

The approximate resistance at the meter terminals on the various ranges is given below, the values being unaffected when the divide-by-two button is pressed.

<i>Normal Range</i>	<i>D.C.</i>	<i>A.C.</i>
0.012 A	10.0 ohms	140 ohms
0.12 A	1.9 ohms	2.5 ohms
1.2 A	0.2 ohms	0.07 ohms
12.0 A	0.03 ohms	0.03 ohms

Standard meter leads have a resistance of 0.02 ohm per pair and this value of resistance should be added to that of the meter.

In certain cases, care should be taken to ensure that a circuit is dead before breaking into it to make current measurements.

#### **VOLTAGE MEASUREMENT**

When measuring voltage, it is necessary to set to the appropriate range of "a.c." or "d.c." and connect the leads across the source of voltage to be measured. If the expected magnitude of the voltage is within the range of the meter, but its actual value is unknown, set the instrument to its highest range, connect up and rotate the appropriate selector switch, decreasing the ranges step by step, until the most suitable one has been selected. Great care must be exercised when making connection to a live circuit, and the procedure should be entirely avoided if possible.

On every normal "a.c." and "d.c." voltage range, except that for 12 volts "a.c.", the instrument consumes 6 mA. for full scale deflection (167 ohms per volt) and proportionately less current for smaller deflections. When using the press button, full scale deflection is produced by half the current (corresponding to 333 ohms per volt) required for the normal range, and since the meter resistance is unaffected, the voltage range is halved. In the case of the 12V. "a.c." range the consumption at full scale deflection is 60 mA.

Whilst discussing the problem of measuring voltage, it would be well to draw attention to the fact that in certain circuits where the current is limited because of the presence of a resistance between the source and the point at which measurements are to be made, it is possible for the actual voltage to be higher than when the meter is connected. All current consuming voltmeters, however sensitive, draw some current to varying degrees from the circuit under test, thus causing a higher voltage drop in the resistances mentioned and thereby causing the potential to fall at the point of measurement. To avoid disturbing the circuit conditions more than absolutely necessary in