Appendix 2

HEIGHT LOCK TRANSDUCER, TYPE A, Ref. No. 6A/5935

SERVICING

FAULT DIAGNOSIS

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Introduction

1. This appendix discusses the method of fault diagnosis for the height lock transducer, Type A, Ref. No. 6A/5935. The diagnosis investigates the faults to the depth of second line servicing which is, in general, limited to locating the faulty component and replacing it with a serviceable one. The transducer is to be rejected as unserviceable however, if the fault lies in the capsule unit or gear train. The tests and adjustments for the height lock transducer are described in App. 3 to Chapter 3 and the removal and replacement of components in App. 4.

2. The first step in fault diagnosis is to locate the faulty section of the transducer. This may be achieved by subjecting the transducer to the S.S.T. (App. 1), since each test which is satisfied will eliminate that section of the transducer which is associated with that test; converseley, a test which fails will point to the section to be investigated. When the transducer fails a test, one of the following symptoms may be experienced

and this symptom used to determine the likely cause of the failure:—

(1) Servomechanism does not drive.

(2) Servo run away.

(3) Sluggish servo follow-up.

(4) Erratic servo follow-up.

(5) Failure of the servo system to null.

(6) Incorrect height lock output for both increasing or decreasing heights, or one direction only.

(7) No height lock output.

3. When fault tracing, look for the straight forward simple faults first before carrying out detailed electrical checks. For example, if the servomechanism fails to drive, first check to see if the motor pinion is loose on the motor spindle allowing the motor only to rotate. If satisfactory, check the gear train for damage, and then the supplies to the motor. If all are correct a check on the capsule unit and servo amplifier may then be made. Should the serviceability of a component be suspected, the supplies and wiring to the suspect component must be checked, and the continuity and resistance of wiring within the component tested before removal, to avoid mistakenly removing a serviceable component.

4. When the fault has been rectified the associated test which faulted the transducer is to be repeated. If this test is now satisfactory the transducer is to be subjected to the complete S.S.T. If the test is still incorrect, the next stage in the diagnosis is to be investigated. This progression is to be continued until either the transducer is repaired or a point is reached beyond which the depth of servicing allows no further investigation and the unit is rejected as unserviceable.

5. The failure of each test on the transducer is discussed in turn in the following paragraphs, which are supplemented by Table 1 to simplify fault tracing. Listed in the table are the symptoms most likely to be encountered and the possible faulty component.

Visual examination

6. Visual examination of the transducer will reveal the obvious physical faults such as defects in or damage to the gear train, broken or loose connections, and overheated or damaged components. Loose clamps of the gear train may be torque tightened in accordance with Table 1, Appendix 4, with the exception of the clamp holding the sector on the capsule spindle and the clamp serving to adjust the slip clutch. If the latter clamps are loose, or if the gear train is found to be damaged, the transducer is to be rejected.

Wiring checks

7. Failure of the transducer to satisfy the resistance or continuity tests is most likely to be due to the open circuit or short circuit type of fault. Should the checks have been preceded by fault rectification however, a check on the reconnections must be made. The wiring checks on plug HL1 are detailed in App. 3, Tests and Adjustments.

Leak test

8. Failure of the leak test is most likely to be caused by a faulty rubber 'O' ring sealing the capsule unit, or a leak through a base terminal seal. The transducer must be rejected for either fault.

Range test

9. Should the servo system fail to stabilize at the selected heights, a check on the capsule null output should be made in accordance with the relevant test of the S.S.T. If the capsule unit is satisfactory the cause may be the velocity feedback resistor RV3 or R6.

Servo follow-up tests

10. If the servo system makes more than one overshoot and one undershoot before coming to rest the velocity feedback resistor RV3 or R6 should be suspected. Should the servo system stabilize correctly but take more than 35 seconds to come to rest consult Table 1 for checks on possible servo fault.

Height lock output tests

11. A faulty capsule unit is most likely to be the cause of an incorrect height lock output. The symptom experienced whilst testing however, and the resultant graph plotted from the output readings will indicate the type of fault, i.e. all outputs incorrect, or incorrect in one direction only, and reference to Table 1 will give alternative checks to be made. If the oscilloscope check shows that the output is more than 20° out of phase with the reference voltage, check the coupling capacitors of the buffer amplifier and C1.

Hysteresis test

12. This test provides a check on the hysteresis of the capsule and loss of movement in the linkage system. Therefore, a faulty capsule unit should be suspected if this test is not satisfactory, and the transducer rejected.

Discrimination test

13. Failure of the transducer to discriminate between the applied pressures would indicate the lack of sensitivity of the capsule unit and the transducer must be rejected.

TABLE 1

Height lock transducer, Type A — fault tracing

	Capsule unit	Servo amplifier	Motor tachogen-erator	Velocity feed-back resistor RV3	Gear train	Relays	Buffer amplifier	Probable faults
Servomechanism does not drive	X	X	X		X	X		
Erratic servo follow-up	X		X	X	X			
Sluggish servo follow-up	X	X	X	X	X			
Hunting around null	X			X				
Servo run away	X	X			X			
No height lock output	X					X	X	
All outputs incorrect	X						X	
Output correct in one direction only	X (see probable faults column)							Adjustment of RV1 and RV5 may be necessary