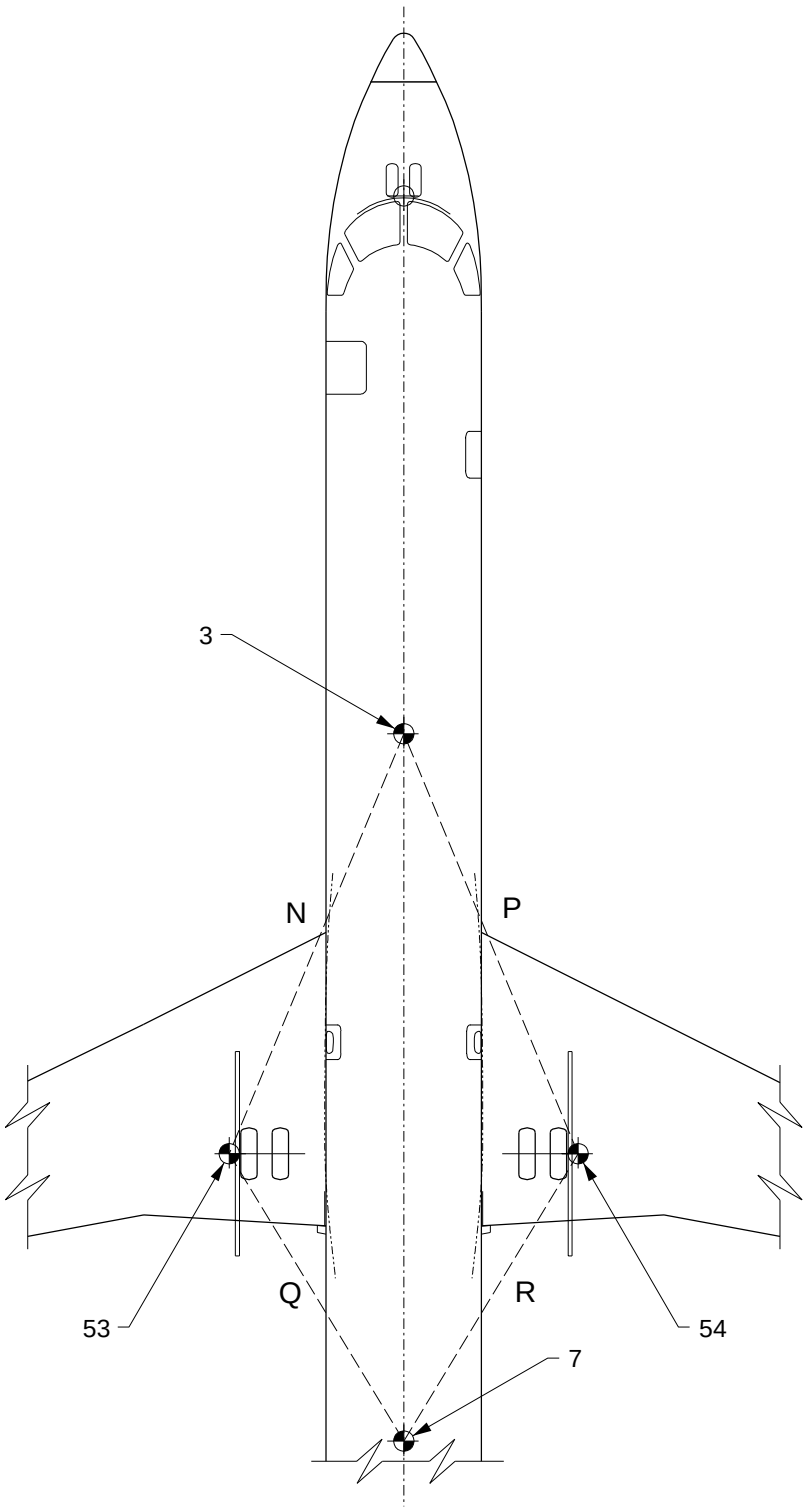
145AMM510032.MCE B

EFFECTIVITY: ACFT MODEL(S) EMB-145
GSE 099 Installation at the Main Landing Gear
Figure 203 - Sheet 3



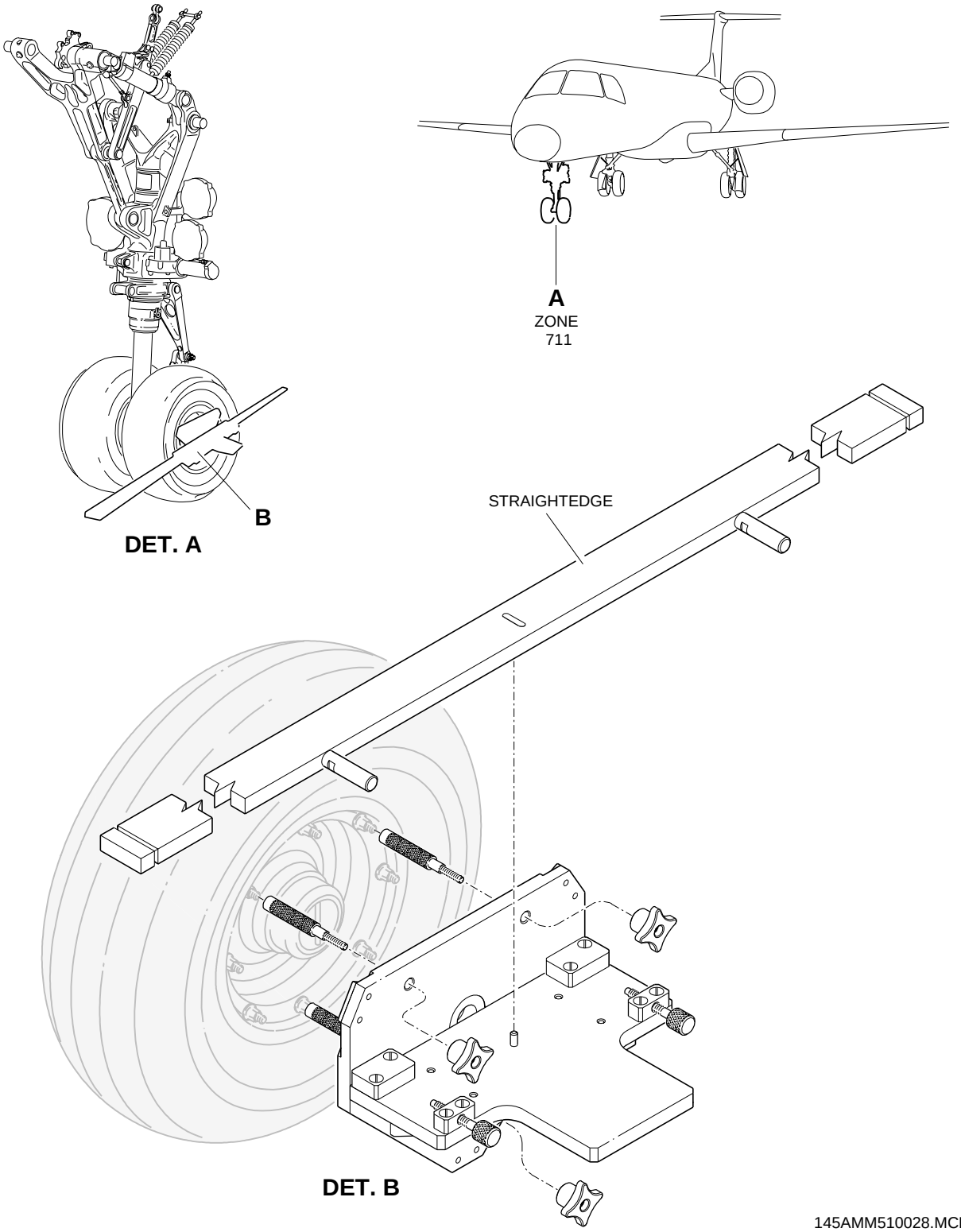
145AMM510034.MCE B

EFFECTIVITY: ACFT MODEL(S) EMB-145
Main Landing Gear Alignment
Figure 204

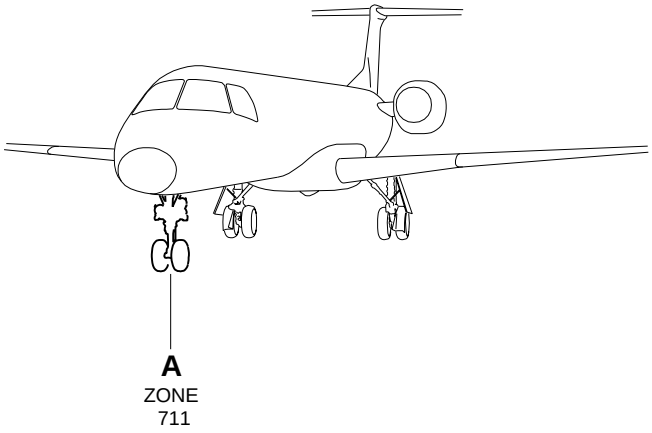


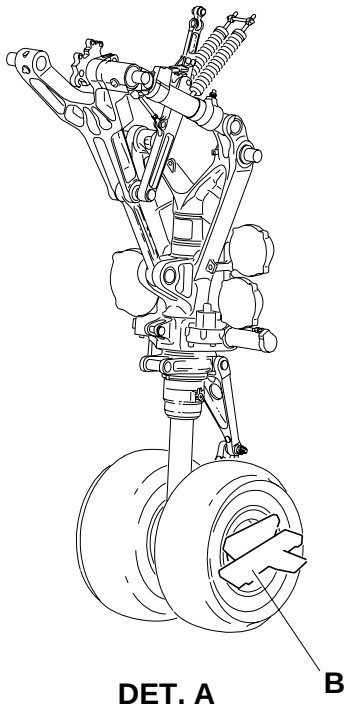
145AMM510018.MCE A

EFFECTIVITY: ACFT MODEL(S) EMB-145
GSE 205 Installation at the Nose Landing Gear
Figure 205 - Sheet 1

