

FERRANTI

MULTI-RANGE D.C. TEST SET.



A First Grade Instrument having many applications.

FERRANTI ELECTRIC
LIMITED,
TORONTO, ONTARIO, CANADA.

FERRANTI LTD.,
HOLLINWOOD,
LANCASHIRE.

FERRANTI INC.,
130, WEST 42ND STREET,
NEW YORK, N.Y.

FERRANTI

Multi-Range D.C. Test Set

PRICE for set only	- - -	£7 : 15 : 0
PRICE complete with case, plugs and leads		£9 : 5 : 0
Extra for Resistance Box to increase range to 500 volts	- - - -	£1 : 10 : 0

THE FERRANTI MULTI-RANGE TEST SET comprises two 2½" Moving Coil Instrument elements of similar design to our Standard Radio Meters, fitted in the same case and calibrated, respectively, to read Voltage and Current independently.

Each Instrument has eight ranges and is provided with a ten-way switch to select the required range, the combination forming a self-contained unit for the measurement of Direct Current, Voltage, Power, and Resistance within wide limits.

The ranges included are :—

VOLTS.	AMPERES.
0—0.1	0—0.01
0—0.5	0—0.05
0—1	0—0.1
0—5	0—0.5
0—10	0—1
0—50	0—5
0—100	0—10
0—250	0—25

As the current for full scale deflection on the Voltmeter is precisely 1 milliampere, an additional range of 0—1 milliamp. can be obtained on this Instrument, connection being made to the "low volts" terminals with the switch set at 0.1 volt.

IN addition to the above-mentioned self-contained ranges, it is possible to increase the range of the Ammeter indefinitely, an additional terminal being provided to permit of the use of external shunts having the British Engineering Standards Association standard full-load volt drop of 0.075 volt. Prices of external shunts will be supplied on request.

Each Instrument is fitted with a knife-edged pointer and mirror scale to prevent parallax errors, the pointer being of aluminium girder construction which provides maximum strength for given weight.

Both Instruments comply with the requirements of the British Engineering Standards Association Specification No. 89—1926 for first-grade Instruments. They have the exceptionally high torque of 0.05 cm. gm., and their torque/weight ratio, which is a measure of the permanence of the accuracy of the Instruments, is 0.125—a higher figure than is given by any other Instrument of similar type at present available. Notwithstanding the high torque, the damping is exceptionally good, the pointer coming to rest in 0.2 second from the switching-on of half-scale value of the quantity measured.

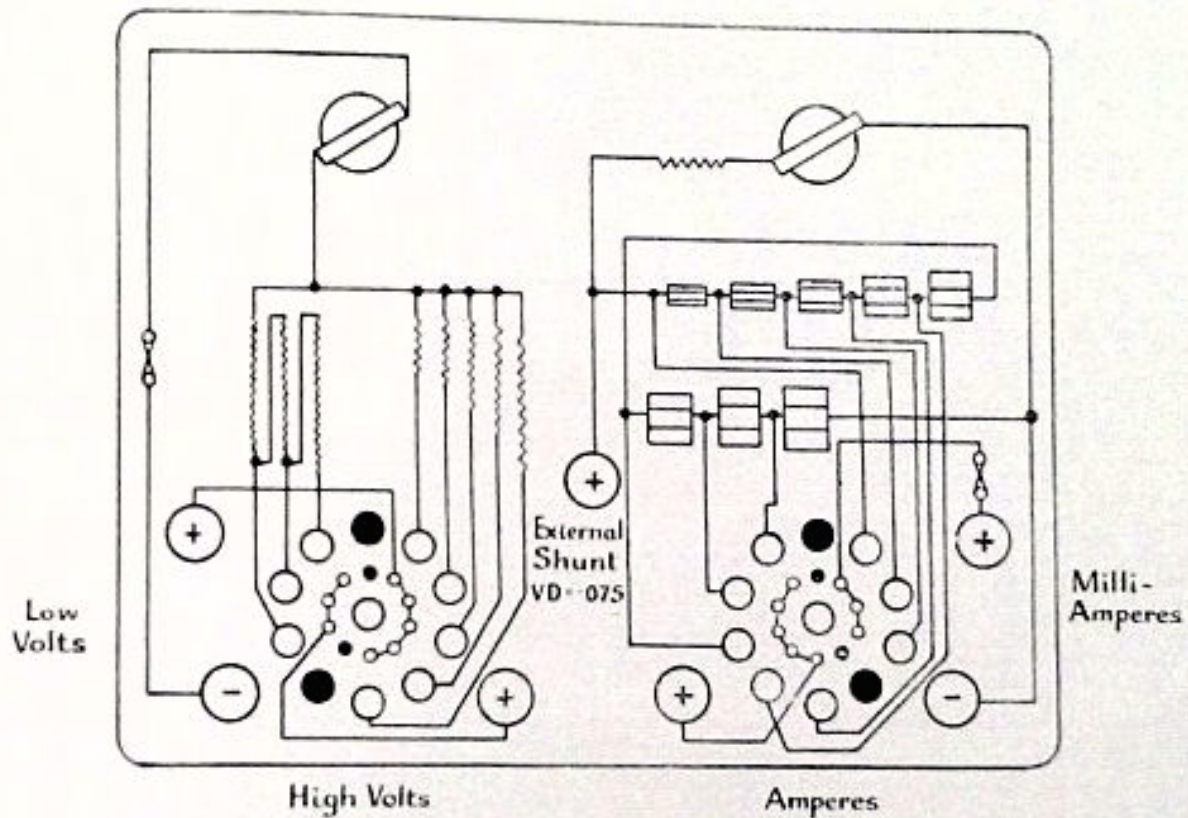
The moving elements, light in weight, are exceedingly robust and are fitted with highly-polished steel pivots which work in sapphire jewels, thus reducing friction to a minimum. The unique patented construction of the magnet system minimises errors due to external magnetic fields and the magnetic safety factor is greater than that of Instruments of any other make.

