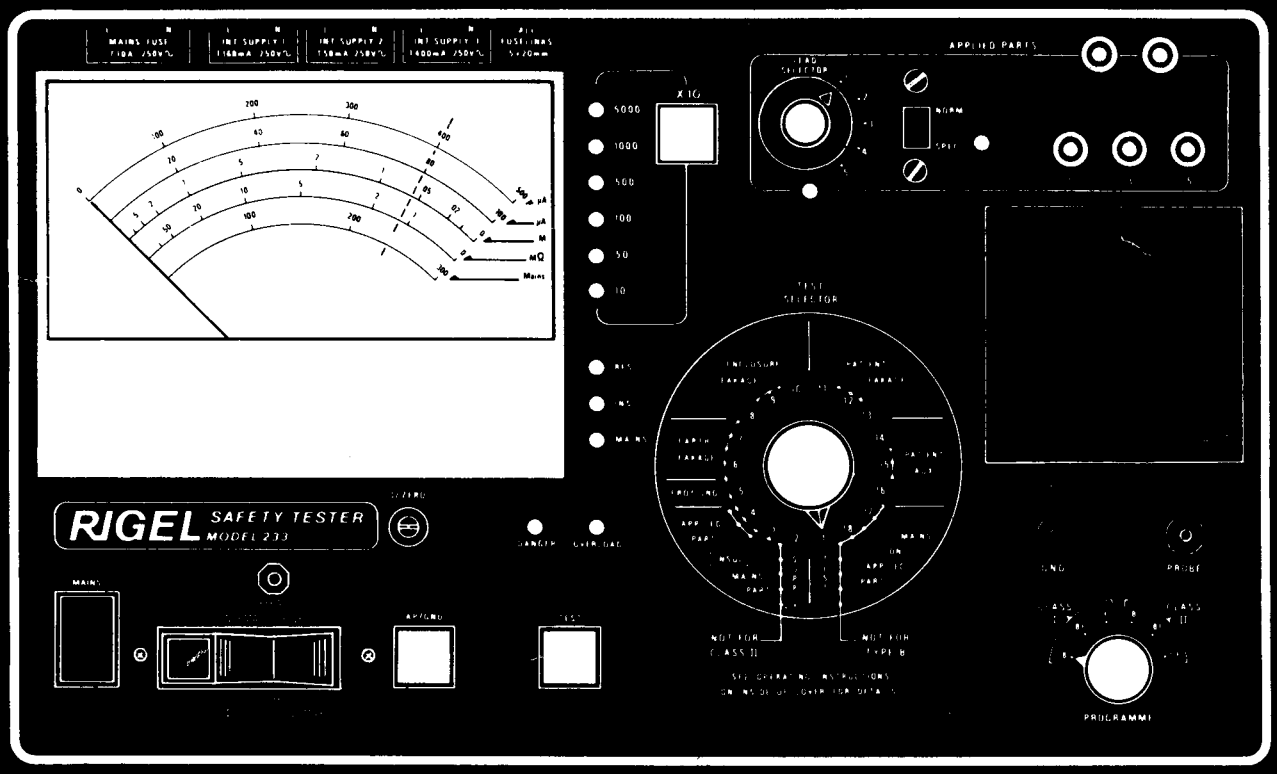
Model 233 Safety Tester
Operating Instructions



