Handy Dandy Little Circuits #20

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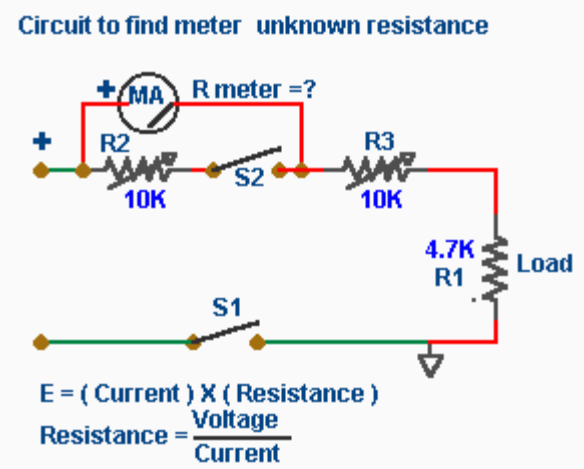
Metering a Power Supply

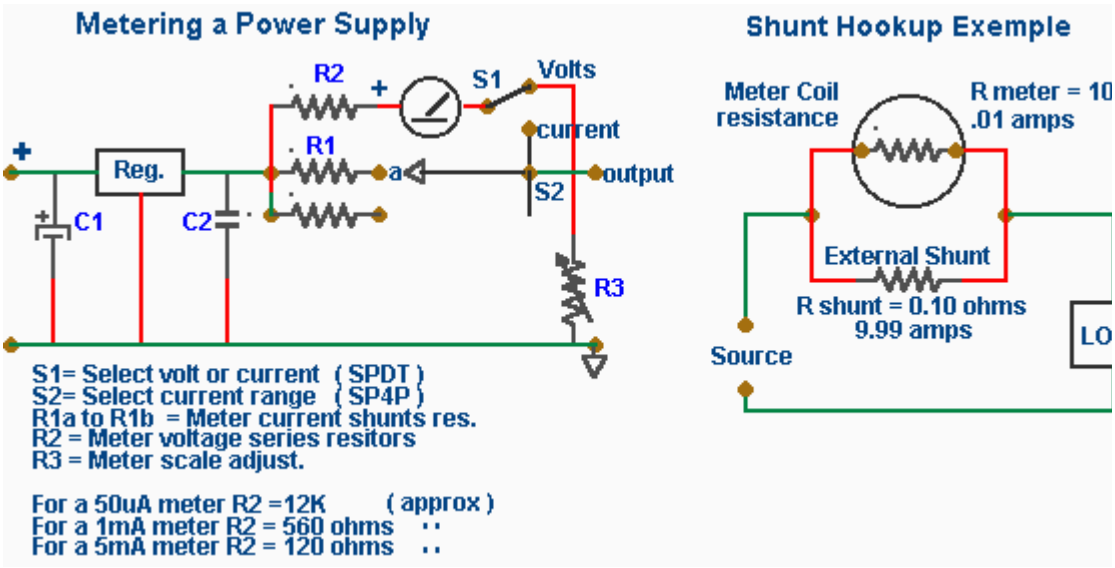
Setting up a metering circuit for a regulated power supply is not difficult but req
accuracy in chosing the right shunt resistance across the meter. Knowing the r
current is sufficient to choose a resistance value(R2) for the voltage measure
as listed below but to get an accurate current measurement you must know pre
the meter internal coil resistance.

To find the meter resistance set-up the meter unknown resistance circuit as sh
and proceed as follows; the first step is to find the meter internal resistance, th
resistance is used only to limit current . Start with the power supply set to zero
leaving S2 open and S1 closed . Raise the voltage slowly to a few volts and slo
increase the current flow by varying R3 until the meter needle moves full - scal
deflection.
Without touching R3 close S2 and adjust R2 until the meter reads half of full - s
The resistance of the meter and of R2 should now be equal. Open S2 and mea
the resistance across R2. This value will now be equal to the internal resistanc
the meter.



With a shunt connected across the meter most of the current is diverted past th
meter. To determine the needed shunt resistance we will consider an example
want a 0 to 10 miliammeter to be able to read full - scale for a current of 10 am
Therefore 10mA will flow through the meter when 9.990 Amps flows through th
shunt.

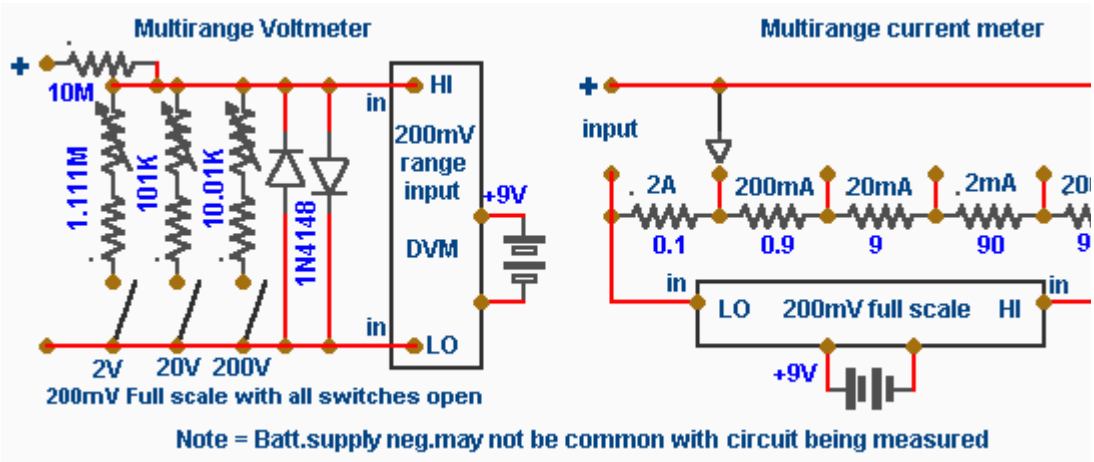
If the meter resistance was 100 ohms, using ohm's Law the voltage across the
parallel circuit is found by using the E(Volt) equation (below) E = (0.01 amps
(100 ohms) = 1 volt .Then by using the R equation R = 1 volt /9.990 Amps = .
ohms.



A shunt resistance can be calculated for any range you wish to apply to your m scale such as 0 to 10 to read 0 to 10 mA , 10 to 100 mA ,100mA to 1 Amp and on .
Many low ohm resistances are available . you can make your own shunts by us any kind of wire material you have on hand from spring wire to nicrhome wire , strings , all of which have a small amount of resistance per inch . Since there is drop across most shunt R3(could be fixed) is use to adjust for full scale readin while in the voltage reading position.

As an option full metering can be used by hadding an additional meter for dedi current reading with the scaling switching as shown and removing S1 and connecting the voltmeter directly to the ground side. If a current limiting rehosta used it would be very handy to be able to short the output while adjusting the rehostat for maximum current output resired as described in the DC Power Sup project

Metering With a DVM Module



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