



EMB145 – EMB135

AIRCRAFT
MAINTENANCE MANUAL

SPOILER HYDRAULIC ACTUATION - ADJUSTMENT/TEST

EFFECTIVITY: ALL

1. General

- A. This section gives the procedures to do the functional check of the ground spoiler/speed brake valves, control circuit, and related messages and to do a check for external leakage at the spoiler actuators.
- 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 |
|----------------------|---|-------------|
| 27-62-00-700-801-A ♦ | GROUND SPOILER/SPEED BRAKE VALVES CONTROL CIRCUIT AND RELATED MESSAGES - FUNCTIONAL CHECK | ALL |
| 27-62-00-700-802-A | EXTERNAL LEAKAGE AT THE SPOILER ACTUATORS - FUNCTIONAL CHECK | ALL |

TASK 27-62-00-700-801-A
EFFECTIVITY: ALL

**2. GROUND SPOILER/SPEED BRAKE VALVES CONTROL CIRCUIT AND RELATED MESSAGES -
FUNCTIONAL CHECK**

A. General

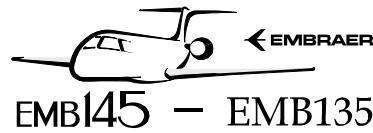
- (1) This task gives the procedures to do the functional check of the ground spoiler/speed brake valves, control circuit, and related messages.

The check of the Ground Spoiler and Speed Brake Valve for leakage can be done with the valve on the aircraft or with the valve removed from the aircraft. Do as it is easier for you.

- (2) [Figure 502](#) or [Figure 503](#), as applicable, gives the location of the ground spoiler and speed brake valves.
- (3) [Figure 504](#) gives the location of the proximity sensors.

B. References

| REFERENCE | DESIGNATION |
|---|--|
| AMM MPP 06-41-01/100 | - |
| AMM TASK 12-13-01-600-801-A/300 | HYDRAULIC SYSTEM RESERVOIR - FLUID LEVEL CHECK |
| AMM TASK 12-13-01-600-802-A/300 | HYDRAULIC SYSTEM RESERVOIR - REPLENISHMENT |
| AMM TASK 20-40-01-860-801-A/200 | ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE |
| AMM TASK 27-62-03-000-801-A/400 | GROUND SPOILER VALVE - REMOVAL |
| AMM TASK 27-62-03-000-802-A/400 | - |
| AMM TASK 27-62-03-400-801-A/400 | GROUND SPOILER VALVE - INSTALLATION |
| AMM TASK 27-62-03-400-802-A/400 | - |
| AMM TASK 27-62-04-000-801-A/400 | SPEED BRAKE VALVE - REMOVAL |
| AMM TASK 27-62-04-000-802-A/400 | - |
| AMM TASK 27-62-04-400-801-A/400 | SPEED BRAKE VALVE - INSTALLATION |
| AMM TASK 27-62-04-400-802-A/400 | - |
| AMM TASK 28-41-00-200-801-A/600 | - |
| AMM TASK 29-10-00-860-801-A/200 | HYDRAULIC SYSTEM - PRESSURIZATION WITH HTS |
| CMM 27-66-01 (Parker Hannifin) | - |
| CMM 27-66-02 (Parker Hannifin) | - |
| O-ring | - |
| S.B. 145-27-0028 | - |
| S.B. 145-27-0032 | - |
| S.B. 145-27-0059 | - |
| TASK 27-40-01-860-801-A | - |



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C. Zones and Accesses

| ZONE | PANEL/DOOR | LOCATION |
|------|------------|----------------------|
| 192 | 192BR | Center lower fairing |
| 192 | 192AL | Center lower fairing |

D. Tools and Equipment

| ITEM | DESCRIPTION | PURPOSE | QTY |
|---------|------------------------------------|--|-----|
| GSE 044 | Head Set, Ramp | For communications | |
| GSE 050 | Digital Multimeter | To measure the voltage | |
| GSE 066 | Spoiler Actuator Locking Clamp | To keep the Speed Brake open | |
| GSE 067 | Speed Brake Actuator Locking Clamp | To keep the Ground Spoiler open | |
| | Stopwatch | To stopwatch | |
| GSE 468 | Needle Valve and Drip tube | To hold and release the hydraulic flow | |

E. Auxiliary Items

| ITEM | DESCRIPTION | PURPOSE | QTY |
|------------------------|---|--------------------------|-----|
| Commercially available | Rubber Gloves, Phosphate Ester-Base, Fluid-Resistant | Protection for the Hands | 1 |
| Commercially available | Rubber Goggles, Phosphate Ester-Base, Fluid-Resistant | Protection for the Eyes | 1 |

F. Consumable Materials

Not Applicable

G. Expendable Parts

| ITEM | IPC REFERENCE (VENDOR REFERENCE) | QTY |
|----------|-------------------------------------|-----|
| 27-62-00 | O-ring | 1 |

H. Persons Recommended

| QTY | FUNCTION | PLACE |
|-----|---------------|-----------|
| 1 | Does the task | Cockpit |
| 1 | Does the task | Wing stub |

I. Preparation

SUBTASK 841-002-A

- (1) Make sure that the aircraft is safe for maintenance.
- (2) Remove access doors 192AL and 192BR (AMM MPP 06-41-01/100) to get access to the ground spoiler and speed brake valves.
- (3) Depressurize the hydraulic system ([AMM TASK 29-10-00-860-801-A/200](#)).



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- (4) Energize the aircraft with an external DC Power Supply (TASK 27-40-01-860-801-A).

J. Functionally Check of Ground Spoiler/Speed Brake Valves, Control Circuit and Related Messages
SUBTASK 720-002-A

WARNING: THE HYDRAULIC SYSTEM CONTAINS PHOSPHATE-ESTER HYDRAULIC FLUID. THE FLUID CAN CAUSE IRRITATION IN YOUR SKIN OR INJURY TO YOUR EYES. USE THE APPLICABLE RUBBER GOGGLES AND GLOVES. IF THE FLUID TOUCHES YOU, FLUSH YOUR SKIN WITH WATER. IF IT GETS IN YOUR EYES, FLUSH THEM WITH WATER AND GET MEDICAL HELP.

- (1) Do a check for leakage on the ground spoiler valve and speed brake valve with the valves removed from the aircraft:

- (a) Do a check for leakage of the ground spoiler valve as follows:

- 1 Remove the ground spoiler valve from the aircraft ([AMM TASK 27-62-03-000-801-A/400](#)) or ([AMM TASK 27-62-03-000-802-A/400](#)) as applicable.
- 2 Refer to the last revision of CMM 27-66-01 (Parker Hannifin) to do the leakage test of the ground spoiler valve.
- 3 Install the ground spoiler valve on the aircraft ([AMM TASK 27-62-03-400-801-A/400](#)) or ([AMM TASK 27-62-03-400-802-A/400](#)) as applicable.

- (b) Do a check for leakage of the speed brake valve as follows:

- 1 Remove the speed brake valve from the aircraft ([AMM TASK 27-62-04-000-801-A/400](#)) or ([AMM TASK 27-62-04-000-802-A/400](#)) as applicable.
- 2 Refer to the last revision of CMM 27-66-02 (Parker Hannifin) to do the leakage test of the speed brake valve.
- 3 Install the speed brake valve on the aircraft ([AMM TASK 27-62-04-400-801-A/400](#)) or ([AMM TASK 27-62-04-400-802-A/400](#)) as applicable.

- (2) Do the following procedures to check for leakage on the ground spoiler valve with the valve installed on the aircraft:

- (a) Do a check for leakage on the Ground Spoiler Valve in energized and de-energized condition as follows:

- 1 De-energized condition:

- a Disconnect the RETURN port line from the Ground Spoiler Valve and plug the line. Refer to [Figure 502](#) or [Figure 503](#) as applicable.
- b Install the GSE 468 to the Ground-Spoiler-Valve RETURN port.

