

Top Tips

Selecting Machine Monitoring Relays for Your Application



Since the vast majority of our industrial and infrastructure equipment relies on electrical power, it has become increasingly important to ensure that the incoming power matches equipment requirements. In addition to being able to monitor DC signals, single-phase AC signals, or three-phase AC mains coming into a building or a room, monitoring of individual equipment or machinery is also important.

Machine monitoring relays detect abnormalities in incoming power and permit actions to be taken to protect equipment before damage can occur. Such relays are used in a wide variety of applications including HVACR; elevators and escalators; food and beverage production and dispensing equipment; pumps; and other motors.

Read on for some tips on choosing the right machine monitoring relay for your application.

1

Choose What to Monitor

Machine monitoring equipment encompasses relays with a range of capabilities. You'll want to choose a relay that monitors the aspect of supplied power that is most critical to your application.

Relays are designed to monitor three-phase power, voltage, current, power factor, frequency, or temperature. For each relay type, you'll want to clearly define the measurement parameters and acceptable tolerances.

2

Factor in Phases

Many types of heavy industrial equipment rely on three-phase power. Inconsistencies in the power supply quality can cause catastrophic damage to equipment. Phase inconsistencies include improper phase sequence, phase loss, and phase imbalance.

For instance, if a motor operating on three-phase power receives two phases out of sequence, it will reverse direction. This can cause damage to the motor, or even pose safety concerns in applications like material loading, lifts, and moving walkways. Furthermore, per the National Electrical Code, all people-moving equipment requires phase reversal protection.

Losing one of the three phases of incoming power can leave a motor unable to operate, or else force it to operate at a lower rating. In addition to a loss of performance, the latter consequence can lead to greater heat generation and shorter component life. A similar outcome occurs if all phases are present but one or more is underpowered because of single-phase loads drawing power unequally on one or more phases.

3

Verify Your Voltage

Trying to run equipment, such as motors, on a voltage that is lower than required causes them to draw more current. This leads to inefficiencies and excessive heat, both of which shorten component life. Overvoltage can cause component stress, leading to permanent damage of some parts. Voltage-monitoring relays can handle anywhere from a low millivolt range up to several hundred volts. Versions are available that monitor under and/or overvoltage.

Voltage relays for DC supplies are often used to monitor backup battery status, such as those found on generator systems. Those designed for single-phase AC work well for motors that could be used in a variety of countries with different supply voltages or in areas where voltage fluctuates.

4

Consider Your Current

Current can be used as an indication of machine function. Equipment that suddenly starts drawing more current may be experiencing a voltage imbalance, an impending bearing failure, or another type of issue. Current monitoring relays help with detecting these variations and taking action before equipment damage occurs.

Low-current AC or DC inputs can be directly connected to most monitoring relays, and AC currents up to 100 A can be monitored by some modules directly. However, higher currents need to be monitored through the means of a shunt or current transformer.

Power monitoring relays can also detect variations in the power consumption of various loads. Depending on the relay, you can detect and react to load excess or absence, motor load variation, and motor direction.

5

Tackle Temperature

Knowing the temperature of your equipment can help prevent fire and equipment breakdown. Temperature monitoring relays use PTC thermistors, mounted in motors, whose resistance increases with motor temperature. They can monitor the temperature of up to six motors or motor windings at once, and can be used to shut down motors during overheating, preventing damage to the motor.

6

Choose Relay Response

Once you've chosen a relay that can monitor your critical power supply characteristics, you'll want it to trigger the right response if an abnormality is detected. The response, of course, depends on the application and the consequences when abnormalities occur.

Relays can be designed to immediately shut down power to the equipment, similar to the operation of a fuse, but more precise. More commonly, the monitoring relay signals a shutdown relay that is equipped to safely power down the equipment. The signal can also be sent to a more sophisticated PLC that can trigger a variety of responses.

7

Insure Your Investment

Many designers look at machine monitoring relays as an insurance policy. Where industrial motors can cost thousands of dollars, monitoring relays typically cost from \$100 to \$200—usually 10% or less of the equipment cost.

In addition to the upfront cost, machine monitoring relays can protect machinery and help reduce the cost of production time lost and product damage. Be sure to select relays with approvals like UL or CE appropriate for your application to give you extra peace of mind. It also never hurts to monitor the incoming power to a building.

8

Get Help

For more help in selecting machine monitoring relays, turn to automation experts like Carlo Gavazzi. They have product literature and selector guides on their websites that can help you get the right product. They also have experienced personnel who can assist you by phone, e-mail, Skype, or in person.

Sponsored by

