

HORIZONTAL-STABILIZER ACTUATOR - ADJUSTMENT/TEST

EFFECTIVITY: ALL

1. General

- A. This section gives the procedures to adjust the electrical zero position of the horizontal stabilizer actuator.
- 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
27-40-02-700-801-A	ADJUSTMENT OF THE ELECTRICAL ZERO POSITION OF THE HORIZONTAL STABILIZER ACTUATOR	ALL
27-40-02-700-802-A	FUNCTIONAL CHECK OF THE TRAVEL OF THE HORIZONTAL STABILIZER ACTUATOR	ALL

TASK 27-40-02-700-801-A

EFFECTIVITY: ALL

2. ADJUSTMENT OF THE ELECTRICAL ZERO POSITION OF THE HORIZONTAL STABILIZER ACTUATOR

A. General

- (1) This task gives the procedures to adjust the electrical zero position of the horizontal stabilizer actuator during its installation ([AMM TASK 27-40-02-400-801-A/400](#)).
- (2) The AMM [AMM TASK 27-40-02-700-802-A/500](#) describes an alternative procedure to do the check of the electrical zero position of the Horizontal stabilizer actuator in situations when the GSE 063 is not available.
- (3) [Figure 501](#) shows the horizontal stabilizer break-out panel and [Figure 502](#) gives the trim panel location.

B. References

REFERENCE	DESIGNATION
AMM MPP 06-41-01/100	-
AMM TASK 27-40-02-400-801-A/400	HORIZONTAL STABILIZER ACTUATOR - INSTALLATION
AMM TASK 27-40-02-700-802-A/500	FUNCTIONAL CHECK OF THE TRAVEL OF THE HORIZONTAL STABILIZER ACTUATOR

C. Zones and Accesses

ZONE	PANEL/DOOR	LOCATION
272	272DR	Fuselage
324	324EL/FR	Empennage

D. Tools and Equipment

ITEM	DESCRIPTION	PURPOSE	QTY
GSE 036	Platform, Hydraulic, Aircraft	To get access to the elevator	
GSE 063	Break-out box, HSA	To do the test of the HSCU	
Commercially available	Multimeter, digital	To measure the horizontal-stabilizer actuator voltage	

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Elevator

I. Preparation

SUBTASK 841-002-A

- (1) Make sure that the aircraft is safe for maintenance.
- (2) Do not do other tasks on the elevator and horizontal stabilizer system.
- (3) Make sure that there are no objects or persons in the elevator and horizontal stabilizer travel area.
- (4) Open door 272DR (AMM MPP 06-41-01/100).
- (5) Make sure that steps (1), (2), (3), and (4) of Installation of Horizontal Stabilizer Actuator - Installation (item 3.I. of the [AMM TASK 27-40-02-400-801-A/400](#)) are done.
- (6) On the overhead Circuit Breaker Panel, make sure that the circuit PITCH TRIM 1 and PITCH TRIM 2 circuit breakers are open.
 - PITCH TRIM 1 (Location Tip: DC BUS 1/FLIGHT CONTROLS/PITCH TRIM 1).
 - PITCH TRIM 2 (Location Tip: ESSENTIAL DC BUS 2/PITCH TRIM 2).
- (7) Do these procedures to connect GSE 063 to the HSCU ([Figure 501](#)).
 - (a) Disconnect the connectors P1082 and P1083 from the HSCU and connect them to the electrical connectors J1082 and J1083 of the GSE 063, respectively.
 - (b) Connect electrical connectors P4 and P5 of GSE 063 to the J4 and J5 electrical connectors of HSCU, respectively.
- (8) On the overhead Circuit Breaker Panel, close the PITCH TRIM 1 and PITCH TRIM 2 circuit breakers.
 - PITCH TRIM 1 (Location Tip: DC BUS 1/FLIGHT CONTROLS/PITCH TRIM 1).
 - PITCH TRIM 2 (Location Tip: ESSENTIAL DC BUS 2/PITCH TRIM 2).
- (9) Push the MAIN CUTOUT switch and BACK-UP CUTOUT switch, on the trim panel (switch lights OFF).

