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WHY USE A SOLID STATE REDUCED VOLTAGE STARTER

A case can be made for the SSRV in almost any AC motor application that does not require Variable Speed Control. Besides the perceived benefits of softer impact on the electrical service, enhanced electronic monitoring of the motor's operational status and solid state reliability, the SSRV provides many far less obvious but equally important mechanical benefits. These benefits to be realized range from enhanced control possibilities to reduced downtime and extended life expectancy of mechanical components.

Most AC motor applications involve a long power transmission chain before the movement created by the motor actually impacts the product or work. This chain can include motor shaft and bearings, couplings, sheaves (pulleys), belts, gearboxes, and drive shafts to name a few, all mechanical wear points, with a definite "limited" life expectancy.

When a motor is started "across line" or by a two step method, such as AutoXFMR, part winding, or primary resistance, the current surges (or inrushes) caused by the uncontrolled application of power cause corresponding torque surge or transients in the mechanical drive train. With "across line" starting, the instant application of full voltage to the motor windings causes a current between 500 and 800% of FLC (full load or "nameplate" current) to flow in the windings of the motor until the load accelerates. At which time, the current drops to a level directly proportional to the steady state torque requirement of the driven load. Since starting torque in the motor is proportional to the square of the current, we can see that during full voltage (or uncontrolled) starting, the torque applied is much higher than the "Steady State" or running torque that the system is designed for – this is called "Shock Loading"

In a two step system, although the inrush or transient is broken down into two steps, the mechanical impact is still there. Although the components are designed with these torque transients in mind, they are sometimes the cause of the most severe mechanical wear the component sees. Through use of an SSRV, we can control the application of power to the motor by limiting the current. This minimizes the "Shock Loading" of the mechanical system, extending the life of the power transmission components.

These same mechanical benefits are apparent in the winding of the motor. There are actually two windings in the motor, the stator (or stationary) winding, and the rotor (or rotating) winding. The current flowing in these windings creates a magnetic field around them that at any given instant oppose each other and create the force or torque which turns the rotor. Again, torque is proportional to the square of the current, so we see that

when the current is highest causing the greatest electrical strain (heating, etc.) on the winding, the "torque" is also causing the greatest mechanical strain. The double whammy of elevated temperature and mechanical "shock loading" can cause severe and rapid deterioration of the motor winding and lead to early failure and frequent rewinds. Again, by utilizing the SSRV for controlled application of power, we can minimize the strain, both electrical and mechanical, on the motor windings and protect them against early failure and extend the intervals between rewinds.

By providing the mechanical benefits of controlled starting to the motor and power transmission components, the SSRV increases reliability of the mechanical system. This results in less "Down Time" and increased production.

The other mechanical benefits to be realized from use of an SSRV are what were referred to earlier as enhanced control possibilities. Since we can control the application of current to the motor, as opposed to the “All or Nothing” limitation of other starting methods, we can control or manipulate the starting (or stopping) torque of the motor. This gives us the flexibility to provide features such as jog, extended (or linear) acceleration, ramp down, braking or even controlled (plug) reversing.

So, we see that the mechanical benefits, along with the more obvious electrical benefits (and the fact that we generally offer a cost benefit above 240 Amps), all combine to make the SSRV a real motion control value.