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.

MODEL S.149
HERMETICALLY SEALED INSTRUMENT

Information contained in this manual affecting safe operation, maintenance and overhaul has been verified and approved by the Air Registration Board in accordance with Chapter A6-2 of British Civil Airworthiness Requirements. 28.11.56.

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

Date of Model Introduction 1955

SANGAMO WESTON LIMITED.

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SANGAMO WESTON LIMITED
MODEL No. S 149

AMENDMENT RECORD SHEET

A.L. No.	Signature	Date	Remarks
1		8/5/58	S149 Page 1 Item 1.
2		8/5/58	S 149 Page 3 Item 1
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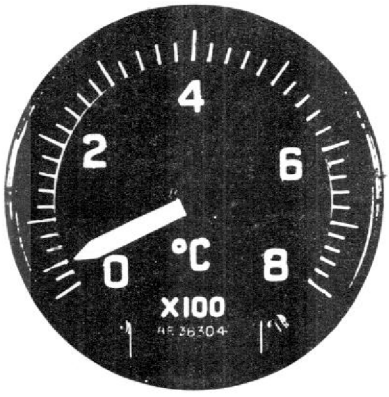
MODEL S.149 HERMETICALLY SEALED INSTRUMENT



Typical Scale Presentation

DESCRIPTION

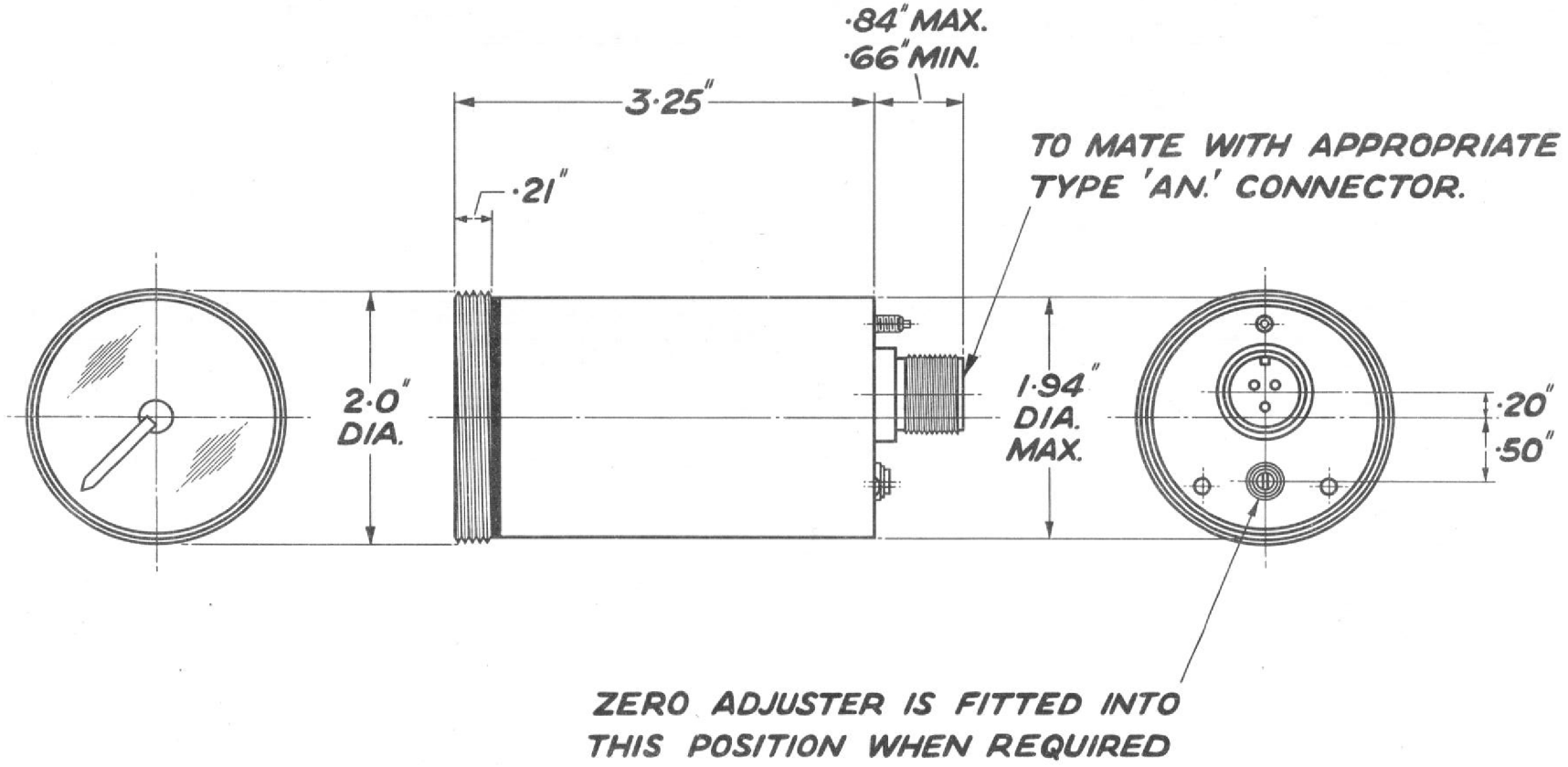
This is a circular scale moving coil instrument contained in a 2″ diameter flangeless hermetically sealed case. Various movements may be mounted inside the case and the Model is divided into 3 forms.

Form 1 is a single ratiometer movement.

