

Using an adjustable frequency drive with a soft starter bypass



Today's most complete drive packages often combine several different solutions together in order to provide the most reliable and robust system available. This application paper will discuss the advantages of using a drive with a soft starter built into the bypass.

Contactors, soft starters, and drives are different devices that can be used to control a motor. A contactor simply connects the motor directly across the AC line. A motor connected to the AC line will accelerate very quickly to full speed and draw a large amount of current during acceleration. A soft starter is a device used to slowly ramp up a motor to full speed, and/or slowly ramp down the motor to a stop. Reducing both current draw and the mechanical strain on the system are big advantages of using a soft starter in place of a contactor. Many large pumps and fans require at least a 30-second ramp time to prevent mechanical damage to the system. Soft starters are more common on larger horsepower systems. An adjustable frequency drive not only has the ramping ability of a soft starter, but also allows the speed to be varied, while offering more flexibility and features.

Enclosed adjustable frequency drives often include a bypass when used in applications that can not afford downtime. A bypass configuration consists of three contactors: one contactor disconnects the drive from AC power, another disconnects the motor from the drive, and the last contactor connects the motor directly to the AC line. See **Figure 1** on the next page for a typical three-contactor bypass configuration.

A bypass provides peace of mind guaranteeing that the system will continue to run, even in the event of a drive failure. However, many designers overlook the possibility of adding a soft starter into the bypass. A soft starter can be added in line with the bypass contactor that connects the motor directly across the line. See **Figure 2** on the next page for a typical three-contactor bypass with an integral soft starter.

If an application is using an adjustable frequency drive because a contactor is not acceptable, then a contactor-only bypass should not be acceptable either. Adding a soft starter to the bypass allows the motor to be ramped up to full speed, thus reducing the mechanical and electrical stress on the system.

The best overall motor control package starts with a drive to provide the greatest amount of control, flexibility, and protection. Adding a bypass with an integral soft starter provides a backup system to run the motor should the drive fail. Large drive systems should have soft starters in the bypass, otherwise the application risks negatively affecting the power system, damaged bearings, or bent shafts once the bypass is engaged.

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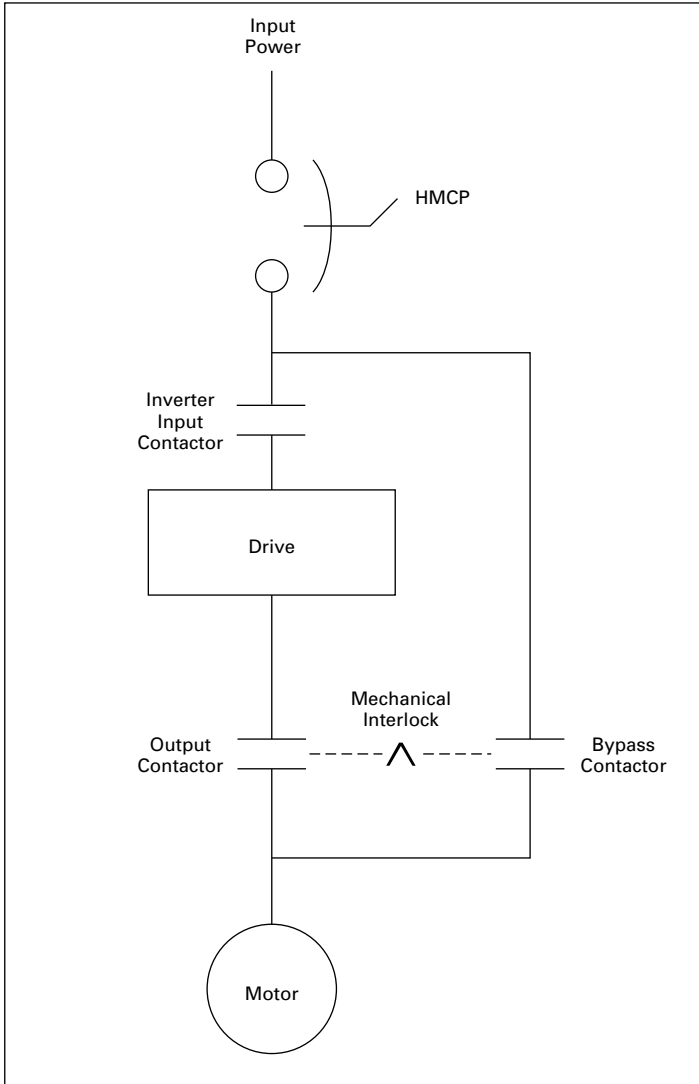


Figure 1. Typical Three-Contactor Bypass Configuration

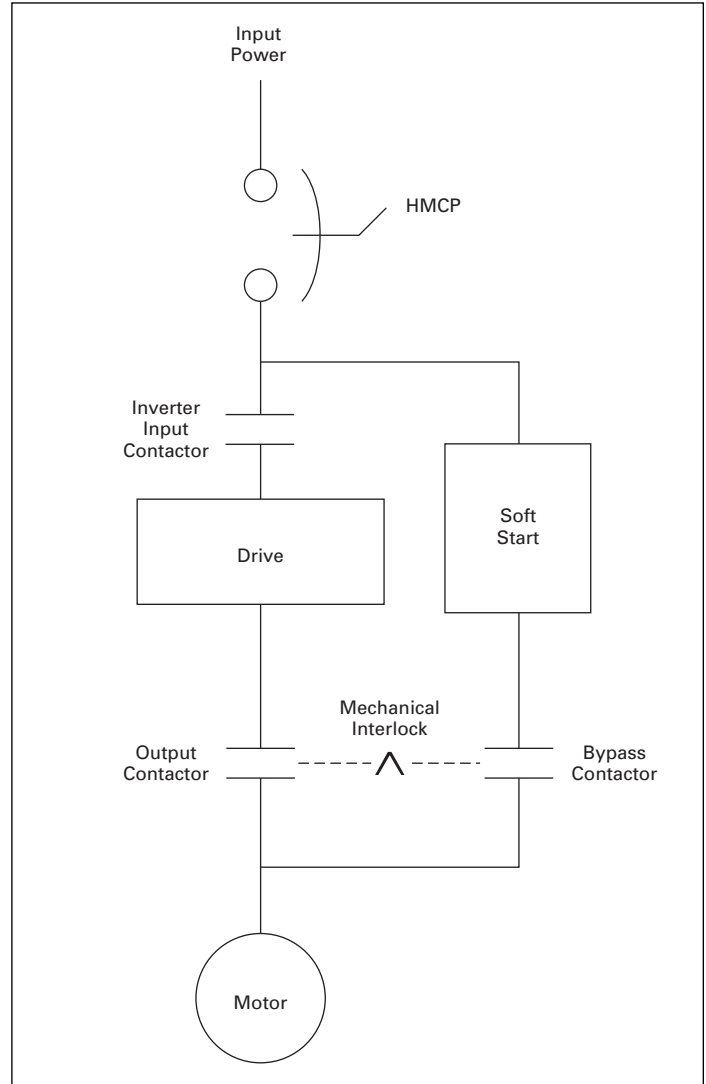


Figure 2. Typical Three-Contactor Bypass with Integral Soft Starter

Eaton Corporation
 Electrical Sector
 1111 Superior Ave.
 Cleveland, OH 44114
 United States
 877-ETN-CARE (877-386-2273)
 Eaton.com

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