OVERHAUL MANUAL

MODEL S.64 FORM 3 - INDICATOR - TEMPERATURE

VARIANTS

S.64.3.361
S.64.3.363

SANGAMO WESTON LIMITED

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This Manual complies with British Civil Airworthiness Requirements, Chapter A6-2. The technical accuracy of this manual has been verified and is certified correct.

Signed. A.P. Rebeiro

Date. 30th October, 1969

A.R.B. Design Approval No. AD/1147/47

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REVISION RECORD SHEET

The introduction of any amendment or revision not certified in accordance with British Civil Airworthiness Requirements Chapter A6-2 will invalidate the statement of certification on Page 2.
Amendments or revisions embodied in this manual, which have been certified under an approval authorisation other than that applicable to the initial certification must be recorded on separate record sheets.

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ILLUSTRATIONS

A. Description

Model S.64 Form 3 is basically a d.c. permanent magnet moving coil indicator adjusted as a millivoltmeter and designed for use in conjunction with a thermocouple, as a temperature indicator. A bimetal volute is an integral part of the design and this compensates for change in circuit e.m.f., caused by changes in ambient temperature. Nickel-steel temperature compensators, which are secured to the magnet system, compensate for errors due to the temperature coefficient of the circuit resistance. Final adjustment of the indicator can be facilitated by use of an adjustable magnet shunt. The indicator is normally used with a 2, 8 or 25 ohms external circuit resistance and this information is printed on the scale face. The indicator is housed in a moulded, small S.A.E. case embodying, at the rear, a moulded terminal block for connection to external wiring systems; the positive terminal is made of brass and the negative terminal of copper-nickel alloy. A red spot and a + sign on the magnetic shield denote the positive terminal.

Detail

The moving element (46) consists of a coil, often of aluminium, which is either frameless or is wound on an aluminium frame. The ends of the coil are soldered to pivot bases which are cemented to the outer layers of the coil; the assembly is completed by the control springs, pivots and the pointer with its balance weights attached. The moving element is pivoted between adjustable jewelled bearings which are inset in the top and bottom bridges (30) and (34). The coil of the moving element swings in the gap between a core (45) and the pole piece assembly (24). The bimetal volute is attached to bridge assembly (28) and the outer end of the volute is secured to one end of a rotary abutment which forms an integral part of top bridge (30); the outer end of the top control spring is secured to the other end of the abutment. The top bridge is secured to studs on the pole piece assembly (24) with bridge pillars (29); bridge (28) locates on the top of pillars (29) and is secured with screws (26).

The pole piece assembly is secured to the base by two screws which engage in threaded mounting pillars and also by two nuts and lockwashers secured to threaded studs. The studs are positioned in the lower part of the base and fit into grooves in the sides of the permanent magnet (25) in order to retain the latter in its correct position between the pole piece assembly (24) and the base (47). The magnet shunt (39), temperature compensators (42), (43), (44) and the spacer (40) are secured to the assembly by the screw (41) which passes through the core (45). The nut (36), lockwasher (37) and washer (38) used to secure the core screw are slackened to allow adjustment of the magnet shunt (39).

An appropriately calibrated scale (15) is mounted on a shield plate (16) and is secured by two screws (12) to two tapped pillars on the pole piece assembly plate; the two screws also secure the two pointer stops (14) A terminal block, integral with the base (47) is fitted with two terminal screws with captive washers (48). The base is secured in the cover assembly by two countersunk screws (6) and a sealing screw (1). The adjusting screw of the pointer zero adjuster (11) incorporated is captive in the cover beneath the cover glass and is retained in position by a spring. A magnetic shield (5) is fitted over the rear of the indicator and is secured by three screws (3).

B. Operation

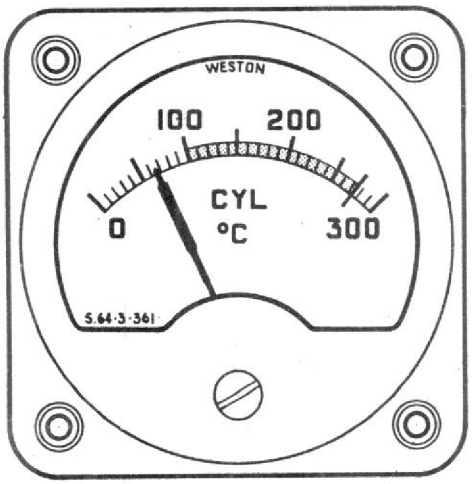
The indicator operates as a normal d.c. moving coil millivoltmeter; the pointer deflection is proportional to the thermocouple e.m.f. input applied. The outer end of the bimetal volute used for compensation engages with the outer end of the top control spring of the moving element. A change in ambient temperature will cause the bimetal volute to move the free end of the control spring and consequently, the pointer. The torque ratio of the control springs and the torque of the bimetal volute are arranged to compensate for the loss or gain of thermal e.m.f. generated by the couple formed at the joint where the copper/nickel wire is connected to the copper wire of the moving coil. An increase in ambient temperature increases this e.m.f. which causes a current to flow in the opposite direction to the current produced by the external thermocouple's output with the result that the pointer would tend (when no compensation is provided) to indicate a figure below the true value of the external thermocouple temperature. The bimetal volute, however, is also affected by the change in ambient temperature and the end of the volute moves to compensate for this loss and the pointer thus indicates the true value of the external thermocouple temperature.

The variations in circuit resistance, caused by changes in ambient temperature, are compensated by changes of the permeability of the nickel-steel temperature compensators (43) and (44). An increase in ambient temperature increases the resistance of the coil of the moving element (46) which causes a decrease of the current in the circuit. However, the increase in ambient temperature also causes a decrease in the permeability of the nickel-steel temperature compensators (43) and (44) and consequently the magnetic flux shunted across the temperature compensators now passes across the main air gap in which the coil of the moving element swings, thus increasing the deflection of the pointer to compensate for the change in circuit current.