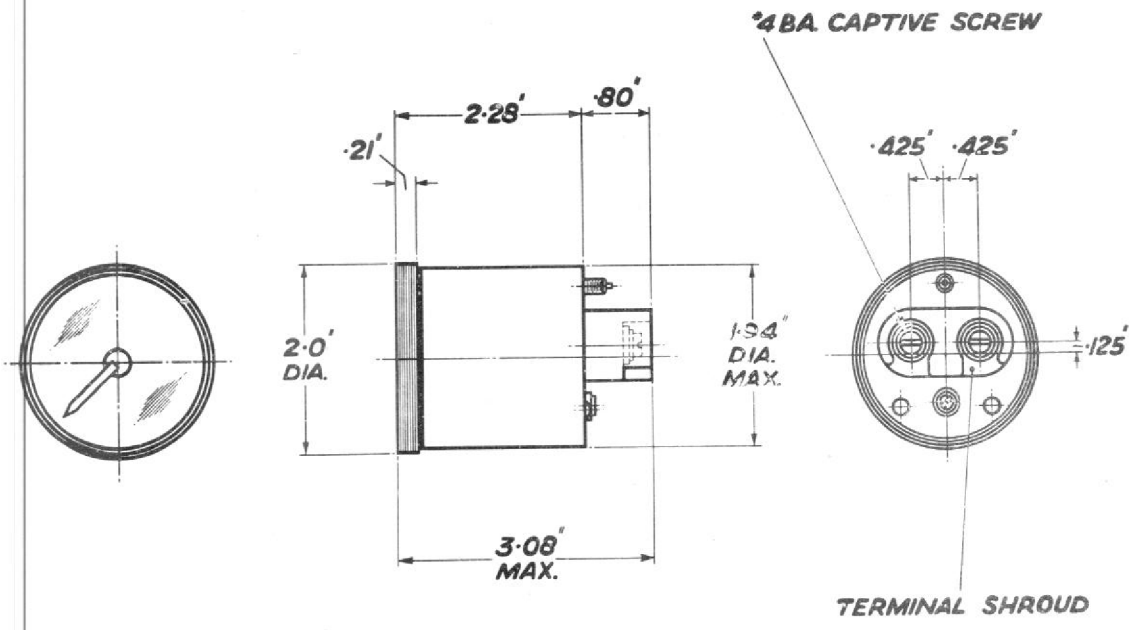
Form 2 is a standard moving coil instrument which may be a Voltmeter, Ammeter, Milliammeter etc.

Form 3 has a shortened case and is used for particular ranges of instruments.

The connections for Forms 1 and 2 are taken through a 3, 7 or 10 pin Cannon plug. The Form 3 version has terminal connections.



Fixing Diagram
Model S.149 Forms 1 and 2



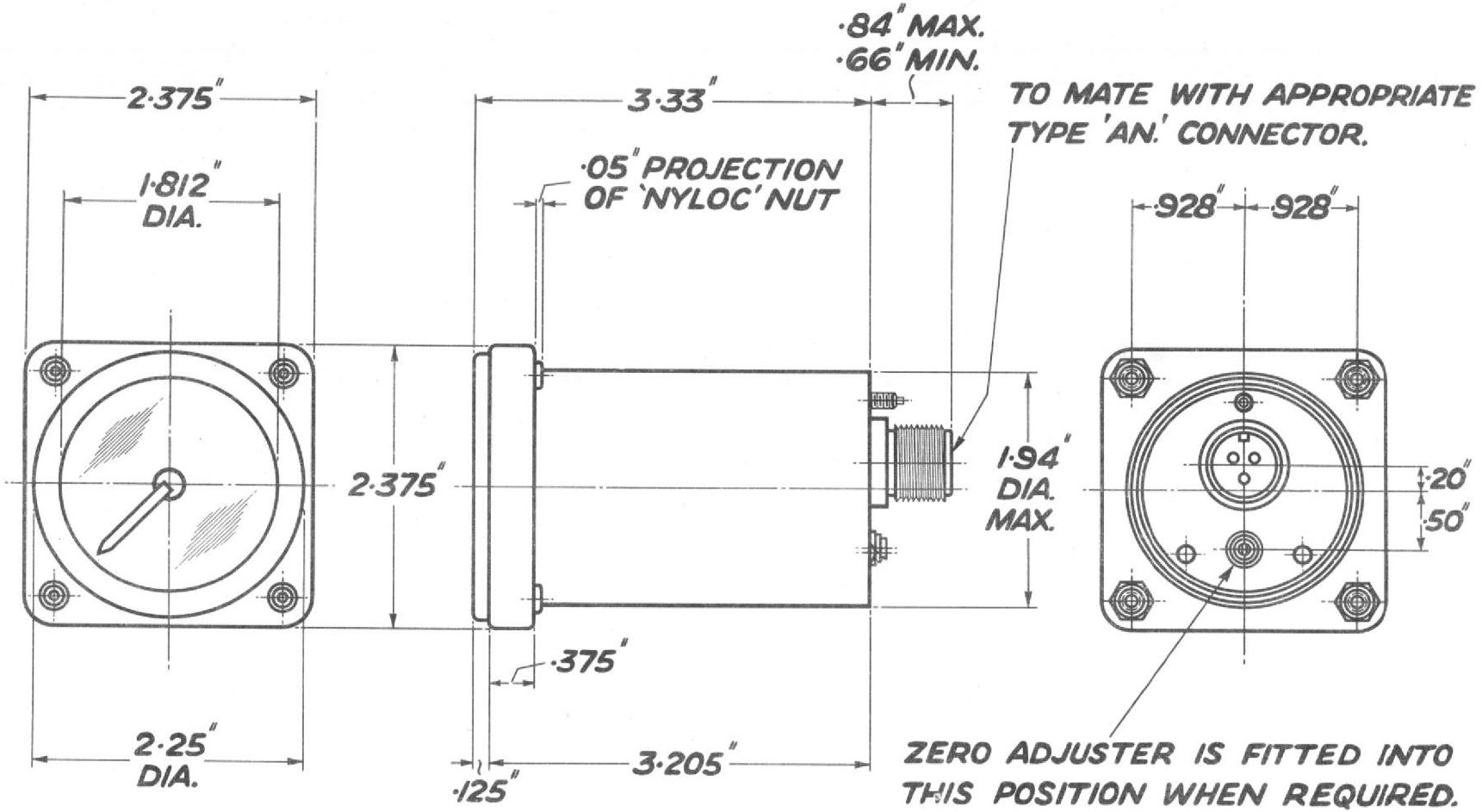
Fixing Diagram
Model S.149 Form 3

DECLARATION

INFORMATION REQUIRED BY BRITISH STANDARD G.100

MODEL S.149 FORMS 1, 2 and 3

Weight	FORM 1	11¼ ozs.
	FORM 2	10¼ ozs.
	FORM 3	9¾ ozs.
Max. storage period without preservation packing		2 years
Acceleration Grade		1B
Climatic Grade		1
Altitude Rating		60,000 ft.
Vibration Grade		3 (when mounted on instrument flight panel).
Fire Resistance Grade		Fire Resistant.
Compass Safe Distance		8 inches.
C. G. Position	FORM 1, FORM 2	1⅜" back from glass along geometric centre.
	FORM 3	1⅛" back from glass along geometric centre.



