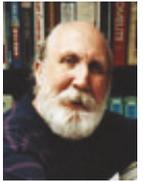




Tech Talk: March 2014



- Q1.How low is too low, to run a motor, when you meg it and why?
- Q2.How do you check a DC motor to determine if it has a bad armature. What is the procedure for checking it?

Q1. IEEE Standard 43 (Recommended Practice for Testing Insulation Resistance of Rotating Machinery) recommends as per below table. If you follow the recommendations in this table you should be safe in your practice. If you choose to allow lower meg insulation values for the safe start of these machines then you are acting against good historical advice.

Recommended Safe Minimum Values for Rotating Machinery	
Motor type	Insulation resistance value
Random wound before 1974	>1 Meg-ohm+1 Meg-ohm/kV rating of motor
Random wound after 1974	>5 Meg-ohm
Form wound and DC armatures	>100 Meg-ohm
Motor voltage rating	Test voltage
< 600V	500V
1,000V to 2,500V	500V to 1,000V
2,500V to 5,000V	1,000V to 2,500V
> 5,000V	2,500V to 5,000V

IEEE Std. 43-2000 lists these safe minimum values for testing insulation in rotating machinery.

Q2. The first electrical test on the armature should be the megohmmeter test. A megohmmeter test at 500 volts DC should result in an insulation resistance of at least 100 megohms . Although the IEEE recommends >100 megs my experience has shown me that satisfactory operation on 500v armatures, using a 500v megger , can be had with a meg readings in excess of 5 megohms.

If the test above indicates a good insulation reading,then we can test for a shorted armature by applying 1/2 to full voltage DC to the shunt fields only. Rotate the armature by hand.As the shorted bars approach the brush a resistance to motion is noted. It requires much more effort to rotate the armature past the shorted bars. If the force can be overcome, the armature suddenly feels released and spins forward in the direction in which it was being rotated. If, as the point of resistance is being approached,the armature is released, it tends to speed backward, like a rubber band under tension.

The commutator is the heart of the dc motor and needs to be closely looked at for possible damage. Press a finger lightly on the brush and brush box simultaneously, then rotate the armature shaft slowly. If a movement is felt or heard, the commutator is not perfectly round. We should investigate possible reasons for this before correcting the out of round condition. “Opens” do not cause out of roundness, but are visible on the commutator in the form of a missing part of a copper bar.

In these armature tests we have made the assumption that the fields have been tested as good.

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