NOTE: Make sure that a O-ring is installed in the GSE 468 joint that will connect to Ground Spoiler and Speed Brake Valve RETURN port. Refer to [Figure 501](#).

- c Apply a torque 10.7 - 11.9 N.m (95 - 105 lbf.in).

WARNING: **CHECK ON HYDRAULIC FITTING OF THE GSE 468 FOR TIGHTNESS. MAKE SURE THAT THERE IS NO LOOSE FITTING. IT CAUSES HYDRAULIC FLUID LEAKAGE AND INJURY TO PERSONS.**

- d Close the needle valve of the GSE 468.
e Put a container immediately under the end of the hose.
f Pressurize the hydraulic system ([AMM TASK 29-10-00-860-801-A/200](#)).

NOTE: Make sure that there is no leakage in the hoses, plugs, and connection points after the system is pressurized.

- g Make sure that the AIR GROUND A/B/C/D circuit breakers are closed.
h Set the engine thrust lever to the flight IDLE position.

WARNING: • **MAKE SURE THAT THERE ARE NO PERSONS OR EQUIPMENT IN THE FLAP AND SPOILER TRAVEL AREA.**
• **WHEN THE SPOILER TEST SWITCH IS ACTIVATED, THE SPOILERS WILL DEPLOY.**

- i On maintenance Panel, set the SPOILER switch to the TEST position and hold. This will energize the GSV solenoid and the Ground Spoiler panels will deploy.
j Release the SPOILER switch.

NOTE: After you release the switch the panels will not close.

WARNING: **DO NOT SET THE SPOILER SWITCH BACK TO THE TEST POSITION. IF YOU RELEASE THE SWITCH TWICE THE PRESSURE INCREASES IN THE GSE 468 LINE AND IT WILL CAUSE DAMAGE TO THE GSE 468 ASSEMBLY AND A LARGE SKYDROL LEAKAGE WILL OCCUR.**

- k **NOTE:** After the needle valve of the GSE 468 is opened the hydraulic fluid comes out.

Put the end of the hose of the GSE 468 in the container and slowly open the needle valve to let the panels close and wait 1 minute for stabilization with the Ground Spoiler Valve deenergized (SPOILER switch test released).

- l After 1 minute of stabilization, put a graduated container under the end of the hose and collect the hydraulic fluid for 1 minute.

NOTE: Make sure that the hose is straight and with no kinks to let the hydraulic fluid flow freely.

- m Measure the volume of fluid.

NOTE: The leakage at a drip tube must not be more than 15 cc/minute (300 drops/minute).

- n Close the needle valve of the GSE 468 and do the leakage test in the energized condition.

2 Energized condition:

- a Make sure that a container is under the end of the hose of the GSE 468 to collect the hydraulic fluid.

- b Make sure that the needle valve of the GSE 468 is closed and put the end of the hose in the container.

- c Make sure that the AIR GROUND A/B/C/D circuit breakers are closed.

- d Set the engine thrust lever to the flight IDLE position.

WARNING: • **MAKE SURE THAT THERE ARE NO PERSONS OR EQUIPMENT IN THE FLAP AND SPOILER TRAVEL AREA.**

• **WHEN THE SPOILER TEST SWITCH IS ACTIVATED, THE SPOILERS WILL DEPLOY.**

- e On the maintenance Panel, set the SPOILER switch to the TEST position and hold. This will energize the ground spoiler valve solenoid and the Ground Spoiler panels will deploy.

With the ground spoiler solenoid energized (SPOILER switch held in the TEST position), open the needle valve of the GSE 468 and wait 1 minute for stabilization.

- f After 1 minute of stabilization with the SPOILER switch held in TEST position and collect the leakage of oil in a graduated container. Collect the oil for 1 minute.

NOTE: • Make sure that the hose is straight and with no kinks to let the hydraulic fluid flow freely.
• Do not release the switch from the test position during this time. It will cause a high rate of hydraulic flow.
• The leakage at the end of the hose must not be more than 15 cc/minute (300 drops/minute).

- g Close the needle valve of the GSE 468.

- h Release the SPOILER switch on the Maintenance Panel.

NOTE: After you release the switch, the panels will not close.

WARNING: DO NOT SET THE SPOILER SWITCH BACK TO THE TEST POSITION . IF YOU RELEASE THE SWITCH TWICE THE PRESSURE INCREASES IN THE GSE 468 AND IT WILL CAUSE DAMAGE TO THE GSE 468 AND A LARGE SKYDROL LEAKAGE WILL OCCUR.

CAUTION: AFTER THE NEEDLE VALVE OF THE GSE 468 IS OPENED THE HYDRAULIC FLUID COMES OUT.

- i Put the end of the hose of the GSE 468 in the container and slowly open the needle valve to let the panels close.
- j Depressurize the hydraulic system ([AMM TASK 29-10-00-860-801-A/200](#)).
- k Remove the hydraulic tube and GSE 468 from the return port.
- l Remove the plug from the return line.
- m Reconnect the return line back to the return port. Apply a torque 10.7 - 11.9 N.m (95 - 105 lbf.in).

(3) Do the following procedures to check for leakage of the speed brake valve with the valve installed on the aircraft:

(a) For the check of the speed brake valve in the Ground Spoiler Mode, do as follows:

- 1 Ground Spoiler Mode in Deenergized Condition:
 - a Disconnect the return port line from the speed brake valve (SBV) and plug the line.
 - b Install the GSE 468 to the Speed-Brake-Valve RETURN port.

NOTE: Make sure that an O-ring is installed in the GSE 468 joint that will connect to Speed-Brake-Valve RETURN port. Refer to [Figure 501](#).

- c Apply a torque 10.7 - 11.9 N.m (95 - 105 lbf.in). Refer to [Figure 501](#).

WARNING: CHECK ON THE HYDRAULIC FITTING OF THE NEEDLE VALVE ASSEMBLY FOR TIGHTNESS. MAKE SURE THAT THERE IS NO LOOSE FITTING. IT CAUSES HYDRAULIC FLUID LEAKAGE.

- d Close the needle valve of the GSE 468.
- e Energize the aircraft with the External DC Power Supply (TASK 27-40-01-860-801-A).
- f Pressurize the hydraulic system ([AMM TASK 29-10-00-860-801-A/200](#)).
- g Make sure that the AIR GROUND A/B/C/D circuit breakers are closed.

h Set the engine thrust lever to the flight IDLE position.

- WARNING:** • **MAKE SURE THAT THERE ARE NO PERSONS OR EQUIPMENT IN THE FLAP AND SPOILER TRAVEL AREA.**
- **WHEN THE SPOILER TEST SWITCH IS ACTIVATED, THE SPOILERS WILL DEPLOY.**

i On the Maintenance Panel, set the SPOILER switch to the TEST position and hold. This will energize the ground spoiler valve solenoid and the panels will deploy.

j Release the SPOILER switch on the Maintenance Panel.

NOTE: After you release the switch the panels will not close.

WARNING: **DO NOT SET THE SPOILER SWITCH BACK TO THE TEST POSITION. IF YOU RELEASE THE SWITCH TWICE, THE PRESSURE INCREASES IN THE GSE 468 AND IT CAN CAUSE DAMAGE TO THE GSE 468 AND A LARGE SKYDROL LEAKAGE WILL OCCUR.**

k Put the end of the hose of the GSE 468 in the container and slowly open the needle valve to let the panels close.

l With the Speed Brake Valve solenoids de-energized (SPOILER switch released), wait 1 minute for stabilization. Then use a graduated container or count drops to measure the leakage rate at the end of hose during 1 minute.

NOTE: • The leakage at the end of hose must not be more than 15 cc/minute (300 drops/minute).