Fixing Diagram
S.A.E. Flange

INSTALLATION

The instrument must be insulated from aircraft vibration. Normally it should be fitted to the instrument flight panel where it will operate satisfactorily. It must be mounted with its scale in a vertical plane when the aircraft is in level flight.

If it is required to mount the instrument in a panel cutout which has been made to take a normal small S.A.E. fixing flange, an adaptor can be supplied to cater for this condition.

METHOD OF TEST

The method of test varies according to the type of instrument. Customers are, therefore, advised to contact the manufacturers to obtain the necessary information. The instrument Code Number should be quoted.

HIGH VOLTAGE TEST

A potential of 1,000 volts R.M.S. must be applied for one minute between the following parts:

(a) All pins or terminals connected in parallel and the case.

(b) All pins or terminals connected in parallel and a conductor resting in contact with the external surface of the zero adjuster.

There must be no sign of breakdown, flashover or incipient failure.

INSULATION TEST

The insulation test which must follow immediately after the high voltage test shall be as follows.

The insulation resistance between the connections and the case when measured after one minute of electrification at 500 volts D.C. shall not be less than 20 megohms.

MAINTENANCE AND REPAIR

If the fault is obviously electrical the first step is to check the connections to the movement. An electrical check of the movement itself will be necessary if no fault is revealed by the initial investigation.

To do this, first remove the sealing pin by unsoldering it from its stud.

Remove the back plate by pulling the rip wire and taking out the seating ring. This permits the assembly to be withdrawn. Make sure that the moving coil is definitely the part affected and that the fault is not caused by a defective spool or damaged springs or ligaments. If these appear intact make a resistance test across the coil.

The resistance values may be obtained from the manufacturer on application.

If the moving coil is to be replaced proceed as follows:

FORM 1

Strip down to movement complete. Remove the pointer return unit if fitted, then the yoke and the magnet.

Disconnect the top ligament and remove the bridge, bridge studs, top plate, and the tee piece. Remove the bottom bridge and release the bottom core. Take off the bottom ligaments. The cores and coils may now be withdrawn. Replace the new coil in a sequence of operations in a reverse order to those already quoted but solder the new ligaments to the coil ends before replacing the bridges.

NOTE.—For instruments employing oil-damped movements, a new top bridge will be required. To assist identification, bridges fitted with oil-damped jewels are marked with a paint spot on their outer surface, the colour of which signifies the viscosity grade of the oil.

When the bridges are in place, the coils must be centred longitudinally so that the gaps between them and the top and bottom plates are equal.

Thermal expansion of the moving coils may occur in this model and allowance for this should be made when adjusting the jewels.

Where an oil-damped jewel is fitted, pointer " flop " will not be noticeable, and, therefore, cannot be used as a reference. In this case the test for correct adjustment is the free movement of the pointer together with a minimum amount of " end-shake " in the movement itself. It must be stressed that on no account should the jewel screw be tightened so that no " end-shake " is present.

RAISING THE MAGNET

Replace the magnet and yoke making sure that they are correctly located. The magnet must now be raised to its correct strength. The magnetising force required may be obtained from a coil giving a peak value of not less than 50,000 ampere turns. Refer to detailed information for polarities.

CHECKING MAGNETIC POLARITY

With the common end of the two coils connected to the positive of the D.C. supply and with equal currents of a few milliamps flowing in each coil, the instrument should indicate approximately mid-scale.

CHECKING EFFICIENCY OF MAGNET RAISING

If the magnet has been raised to its correct strength, a significant torque figure for a 90° displacement of the pointer from mid-scale should be reached. It will be apparent that the figure will vary for different types of instruments and the manufacturers should be consulted for the relevant information.

STABILISING PROCEDURE

Before any necessary recalibration the complete instrument assembled in its case must be baked at a temperature of 70°C. (158°F.) for a period of not less than 8 hours.

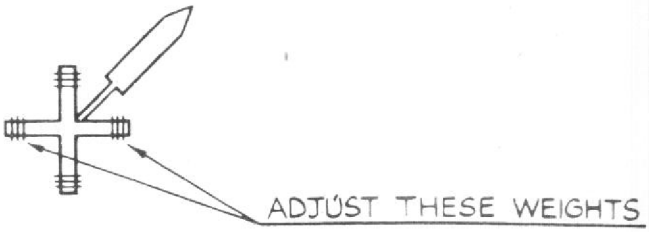
REBALANCING

Should the instrument need rebalancing after the process detailed in the previous paragraph proceed as instructed under the heading " Balancing the Movement ".

BALANCING THE MOVEMENT

The balance weights are adjusted in pairs. If necessary, release the pointer return unit with the thumb. With the instrument in a horizontal position, allow the pointer to come to rest. The pointer is kept in this position on the scale to minimise the effect of ligament drag.

Turn the instrument to a vertical position so that the pointer is as shown, and adjust the horizontal weights.



When the movement is balanced in this position, turn the instrument through 90° and adjust the other two weights as shown.

FORM 2

Strip down to the movement complete. Remove the yoke and the magnet.

Disconnect the springs and remove the bridge, bridge studs, top plate and the tee piece. Remove the bottom bridge and release the core. The core and the coil may now be withdrawn.

Replace the moving coil in a sequence of operations in a reverse order to those already quoted, but before replacing the bridges make sure that the return spring is in its original angular position relative to the coil. When this has been verified the bridges may be refitted.

Carry out jewel adjustments (see paragraph " Adjustment of Jewels "). Refer to the note regarding oil-damped jewels given in the Form 1 Section, as under certain conditions this may apply to Form 2 instruments.

The outer ends of the return springs are now to be soldered into position on the bridges.

When the bridges are in place the core must be centred longitudinally so that the gaps between it and the top and bottom plates are equal.

RAISING THE MAGNET

The procedure for this operation is exactly the same as for the Form 1 version.

CHECKING MAGNETIC POLARITY

Check that the pointer moves upscale when the instrument connection pins are connected to the relative positive and negative of the output.

AGEING THE MAGNET

In general, instruments should be aged to full-scale deflection by the application of a 50 cycle A.C. field. This applies in all cases except where specified by the manufacturer.