J. Adjustment of the Electrical Zero Position and the Left Attachment of the Horizontal Stabilizer Actuator ([Figure 501](#)) ([Figure 502](#)) ([Figure 503](#))

SUBTASK 720-002-A

WARNING: MAKE SURE THAT THERE ARE NO PERSONS OR OBJECTS IN THE HORIZONTAL STABILIZER TRAVEL AREA.

- (1) Set the Electrical Zero Position of the Horizontal Stabilizer Actuator as follows:
 - (a) Set the multimeter to read the voltage between WIPER and EXC - of the MAIN channel (HSA 1) on the Horizontal Stabilizer break-out box.

- (b) Through the RET and EXT switches of the MAIN channel of the Horizontal Stabilizer break-out box, control the horizontal stabilizer to the UP and DOWN positions, until the multimeter reads 6.58 V. When this value is got, the Horizontal Stabilizer Actuator is at the electrical zero position and the EICAS indicates zero position on PITCH.
 - (c) Set the multimeter to read the voltage between WIPER and EXC - of the BACK UP channel (HSA 2). The value must be between 6.51 V and 6.65 V.
- (2) Adjustment of the Left Attachment of the Horizontal Stabilizer Actuator.
- (a) Set the multimeter to read the voltage between MOT CURR and EXC - of the MAIN channel (HSA 1) on the Horizontal Stabilizer break-out box.
 - (b) Control the Horizontal Stabilizer to the UP and DOWN positions through the RET and EXT switches of the Main Channel of the Horizontal Stabilizer break-out box. When set to UP or DOWN position, the actuator moves and the multimeter shows values in proportion to the movement of the actuator. Read and record, for either direction, the maximum steady-state (not peak) value shown on the multimeter. If the result is more than 2.06 Volts, adjust the Left Attachment.
- 1 Fine adjustment of the length of Left Attachment (left HSA rod end) ([Figure 503](#)):
- a Cut and remove the lockwire (8).
 - b Release the small jam nut (2).
 - c Move the serrated locking washers (7) away from the adjusting nut (3) until they disengage.
 - d Turn the adjusting nut (3) to adjust the length of HSA rod end as necessary to permit the bolt installation without interference.
- NOTE:** One turn (360 degrees) of the adjusting nut (3) changes the rod end (1) length in approximately 1.41 mm (0.055 in).
- e Engage the serrated locking washers (7) to the adjusting nut (3).
 - f Tighten the small jam nut (2) to a torque value of 74.6 to 81.3 N.m (660 to 720 lb.in).
 - g Safety-wire the rod end (1) with the lockwire (8) to prevent the small jam nut (3) from loosening.
- 2 If you cannot get rig condition after the fine adjustment do the combined fine and coarse adjustment of the length of left attachment.
- 3 Combined fine and coarse adjustment of the length of Left Attachment (left HSA rod end) ([Figure 503](#)):
- a Cut and remove the lockwire (8).
 - b Release the small jam nut (2).

- c Move the serrated locking washers (7) away from the adjusting nut (3) until they disengage.
- d Turn all the tabs of the locking tab washer (6) until they become straight.

CAUTION: THE LARGE JAM NUT (4) HAS A LEFT-HAND THREAD. MAKE SURE THAT IT IS TURNED IN THE CORRECT DIRECTION, SPECIALLY WHEN YOU LOOSEN IT.

CAUTION: THE ROTATION MOVEMENT BETWEEN THE RAM TUBE AND THE ACTUATOR HOUSING CAN BREAK THE TORQUE INSIDE WITH THE ACME SCREW. MAKE SURE THAT THERE IS NO ROTATION BETWEEN THEM.

- e While you hold the ram tube wrench flats (5), loosen the large jam nut (4) away from the locking tab washer (6).
- f Turn the adjusting nut (3) to adjust the length of HSA rod end as necessary to permit the bolt installation without interference.
NOTE: One turn (360 degrees) of the adjusting nut (3) changes the rod end (1) length in approximately 1.41 mm (0.055 in).
- g Tighten the large jam nut (4) to a torque value of 122.0 to 135.6 N.m (1080 to 1200 lb.in).
- h Engage the serrated locking washers (7) to the adjusting nut (3).
- i Tighten the small jam nut (2) to a torque value of 74.6 to 81.3 N.m (660 to 720 lb.in).
- j Safety-wire the rod end (1) with the lockwire (8) to prevent the small jam nut (3) from loosening.