- Make sure that the hose is straight and with no kinks to let the hydraulic fluid flow freely.

m Close the needle valve of the GSE 468 and go to the next step.

2 Ground Spoiler Mode in Energized Condition:

a Put the end of the hose of the GSE 468 in the container.

b Make sure that the AIR GROUND A/B/C/D circuit breakers are closed.

c Set the engine thrust lever to the flight IDLE position.

WARNING: • **MAKE SURE THAT THERE ARE NO PERSONS OR EQUIPMENT IN THE FLAP AND SPOILER TRAVEL AREA.**

- **WHEN THE SPOILER TEST SWITCH IS ACTIVATED, THE SPOILERS WILL DEPLOY.**

- d On the Maintenance Panel, set the SPOILER switch to the TEST position and hold. This will energize the ground spoiler valve solenoid and the panels will deploy.

- e With the ground spoiler solenoid energized (with the switch held in the TEST position), wait 1 minute for stabilization. Then measure the leakage rate at the RETURN port during one minute, use a graduated container to collect and measure the leakage.

NOTE: • The leakage at the end of hose must not be more than 15 cc/minute (300 drops/minute).

- Make sure that the hose is straight and with no kinks to let the hydraulic fluid flow freely.

WARNING: DO NOT RELEASE THE TEST SWITCH DURING THE HYDRAULIC FLUID COLLECTION. IT WILL CAUSE A HIGH RATE OF HYDRAULIC FLOW.

- f Close the needle valve of the GSE 468.

- g Release the switch.

NOTE: After you release the switch the panels will not close.

WARNING: DO NOT SET THE SPOILER SWITCH BACK TO THE TEST POSITION. IF YOU RELEASE THE SWITCH TWICE, THE PRESSURE INCREASES IN THE GSE 468 AND IT CAN CAUSE DAMAGE TO THE GSE 468 AND A LARGE SKYDROL LEAKAGE WILL OCCUR.

- h Make sure that there is a container under the drip tube to collect the spoiler system fluid.

- i Slowly open the needle valve of the GSE 468 to let the fluid drain as the panels retract.

- (b) Do the following steps to check the speed brake valve in the Speed Brake Mode:

- 1 Speed Brake Mode in Energized Condition:

- a Do following steps only for aircraft PRE-MOD. [S.B. 145-27-0028](#) and PRE-MOD. [S.B. 145-27-0032](#) (for FAA-Certified Aircraft) or PRE-MOD. [S.B. 145-27-0059](#) (for JAA-Certified Aircraft).

- 1) On the maintenance panel, set the ADC1 and ADC2 test switches to the up position and hold them in this position.
- 2) Set the engine thrust levers 1 and 2 to the flight IDLE position.
- 3) Put a container under the end of the hose of the GSE 468.
- 4) Make sure that the needle valve of the GSE 468 is closed.

WARNING: • **MAKE SURE THAT THERE ARE NO PERSONS OR EQUIPMENT IN THE FLAP AND SPOILER TRAVEL AREA.**

• **WHEN THE SPEED BRAKE CONTROL LEVER IS MOVED TO THE OPEN POSITION, THE SPEED BRAKES WILL DEPLOY.**

- 5) Set the speed brake control lever to the OPEN position. This will energize the speed brake solenoid and the panels will deploy.
- 6) Slowly open the needle valve of the GSE 468.
- 7) With the speed brake solenoid energized, wait 1 minute for stabilization then put a graduated container under the end of hose and collect the oil that comes from RETURN port for 1 minute.

NOTE: • Make sure that the hose is straight and with no kinks to let the hydraulic fluid flow freely.
• Do not move the Speed Brake Control Lever back to the CLOSED position during this time. It will cause a high rate of hydraulic flow.
• The leakage at the end of the hose must not be more than 15 cc/minute (300 drops/minute).

- 8) Close the needle valve of the GSE 468.
- 9) Make sure that there is a container under the drip tube to capture the speed brake system fluid.
- 10) Move the speed-brake control lever back to the CLOSED position.

NOTE: After you move the speed-brake control lever back to the CLOSED position, the panels will not close.

WARNING: DO NOT SET THE SPEED BRAKE CONTROL LEVER BACK TO THE OPENED POSITION. IF YOU MOVE THE SPEED BRAKE CONTROL LEVER TO THE CLOSED POSITION TWICE THE PRESSURE INCREASES IN THE GSE 468 LINE AND IT CAN CAUSE DAMAGE TO THE GSE 468 AND A LARGE SKYDROL LEAKAGE OCCUR.

- 11) Slowly open the needle valve of the GSE 468 to let the fluid drain as the panels retract.
- 12) On the Maintenance Panel, release the ADC 1 and ADC 2 test switches.
- 13) Depressurize the hydraulic system ([AMM TASK 29-10-00-860-801-A/200](#)).

- 14) Remove the GSE 468 from the RETURN port and remove the plug from the RETURN line.
 - 15) Reconnect the RETURN line to the RETURN port of the Speed Brake Valve.
Apply a torque 10.7 - 11.9 N.m (95 - 105 lbf.in). Refer to [Figure 502](#) and [Figure 503](#).
- 2** Do the following steps only for aircraft POST-MOD. [S.B. 145-27-0028](#) and POST-MOD. [S.B. 145-27-0032](#) (for FAA-Certified Aircraft) or POST-MOD. [S.B. 145-27-0059](#) (for JAA-Certified Aircraft):
- a Make sure that the flap panels are in the zero-degree position.
 - b Set the engine thrust levers 1 and 2 to the flight IDLE position.
 - c Put a container under the end of the hose of the GSE 468.
 - d Make sure that the needle valve of the GSE 468 is closed.
- WARNING:** • **MAKE SURE THAT THERE ARE NO PERSONS OR EQUIPMENT IN THE FLAP AND SPOILER TRAVEL AREA.**
- **WHEN THE SPEED BRAKE CONTROL LEVER IS MOVED TO THE OPEN POSITION, THE SPEED BRAKES WILL DEPLOY.**
- e Set the speed-brake control lever to the OPEN position. This will energize the speed brake solenoid.
 - f With the speed brake solenoid energized, slowly open the needle valve of the GSE 468 and wait 1 minute for stabilization. Then put a graduated container at end of the hose of the GSE 468 and collect the oil for 1 minute.
- NOTE:** • Make sure that the hose is straight and with no kinks to let the hydraulic fluid flow freely.
- Do not move the Speed Brake Lever back to the Closed position during this time. It will cause a high rate of hydraulic flow.
 - The leakage at the end of hose must not be more than 15 cc/minute (300 drops/minute).
- g Close the RETURN port drip tube needle valve of the GSE 468.
 - h Put a container under the drip tube to collect the speed brake system fluid.

WARNING: FLUID WILL COME OUT OF THE DRIP TUBE AT A HIGH RATE IF THE NEEDLE VALVE OF THE GSE 468 IS OPENED TOO FAR AND THE SPEED BRAKE CONTROL LEVER IS RESTORED TO THE CLOSED POSITION.

- i Move the speed brake control lever to the CLOSED position.

NOTE: After you move the speed brake control lever to the CLOSED position the panels will not close.

WARNING: DO NOT SET THE SPEED BRAKE CONTROL LEVER BACK TO THE OPENED POSITION. IF YOU MOVE THE SPEED BRAKE CONTROL LEVER TO THE CLOSED POSITION TWICE THE PRESSURE INCREASES IN THE GSE 468 LINE AND IT CAN CAUSE DAMAGE TO THE GSE 468 AND A LARGE SKYDROL LEAKAGE OCCUR.

- j Slowly open the drip tube needle valve of the GSE 468 and let the fluid drain as the panels retract.
- k With the speed brake solenoid energized, slowly open the needle valve of the GSE 468 and wait 1 minute for stabilization. Then put a graduated container at end of the hose of the GSE 468 and collect the oil for 1 minute.
- l Depressurize the hydraulic system ([AMM TASK 29-10-00-860-801-A/200](#)).
- m Remove the GSE 468 from RETURN port and remove the plug from the RETURN line.
- n Reconnect the RETURN line to the RETURN port of the Speed Brake Valve.

