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CF-105 SERVICE DATA

By authority of AVRS

Date 25 Oct 86

Signature [Signature]

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CANOPIES

FILE IN VAULT

Section 32.

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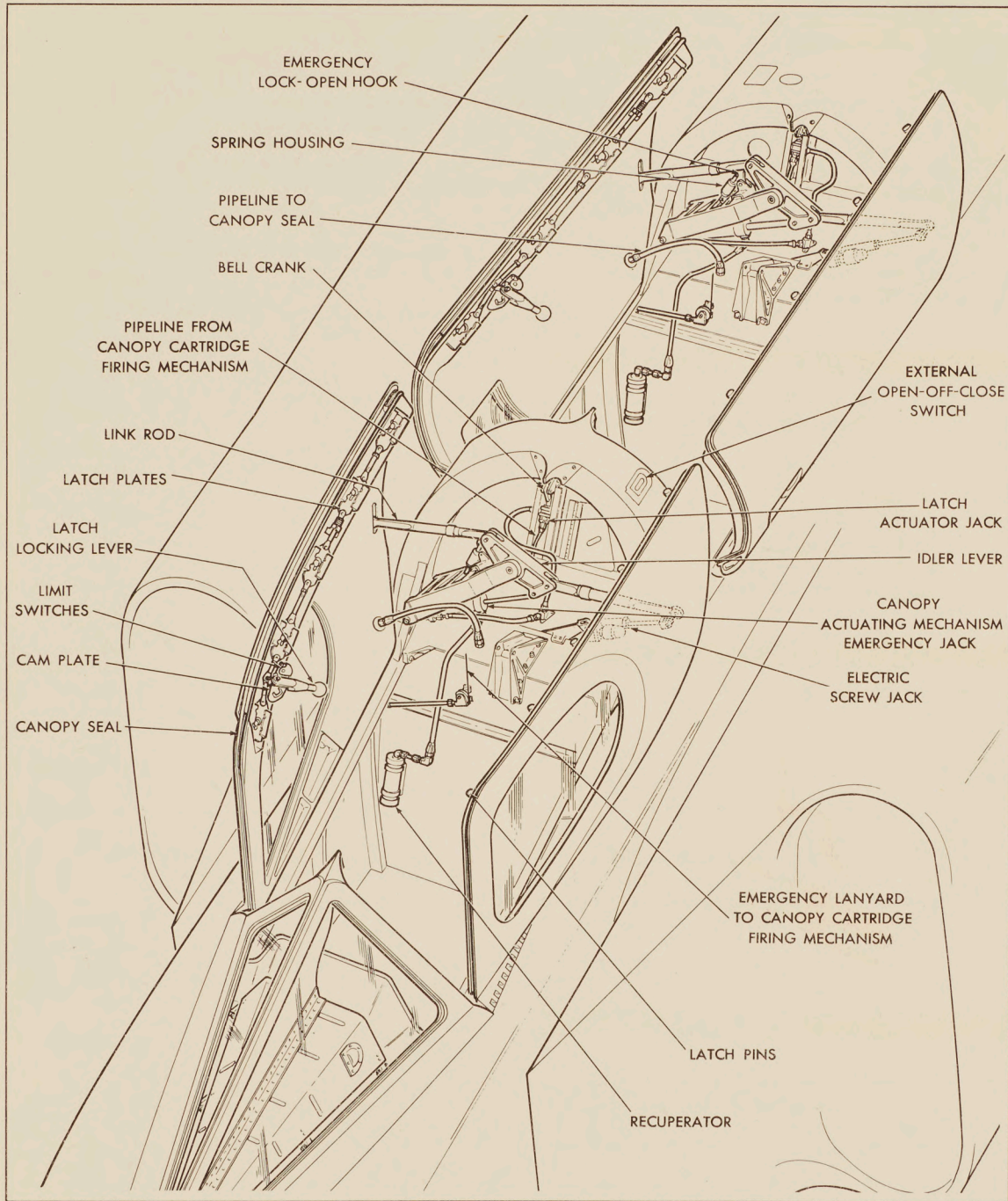
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ANNEXE
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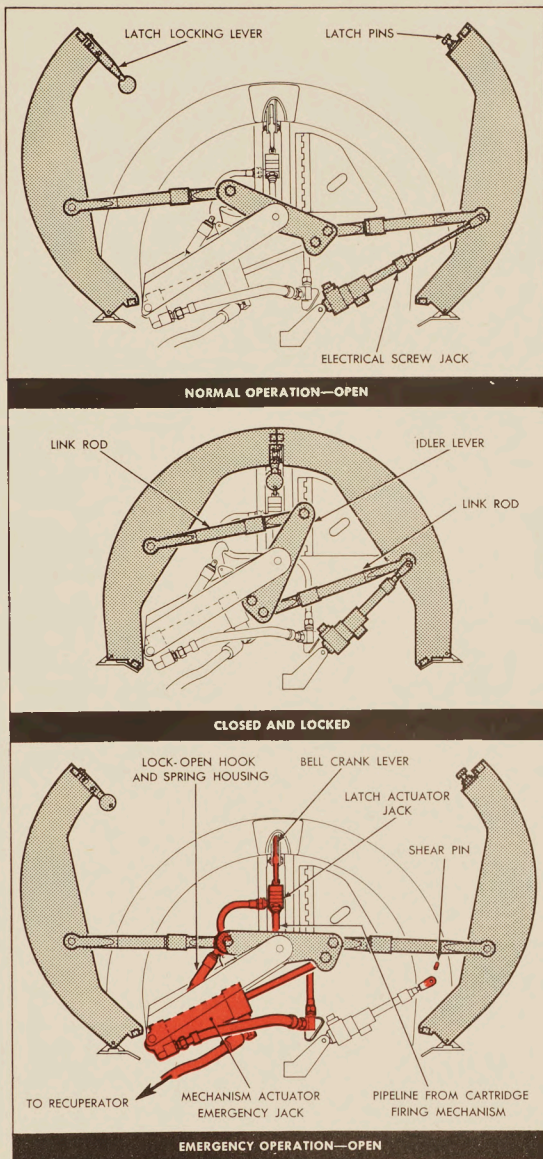