- (c) Set the multimeter to read the voltage between MOT CURR and EXC - of the BACK UP channel (HSA 2) on the Horizontal Stabilizer break-out box. Do as in step (b) for the BACK UP channel.

K. Follow-on

SUBTASK 842-002-A

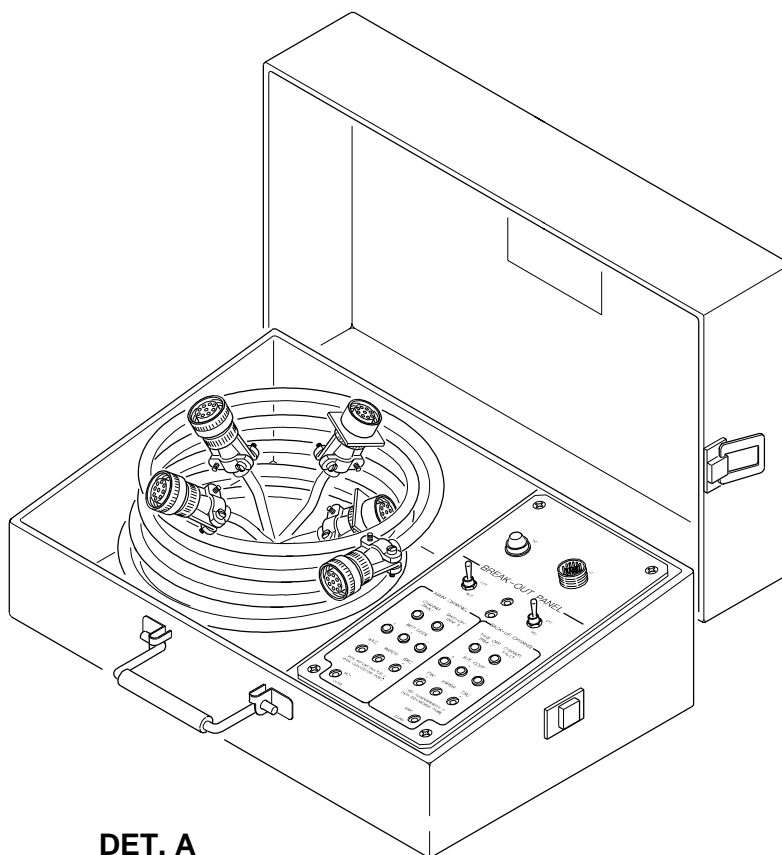
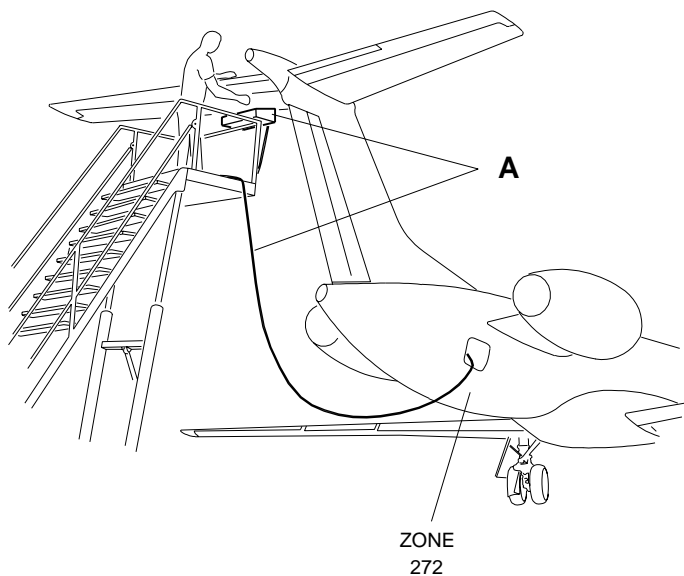
- (1) On the overhead Circuit Breaker Panel, make sure that the circuit PITCH TRIM 1 and PITCH TRIM 2 circuit breakers are open.
 - PITCH TRIM 1 (Location Tip: DC BUS 1/FLIGHT CONTROLS/PITCH TRIM 1).
 - PITCH TRIM 2 (Location Tip: ESSENTIAL DC BUS 2/PITCH TRIM 2).
- (2) Do these procedures to disconnect GSE 063 from the HSCU:
 - (a) Disconnect the J1082 and J1083 electrical connectors of GSE 063 from the aircraft electrical connectors P1082 and P1083.
 - (b) Disconnect electrical connectors P4 and P5 of GSE 063 from the J4 and J5 electrical connectors of the HSCU.