Apply a torque 10.7 - 11.9 N.m (95 - 105 lbf.in). Refer to [Figure 502](#) and [Figure 503](#).

- (4) Do a check of the spoiler control circuit (ground spoiler operation). See [Figure 502](#), [Figure 503](#), and [Figure 504](#).
 - (a) Disconnect connector P1191 from the Ground Spoiler Valve and connector P1169 from the Speed Brake Valve.
 - (b) Energize the aircraft with the External DC Power Supply ([AMM TASK 20-40-01-860-801-A/200](#)).
 - (c) Pressurize the hydraulic system ([AMM TASK 29-10-00-860-801-A/200](#)).
 - (d) Make sure that the AIR GROUND A/B/C/D circuit breakers are closed.
 - (e) On the Maintenance Panel, put the SPOILER switch in the TEST position and hold it in this position.
 - (f) Set the engine thrust lever to the flight IDLE position.
 - (g) Measure the voltage between pins C (+) and A (-) of connector P1191.
Result:
1 The voltage must be 28 V DC.

- (h) Measure the voltage between pins B (+) and A (-) of connector P1169.
 Result:
 - 1 The voltage must be 28 V DC.
- (5) On the Maintenance Panel, release the SPOILER switch.
- (6) Connect electrical connector P1191 to the ground spoiler valve.
- (7) Make sure that the flap panels are in the zero-degree position.
- (8) Do a check of the spoiler control circuit (speed brake operation). See [Figure 502](#) or [Figure 503](#) as applicable.
 - (a) Do this step (a) only for aircraft PRE-MOD. [S.B. 145-27-0032](#) (for FAA-Certified Aircraft), or PRE-MOD. [S.B. 145-27-0059](#) (for JAA-Certified Aircraft).
 - 1 On the Maintenance Panel, set the ADC 1 and ADC 2 test switches to the up position and hold them in this position.
 - (b) Set engine thrust levers 1 and 2 to the flight IDLE position.
 - (c) Set the speed-brake control lever to the OPEN position.
 - (d) Measure the voltage between pins D (+) and E (-) of connector P1169.
 - 1 The voltage must be 28 V DC.
 - (e) Do this step (e) only for aircraft POST-MOD. [S.B. 145-27-0028](#).
 - 1 Set the flap selector lever to the 9-degree position.
 - a The voltage must be 28 V DC.
 - 2 Set the flap selector to zero-degree position.
 - (f) Set the speed-brake control lever to the CLOSE position.
 - (g) Do this step (g) only for aircraft PRE-MOD. [S.B. 145-27-0032](#) (for FAA-Certified Aircraft), or PRE-MOD. [S.B. 145-27-0059](#) (for JAA-Certified Aircraft).
 - 1 On the Maintenance Panel, release the ADC 1 and ADC 2 test switches.
 - (h) Connect electrical connector P1169 to the speed brake valve.

WARNING: MAKE SURE THAT THERE ARE NO PERSONS AND EQUIPMENT IN THE FLAP AND SPOILER TRAVEL AREA.

- (9) Do a check of the spoiler control circuit (proximity sensors and messages).
 - (a) Make sure that the AIR GROUND A/B/C/D circuit breakers are closed.
 - (b) On the maintenance panel, set the SPOILER switch to the TEST position and hold it in this position.
 - (c) Set the engine thrust lever to the flight IDLE position.
 Result:
 - 1 The inboard and outboard ground spoiler panels open.

2 The EICAS display does not show failure messages.

- (d) Release the pressure from the hydraulic system ([AMM TASK 29-10-00-860-801-A/200](#)) and install GSE 066 to the ground spoiler actuator and GSE 067 to the speed brake actuator to keep them open ([Figure 505](#)).
- (e) Disconnect connector P1191 from the Ground Spoiler Valve and connector P1169 from the Speed Brake Valve.
- (f) Keep the ground spoiler panels open.
- (g) Put the metallic target, one at a time, on the four proximity sensors of the spoilers. See [Figure 504](#).

Result:

- 1 The SPOILER FAIL caution message is shown on the EICAS display, when the metallic target is near each proximity sensor. The SPOILER FAIL caution message goes out of view when the metallic target is away from the proximity sensor.

- (h) On the Maintenance Panel, release the SPOILER switch.
- (i) Put the metallic target on the four proximity sensors of the spoilers.

Result:

- 1 On the EICAS there is an indication of the spoiler panels closed.

- (j) Remove, one at a time, the metallic target from each proximity sensor.
- Result:

- 1 On the EICAS, the SPOILER FAIL caution message comes on, when the metallic target is away from the proximity sensor.

- (k) Put the metallic target on the proximity sensor again, one at a time.

Result:

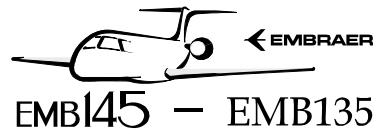
- 1 On the EICAS, the SPOILER FAIL caution message goes out of view, when the metallic targets are near the four proximity sensors.

K. Follow-on

SUBTASK 842-002-A

- (1) Remove the metallic target from the proximity sensors.
- (2) Connect connector P1191 to the ground spoiler valve and connector P1169 to the speed brake valve.
- (3) Remove GSE 066 from the ground spoiler actuator and GSE 067 from the speed brake actuator to release them.
- (4) Make sure that the hydraulic reservoir is full ([AMM TASK 12-13-01-600-801-A/300](#)). If necessary, fill the reservoirs ([AMM TASK 12-13-01-600-802-A/300](#)).
- (5) Do an inspection on the fuel quantity indication harness (AMM TASK 28-41-00-200-801-A/600).

NOTE: The inspection of fuel quantity indication harness is a part of Critical Design Configuration Control Limitations (CDCCL) in the Airworthiness Limitations (Section 6) of the Maintenance Review Board Report (MRB).