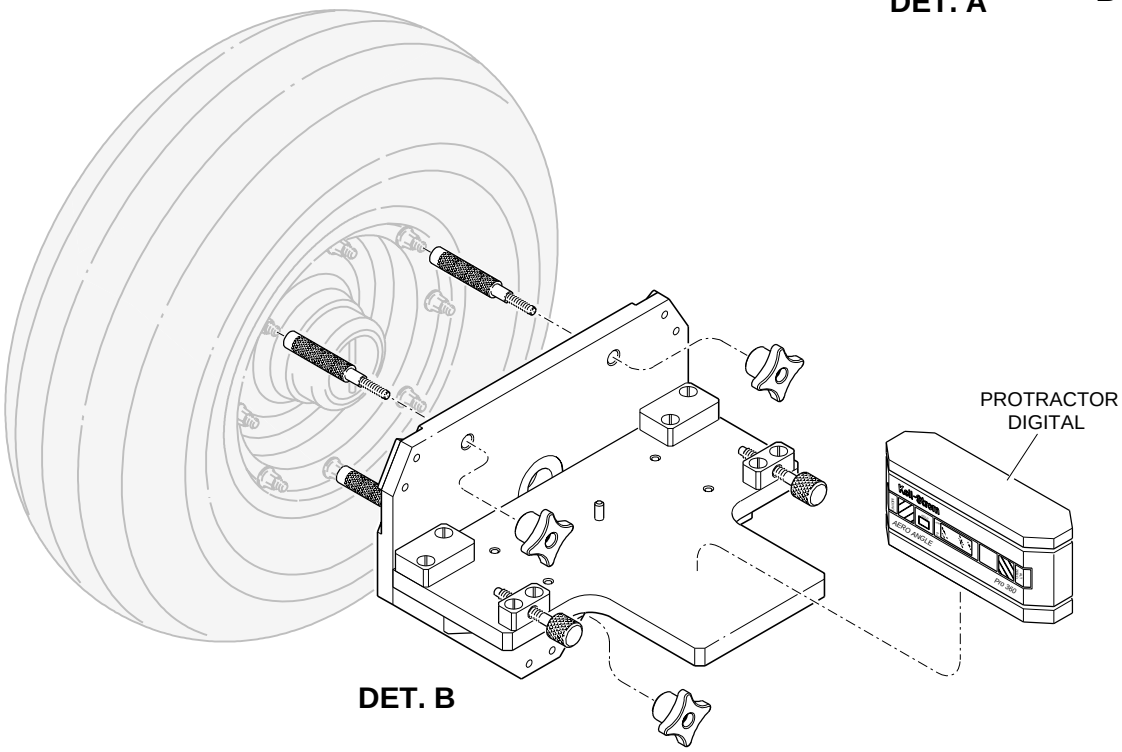


EFFECTIVITY: ACFT MODEL(S) EMB-145
GSE 205 Installation at the Nose Landing Gear
Figure 205 - Sheet 2





