TBC ALL

Ultrasonic Leak Detection Checks

(Figure 201, Figure 202)

A. General

(1) Recommended Equipment

(a) An ultrasonic leak probe, SPL-1473, is the recommend equipment. When performing ultrasonic leak detection, use a leak detector that meets or exceeds ASTM E1002.

(b) An acoustic digital camera, COM-18702, is the recommend equipment. Recommend using a camera with an adjustable frequency range between 2kHz to 50kHz.

(2) Usage

(a) An ultrasonic leak probe, SPL-1473, converts and amplifies inaudible ultrasonic sounds into audible “natural” sounds by lowering the received frequency into the audible range. The unaided human ear can only detect sound between 20 Hz and 20 kHz; well below what is required to detect pressure leaks that are normally found in the ultrasonic 35kHz to 45kHz range.

1) Detect pressure leaks, vacuum leaks and hydraulic bypassing

a) Provides effective indication and location of leaks. When a gas or liquid escapes through a crack from a high-pressure system to a low-pressure system it results in turbulence, which produces ultrasound.

b) Accurately identifies leaking valves, solenoids, gaskets and connections.

(b) An acoustic digital camera, COM-18702, provides a means to quickly sweep a wide area to detect and locate leaks in compressed air, compressed gas, and vacuum systems. The frequency range covers 2kHz to 52kHz with a maximum operating distance of 164 ft (50 m). The acoustic digital camera, COM-18702, has a visible light camera that captures a live-view image of the inspection area, while the acoustic sensor-array aligns a sound-source heatmap with the image.

(3) Images in this task are examples only. The images may not agree with your airplane model or airplane configuration.

B. References

Reference	Title
21-00-00-800-801	Supply Conditioned Air to the Airplane (P/B 201)
29-11-00-860-801	Hydraulic System A or B Pressurization (P/B 201)
34-11-00-790-802	Static and Total Air Pressure System - Pressurization (P/B 201)
36-00-00-860-801	Supply Pressure to the Pneumatic System (Selection) (P/B 201)
36-00-00-860-805	Supply Pressure Upstream of the PRSOV with Engines Off (P/B 201)

Preliminary Requirements

C. Tools/Equipment

NOTE: When more than one tool part number is listed under the same "Reference" number, the tools shown are alternates to each other within the same airplane series. Tool part numbers that are replaced or non-procurable are preceded by "Opt:", which stands for Optional.

Reference	Description
COM-18702	Digital Camera - Acoustic **737-10, -7, -8, -8200, -8BBJ, -9** Part #: 9050 Supplier: 4MJL8 Part #: FLK-ii900 Supplier: 4U744 Part #: FLK-ii910 Supplier: 4U744
SPL-1473	Probe - Kit, Ultrasonic Leak **737-10, -7, -8, -8200, -8BBJ, -9** Part #: B00033 Supplier: 62373 Part #: ST6760A-1 Supplier: 81205

Procedure

D. Ultrasonic Leak Detection Checks

WARNING MAKE SURE THAT YOU OBEY ALL SAFETY PRECAUTIONS AND FOLLOW THE GENERAL MAINTENANCE PRACTICES. IF YOU DO NOT OBEY, YOU CAN CAUSE PERSONNEL INJURY AND EQUIPMENT DAMAGE.

WARNING MAKE SURE YOU OBEY THE PROPER PROCEDURES FOR COMPRESSION AND DECOMPRESSION WHEN YOU USE PERSONS IN A PRESSURIZED AREA. PRESSURE CHANGES THAT CAUSE PAIN MUST NOT BE DONE. IF YOU DO NOT OBEY THE PRECAUTIONS, INJURY TO PERSONS CAN OCCUR.

WARNING MAKE SURE ONLY THE PERSONS NECESSARY FOR THIS TEST ARE IN THE PRESSURIZED AIRCRAFT. EACH PERSON MUST SPEAK TO ALL OTHER PERSONS ON THE INTERPHONE OR GROUND COMMUNICATION SYSTEMS. CABIN PRESSURE TESTS CAN CAUSE INJURY TO PERSONS.

SUBTASK 20-10-79-790-001

(1) Do the cabin pressurization leak test as follows:

NOTE: Two persons are necessary for this task. One person examines the airplane with the acoustic camera from out of the airplane, while the other person in the airplane uses the ultrasonic detector to identify the leakage.

(a) Do the cabin pressurization (TASK 21-00-00-800-801).