- (c) Connect aircraft electrical connectors P1082 and P1083 to the HSCU.
- (3) On the overhead Circuit Breaker Panel, close the PITCH TRIM 1 and PITCH TRIM 2 circuit breakers.
- (4) Close door 272DR (AMM MPP 06-41-01/100).

EFFECTIVITY: ALL

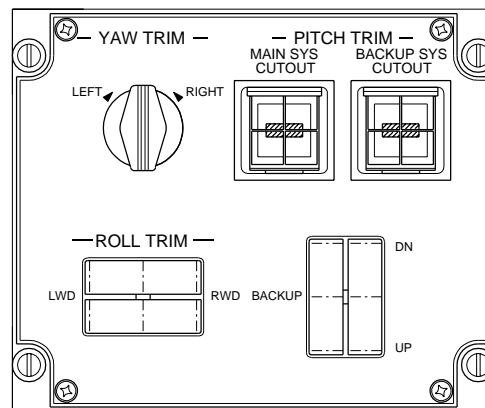
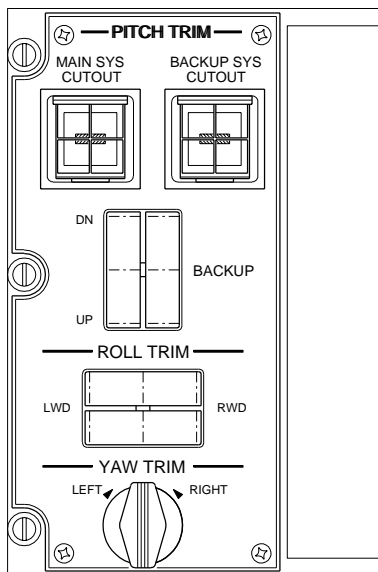
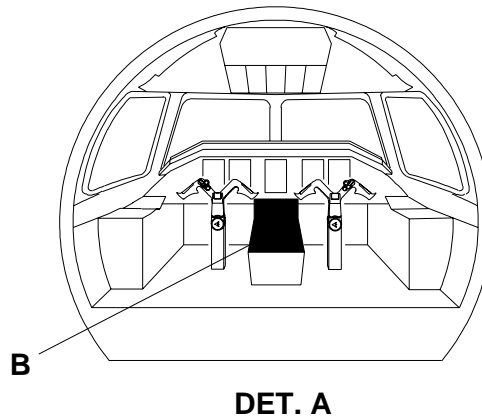
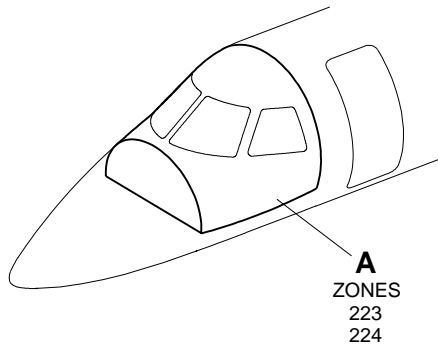
Horizontal Stabilizer Break-out Box

