

# Fast Motor Bus Transfer System



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

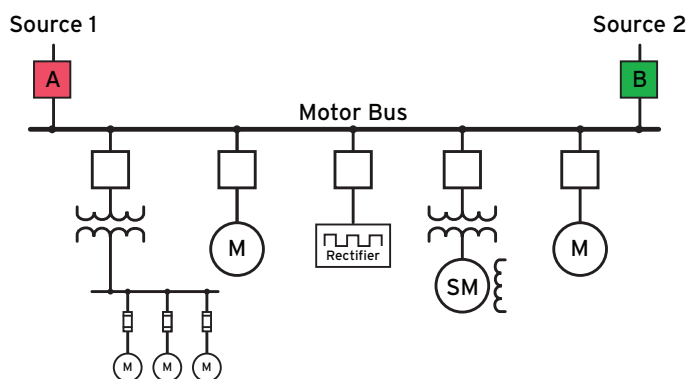
The fast transfer mode switches the motor bus to an alternate source with no intentional delay. The multiple-input SEL-451 Protection, Automation, and Bay Control System makes connections to multiple sources easy.

### 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.

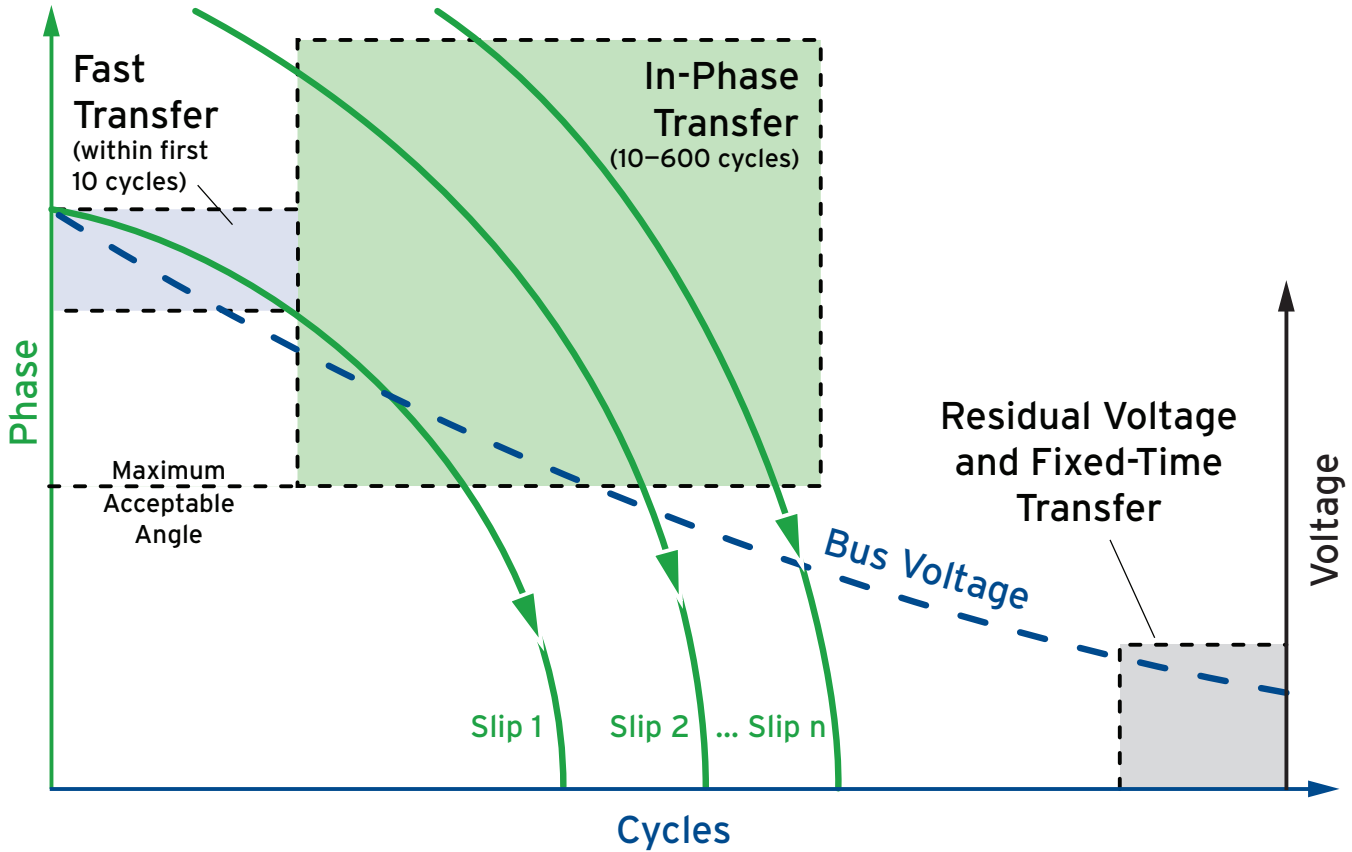
### Restore Power to Low-Inertia Buses With Residual Voltage and Fixed-Time Transfer

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.



