WESTON
ELECTRICAL INSTRUMENTS
FOR AIRCRAFT

Weston Aircraft Instruments are supplied to the Air Ministry and to leading military and civil aircraft manufacturers throughout the world.

Sangamo Weston Ltd. are Design Approved by the Ministry of Supply, and the engineers at our Works and at our Branches are always available to discuss any problems or to give any assistance which may be required in connection with these instruments. Enquiries at any of our addresses will receive immediate attention.

ICE WARNING SYSTEM

This manual has been approved by the Air Registration Board.
9.4.58.

Amendments to this publication invalidate the approval statement unless issued by the manufacturers with the concurrence of the Air Registration Board.

Date of System Introduction 1958

SANGAMO WESTON LIMITED

Head office and Works:

ENFIELD, MIDDLESEX, ENGLAND

Telegrams: " Sanwest, Enfield."

Telephones: Enfield 3434 (6 lines), Enfield 1242 (6 lines)

Scottish Factory:

Port Glasgow, Renfrewshire

Telephone: Port Glasgow 41151

LONDON GLASGOW NEWCASTLE-on-TYNE

MANCHESTER LEEDS LIVERPOOL

WOLVERHAMPTON NOTTINGHAM BRISTOL

SOUTHAMPTON BRIGHTON

ICE WARNING SYSTEM

MODEL S.110G. RESISTANCE BULB

MODEL S.171 FORM 1 DETECTOR HEAD

MODEL S.172 FORM 2 AUTOMATIC RE-SET CONTROL UNIT

MODEL S.172 FORM 3 MANUAL RE-SET CONTROL UNIT

GENERAL

The SANGAMO WESTON Ice Warning System consists of three units. These are, (a) the Resistance Bulb, Model S.110G. (b) the Detector Head, Model S.171 Form 1, and, (c) the Control Unit, Model S.172.

There are two versions of the Control Unit. Model S.172 Form 2 employs an automatic re-set circuit, whilst Model S.172 Form 3 has been designed for manual re-setting. Both versions should have a test switch incorporated in the system (see Figs. 7 and 9.) so that a routine check of the apparatus may be made as part of the normal aircraft test procedure.

The complete equipment has been designed in close collaboration with the Ministry of Supply and the Royal Aeronautical Establishment. Particular care has been taken regarding the strength of the components. For example, the Detector Head is sufficiently robust to be fitted inside a jet engine air intake.

The Detector Head has been fully type tested, and the complete equipment satisfies the requirements laid down in British Standard G.100 and R.A.E. Tech. Memo. DES.1. It has also received Ministry of Supply, and A.R.B. approval.

PRINCIPLE OF OPERATION

The Ice Warning System is designed to operate upon the occurrence of two conditions responsible for the formation of ice. These conditions are, (a) the presence of free water in the atmosphere, and (b), a local temperature at, or below, freezing point.

The Detector Head is basically a water sensitive device designed to notify the presence of free water. It is a unit comprising two heated bulbs, and is placed in the air stream so that the rear bulb is shielded by the front one. When the unit enters a water bearing cloud, the rear bulb does not cool at the same rate as the front bulb, due to the shielding effect, and the difference in temperature is used as a measure of water concentration.

The Resistance Bulb is used to monitor air temperature and to supply information regarding ambient temperature to the Control Unit.

Thus two separate parameters are obtained and are fed to the Control Unit. They are then integrated by a relay system which, in turn, gives an output sufficient to operate a lamp or a power relay for de-icing equipment, or both.

INSTALLATION

Resistance Bulb S.110G.

The point of installation of the bulb is of considerable importance. If it can be mounted on the nose probe of the aircraft, consistent readings can be obtained and deleterious effects from shock wave formation are reduced.

In icing cloud, the resistance bulb will ice up, but as it has to operate at one point only, it will still provide a " below zero " signal irrespective of the shielding effect of the ice.

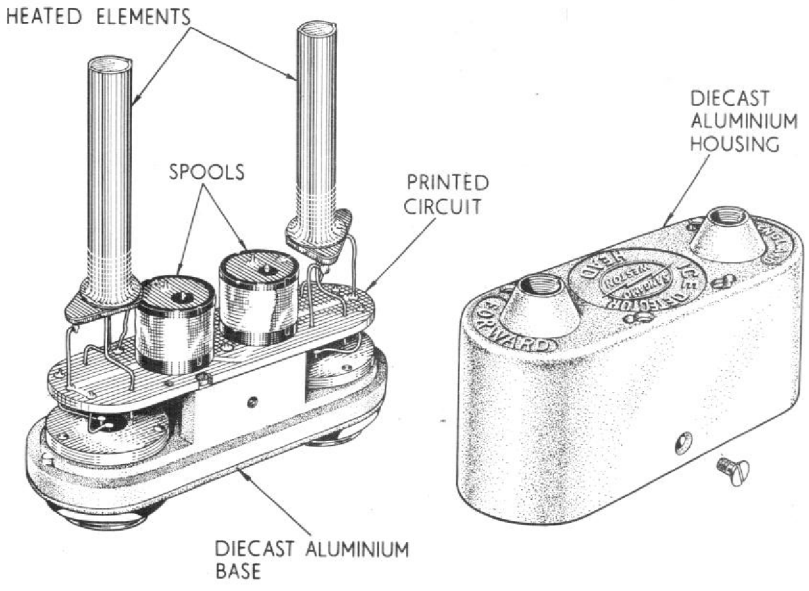


Fig. 1. Detector Head.

Detector Head Model S.171 Form 1

The following conditions of installation must be fulfilled for proper operation.

(*a*) The air flow over the head must be laminar at all velocities.

(*b*) There must be no shielding of the head from the free water in the air, that is, there must be no projections in front of the head.

(*c*) When installed on the airframe, the head must be fitted so that the elements are vertical, projecting either upwards or downwards. The airflow must be in line with the two elements under normal flying conditions. Any deviations of airflow greater than 5° may, in certain conditions, initiate a false signal.

(*d*) The elements must be outside the aircraft boundary layer.

It is suggested that the detector head is mounted so that the elements project through the surface of the aircraft skin with the housing inside. If it is not possible to find a suitable position on the aircraft, the detector head may be mounted in a heated mast. When the aircraft skin or mast is heated, the head must be thermally insulated, although the degree of insulation is not very critical.

For axial flow jet engines, which may, under certain conditions, be susceptible to icing, the detector head can be mounted inside the engine inlet. In this case, the vertical attitude referred to in (*c*) above does not necessarily apply.

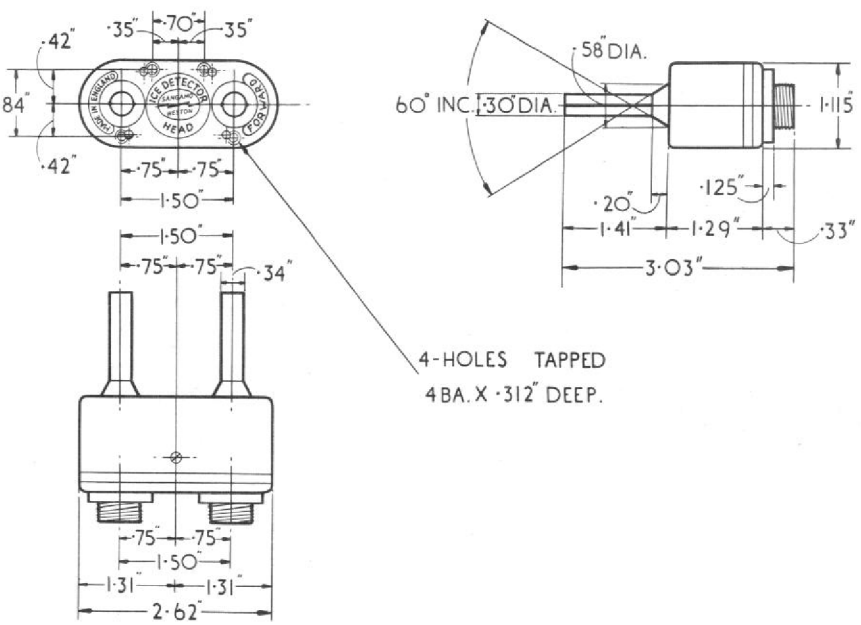


Fig. 2. Detector Head Fixing Diagram.

Control Unit Model S.172

The Control Unit is normally fitted on an A.V. mounting bracket and must be installed in a horizontal position. It is limited to a temperature range of —40°C. to +70°C. and is most conveniently fitted in the pressurized section of the aircraft.

