



A Leader in Electric Motor Testing

# Tip Of The Week

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March 28, 2016

## Smaller is Bigger

DC motors are relatively simple machines consisting of an armature winding (rotating) and shunt/series windings (stationary). Energizing these two primary components of the DC motor creates two magnetic fields that push or pull each other to make the armature rotate. Recording a winding resistance value on these components is a common practice during de-energized motor testing for trending or troubleshooting. When it comes to measuring winding resistance, remember our tip that smaller is bigger. The smaller the wire size the bigger the resistance. The rotating armature windings, connected to the commutator, are relatively large and in many industrial DC motors are form wound. The stationary series windings are randomly wound around the pole pieces and are also relatively large. By relatively large we mean that if you look at an individual strand of copper wire that makes up the armature or series winding, the diameter or circular mils of the strand is larger when compared to the shunt field windings. The shunt field windings are also randomly wound around the same pole piece as the series winding but consist of much smaller strands of wire when compared to the series and armature windings. Therefore, true to our tip, on smaller shunt field windings you would expect a bigger resistance reading. Having a basic understanding of these two components will make you more effective when analyzing the data received when performing a winding resistance test on a DC motor.

Don't forget to visit our website at [http://www.pdma.com/pdfs/Articles/DC\\_Motor\\_Analysis.pdf](http://www.pdma.com/pdfs/Articles/DC_Motor_Analysis.pdf) for an article detailing what to expect when testing DC motors.

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](mailto:lou@pdma.com).

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