C. Data

Details applicable to Variants of the Model S.64 Form 3 are given in subsequent pages of the manual - refer to the TABLE OF CONTENTS.

MODEL S64.3.361



Data

Range	0-300°C
External resistance	2 ohms
Resistance of moving element (20°C)	2.6 - 3.8 ohms
Terminals	Unified threads

Model S64.3.361 is designed and calibrated for use with a copper/copper-nickel thermocouple system which is adjusted to a resistance of 2 ohms.

The scale presentation is illustrated. The caption, figures, cardinals, division lines and narrow tipped, lance type pointer are finished in photogenic white.

The scale background is matt black. A green band extends from 100°C to 274°C which is terminated by a red line.

Calibration

Connect the indicator to the circuit shown in Fig.701 and proceed as follows:

(1) Set the pointer of the indicator to zero by means of the zero adjuster.

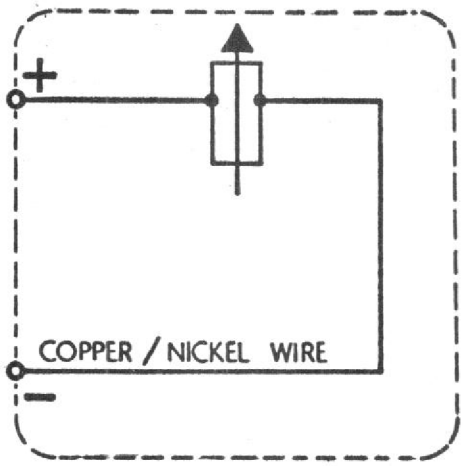
(2) Adjust the external circuit resistor (Fig.701) to give a circuit resistance of 2 ohms.

(3) Apply 14.7 mV. to the circuit and age the magnet until the pointer indicates at full scale.

(4) Check or calibrate the indicator using the values given in the following table.

Temperature °C	Equivalent e.m.f millivolts couple junction
0	0
20	0.77
50	2.03
100	4.24
150	6.65
200	9.20
250	11.90
300	14.70

NOTE: The ambient temperature should be maintained constant throughout the calibration period.
After checking the calibration, and prior to transit, set the pointer of the indicator to the ambient temperature; short the terminals with a length of wire.



Accuracy

The accuracy of the indicator is ±2% of full scale deflection.

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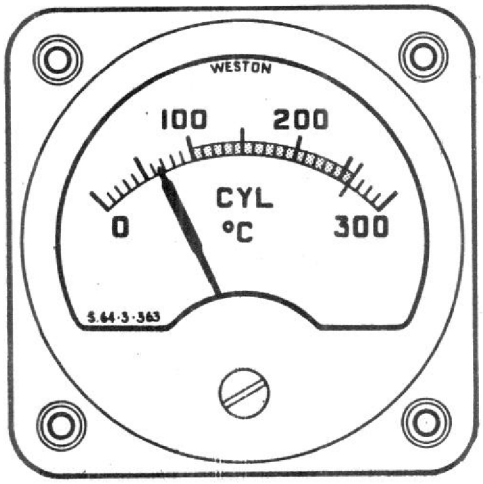


Data

Range	0-300°C
External resistance	2 ohms
Resistance of moving element (20°C)	2.6 - 3.8 ohms
Terminals	Unified threads

Model S64.3.363 is designed and calibrated for use with an iron/copper-nickel thermocouple system which is adjusted to a resistance of 2 ohms.

The scale presentation is illustrated. The caption, figures, cardinals, division lines and narrow tipped, lance type pointer are finished in photogenic white.

The scale background is matt black. A green band extends from 100°C to 260°C which is terminated by a red line.

Calibration

(1) Set the pointer of the indicator to zero by means of the zero adjuster.

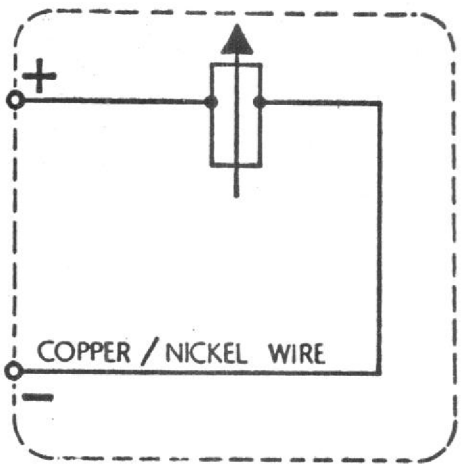
(2) Adjust the external circuit resistor (Fig.701) to give a circuit resistance of 2 ohms.

(3) Apply 16.33 mV. to the circuit and age the magnet until the pointer deflects to full scale.

(4) Check or calibrate the indicator using the values given in the following table.

Temperature °C	Equivalent e.m.f. millivolts Couple junction
0	0
20	1.02
50	2.58
100	5.27
150	8.00
200	10.78
250	13.56
300	16.33

NOTE: The ambient temperature should be maintained constant throughout the calibration period.
After checking the calibration, and prior to transit, set the pointer of the indicator to the ambient temperature; short the terminals with a length of wire.



Accuracy

The accuracy of the indicator is ±2% of full scale deflection.

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DISASSEMBLY

A. Checks before dismantling

Check whether the indicator has been returned with a history sheet which may indicate any parts requiring particular attention.

B. Preparation

Observe absolute cleanliness of work-bench and tools.

C. Procedure (Refer to Fig. 101)

NOTE: All lockwashers disturbed during disassembly must be discarded and renewed for reassembly.

(1) Remove the sealing screw (1) sealing cup (2), screws (3) and lockwashers 4 (3 off each item); withdraw the shield (5).

(2) Remove the screws 6(2 off) and withdraw the cover (7) complete with bezel (8), glass (9) and zero adjuster and spring (11) and (10).

(3) To remove glass (9) from cover (7), refer to REPAIR ,Page 401.

(4) To remove zero-stud (11), first remove spring (10) (not shown) on underside.