Figure 501



145AMM270265.MCE A

EFFECTIVITY: ALL
Trim Panel - Location
Figure 502

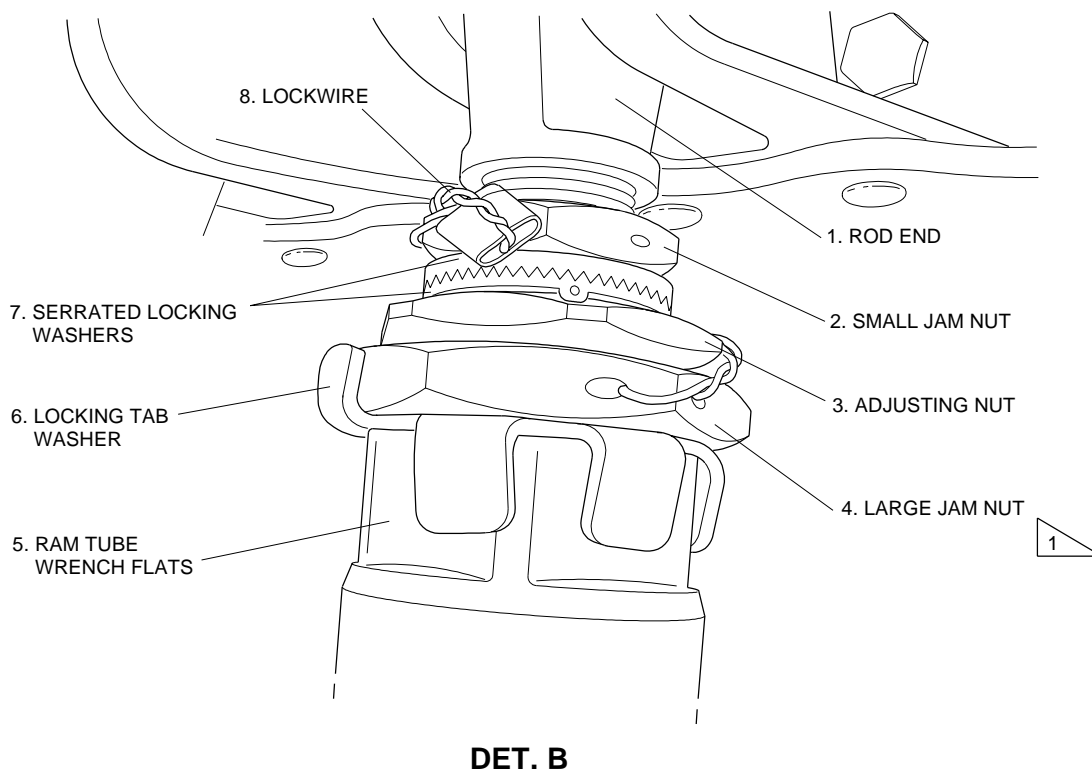
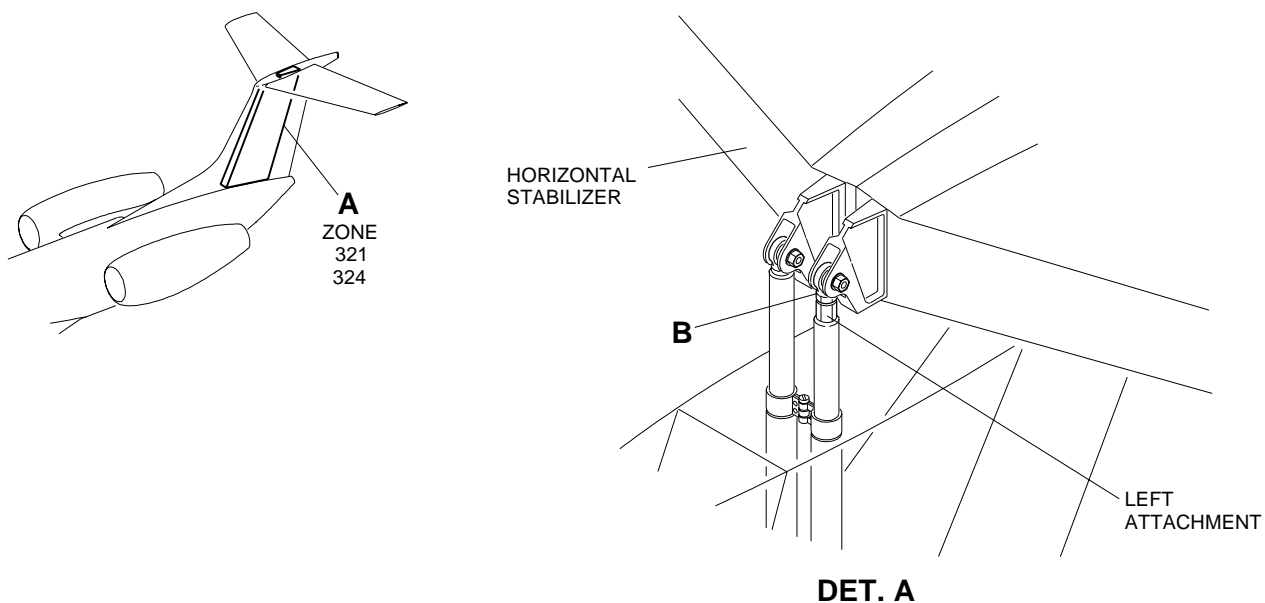