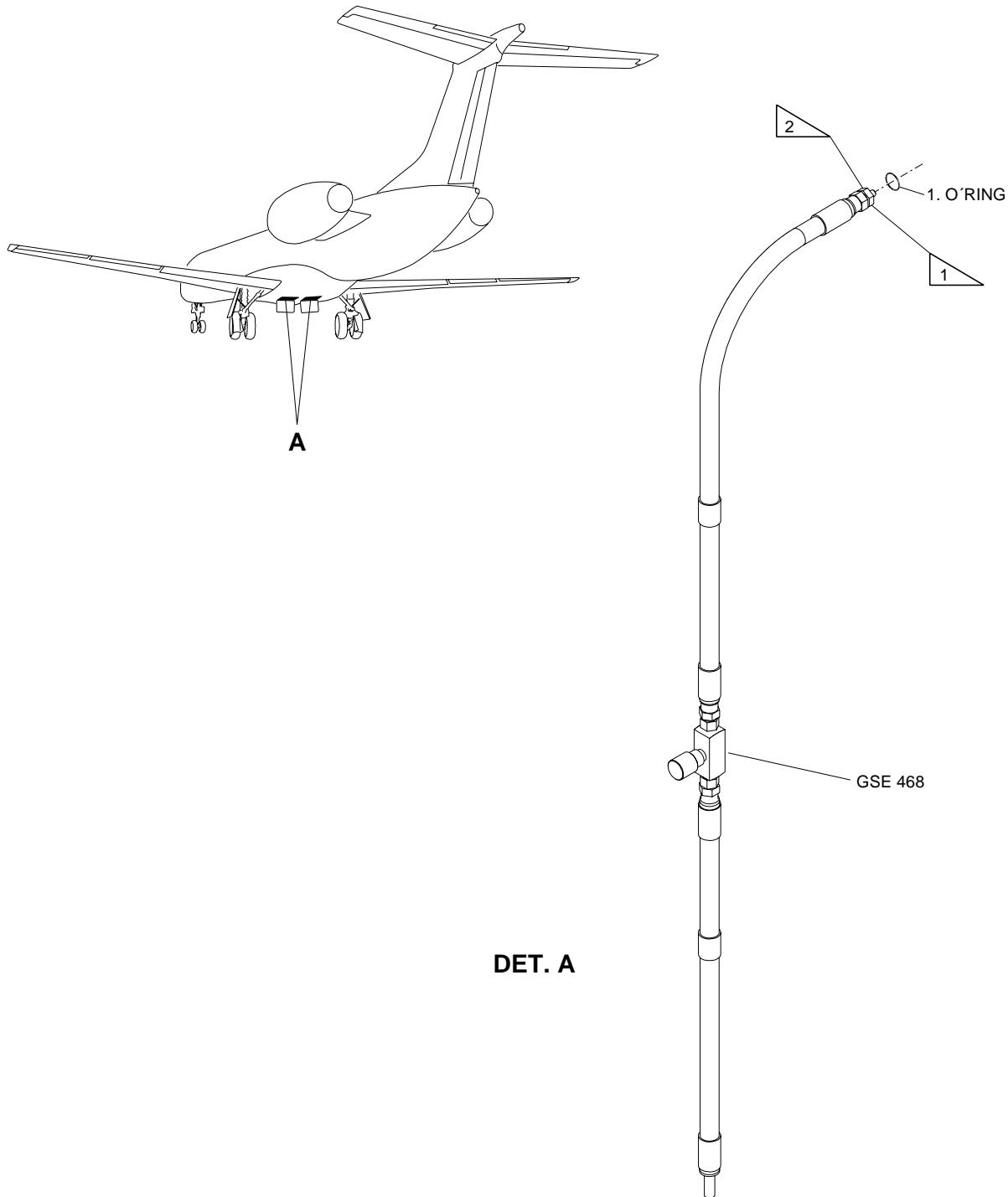
AIRCRAFT
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- (6) Install access doors 192AL and 192BR (AMM MPP 06-41-01/100).
- (7) Deenergize the aircraft ([AMM TASK 20-40-01-860-801-A/200](#)).

EFFECTIVITY: ALL

Needle Valve and Drip Tube - Assembly

Figure 501



1 TORQUE: 10.7 – 11.9 N.m. (95 – 105 lb.in).

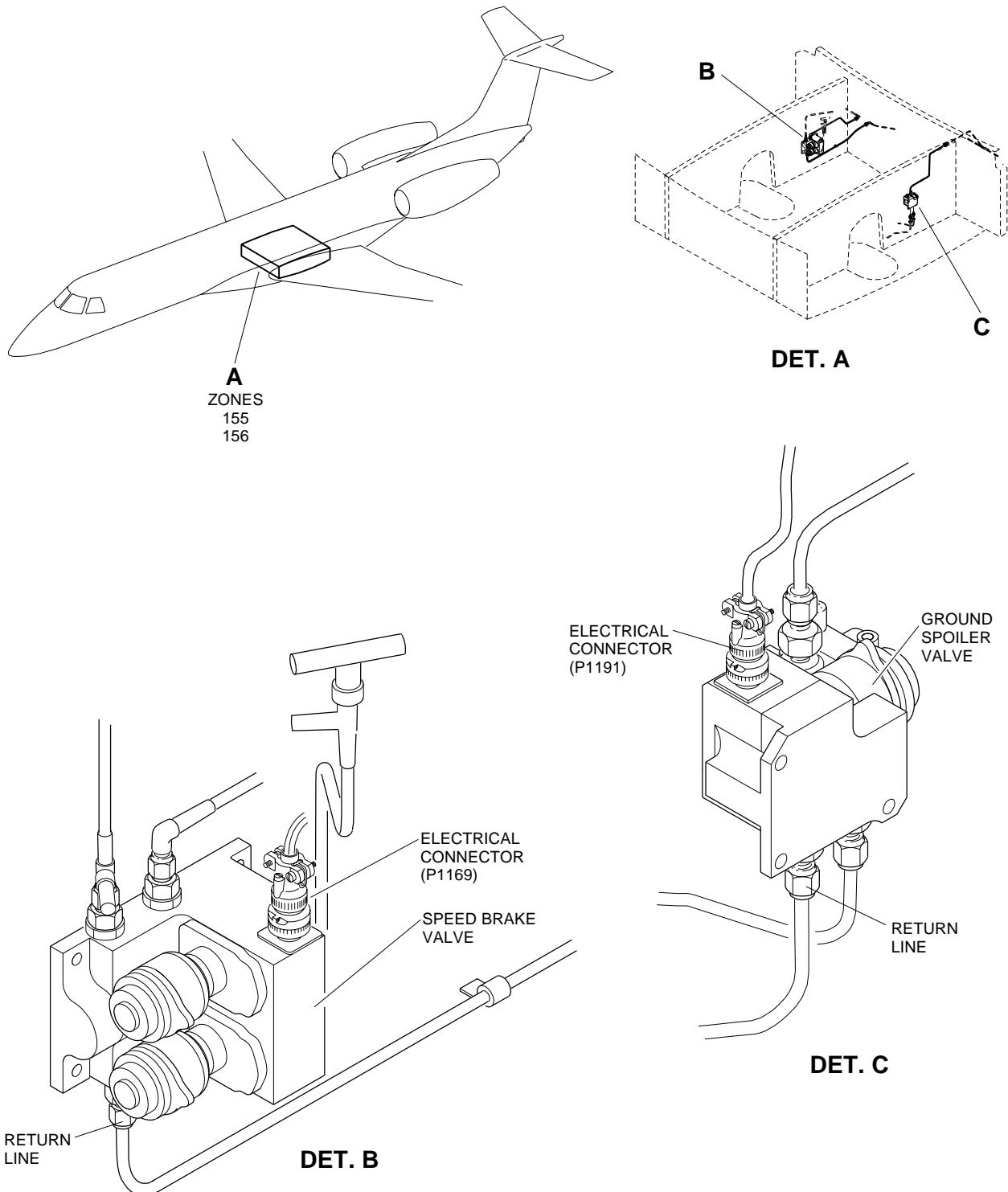
2 JOINT THAT CONNECT TO MANIFOLD RETURN PORT
OF GRAND SPOILER AND SPEED BRAKE VALVE.