(5) Remove screws (12), lockwashers (13) pointer stops 14 (2off each item) and remove the scale (15) together with the magnetic shield plate (16), taking great care not to damage the pointer.

(6) Remove nuts 17, screws 19, together with lockwashers 18 & 20(2off each item).

(7) Withdraw assembly to extent allowed by terminal leads.

(8) Unsolder terminal leads from terminals and bridges.

NOTE: Further disassembly will depend upon the extent of the necessary repairs. The sequence for dismantling the assembly down to the moving element is contained in the sub-paras. from (9) to (17).

(9) Unfasten screw (21) and lockwasher (22) and remove spool (23) if fitted.

(10) Remove magnet (25).

NOTE: Due to the magnetic circuit having been broken, it is essential for the magnet to be raised at assembly in order to regain the required moving coil sensitivity. The procedure is detailed in ASSEMBLY, B.Procedure (13).

(11) Unsolder the ligament attached to the bimetal volute, from the soldering tag on the top bridge assembly (30).

(12) Remove screws (26), lockwashers (27) (2 off each item) and lift off the bridge assembly (28).

(13) Unsolder the outer ends of the control springs; unscrew the top bridge pillars 29 (2 off) and remove the top bridge (30).

(14) Remove the nuts (31), lockwashers (32) and insulating washers 33 (2 off each item) and remove the bottom bridge assembly (34) and insulated bushes 35 (2 off).

(15) Remove nut (36), lockwasher (37), plain washer (38) and the magnet shunt assembly (39) and (40). Withdraw screw (41) and the temperature compensators (42), (43) and (44).

(16) With great care, withdraw the moving element (46) complete with core (45) from the pole piece assembly (24).

(17) Slide the core (45) from the moving element (46).

NOTE: If a new moving element is fitted to the indicator, a new bridge assembly (28) will also be required since the moving element and bimetal volute must be correctly matched

(18) Remove terminal screws (48) complete with captive washers from terminal moulding.