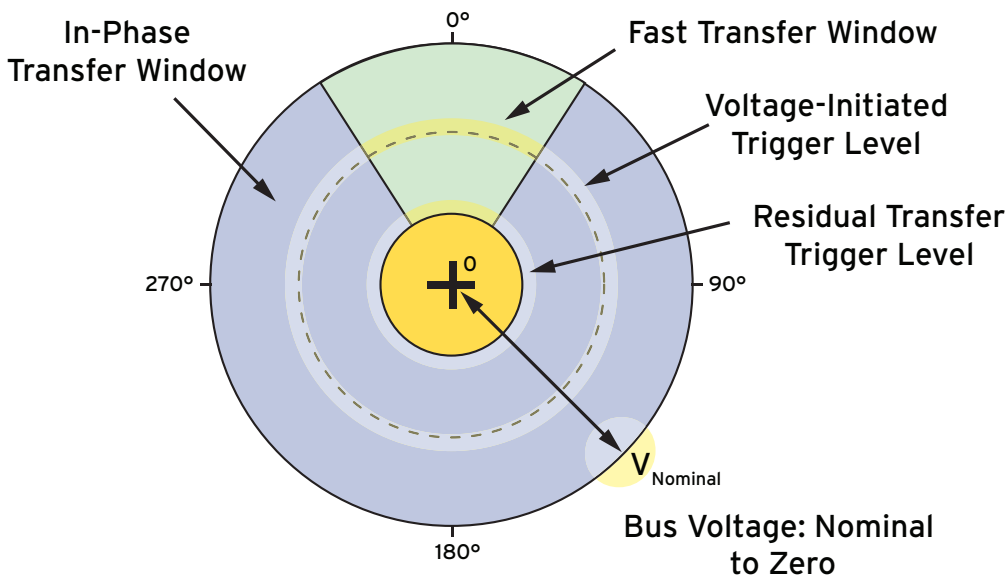
***Making Electric Power Safer, More Reliable, and More Economical®***

## Functional Overview



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<sup>®</sup> Control Equations



High-speed SELogic control equations provide automatic transition—fast, in-phase, and residual—with external or low-voltage initiation.

# SEL-451 Protection, Automation, and Bay Control System



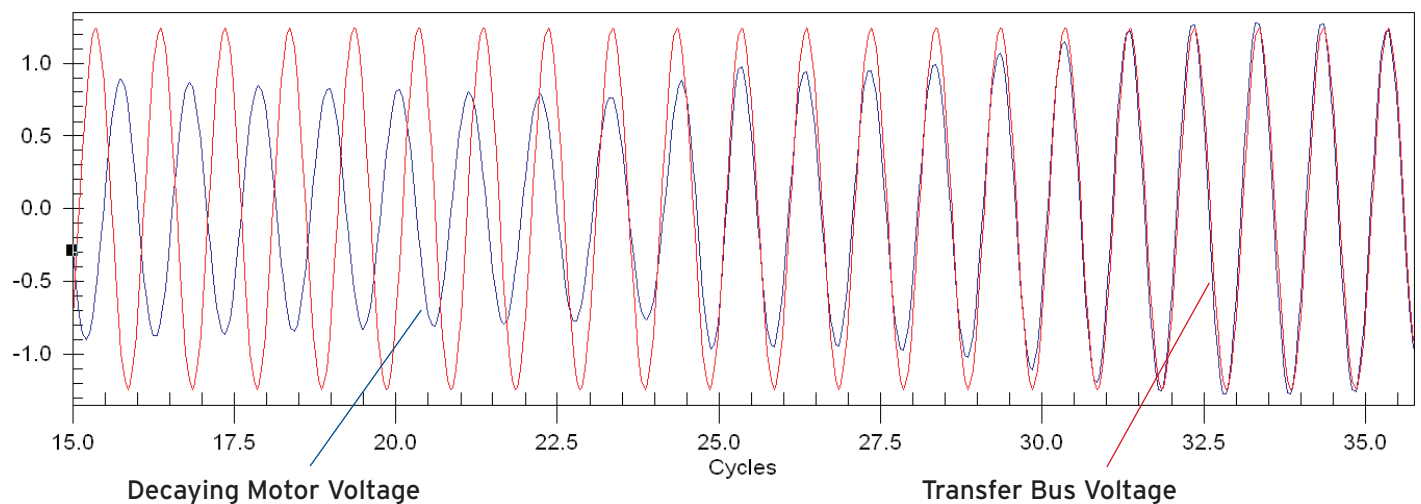
## Flexible Control Capability

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



*Transfer accomplished without impulse to motor.*

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.

# SEL Fast Motor Bus Transfer System

## 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



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