BALANCING THE MOVEMENT

The balance weights are adjusted in pairs. With the instrument in a horizontal position allow pointer to come to rest. Turn the instrument to a vertical position so that the pointer is as shown for Form 1 and adjust the horizontal weights.

When the movement is balanced in this position turn the instrument through 90° and adjust the other two weights.

STABILISING PROCEDURE

After ageing the magnet and before any necessary recalibration, the complete instrument assembled in its case must be baked at a temperature of 70°C. for a period of not less than 8 hours.

REBALANCING

Should the instrument need rebalancing after the process detailed in the previous paragraph, proceed as instructed under the heading " Balancing the Movement ".

FORM 3

Procedures for Form 3 are exactly the same as those for the Form 2, the only difference being that the case is shortened and terminals are fitted instead of a plug.

The information which follows, applies to all forms of the S.149 instrument.

JEWEL ADJUSTMENT

Jewel adjustment is carried out by turning the jewel screw clockwise in small increments in the order of 1/10th turn until pointer " flop " just disappears. (" Flop " is the movement of the pointer due to the pivots being able to move laterally in the jewels.)

Back off the jewel screw by an amount of 1/8th to 1/10th turn until a definite pointer " flop " is apparent.

PRE-SEALING TREATMENT

Any tests which have to be made on this instrument must be carried out with the instrument assembled into its case, but before the drying and sealing process.

When the instrument has been tested for accuracy and appearance, it must be carefully inserted into the cover, which must have any excess solder cleaned from the inside. Place the seating ring over the back so that it fits down inside the cover.

Open the cover from the base approximately ½" and place the whole instrument in an oven at 70°C. for an overnight drying-out period.

COVER TO BACK PLATE SEALING

This must be carried out within one hour of removal of the instrument from the drying oven. If this is not possible the instrument must be kept in a dry atmosphere. Failure to do this will necessitate a redrying period as specified in the previous paragraph.

Replace the cover fully over the instrument so that the rim of the back plate is resting on the seating ring.

Fit the sealing wire into the gap between the back plate and the cover edge. The wire should fit snugly into this gap leaving no spaces.

The wire is then to be soldered into position. The flux to be used must be such that no neutralising process is necessary. Use a low temperature (180°C.) solder.

The soldered joint must be flat, level with the back plate, and shall be such that the back plate is completely sealed to the case. Care should be taken at the overlap point to ensure that such a seal is obtained, but that the external overlap is not completely embedded in solder and is capable of being prised up for removal of the wire as and when required.

The soldering process is best achieved by using a large soldering iron to apply local heat and gradually flowing the solder round the case. It is essential that the case temperature should be kept low and that the whole operation is carried out as swiftly as possible.

SEALING TEST

The vent at the rear of the case must be connected to an external pumping source which will remove air from the case. By the use of a change-over valve the evacuated case must be filled with dry nitrogen to a pressure of 15 lbs. sq. in. The instrument must be " wetted " in a suitable wetting agent (" Teepol ") and then placed in a solution of 99% distilled water and 1% " Teepol ".

There must be no sign of any bubble formation from the instrument due to the applied pressure over a period of five minutes.

After satisfactory completion of this period, the vent must be sealed by the use of a suitable pin and solder.

The instrument must then be checked against the requirements of its particular type.

INSPECTION

Subsequent to satisfactory installation, the instrument should be checked visually to ensure that the glass is unbroken and that the external connections are secure. No other maintenance is necessary for a period of 1,200 flying hours. On the completion of this period the instrument should be checked for accuracy, preferably *in situ*, as apparatus of this nature is more liable to damage from handling than from years of service.

If the instrument is within permissible limits it should be passed as serviceable for a further 1,200 hours.

SPECIAL NOTE

In some instances the Model S.149 is fitted with a movement which has a specially assembled pole piece unit. This occurs only when the movement is a ratiometer type.

When this is so, the movement cannot be dismantled, due to the fact that re-assembly is not possible without the use of special techniques.

This type of unit is identified by a Mod. Letter " J " or a subsequent letter appearing on the dial adjacent to the Sangamo Weston Code Number.

Thus, all information contained in this manual relating to the stripping of ratiometer movements applies only to those instruments prior to Mod. Letter " J ". In all other respects the two types of instruments are identical.

PARTS LIST

MODEL S.149 FORM 1

(Up to, but not including, Mod "J")

Ref. No.	Description	Part No.	No. Off
1	Case Assembly	168332	1
2	Scale Screw 10 B.A. Black	169910	2
	Scale Screw 10 B.A. White	169911	2
3	Lock Washer 10 B.A. Black	154825	2
	Lock Washer 10 B.A. White	153367	2
4	Scale and Clip (Upper)	Specify Code No.	1
5	Scale (Lower)	Specify Code No.	1
6	Nut 6 B.A.	112243	7
7	Lock Washer 6 B.A.	156976	10
8	Terminal Tag 6 B.A.	156456	1
9	Spacer	171589	2
10	Nut 6 B.A. (Round)	92356	3
11	Moulded Ring	170060	1
12	Nut 6 B.A. Special	170056	3
13	Spool Mounting Plate	171590	1
14	Screw 10 B.A. × $\frac{3}{16}$" (Spools)	150330	Equal to No. of Spools
15	Lock Washer 10 B.A. (Spools)	153367	
16	Washer 6 B.A.	90296	3
17	Spools	Specify Code No.	—
18	Seating Ring	169908	1
19	3 mm. × $\frac{1}{2}$" Westoflex Sleeve	171395	As required
20	End Plate Assembly	Specify Code No.	1
21	Sealing Wire	168416	1
22	Pointer Return Unit	168393	1
23	Lock Washer 10 B.A. (P.R.U.)	153367	2
24	Screw 10 B.A. × $\frac{1}{8}$" Ch. Hd. (P.R.U.)	150321	2
25	Nut 12 B.A.	155125	7
26	Lock Washer 12 B.A.	155830	7
27	Pointer Stop L.H.	162557	1
28	Pointer Stop R.H.	Specify Code No.	1
29	Bridge Assembly Top	Specify Code No.	1
30	Spring	Specify Code No.	
	LIG. TOP: Phos. Bronze .0001" × .002" × .5"	Specify Code No.	
	LIG. BOTTOM: Phos. Bronze .0001" × .002" × .65"	Specify Code No.	
31	Bridge Stud Top	162548	3
32	Top Mounting Plate Assembly	168359	1
33	Screw 12 B.A. (Core)	162540	4
34	Screw 10 B.A. (Mag. Spacer)	157415	1
35	Pointer Mounted	Specify Code No.	1
36	Core	162547	2
37	Pivot Base Nut	153320	2
38	Balance Weights — Specify Code No.	158012	As required
39	Moving Element c/w Springs, Pivots, etc. — Specify Code No.	171449	1
40	Magnet Spacer	171485	1
41	Pole Piece Machined	168373	1
42	Magnet	168386	1
43	Yoke	168387	1
44	Back Plate	171499	1
45	Stud 12 B.A.	162559	1
46	Insulating Bush	154397	2
47	Ligament Terminal L.H.	170063	1
48	Insulating Bush	162562	1
49	Ligament Terminal R.H.	170062	1
50	Bottom Mounting Plate	168919	1
51	Bridge Stud Bottom	162549	3
52	Bridge Insulating Bush	162551	6
53	Bridge Assembly Bottom	168383	1
54	Terminal Tag 10 B.A.	168837	1