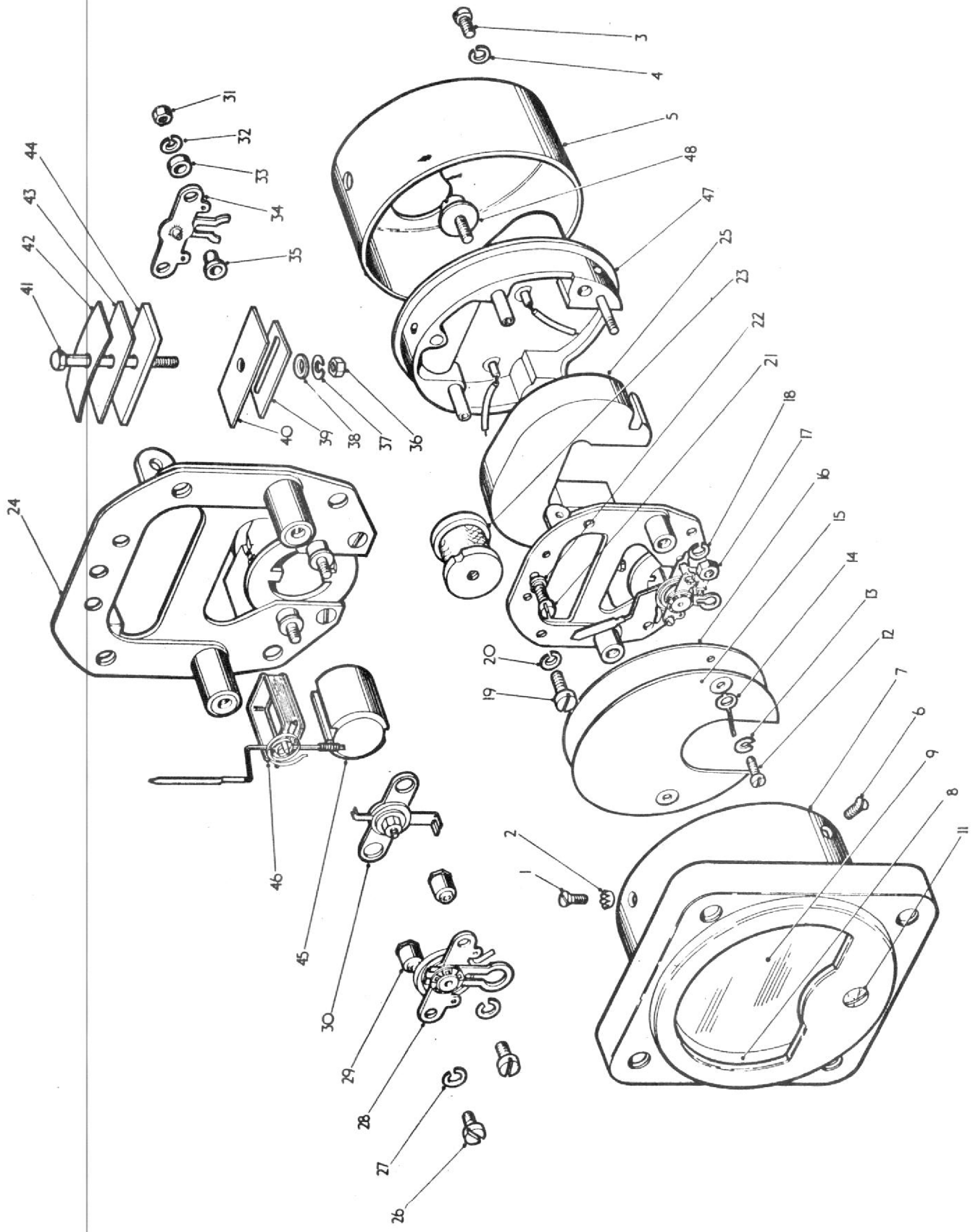

Fig. 101 Exploded view of indicator - Model S.64 Form 3

KEY TO FIG. 101

1. Sealing screw
2. Sealing cup
3. Shield securing screw
4. Lockwasher
5. Shield
6. Cover retaining screw
7. Cover
8. Bezel ring
9. Glass
10. Zero-stud spring (Not shown)
11. Zero stud
12. Pointer stop retaining screw
13. Lockwasher
14. Pointer stop
15. Scale
16. Magnetic shield plate
17. Pole piece assembly retaining nut
18. Lockwasher
19. Pole piece assembly retaining screw
20. Lockwasher
21. Spool securing screw
22. Lockwasher
23. Spool
24. Pole piece assembly
25. Magnet
26. Bridge assembly retaining screw
27. Lockwasher
28. Bridge assembly (Comp. coil)
29. Pillar
30. Bridge assembly (top)
31. Bottom bridge assembly retaining nut
32. Lockwasher
33. Insulating washer
34. Bridge assembly (bottom)
35. Insulating bush
36. Magnet shunt securing nut
37. Lockwasher
38. Washer
39. Magnet shunt
40. Spacer
41. Core screw
42. Magnet shunt, iron
43. Magnet shunt, thin
44. Magnet shunt, thick
45. Core
46. Moving element complete
47. Base
48. Terminal screw and washer assembly.

CLEANING

A. Procedure

(1) Use acetone to remove all Bostick adhering to threads of screws and nuts, and to all other components which have been disturbed. Ensure that the acetone does not come into contact with insulation or varnished surfaces.

(2) Use a soft brush to remove all dust etc. from the case. Blow out the magnet gap with a fine jet of clean, dry air.

B. Schedule of cleaning materials

(1) Camel-hair brush, No. 12, round.

(2) Acetone, B.P.C.

(3) A small piece of wash leather.

INSPECTION/CHECK

A. General procedure

Examine all metal components for corrosion; check screws, nuts and threaded holes for good condition and serviceability of threads.

B. Detail procedure

(1) Use a 10x magnifier to examine the gap, in which the moving coil swings, for obstructions; small particles adhering to the core or pole piece must be removed with a snaped piece of wood or celluloid.

CAUTION: UNDER NO CIRCUMSTANCES MAY A METALLIC NEEDLE BE USED FOR THIS PURPOSE. AVOID DAMAGE TO THE CONTROL SPRINGS.

(2) Ascertain that the resistance of the moving coil is within the limits quoted in the Data section of the variant being overhauled.

(3) Inspect the control springs for any damage or twisting, the top spring must open and the bottom spring must close when the pointer is deflected upscale.

(4) Examine spool (if fitted) for open circuit or damaged insulation and the threaded hole for good condition.

(5) Examine the cover and base for cracks or other damage and for a broken or loose glass.

REPAIR

A. Cover and base

If either part is defective, it must be renewed.

B. Broken glass (Refer to Fig.101).

(1) Prise out the bezel ring (8) and glass (9) from cover (7).

NOTE: It may be necessary to break the bezel ring during this operation.

(2) Use toluene/acetone to remove all Bostik adhering to cover.

(3) Apply Bostik cement No.772 evenly around the inside lip of the cover. Press down the new glass firmly into the cement, ensuring that all air bubbles are eliminated and that the cement covers the edge of the glass and fills all gaps.

(4) Apply more Bostik around the internal surface of the cover immediately above the glass.

(5) Insert the bezel ring and press down firmly into the cement so that a layer of Bostik forms between the bezel ring and the glass.

(6) Allow to air dry for a minimum of 48 hours.

(7) Support the glass to prevent it becoming loose and trim off the surplus Bostik with a sharp wet knife.

C. Schedule of materials

Acetone	B.P.C.
Toluene	B.P.C.
Bostik Cement No.772	Messrs. B.B. Chemical Co.Ltd.

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ASSEMBLY

A. Preparation

Prior to assembly obtain the following materials.

B.S. 104	Bostik No. 772 thinned with acetone to a brushable consistency.
Thermolene Lacquer	Messrs. Canning's Red Thermolene Lacquer No. 185
B.S. 43	Messrs. Gulf Oil Co's. Gulfcrown grease No. 3

During assembly, apply a little B.S. 104 to all threaded holes, nuts and screwheads to lock these items against vibration. Cement jewel screws and coat all soldered connections with Red Thermolene Lacquer. After final adjustment and calibration, apply a thin coat of B.S. 43 to the cover-to-base join and to the internal surface of the cover. These finishes, to SANGAMO WESTON B.S. Specifications, may be obtained from Messrs Sangamo Weston Ltd., Enfield, Middlesex, England, or obtained directly from the suppliers.

B. Procedure

Observe scrupulous cleanliness.

(1) Fit moving element (46) complete with pointer and springs over core (45).

(2) Insert the moving element (46) complete with core (45) into the aperture in the pole piece assembly (24); avoid damage to the pointer.

(3) Fit the temperature compensators (44), (43) and (42) on top of the pole piece; pass the core screw (41) through the temperature compensators and the core; fit the spacer (40) and the magnet shunt (39) under the pole piece and on the core clamp screw, and secure with plain washer (38), lockwasher (37) and nut (36).

NOTE: It is important to maintain the relative positions of the temperature compensators as shown in the exploded view Fig 101. The adjoining surfaces of the temperature compensators must be in good contact with each other.

(4) Fit the insulating bushes 35 (2 off) on to the threaded pillars on the underside of the pole piece assembly. Mount the bottom bridge assembly (34) on the pillars, fit the insulating washers 33 (2 off) and secure with lockwashers (32) and nuts 31 (2 off each item).

(5) Locate the moving element bottom pivot in its jewelled bearing on the bottom bridge assembly.

(6) Mount the top bridge assembly (30) on the threaded pillars on the top face of the pole piece assembly. Secure with tapped pillars 29 (2 off).

(7) Ensure that both pivots of the moving element are correctly located in their jewelled bearings before finally tightening nuts.

CAUTION: DO NOT FORCE THE JEWELS AND PIVOTS ON TO EACH OTHER. GREAT CARE MUST BE TAKEN TO AVOID DAMAGING THESE ITEMS.

