GROUND TEST INSTRUCTIONS

SECTION 12

HOOD INSTALLATION

LIST OF CONTENTS

SECTION 12

HOOD INSTALLATION

PART 1

DRY – AIR – SANDWICH WINDSCREEN LEAK TEST

I.D. INSTRUCTION H18/1 (Issue 2)

1. WINDSCREEN LEAK TEST UNDER SUCTION

For this test Valve No.3 should be closed and Valves 1, 2 and 5 open. Open Valve No.4 and adjust inlet pressure to air ejector to about 8 lb./sq.in. Now close Valve No.1 until a suction of ½ lb./sq.in. (13.8 I.W.G.) is obtained in the windscreen. Check for leaks around all joints and seal as required. The air sandwich must ultimately be made to hold a suction of ½ lb./sq.in. (13.8 I.W.G.) and not drop below 3/8 lb./sq.in. (10.4 I.W.G.) after a period of 10 minutes.

If the above test is unsatisfactory and a good seal cannot be obtained then the following should be carried out.

2. LEAK TEST UNDER PRESSURE

Close Valves 2 and 4, and open pet cock 5. Adjust Valves 1 and 3 to obtain a pressure of ½ lb./sq.in. in the windscreeen, (relief valve will prevent excessive pressure rise). Check for leaks around edges with soap and water and seal as required.

Having obtained a satisfactory seal by this means a final suction check must be carried out as called for in 1.

Note . . .

For accurate recording of pressures or suctions a water manometer may be used in lieu of a pressure gauge.

SECTION 12

HOOD INSTALLATION

PART 2

HOOD JETTISON AND LOCKING MECHANISMS
(Two Seat A/C)

I.D. INSTRUCTION H18/2 (Issue 7)

1. APPLICABILITY

This instruction covers aircraft incorporating modifications H.507 (or 718 or 2373 or 2383 or 2489 or 2500), 711, 735, 756, 778, 780, 789, 801, 806, (or 2392), 813, 838, 869 and 911.

2. ADJUSTMENTS

Ensure that all parts are correctly lubricated before carrying out adjustments. On completion of each item of adjustment, check the mechanism concerned for freedom of movement.

(i) With hood and fairing door removed, disconnect connecting rods A.218129 at lower ends. Check operation of Spring Release Unit; fit to aircraft and attach upper eye-end to jettison shaft lever. Load release unit to Drg.No. E.231376 and tie handle temporarily in loaded position.

(ii) Fit microswitch to Hood Locking Jack and set as follows:—

(a) Unscrew microswitch attachment bracket to bring switch clear.

(b) Using handpump, fully retract jack and check that jack internal locking sleeve is fully engaged (listen for 'click').

(c) Fit lamp to microswitch terminals and screw up microswitch attachment bracket until switch is just operated by jack microswitch lever. Move microswitch further into engagement to give between 0.01 in. to 0.04 in. switch depression beyond the tripping point, using the special gauge Pt.No. C.235557.

(d) Secure microswitch and attachment bracket and check operation to Drg. No. C.228720. Disconnect pump and lamp.

(iii) Disconnect the connecting rods F.210402 and A.210041 at rear hood locks. Set nominal 35^{o} angle on the torque shaft B.210168 as shown on Drg.No. E.231376. Adjust the length of the locking jack to suit this position and attach.

(iv) Disconnect lower toggle links at all side locks from levers A.210212 and tie toggles clear of latches. Disconnect connecting rod A.211173 from front lock.

Remove plugs from inspection holes in longeron sides, move hood latches to unlocked position and fit setting jig T.402349.

2. ADJUSTMENTS (Contd).

(v) Raise latches A.210150 by hand to contact the jig pivot and check that top face of pivot has a minimum clearance of 0.10".

(vi) Check that side lock rollers are all clear of hooks and raise jig to bring front top fingers into a fair line with windscreen arch top using 0.250" packing provided between finger and arch to check contour. Adjust shims F.219967, F.219760 and F.216574 at front lock on windscreen arch so that front hook is just in contact with the top of the jig pin with 0.10" nominal gap between the aft face of the pin and the hook.

(vii) Adjust shims F.219968 at front lock to give correct gap between aft face of jig pin and hook with toggle links at dead centre.

(viii) Release hook and remove 0.25" additional packing. Set 0.100" gap between hood butt line and checking face on jig at port forward position. Check that, at remaining three positions, gaps are within 0.090" to 0.150": check gaps between windscreen and checking fingers are between 0.150" and 0.250".