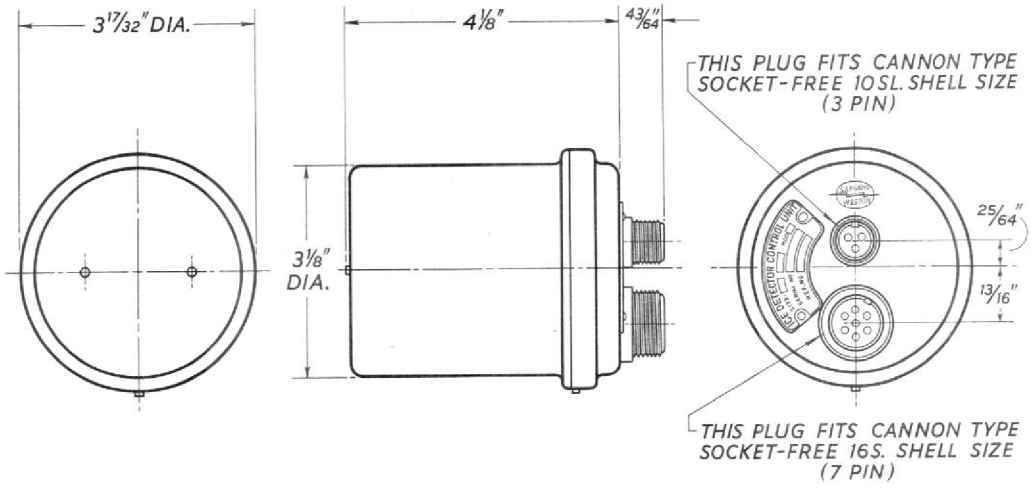


Fig. 3. Fixing Diagram.
Control Unit Model S172 Form 2.

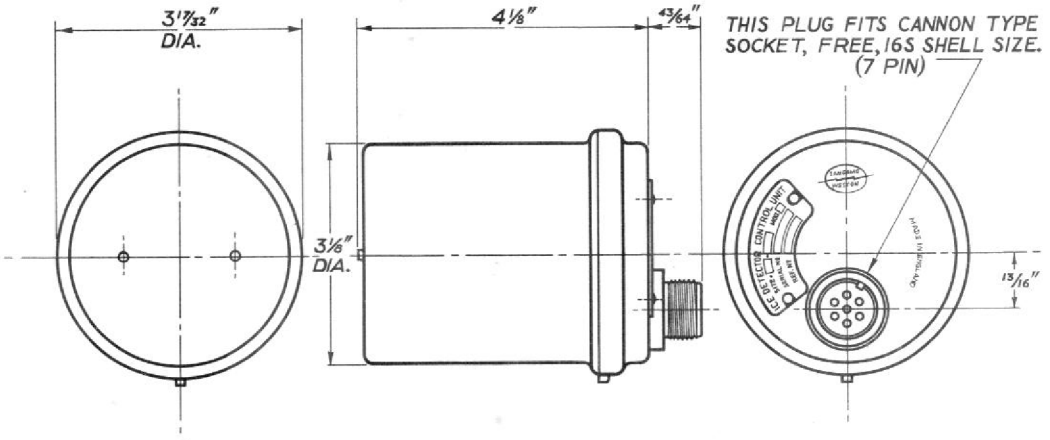


Fig. 4. Fixing Diagram.
Control Unit Model S172 Form 3.

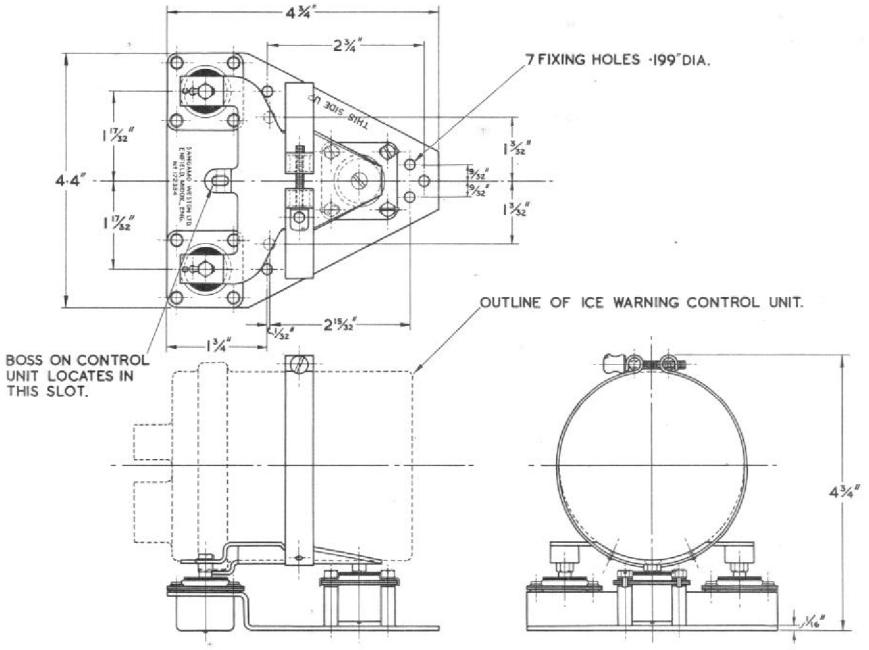


Fig. 5. Fixing Diagram.
Anti-Vibration Mounting Bracket.

SUPPLY

Detector Head and Control Unit

25 — 29 volts D.C. Approximately 2·5 amperes.

OUTPUT

The output of 27 volts 1 amp. which is obtainable from this system is more than sufficient to operate a warning light and/or a power relay which can be used to initiate de-icing equipment.

WEIGHTS

Model S.171 Form 1 Detector Head	4 ozs.
Model S.172 Form 2 Control Unit	1 lb. 9 ozs.
Model S.172 Form 3 Control Unit	1 lb. 2 ozs.
Model S.110G Form 26 Resistance Bulb	2 ozs.
A.V. Mounting Bracket	9 ozs.
Leads (3 off)	13 ozs. per 20 feet Shorter lengths pro rata.

Information regarding the S.110G Resistance Bulb can be obtained from the relevant SANGAMO WESTON Service Manual.

LIMITING CONDITIONS AND DECLARATION REQUIRED BY BRITISH STANDARD G.100

DETECTOR HEAD

MODEL S.171

PERFORMANCE

Instability does not exceed a value equivalent to 0·1 gm/metre in dry air conditions under normal variations of ambient temperature, air velocity and altitude as described in this schedule.

LIMITING CONDITIONS OF USE

The detector head is approved for use only under conditions stated herewith.

Power Supply

25 — 29 volts D.C.

Power Consumption

Approximately 64 watts at 27 volts D.C.

Temperature Range

Complies with the relevant clauses in A.P.970 Vols. 1 and 2 and B.S. G.100.

Air Velocity

90 knots to Mach. 2·5.

Altitude

Sea level to 60,000 ft.

Climatic Conditions

To D.T.D.1085B.

Vibration

To Tech. Memo. DES.1 Clause 1·4 for equipment directly mounted in any region. Also G.100 Section 1 Clause 6 Grade 1.

Acceleration

To Tech. Memo DES.1 Clause 1·7 Category 1 of Table II. Also G.100 Section 1 Clause 5 Grade 1A.

Crash Landing

Not applicable.

Flame Proof

Not applicable.

Fire Resistant

Will not support combustion.

Waterproof

Complies with D.T.D. 1085B.

Compass Safe Distance

10 inches.

Mounting Attitude and Position

To be determined in conformity with conditions laid down in this publication for any particular application.

Operational Life

Check in flight under known flying conditions every 300 hours.

CONTROL UNIT
MODEL S.172

The Control Unit is approved for use only under conditions stated herewith.

Power Supply
25 — 29 volts D.C.

Power Consumption
Total consumption with associated equipment does not exceed 70 watts at 27 volts D.C.

Temperature Range
—40°C. to +70°C.

Altitude Rating
20,000 ft.

Climatic Conditions
D.T.D.1085B.

Vibration
To Tech, Memo. DES.1 for equipment mounted in central region. Also G.100 Section 1 Clause 6 Grade 3.

Acceleration
DES.1 Category 3 Table 4. Also G.100 Section 1 Clause 5 Grade 3.

Flame Proof
Yes, according to British Standard G.100.

Water Proof
Yes.

Compass Safe Distance
20 inches.

Mounting Attitude and Position
Horizontal on A.V. mount.

Operational Life
Check before each flight, by use of the test switches.

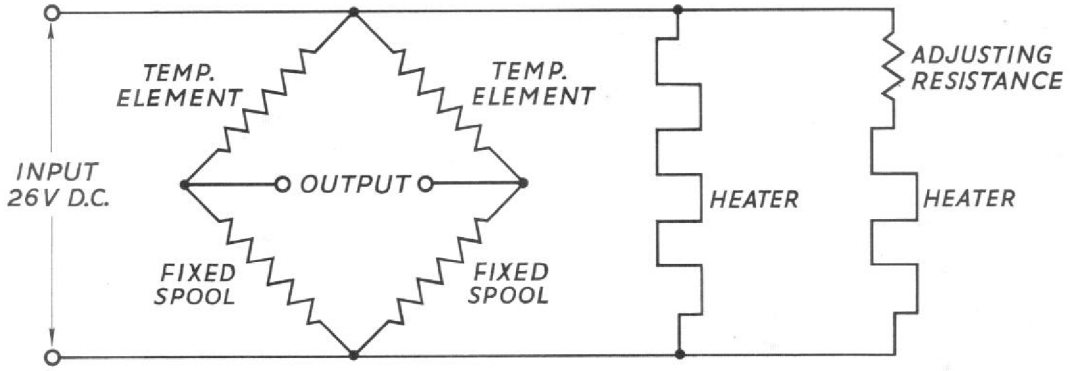


Fig. 6. Model S171 Detector Head Internal Wiring Diagram.