EM145AMM270672C.DGN

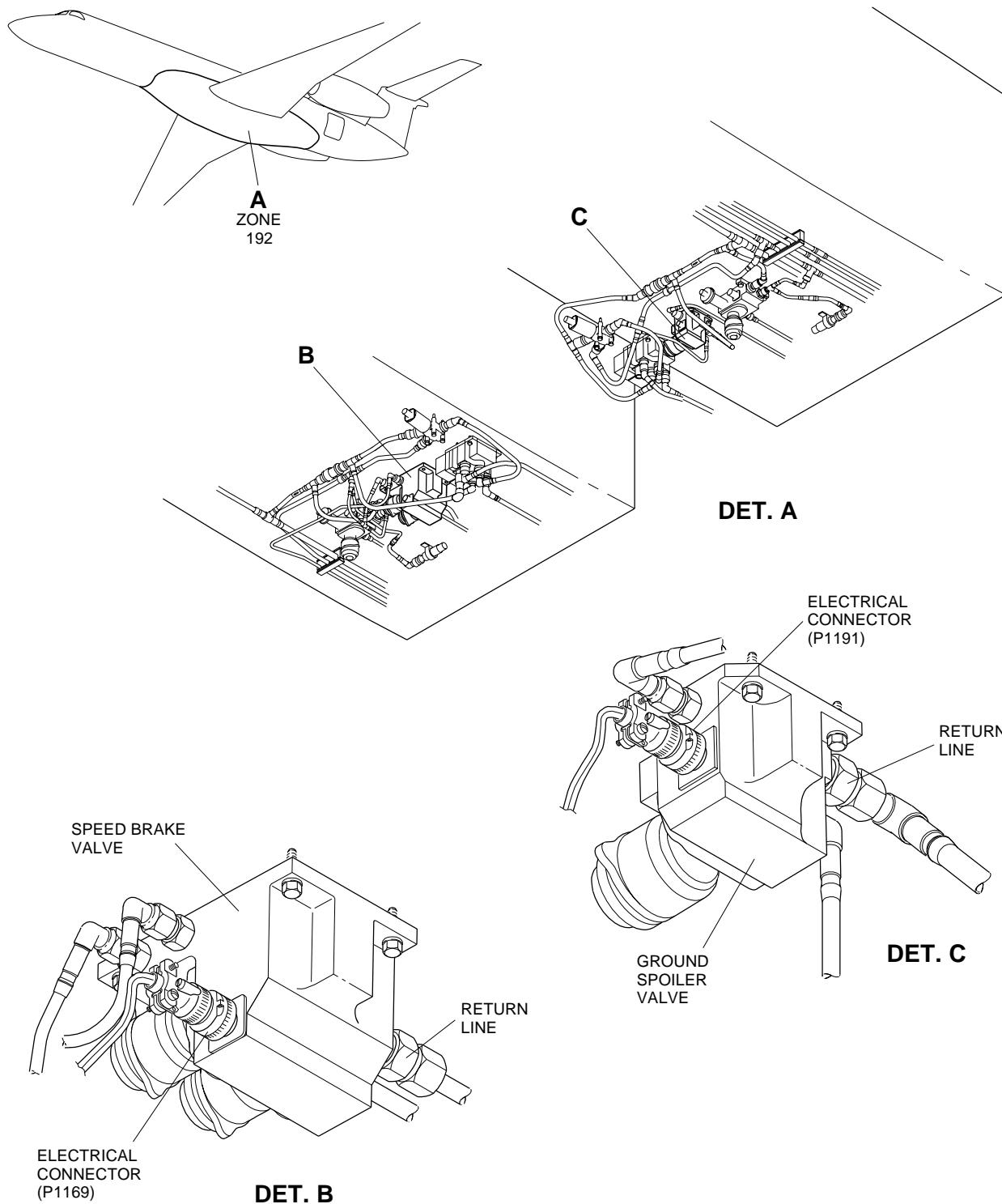
EFFECTIVITY: EMB-145ER/EP/EU AND EMB-135ER MODELS

Ground Spoiler and Speed Brake Valves - Location

Figure 502

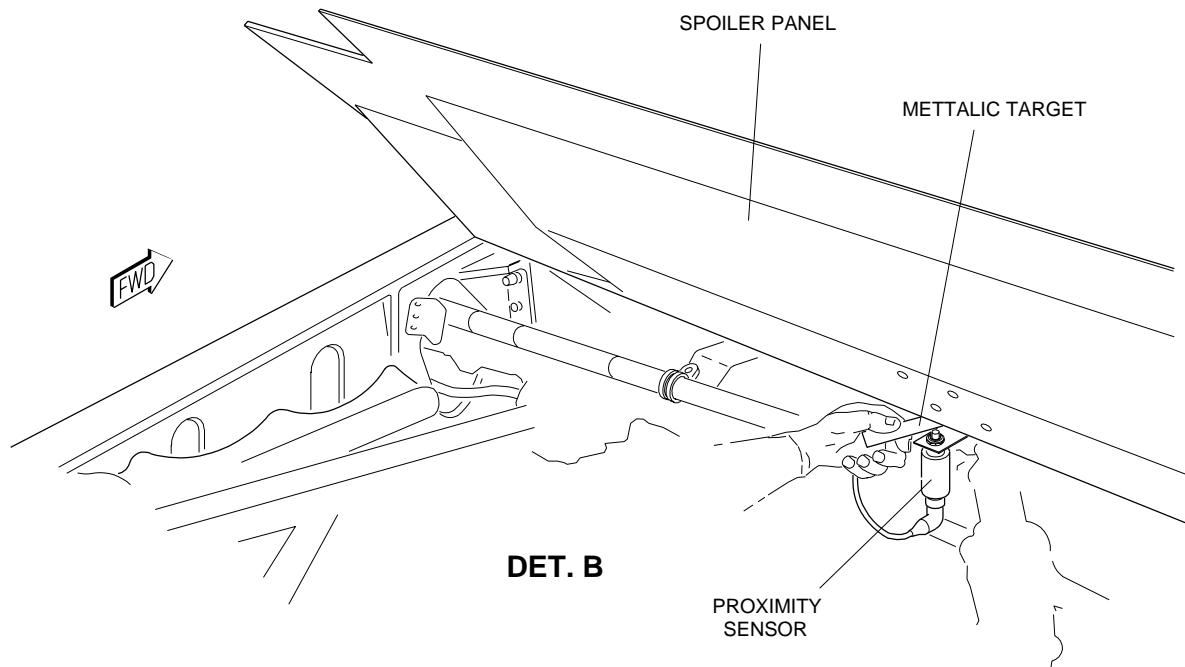
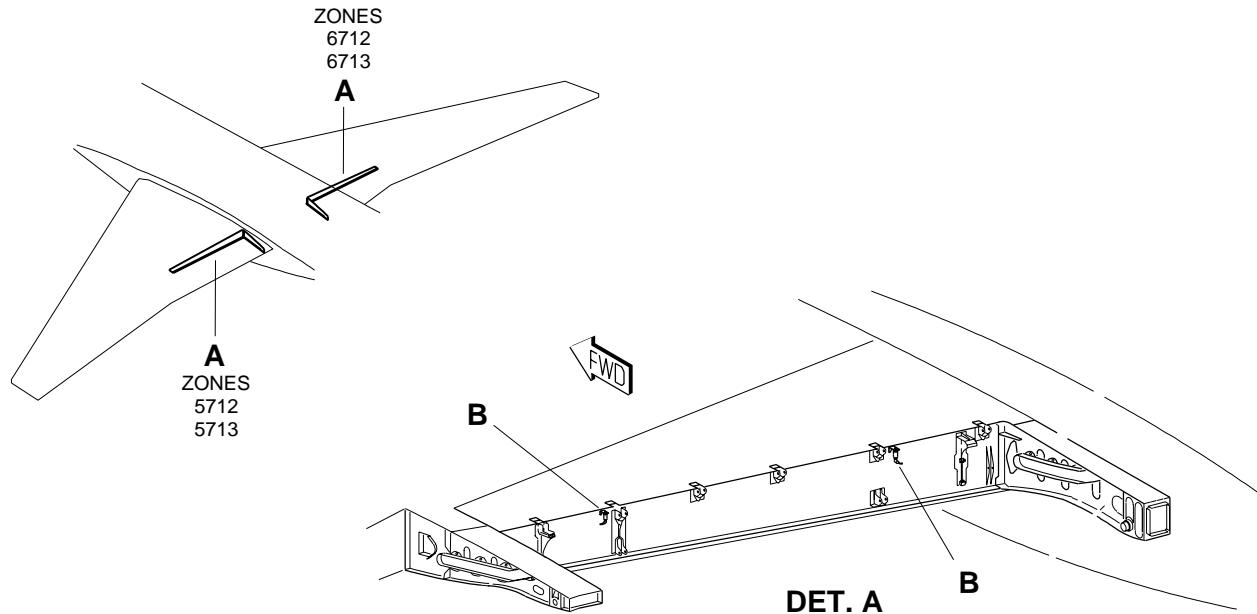


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EFFECTIVITY: EMB-145LR/MR/LU AND EMB-135LR MODELS
Ground Spoiler and Speed Brake Valves - Location
Figure 503


