

Mains Peak/RMS/Mean Meter

From: G8MNY@GB7CIP.#32.GBR.EU

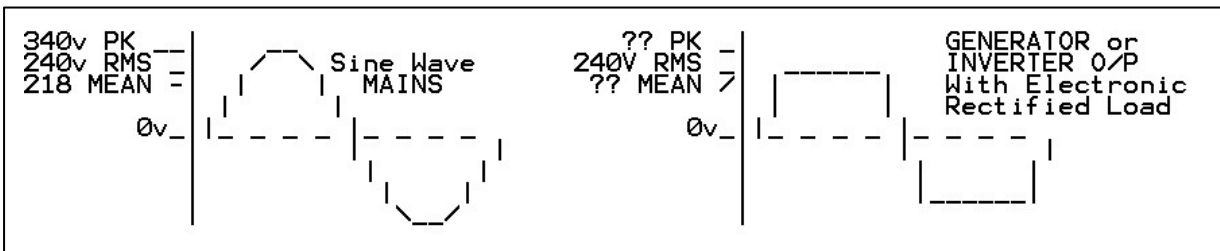
By G8MNY

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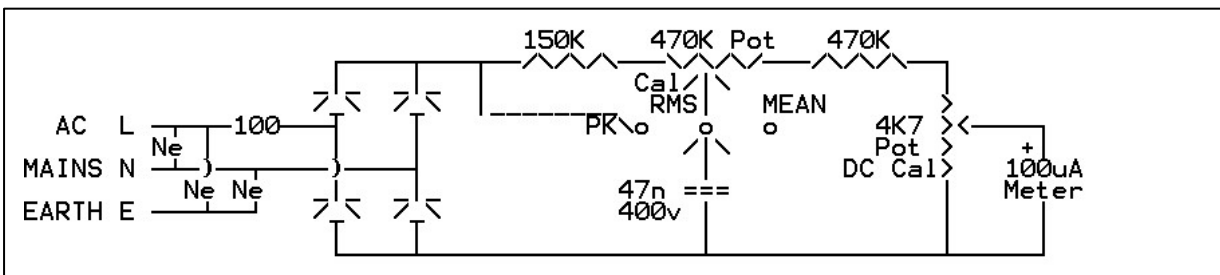
PSEUDO RMS VOLTMETER

True Root Mean Squared (RMS) meters either use an insensitive moving iron movement (with a non linear scale) or have active Squarer circuits to compute the value. So most meters are only "Average" (Mean) indicating & calibrated to indicate the RMS value, by applying sine waveform correction factor of 110%.

Real mains is normally 240v RMS (EU 230v, +10%=253v Max) & has a peak value of 340v (357v Max) with a mean value of 218v. Most electronic equipment needs the right peak voltage to work properly, & not some clipped 240v square wave that has the same RMS voltage!



This simple passive meter circuit can be used to give a more meaningful measurement of a Generator/Inverter AC supply, or to upgrade an existing meter. The added Peak & Mean features can be ignored for simple RMS meter.



PARTS:-

- Box Old Plug top PSU with 3 metal pins.
- Resistors 1/4 Watt or higher if using lower values. 100 \hat{e} is a fuse type.
- Diodes Hi PIV types eg. 1N4007
- Cap 400V or higher Polly type.
- Cal Pots Preset type (N.B. mains is on them if adjusted from outside!)
- Switch Any 3 pole 300VAC (low current) switch. (3 coloured positions)
- Meter 100uA Scaled 0-360V, or 50% Back wound movement Scaled 160v-360v. Use 3 Colour bands on the scale for ideal readings. Mounted so that it is well insulated. (double insulated?) For higher current meter e.g. 1mA divide the R values by 10, & multiply the Capacitor value by 10.
- Neons With internal Rs, can be added L-N, L-E, N-E, show the status of the voltages on the wiring. On Household Mains only L-N & L-E

should light up, on a floating generator feed all will light up.

CALIBRATION:-

Warning this means using MAINS VOLTAGES! Use an isolation transformer & variac if you can, to make it safer!

- 1/ Apply smooth 250V-300V DC on the AC Input, Adjust the DC Cal pot for the same reading. Or with use the Peak reading feature & measure the Voltage across the Cap with a Digital meter & adjust the DC Cal pot to read the same. This simulates a perfect square wave.
- 2/ Apply 50Hz 240V AC Sine wave & adjust Cal RMS pot for the same reading. This varies the amount of peak voltage that is added to the mean voltage to get the pseudo RMS reading.
- 3/ Check that with 240V AC the meter reads 340v Peak & 218v Mean.

/QSL

73 de John G8MNY @ GB7CIP