Free wheeling fan or pump

Question: I noticed occasionally testing motors in the field that the AWA will not converge on Resistance Test, the values it reports in the Temperature/Resistance Test screen scroll continuously.

For example: “Lead 1 Resistance Ohms” will continuously scroll up and down like so:

0.099 – 0.112 – 0.139 – 0.218 – 0.331 – 0.210 – 0.112 –0.099 etc, etc, etc...

Answer: This is caused by a fan or pump, attached to the motor, freewheeling due to back-pressure. With fans it is usually because the draft caused by pressure or temperature is spinning the fan at some low RPM. Generally speaking it is not a critical problem for fans to spin while de-energized, because of the compressibility of air. A restart of the motor will only have to over come the inertia of the fan blades and the rotor to come up to speed.

With pumps, it is a different story:

For example: 4 x 1000 HP 4160 VAC 1800 RPM induction motors drive boiler water circ pumps attached to a manifold at a power plant. When tested with the Baker AWA it was noticed that the AWA would not converge on it’s resistance test on one of the motors. Upon investigation (by actuating the discharge valve) it was found that the check valve for that motor was sticking, and the pressure of the water was spinning the rotor in reverse at significant RPM.

When the valve was actuated, the motor stopped spinning and the AWA was able to conclude a balanced resistance test. When the valve was then closed the motor started spinning again, the AWA again reporting scrolling resistance readings.

This represents a very serious overload if this motor is re-started, without correcting the check valve. The motor would have to overcome the inertia of the pump, reverse spinning rotor and the circulating fluid.

How? The Baker AWA uses a constant DC current source for the resistance test. This DC current is capable of magnetizing the motor sufficiently that the spinning rotor induces sinusoidal voltage across the motor terminals, measured by the AWA and revealing hidden problems such as a malfunctioning check valve.