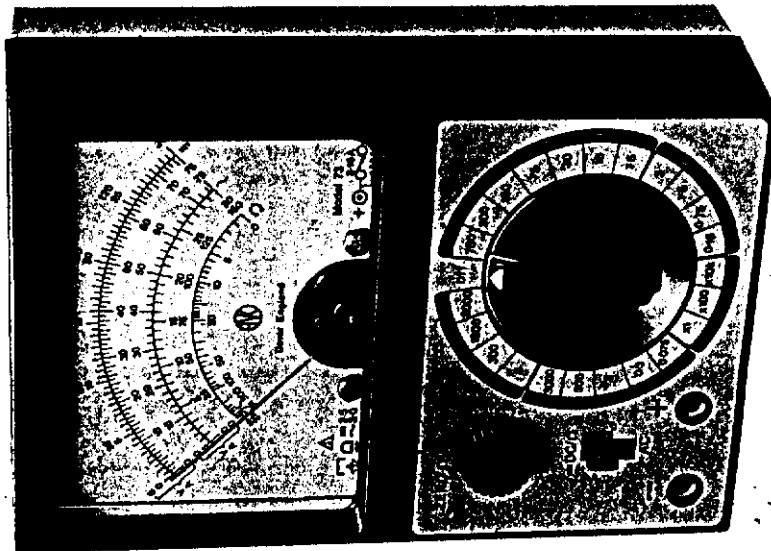


## FAULT FINDING AND SERVICING INFORMATION Model 73



## Fault Finding Table

Symptoms	Probable Fault
(a) No reading on any current ranges. Low readings on all voltage ranges. Inability to obtain Ohms Zero setting.	Ruptured fuse.
(b) No reading on any range or intermittent reading only.	Leads open circuit. Intermittent switch or circuit fault. Moving coil open circuit or stuck. If movement is suspected, check by inserting replacement.
(c) No reading on an isolated range.	Faulty connection between the range switch contact and the shunt or multiplier concerned.
(d) No dc voltage or current readings, but correct on ac.	Faulty ac/dc switch
(e) One or more dc current ranges inoperative and lower ranges incorrect.	One or more dc shunt sections open circuit.
(f) No dc voltage readings (or erratic readings) in excess of a particular range.	An open circuit in a resistor beyond the last working range.
(g) Readings approximately 25% high on dc volts.	Shunt open circuit.
(h) Low, or fails to read, on ac but correct on dc.	Faulty ac/dc switch. Faulty half-wave bridge rectifier diode.
(i) One or more ac current ranges inoperative and lower ranges incorrect.	One or more ac shunt sections open circuit.
(j) Ohms range inoperative, intermittent or incorrect.	Cell not making satisfactory contact. Zero Ohm potentiometer faulty. Range resistor faulty. Cell deterioration.
(k) Inability to attain ohms zero setting or ohms zero drifts shortly after being set.	Leads damaged. Faulty switch.
(l) General instability of reading.	Hairspring turns caught up or stuck together. This fault is sometimes associated with a change of zero.
(m) Low readings on all current and voltage ranges.	Partial short circuit in the moving coil.
(n) Pointer stick at one particular point.	Dust, hair or other foreign body fouling the movement. It may possibly be in the gap, on the scaleplate or window glass.
(o) Slight uniform pointer stick over the whole scale.	Tight in jewels, blunted pivots, dirt in jewels or damaged jewels.
(p) Pointer stuck firmly.	Pivot out of jewel.
(q) Pointer moves from the position of rest by more than 1% of the maximum scale value when the instrument is held in any position within 45° from the horizontal.	Movement out of balance.

# Specification Model 73

Whenever repair, the instrument should meet the following accuracies when it is tested in the horizontal position at 20°C. The accuracy of the test equipment should be taken into account.

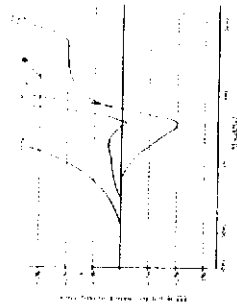
### Accuracy

DC Voltage and Current ranges:  $\pm 2.5\%$  of f.s.d.  
AC Voltage and Current ranges:  $\pm 3.0\%$  of f.s.d. at 50 Hz

### Sensitivity

20,000  $\mu$ V dc  
2,000  $\mu$ V ac

### Frequency Response



# Making the Repair Model 73

To enable the most suitable method of repair to be selected the information obtained from the Fault-Finding Table should be carefully considered together with the servicing information relevant to the particular model in this section, and the details regarding the supply of sub-assemblies.

The information in this section is cross-referenced to the alphabetical sequence in the fault-finding table, i.e. if the symptoms and possible fault appear at 'f' in the fault-finding table, the relevant servicing information will be found at 'f' in this section.

### (a) Ruptured fuse

Remove the rear cover and replace the fuse. (For correct type, see 'Specification'). Replace the cover and test the instrument to ensure that no further damage has occurred.

### (b) No reading on any range or intermittent reading only

Check the leads for open circuit. If these are in good condition, use another meter to check whether current flows in the circuit on both current and voltage ranges in spite of no pointer deflection. If current flows the fault is possibly in the moving coil, and this should be checked for open circuit.