NOTE: SANGAMO WESTON CODE NUMBER APPEARS ON FRONT OF DIAL.

PARTS LIST

MODEL S.149 FORM 1

(Mod " J " and onwards)

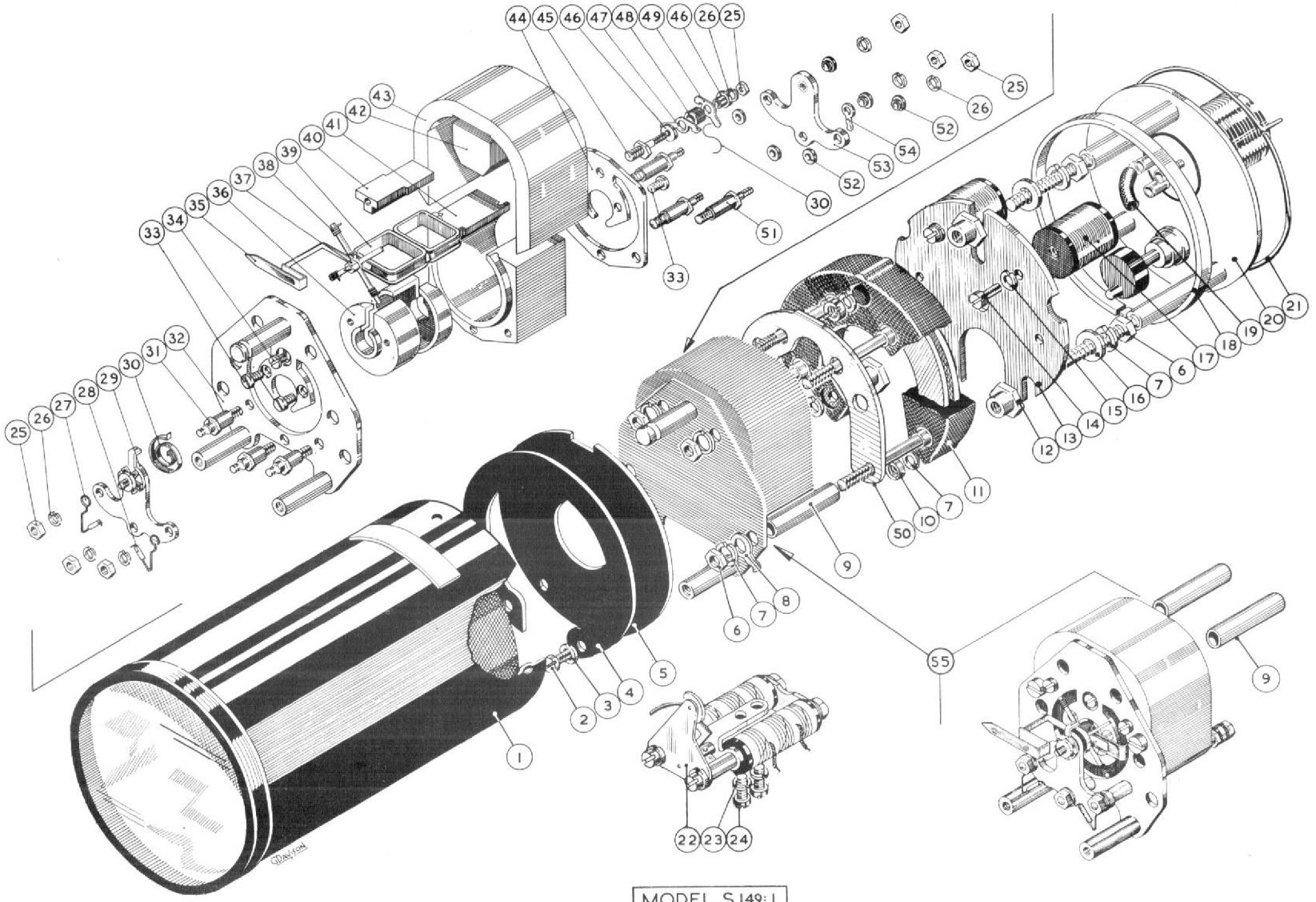
IMPORTANT

Instruments bearing the Mod Letter " J " (see Page 4, List S.149.3.2) or a subsequent letter are fitted with specially assembled pole-piece units. This precludes the replacement of any part of a movement which may have become damaged, as the movement itself may not be dismantled.

Item number 55 on this parts list is the only replacement movement for intruments from Mod. Letter " J " onwards, and can only be supplied as a complete unit.

