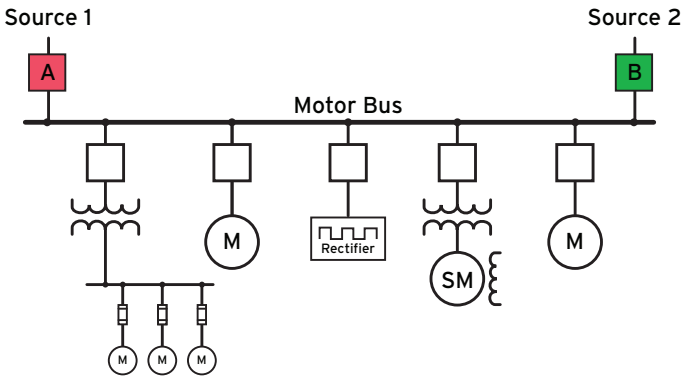
Fast Motor Bus Transfer System

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.

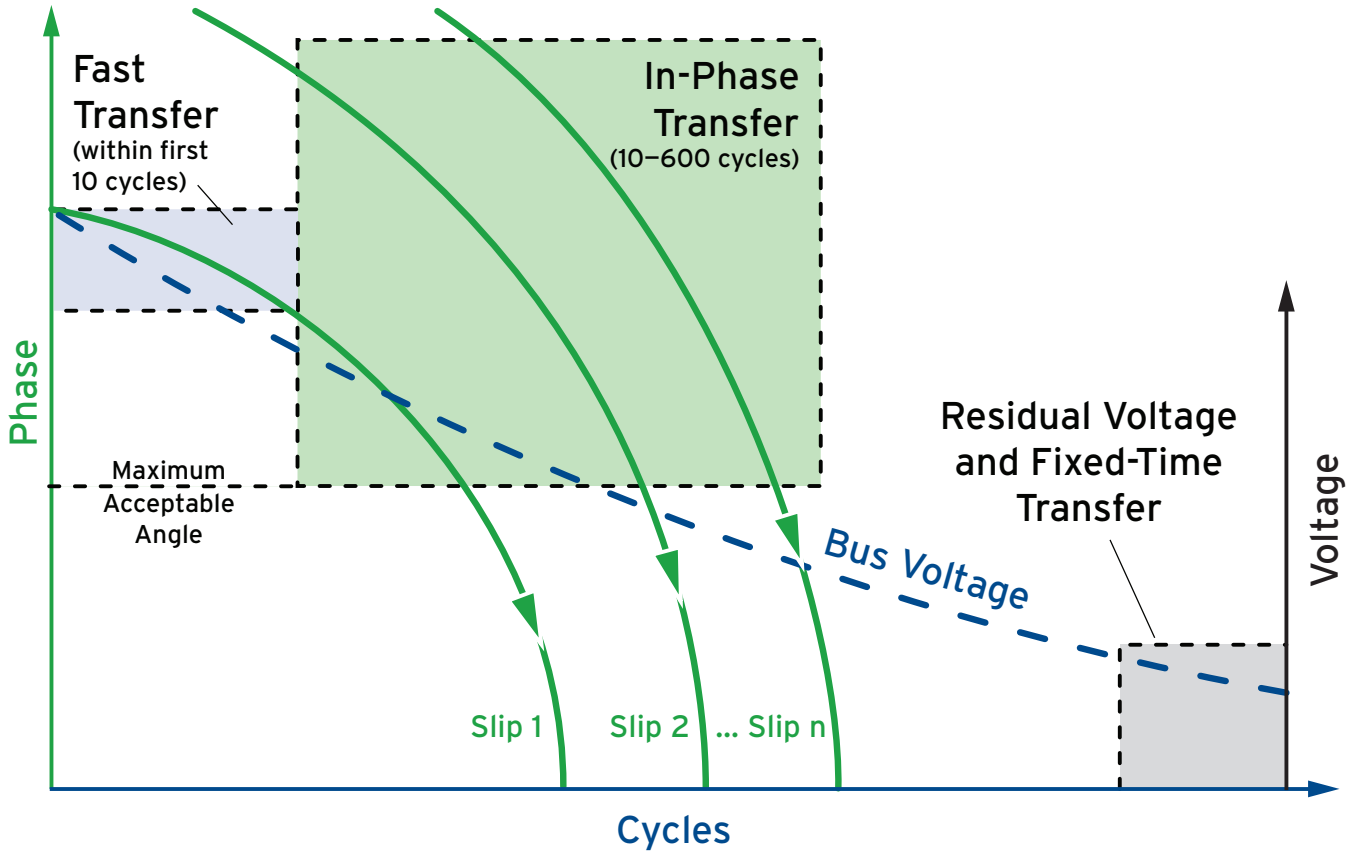
Minimize Transient Torques Using In-Phase Transfer to Prevent Motor Damage

