selectest

SUPER 50

SEI

G.E.C.

15465

selectest

MODEL **SUPER 50**

PATENT No. 592,392

INSTRUCTION MANUAL

SALFORD ELECTRICAL INSTRUMENTS LIMITED

Description

The Salford Selectest Model "Super 50" is a self-contained, portable test set for the measurement of A.C. or D.C. voltages, currents and resistance. It has been designed to comply with the requirements of the British Standards Specification 89/1954.

The latest instrument techniques have been employed in the design and manufacture to ensure long and satisfactory service under normal working conditions. The critically damped movement employs a stabilised Alcomax III magnet to ensure that life-long first grade accuracy is maintained. An automatic cut-out is provided to protect the instrument against excessive overloads. All components have a safety factor rating of 20 times normal load without damage. The six inch long eyelash pattern scale is evenly divided and clear presentation enables full use to be made of the instrument accuracy. The knife edge pointer, used in conjunction with the scale mirror, obviates parallax errors and gives maximum legibility.
Reliability is ensured by the use of a printed circuit for internal electrical connections.

Standard thirty-inch long test leads (total resistance 0.035 ohms) are supplied with spade connectors at one end for connecting to the instrument terminals. The other ends are fitted with removable spring clips which can be replaced by the test prods provided. The test leads may be wound round the handle for temporary storage. A leather carrying case for the instrument, with room for the test leads, is available as an extra.

General Specification

A.C. Voltage Ranges 2·5, 10, 25, 100, 250, 1000, 2500 volts.
A.C. Current Ranges 25 mA, 100 mA, 250 mA, 1A, 2·5A, 10 amp.
D.C. Voltage Ranges 250 mV, 2·5, 10, 25, 100, 250, 1000, 2500 volts.
D.C. Current Ranges 50 μA, 250 μA, 1 mA, 10 mA, 100 mA, 1A, 2·5A, 10 amp.

The 250 mV range and 50 μA range are common.

Resistance Ranges :
(with self-contained batteries)

0— 2,000 ohms	(mid-scale reading	20 ohms)
0—200,000 ohms	(,, ,, ,,	2,000 ohms)
0— 20 Megohms	(,, ,, ,,	200,000 ohms)

Accuracy

The test set complies with British Standard Specification No. 89/1954 for Industrial Grade Portable Instruments as follows:—

D.C. Voltages and Currents ± 1% of F.S.D.

A.C. Voltages and Current ± 2¼% of F.S.D. at frequencies within the range 50 cycles per second ± 20%.

In addition the instrument has a minimum accuracy of ± 2¼% of F.S.D. over the following ranges and frequencies.

Ranges	Frequencies
A.C. Voltages	
2,500 V	10 c/s to 1 kc/s
1,000 V	10 c/s to 2 kc/s
250 V	10 c/s to 10 kc/s
100 V	10 c/s to 20 kc/s
25 V	10 c/s to 50 kc/s
10 V	10 c/s to 50 kc/s
2·5 V	10 c/s to 2 kc/s
A.C. Current	
10 A	10 c/s to 2 kc/s
2·5 A	10 c/s to 2 kc/s
1 A	10 c/s to 10 kc/s
250 m/A	10 c/s to 50 kc/s
100 m/A	10 c/s to 50 kc/s
25 m/A	10 c/s to 50 kc/s

Resistance: (with New Battery)
± 3% from zero to mid-scale reading.
± 5% from mid-scale to two-thirds full-scale.
± 10% from two-thirds full scale to full-scale.

Sensitivity

D.C. Voltage ranges 20,000 ohms per volt or 50 μA full scale deflection.
A.C. Voltage ranges 2,000 ohms per volt or 500 μA full scale deflection.
2·5 Volt A.C. range 167 ohms per volt or 6 mA approx. full scale deflection.
Maximum potential drop on D.C. current ranges, 250 mV on 50 μA range.
Maximum potential drop on A.C. current ranges, 720 mV on 25 mA range.

Dimensions

	Inches	*Centimeters*
Length including handle	9	23
Length of case	7⅝	19·4
Width of case	7	17·8
Depth of case	3½	9
Net weight including batteries	5 lbs. 6 ozs.	2·44 kgs.