(ix) Set housing blocks transversely central about their jig locating spigots by adjusting shims F.230878, F.216574 and F.232700 (See Drg.No. E.232768 or E.233786) and secure. Insert temporary packing to fix jig transversely.

(x) Adjust shims F.209864 at bearing block B.209858 of each side lock. With 0.050" gap between the aft face of the roller and the vertical hook reference face, check the gap between the horizontal reference face and the top of the sliding finger, when its bottom is in contact with the top of the roller.

The gap should be 0.090" to 0.120", if the gap between the jig checking face and the hood butt line is less than 0.100". If it exceeds 0.100", then the lock gap should lie between 0.080" and 0.120".

(xi) Check the clearance between theroller levers and the jig hooks and adjust bearing blocks transversely if necessary.

(xii) Reconnect toggle links and adjust shims F.211139 at each side lock, with toggle links at dead centre, to give 0.04" to 0.06" clearance between rear of roller and jig hook vertical reference face. Secure nuts. Move all locks to open position and remove jig. Remove packing from spigot housings.

(xiii) Keeping locking jack in locked position adjust connecting rods F.210402 to hold rear lock toggles at dead centre or with centre bolt not more than 0.050" forward of it, and connect. Backlash should be taken up aft.

(xiv) Similarly adjust connecting rods A.210041 and connect to front side lock toggles.

(xv) Adjust connecting rod (A.211173) length to 36.3" (nominal value) and attach to front lock toggle link. Take up backlash aft and adjust lengths of Teleflex cables to suit forward side links and lever A.212037 with starboard front lock at locked position and front lock toggle links at dead centre.

(xvi) Adjust shims at hood 'up' sequence valve to Drg.No. B.211996.

2. ADJUSTMENTS (Contd).

(xvii) Connect hand-pump supply to hood lock jack and operate jack to check smoothness of operation and repeatability of lock settings. Leave mechanism in fully unlocked position.

(xviii) Adjust locating spigots on hood to Drg.No. E.232768 (or E.233786), using jig T.413147 and 8. Fit hood, less fairing door, to aircraft. Close by hand and check that all lock rollers clear hooks. Check hood contact points in static position. Adjust bearing plate shims so that outer rollers on hood hinge bracket make contact with bearing plate F.210034 (See Drg.No. 219298).

(xix) Adjust connecting rods A.218129 to bring latches A.210150 within 0.02" of forward face of hood pivot, and secure. The backlash should be taken up by pushing down on the lever at the top of the release unit. See drg.No. E.231376.

(xx) Fit 0.05" (nominal) temporary packing between forward ends of hood side members and longerons to bring hood sides to flight position.

(xxi) Ensure hood operating jack is fully closed and adjust fork end so that it touches the rear face of the centre roller on the hinge bracket.

(xxii) Connect hydraulic hand-pump to hood operating jack, and adjust hood operating jack sequence valve to Drg.No. B.212990.

(xxiii) Move locking jack slowly to fully locked position. Check that lock rollers clear hook noses. Check that side lock rollers are just in contact with upper faces of hooks and that horizontal clearances and toggle positions are maintained. Check that side lock levers are centralised transversely about hooks.

(xxiv) Raise centre of hood front arch by hand until front lock roller and hook are in vertical contact. Check hood is in a fair line with windscreen arch. Lower hood and check the horizontal gap between front hook and roller and that front lock toggles are at dead centre.

(xxv) Move locking jack to unlocked position and check that rear latch rollers clear hooks on opening hood. If necessary, adjust rear connecting rods and toggles within limits given by Drg.No. E.219298. Check front locks and similarly readjust, if necessary.

(xxvi) Using hand-pump, operate locking jack and check linkage for smoothness of operation. Remove packing and check that in the locked position hood lock rollers clear hooks. Replace packing.

(xxvii) Adjust connecting rod A.218069 to give correct clearances between roller and operating jack hook and body. Check that hook can be moved easily by hand in this condition. See Drg.No. E.231376.

(xxviii) Adjust de-seal valve control rod, A.213058, to Drg.No. E.231376.

(xxix) Blank off accumulator line, connect up hood hydraulic system and bleed.

(xxx) Connect 28 V. electrical supply by changeover switch to Hydel selector valve. Connect indicator lamps to all hood microswitches. See Drg.No. C.228720.