DESCRIPTION OF UNITS

DETECTOR HEAD MODEL S.171 FORM 1

This has been designed around the SANGAMO WESTON Model S.110G. platinum resistance bulb. Two of these together with their associated parts are mounted in tandem in each Detector Head.

The sensing element in the bulb is a strain-free platinum spiral supported on an anodised aluminium former and finally sealed in a stainless steel tube.

This stainless steel tube is used as a former for a heater winding which is made from 34 SWG insulated minalpha wire impregnated with silicone varnish. The heater is then protected with a nickel tube which has a wall thickness of 0·010″.

The manufacture and assembly of the parts is such that hot spots are eradicated. Air gaps are almost completely eliminated, and the response time is a function purely of insulation thickness and mass. The Detector Head is largely unaffected by severe vibration conditions.

Each bulb assembly is mounted directly on to a printed circuit by four connections, two from the bulb and two from the heater. The printed circuit also holds two fixed spools which together with the bulbs, form a Wheatstone bridge circuit.

The baseplate is an anodised die-cast aluminium casting which holds the two connecting plugs. The printed circuit mounts directly on to ledges on the baseplate and is indexed to prevent incorrect assembly. Connections to the plugs are short, stiff, copper wires.

The cover, also, is an anodised die-cast aluminium casting indexed for correct assembly to the base. This form of indexing and the use of a printed circuit makes assembly practically foolproof.

An adjustment spiral is fitted into a false bottom on the detector head. This enables a large amount of heat to be dissipated without appreciably warming the inside of the Detector Head.

The Detector Head is sealed after adjustment so that it is waterproofed, although not necessarily hermetically sealed. The plugs are so arranged that the leads cannot be interchanged.

CONTROL UNIT MODEL S.172

The Control Unit operates when two critical signals are applied to it; one from the Detector Head and one from the Resistance Bulb.

In terms of electrical energy, these signals are relatively weak, but are boosted by the Control Unit to give an output large enough to operate a robust power relay and/or a warning lamp.

The Model S.172 Form 2 Control Unit is fully automatic in that the system is cleared automatically when icing conditions are no longer present, whereas the Model S.172 Form 3 Control Unit is designed for manual re-setting, and must be manually cleared after each operation.

Construction

The components are mounted directly on to a sub-chassis. All connections are made with copper wire insulated with silicone rubber sleeving.

The relay assembly is mounted to the die-cast aluminium base by three 6 B.A. screws, with a further clamp over the whole assembly consisting of a plate which fits on two 6 B.A. pillars. The base is screwed into a die-cast aluminium cover fitted with a rubber gasket seal.

Lead Details

The leads are moulded neoprene cables which, when screwed to the plug of the Detector Head, are completely waterproof. The cable length is unimportant. However, the supply cable must be capable of carrying 3 amperes without an appreciable voltage drop, and the output cable resistance must not exceed 50 ohms.

TEST PROCEDURE

Before carrying out any test, make a visual inspection to ascertain conditions of exterior wiring, plugs and sockets, connections, and so on.

It is considered desirable to include a Test Switch (see Figs. 7 and 9) as a means of checking that the Control Unit is working correctly. This check may be carried out on the ground or in the air. Each switch should be placed in circuit as shown in Figs. 7 and 9, and reference should be made to the table at the end of this publication for recommended types.

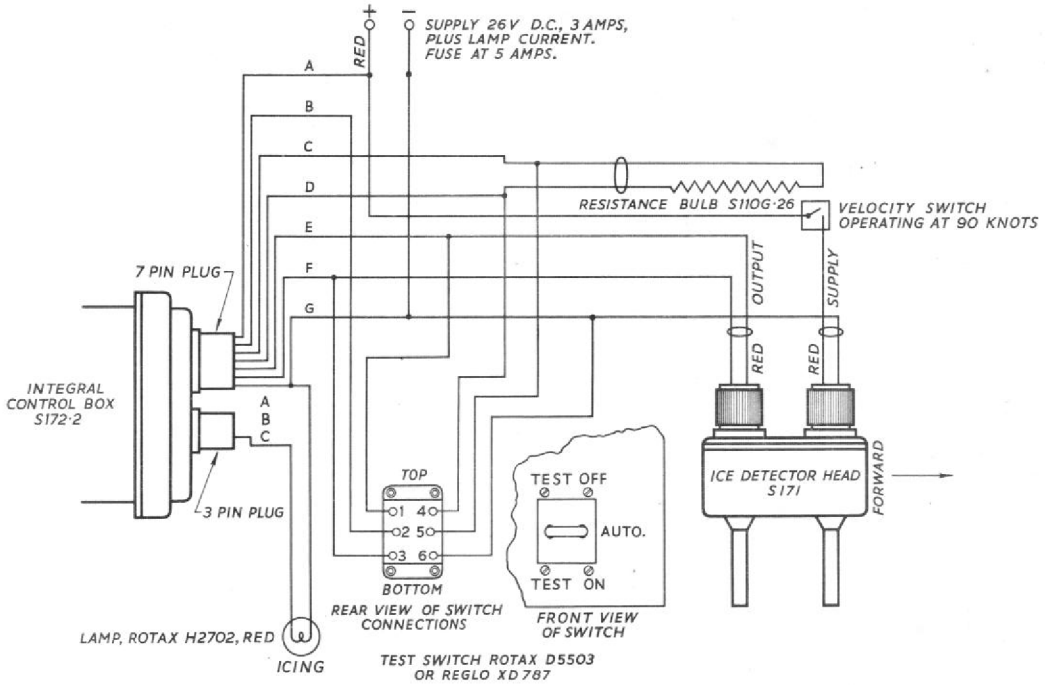


Fig. 7. System Circuit Diagram.
Automatic Re-Set.

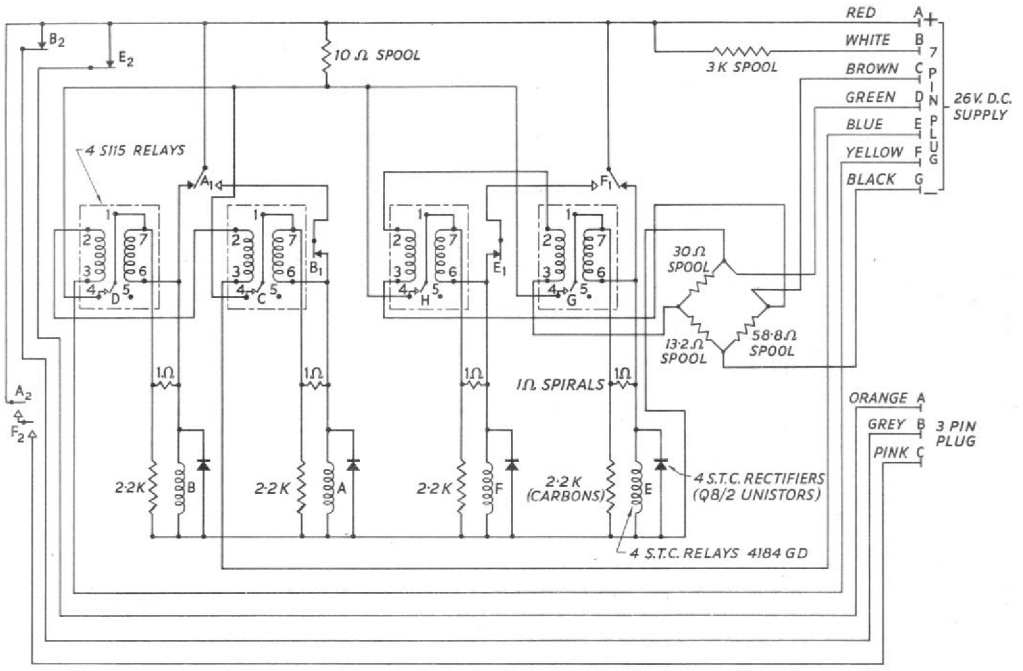


Fig. 8. Control Unit Model S172 Form 2.
Internal Wiring Diagram.