The Voltmeter has a resistance of 1000 ohms per volt and the Ammeter shunts are solidly connected, thus avoiding errors due to variable contact resistance in the switch.

An unusual feature is the provision of replaceable fuses which protect the voltage and milliampere ranges of the Set in the event of the application of excessive pressures and currents.

Three terminals are provided for each Instrument instead of the customary two, thus enabling two circuits to be connected to each Instrument at one time, so that the switch on the

Diagram of Internal Connections.



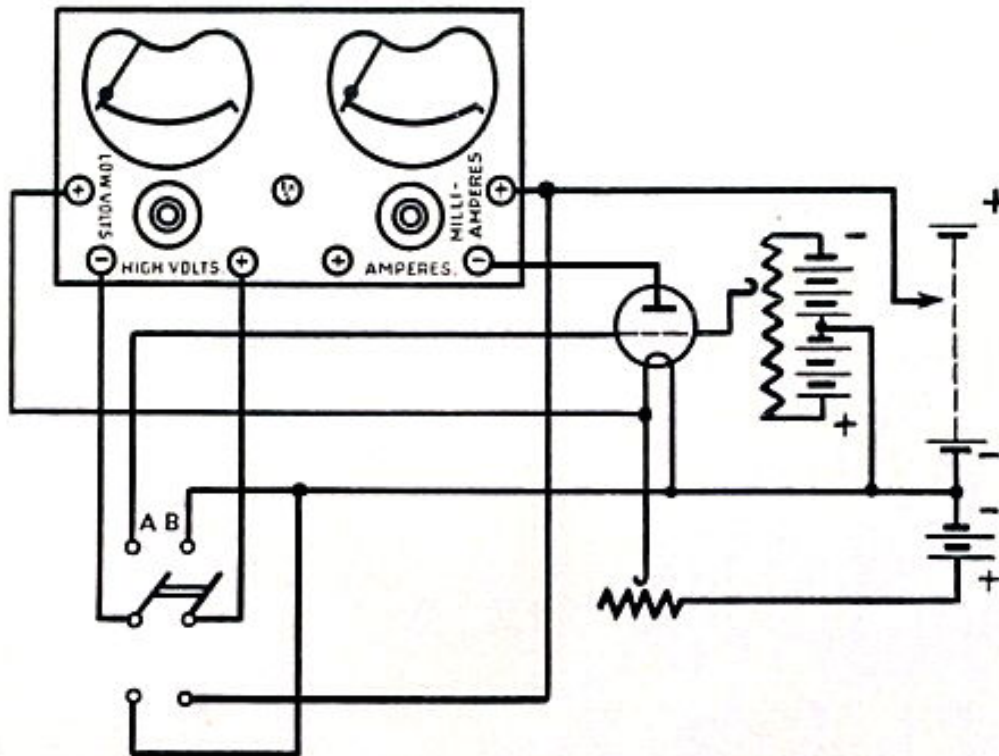
Multi-Range Set.