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

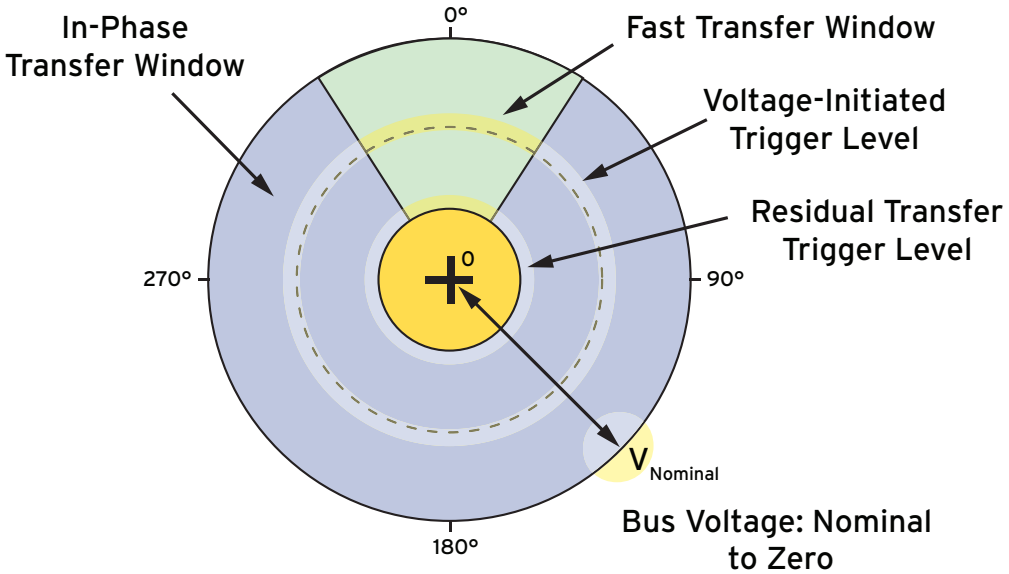
In cases where fast and in-phase bus transfers do not occur, advanced logic in the SEL-451 provides reliable tie-breaker closing after a fixed delay or when the residual voltage on the motor bus has decayed to a safe level.

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® Control Equations



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

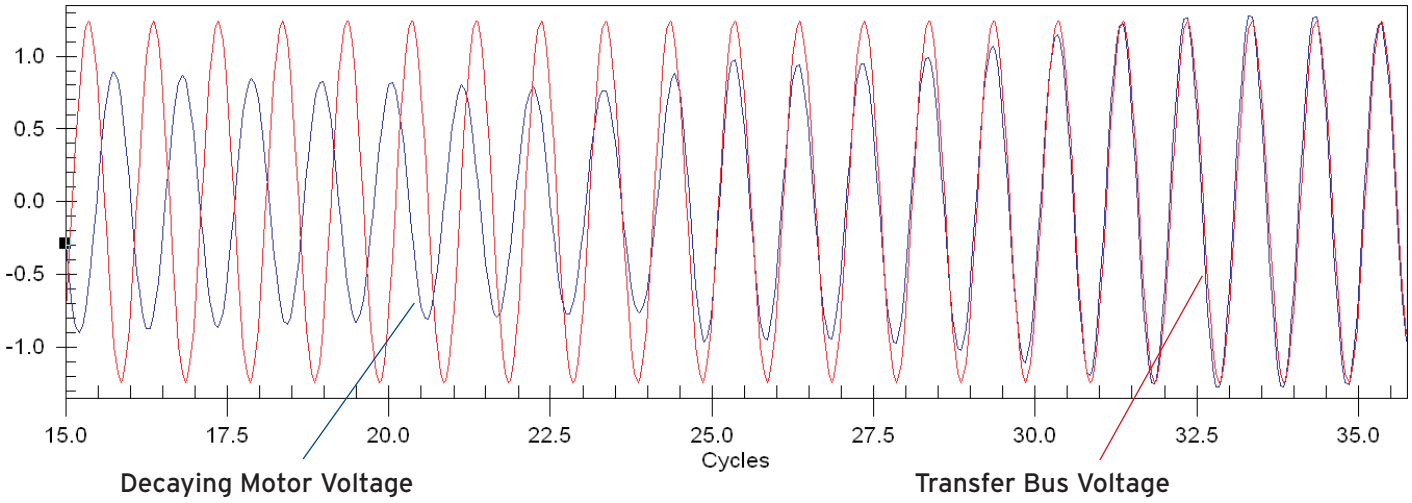
SEL-451 Protection, Automation, and Bay Control System

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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