1 APPLICABLE TO AIRCRAFT WITH SINGLE FMS INSTALLED.

2 APPLICABLE TO AIRCRAFT WITH DUAL FMS INSTALLED.

145AMM270382.MCE A

EFFECTIVITY: ALL
HSA Left Attachment - Adjustment
Figure 503



1 LEFT-HAND THREAD

145AMM270550.MCE A

TASK 27-40-02-700-802-A

EFFECTIVITY: ALL

3. FUNCTIONAL CHECK OF THE TRAVEL OF THE HORIZONTAL STABILIZER ACTUATOR

A. General

- (1) This task gives the procedures to do the check of the travel of the horizontal stabilizer actuator.
- (2) Figure 502 shows the trim panel location and Sheet 1, [Figure 504](#) gives the GSE 070 installation on the Horizontal Stabilizer.

B. References

REFERENCE	DESIGNATION
AMM MPP 27-40-02/400	- REMOVAL/INSTALLATION

C. Zones and Accesses

Not Applicable

D. Tools and Equipment

ITEM	DESCRIPTION	PURPOSE	QTY
GSE 036	Platform, Hydraulic, Aircraft	To get access to the elevator	
GSE 070	Digital Protractor	To check the HS position	

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	FUNCTION	PLACE
1	Does the task	Cockpit
1	Helps the other technician	Elevator

I. Preparation

SUBTASK 841-003-A

- (1) Make sure that the aircraft is safe for maintenance.
- (2) Do not do other tasks on the elevator and horizontal stabilizer system.
- (3) Make sure that there are no objects or persons in the elevator and horizontal stabilizer travel area.

- (4) On the overhead Circuit Breaker Panel, make sure that the PITCH TRIM 1 and PITCH TRIM 2 circuit breakers are closed.
 - PITCH TRIM 1 (Location Tip: DC BUS 1/FLIGHT CONTROLS/PITCH TRIM 1).
 - PITCH TRIM 2 (Location Tip: ESSENTIAL DC BUS 2/PITCH TRIM 2).

J. Functionally Check the Travel of the Horizontal Stabilizer Actuator ([Figure 504](#))

SUBTASK 720-003-A

- (1) Install a digital protractor on the horizontal stabilizer surface, parallel with the fairing.