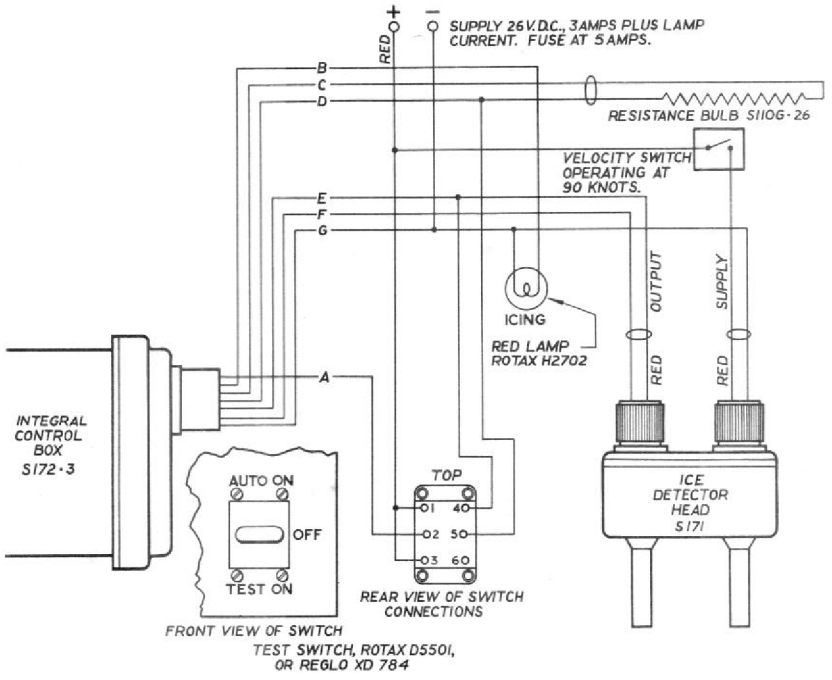


Fig. 9. System Circuit Diagram.
Manual Re-Set

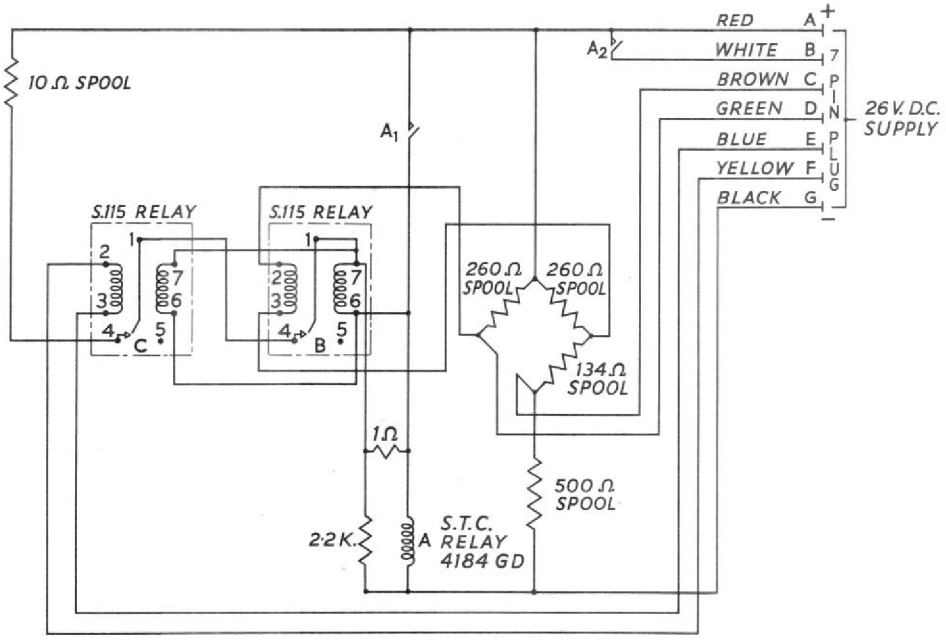


Fig. 10. Control Unit Model S172 Form 3.
Internal Wiring Diagram.

GROUND TESTS

Detector Head Model S.171 Form 1

A resistance check should be made across the input pins of the Detector Head. The resistance value so obtained should be 11 $\pm$ 2 ohms.

Model S.172 Form 2 Automatic Re-set Version

If the approved test switch is used, it will be found that it is biassed to the central (AUTO) position. It has three positions, Top " TEST OFF ", centre " AUTO ", bottom " TEST ON ".

When the switch is placed in the " TEST ON " position, the " ICING " lamp will light. Upon returning the switch to the " AUTO " position, if the ambient temperature is at, or below, the operating point of the system, the " ICING " lamp will remain alight. If, however, the temperature is above this point, the lamp will be automatically extinguished.

If the lamp remains alight due to ambient conditions, it will be extinguished by placing the switch in the " TEST OFF " position.

Upon returning the switch to its central, " AUTO " position, the lamp will remain extinguished.

Model S.172 Form 3 Manual Re-set Version

If the approved test switch is used, it will be found to have three positions, top " AUTO ", centre " OFF" bottom " TEST ON ".

When the switch is placed in the " TEST ON " position, the " ICING " lamp will light, but will go out when the switch is moved to the central " OFF " position. Upon returning the switch to the " AUTO " position, the " ICING " light will remain out.

WHEN CARRYING OUT TESTS AS SPECIFIED UNDER THE PREVIOUS TWO HEADINGS, THE POSITIVE LINE TO THE DETECTOR HEAD MUST BE BROKEN. FAILURE TO DO THIS MAY RESULT IN THE BURNING OUT OF THE HEATED ELEMENTS. NORMALLY, WHEN THE AIRCRAFT IS ON THE GROUND, THE DETECTOR HEAD IS PROTECTED BY A RAM SWITCH, OR AN UNDERCARRIAGE SWITCH, BUT SHOULD UNDERCARRIAGE OR CERTAIN ELECTRICAL TESTS BE CARRIED OUT CONCURRENTLY WITH THE ICE WARNING SYSTEM TESTS, IT MAY BE THAT THESE PROTECTIVE DEVICES ARE RENDERED IN-OPERATIVE. SPECIAL CARE MUST BE TAKEN REGARDING THIS.

FLIGHT TESTS

Model S.172 Form 2 Automatic Re-set Version

When the test switch is moved to the " TEST ON " position, the " ICING " lamp will light. When the switch is moved to its central " AUTO " position the lamp will stay alight if icing conditions are present, but will go out if there are no icing conditions to affect the system.

When the switch is moved to the " TEST OFF " position, the " ICING " light, if it is on, will be extinguished. Depending, again, on prevailing conditions, the lamp may re-light or remain extinguished, when the switch is moved to its centre position.

Model S.172 Form 3 Manual Re-set Version

When the test switch is moved to the " TEST ON " position, the " ICING " lamp will light, and will go out when the switch is moved to its central " OFF " position.

When the switch is moved to the " AUTO " position, the " ICING " light, may, depending on prevailing conditions, re-light, or remain extinguished.

FAULT FINDING

FLIGHT CONDITIONS

Symptom	What to Check	Remedy	Remarks
Equipment operates when not under icing conditions.	Operate " OFF " Test Switch, when fitted, and note operation of equipment. If equipment then functions, original fault was probably due to aircraft manoeuvre.		
	If equipment returns to " ON " position, probably due to failure in Detector Head.	Full equipment must be ground tested.	See General Test Schedule.
No operation under Icing conditions.	Operate "ON", then "OFF" switches, when fitted, and note operation of equipment.		
	If equipment does not function, probably due to sticky relay.	Full equipment must be ground tested.	See General Test Schedule.

GROUND CONDITIONS

Symptom	What to Check	Remedy	Remarks
Equipment does not operate when " ON " test switch is operated.	Check according to General Test Schedule. Page 2	—	Before carrying out any tests, make absolutely sure that supplies are " ON " to the Control Unit.
Equipment does not switch itself off when " OFF " test switch is operated.	Check according to General Test Schedule. Page 2	—	—
Resistance across input pins from Detector Head is incorrect.	Check resistance across input pins from Detector Head. Should be 11 $\pm$ 2 ohms.	Non - repairable item. Return to manufacturers.	This is usually caused by switching the Detector Head " ON " under static air conditions.

GENERAL TEST SCHEDULE

CONTROL UNIT

1. VISUAL EXAMINATION

Model S.172 Forms 2 and 3

All Control Units must be examined in order to check that they conform to Figs. 3 and 4, and in respect of mechanical defects such as loose screws, deformed cases, and so on.

2. SENSITIVITY CHECK

Model S.172 Form 2

(*a*) Connect the Control Unit as shown in Fig. 7, but omit the Detector Head and Resistance Bulb.
(*b*) Connect an adjustable resistance box in place of the Resistance Bulb and set to 133·7 ohms.
(*c*) Connect a source of variable current and a microammeter to pins E and F, making pin E positive. Set the supply volts to 27 volts D.C.
(*d*) Set current to +40 mic.A. and adjust resistance box until light comes on. The resistance must be between 131·5 and 132·5 ohms.
(*e*) With current at +40 mic.A. adjust resistance box until light goes out. The resistance must be between 135 and 136 ohms.
(*f*) Repeat (*d*).
(*g*) Set resistance box to 131·5 ohms and adjust current until light goes out. The current must be between —10 to —40 mic.A.
(*h*) With resistance box set to 131·5 ohms adjust current until light goes on. The current must be between +10 to +40 mic.A.
(*i*) Repeat (*g*).

3. SENSITIVITY CHECK

Model S.172 Form 3

(*a*) Connect the control unit as shown in Fig. 9, but omit the detector head and resistance bulb.
(*b*) Connect an adjustable resistance box in place of the resistance bulb, and set to 134 ohms.
(*c*) Connect a source of variable current and a microammeter to pins E and F, making pin E positive. Set the supply volts to 27 volts D.C.
(*d*) Set current to +40 mic.A. and adjust resistance box until the light comes on. The resistance must be between 131·5 and 132·5 ohms.
(*e*) Set current to zero, and resistance box to 134 ohms. Operate re-set switch.
(*f*) Set resistance box to 131·5 ohms and adjust current until light goes on. The current must be between +10 and +40 mic.A.
(*g*) Repeat (*e*).
(*h*) Repeat (*d*).
(*i*) Repeat (*e*).
(*j*) Repeat (*f*).

