

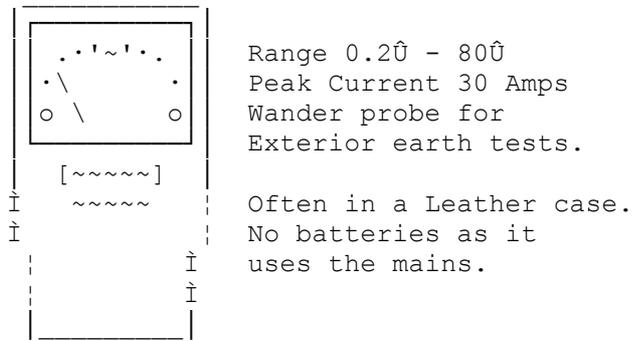
EdgcumePeebles Earth Loop Z

By G8MNY

(New Jan 08)

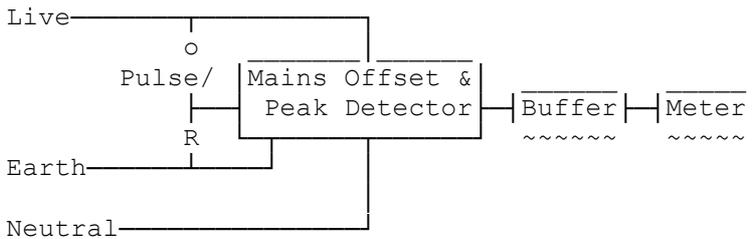
(8 Bit ASCII Graphics use code page 473 or 850)

This is an old tester the engineers used to use for testing the mains socket & veracity of earths on sockets etc. It is quite useless nowadays with RDC/ELCB protected supplies as it WILL ALWAYS TRIP THEM!



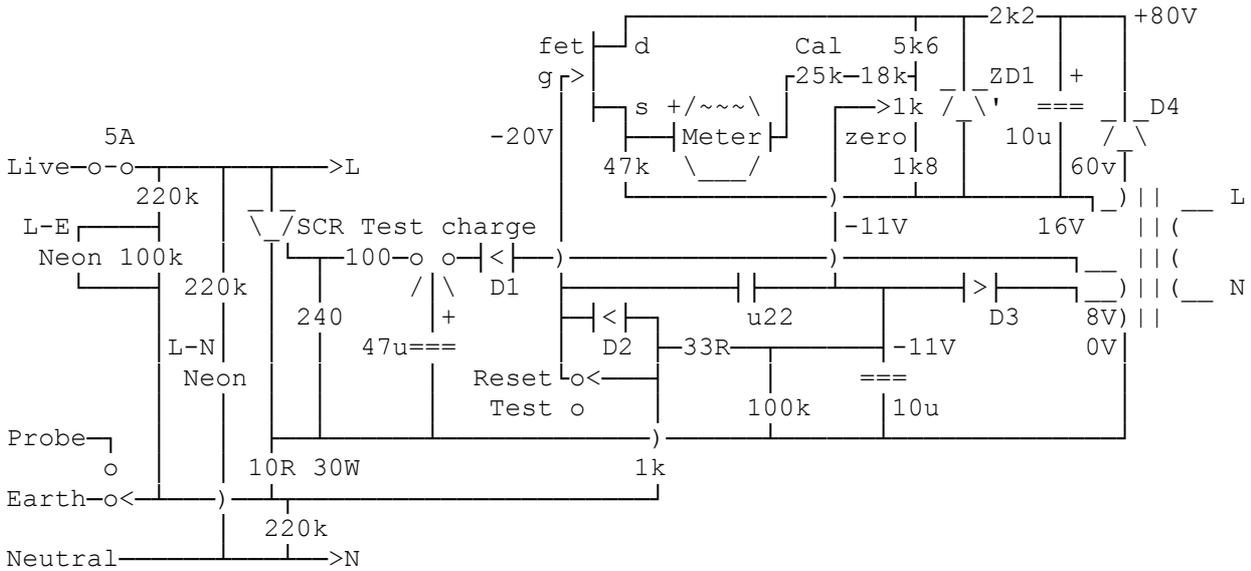
PRINCIPLES

The meter provides a single half wave pulse of current (30A) from live to earth through a known resistor. The peak voltage across the resistor will equal the supply voltage less the loss due to earth line resistance.



If the Earth & Live resistance equals R the voltage across R will be halved. This voltage is compared to the mains so that variation in the mains does not alter meter reading. Because this is fast pulse test (10mS) the earth circuit "impedance" to the pulse rather than just the DC resistance is measured. Also by using a full 30A peak current the capability of the wiring is actually tested, e.g. fine wire strands that may pass the resistance test would be blown up passing this current. This makes the test, what is required for a PROPER SAFETY TEST, even though it hazards other it plugged in at the time!

METER CIRCUIT



CIRCUIT OPERATION

On connecting the mains the 2 neons should light, indication the mains is SAFE to test. The 5A fuse handles the 30A pulse OK.

The transformer's 16V winding charges up the 47uF capacitor via D1 ready to trigger the SCR. The 8V winding via D3 makes a -11V mains reference rail.

On testing, a single half cycle +ve peak voltage appears across the 30 Watt 10R (one test per min MAX) & it is attenuated with 1k & 33R & compared to the 11V rail, the resultant peak voltage is fed via D2 (not shorted in test mode) to the u22 storage cap.

The voltage across the cap is then read with the FET buffered meter, with its floating regulated power supply. Zero offset & meter gain presets finish off the calibration.

Z VALUES

To quickly blow a 13A fuse, a current > 26A must flow. So @ 220V that needs a total loop resistance < 9Ω. However with high current main ring circuits of 30A to blow a ring fuse quickly needs a current > 60A, which needs loop resistance < 3Ω. These are much lower values than you can get with external earths, I once tested a large unused radio tower & earth system & I was horrified to find it was about 40Ω!

Why don't U send an interesting bul?

73 de John G8MNY @ GB7CIP