If current flow is intermittent, a faulty switch may be the cause. If current flows on some ranges and not on others, a circuit fault should be suspected and the components associated with the range on which no current flows should be checked and any faulty components replaced.

### (c) No reading on an isolated range

If only one range is found to be at fault, check the circuit and the component associated with that particular range. The connection between the relevant switch contact and the shunt or multiplier concerned should be checked with an ohmmeter to ascertain if there is a dry joint, and correction made if necessary.

### (d) No dc voltage or current readings but correct on ac

This fault may be caused by a faulty ac/dc switch. Check the continuity of the switch using an ohmmeter. Cleaning of the switch contacts may remove the fault, but if it persists it will be necessary to replace the switch.

### (e) One or more dc current ranges inoperative and lower ranges incorrect

One or more shunt sections may be open circuit, and these should be checked.

### (f) No dc voltage readings in excess of a particular range

The fault will almost certainly be caused by an open circuit resistor connected in the circuit following the last working dc voltage range. Check the resistors in the first non-working range.

### (g) Readings approximately 25% high on dc volts

This will almost certainly be caused by an open circuit shunt. The faulty component should be replaced, or if damage is extensive the complete printed circuit board should be replaced.

### (h) Low or fails to read on ac but correct on dc

This fault may be caused by faulty diodes. Either one or both of the diodes must be replaced, and these are supplied in pairs as a spare part. The fault may also be caused by a faulty ac/dc switch. Check the continuity of the switch using an ohmmeter. Cleaning of the switch contacts may remove the fault, but if it persists it will be necessary to replace the switch.

### (i) One or more ac current ranges inoperative and lower ranges incorrect

One or more ac shunt sections may be open circuit, and these should be checked.

### (j) Ohms range inoperative, intermittent or incorrect

Check the connections to the cells by connecting a voltmeter to the battery connections and then tapping the case nearby. If trouble exists or is suspected the battery case and contacts should be cleaned. If the fault persists, check the Ohms range potentiometer and replace it if it is defective. If the fault exists on only one range, check the range resistor.

### (k) Inability to attain ohms zero setting or ohms zero drifts shortly after being set

If the pointer cannot be brought up to ohms zero or fails to remain at the ohms zero position for a reasonable period with the leads shorted together, the cells require replacement.

### (l) General instability of reading

This may be caused by damaged leads. Check by using a replacement set of leads. If the fault persists, check the switch contacts. General cleaning of all switch contacts will probably remove the instability. Ensure that the bi-metal contacts are working freely on the switch arms of the main switch assembly. If the switch is damaged a new printed circuit board will be required.

### (m) Low readings on all current and voltage ranges

Movement fault.

### (n) Pointer stick at one particular point

Movement fault.

### (o) Slight uniform pointer stick over the whole scale

Movement fault.

### (p) Pointer stuck firmly

Movement fault.

### (q) Movement out of balance

Movement fault.

# Components List - Model 73

Circuit Reference	Description	Module No.
R1	9M $\Omega$ $\pm$ 1%	1
R2	3M $\Omega$ $\pm$ 1%	1
R3	1.5M $\Omega$ $\pm$ 1%	1
R4	900K $\Omega$ $\pm$ 1%	1
R5	300K $\Omega$ $\pm$ 1%	1
R6	150K $\Omega$ $\pm$ 1%	1
R7	90K $\Omega$ $\pm$ 1%	2
R8	30K $\Omega$ $\pm$ 1%	2
R9	2.145K $\Omega$ $\pm$ 1%	2
R10	60K $\Omega$ $\pm$ 1%	2
R11	180K $\Omega$ $\pm$ 1%	2
R12	15K $\Omega$ $\pm$ 1%	3
R13	12K $\Omega$ $\pm$ 1%	3
R14	5K $\Omega$ $\pm$ 1%	3
R15	2.79K $\Omega$ $\pm$ 1%	4
R16	6.98K $\Omega$ $\pm$ 1%	4
R17	400 $\Omega$ $\pm$ 1%	4
R18	5K $\Omega$ $\pm$ 1%	4
R19	7.5K $\Omega$ $\pm$ 1%	4
R20	2.25K $\Omega$ $\pm$ 1%	5
R28	300K $\Omega$ $\pm$ 2%	5
R29	Swamp - adjust on test	
R30	19.2 $\Omega$ $\pm$ 1%	
R31	Pentonometer 18K $\Omega$	
R32	0.25 $\Omega$ $\pm$ 1%	
R33	0.555 $\Omega$ $\pm$ 1%	
R34	2.25 $\Omega$ $\pm$ 1%	
R35	4.444 $\Omega$ $\pm$ 1%	
R36	247.5 $\Omega$ $\pm$ 1%	
R37	551 $\Omega$ $\pm$ 1%	
R38	0.555 $\Omega$ $\pm$ 1%	
D1	OA 95	
D2	OA 95	
C1	Capacitor 22nF $\pm$ 10%	
V1 - V5	Neon 34 H	
B1	1.5V cell	
B2	15V battery	
FS1	Fuse 3.15A ceramic cartridge IEC 127 Sheet 1.	

Circuit Diagram Model 73