CONSTANTS APPLICABLE TO MODEL S.172 FORMS 2 AND 3 CONTROL BOXES

1. A current of 30 mic.A. is equivalent to the signal created by a water concentration of ·01 gm/cubic metre.
2. The resistance limits of 131·5 to 132·5 ohms are equivalent to temperatures of +3°C. and +5°C. respectively.
3. The resistance limits of 135 and 136 ohms are equivalent to temperatures of +10°C. and +12°C. respectively.

INSULATION TEST

Model S.172 Forms 2 and 3 Control Boxes must be tested for insulation as follows.

(*a*) The insulation resistance must be measured between all pins and the case.
(*b*) The reading must be taken after one minute's electrification at 500 volts D.C.
(*c*) The value of insulation resistance so obtained must not be less than 20 megohms.

TROUBLE SHOOTING (BENCH TESTING PROCEDURE)

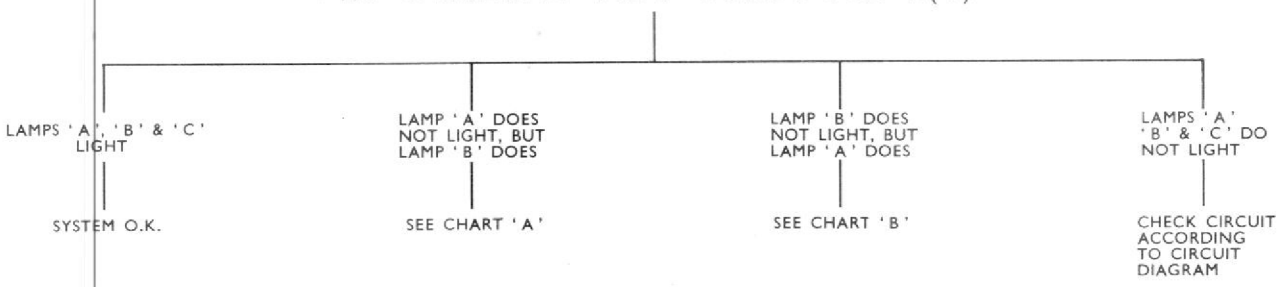
All checks for the Form 2 Control Box as laid down in the following tables should be made with two extra lamps included in the circuit. These are in addition to the lamp already fitted, and are to be equivalent to Rotax type H.2702. They are to be wired in to the 3 pin plug so that one goes between pin A and the negative line, whilst the other goes between pin B and the negative line. The three lamps will be referred to in the tables as lamps A, B and C respectively.

The Form 3 Control Box has only one lamp which is used throughout the tests as laid down in Chart E.

Make sure that all components used for checking purposes are satisfactory, and before proceeding with detailed tests, open the case and check for faulty or loose connectons.

All components necessary for testing, as laid down in "General Test Schedule" and "Trouble Shooting", are contained in our Model S.226 Test Set. This should be used wherever possible in order to simplify testing procedure.

USING PARAMETERS AS LAID DOWN IN GENERAL TEST SCHEDULE 2(d)



MODEL S172 FORM 2

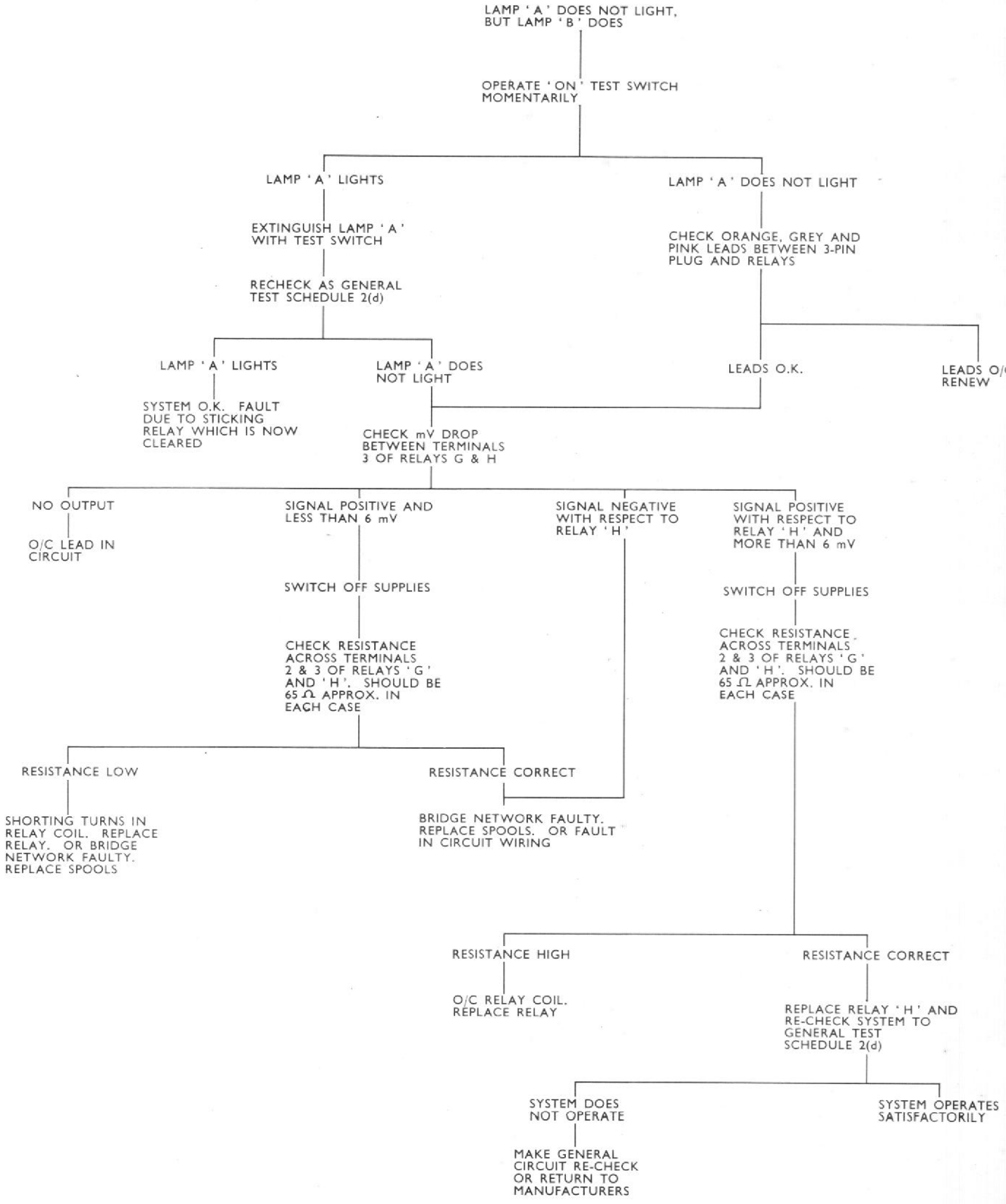


CHART 'A'