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FIG. 1 FRONT AND REAR CANOPIES

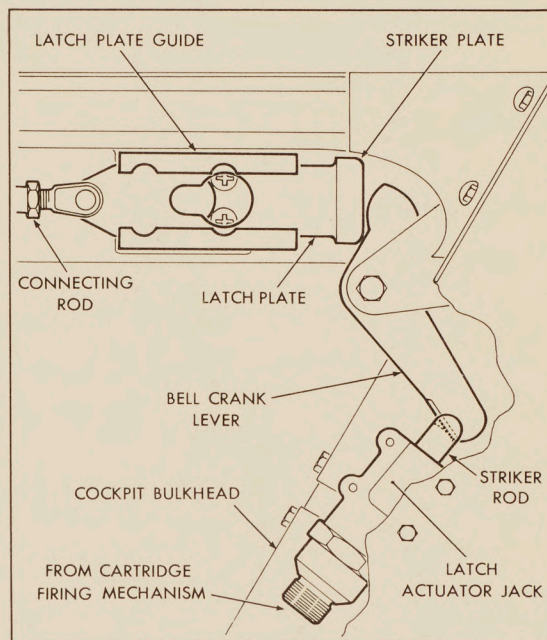
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FIG. 2 CANOPY ACTUATING MECHANISM - GEOMETRY



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FIG. 3 EMERGENCY ACTUATOR - CANOPY LATCH

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SYSTEM DATA SHEET

SYSTEM	SUB-SYSTEM	AIRCRAFT EFFTY	REF. NO.
CANOPIES		25201	53
<p>DESCRIPTION</p> <p>General</p> <ol style="list-style-type: none"> 1. The pilots and navigators cockpits are enclosed by separate canopies. Each canopy consists of two half shells. The half shells are attached by hinges to the cockpit sides. 2. The canopies are normally opened and closed by electrically actuated screw jacks and are locked mechanically when closed. An explosive cartridge operated system is fitted in each cockpit for emergency opening and this is interconnected with the ejection system. 3. Seals fitted around each half shell automatically inflate to seal the cabin when both canopies are closed. Both seals deflate when the first canopy is selected open. <p>Structure</p> <ol style="list-style-type: none"> 4. Both canopies are of similar construction, each half shell consisting of a light alloy frame casting covered by an inner and an outer skin. A glass clear vision panel is incorporated into the forward end of each half shell, the pilot's panels being electrically heated for de-icing. The canopies are attached to the cockpit sides by piano type hinges. Cockpit pressurization sealing is attained by inflating seals fitted around the periphery of each half shell. Locking latch pins are located on the left hand half shells and mating locking latches are located on the right hand half shells. <p>Controls</p> <ol style="list-style-type: none"> 5. The canopies are opened and closed individually from inside the cockpits by selection of an OPEN-OFF-CLOSE toggle switch located on the left hand console of each cockpit. For external operation two OPEN-OFF-CLOSE switches, one for each canopy, are located underneath a toggle latch locked door on the left hand side of the arch dividing the two cockpits. An interlock circuit prevents the external switches from operating in opposition to the internal switches. A limit switch operated by the latch locking lever prevents power being fed to the actuator before the canopy is mechanically unlocked. 6. The de-icing system for the pilot's clear vision panel operates automatically when the master power switch is switched on. The temperature is thermostatically controlled at 43°C (110°F). 7. The canopy seals are inflated by the final movement of the latch locking lever which actuates a second limit switch located on a cam plate on the front upper face of the right hand half shell. Both canopies must be closed to inflate the seals. 			
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8. In an emergency, each canopy may be opened by the individual crew member by either of the following controls:

- (a) The ejection seat firing handle. Pulling this handle opens the canopy and after a one second delay, ejects the seat.
- (b) A control lever, marked EMERGENCY CANOPY OPEN. This lever is painted black and yellow in alternate diagonal stripes and is located forward and above the right knee of the crew member. Pulling this lever opens the canopy.

9. The canopies can also be opened from the outside, in an emergency, by a lanyard, located under a toggle latch locked door fitted externally on the right hand side of the aircraft, just forward of the engine air intake. Pulling outwards on the lanyard opens both of the canopies simultaneously.

NOTE

Ground personnel should stand clear of the aircraft when this lanyard is pulled.

Locking Mechanism

10. The pilot's canopy has five trunnion type latch pins on the upper edge of the left hand half shell and five mating latches on the upper edge of the right hand half shell. The navigator's canopy has a similar arrangement, but with only four mating latch pins and latches. The latches consist of sliding plates joined laterally by adjustable connecting rods. Each plate has a keyhole slot, the hole being of a size to permit passage of the head of the latch pin and the slot being of sufficient width to allow clearance on the shaft of the latch pin. A spring fitted over one of the connecting rods assists the backward movement of the latch plates to form a positive lock when the latch locking lever is pushed forward. This lever contains a spring-loaded plunger which rides on a cam plate. A pull on the knob of the locking lever withdraws the spring-loaded plunger from locking recesses in the cam plate, allowing the locking lever to be rotated through its quadrant and retained in any of three positions, as follows:

- (a) Canopy open.
- (b) Canopy closed, locked, and the OPEN-OFF-CLOSE switches isolated.
- (c) Canopy closed, locked, the OPEN-OFF-CLOSE switches isolated and the canopy seals inflated.

The final movement of the latch locking lever to the third position forms a geometric lock on a special two-piece front connecting rod.

Normal Operation

11. The canopy is unlocked by a downwards and backwards pull on the knob of the latch locking lever which moves the latches forward to the unlocked position. This movement also releases the canopy seal limit switch to deflate the canopy seal, and depresses the second limit switch to complete the electrical circuit to the OPEN-OFF-CLOSE switches.