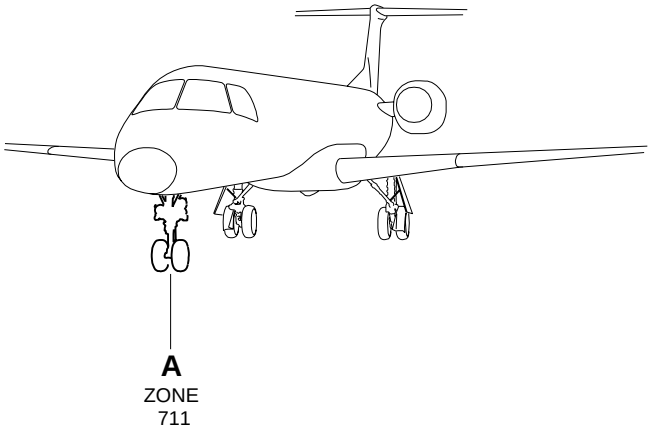
DET. A

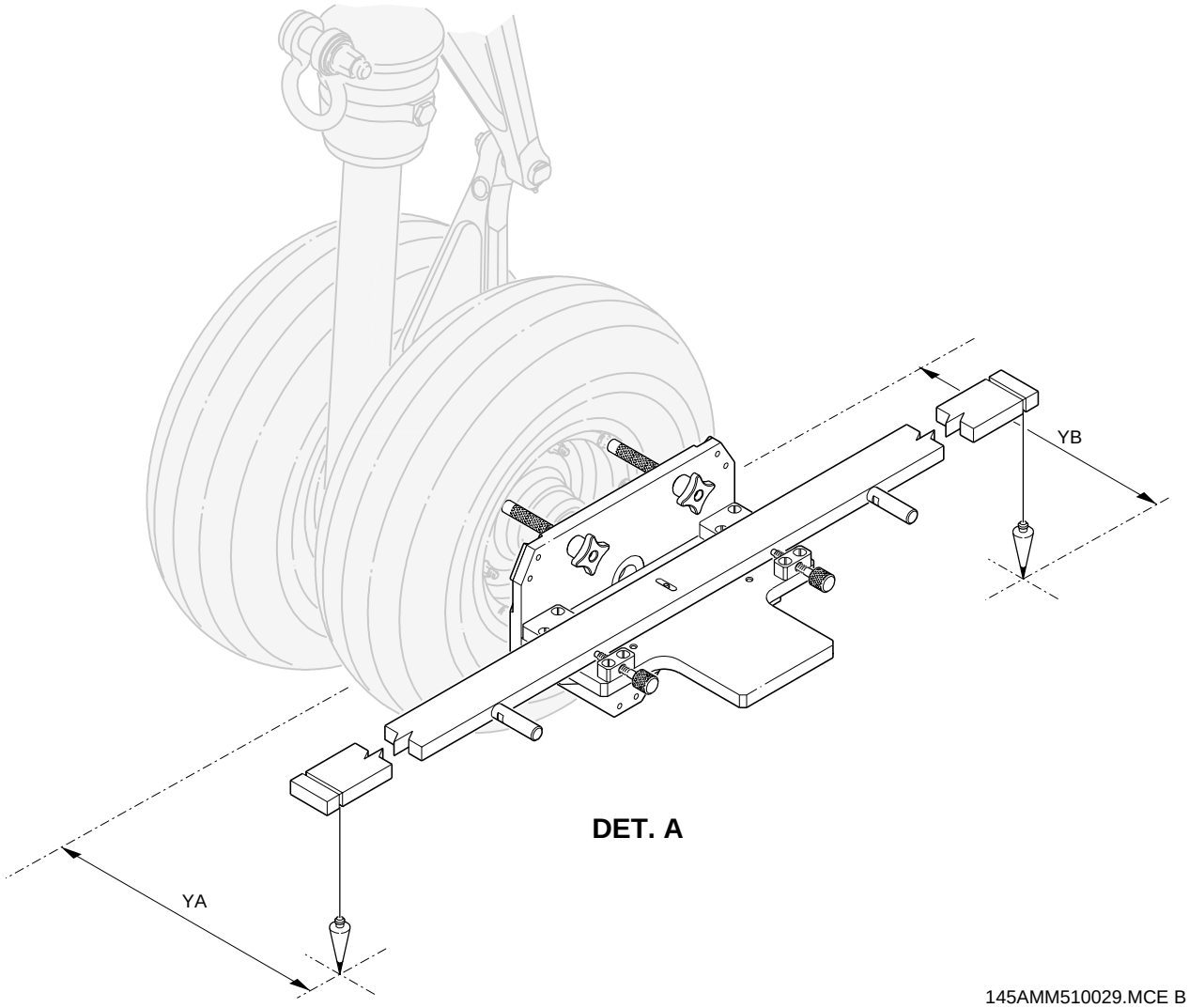


DET. B

145AMM510027.MCE C

EFFECTIVITY: ACFT MODEL(S) EMB-145
Nose Landing Gear Alignment
Figure 206

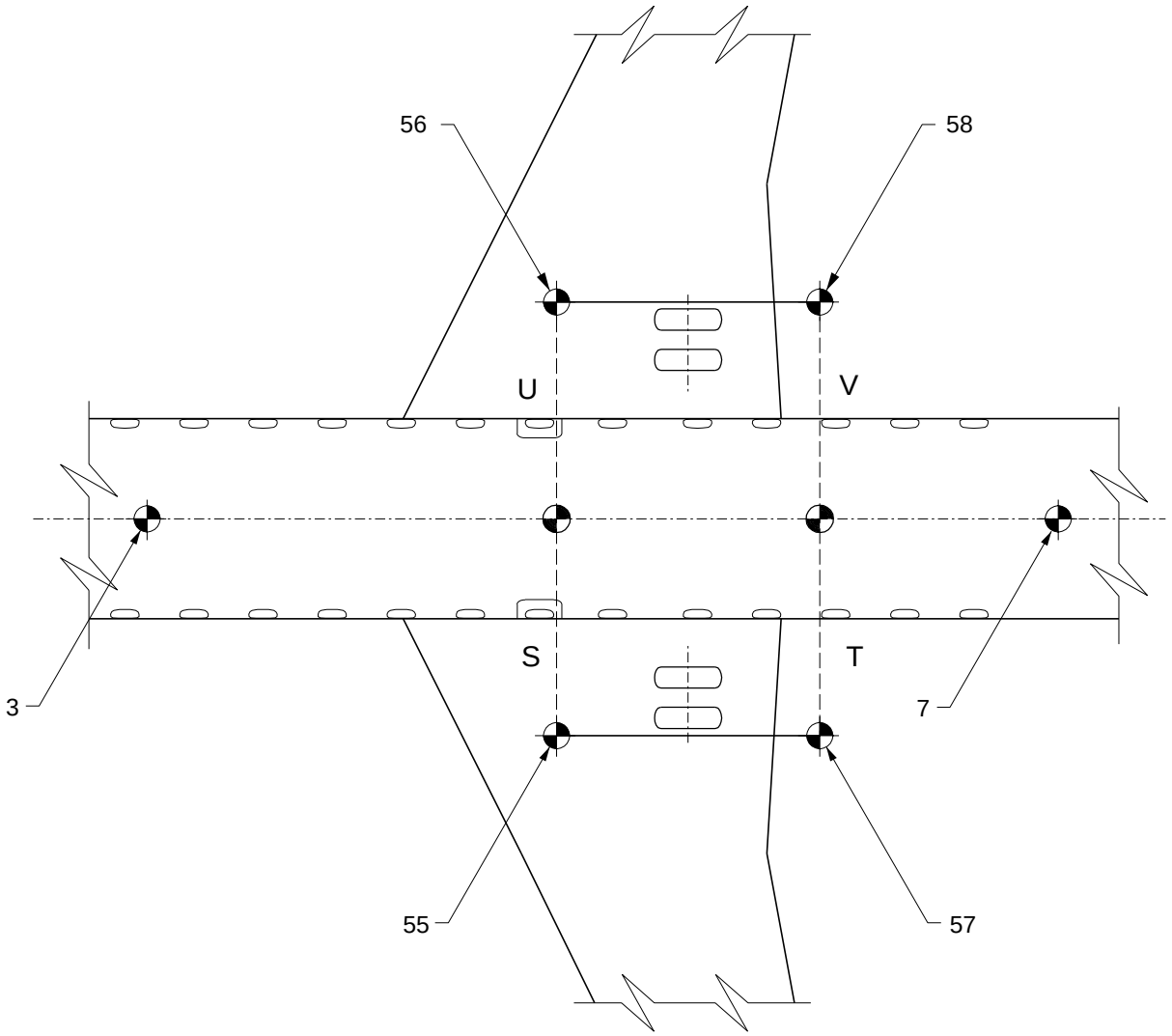




DET. A

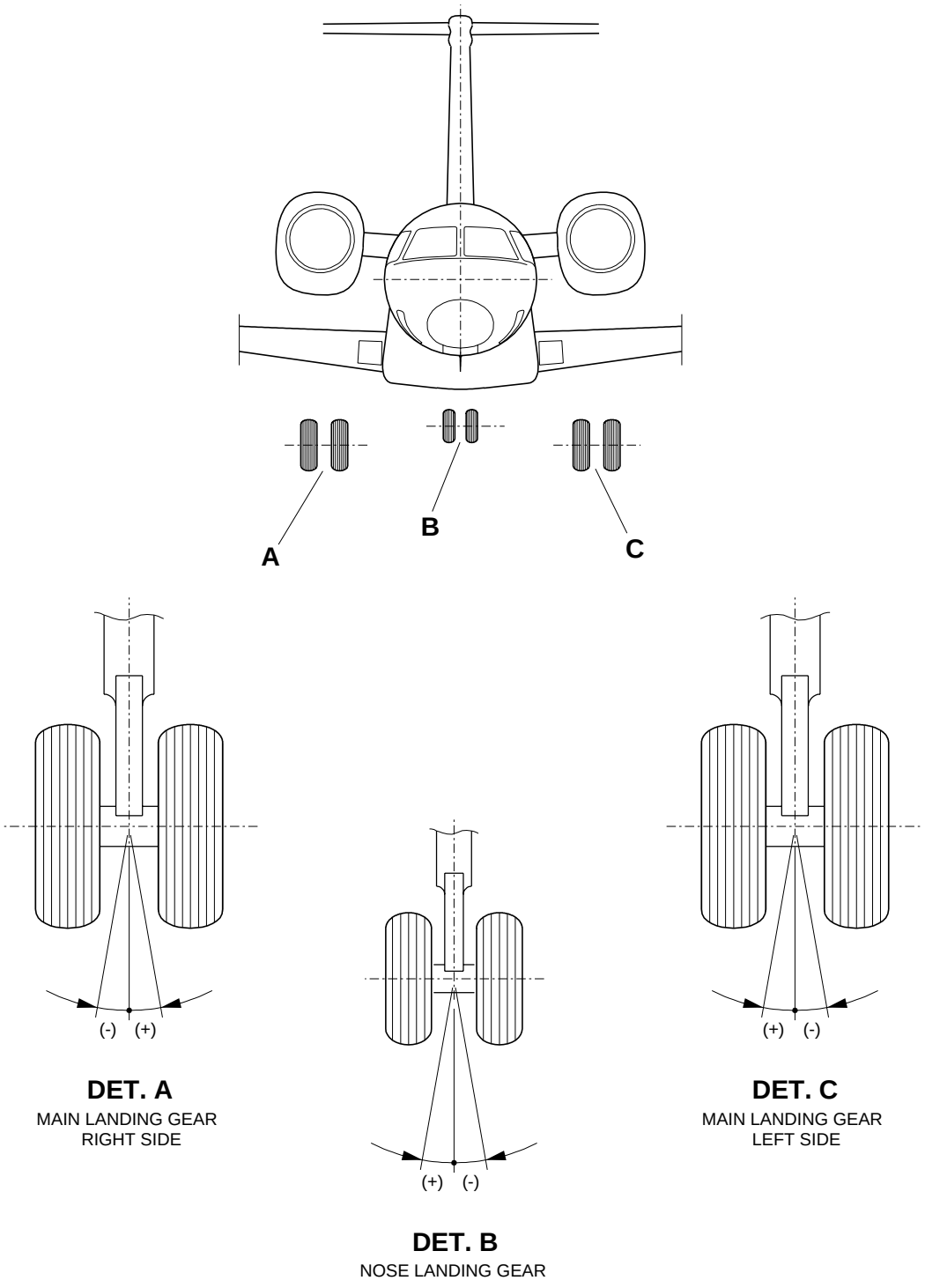
145AMM510029.MCE B

EFFECTIVITY: ACFT MODEL(S) EMB-145
Main Landing Gear Wheel Alignment
Figure 207



145AMM510017.MCE

EFFECTIVITY: ACFT MODEL(S) EMB-145
Wheel Camber
