

Re: Mystery Motor/Generator with some clues

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These are highly valuable devices that could sell very well on ebay.

That's what I would suggest to your friend.

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On Sun, 28 May 2006 21:03:17 -0400, Paul E. Schoen <pstech@xxxxxxxxx> wrote:

I just bought a fantastic motor that is designed to connect to a DC generator I got last month. The pair comprise an Electrical Engineering lab setup in which various AC and DC motors can be constructed and tested with the generator and load banks as a dynamometer. I now have the manual for the system, which shows how to connect the various stator and rotor windings of the motor for single phase, two phase, and three phase, synchronous and induction types, as well as DC machines, and even frequency and phase converters. It has four brushes for the DC commutator, and a set of eight slip rings to the wound rotor for AC.

The generator seems to be fairly simple. It is specified as a 3 kW, 110 VDC, 27 amp, shunt wound machine. There are two heavy wires which are connected to the brushes and the rotor, and they read about 2 ohms. I assume this is the output. There are two other pairs of wires, one of which reads 150 ohms, and the other is about 1.65 k. The drawings I have show only two pairs, A-AA for the armature, and X-XX for the field. I would assume the 150 ohm winding would be connected to 110 VDC through a variable 0-250 ohm resistance. The schematics generally show a separate excitation voltage, probably so the output to the load will reflect the power input for use as a dynamometer. There is also a separate tachometer attached to the generator. I think it is well worth the \$20 I paid for it, if only as a learning toy.

Today I got the other half (also for \$20), which is called a Universal Laboratory Machine. The schematic shows 12 pairs of connections to the stator windings, 1-1' to 12-12', and ten connections to the rotor, A, B, C (at 120 degrees), B1, B2 (at 90 degrees), and Q1-Q2 and D1-D2 (at 90 degrees, for DC use). There is also a stator search coil X1-X2, and a rotor search coil X3-X4. There appears to be a search coil for the dynamometer X5-X6, so that is probably the extra high resistance winding I found. There is also an adjustable rotor angle indicator.

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The problem is that all the stator wires were cut off from the original panel that had labels for the pairs 1-1' through 12-12'. Luckily, all the start windings were grouped in one bunch of 13 wires, and the ends in another. I used an ohmmeter to find the pairs, but they are in random order, and probably one pair is the search core, which probably has a higher resistance. The rotor wires are easily traced to the slip rings, so those connections are known. My problem is: how to find the stator windings in their proper order.

What I plan to try is to feed the rotor A, B, and C windings with low voltage three phase. Then, I believe I can read the voltage of the stator search coil, using an oscilloscope, and adjust the rotor until it is exactly in phase with A-N. I can then set the rotor to 0 degrees on the position indicator. The other stator pairs (I think) should each be $360/12 = 30$ degrees apart, so I can set them in order.

There may be another way to set the 0 degree alignment, by energizing the stator search coil and adjusting the rotor for maximum voltage (in phase) on the rotor search coil. I might also be able to avoid using a three phase supply by utilizing the 90 degree B1-B2 rotor coils with a capacitor phase shifter.

Any other suggestions are welcome. I have been fascinated with motors for some time and this seems to be the ultimate learning toy. I'm not really sure how much I will use it. I mostly wanted the generator to make a dynamometer to test the HP output of specially wound three phase motors at higher frequency. This looks like the perfect setup for that. The generator is even mounted on rotating gimbals and was originally fitted with a spring scale to measure torque.

If anyone is interested, the guy I bought these from has several more in his garage in New Jersey. Let me know if you are interested and I'll give you his email address. I'm sure he would be happy to find a good home for these beautifully made machines, rather than scrapping them for the copper and iron. If nothing else, the generator would be great for hydroelectric or wind power applications.

Thanks for any help you may be able to provide. I'll let you know if and when I figure out the connections and get anything working.

Paul (The "FunGi")