(8) Adjust the jewelled bearings to give equal gaps longitudinally between the coil of the moving element and each end of the core (45).

(9) Solder the outer ends of the two control springs to the abutments provided on the top and bottom bridges.

CAUTION: DO NOT ALLOW THE CONTROL SPRINGS TO BECOME OVERHEATED. EXCESS HEAT MAY CAUSE PERMANENT DAMAGE TO SPRINGS.

(10) Position the magnet (25) on the pole piece assembly (24).

(11) Check that the moving coil is centred, as instructed in operation (8) and turn jewel screws clockwise in increments of approximately 1/10th of a turn until pointer flop (the movement of the pointer due to the pivots being able to move laterally in the jewel bearings) is just eliminated.

(12) Back off the jewel screws by 1/10th to 1/8th of a turn until a slight pointer flop is just perceptible and then finally tighten the bearings.

(13) Due to the magnetic flux having been broken during disassembly, the magnet must be raised by subjecting it, after assembly, to a magnetizing force of not less than 10000 ampere turns.

(14) Ensure that the gap in which the moving coil swings is free from dirt or small particles adhering to the surface of the core or pole piece. If necessary, clean as described in CLEANING , Page 201.

(15) Place spool (23) in position and secure with 10 B.A. lockwasher (22) and 10 B.A. screw (21). Resolder the connections between the positive terminal and the spool and between the spool and the soldering tag on the bottom bridge assembly. Resolder the connection between the negative terminal and the tag on the top bridge; the wire used must be copper/nickel.

(16) Mount the bridge assembly (28) on the pillars (29) securing the top bridge (30) and secure with lockwashers (27) and screws 26 (2 off each item).

(17) Resolder the 0.006 in. diameter tinned copper wire attached to the bimetal volute, to the soldering projection on the top bridge assembly (30).

(18) Mount the pole piece assembly (24) on the base (47) and secure to the tapped mounting pillars on the base with lockwashers (20) and screws 19 (2 off each item), and to the studs on the base with lockwashers (18) and nuts 17 (2 off each item).

(19) Mount the shield plate (16) and the scale (15) complete with pointer stops 14 (2 off) onto the supporting pillars on the pole piece assembly plate and secure with lockwashers (13) and screw 12 (2 off each item).

NOTE: Care must be taken to avoid damage to the pointer during this operation.

(20) Balance the moving element as described in Section C.

(21) Age the magnet (if possible with magnet shield (5) in position) as follows:

NOTE: (1) If it is not possible to age the magnet with shield (5) in position, determine the percentage allowance which must be deducted from the final sensitivity when ageing.

(2) The magnet shunt (39) adjustment must be set in the position to give minimum deflection, i.e. push the shunt to the left until the end of the slot rests against the screw projecting from spacer (40).

(a) Apply the specified millivolts (quoted in the variant , CALIBRATION) for full scale deflection of the pointer.

(b) With a coil which is suitable for connection to a 50 c/s supply, age the magnet until the pointer registers full scale deflection. The ageing process may be accomplished by the gradual approach and recession of the coil, or by slowly increasing and decreasing the current in the magnetizing coil. The process must be continued until the correct pointer deflection is obtained.

(22) Temporarily assemble the cover (7) to the base (47) and secure with screws 6 (2 off and screw (1). Bake the indicator for not less than eight hours at a temperature of 70°C to stabilise the magnet. The indicator is then ready for adjustment and calibration. The magnet shield (5) must be in position during calibration.

NOTE: Final assembly of the indicator is not to be carried out until calibration has been completed.

(23) When the indicator is finally adjusted and calibrated, complete the assembly sequence by applying a thin coat of B.S.43 to the cover-to-base join and a further coat to the internal surface of the cover (7) and to the base (47).

(24) Fit the cover (7) to the base (47) and secure with screws 6 (2 off), sealing cup (2) and sealing screw (1).

(25) Fit the magnet shield (5) and secure with lockwashers (4) and screws 3 (2 off each item).

C. Balancing the moving element (46)

(1) Check the jewelled bearings for correct adjustment, then proceed as follows:

NOTE: After balancing, pointer error must not exceed 1% of full scale range value.

(2) Adjust the balance weights in the following manner to maintain the pointer within the permissible limits:

(a) With the indicator scale in the horizontal position and the pointer in alignment with the scale zero cardinal, proceed as below.

(b) Turn the indicator to bring the pointer parallel to the table edge.

(c) Raise the indicator slowly until the scale is vertical; the pointer deviation from the zero cardinal must not exceed the permissible limit. If outside the limit, readjust the position of the tail weight.

(d) Repeat operation (b) but with the side arm parallel to the table edge.

(e) Repeat operation (c); adjust the side arms to correct any deviation in the balance.

TESTING

A. Preparation (Refer to Fig.701)

(1) Obtain a flask to hold melting ice and a test couple which should preferably be of copper/copper-nickel. A precision grade d.c. millivoltmeter, similar to Sangamo Weston Model S82 with preferred ranges of 0/20mV, 0/50mV and a resistor of approximately 1 ohm are also required.

B. Tests

(1) Connect the indicator to the circuit.