Figure 208



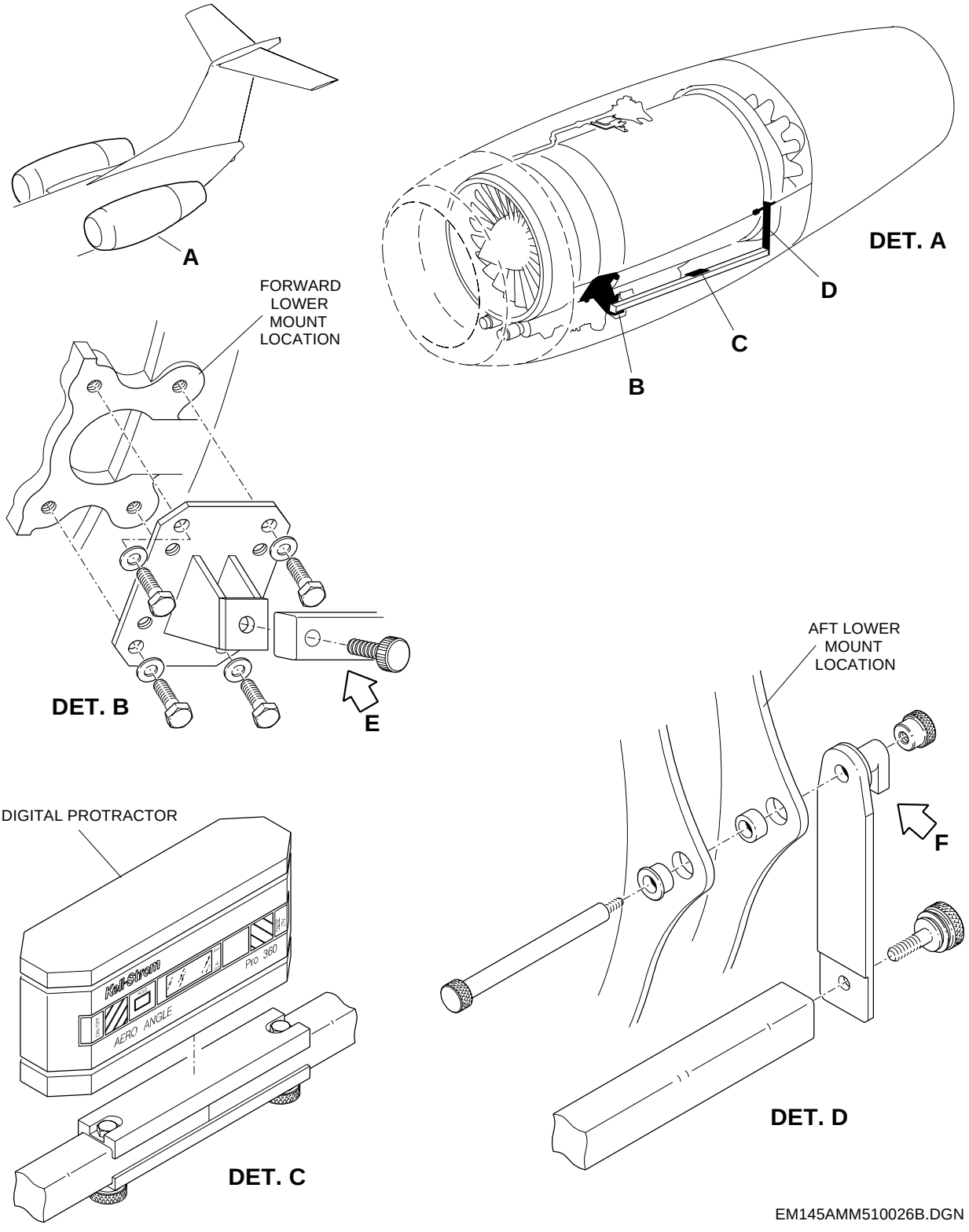
DET. A
MAIN LANDING GEAR
RIGHT SIDE

DET. B
NOSE LANDING GEAR

DET. C
MAIN LANDING GEAR
LEFT SIDE

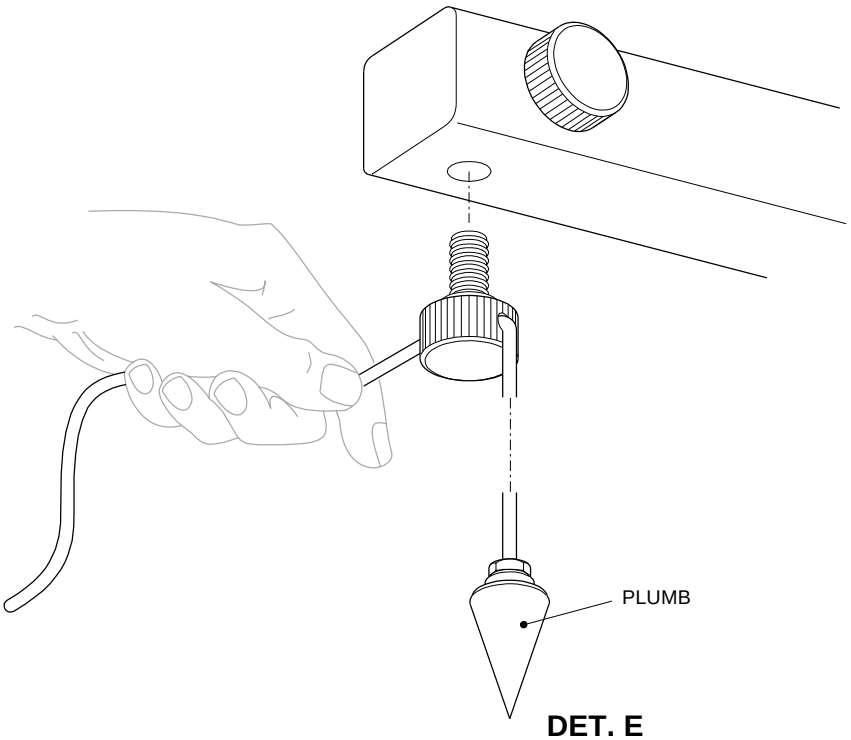
145AMM510016.MCE A

EFFECTIVITY: ACFT MODEL(S) EMB-145
Engine Straightedge Installation
Figure 209 - Sheet 1

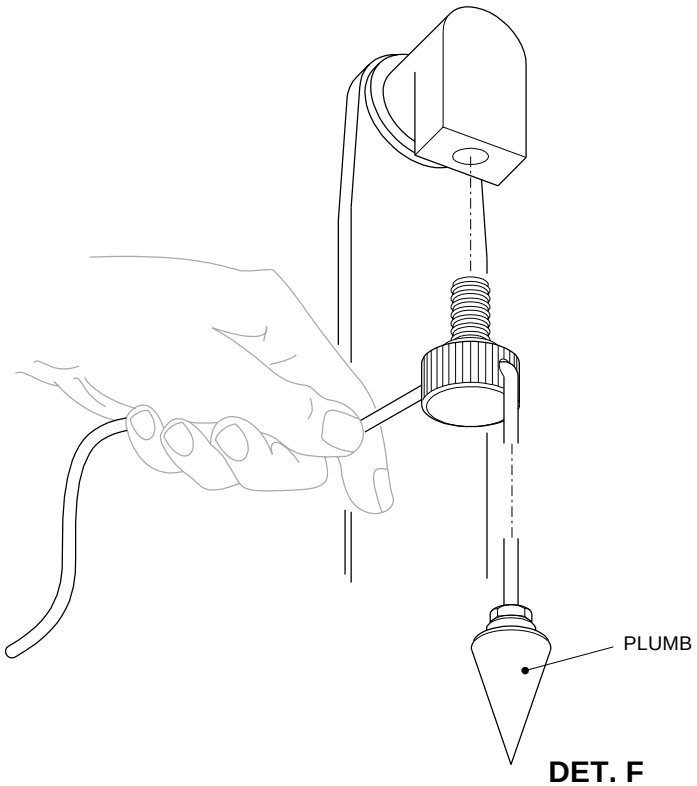


EM145AMM510026B.DGN

EFFECTIVITY: ACFT MODEL(S) EMB-145
Engine Straightedge Installation
Figure 209 - Sheet 2