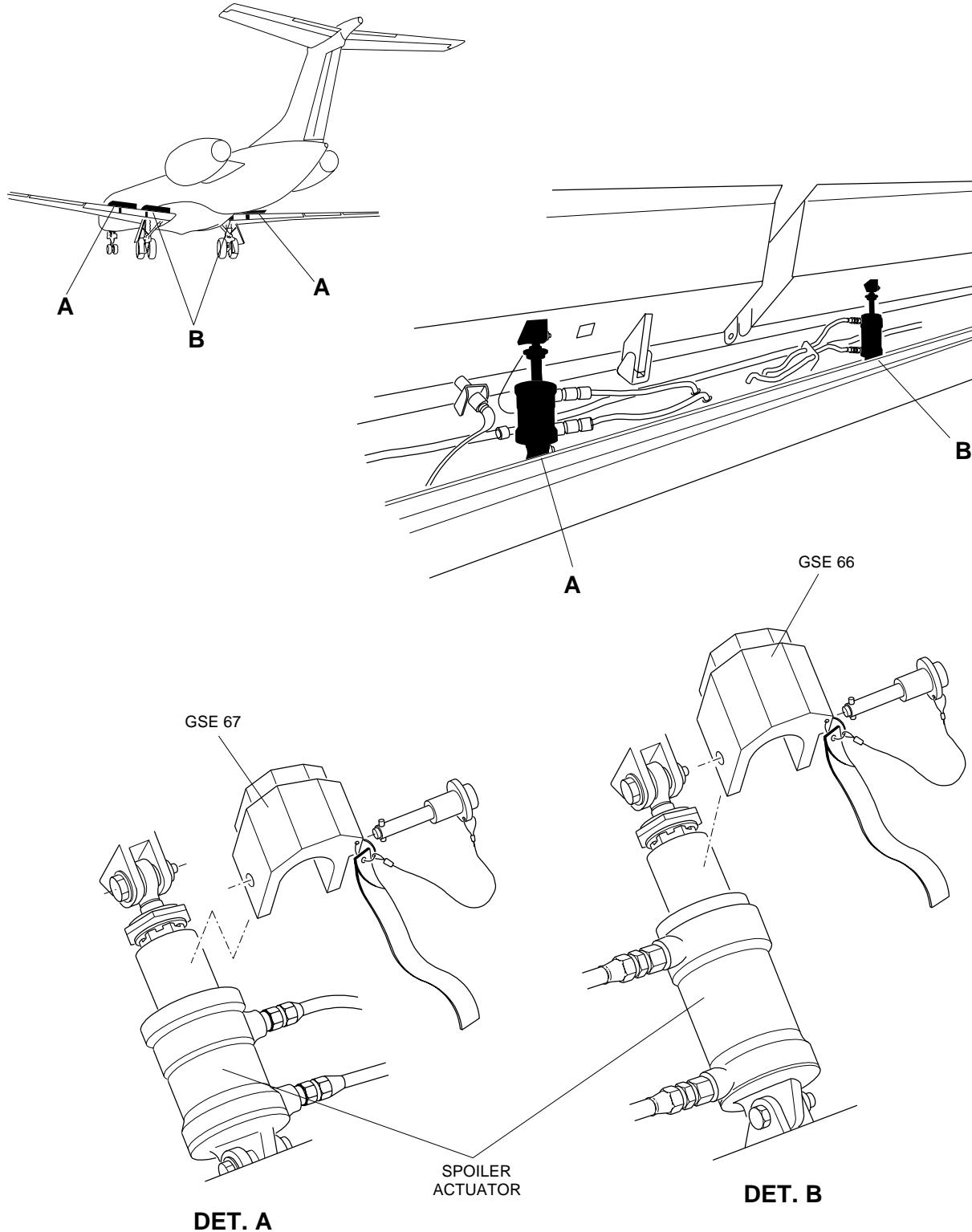
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EFFECTIVITY: ALL
 Proximity Sensor Locations
 Figure 504

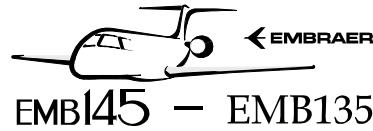


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EFFECTIVITY: ALL
GSE 066 and GSE 067 Installation
Figure 505



EM145AMM270948A.DGN



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TASK 27-62-00-700-802-A

EFFECTIVITY: ALL

3. EXTERNAL LEAKAGE AT THE SPOILER ACTUATORS - FUNCTIONAL CHECK

A. General

(1) This task gives the procedures to do a check for external leakage at the spoiler actuators.

B. References

| REFERENCE | DESIGNATION |
|---------------------------------|--|
| AMM TASK 20-40-01-860-801-A/200 | ENERGIZATION OF THE AIRCRAFT WITH AN EXTERNAL POWER SOURCE |
| AMM TASK 27-62-01-000-801-A/400 | GROUND SPOILER ACTUATOR - REMOVAL |
| AMM TASK 27-62-01-400-801-A/400 | GROUND SPOILER ACTUATOR - INSTALLATION |
| AMM TASK 27-62-02-000-801-A/400 | SPEED BRAKE ACTUATOR - REMOVAL |
| AMM TASK 27-62-02-400-801-A/400 | SPEED BRAKE ACTUATOR - INSTALLATION |
| AMM TASK 27-63-01-700-801-A/500 | SPOILER SYSTEM - OPERATIONAL CHECK |
| AMM TASK 29-10-00-860-801-A/200 | HYDRAULIC SYSTEM - PRESSURIZATION WITH HTS |
| AMM TASK 57-56-01-000-801-A/400 | INBOARD AND OUTBOARD FLAP LOWER SHROUDS - REMOVAL |
| AMM TASK 57-56-01-400-801-A/400 | INBOARD AND OUTBOARD FLAP LOWER SHROUDS - INSTALLATION |

C. Zones and Accesses

| ZONE | PANEL/DOOR | LOCATION |
|------|------------|----------------|
| 5712 | | Ground Spoiler |
| 6712 | | Ground Spoiler |
| 5713 | | Speed Brake |
| 6713 | | Speed Brake |

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

| SPECIFICATION (BRAND) | DESCRIPTION | QTY |
|--------------------------|---------------|-----|
| Commercially available | Adhesive tape | AR |

G. Expandable Parts

Not Applicable

H. Persons Recommended

| QTY | FUNCTION | PLACE |
|-----|---------------|----------------------|
| 1 | Does the task | Cockpit |
| 2 | Do the task | Outside the aircraft |

I. Preparation
SUBTASK 841-003-A

- (1) Make sure that the aircraft is safe for maintenance.
- (2) Energize the aircraft with an external DC power supply ([AMM TASK 20-40-01-860-801-A/200](#)).
- (3) Set the flaps to the 45-degree position.
- (4) Do not do other tasks on the speed brake, ground spoiler, and flap system at this time.
- (5) On the circuit breaker panel, open the Flap 1 and FLAP 2 circuit breakers and attach a DO-NOT-CLOSE tag to them.

CAUTION: WHEN YOU OPEN THE INBOARD-FLAP LOWER SHROUD, IF IT IS NECESSARY TO MOVE THE FLAPS, DO AS FOLLOWS (IT WILL PREVENT DAMAGE TO THE INBOARD-FLAP LOWER SHROUD AND INBOARD-FLAP LEADING EDGE):

- RELEASE THE SPRINGS FROM THE ROOT AND TIP SUPPORTS OF THE INBOARD-FLAP LOWER SHROUD.

- (6) Open the lower shroud of the inboard and outboard flaps ([AMM TASK 57-56-01-000-801-A/400](#)).