Ref. No.	Description	Part No.	No. Off
1	Case Assembly	168332	1
2	Scale Screw 10 B.A. Black	169910	2
	Scale Screw 10 B.A. White	169911	2
3	Lock Washer 10 B.A. Black	154825	2
	Lock Washer 10 B.A. White	153367	2
4	Scale and Clip (Upper)	Specify Code No.	1
5	Scale Lower	Specify Code No.	1
6	Nut 6 B.A.	112243	7
7	Lock Washer 6 B.A.	156976	10
8	Terminal Tag 6 B.A.	156456	1
9	Spacer	171589	4
10	Nut 6 B.A. (Round)	92356	3
11	Moulded Ring	170060	1
12	Nut 6 B.A. Special	170056	3
13	Spool Mounting Plate	171590	1
14	Screw 10 B.A. × $\frac{3}{16}$" (Spools)	150330	Equal to No. of Spools
15	Lock Washer 10 B.A. (Spools)	153367	
16	Washer 6 B.A.	90296	3
17	Spools	Specify Code No.	—
18	Seating Ring	169908	1
19	3 mm. × $\frac{1}{2}$" Westoflex Sleeve	171395	As required
20	End Plate Assembly	Specify Code No.	1
21	Sealing Wire	168416	1
22	Pointer Return Unit	168393	1
23	Lock Washer 10 B.A. (P.R.U.)	153367	2
24	Screw 10 B.A. × $\frac{1}{8}$" Ch. Hd. (P.R.U.)	150321	2
50	Bottom Mounting Plate	168919	1
55	Ratiometer Movement Complete	Specify Code No.	1

NOTE: SANGAMO WESTON CODE NUMBER APPEARS ON FRONT OF DIAL.


MODEL. S.149:1

PARTS LIST
MODEL S.149 FORM 2
(Up to, but not including Mod. " J ")

Ref. No.	Description	Part No.	No. Off	Estimated requirement for 100 instruments
20	Sealing Wire	168416	1	5
21	End Plate	Specify Code No.	1	5
—	Terminal Shroud *Not shown*	171894	1	—
—	Screw and Washer Assembly *Not shown*	157703	2	8
—	Fixing Nut 0 B.A. *Not shown*	154784	2	—
22	Seating Ring	169908	1	—
23	3 mm × $\frac{1}{8}$" Westoflex Sleeving	171395	As required	As required
24	Nut 6 B.A.	112243	7	—
25	Lockwasher 6 B.A.	156976	10	—
26	Washer 6 B.A.	90296	3	—
27	Spools	Specify Code No.	As required	5 sets
28	Nut 6 B.A. (Special)	170056	3	10
29	Spool Mounting Plate	171581	1	—
30	Lockwasher 10 B.A. (Spools)	153367	Equal to	—
31	Screw 10 B.A. × $\frac{3}{16}$" (Spools)	150330	No. of Spools	—
32	Moulded Ring	170060	1	—
33	Nut 6 B.A. (Round)	92356	3	—
34	Bottom Mounting Plate	168919	1	—
35	Spacer	171589	2	—
36	Terminal Tag 6 B.A.	156456	1	—
37	Scale Lower	Specify Code No.	1	5
38	Scale Upper	Specify Code No.	1	5
39	Lockwasher 10 B.A. Black	154825	2	10
	Lockwasher 10 B.A. White	153367	2	10
40	Scale Screw 10 B.A. Black	169910	2	10
	Scale Screw 10 B.A. White	169911	2	10
41	Case	168332	1	5
42	Bridge Insulating Bush	162551	6	10
43	Nut 12 B.A.	155125	6	10
44	Lockwasher 12 B.A.	155830	6	—
45	Bottom Bridge	168378	1	—
46	Screw 10 B.A. (Magnet Spacer)	157415	2	—
47	Back Plate	171499	1	—
48	Yoke	168387	1	—
49	Magnet	168386	1	—
50	Magnet Spacer	171908	1	—
51	Pole Piece	168819	1	—
52	Core	164068	1	—
53	Top Mounting Plate	168358	1	—
54	Top Bridge	168377	1	—
55	Pointer Stop R.H.	162558	1	10
56	Pointer Stop L.H.	162557	1	10
57	Moving Element c/w Springs, Pivots, etc.	Specify Code No. 171449	1	5
—	Lockwasher (for use with Part No. 154784)	172536	2	—

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.

NOTE : SANGAMO WESTON Code Number appears on front of Dial.