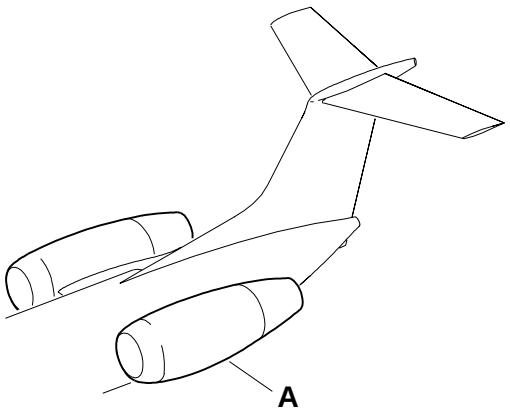
DET. E

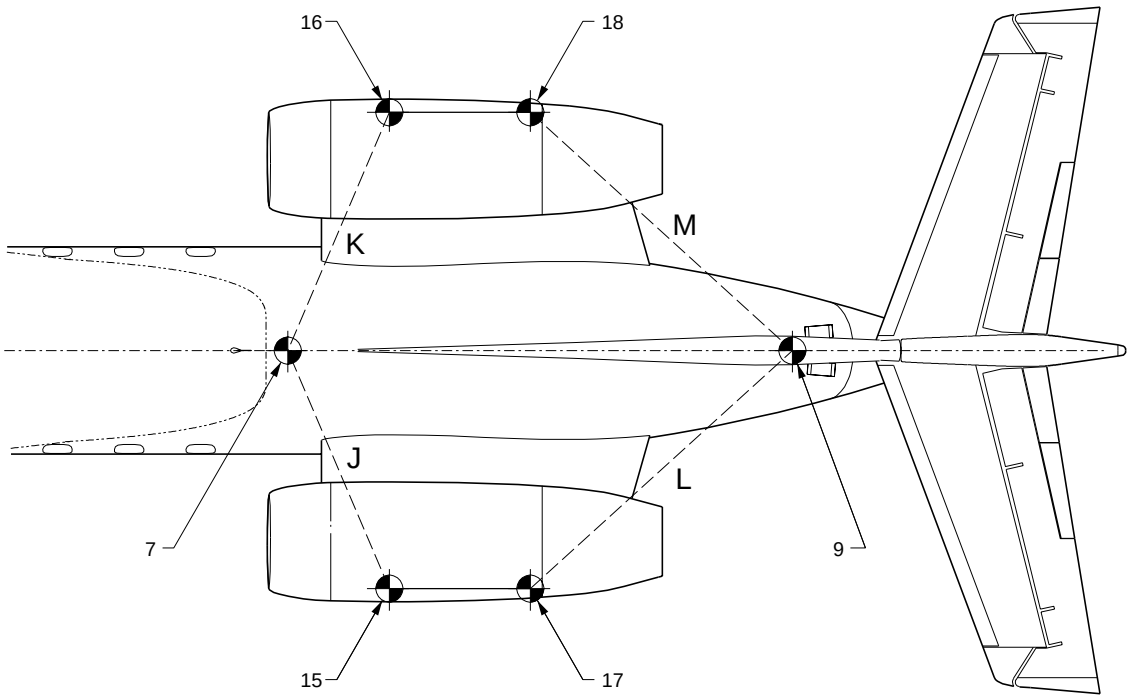


DET. F

EM145AMM510098A.DGN

EFFECTIVITY: ACFT MODEL(S) EMB-145
Engine Alignment
Figure 210

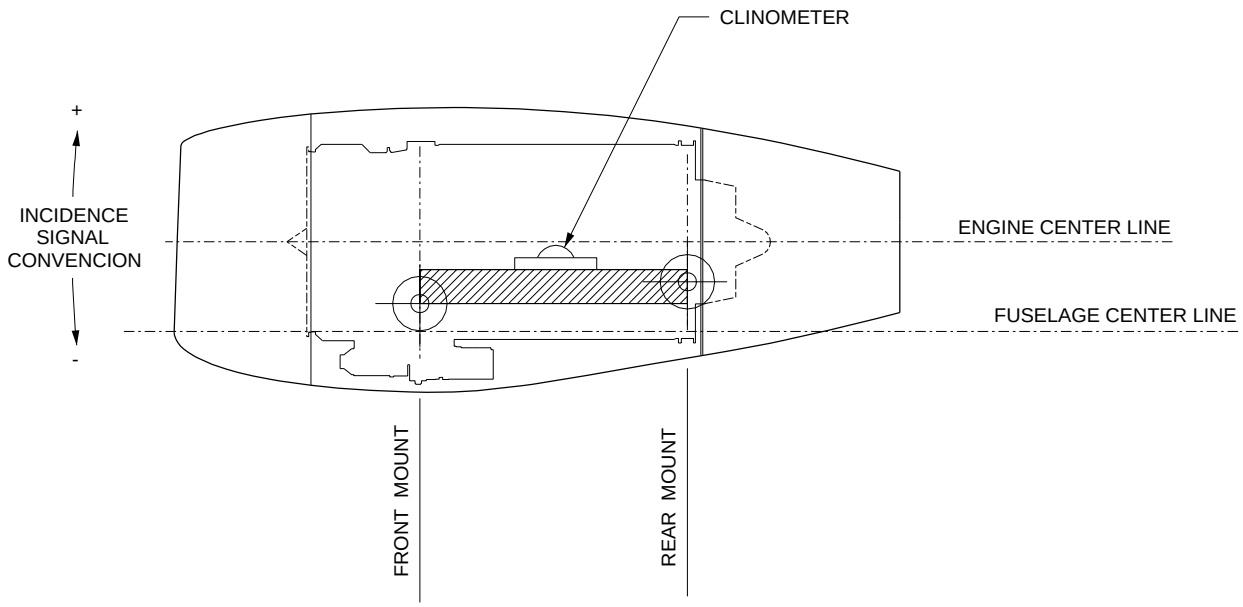




DET. A

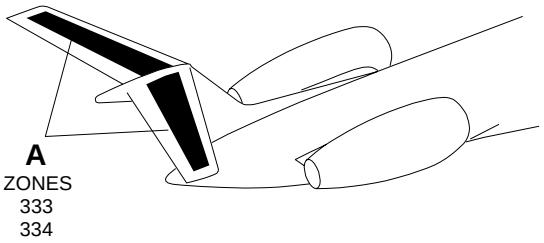
145AMM510019.MCE A

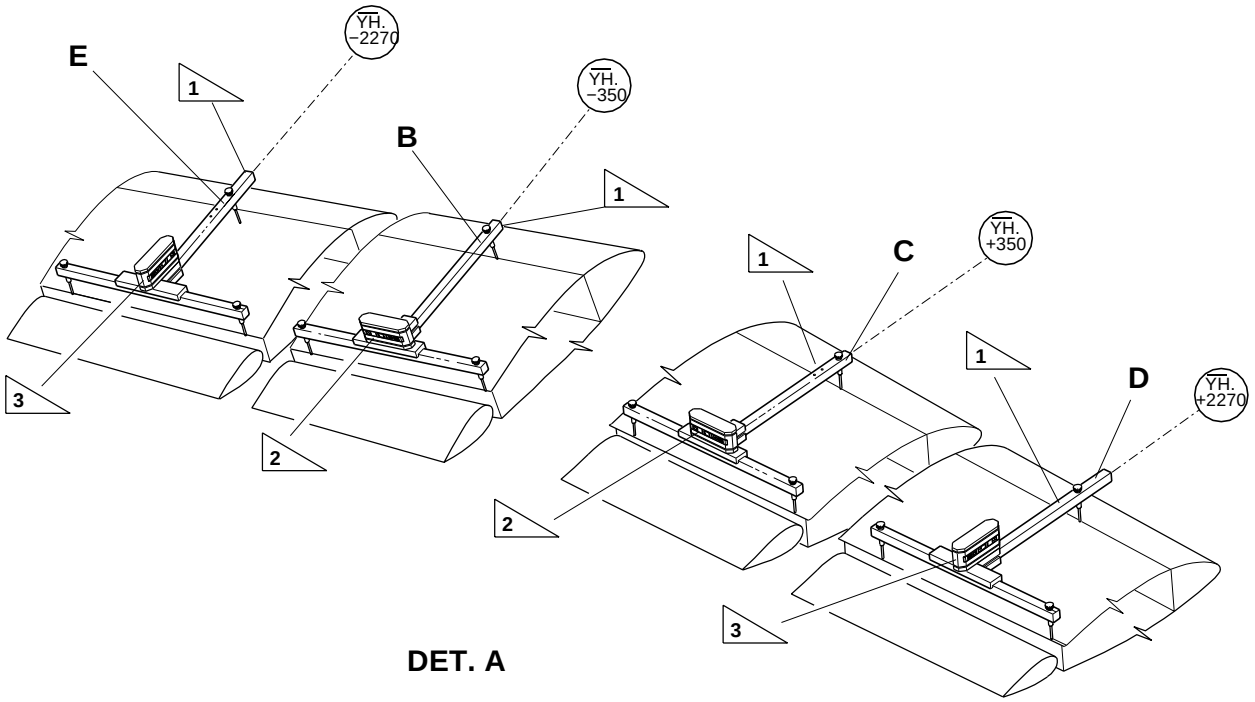
EFFECTIVITY: ACFT MODEL(S) EMB-145
Engine Incidence
Figure 211



145AMM510030.MCE

EFFECTIVITY: ACFT MODEL(S) EMB-145
Dihedral and Incidence of Horizontal Stabilizer
Figure 212 - Sheet 1