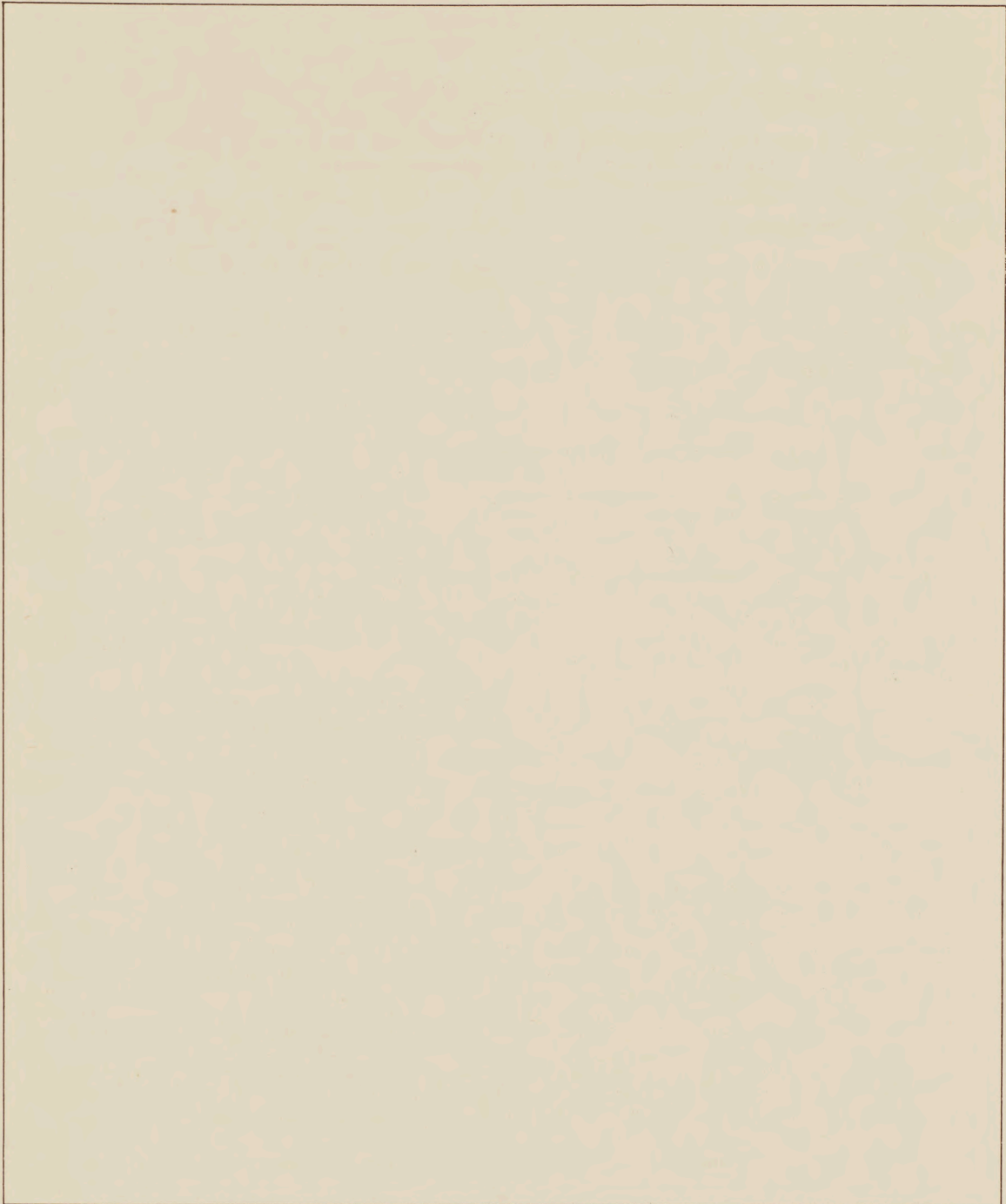
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SYSTEM DATA SHEET

SYSTEM	SUB-SYSTEM	AIRCRAFT EFFTY	REF. NO.
CANOPIES		25201	53
<p>12. Selection of the internal or external OPEN-OFF-CLOSE switch to OPEN operates the electrical screw jack which extends and opens the canopy.</p> <p>Emergency Operation</p> <p>13. The emergency operating mechanism of the canopies comprises the following components:</p> <ul style="list-style-type: none"> (a) A Martin-Baker cordite type cartridge and a firing mechanism. (b) A latch actuator jack and a bell-crank lever. (c) A canopy actuating mechanism actuator jack. (d) A spring-loaded, lock open hook. <p>14. Any one of the three canopy emergency opening methods as described in Paras 8 and 9 will cause the firing mechanism to operate. The gas generated by the firing of the cartridge in the firing mechanism, is piped to the latch actuator jack. The gas pressure causes a piston and striker rod in the jack to move upwards. The striker rod thrusts on the lower arm of a bell-crank lever, causing it to rotate. The upper arm of the bell-crank lever hits the striker plate on the rear face of the rearmost latch plate. This forces the linked latch plates forward and disengages them from the latch pins, thereby unlocking the canopy. The latch operating lever remains in its locked position during this operation.</p> <p>15. Full travel of the piston uncovers internal ports in the latch actuator jack and the remaining gas pressure is piped from the internal ports to the canopy actuating mechanism emergency jack. Extension of this jack causes the piston rod to rotate an idler lever which thrusts the left hand and right hand link rods outwards to open the canopy.</p> <p>16. The initial movement of the canopy shears the special pin which attaches the electrically operated screw jack to the left hand canopy half shell.</p> <p>17. In the emergency open position, the canopy is opened 2° further than in the normally open position. This additional 2° of opening allows a spring-loaded hook to engage behind a bushing on the idler lever. This hook retains the canopy in the open position and the additional opening causes a safety link device to disengage, which allows the ejection seat firing mechanism to operate one second after the ejection seat firing handle has been pulled.</p> <p>18. The emergency operation of the canopy operating mechanism is damped by venting the canopy actuating mechanism emergency jack to an oil filled recuperator. This recuperator is mounted just above the floor level on the right hand side of each cockpit rear bulkhead. During normal operation of the canopy, the canopy actuating mechanism emergency jack extends and retracts freely with the idler lever assembly.</p>			
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CF-105 SERVICE DATA
COMPONENT DATA SHEET

