Troubleshooting your ESU analyzeer

When testing an ESU and getting NO power reading on the ESU analyzer, is it the ESU or the analyzer that's at fault? A quick check is as close as your nearest power receptacle!

Most ESUs use a thermocouple as the power measuring device. They produce a DC output that's proportional to the power being applied. They have a low resistance so additional resistance
is part of the internal circuitry. Usually resistances from 50 - 500 ohms are selectable with 300 - 500 ohms being used for high power bipolar ESU outputs.

You can verify operation by selecting a high resistance range, say 300 - 500 ohms, then plugging the analyzer into the power receptacle. While this is NOT a calibration technique it can indicate proper operation quite accurately.

You'll need an AC voltmeter to measure line voltage, it's usually NOT exactly 120 volts, so measure
it. Using Ohm's Law you can calculate what power that should be appearing on the analyzer.

If load resistance is 500 ohms and the line measures 115 volts the calculations are as follows:

P = E squared/Resistance

P =115 squared (which is 13225) / 500 = 25.45 Watts and you should read about that.

Another example if you use the 400 ohm load on the analyzer, and assuming the same 115 volts:

P = 115 squared (13225 / 400) = 33.06 Watts and you should be reading about that.

SOME CAVEATS -- Keep the load resistance at or above 300 ohms to minimize damage to the internal thermocouple. When connecting to the receptacle, connect the patient plate on the analyzer to the neutral (wide blade) at the receptacle and the active input to the hot (narrow blade)
at the receptacle. (While not always necessary, some analyzers have the patient plate input grounded internally.)

Often, ESU analyzers have a fractional amp fuse to protect the thermocouple, and if you're not getting a reading that's a good place to start. If it's bad, be sure to replce it with the EXACT replacement fuse with the same rating as noted by the manufacturer of the analyzer. These fuses
are usually fast blow types and should NOT be replaced with slow blow fuses lest you damage the
thermocouple -- and they're costly, often over $1000.

This technique works because the thermocouples used have a freqency response from DC to above
5 MHz and most ESUs work in the 300 - 500 KHz range. Therefore 60 Hz can be used as a power
source for testing.

Send any comments and ideas for future articles to:

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