RIGEL

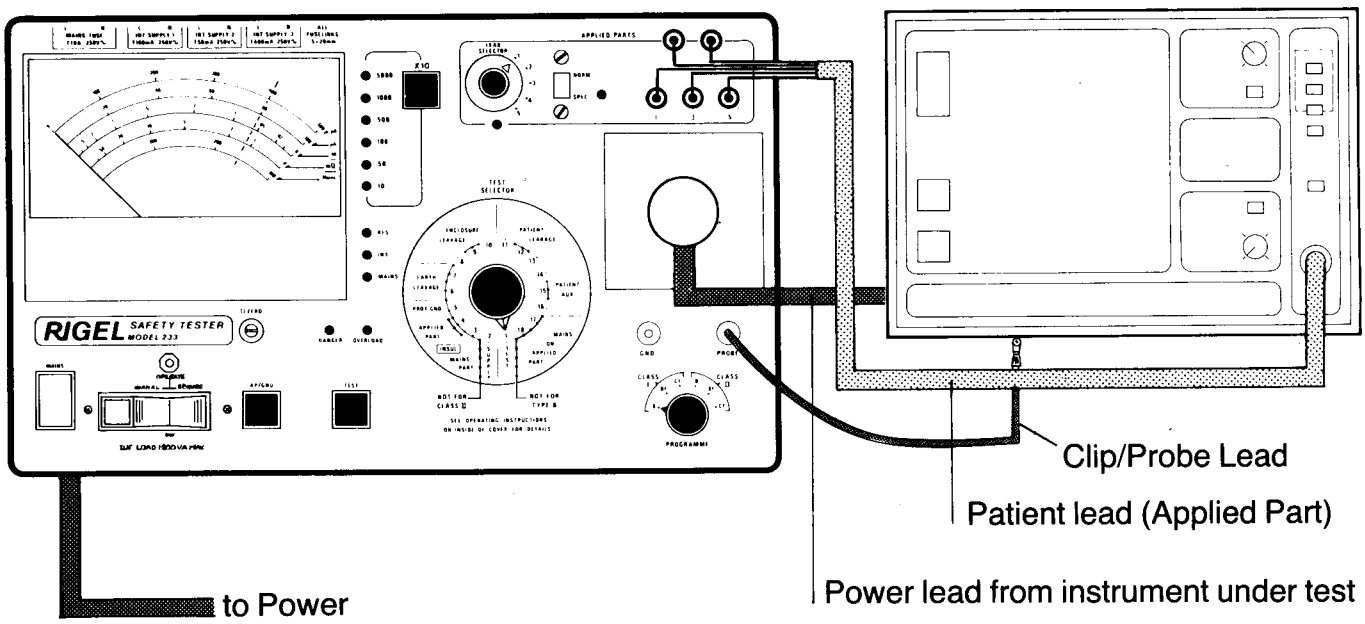
RIGEL MODEL 233 SAFETY TESTER
Operating Instructions:
Please read instruction manual before using the Safety Tester for the first time.

1. Connection of Instrument under test

The instrument to be tested is connected as shown in the diagram.

Safety Tester

Instrument under test



2. Set Class and Type of Instrument under test

Use the Programme switch to set the Class and Type of instrument to be tested according to the markings on the instrument.

CLASS I	⏚	Protective Earth*
CLASS II	⧈	Double Insulation
TYPE B	🚹	Non-isolated Applied Part
TYPE BF	🚹	Isolated Applied Part
TYPE CF	🫀	Isolated Applied Part, suitable for direct Cardiac Application

***Note:** There is no symbol for Class I Instruments, however they generally have a protective earth terminal.

3. Switch Instrument under test ON. Switch Safety Tester ON.

4. Operate Main Selector Switch to perform safety test programme.
Use ancillary switches when illuminated.

PROGRAMME

TEST No.	CLASS I			CLASS II			TEST DESCRIPTION		NOTES (see next page)
	B	BF	CF	B	BF	CF			
1							Self check. All lamps illuminated, meter indicates at 'Test' line		1,2,3,4,5
2							Meter indicates Supply Voltage		
3	See note			N/A			Insulation Resistance: Mains to Case		6,10
4	See note			N/A			Insulation Resistance: Applied Part to Case		6,7,10,11
5	0.1 to 0.2 ohms			N/A			Protective Earth Continuity — Use Probe		8,9
6	500	500	500	N/A			Earth Leakage Current — Normal		10
7	1000	1000	1000	N/A			Earth Leakage Current — S.F.C. Open Supply		10
8	100	100	10	100	100	10	Enclosure Leakage Current — Normal	Use Probe at a number of metal points on case	9
9	500	500	500	N/A			Enclosure Leakage Current — S.F.C. Open Ground		9,10
10	500	500	500	500	500	500	Enclosure Leakage Current — S.F.C. Open Supply		9
11	100	100	10	100	100	10	Patient Leakage Current — Normal		11
12	500	500	50	N/A			Patient Leakage Current — S.F.C. Open Ground		10,11
13	500	500	50	500	500	50	Patient Leakage Current — S.F.C. Open Supply		11
14	10	10	10	10	10	10	Patient Auxiliary Current — Normal		
15	500	500	50	N/A			Patient Auxiliary Current — S.F.C. Open Ground		
16	500	500	50	500	500	50	Patient Auxiliary Current — S.F.C. Open Supply		
17		5000	50		5000	50	Mains on Applied Part — Normal Phase		7,10,11
18		5000	50		5000	50	Mains on Applied Part — Reversed Phase		7,10,11

S.F.C. = single fault condition. N/A = not applicable to Class II.
Test limit figures given in the table are true RMS values in microamps of a.c. and/or d.c. components.

Indicator lamps/LEDs, adjacent to or included in controls, will light up when the associated control should be used. Thus, the Test button, the Normal/Reverse switch, the AP/GND switch and the Lead Selector must be used when indicated; in accordance with the Class and Type test requirements of the IUT ⚠

For instruments with Type CF Applied Part Electrodes, Tests 11, 12 and 13, set Norm/Spec switch to Spec and use Lead Selector to make individual Electrode checks.

