Appendix 2

STATIC TRANSDUCER, TYPE B, Ref. No. 6A/6434

SERVICING

FAULT DIAGNOSIS

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General

1. The majority of faults on equipment occur in service and many of them may have more than one cause: some reported faults may not be apparent when subject to test. As a first step to fault diagnosis, the standard serviceability test (Appendix 1) should be carried out. If the fault then becomes apparent but cannot be located reference must be made to Appendix 3 (tests and adjustments) and Appendix 4 (removal and replacement of components).

2. When a suspect transducer is subjected to the standard serviceability test (Appendix 1) one or more of the following symptoms may be exhibited:—

(1) Erratic follow-up.

(2) Sluggish follow-up.

(3) Hunting around the null.

(4) Incorrect G1 readings of one function.

(5) Incorrect G1 readings of more than one function.

(6) Incorrect G1 readings of all functions.

(7) No change in G1 readings irrespective of the value of applied static pressure.

(8) Correct G1 readings in one direction, but incorrect in the other direction of applied pressure.

(9) Servo run away.

3. Faults are cleared by either the adjustment or replacement of the component(s) concerned. A fault due to a component not held in the second line range of spares will result in the transducer being declared unserviceable. If the same fault exists after a suspect item is changed then the original item is to be replaced into the transducer and the next stage in the sequence investigated. Fault diagnosis is to continue until either the transducer is repaired, or a point is reached beyond which the level of servicing authorized permits no further investigation: at this stage, the transducer is to be declared unserviceable.

4. When a suspect sub-unit or component is replaced, the standard serviceability test is to be repeated, to ensure that only this component is at fault.

Gear train checks

5. The gear train is to be examined in order to determine:—

(1) Whether any gear is damaged—broken teeth, distorted gear, etc.

(2) That all split clamps are tightened to the correct torque loading (Table 1), with the two halves of the clamp symmetrically placed on the collar.

(3) That there is no undue backlash throughout the gear train.

6. If any gears are damaged, or if either of the split clamps securing the sector (axis 10) or the 76T gear (axis 6a) (Appendix 3, fig. 1) is loose, or backlash is considered exceptional, declare the transducer unserviceable. If other split clamps are loose, they are to be tightened, but before tightening those associated with CX1, CX2 or RV3 carry out the appropriate setting-up test as detailed in Appendix 3. The standard serviceability test is to be carried out when any adjustment is made to the gear train.

Slip clutch (post-mod. ADS/38)

7. If the split clamp of the slip clutch on axis 3 is loose, it should be tightened to the correct torque loading in such a position that when a gramme gauge is inserted in one of the holes of the 200T gear of axis 2 then:—

(1) The force required to turn the gear train does not exceed 7 gm.

(2) If the 135T gear of axis 4 is held to prevent it moving the force required to slip the clutch does not exceed 12 gm.

Cam CU1A

8. The CU1A mechanism is to be examined to ensure that at zero feet pressure, the cam follower is resting at a point approximately $\frac{1}{8}$ in. clockwise (when viewed from the top) of the small "dip" in the cam profile. If the cam follower is incorrectly situated, refer to Appendix 3 (adjustment of CU1A cam follower).

Wiring checks

9. Continuity tests are given in Appendix 1, para. 13. Should these fail, the transducer should be disconnected from all test equipment and the following checks be made:—

(1) That each pin on plugs ST1 and ST2 is connected to the relevant point(s) as shown on the circuit diagram (Chap. 11) and the resistance across such a connection in each case does not exceed 0·2 ohm.

(2) That all soldered connections are mechanically sound and that adequate clearance exists between adjacent terminals.

(3) That the resistance between each pin on plugs ST1 and ST2 and the chassis of the transducer is in each case greater than 10M. Use the insulation tester Ref. No. 5G/1621 for this test.

10. It is assumed that all supplies are correct at plug ST2, as these are supplied by the test set, Type 9B. However, should a sub-unit or output component be suspect, then the voltage supplies at the sub-unit or output component should be checked before deciding on a replacement. Tolerances are given in Appendix 1, Table 2.

11. Should any test of para. 9 or 10 be incorrect, then a wiring fault exists and the transducer is to be declared unserviceable.

Leak test

12. Failure of this test will be due to faulty capsule unit "0" rings or sealed connections and the unit is to be declared unserviceable.

Ranging tests

13. Should any of these tests fail, the most likely cause will be:—

(1) Capsule unit at fault.

(2) Incorrect sensitivity due to an unbalanced pick off bridge (RV5) in units pre-mod. ADS/75 or a maladjusted RV103 in units post-mod. ADS/75.

(3) Incorrect adjustment of RV102 (DATUM ADJUST) and/or RV104 (SEA LEVEL TEMPERATURE CORRECTION) in units post-mod. ADS/75.

(4) Gearing fault.

(5) Faulty output component.

(6) Faulty servo amplifier.

(7) Wiring fault.

14. Table 2 gives a list of fault symptoms (col. (b)), the probable cause of the fault (col. (c)) and the immediate action to be taken (col. (d)). Whatever action is taken, the relevant instructions contained in para. 3 and 4 are to be implemented.

Servo follow-up test

15. Should this test fail, refer to para. 14.

TABLE 1

Split clamp loading torques

Item (a)	Size of clamp screw (b)	Mild steel torque (c)	High tensile stainless steel torque (d)
1	12BA	0·645 kgm.cm	0·850 kgm.cm
2	10BA	1·230 kgm.cm	1·900 kgm.cm.
3	8BA	3·125 kgm.cm	6·000 kgm.cm
4	6BA	3·750 kgm.cm	

TABLE 2

Fault tracing

Item (a)	Symptom (b)	Probable cause (c)	Action to be taken (d)
1	Erratic follow-up	Pre-mod. ADS/75 units RV1 requires adjustment or C1 requires replacement	Appendix 3, para. 10 and para. 13
2	Sluggish follow-up		
3	Hunting	Post-mod. ADS/75 units R7 requires changing	Appendix 3, para. 12
4	One output incorrect	(a) Faulty output component	(a) Carry out relevant component checks in Appendix 3
		(b) If log S—incorrect setting of CU1A cam follower	(b) See para. 8
		(c) Component clamps loose	(c) As for Item 4(a)
5	More than one output incorrect	(a) Faulty common gear	(a) Carry out checks of para. 5 and 6
		(b) Faulty output component	(b) As for Item 4
6	All outputs incorrect	(a) Pre-mod. ADS/75 units RV5 requires adjustment	(a) Carry out test of Appendix 3, para. 8
		(b) Post-mod. ADS/75 units RV103 requires adjustment	(b) Carry out test of Appendix 3, para. 12
		(c) Faulty servo amplifier	(c) Carry out servo amp. check of Appendix 3
		(d) Faulty capsule unit	(d) Declare unit unserviceable
		(e) Faulty gearing	(e) Carry out checks of para. 5 and 6
		(f) Wiring fault	(f) Carry out checks of para. 9, 10 and 11
7	G1 does not change as applied pressure is varied (i.e. no output)	(a) Faulty capsule unit	(a) As for Item 6(d)
		(b) Faulty servo amplifier	(b) As for Item 6(c)
		(c) Wiring fault	(c) As for Item 6(f)
8	G1 readings correct in one direction only	(a) Faulty capsule unit	Declare unit unserviceable
		(b) Backlash in gears	
9	Servo run away	(a) Faulty capsule unit	(a) As for Item 6(d)
		(b) Faulty servo amplifier	(b) As for Item 6(c)
		(c) Faulty gearing	(c) As for Item 6(e)
		(d) Wiring fault	(d) As for Item 6(f)

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