J. Functional Check for External Leakage at the Spoiler Actuators (Figure 501)
SUBTASK 720-003-A

WARNING: THE HYDRAULIC SYSTEM CONTAINS PHOSPHATE-ESTER HYDRAULIC FLUID. THE FLUID CAN CAUSE IRRITATION IN YOUR SKIN OR INJURY TO YOUR EYES. USE THE APPLICABLE RUBBER GOGGLES AND GLOVES. IF THE FLUID TOUCHES YOU, FLUSH YOUR SKIN WITH WATER. IF IT GETS IN YOUR EYES, FLUSH THEM WITH WATER AND GET MEDICAL HELP.

- (1) On the circuit breaker panel, open the SPEED BRAKE and GND SPLR OUTBD circuit breakers.
- (2) Do steps (1) and (2) of [AMM TASK 27-62-01-000-801-A/400](#) to disconnect the left and right ground spoiler actuators from the spoiler surface and its support.

NOTE: With adhesive tape, attach the open surface.

- (3) Do steps (1) and (2) of [AMM TASK 27-62-02-000-801-A/400](#) to disconnect the left and right speed brake actuators from the spoiler surface and its support.

NOTE: With adhesive tape, attach the open surface.

(4) Carefully turn the two ground spoiler actuators in the horizontal position and hold them tight.

(5) Pressurize hydraulic system 1 ([AMM TASK 29-10-00-860-801-A/200](#)).

(6) Cycle the actuator until the first drop falls from the unit or until 100 cycles are completed.

NOTE: Pay attention to do the steps below because these events cannot occur at the same time on the left and right sides of the aircraft. It is very important to do this leakage test during the same cycling for these two actuators. It is necessary to have two technicians, one for each actuator, to do the steps that follow correctly.

(a) If no drop falls until 100 cycles are completed, stop the cycling. The actuator is in good condition.

NOTE: The actuator can leak from its rod end and from its body seal.

(b) If one drop falls from the unit before the 100 cycles are completed, go to step (7).

NOTE: Do not clean the actuator because the hydraulic fluid on the actuator body will permit you to count the drops.

(7) Do 25 cycles again and look to see if more than two drops fall from the unit. If it occurs, replace the actuator.

(8) Release the pressure from hydraulic system 1 ([AMM TASK 29-10-00-860-801-A/200](#)).

(9) On the circuit breaker panel, open the GND SPLR INBD circuit breaker and close the SPEED BRAKE and GND SPLR OUTBD circuit breakers.

(10) Carefully turn the two speed brake actuators in the horizontal direction and hold them tight.

NOTE: It is necessary to wait until the actuator gets the fully extended position to cycle it again.

(11) Pressurize hydraulic system 2 ([AMM TASK 29-10-00-860-801-A/200](#)).

(12) Do steps (6) and (7) again.

(13) Release the pressure from hydraulic system 2 ([AMM TASK 29-10-00-860-801-A/200](#)).

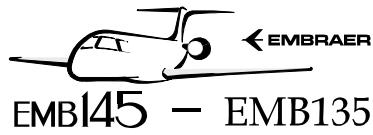
(14) Do steps (1) and (2) of [AMM TASK 27-62-01-400-801-A/400](#) to install the left and right ground spoiler actuators to the spoiler surface and its support.

(15) Do steps (1) and (2) of [AMM TASK 27-62-02-400-801-A/400](#) to install the left and right speed brake actuators to the spoiler surface and its support.

K. Follow-on

SUBTASK 842-003-A

(1) Close the lower shroud of the inboard flap ([AMM TASK 57-56-01-400-801-A/400](#)).

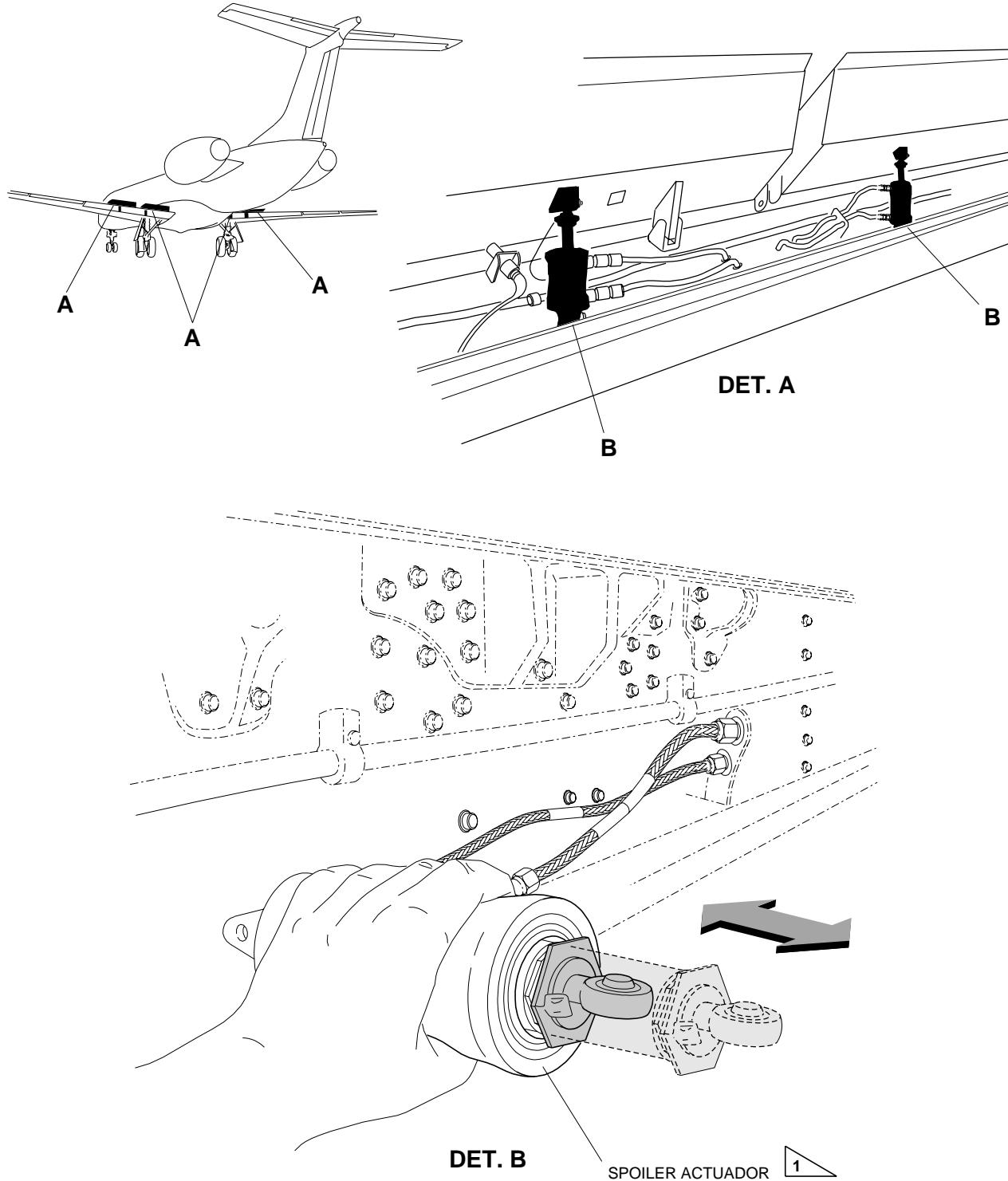


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- (2) On the circuit breaker panel, close the FLAP 1, FLAP 2, and GND SPLR INBD circuit breakers.
- (3) Set the flaps to the 0-degree position.
- (4) Deenergize the aircraft ([AMM TASK 20-40-01-860-801-A/200](#)).
- (5) Do the operational check of the spoiler system ([AMM TASK 27-63-01-700-801-A/500](#)).

EFFECTIVITY: ALL

External Leakage of the Spoiler Actuator
Figure 506

1 SPOILER ACTUADOR ON THE HORIZONTAL POSITION

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