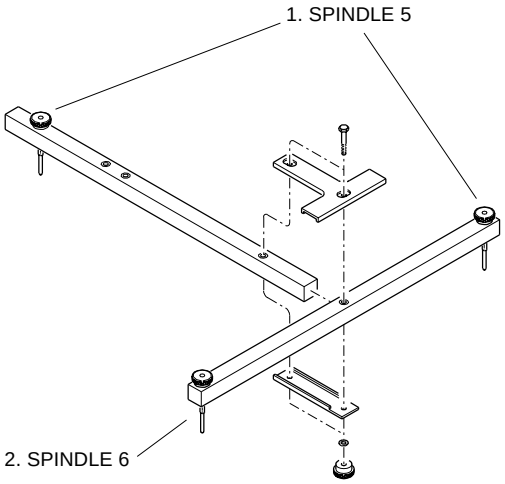


DET. A

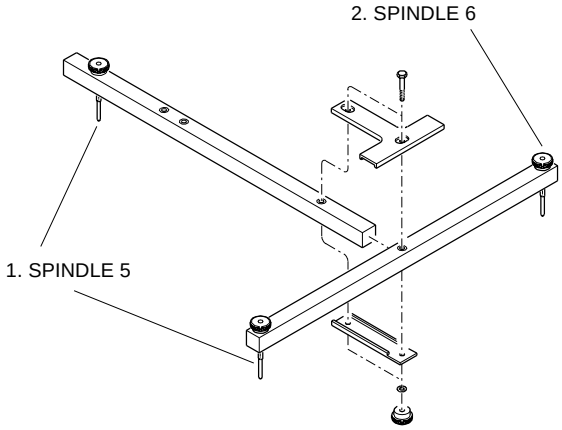
1. DO NOT PERMIT THE STRAIGHTEDGE FRONT PIN TO BE ON THE HORIZONTAL STABILIZER LEADING EDGE OR THE REAR PINS TO BE ON THE HORIZONTAL STABILIZER TRAILING EDGE.
2. TO MEASURE HORIZONTAL STABILIZER DIHEDRAL THE PROTRACTOR−DIGITAL MUST BE IN THE DIRECTION OF THE SHORTER ARM OF THE STRAIGHTEDGE AND THE GSE 070 DISPLAY MUST ALWAYS POINT TO THE TRAILING EDGE OF THE HORIZONTAL STABILIZER.
3. TO MEASURE HORIZONTAL STABILIZER INCIDENCE THE PROTRACTOR−DIGITAL MUST BE IN THE DIRECTION OF THE LONGER ARM OF THE STRAIGHTEDGE AND GSE 070 DISPLAY MUST ALWAYS POINT TO THE RIGHT SIDE OF THE AIRCRAFT.

145AMM510050.MCE

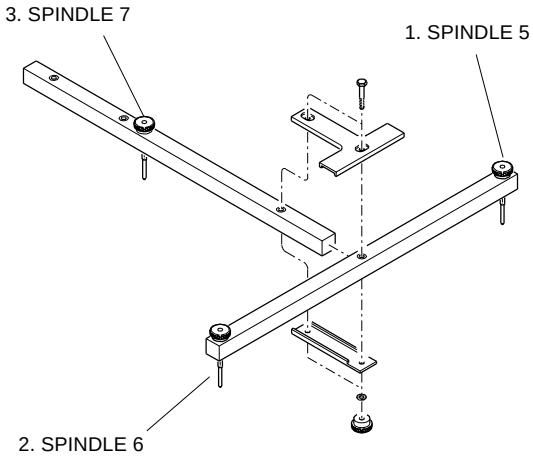
EFFECTIVITY: ACFT MODEL(S) EMB-145
Dihedral and Incidence of Horizontal Stabilizer
Figure 212 - Sheet 2



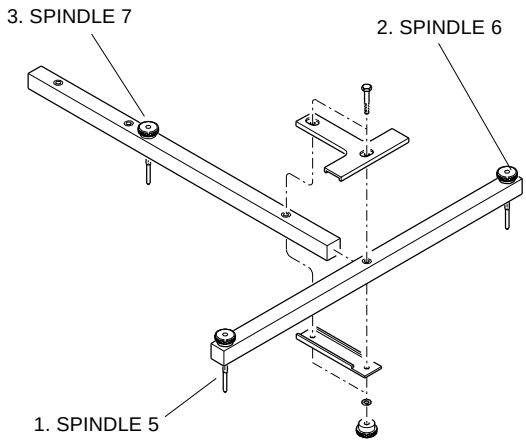
DET. B



DET. C



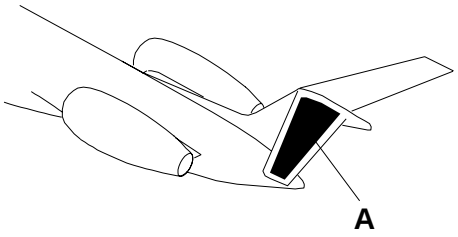
DET. E

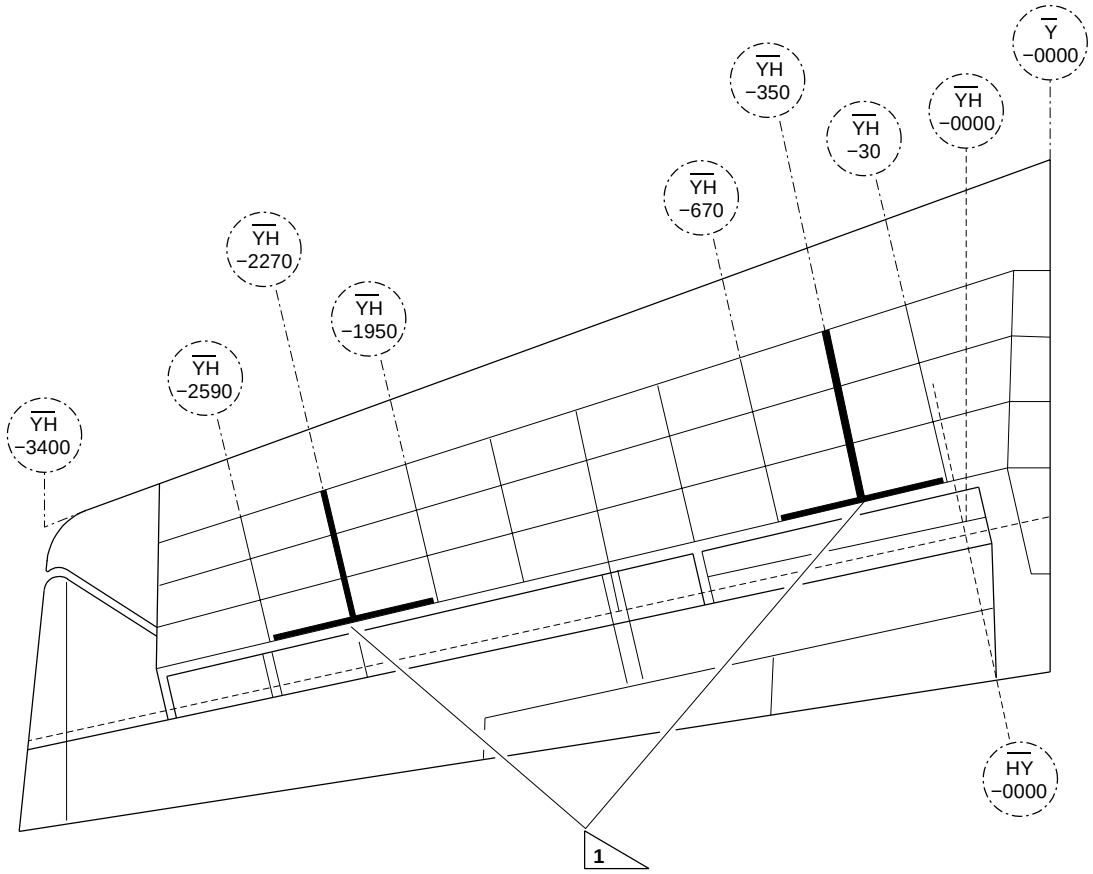


DET. D

145AMM510051.MCE

EFFECTIVITY: ACFT MODEL(S) EMB-145
Dihedral and Incidence of Horizontal Stabilizer
Figure 212 - Sheet 3