MODEL S172 FORM 2

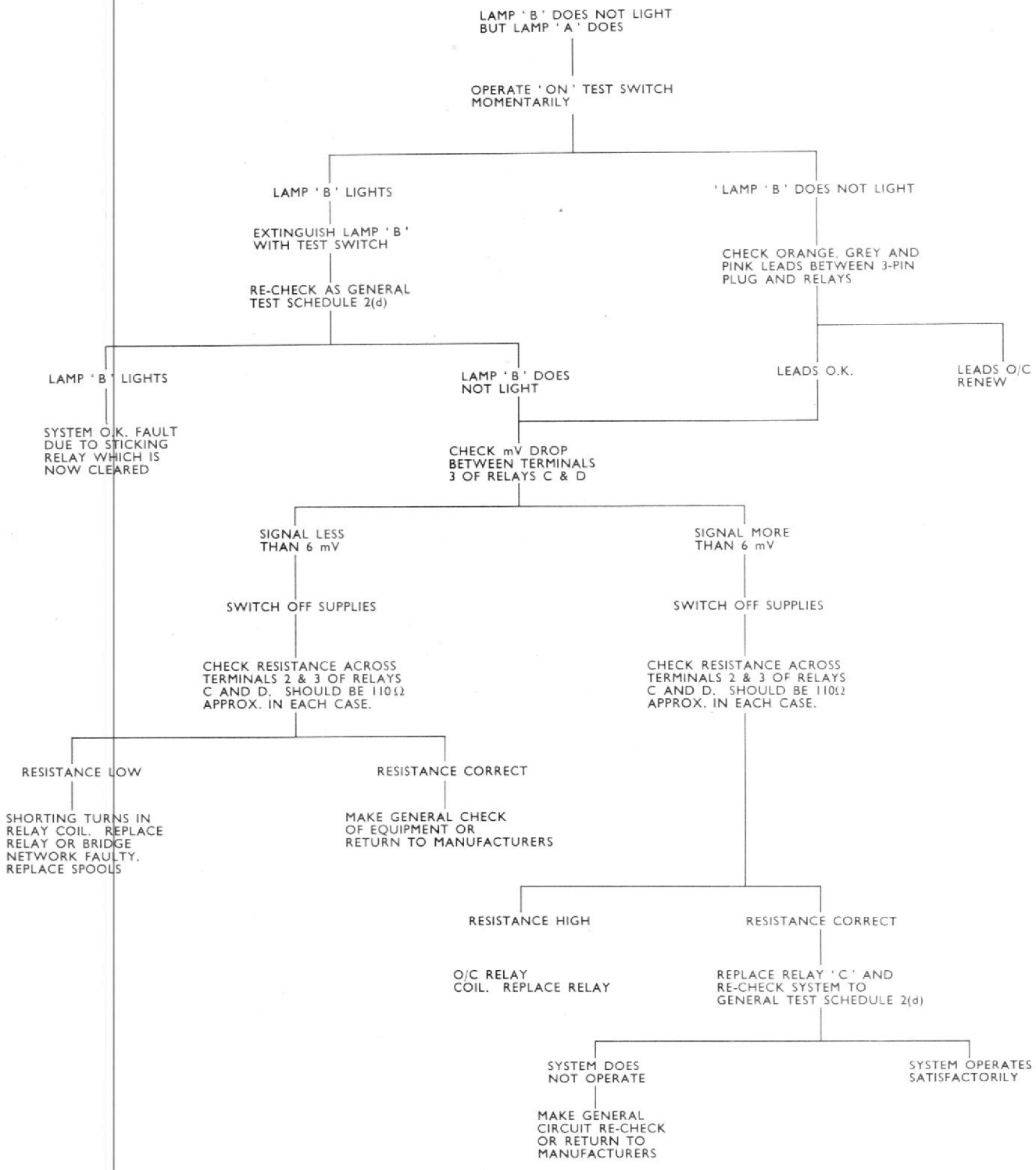


CHART 'B'

MODEL S172 FORM 2

USING PARAMETERS AS LAID DOWN IN GENERAL TEST SCHEDULE 2(e)

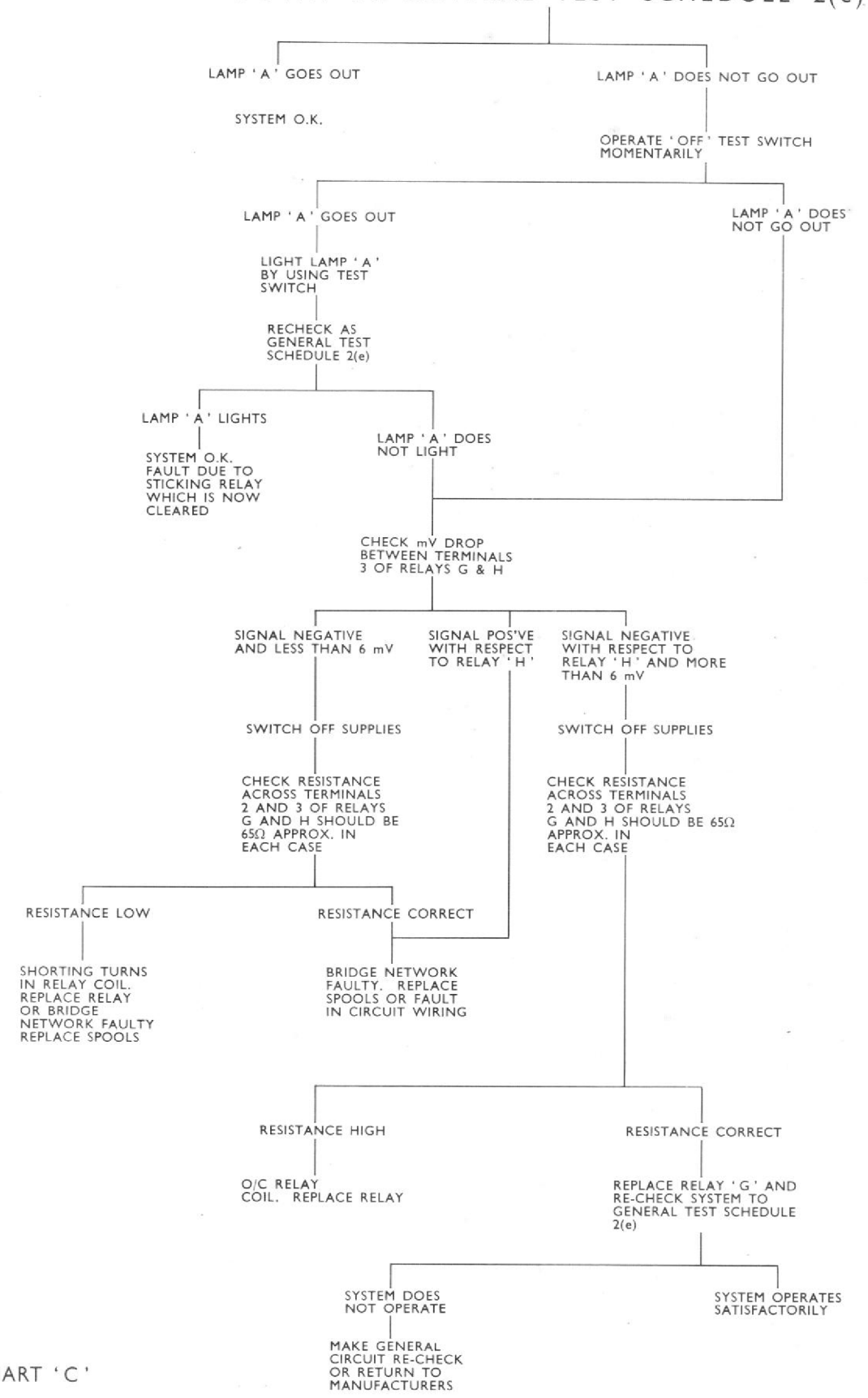


CHART 'C'

MODEL S172 FORM 2

USING PARAMETERS AS LAID DOWN IN GENERAL TEST SCHEDULE 2(g)

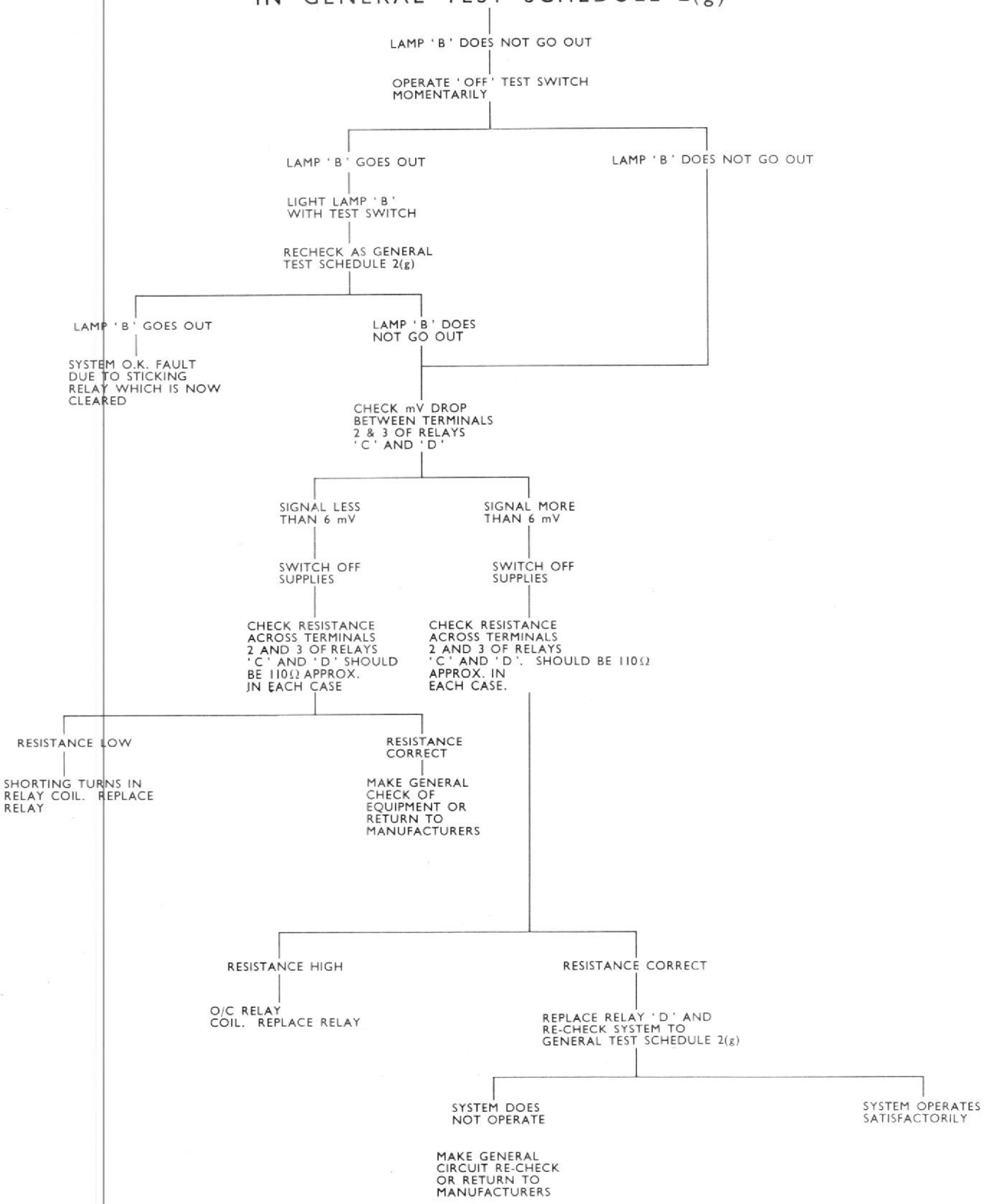


CHART 'D'