NOTES:

1. Danger LED indicates a hazardous situation (>90 volts across 1 Kohm load). ⚠
2. Overload LED indicates 120% full scale deflection and power to instrument under test is removed. To read actual current depress × 10 button and restore power by momentarily selecting the next test. ⚠
3. The red sectors on the current scales cater for tolerances and mains voltage variations, therefore the indicated value may be above the allowed limited (IEC 601–1). ⚠
4. For instruments under test with a functional earth connection, Tests 6 to 18 inclusive should be performed with and without this point connected to the Ground (GND) terminal on the Model 233.
5. For instruments with no applied part Tests 11 to 18 inclusive are not applicable.
6. For Tests 3 and 4 a 500 volt DC supply from a source impedance of 5 Megohms is used.
7. During Tests 4, 17 and 18 a shock hazard exists. The Applied Part should not be touched while the Test button is depressed.
   Current is limited to 100μA for Test 4 and 5mA for Tests 17 and 18.
8. For Test 5, the test current is thermally limited to approximately 40 seconds at 25 amps (short-circuit condition). Ten minutes must elapse before the Test 5 is repeated.
   Zero adjustment: Connect Clip/Probe lead between the Ground and Probe terminals, depress the Test button and use a screwdriver to adjust the pre-set "Ωzero" control, to obtain a zero reading on the meter.
   To measure between two (ground) points, see special test C.
9. Test 5, 8, 9 and 10 require the use of the Clip/Probe lead to check the earth continuity (5) or enclosure leakage current (8, 9 and 10) from all conductive parts of the instrument under test to ground.
   To measure between conductive parts, see special test A.
10. The Test Plug supplied may be used to check the basic function of the Model 233 but not for calibration.

    Fit Test Plug with flying lead connected to AP socket No.3 and set Lead Selector to No.3. Select Class 1, type CF.

Test Selector position	Function	Meter reading (varies with mains voltage)
3	Inst. Mains — Case	1 Megohm ± 15%
4	Inst. Applied Part — Case	10 Megohms ± 15%
6	Earth leakage current	90μA to 140μA
7	Earth leakage — open supply	160μA to 250μA, or 0μA*
9**	Enclosure leakage current — open ground	90μA to 140μA
12	Patient leakage current — open ground	8μA to 13μA
17/18	Mains on Applied Part	20μA to 30μA

⚠ Refer to instruction manual.
* Depends on position of Normal/Reverse Switch.
** Connect Clip/Probe cable between Probe terminal and GND terminal.

11. For measurements per Lead, use "Special" switch as well as Lead Selector.
12. For use as an independant μA/mV meter, see special test B.

N.B. Results will be affected by the mains supply voltage and thus the Test Plug facility should not be used for calibration. For details of special tests A, B & C refer to instruction manual.

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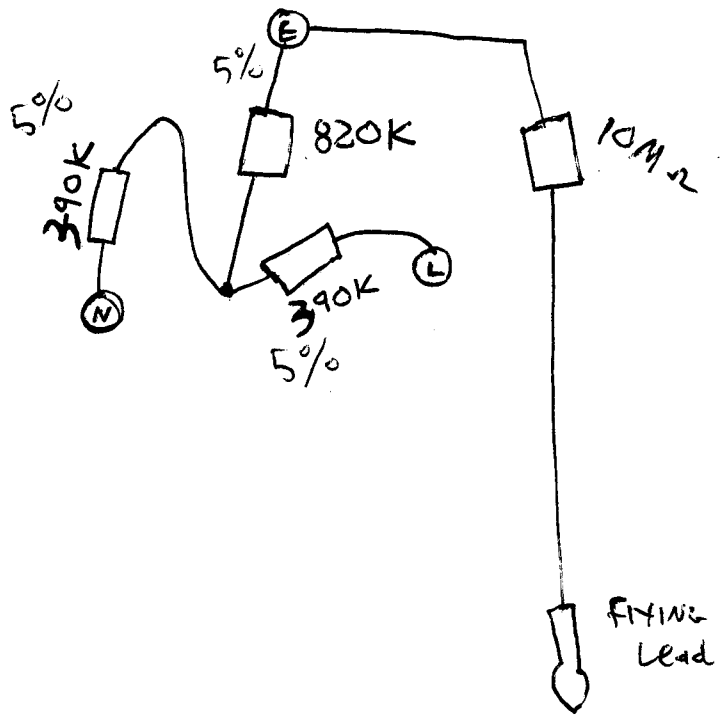
RIGEL TEST PLUG

833 SAFETY TESTER SCAN BY AXT



[1/2 or 1 WATT]