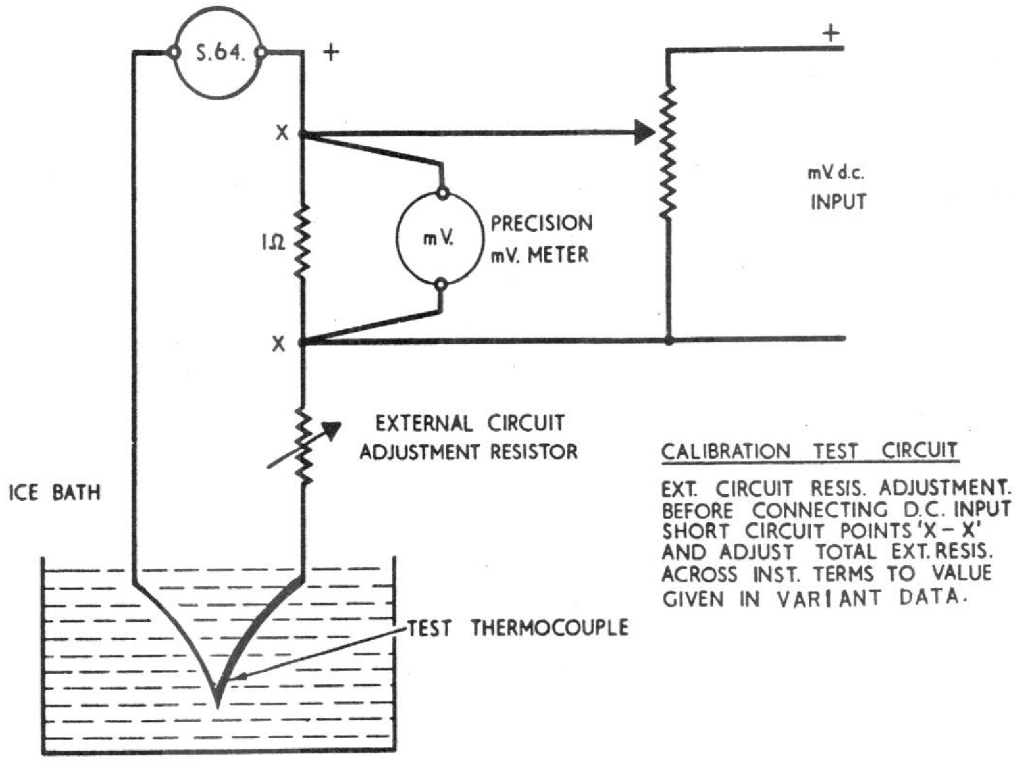

Fig. 701 Test Circuit Diagram

(2) Set the potentiometer slider (connected to point X and indicator +Ve) to give a minimum, millivolt input; apply the appropriate millivolt values as given in the variant **CALIBRATION** details.

(3) Set the variable resistance, in turn, from a value giving a zero scale reading, through each intermediate value to the maximum scale value and check the accuracy of the indicator against the precision test instrument.

NOTE: (1) Ensure that the indicator is mounted on a vertical panel during adjustment and calibration, or mounted as detailed in the **DATA** *section of the variant under test.*

(2) Adjusted spools are fitted to some indicators. If a spool is changed, connect the adjusted replacement spool in series with the moving coil and then age the magnet to give full scale deflection of the pointer with the appropriate external resistance for the particular variant connected in series and the correct millivolt input as quoted in the appropriate variant section applied to the circuit.

(4) Calibrate the indicator as instructed in the variant section.

Cold-end compensation check

(1) Connect a thermocouple and its extension leads of the correct resistance and type to the indicator.

(2) Place the thermocouple in an ice flask at 0°C and set the indicator pointer to zero.

(3) Place the indicator in a controlled temperature chamber maintained at any temperature between -50°C and +70°C, at the same time keeping the thermocouple in the flask at 0°C.

(4) The indicator reading should remain at 0°C within 4% of full scale deflection throughout the test, irrespective of the temperature of the chamber.

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TROUBLE SHOOTING

A. Causes

The main symptons of faults after overhaul are:

(1) Incorrect indication by pointer.

(2) Fluctuation of indication with constant voltage or current applied.

(3) Movement sticking.

B. Correction

(1) Trace fault by means of trouble shooting chart and take suitable remedial action.

(2) Retest indicator after repair and recalibrate as necessary.