(b) Examine the windows, doors, and other possible leak locations with the acoustic digital camera, COM-18702, to find the leakage.

1) When you find the leaks, move the camera to make sure that the leaks you found are not reflections.

NOTE: Leaks will stay stable while the user moves. Reflections will move while the user moves.

(c) Speak with the person in the airplane to identify the location of the leaks with the ultrasonic leak probe, SPL-1473.

NOTE: Use an ultrasonic leak detector with the recommended sensitivity.

SUBTASK 20-10-79-790-002

(2) Do the air conditioning leak check as follows:
   (a) Operate the air conditioning (TASK 21-00-00-800-801).
   (b) Examine the packs and ducting with the acoustic digital camera, COM-18702, for possible leaks.
      1) When you find the leaks, move the camera to make sure that the leaks you found are not reflections.

         NOTE: Leaks will stay stable while the user moves. Reflections will move while the user moves.

   (c) If you find leaks, you must identify the location of the leaks with the ultrasonic leak probe, SPL-1473.

      NOTE: Some valves have pressure bleed orifices that can possibly show as leaks. If you are not sure, identify the leaking orifice and compare with the other side.

SUBTASK 20-10-79-790-003

(3) Do the bleed air leak check as follows:
   (a) For the airframe do the following steps:
      1) Operate the bleed air (TASK 36-00-00-860-801).
      2) Examine the aircraft with the acoustic digital camera, COM-18702, for possible leaks.
         a) When you find the leaks, move the camera to make sure that the leaks you found are not reflections.

            NOTE: Leaks will stay stable while the user moves. Reflections will move while the user moves.

      3) If you find leaks, you must identify the location of the leaks with the ultrasonic leak probe, SPL-1473.

         NOTE: Once panel is removed, bleed air leaks are easily pinpointed to clamps, valve body and seals.

   (b) For the engine do the following steps:
      1) Operate the bleed air (TASK 36-00-00-860-801).
      2) Open the Pressure Regulating and Shutoff Valve Controller (PRSOVC) to back pressure lines and ducts up to the High Pressure Shutoff Valve (HPSV) (TASK 36-00-00-860-805).
      3) Examine the engine with the acoustic digital camera, COM-18702, for possible leaks.
         a) When you find the leaks, move the camera to make sure that the leaks you found are not reflections.

            NOTE: Leaks will stay stable while the user moves. Reflections will move while the user moves.

      4) If you find leaks, you must identify the location of the leaks with the ultrasonic leak probe, SPL-1473.

         NOTE: Some valves have pressure bleed orifices that possibly show as leaks. If you are not sure, identify the leaking orifice and compare with the other side.

SUBTASK 20-10-79-790-004

(4) Do the hydraulic system bypassing check as follows:
   (a) Operate the hydraulic system (TASK 29-11-00-860-801).
      1) Examine the hydraulic valves/lines with the acoustic digital camera, COM-18702, for possible bypassing.

2) If you find the bypassing, you must identify the location of the bypassing with the ultrasonic leak probe, SPL-1473.

SUBTASK 20-10-79-790-006

(5) Do the parking brake bleed down issue as follows:
   (a) Operate the hydraulic system (TASK 29-11-00-860-801).

   NOTE: It can be necessary to occasionally re-pressurize the system to do all of the leak check.

   (b) Set the parking brake.
   (c) Examine the pressure return lines with the acoustic digital camera, COM-18702, for possible leaks.
      1) When you find the leaks, move the camera to make sure that the leaks you found are not reflections.

      NOTE: Leaks will stay stable while the user moves. Reflections will move while the user moves.

   (d) If you find leaks, you must identify the location of the leaks with the ultrasonic leak probe, SPL-1473.

SUBTASK 20-10-79-790-007

(6) Do the pitot static check as follows:
   (a) Increase pitot and static to the maximum test pressures (TASK 34-11-00-790-802).
   (b) Examine the pitot and static lines and components with the acoustic digital camera, COM-18702, for possible leaks.
      1) When you find the leaks, move the camera to make sure that the leaks you found are not reflections.

      NOTE: Leaks will stay stable while the user moves. Reflections will move while the user moves.

   (c) If you find leaks, you must identify the location of the leaks with the ultrasonic leak probe, SPL-1473.

SUBTASK 20-10-79-790-005

(7) Do the oxygen system leak check as follows:
   (a) Examine the oxygen lines and components with the acoustic digital camera, COM-18702, for possible leaks.
      1) Make sure that you do not contact with the oxygen lines or components.
      2) When you find the leaks, move the camera to make sure that the leaks you found are not reflections.