MODEL S172 FORM 2

SANGAMO WESTON

USING PARAMETERS AS LAID DOWN IN GENERAL TEST SCHEDULE 3(d) AND 3(f)

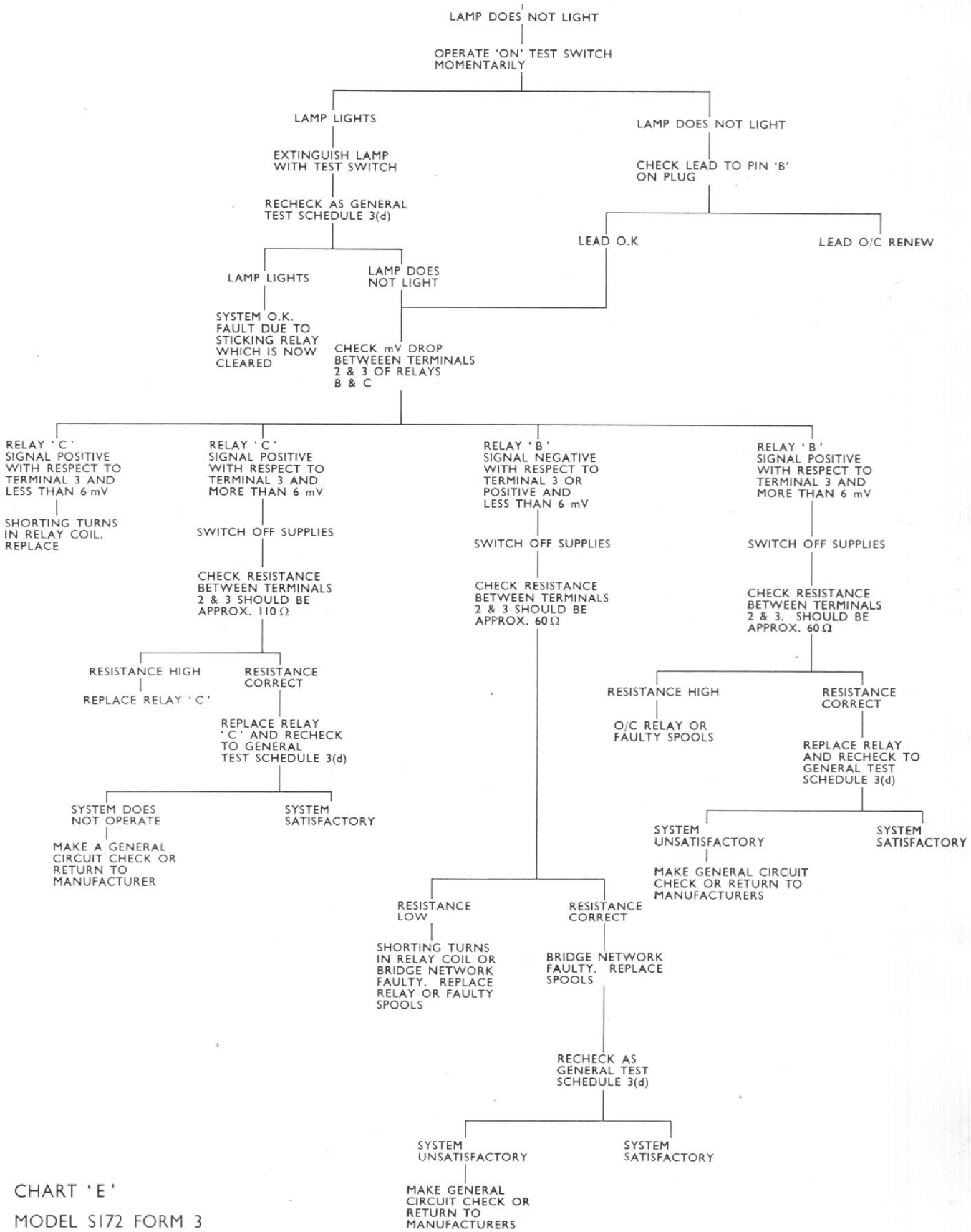


CHART 'E'

MODEL S172 FORM 3

SMELL OF BURNING FROM CONTROL BOX

OVERHEATING SPOOLS

CHECK POLARITY OF SUPPLIES

CHECK RECTIFIERS
RECTIFIER BREAKDOWN
WOULD CAUSE HIGH CURRENT
TO PASS THROUGH SPOOLS

MAKE GENERAL
CIRCUIT CHECK

REPLACE ANY UNSERVICEABLE
RECTIFIER AND REPLACE ALL
SPOOLS ON SPOOL PLATE.

NOTE: RECTIFIER BREAKDOWN
WILL INVARIABLY LEAD TO
SEVERE RELAY CONTACT
BURNING DUE TO THE
PASSING OF AN EXCESSIVELY
HIGH CURRENT

RECOMMENDED ANCILLARY EQUIPMENT

MODEL S.172

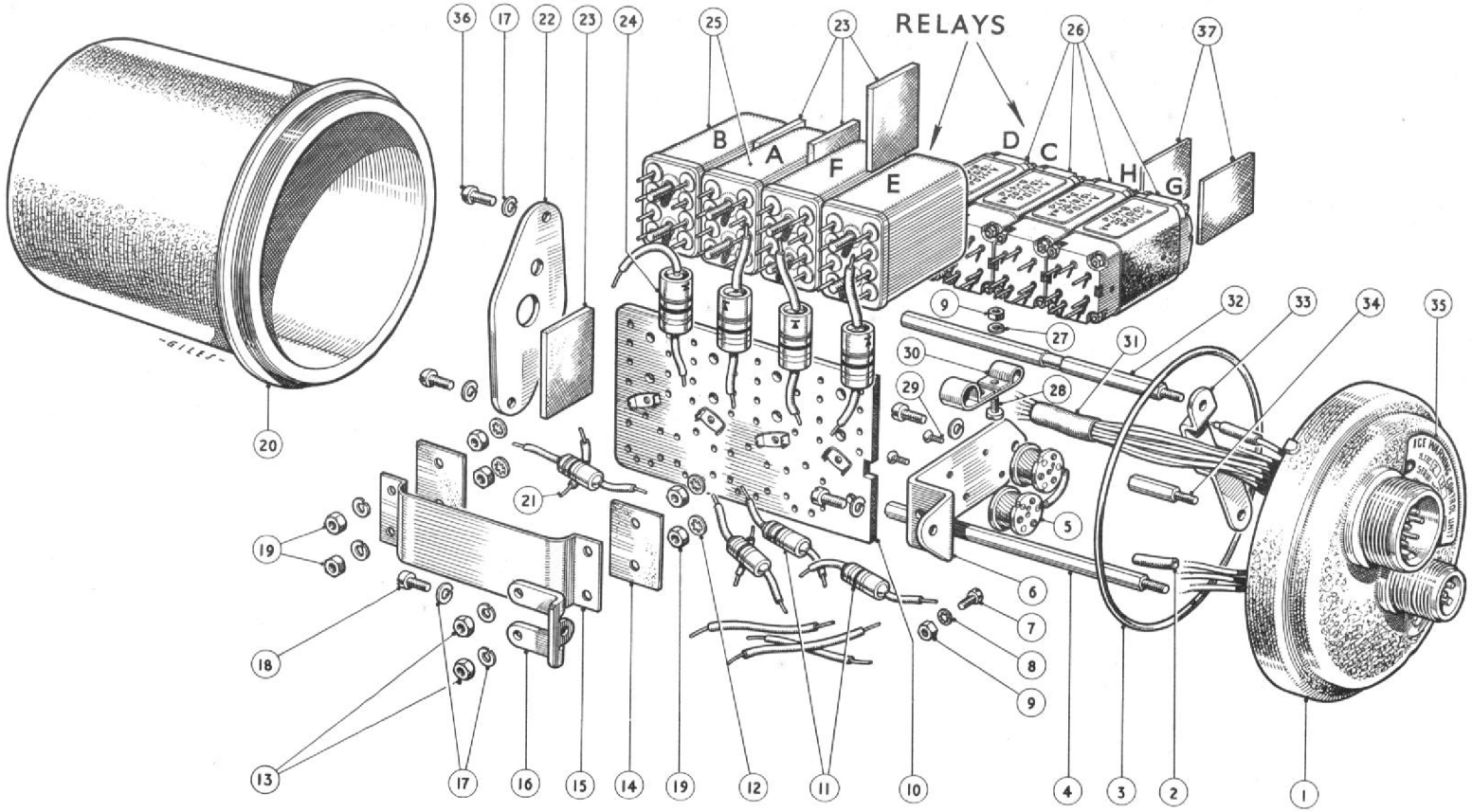
A.V. Mounting Bracket (S.172 Form 2)	Sangamo Weston Part No. 172354
A.V. Mounting Bracket (S.172 Form 3)	Sangamo Weston Part No. 171962
Lampholder, Red	Rotax Part No. H.2702
Caption, " ICING "	Ministry Ref. 5C/1638 Sangamo Weston Part No. 172366
Lamp, 24V. 2·8W.	Ministry Ref. 5L/1928 Sangamo Weston Part No. 172367
Ram Air Pressure Switch	Teddington Controls Part No. FGW/A/6 Ministry Ref. 5C/4259 Sangamo Weston Part No. 172368

FORM 2 ONLY

Double Pole Switch	Ministry Ref. 5CW/4224 Reglo Part No. XD/787 Rotax Part No. D/5503 Sangamo Weston Part No. 172365

FORM 3 ONLY

Double Pole Switch	Ministry Ref. 5C/4199 Reglo Part No. XD/784 Rotax Part No. D/5501 Sangamo Weston Part No. 172364



Model S172 Form 2.