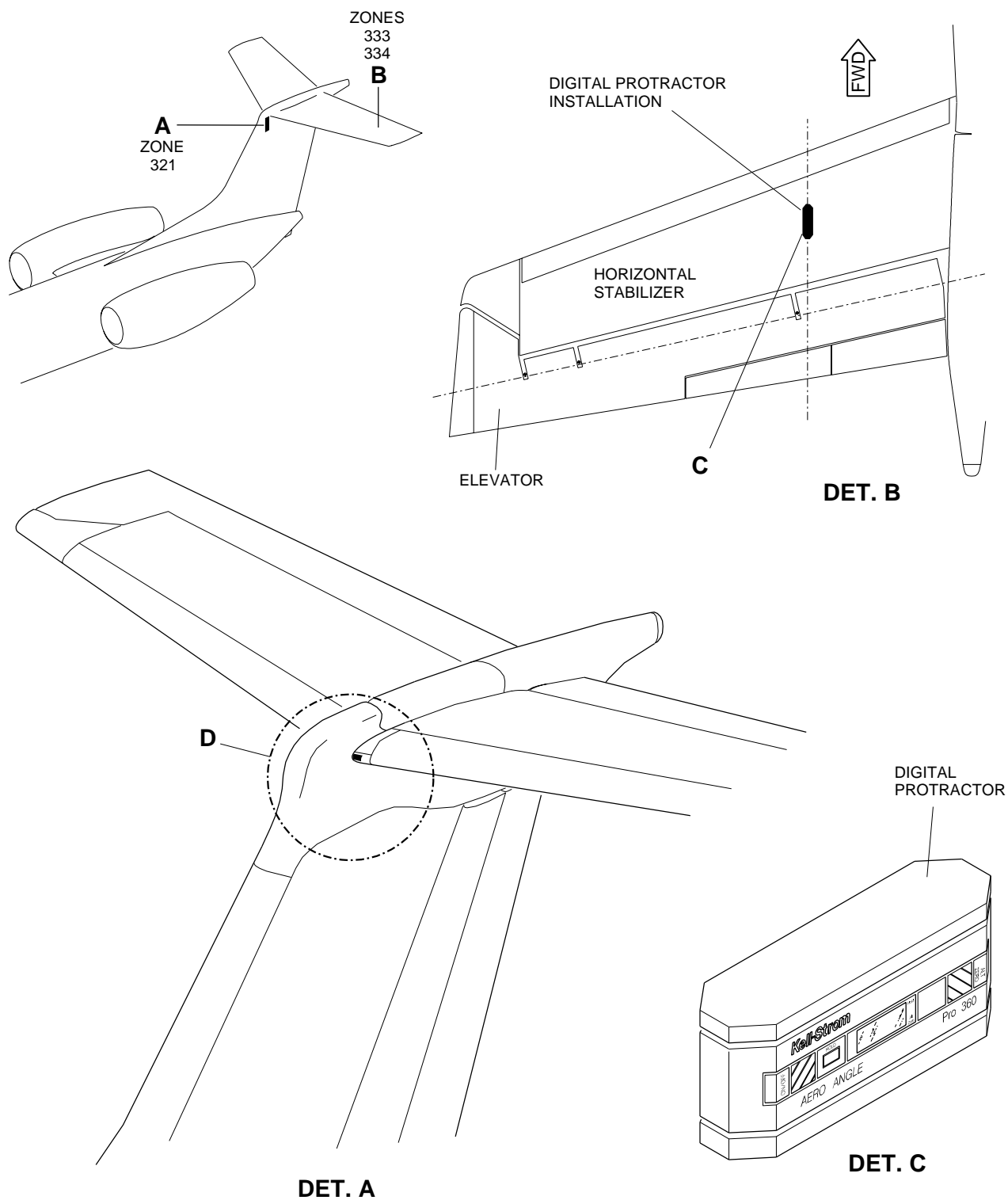
NOTE: Use an adhesive tape to install the protractor.
- (2) Command the CPT trim switch located on the control yoke to a fully nose down position (horizontal stabilizer surface leading edge moves to up position).
- (3) Reset (zero) the digital protractor.
- (4) Command the CPT trim switch located on the control yoke until the the horizontal stabilizer is aligned with the neutral strip marked on the vertical stabilizer.
- (5) Read the value shown on the digital protractor. The value obtained must be between 3.5° and 4.5°.
- (6) Make sure that the digital indication on EICAS (the number inside the box) displays "0", refer to Sheet 2, [Figure 504](#).
- (7) Command the CPT trim switch located on the control yoke to a fully nose up position (horizontal stabilizer surface leading edge moves to down position).
- (8) Read the value shown on the digital protractor. The value obtained must be between 13.5° and 14.5°.
- (9) If the values read on the protractor are different from those specified in steps (5) and (8), replace Horizontal Stabilizer Actuator ([AMM MPP 27-40-02/400](#)).

K. Follow-on

SUBTASK 842-003-A

- (1) Remove GSE 070 from the Horizontal Stabilizer Surface.