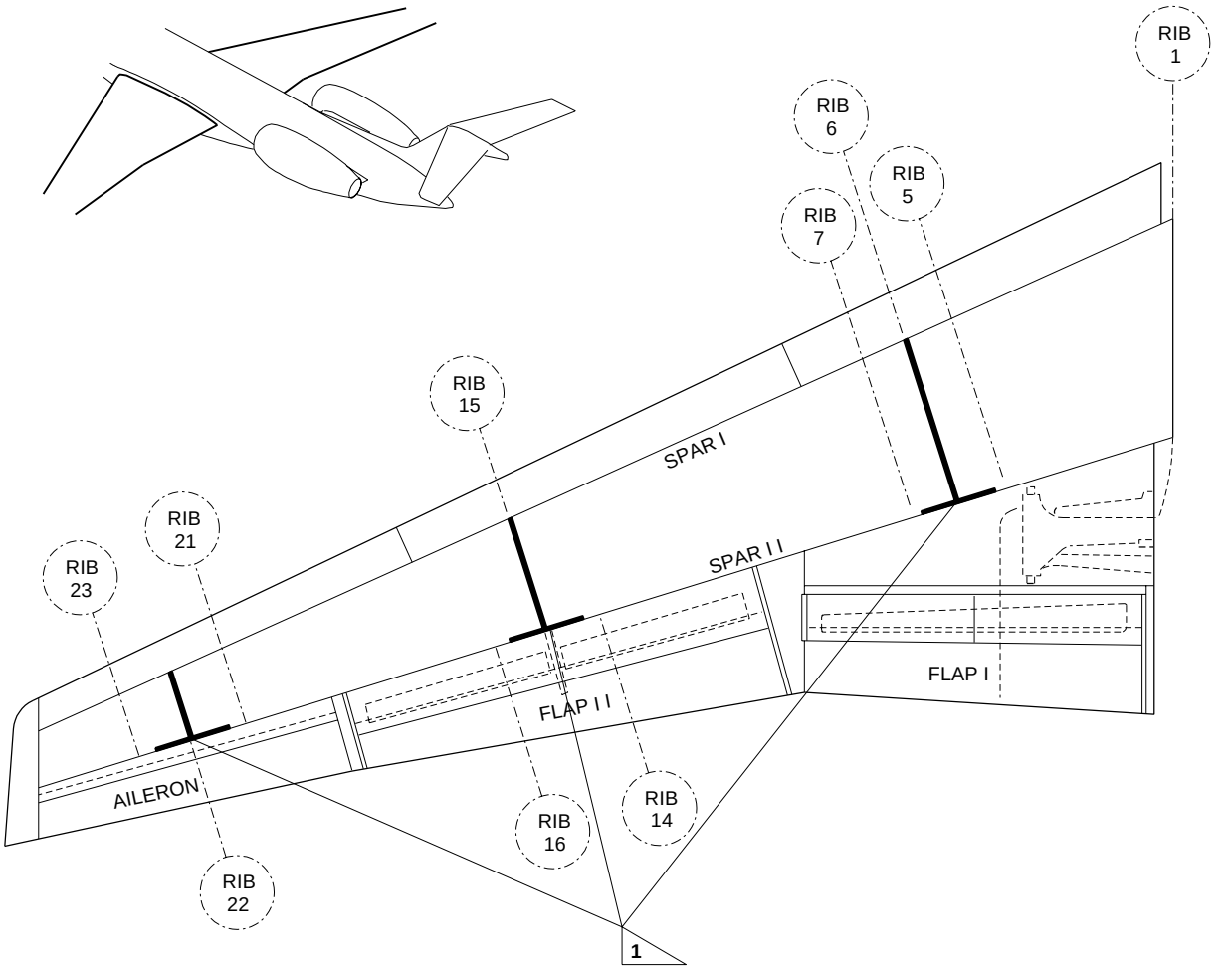


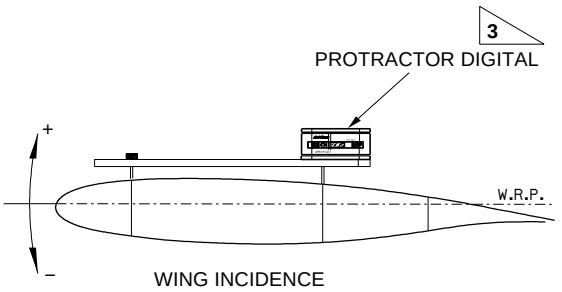
DET. A

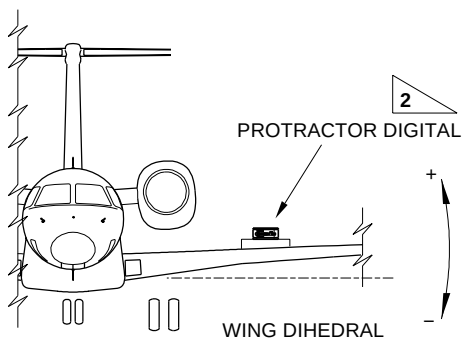
1 PUT STRAIGHTEDGE GSE 141 OVER THE 2nd RIVET ROW AND OVER THE 8th RIVET ROW.

145AMM510052.MCE

EFFECTIVITY: ACFT MODEL(S) EMB-145
Dihedral and Incidence of Wings
Figure 213 - Sheet 1







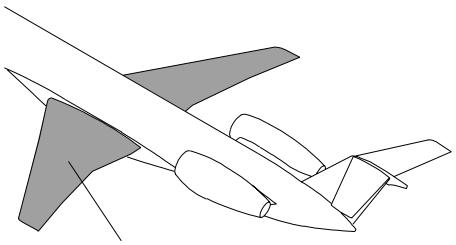
1 INSTALLATION OF GSE 141 ON RIBS 6, 15, AND 22.

2 TO MEASURE WING DIHEDRAL THE PROTRACTOR–DIGITAL MUST BE IN THE DIRECTION OF THE SHORTER ARM OF THE STRAIGHTEDGE AND THE GSE 070 DISPLAY MUST ALWAYS POINT TO THE TRAILING EDGE OF THE WING.

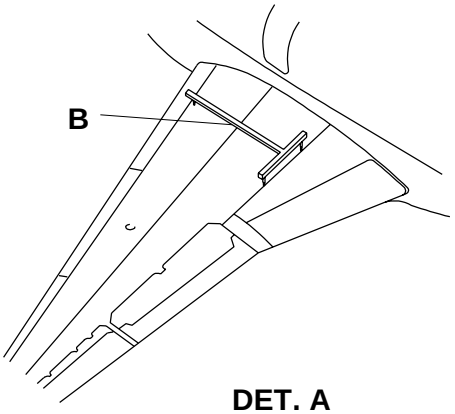
3 TO MEASURE WING INCIDENCE THE PROTRACTOR–DIGITAL MUST BE IN THE DIRECTION OF THE LONGER ARM OF THE STRAIGHTEDGE AND GSE 070 DISPLAY MUST ALWAYS POINT TO THE RIGHT SIDE OF THE AIRCRAFT.

EM145AMM510022E.DGN

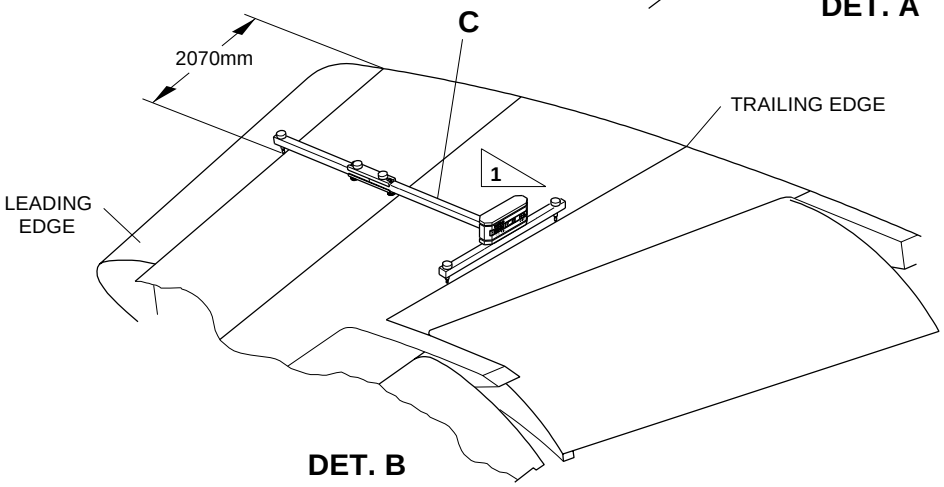
EFFECTIVITY: ACFT MODEL(S) EMB-145
Dihedral and Incidence of Wings
Figure 213 - Sheet 2



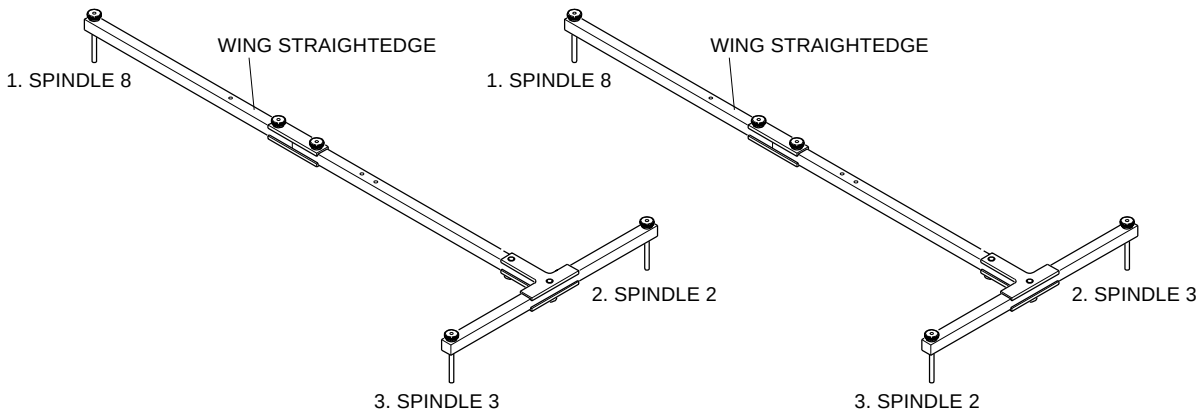
A
ZONES
531
631



DET. A



DET. B



LH WING

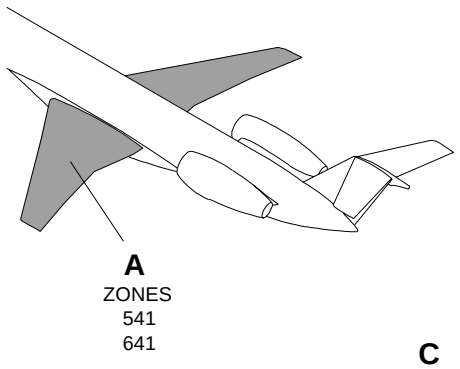
DET. C

RH WING

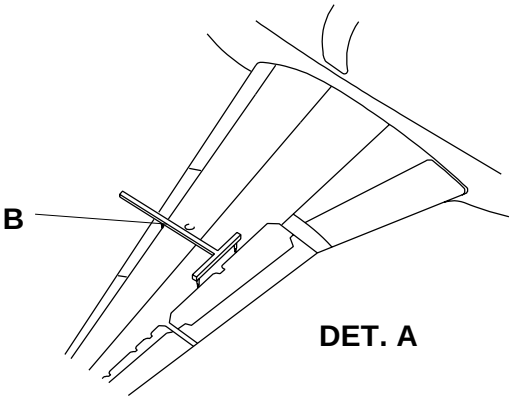
1 PUT THE STRAIGHTEDGE OVER THE SIXTH RIVET ROW (APROXIMATELY 2070mm FROM THE WING ROOT). DO NOT PERMIT THE STRAIGHTEDGE FRONT PIN TO BE ON THE WING LEADIND EDGE OR THE REAR PINS TO BE ON THE WING TRAILING EDGE.