PARTS LIST

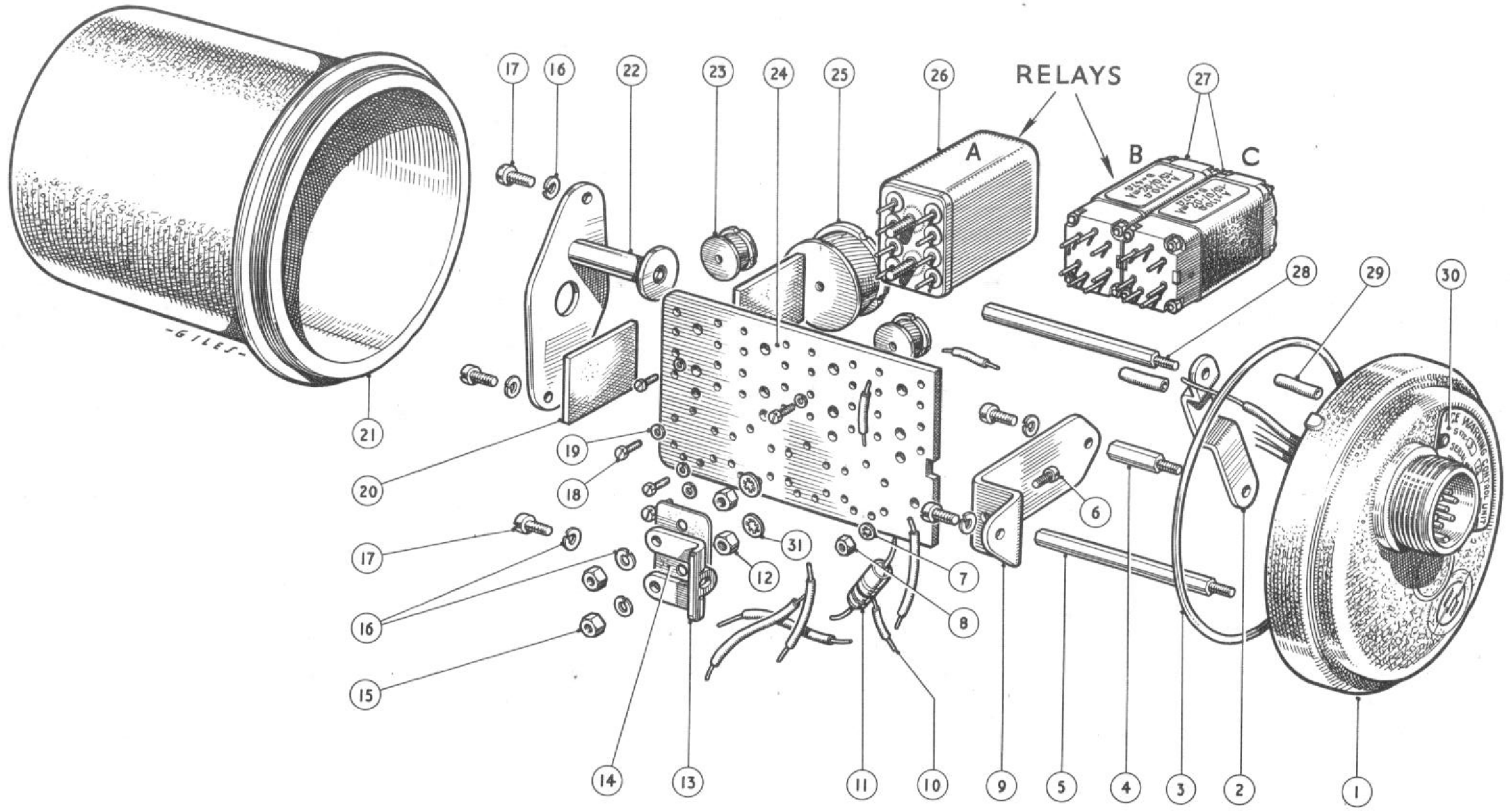
MODEL S.172 FORM 2

Ref. No.	Description	Part No.	No. Off	Estimated requirement for 100 instruments
1	Base	171970	1	2
2	Sleeve Insulation	171360	10	3 ft.
3	Ring, Rubber Sealing	169847	1	1
4	Stud, Clamping	171954	1	5
5	Spool	Specify Code No.	5	25 sets
6	Plate, Spool	171953	1	—
7	Screw 8 B.A. × $\frac{5}{16}$"	96646	1	—
8	Washer Shakeproof 8 B.A.	94469	1	—
9	Nut Lock 8 B.A.	150178	3	—
10	Plate Mounting	171949	1	—
11	Carbon Resistor 2·2K ±10%	169306/2·2K ±10%	4	5
12	Washer Shakeproof 6 B.A.	150376	8	—
13	Nut Lock 6 B.A.	90605	2	—
14	Insulator	171968	2	5
15	Strap Rectifier	171967	1	—
16	Bracket Relay	171957	1	—
17	Washer Lock 6 B.A.	156976	9	—
18	Screw 6 B.A. × $\frac{5}{16}$" Ch. Hd.	150138	3	—
19	Nut Full 6 B.A.	112243	10	—
20	Cover	169848	1	1
21	Resistance 1 ohm	171963	4	10
22	Plate Clamping	171959	1	—
23	Packing Piece (Hallprene)	171961	4	5
24	Rectifier ' Unistor '	171966	4	10
25	Relay Midget	171965	4	10
26	Relay S.115	Specify Code No.	4	10
27	Washer Lock 8 B.A.	103854	2	—
28	Screw 8 B.A. × $\frac{3}{16}$" Thin Hd.	91377	2	—
29	Screw 10 B.A. × $\frac{3}{16}$" C'sk	150310	5	—
30	Strap Cable Form	171960	1	—
31	Sleeve Cable Form	172307	1	1 ft.
32	Stud Clamping (Cable Form Strap)	171955	1	5
33	Bracket, Relay Support	171958	1	—
34	Pillar	171956	1	5
35	Nameplate	Specify Code No. 171964	1	2
36	Screw 6 BA × $\frac{5}{16}$" Rd.	94319	2	—
37	Packing Piece, Relay	172585	As Req'd	As Req'd

NOT SHOWN

NOTE: SANGAMO WESTON Code Number appears on Nameplate fixed to Base.

The items printed in blue should be stocked by the customer in order to cater for conditions arising due to careless handling or accidental damage. They are quoted for this purpose only and do not form part of a normal overhaul requirement.



Model S172 Form 3.

PARTS LIST

MODEL S.172 FORM 3

Ref. No.	Description	Part No.	No. Off	Estimated requirement for 100 instruments
1	Base	172311	1	2
2	Bracket, Relay Support	171958	1	—
3	Ring, Rubber Sealing	169847	1	1
4	Pillar	171956	1	5
5	Stud, Clamping (Long)	172316	1	5
6	Screw 8 B.A. × $\frac{5}{16}$"	96646	1	—
7	Washer, Shakeproof 8 B.A.	94469	1	—
8	Nut Full 8 B.A.	150168	1	—
9	Bracket Relay Support	172315	1	—
10	Resistance 1 ohm	171963	1	2
11	Carbon Resistor 2·2 K ±10%	169306/2·2 K ±10%	1	2
12	Nut, Lock 6 B.A.	90605	2	—
13	Bracket Relay	171957	1	—
14	Insulator	171968	1	2
15	Nut, Full 6 B.A.	112243	2	—
16	Washer, Lock 6 B.A.	156976	7	—
17	Screw 6 B.A. × $\frac{5}{16}$" Ch. Hd.	150138	5	—
18	Screw 10 B.A. × $\frac{3}{16}$" Ch. Hd.	150330	5	—
19	Washer, Lock 10 B.A.	153367	5	—
20	Packing Piece (Hallprene)	171961	2	2
21	Cover	169848	1	1
22	Plate, Clamping	172314	1	—
23	Spool (Small)	Specify Code No.	4	20 sets
24	Plate, Mounting	171950	1	—
25	Spool (Large)	Specify Code No.	1	5 sets
26	Relay Midget	171965	1	2
27	Relay S.115	Specify Code No.	2	5
28	Stud, Clamping (Short)	172317	1	5
29	Sleeve Insulation	171360	7	2½ ft.
30	Nameplate	Specify Code No. 171964	1	2
31	Washer, Shakeproof 6 B.A.	150376	2	—

NOTE: SANGAMO WESTON Code Number appears on Nameplate fixed to Base.

The items printed in blue should be stocked by the customer in order to cater for conditions arising due to careless handling or accidental damage. They are quoted for this purpose only and do not form part of a normal overhaul requirement.