Batteries

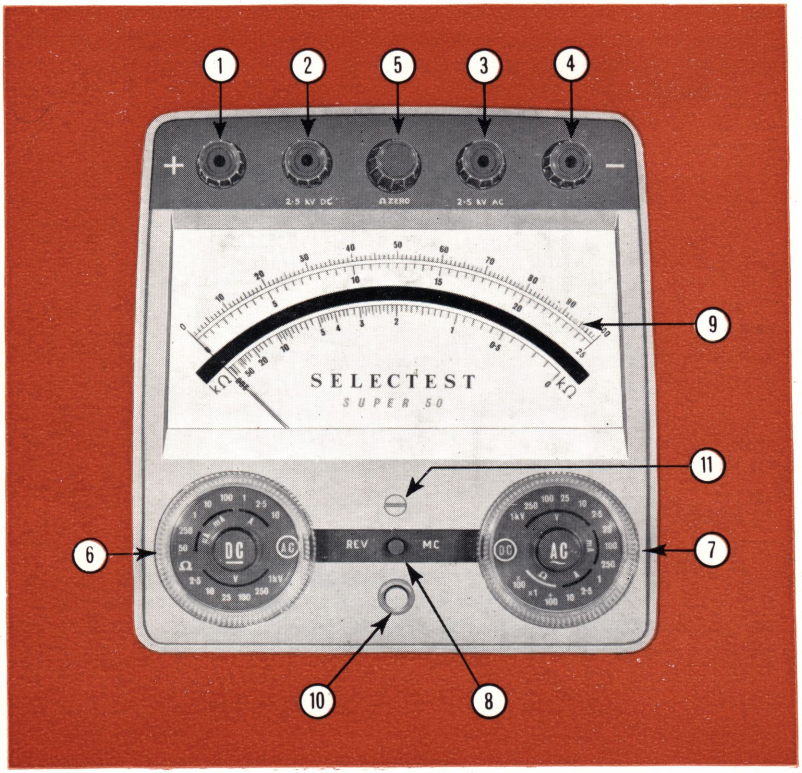
Two replaceable batteries are fitted in the back of the case for resistance measurements.

1 — 1·5 Volt cell Ever Ready type LPU2

1 — 15 Volt battery Ever Ready type B.121.

SUITABLE BATTERY REPLACEMENTS

	1·5V	15V
Ever Ready ..	LPU2	B121
Exide	T21	DH521
Oldham ..	LP532	—
Siemens ..	TI-LP	S121
Vidor	V0002	L5541



Terminals

1 Common positive.
2 D.C. volts 2500.
3 A.C. volts 2500.
4 Negative.
5 Zero adjusting potentiometer for resistance measurement.

Range Selector Switches

6 D.C. Current and Voltage.
7 A.C. Current and Voltage and Resistance.
8 Moving Coil reversing switch.
9 Scale.
10 Automatic Cut-out reset button.
11 Mechanical zero adjusting screw.

Operating Instructions

To obtain maximum efficiency, the instrument should be used in the horizontal position, but the case has been designed so that readings may be taken in the vertical position if required.

Zero Adjustment

Before connecting the instrument in circuit, ensure that the pointer is set to zero on the scale. If not, it may be adjusted by turning the "Zero-adjusting screw" (11).

Range Selector Switches

The two selector switches D.C. (6) and A.C. (7) can be rotated in either direction to select the desired range. The correct selection position for either switch is indicated within the index circle on the top of each knob. These switches are electrically interlocked to avoid damage through inadvertently setting the switches incorrectly.

A.C. readings can only be taken after setting the left-hand switch (6) to the A.C. position and the right-hand switch (7) to the desired range.

D.C. readings require the right-hand switch turned to the D.C position and the left-hand switch (6) turned to the desired range When taking any A.C. or D.C. measurements in an unknown circuit, the appropriate Range Selector Switch should be set to the highest range before connecting the instrument in circuit. The range can then be progressively reduced until a suitable scale reading is obtained.

The switches should **not** be used for switching off circuits by turning to a blank position.

Resistance readings are taken by setting the left-hand switch (6) to the Ω (ohms) position and the right-hand switch (7) to the range desired.

Connect the Test Leads to terminals + (1) and — (4) and short the open ends together. Adjust the "Zero Adjusting Potentiometer" (5) until the pointer is on Zero at the right-hand side of the bottom scale. The leads may now be connected across the unknown resistance and the value read from the bottom scale. If Range

Switch (7) is set to another range, the Zero position should be checked by again shorting the Test Leads and adjusting (5) if necessary, before making a resistance measurement. If it is not possible to adjust the pointer to Zero it is an indication that the batteries are run down, and should be replaced.

When used on the resistance ranges, the connections of the internal batteries are such that positive potential appears at the negative terminal (4). Certain components, such as electrolytic condensers, rectifiers and semi-conductors have a variable resistance according to the direction of current flow. When measuring leakage on an electrolytic condenser the negative lead from the instrument should be connected to the positive terminal of the condenser.