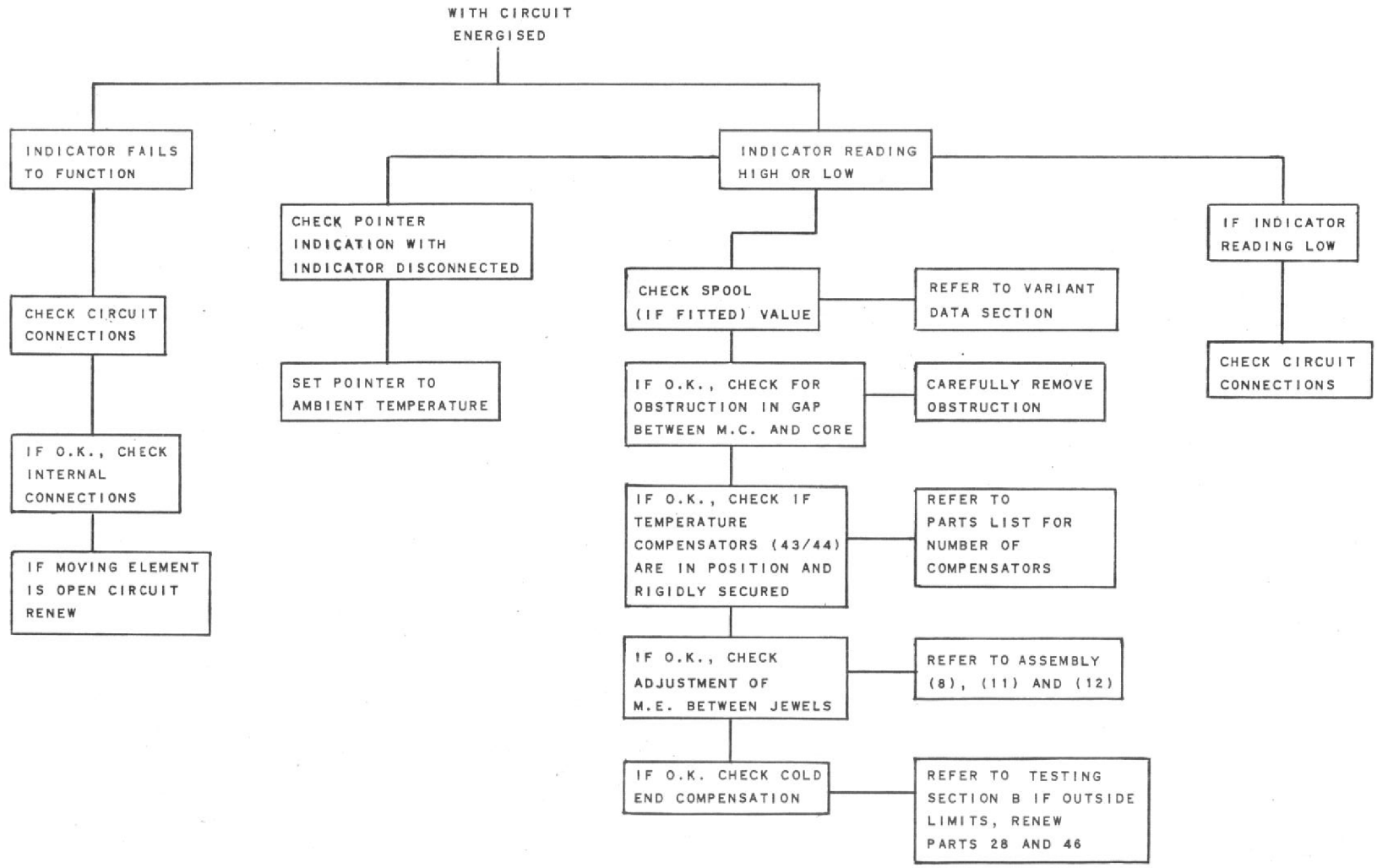

Fig. 801 Trouble Shooting Chart

OVERHAUL MANUAL

MODEL S.64 FORM 3 - INDICATOR - TEMPERATURE

STORAGE INSTRUCTIONS

A. Conditions

(1) For Transit:

Set the pointer by means of the zero adjuster to the ambient temperature and then short circuit the terminals with a length of copper wire.

(2) For packing in temperate areas, prepare the following, if the original packing is not available.

(i) A strong cardboard box, 2¾ in. x 2¾ in. x 2¾ in. (internal dimensions).

(ii) Two squares of corrugated cardboard, 2¾ in. x 2¾ in.

(iii) One strip of corrugated cardboard, 2¾ in. x 36 in. and a second strip 2 in. x 36 in.

(iv) A polythene bag, 6 in. x 6 in.

(v) Place the indicator in the polythene bag and heat-seal the opening.

(vi) Wrap the wider strip of corrugated cardboard around the cover of the indicator and then wrap the other strip to cover the glass and base.

(vii) Place a cardboard square in the bottom of the box, insert the wrapped indicator, place the second cardboard square on top and fit the lid.

(viii) Attach to the box a label giving the following details:-

(a) Identification of indicator e.g. S.64.3.00

(b) Date of removal from aircraft

(c) Date of last overhaul

(d) Details and date of any component change

(e) Modification state of indicator

(g) Reason for return of indicator

(3) For packing in tropical areas:-

(i) The indicator must be packed as for temperate areas with the addition of water-resistant paper completely to enwrap the indicator prior to insertion in the polythene bag.

(ii) The cardboard box must be enclosed in a suitable wooden box.

B. **Storage limiting period**

(1) The storage limiting period for the indicator is five years.

(2) Indicators which have been stored for five years must be subjected to a calibration check described in para. 8.

(3) Indicators must be stored under conditions where humidity does not exceed 50% and where temperature is within the range -25°C to +50°C.

OVERHAUL MANUAL

MODEL S.64 FORM 3 - INDICATOR - TEMPERATURE

SPECIAL TOOLS, FIXTURES AND EQUIPMENT

Item	Description	
1	Precision grade mVoltmeter (Model S.82) Appropriate Range	Sangamo Weston Ltd.
2	Balance weight wrench (271157)	Sangamo Weston Ltd.
3	Magnetizing equipment (10000 ampere turns minimum)	Local Manufacture
4	Thermocouple (copper/copper-nickel)	Local Manufacture
5	Flask (To hold melting ice)	Local Manufacture