2. ADJUSTMENTS (Contd).

(xxxi) Fit hand-pump to pressure line (No.29) and check hood and lock operation.

(xxxii) Close hood and, with hood lock jack fully retracted and locked using 2,800 p.s.i. pressure, set torque shaft Dowmic switch to Drg.No. C.228720.

(xxxiii) With the hood closed, hood locks fully locked and hood lock jack fully bottomed adjust the plunger of the hydraulic 'open circuit' sequence valve as shown on Drg. A.231427.

(xxxiv) Set microswitches on forward port side lock and forward top lock to Drg.No.C.228720.

(xxxv) Select hood open and using hand-pump, check that microswitches disengage correctly.

(xxxvi) Fit hood locking gear casings to cockpit sides.

(xxxvii) Attach hood fairing door to hood. Adjust shims on hood fairing door catches F.218702–3 to give correct clearance between bottom of distance tube on roller bracket B.218946 and catches. See Drg.No. E.219298.

(xxxviii) Adjust hood seal connection to Drg.No. E.219298.

(xxxix) Adjust hood strut and check to Drg.No. C.231510.

(xl) Operate hood and check for smooth operation of hood, fairing door and locks. Paint dots on casing windows and front lock indicator arrow.

(xli) Disconnect external supplies, charge accumulator and reconnect.

(xlii) Complete electrical circuitry.

(xliii) Remove temporary packing between forward ends of hood side members and longerons. Replace plugs in inspection holes in longerons.

(xliv) Ensure Martin-Baker Firing Unit is unloaded. Adjust connecting rod F.215738 to suit mating levers with Release Unit correctly loaded and Firing Unit fully locked (see Drg.No.231376) and attach.

(xlv) Ensure that the muzzles of the hood jettison guns are clean and free from paint and swarf.

INSTALLATION TESTS

3. FUNCTIONING TEST OF HOOD CLOSE CUT–OUT RELAY

The aircraft should be tested with the hydraulic system serviceable, port ejection seat removed, and starboard ejection seat guns unloaded. A hydraulic rig (SE.599) and 28 volt electrical supply should be connected, using an SE.1437 adaptor to supply on to the aircraft battery leads. An avometer will be required.

(i) Remove the terminal cover from the cut-out relay, type 9B No. 2A.

(ii) Run hydraulic pump in 1st (high speed) gear. With battery master switch OFF, use the internal hood control switch to close the hood, whilst holding the negative probe from the Avometer (set to 100 V. range) on terminal 3 and the Avometer positive probe on terminal 4 of the cut-out relay. After approximately 3 to 6 sec. delay the hood will commence to close and the Avometer will show a voltage reading equivalent to the external supply.

Note . . .

If a reading is not shown release the hood control switch to avoid damage to the delay unit.

INSTALLATION TESTS

3. FUNCTIONING TEST OF HOOD CLOSE CUT–OUT RELAY (Contd).

(iii) Apply the negative probe to terminal 5 and the positive probe to terminal 6 of the cut-out relay with the Avometer still set to 100 volts range, with the hood closed or closing and hood shut selected on the internal hood control switch. No reading should be apparent on the Avometer.

Note . . .

The tests (ii) and (iii) check that the cut-out relay has broken contact between terminals 3 and 4 and made contact between terminals 5 and 6.

(iv) Open the hood by using the pilot's control switch.

(v) Refit the terminal cover removed from the cut-out relay.

INSTALLATION TESTS

4. NORMAL OPERATION

The aircraft should be on jacks, with all hydraulic circuits serviceable, accumulators correctly charged and seats fitted. The seat ejection guns should be unloaded. A hydraulic rig (SE.599) and 28 volt electrical supply should be connected, using a SE.1437 adaptor to supply on to aircraft battery leads. Hood seal to be inflated as required using footpump. An SE.58JD rig (with adaptor ref.10) will be required for testing hood jettison gun system. The plugs should be removed from the longeron inspection holes to permit checking of hood locking.

(i) Run pump in 1st (high speed) gear. With battery master switch OFF, use internal hood control switch to close hood. Check that warning horn blows on selecting hood SHUT and that, after a 3 to 6 second delay (on first operation only when Mod. H.756 is incorporated), hood starts to close. Check hood shuts smoothly in 4 to 6 seconds and that horn blows throughout movement. Check hood fairing door and locks for correct functioning. Check that the hood lock warning lights show green. Check when the control switch is released that the hood lock warning light goes out.