EM145AMM510023C.DGN

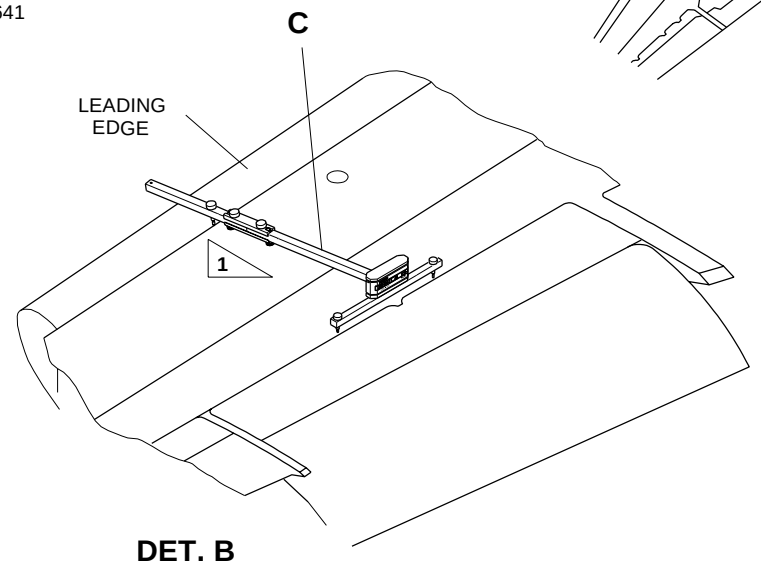
EFFECTIVITY: ACFT MODEL(S) EMB-145
Dihedral and Incidence of Wings
Figure 213 - Sheet 3



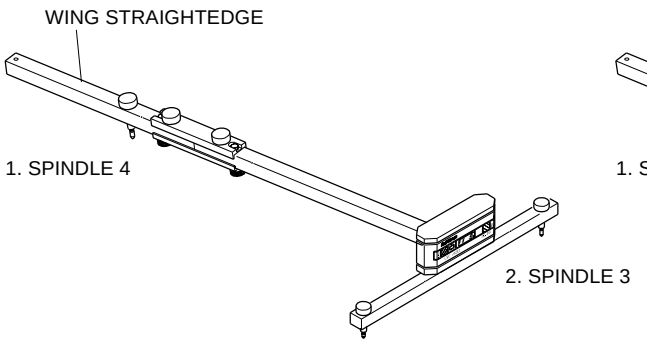
A
ZONES
541
641



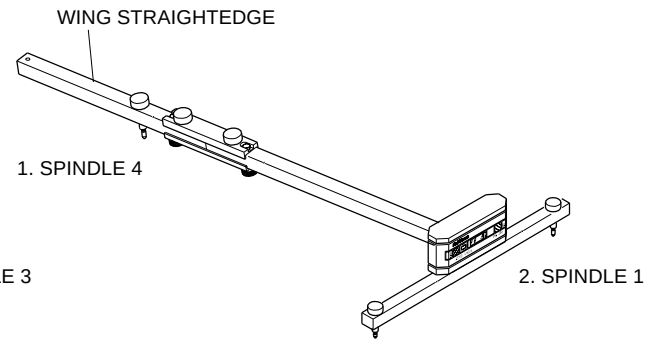
DET. A



DET. B



LH WING



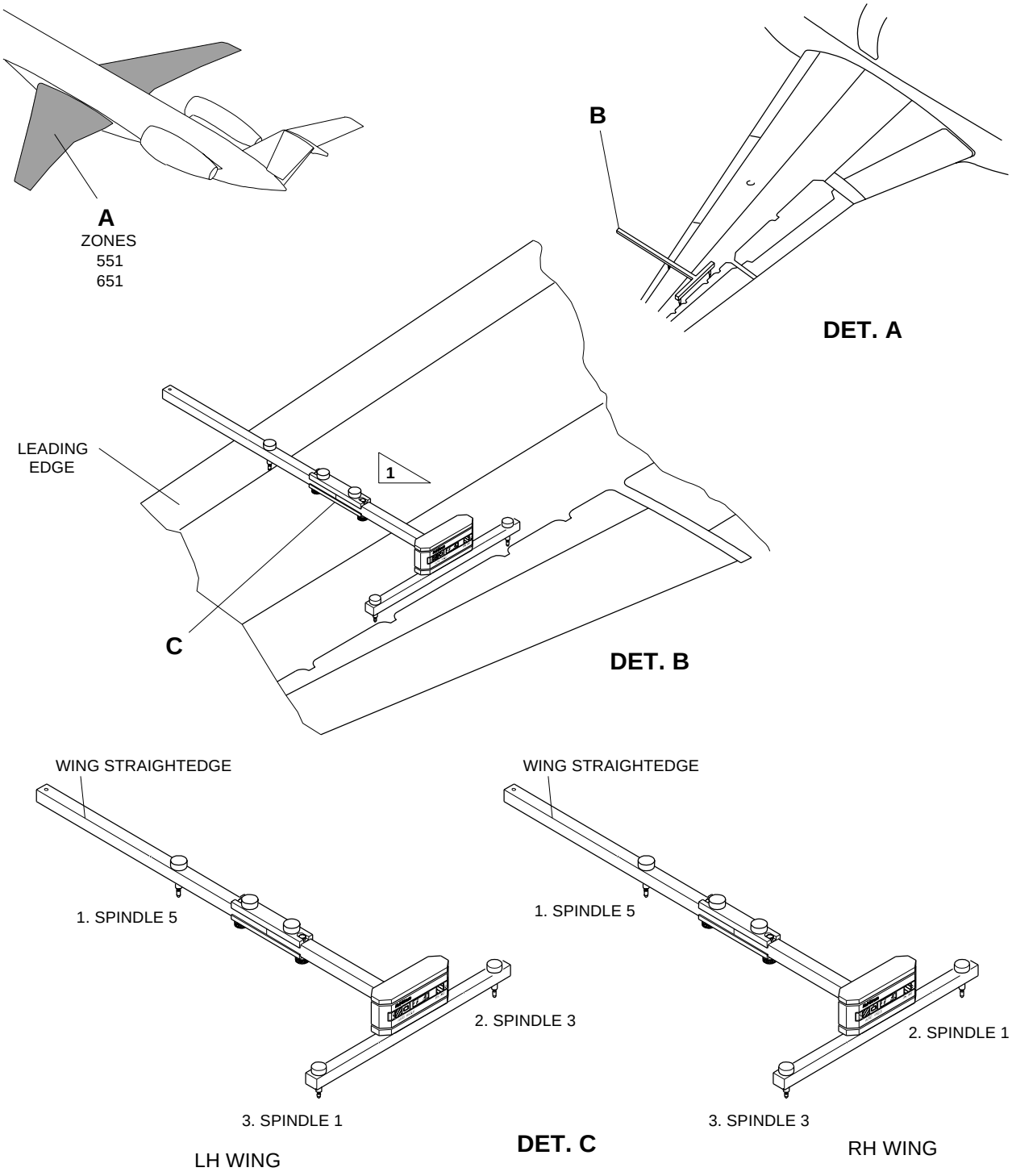
RH WING

DET. C

1 PUT THE STRAIGHTEDGE OVER THE SIXTH RIVET ROW. DO NOT PERMIT THE STRAIGHTEDGE FRONT PIN TO BE ON THE WING LEADING EDGE OR THE REAR PINS TO BE ON THE WING TRAILING EDGE.

EM145AMM510024C.DGN

EFFECTIVITY: ACFT MODEL(S) EMB-145
Dihedral and Incidence of Wings
Figure 213 - Sheet 4



1 PUT THE STRAIGHTEDGE OVER THE SIXTH RIVET ROW. DO NOT PERMIT THE STRAIGHTEDGE FRONT PIN TO BE ON THE WING LEADING EDGE OR THE REAR PINS TO BE ON THE WING TRAILING EDGE.

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