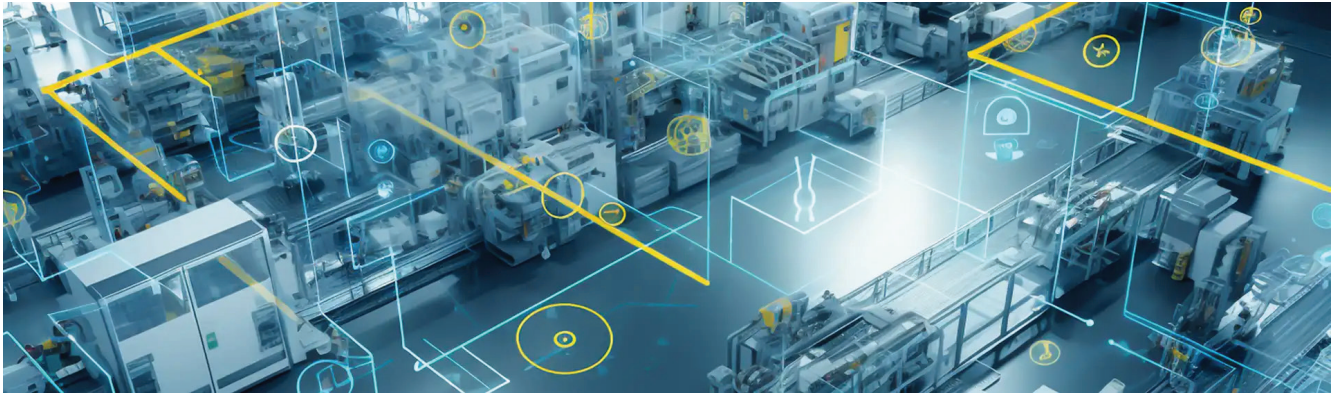


The Industrial and Commercial Canary in a Coal Mine



Motors are used everywhere in industrial and commercial automation applications. Various means are available to determine whether a motor is running, such as an indicator light connected to the motor power input. However, knowing that a motor is operating optimally and within specifications requires a different approach.

Motors have shaft bearings, and those bearings will wear over time. The source of a motor failure, such as bearing wear, can be used to provide an early warning of impending failure. A power transducer or current transducer can help prevent equipment damage and unplanned downtime by providing advanced warning that a motor might fail or is overloaded.

Early Warning Methods

Years ago, in the hard coal mining industry in Pennsylvania, long before gas detection devices were available, miners would carry a canary deep into the coal mines with them. They would keep an eye on the canary to determine whether harmful gases such as carbon monoxide were present in the mine. If the canary collapsed, it was the miners' early warning to evacuate the mine shaft until the source of the toxic gas could be located and eliminated before they, too, fell victim.

A power or current transducer can be used in much the same manner as the canary once was. Transducers can be used to create an early warning that then can be used to investigate a potential problem's source well before a catastrophic event occurs. Think of it as an "electronic problem detecting canary in a coal mine."

As motor bearings wear, the motor will work harder to overcome the increased resistance associated with shaft bearing wear. The effect of increased resistance is reflected in the current a motor is drawing.

As the bearings wear, the motor current draw will increase proportionally. A power or current transducer installed on one conductor of an AC motor can be used to monitor the motor's current draw. The current transducer's analog output can be connected to a programmable logic controller's (PLC's) analog input card. The PLC can, in turn, be programmed to issue an alert or sound an alarm when the motor current exceeds the motor current draw associated with an optimally functioning process.

More than Just Motor Damage

The value of monitoring motor power or current should not be underestimated. Losing a motor may seem to be inconsequential. However, the motor expense itself often can be the least costly piece of equipment when the process the motor operates is damaged. Instead, the \$10,000 spindle connected to the motor shaft may be a more expensive problem if the motor seizes up. The same is true of raw material the process is consuming. If the motor fails, the associated loss in process raw materials, and production often can exceed the motor cost by many orders of magnitude.

Power and current transducers are the preferred device to monitor for motor bearing wear. For instance, when connected to a PLC, a variable frequency device (VFD) motor's nominal operating current needs profiled to determine the upper control limit. With that known, and assuming the VFD motor is properly sized horsepower-wise, the excessive current alert level in the PLC can then be accurately programmed.

Predictive Maintenance and Planning

Power and current transducers are the preferred devices for monitoring motor bearing wear. For example, when connected to a PLC, the nominal operating current of a variable frequency drive (VFD) motor needs to be profiled to establish the upper control limit. Once this limit is determined, and assuming the VFD motor is correctly sized in terms of horsepower, the PLC can be accurately programmed to trigger an excessive current alert.

Applications

- Motors
- Manufacturing
- Machine Tools
- Power Equipment and Monitoring

AC Power and Current Transducers

NK Technologies offers a wide variety of power and current transducers to help you identify potential issues with your process well before a key part of your application, such as a motor, fails with the ensuing collateral damage to your operation.

Transducer models feature field adjustable measurement ranges, solid and split core designs, single and three phase models, choice of 0-5 VDC or 0-10 VDC or 4-20 mA Outputs, True RMS Output Options and choice of multiple power supply options to include 24 VAC/VDC, 24 VDC, 120 VAC, Self-Powered and 24 VDC Loop Powered.