(ii) Select battery master switch ON and check that cockpit indicator lamp shows 'green' with hood locked shut and undercarriage down. Select undercarriage UP and check that the hood warning light goes out. Hold the hood override switch to open and check visually that the hood control valve shut solenoid is not energised. Select SHUT on pilot's hood control switch and check visually that the shut solenoid is energised. Release the override and pilot's control switches. Select undercarriage DOWN and check that the hood lock warning light shows green. Select battery master switch to OFF.

(iii) Reduce electrical supply to 24 volts.

INSTALLATION TESTS

4. NORMAL OPERATION (Contd).

(iv) Use internal hood control switch to open hood. Check that there is a delay of 3 to 7 seconds on first hood opening. Check that hood opens smoothly in 4 to 7 seconds. Check hood fairing door and locks for correct functioning.

(v) Repeat 3(i) (ii) & (iv) four times using 28 volt supply throughout.
Note . . .
delay times may have shortened.

(vi) Inflate hood seal and check lock roller engagements. Select battery master switch ON: select OPEN on internal hood control switch and check that seal deflates and hood remains locked shut. Check that hood cannot be opened by external control switch with battery master switch ON.

(vii) After a 10 minute rest period (to allow time delay units to cool) select battery master switch OFF and repeat 3(i) (ii) & (iv) five times using external hood control switch and 28 volt supply throughout. Before the fifth check inflate hood seal; check that it deflates on selecting hood open.

(viii) After a ten minute rest; check battery master switch OFF, close hood on pilot's switch; release switch to stop hood 4 to 5 in. open, measured at front arch top. Move the battery master switch to ON and check that the horn does not blow, hood shuts and locks and the green light comes on.

(ix) Hold hood override switch at OPEN, and check that hood opens and closes, using internal hood control switch. Partially open hood, lower hood strut manually and check hood lowering and raising. Stow hood strut and close hood. Release test and override switches.

(x) With battery master switch ON, select undercarriage UP and check that hood inciator green light goes out.

(xi) Run pump in 3rd gear and cycle flying controls in power while operating undercarriage, airbrake and flaps. Check that hood remains locked shut, and that there is no movement of the hood lock toggles.

(xii) Stop pump and check hood remains locked. Move battery master switch to OFF and check operation of hood on hydraulic accumulator supply. Record number of operations to exhaust accumulator, with 2 minute intervals between operations: the hood should complete the cycle (unlock, open, shut and lock) swice and finally unlock.

(xiii) Recharge accumulator and check that hood may be stopped smoothly in mid-movement.

Do not operate time delays more than five times successively without allowing to cool.

5. JETTISON MECHANISM TESTS

The operating load in every jettison test, except when using handle on release unit, is not to exceed 50 lb.

(i) Ensure firing unit is unloaded and cocked and that spring release unit is correctly loaded. Remove release handle restraint. Close and lock hood and, using a spring balance, check the load required to operate the centre hood jettison handle. Check the mechanism for correct operation. Reset mechanism and check hood locks.

(ii) Remove pip-pin at firing unit and check load and operation using handle on release unit. The load is not to exceed 8 lb. Reset mechanism and replace pip-pin; check hood locks.

(iii) Fit hood restraint and inflate hood seal. Check load and operation using external control. Repeat this test for a total of 3 successive operations. Finally reset mechanism but do not fit hood.

(iv) Check load and operation using port seat hood blind handle. Check that rotation of shaft frees blind cable attachment from both seats.

(v) Reset mechanism and repeat C.(iv) above using starboard seat handle.

(vi) Remove pip-pin at firing unit sear. Remove firing unit breech member and fit SE.58 adaptor and rig. Fit gun piston restraining clamps. Set rig pressure controller to 90 p.s.i.

(vii) Open hand valve sharply to apply air pressure to jettison gun system and check that both gun pistons rise. Release pressure and replace pistons.

(viii) Remove rig and re-attach gun breech and linkage. Reset jettison mechanism and refit release handle safety pin. Refit hood.

(ix) On completion of all tests close and lock hood: check that latch rollers are correctly positioned in hood hooks. Replace inspection plugs in longerons.

(x) Disconnect rig and electrics.

Note . . .

Whenever resetting mechanism, remove pip-pin from the upper fork-end of connecting rod F.215738. Cock firing unit. Load release unit to Drg.No. E.231376, and check that final position of nut permits easy replacement of pip-pin.