Resistance measurements should **NOT** be carried out on any components in a "live" circuit.

Replacing Batteries

To replace the batteries, remove the cover on the back of the instrument. Take out old batteries and fit new ones making sure they are inserted to match the polarity markings on the case.

Discharged batteries should **not** be left in the instrument, as possible electrolyte leakage may cause damage. If the instrument is to be stored, unused, for some time, it is recommended that the batteries be removed.

With some batteries the internal resistance can so increase with age that a loss of accuracy can occur on the resistance ranges. If errors are suspected change the old battery for a new one.

Moving Coil Reversing Switch

The switch (8) is a non-locking push button type which when depressed, will reverse the polarity of the instrument without the need to change over the leads. This feature assists measurements on D.C. circuits, the polarity of which is not known.

Automatic Cut-out

If an overload is applied to the instrument in a forward or reverse direction, the automatic cut-out operates and breaks the main circuit current. Operation is indicated by the red Reset Button (10) showing above the front panel. The cut-out is reset by pressing the red button until the catch holds, thus completing the circuit again and making the instrument ready for use.

THE CUT-OUT MUST NOT BE RESET UNTIL THE OVER-LOAD HAS BEEN CLEARED

TABLE OF RANGES WITH SWITCH POSITIONS AND TERMINAL CONNECTIONS

RANGES	Left-hand D.C. Switch Position	Right-hand A.C. Switch Position	Terminal Connections
D.C. Volts 250 mV	50 μA	D.C.	+ and —
D.C. Volts 2·5, 10, 25, 100, 250, 1000 volts.	Range required	D.C.	+ and —
D.C. Volts 2500	1000 v.	D.C.	+ and 2500 v D.C.
D.C. Current All ranges	Range required	D.C.	+ and —
A.C. Volts. 2·5, 10, 25, 100, 250, 1000	A.C.	Range required	+ and —
A.C. Volts 2500	A.C.	1000 v.	+ and 2500 v. .C.
A.C. Current All ranges	A.C.	Range required	+ and —
Resistance 2 KΩ, 200 KΩ, 20 Meg. Ohms.	Ohms	Range required	+ and —

Conclusion

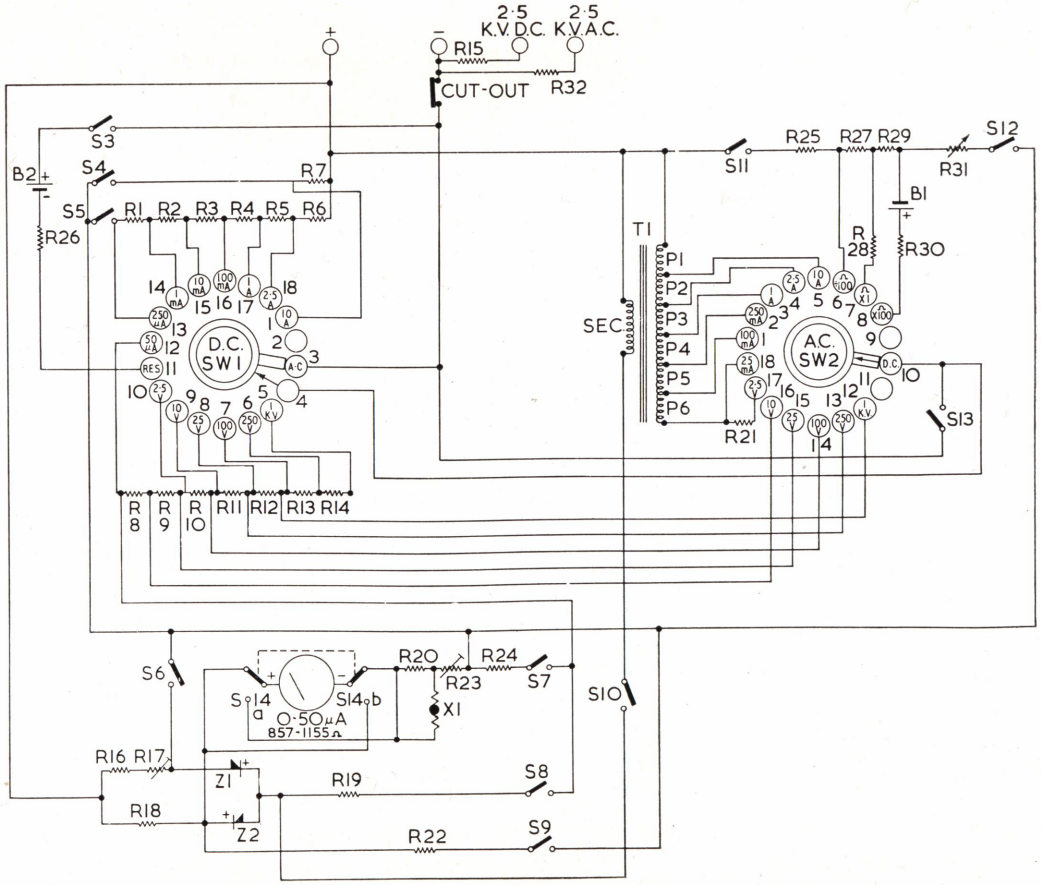
At the completion of a series of tests, make sure that the Range Selection Switches are not left in the Resistance measuring positions. This will prevent the batteries being discharged if the Test Leads short together.