SYSTEM CANOPIES	SUB-SYSTEM	COMPONENT Canopy - Pilot	REF. NO. 53-1
AVRO PART NO. 7-1052-1, 2	MANUFACTURER Avro Aircraft	MAN'F'R'S PART NO.	AIRCRAFT EFFECTIVITY 25201
OVERHAUL LIFE: KNOWN-		ESTIMATED- 1500 hours	
FUNCTION To enclose the pilot's cockpit.			
LOCATION Above the pilot's cockpit.			
ACCESS Unobstructed accessibility.			MEN X MINUTES
REPLACEMENT PROCEDURE Position the LH canopy half shell and attach to the aircraft using 66 - 5/16 inch screws along the piano type hinge. Repeat the above for the RH canopy half shell. Connect the canopy seal pressure hoses to both of the half shells. Connect each link rod by a pip pin to its respective half shell. Connect the limit switch electrical leads to the terminal block mounted on the longeron beneath the rear end of the RH half shell. Connect the electrical leads of the de-icing elements to their terminal strip. Clip all electrical leads where necessary. Connect the electric screw jack to the LH half shell using the special shear pin. Attach the canopy actuating mechanism emergency jack to the RH canopy half shell. Insert the cartridge into the firing mechanism.			MEN X MINUTES

INSPECTION							MEN X MINUTES	
Check the operation of the canopy from the switch inside and outside of the aircraft. Check the glass for cracks, check the seal and check the operation of the latches. Check the electric jack, the idler lever, the link rods, and the actuating mechanism emergency jack for attachment. Check the operation of the electric jack, the seals, and the glass heating elements and the limit switches. Check the emergency lanyard and the cable run for serviceability. Change the emergency cartridge if its life has expired. Carry out a pressurization check.								
FUNCTIONAL CHECKS							MEN X MINUTES	
GROUND HANDLING AND GROUND TEST EQUIPMENT								
Electrical ground power unit. Cockpit pressurization test rig. Cockpit access stand.								
SPECIAL TOOLS TO REMOVE OR SERVICE								
REMARKS								
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COMPONENT DATA SHEET

SYSTEM CANOPIES	SUB-SYSTEM	COMPONENT Canopy - Navigator	REF. NO. 53-2
AVRO PART NO. 7-1052-3, 4	MANUFACTURER Avro Aircraft	MAN'ER'S PART NO.	AIRCRAFT EFFECTIVITY 25201
OVERHAUL LIFE: KNOWN-		ESTIMATED- 1500 hours	
FUNCTION To enclose the navigator's cockpit.			
LOCATION Above the navigator's cockpit.			
ACCESS Unobstructed accessibility..			MEN X MINUTES
REPLACEMENT PROCEDURE Position the LH canopy half shell and attach to the aircraft using 56 - 5/16 inch screws along the piano type hinge. Repeat the above for the RH canopy half shell. Connect the canopy seal pressure hoses to both of the half shells. Connect each link rod by a pip pin to its respective half shell. Connect the limit switch electrical leads to the terminal block mounted on the longeron beneath the rear end of the RH half shell. Clip the electrical leads where necessary. Connect the electric screw jack to the LH half shell using the special shear pin. Attach the canopy actuating mechanism emergency jack to the RH canopy half shell. Insert the cartridge into the firing mechanism.			MEN X MINUTES

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INSPECTION		MEN X MINUTES	
<p>Check the operation of the canopy from the switches inside and outside of the aircraft.</p> <p>Check the glass for cracks, check the seal and check the operation of the latches.</p> <p>Check the electric jack, the idler lever, the link rods and the actuating mechanism emergency jack for attachment.</p> <p>Check the operation of the electric jack, the seals and the limit switches.</p> <p>Check the emergency lanyard and the cable run for serviceability.</p> <p>Change the emergency cartridge if its life has expired.</p> <p>Carry out a pressurization check.</p>			
FUNCTIONAL CHECKS		MEN X MINUTES	
GROUND HANDLING AND GROUND TEST EQUIPMENT			
<p>Electrical ground power unit.</p> <p>Cockpit pressurization test rig.</p> <p>Cockpit access stand.</p>			
SPECIAL TOOLS TO REMOVE OR SERVICE			
REMARKS			
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