MODEL S.64 FORM 3 - INDICATOR - TEMPERATURE

ILLUSTRATED PARTS LIST

VARIANTS

	USAGE CODE
S.64.3.361	A
S.64.3.363	A

Illustrated parts list

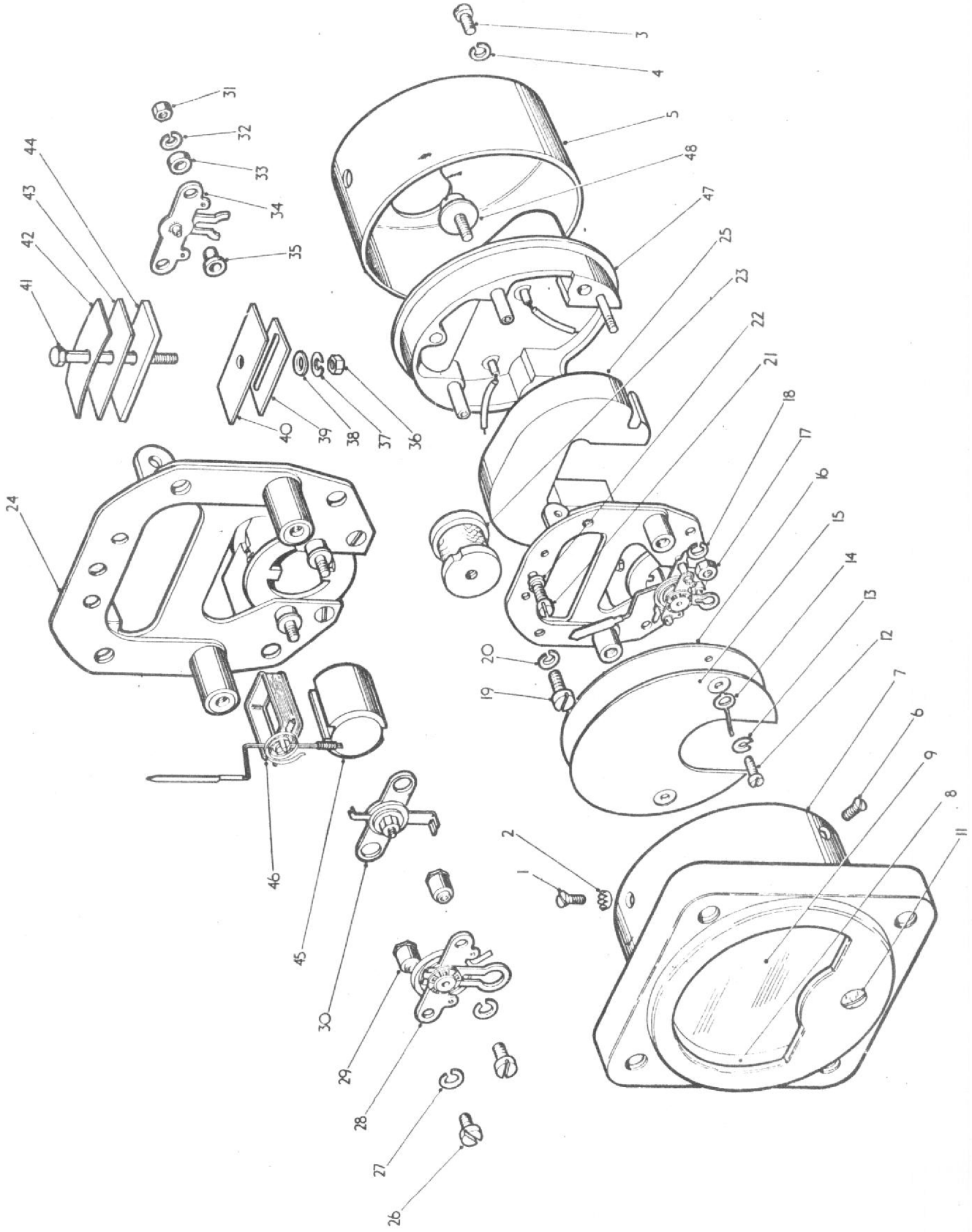

Fig. 1101 Model S.64 Form 3

A. Parts List

Fig. and Index No.	Part No.	Nomenclature	Usage Code	Units per Assy.
Fig. 1101	S64. Form 3			
1	168861	Screw, sealing	A	1
2	168012	Cup, sealing	A	1
3	157072	Screw, 6 BA x 7/32in. Ch.Hd.	A	3
4	156976	Lockwasher, 6 BA	A	3
5	160789	Shield	A	1
6	156400	Screw, 8 BA x 7/32in. C' sk.	A	2
7	178054	Cover (UNF)	A	1
	166879	Cover (Std)		1
	166880	Cover (T.Glass)		1
8	160244	Bezel Ring	A	1
9	159082	Glass (Plain)	A	1
	178825	Glass (Toughened)		1
10	154087	Spring, Zero stud (not shown)	A	1
11	155063	Zero stud	A	1
12	156396	Screw, 10 BA Sp.Hd. (Black)	A	2
	158245	Screw, 10 BA Sp.Hd. (Nickel)		2
13	159306	Lockwasher, 10 BA (Black)	A	2
	153367	Lockwasher, 10 BA (Nickel)		2
14	168470	Stop, pointer (Black)	A	2
	168451	Stop, pointer (Nickel)		2
15	160625	Scale plate, Blank	A	1
16	160626	Plate, Magnetic shield	A	1
17	150178	Nut, 8 BA	A	2
18	103854	Lockwasher, 8 BA	A	2
19	91377	Screw, 8 BA x 5/16in. Sp.Hd.	A	2
20	See Index 18	Lockwasher, 8 BA	A	2
21	150330	Screw, 10 BA x 3/16in.Ch.Hd.(Spool)	A	As reqd
22	153367	Lockwasher, 10 BA (Spool)	A	As reqd
23	S.64.3.Variant Quote variant number	Spool A If variant on Page 1101 is marked with an asterisk, spool values available in steps of 0.1 to 1Ω - quote requirement.	A	1
24	173458	Pole Piece Assembly	A	1
25	160701	Magnet, Large Alnico	A	1
	160645	Magnet, Large Alconax		1
	164257	Magnet, Std.		1
26	158626	Screw, 12 BA x .07in.Sp.Hd.	A	2
27	155830	Lockwasher, 12 BA	A	2
28	166149	Bridge Assem. (Comp.Coil)	A	1
29	160779	Pillar, Bridge	A	2
30	160886	Bridge Assembly, Top	A	1
31	155125	Nut, 12 BA	A	2
32	See Index 27	Lockwasher, 12 BA	A	2
33	154399	Washer, insulating	A	2
34	161019	Bridge Assembly, Bottom	A	1
35	154397	Bush, insulating	A	2
36	See Index 31	Nut, 12 BA	A	1
37	See Index 27	Lockwasher, 12 BA	A	1
38	153364	Washer, 12 BA	A	1
39	158686	Magnet shunt	A	1
40	150594	Spacer	A	1
41	160772	Screw, 12 BA (Core)	A	1
42	160776	Silicon Iron Strip	A	1
43	160777	Mutemp Strip, thin	A	1
44	160778	Mutemp Strip, thick	A	1
45	160771	Core	A	1
46	46/S64.3.Variant	Element, moving (Quote Variant number)	A	1
47	160589	Base, Std.		1
	177489	Base, UNF	A	1
48	157716	Screw & Washer Assem. Std.		2
	175279	Screw & Washer Assem. UNF	A	2

MODEL S.64 FORM 3 - INDICATOR - TEMPERATURE

SCHEDULE OF OVERHAUL PERIODS

A. Overhaul period 'ON CONDITION'

NOTE: The term 'On Condition' is applicable to systems/components on which airworthiness is determined by inspections, measurements and tests, or by other means specified, without extensive disassembly or renewal.

Inspections or checks of the aircraft indicator are scheduled at intervals shown in the aircraft maintenance schedule which will determine the repairs, replacements and refinishing needed to maintain the required airworthiness standard.