



A Leader in Electric Motor Testing

Tip Of The Week

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Rotor Bar Count

Why it is important

It is important to know rotor angular velocity and the number of rotor bars of a motor being tested online in order to calculate the RBPF (Rotor Bar Pass Frequency). Eccentricity peaks in the current spectrum are located on sidebands at odd harmonics of the line frequency. Confidence level is much higher when there is certainty about the rotor bar count.

Other ways to determine rotor bar count

Sometimes, the number of rotor bars can be looked up on the motor manufacturer's website. Not all manufacturers provide this information. The U.S. Department of Energy created a free database called MotorMaster+. Most of the motors contained in this database do not have the rotor bars field populated. Your motor shop may have a record of the rotor bar count for your particular motor or another identical motor. If you know the rotor RPM during the eccentricity test, the MCEGold® software can perform a reverse calculation to estimate rotor bars. If the motor can be disassembled, the rotor bars can be counted.

Procedure for determining rotor bar count without motor disassembly

1. Uncouple the motor from the load so the shaft turns freely.
2. Use a variac to apply voltage to a single phase of the motor. This is the same setup as used in a single-phase test.
3. While monitoring current, slowly increase voltage and slowly rotate the motor shaft until cogging can be easily felt. Do not exceed half nameplate FLA.
4. Make a reference mark on the endbell near the motor shaft with a fine-point Sharpie or similar marker.
5. Turn the motor shaft to feel one of the cogging positions and mark the motor shaft where it lines up with the reference.
6. Repeat the above step for each cogging position.
7. When all cogging positions have been marked, turn down the voltage source to zero and disconnect from the motor.
8. Rotate the shaft and inspect the marks. They should be uniformly spaced. If not, repeat the procedure.
9. Count the marks. There is one cogging position for each rotor bar

Thank you to Jim McKeown, Bodine Electric of Decatur, in Decatur, Illinois, for providing this week's tip. Your mug is on its way.

Did you know that PdMA® has Case Study videos on their website? To view the latest video titled *Rogue Robots* go to <http://www.pdma.com> and click on the Robot Button.

You are invited to submit an Electric Motor Testing Tip of your own and receive a free PdMA® mug or hat if we publish it! Contact Lou at 813-621-6463 ext. 126 or lou@pdma.com.