WEIGHTS.

Instrument only	-	-	-	1 lb 14 ozs.
Instrument, Box, and Leads	-	-	-	3 lbs 1 oz.
Leads only	-	-	-	7 ozs.

DIMENSIONS	-	-	$5\frac{3}{8}" \times 4\frac{1}{4}" \times 1\frac{7}{8}"$
DIMENSIONS OF CASE	-	-	$7\frac{1}{8}" \times 6" \times 2\frac{1}{2}"$

The following figure shows a typical Radio use for which this Instrument is particularly suitable.



This figure shows the connection of the Test Set for taking a complete set of valve characteristics. It is most convenient to insert the valve under test in a separate holder mounted on a testing board fitted with regulating resistances and potentiometers to control the Filament Voltage, Anode Voltage and Current and Grid Voltage. An external double-pole double-throw switch has to be provided for use with the voltmeter to enable it to read the Anode, Grid and Filament Voltages.

The method of taking a valve characteristic curve is as follows, the apparatus being connected as shown in the diagram:

The Filament Voltage is adjusted to the value which is normal for the type of valve under test, and the H.T. is adjusted to the particular voltage at which the characteristic is required.

The Grid Voltage is then varied and the Anode Current noted for each particular value of Grid Bias, both positive and negative. To obtain a series of curves, the process is repeated using other Anode Voltages.

<i>Switch up</i>	<i>Grid Bias negative.</i>
<i>Switch up</i>	<i>Grid Bias positive with leads A and B reversed.</i>
<i>Switch down</i>	<i>Anode Voltage with range switch at 50 or above.</i>
<i>Switch down</i>	<i>Filament Voltage with range switch at 10 or below.</i>

Other uses to which the Test Set may be put are innumerable, but will be readily appreciated by the Experimenter and Engineer, to whom we shall be pleased, on request, to forward list Ga238/1, which contains numerous diagrams relating to the use of this Test Set.

MULTI-RANGE D.C. TEST SET.

A FIRST GRADE INSTRUMENT HAVING MANY APPLICATIONS.



Two models are available, the essential difference being that one reads up to 250 volts, whilst the other reads up to 600 volts. The resistance of the 250 volt Instrument is 1,000 ohms per volt, whilst in the case of the 600 volt Instrument, it is 500 ohms per volt.

The following are the ranges :—

1,000 OHMS PER VOLT MODEL.

VOLTS.	AMPERES.
0-0.1.	0-0.01.
0-0.5.	0-0.05
0-1.	0-0.1.
0-5.	0-0.5.
0-10.	0-1.
0-50.	0-5.
0-100.	0-10.
0-250.	0-25.

500 OHMS PER VOLT MODEL.

The ampere ranges are the same as for the 1,000 ohms per volt model.
The following are the voltage ranges:—

- VOLTS.
- 0-0.12.
- 0-0.6.
- 0-1.2.
- 0-6.
- 0-12.
- 0-60.
- 0-120.
- 0-600

An additional range of 0-1 milliamps in the case of the 1,000 ohms per volt instrument, and of 0-2 milliamps in the case of the 500 ohms per volt instrument, can be obtained by making connection to the "low volts" terminals with the switch set at 0.1 volts or 0.12 volts respectively.

A range of 0-0.075 volts is available on the ammeter of each Multi-Range Test Set, by using the "External Shunt" and common negative terminals.

PRICES :—

- (a) Multi-Range Test Set reading up to 25 amps. and 250 volts (1,000 ohms per volt) - - - - - **£8 : 5 : 0**
- (b) Extra for Resistance Box to give additional range of 500 volts (1,000 ohms per volt) - - - - - **£1 : 15 : 0**
- (c) Extra for Resistance Box to give additional range of 600 volts (1,000 ohms per volt) - - - - - **£2 : 5 : 0**
- (d) Multi-Range Test Set reading up to 25 amps. and 600 volts (500 ohms per volt) - - - - - **£13 : 0 : 0**
- (e) Extra to (a) and (d) for the supply of a case complete with valve-plugs and leads, for taking measurements in Radio Sets - - - - - **£1 : 15 : 0**
- (f) Extra for Adaptor for use with the above Plugs and Leads for taking measurements in connection with A.C. Valves - - - - - **£0 : 15 : 0**

Full particulars regarding the use and application of this Test Set are given in the instruction pamphlet supplied with each.