EFFECTIVITY: ALL
HSA - Check of the Travel
Figure 504 - Sheet 1

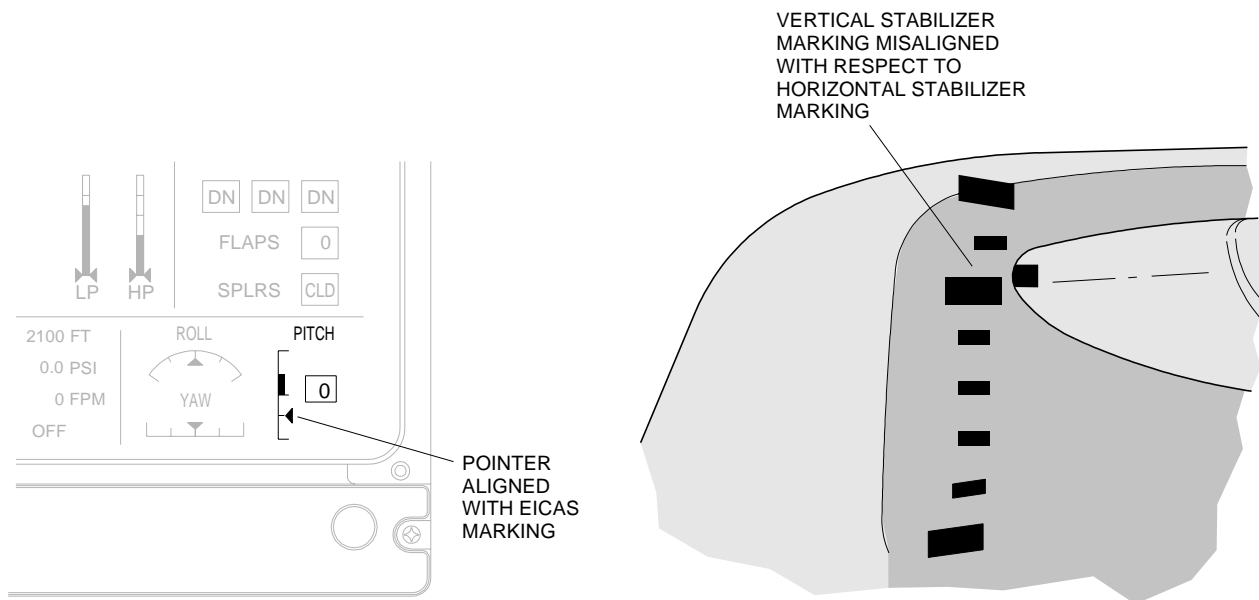


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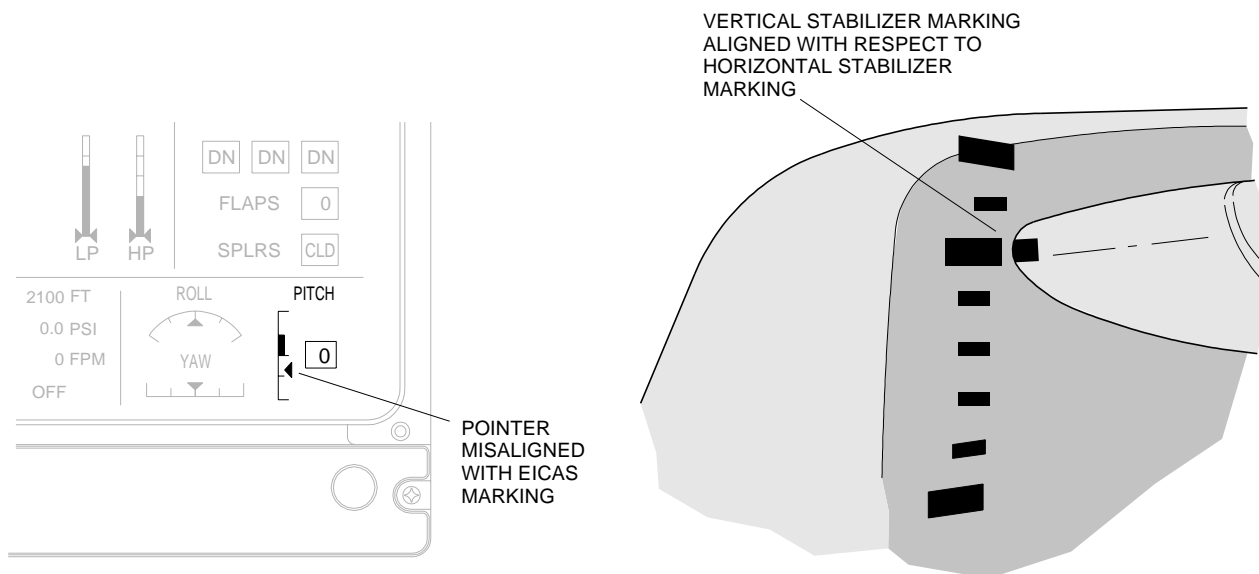
EFFECTIVITY: ALL

HSA - Check of the Travel

Figure 504 - Sheet 2



INTERNAL AND EXTERNAL INDICATION COMPARISON
DET. D



ZERO CONDITION AT VERTICAL STABILIZER MARKING
DET. D

EM145AMM270733A.DGN