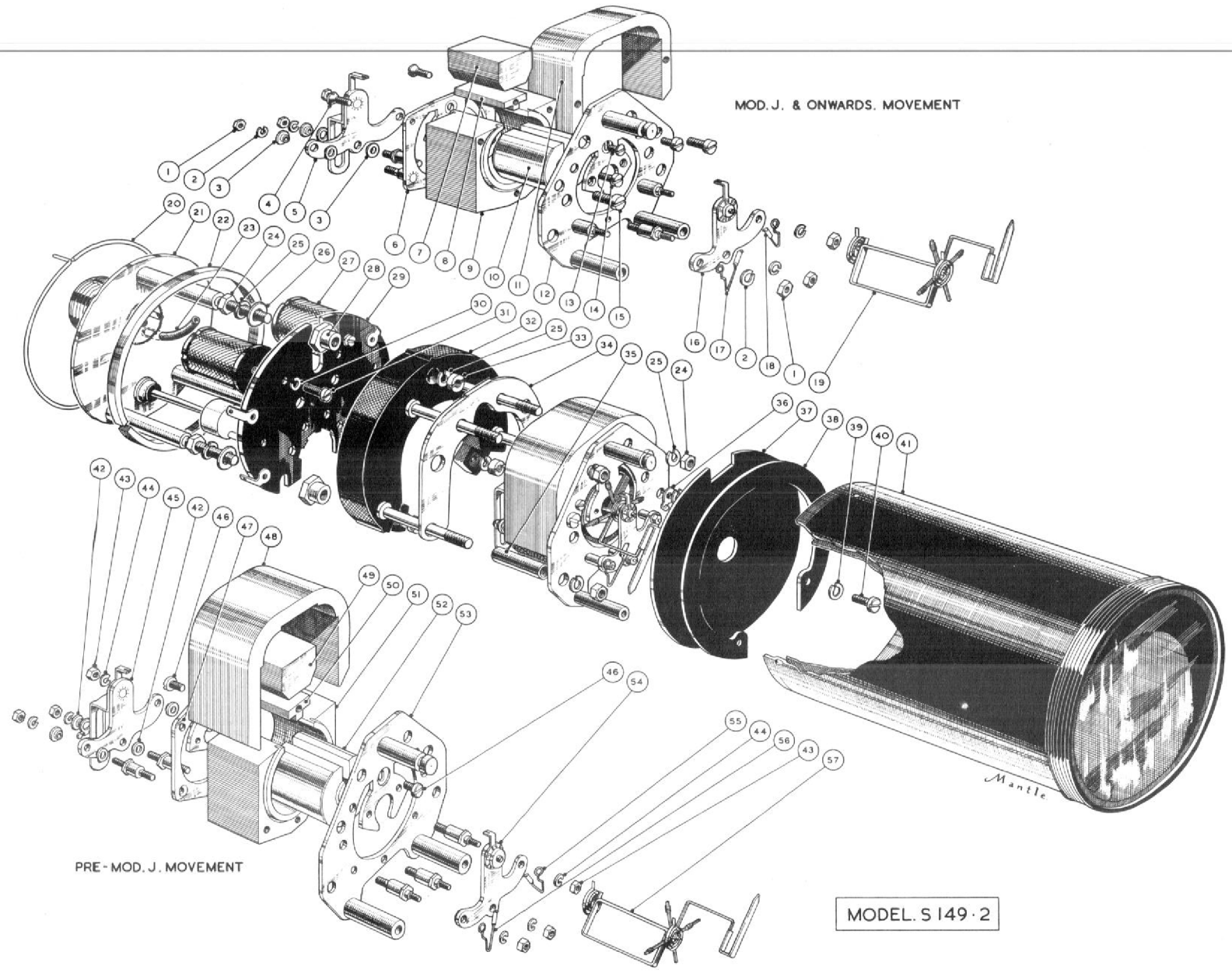
PARTS LIST
MODEL S.149 FORM 2

(Mod. " J " and onwards)

Ref. No.	Description	Part No.	No. Off	Estimated requirement for 100 instruments
1	Nut 12 B.A.	155125	6	10
2	Lockwasher 12 B.A.	155830	6	—
3	Bridge Insulating Bush	162551	6	10
4	Screw 10 B.A. × $\frac{1}{8}$" Csk	158320	2	—
5	Bottom Bridge	168378	1	—
6	Back Plate	171515	1	—
7	Magnet	168386	1	—
8	Magnet Spacer	171908	1	—
9	Pole Piece	171516	1	—
10	Core	164068	1	—
11	Yoke	171491	1	—
12	Top Mounting Plate	171513	1	—
13	Screw 10 B.A. (Magnet Spacer)	157415	1	—
14	Screw 10 B.A. × $\frac{1}{8}$" Ch. Hd.	150321	2	—
15	Screw 8 B.A. × $\frac{3}{16}$"	159195	2	—
16	Top Bridge	168377	1	—
17	Pointer Stop L.H.	162557	1	10
18	Pointer Stop R.H.	162558	1	10
19	Moving Element c/w Springs, Pivots, etc.	Specify Code No. 171449	1	5
20	Sealing Wire	168416	1	5
21	End Plate	Specify Code No.	1	5
—	Terminal Shroud	171894	1	—
—	Screw and Washer Assembly	157703	2	8
—	Fixing Nut	154784	2	—
22	Seating Ring	169908	1	—
23	3 mm × $\frac{1}{2}$" Westoflex Sleeving	171395	As required	As required
24	Nut 6 B.A.	112243	7	—
25	Lockwasher 6 B.A.	156976	10	—
26	Washer 6 B.A.	90296	3	—
27	Spools	Specify Code No.	As required	5 sets
28	Nut 6 B.A. (Special)	170056	3	10
29	Spool Mounting Plate	171581	1	—
30	Lockwasher 10 B.A. (Spools)	153367	Equal to	—
31	Screw 10 B.A. × $\frac{3}{16}$" (Spools)	150330	No. of Spools	—
32	Moulded Ring	170060	1	—
33	Nut 6 B.A. (Round)	92356	3	—
34	Bottom Mounting Plate	168919	1	—
35	Spacer	171589	4	—
36	Terminal Tag 6 B.A.	156456	1	—
37	Scale Lower	Specify Code No.	1	5
38	Scale Upper	Specify Code No.	1	5
39	Lockwasher 10 B.A. Black	154825	2	10
	Lockwasher 10 B.A. White	153367	2	10
40	Scale Screw 10 B.A. Black	169910	2	10
	Scale Screw 10 B.A. White	169911	2	10
41	Case	168332	1	5
—	Lockwasher (for use with Part No. 154784)	172536	2	—

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.

NOTE : SANGAMO WESTON Code Number appears on front of Dial.



MODEL. S 149·2

SANGAMO WESTON

PARTS LIST
MODEL S.149 FORM 3
(Up to, but not including Mod. " J ")

Ref. No.	Description	Part No.	No. Off	Estimated requirement for 100 instruments
20	Screw and Washer Assembly	157703	2	
21	Fixing Nut 0 B.A.	154784	2	—
22	Terminal Shroud	171894	1	—
23	Sealing Wire	168416	1	5
24	End Plate	171720	1	
25	Seating Ring	169908	1	—
26	Moulded Ring	170060	1	—
27	Lockwasher 6 B.A.	156976	7	—
28	Nut 6 B.A. Round	92356	3	—
29	Bottom Mounting Plate	168919	1	—
30	Spacer	171589	2	—
31	Nut 6 B.A.	112243	4	—
32	Terminal Tag 6 B.A.	156456	1	—
33	Scale Lower	Specify Code No.	1	5
34	Scale Upper	Specify Code No.	1	5
35	Lockwasher 10 B.A. White	153367	2	10
	Lockwasher 10 B.A. Black	154825	2	10
36	Scale Screw 10 B.A. Black	169910	2	10
	Scale Screw 10 B.A. White	169911	2	10
37	Case	170857	1	
38	Nut 12 B.A.	155125	6	
39	Lockwasher 12 B.A.	155830	6	—
40	Bridge Insulating Bush	162551	6	10
41	Bottom Bridge	168378	1	—
42	Screw 10 B.A. (Magnet Spacer)	157415	2	—
43	Back Plate	171499	1	—
44	Yoke	168387	1	—
45	Magnet	168386	1	—
46	Magnet Spacer	171908	1	—
47	Pole Piece	168819	1	—
48	Core	164068	1	—
49	Top Mounting Plate	168358	1	—
50	Top Bridge	168377	1	—
51	Pointer Stop R.H.	162558	1	10
52	Pointer Stop L.H.	162557	1	10
53	Moving Element c/w Springs, Pivots, etc.	Specify Code No. 171449	1	5
—	Lockwasher (for use with Item 21)	172536	2	—

NOTE : SANGAMO WESTON Code Number appears on front of Dial.