It will be seen from the instructions that operation of the instrument is simple and will readily become a matter of habit.

Should it become necessary at any time to return the instrument for repair, careful packing will avoid damage in transit.

If you have any instrumentation problems, Salford Electrical Instruments Engineers are at your service to assist and advise.

CIRCUIT DIAGRAM



COMPONENT DETAILS

Ref. No.	Description			Ref. No.	Description		
	Res. Ω	Tol. %	Watts.		Res. Ω	Tol. %	Watts.
R1	562	0·5	¼	R17	300	1	
R2	168·8	0·5	¼	R18	385	0·5	¼
R3	16·88	0·5	¼	R19	4060	1	¼
R4	1·688	0·5	¼	R20	536	1	¼
R5	0·1125	0·5		R21	370	0·5	¼
R6	0·075	0·5		R22	194	0·5	¼
R7	0·015	0·5		R23	750	1	
R8	15k	0·5	¼	R24	2000	0·5	¼
R9	30k	0·5	¼	R25	8·15	0·5	¼
R10	150k	0·5	½	R26	11	0·5	¼
R11	300k	0·5	1	R27	807	0·5	¼
R12	1·5M	0·5	1	R28	1208	0·5	¼
R13	3M	0·5	½	R29	7185	0·5	¼
R14	15M	0·5	2	R30	195k	0·5	½
R15	30M	0·5	2	R31	3·3k.POT	10	
R16	100	1	¼	R32	3M	0·5	2

SWITCHES

SW1	S.E.I. Part No. MA 91121
SW2	S.E.I. Part No. MA 91122
S.3	operated by S.W.2
S.4	operated by S.W.1
S.5	operated by S.W.1
S.6	operated by S.W.2
S.7	operated by S.W.2
S.8	operated by S.W.2
S.9	operated by S.W.2
S.10	operated by S.W.2
S.11	operated by S.W.1
S.12	operated by S.W.1
S.13	operated by S.W.2
S.14	Reverse M.C.

MISCELLANEOUS

T.1	P.1	10A.	1 turn	cu. strip ·006 x ·25
	P.2	2.5A	3 turns	17 s.w.g. cu. wire ·056
	P.3	1A	6 turns	20 s.w.g. cu. wire
	P.4	0·25A	30 turns	26 s.w.g. cu. wire
	P.5	0·1A	60 turns	32 s.w.g. cu. wire
	P.6	0·025A	300 turns	38 s.w.g. cu. wire
	SEC.	2mA	5000 turns	44 s.w.g. cu. wire
B.1	15 v. cell			B.121
B.2	1·5 v. leakproof			B.A. 6123
Z1 Z2	Germanium Diode			OA81
X1	Varite Thermistor			Type VA1039

D.C. SWITCH S.W.1.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	10 A	Blank	A.C.	Blank	1 kV.	250 V.	100 V.	25 V.	10 V.	2·5 V.	Res.	50 μA.	250 μA.	1 mA.	10 mA.	100 mA.	1 A.	2·5A
S4	●																	
S5												●	●	●	●	●	●	●
S11											●							
S12											●							

● Denotes switch closed

A.C. SWITCH S.W.2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	100 mA	250 mA	1 A	2·5 A	10 A	÷ 100Ω	X 1Ω	X 100Ω	Blank	D.C.	Blank	1 kV.	250 V.	100 V.	25 V.	10 V.	2·5 V.	25 mA.
S3						●	●	●										
S6	●	●	●	●	●						●	●	●	●	●	●	●	●
S7										●								
S8												●	●	●	●	●	●	
S9	●	●	●	●	●													●
S10	●	●	●	●	●												●	●
S13										●								

● Denotes switch closed

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