Preserve Process Reliability With Multifunction Bus Transfer

The Fast Motor Bus Transfer System includes all transfer modes in one low-cost SEL-451 package.

Features and Benefits

**Restore Power With Fast Transfer Mode Before the Motor Slows Down**

The fast transfer mode switches the motor bus to an alternate source with no intentional delay. The multiple-input SEL-451 Protection, Automation, and Bay Control System makes connections to multiple sources easy.

**Minimize Transient Torques Using In-Phase Transfer to Prevent Motor Damage**

High-speed logic in the SEL-451 uses accurate phase angle and voltage measurements to connect the alternate source when it is in phase with the induced motor voltage.

**Restore Power to Low-Inertia Buses With Residual Voltage and Fixed-Time Transfer**

In cases where fast and in-phase bus transfers do not occur, advanced logic in the SEL-451 provides reliable tie-breaker closing after a fixed delay or when the residual voltage on the motor bus has decayed to a safe level.
Depending on system inertia at the time of the transfer and the conditions initiating the transfer, different methods will be appropriate. The SEL-451–based Fast Motor Bus Transfer System provides all transfer methods in one product.

**Automatic SELogic® Control Equations**

High-speed SELogic control equations provide automatic transition—fast, in-phase, and residual—with external or low-voltage initiation.
Flexible Control Capability
The SEL-451 provides the protection, control, and automation for fast bus transfer, plus:

- Configurable pushbuttons for easy customization
- Six voltage and six current inputs
- Serial and Ethernet communications options
- Complete current- and voltage-based protection
- Direct-acting pushbuttons option for reliable backup control

In-Phase Transfer Reduces Motor Stress

In-phase transfer combines precise measurement of the residual motor voltage and the transfer bus voltage with high-speed logic to determine the best time to initiate closing of the transfer breaker.

The automatic SELogic control equations in the SEL-451 run through all programmed steps four times per cycle to provide an accurate closing signal.

Transfer accomplished without impulse to motor.
Supported Transfer Characteristics

**Fast Transfer**
The fast bus transfer is initiated at high speed (<10 cycles) before the motor has a chance to slow significantly.

**In-Phase Transfer**
The SEL-451 provides a synchronized close so that the back EMF of the motor is in phase with the alternate source, reducing inrush and shaft transient torque.

**Residual Transfer**
Low-inertia motors and loads may slow too fast for high-speed transfer. In this case, the SEL-451 system accurately measures the residual voltage to close when closing currents and torques are low.

**Time Delay Transfer**
The timing logic included in the SEL-451 provides a fixed time delay when desired, in case a fast transfer is not possible.

**Externally Initiated**
For tripping of a source breaker, the SEL-451 can provide instantaneous transfer to the alternate source. Multiple inputs accept contacts from breaker auxiliaries, remote controls, or other relays.

**Low-Voltage Initiated**
Accurate single- or three-phase voltage measurements detect reduced voltage on the primary source bus and initiate a source transfer.

**Closed Transition**
High-speed breaker failure detection provides fast transfer tripping in case a primary source breaker fails.

General Specifications

**Control Inputs**
- **Range**: 15–265 Vdc
- **Accuracy**: ±5% plus ±3 Vdc
- **Maximum Voltage**: 300 Vdc
- **Sampling Rate**: 1/16 cycle
- **Typical Burden**: 0.24 W @ 125 Vdc

**Weight (maximum)**
- **3U Rack-Mount**: 8.0 kg (17.5 lbs)
- **4U Rack-Mount**: 9.8 kg (21.5 lbs)
- **5U Rack-Mount**: 11.6 kg (25.5 lbs)

**Operating Temperature**
-40° to +85°C (−40° to +185°F)
-40° to +70°C with optional Ethernet
Note: LCD contrast impaired for temperatures below −20° and above +70°C.

**Processing Specifications**
**AC Voltage and Current Inputs**
- 8,000 samples per second, 3 dB low-pass analog filter cut-off frequency of 3000 Hz

**Digital Filtering**
- Full-cycle cosine and half-cycle Fourier filters, after low-pass analog and digital filtering

**Protection and Control Processing**
- 8 times per power system cycle