      NOTE: Leaks will stay stable while the user moves. Reflections will move while the user moves.

   (b) If you find leaks, you must identify the location of the leaks with the ultrasonic leak probe, SPL-1473.

SUBTASK 20-10-79-790-008

(8) Do the leak check of evacuation slides, tires and other pressurized components as follows:
   (a) Examine the slides, tires or other pressurized components with the acoustic digital camera, COM-18702, for possible leaks.
      1) When you find the leaks, move the camera to make sure that the leaks you found are not reflections.

      NOTE: Leaks will stay stable while the user moves. Reflections will move while the user moves.

   (b) If you find leaks, you must identify the location of the leaks with the ultrasonic leak probe, SPL-1473.

Figure 201 Ultrasonic Leak Probe

- Sheet 1

Figure 202 Acoustic Digital Camera

- Sheet 1

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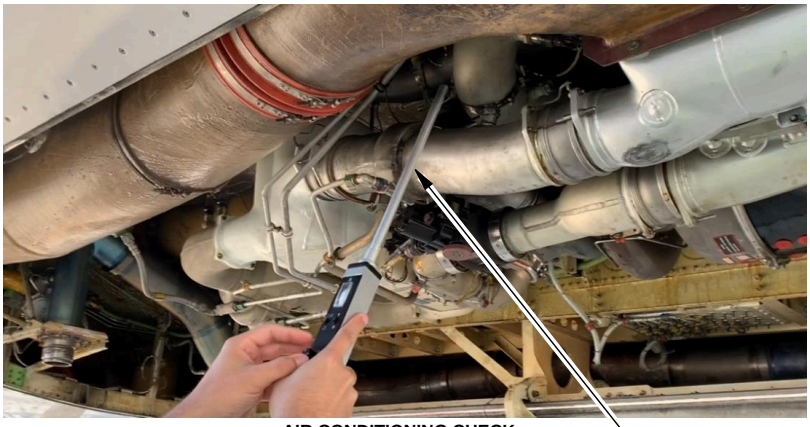
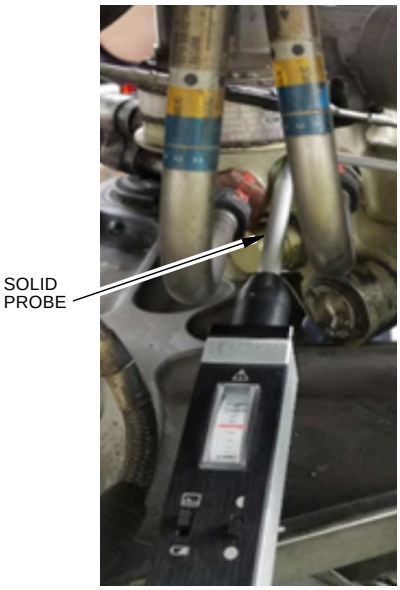


AIR CONDITIONING CHECK (EXAMPLE)



HYDRAULIC BYPASSING CHECK (EXAMPLE)

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Ultrasonic Leak Probe
Figure 201/20-10-79-990-801 (Sheet 1)
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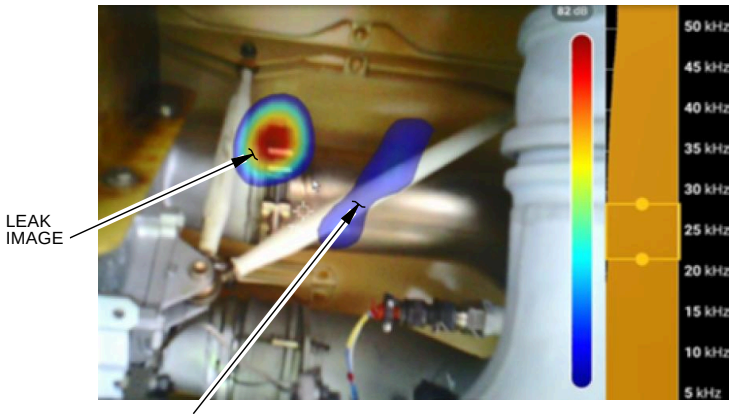
AIR CONDITIONING CHECK (EXAMPLE)



(EXAMPLE)

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Acoustic Digital Camera
Figure 202/20-10-79-990-802 (Sheet 1)
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