Consider 24V DC Control Voltage for Safety, Reliability

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There are two basic components to virtually every manufacturing process: motors and the devices that control them. Typically, control devices are large and operate on the same voltage used to power the motors. This results in large motor-control centers that may not provide maximum reliability.

Taking a page from sensor, operator interface (OI), and PLC developers, OEMs are now building motor-control devices that operate on a 24V DC control voltage. By basing motor control on this lower voltage, OEMs are able to offer manufacturers smaller, safer and more reliable control devices.

They are also offering units that comply with what is becoming a global standard for 24V DC. Among the many voltages and frequencies for the world's power grids (110V/50Hz, 120V/60Hz, 480V/60Hz, and others), only 24V DC is universal. Twenty-four-volt DC power supplies can accept a wide range of voltages and frequencies in, and put out the needed control voltage.

By using 24V DC as a control voltage, manufacturers can increase reliability. One reason for this is that these power supplies operate with limiting circuits to protect against short circuits. In the event of a short, they simply shut down. They eliminate the need for fuses and the time needed to replace them. When the short is cleared, 24V DC power supplies function normally, costing the operator less downtime.

Additionally, 24V DC has higher ride-through capabilities, allowing control devices to better survive voltage sags. Mechanically, 24V DC devices do not require laminations and oils typically used in AC coils, which can cause contacts to stick.

The nature of DC voltage is also helping manufacturers of 24V DC control products reduce the size of their devices. These units do not require shading coils or laminations, for example. Also, using microprocessor technology running on a DC current eliminates the rectification phase and allows control and logic circuits to be separated, further reducing device size. Typically, 24V DC devices are 40% smaller than standard motor-control devices.

Manufacturers have also redesigned some 24V DC components to bring down overall size. In some cases, bypass contactors and overload relays have been combined, for example. Some manufacturers have been able to develop devices that drastically reduce the heat of the device, also limiting size.

Regarding safety, each year thousands of workers are shocked by 120V AC electrical control systems, usually because they are not wearing prescribed safety gear. Unlike AC power, 24V DC does not require the use of personal safety

equipment. Maintenance can be performed safely on energized circuits. If an accident occurs that exposes 24V DC wiring, there is no potential for personnel injury. Because power is limited, equipment is also well protected.

Overall, 24V DC usage is growing. As more realize its benefits, OEMs and other manufacturers are expected to establish it as the industry standard.

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