PARTS LIST
MODEL S.149 FORM 3

(Mod. " J " and onwards)

Ref. No.	Description	Part No.	No. Off	Estimated requirement for 100 instruments
1	Nut 12 B.A.	155125	6	10
2	Lockwasher 12 B.A.	155830	6	—
3	Bridge Insulating Bush	162551	6	10
4	Bottom Bridge	168378	1	—
5	Screw 10 B.A. × $\frac{1}{8}$" Csk	158320	2	—
6	Back Plate	171515	1	—
7	Magnet	168386	1	—
8	Magnet Spacer	171908	1	—
9	Pole Piece	171516	1	—
10	Core	164068	1	—
11	Yoke	171491	1	—
12	Mounting Plate	171513	1	—
13	Screw 10 B.A. × 0·110"	157415	1	—
14	Screw 10 B.A. × $\frac{1}{8}$"	150321	2	—
15	Screw 8 B.A. × $\frac{3}{16}$"	159195	2	—
16	Top Bridge	168377	1	—
17	Pointer Stop L.H.	162557	1	10
18	Pointer Stop R.H.	162558	1	10
19	Moving Element c/w Springs, Pivots, etc.	Specify Code No. 171449	1	5
20	Screw and Washer Assembly	157703	2	8
21	Fixing Nut 0 B.A.	154784	2	—
22	Terminal Shroud	171894	1	—
23	Sealing Wire	168416	1	5
24	End Plate	Specify Code No.	1	5
25	Seating Ring	169908	1	—
26	Moulded Ring	170060	1	—
27	Lockwasher 6 B.A.	156976	7	—
28	Nut 6 B.A. Round	92356	3	—
29	Bottom Mounting Plate	168919	1	—
30	Spacer	171589	4	—
31	Nut 6 B.A.	112243	4	—
32	Terminal Tag 6 B.A.	156456	1	—
33	Scale Lower	Specify Code No.	1	5
34	Scale Upper	Specify Code No.	1	5
35	Lockwasher 10 B.A. White	153367	2	10
36	Lockwasher 10 B.A. Black	154825	2	10
	Scale Screw 10 B.A. Black	169910	2	10
	Scale Screw 10 B.A. White	169911	2	10
37	Case	170857	1	5
—	Lockwasher (for use with Item 21)	172536	2	—

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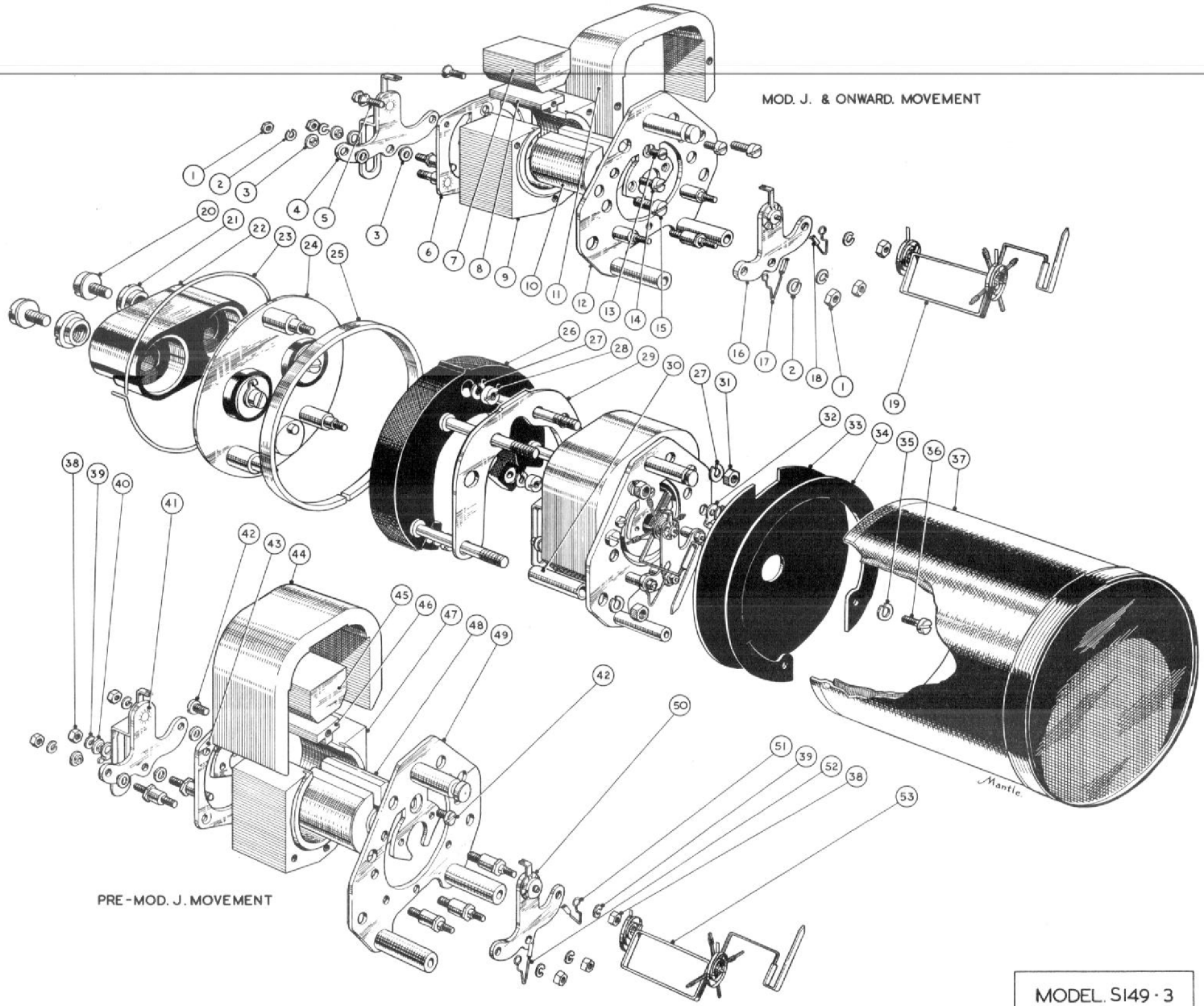

MODEL. S149 · 3

SANGAMO WESTON