



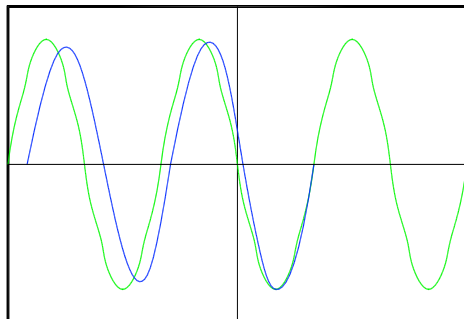
Power Conversion for the Marine Market

Seamless Transfer

When changing from generator to shore power and back again, there are only two main choices: break-before-make (blackout) or make-before-break (seamless transition or transfer). If interruption of electrical equipment (entertainment, communications, computing, etc.) and resetting of programmed parameters (clocks, entertainment, etc.) is undesirable, the Seamless Transfer Option is the solution! Our proprietary system truly synchronizes the converter and generator—operating them in parallel during load transfer—instead of just performing a break-before-make transfer that can cause reverse-power detectors, circuit breakers, and the entire electrical system to take notice.

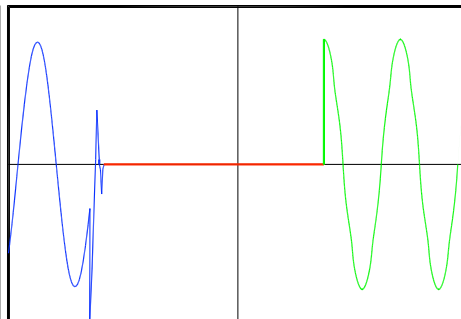
	Pros	Cons
Make-Before-Break (Seamless Transfer)	<ul style="list-style-type: none"> · Easy on converter electronics · Easy on loads · No voltage spikes (dv/dt) generated due to sudden change in voltage 	
Break-Before-Make	<ul style="list-style-type: none"> · Simple to design · Inexpensive · Poor generator stability and quality unimportant 	<ul style="list-style-type: none"> · Voltage spikes (dv/dt) generated due to sudden change in voltage can damage electronics · Loss of power causing shutoff or reset of electrical equipment
Electro-Mechanical Switch (variation of Break-Before-Make)	<ul style="list-style-type: none"> · Simple to design · Inexpensive · Poor generator stability and quality unimportant 	<ul style="list-style-type: none"> · Voltage spikes (dv/dt) generated due to sudden change in voltage can damage electronics · Loss of power causing shutoff or reset of electrical equipment

Seamless Transfer



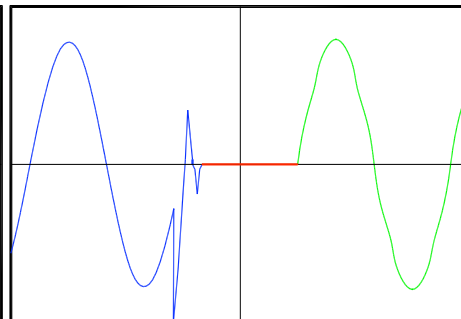
Converter gradually synchronizes and seamlessly transfers to generator.

Break-Before-Make



Converter shutoff, then generator brought online.

Electro-Mechanical Switch



Sudden switch between converter and generator while synchronous.

ASEA Power Systems is here to support all of your power conversion needs!

Technical Information

The following is intended to further describe concepts and processes listed on the front side of this document.

Seamless Transfer

The ASEA Power Systems Seamless Transfer Option works on a markedly different principal than most transfer mechanisms. It controls the Voltage Amplitude, Frequency, and Phase Angle of the converter output with respect to that of the generator during synchronization. Then, the converter parallels itself and the generator while controlling load shift until the appropriate energy source is turned offline via its contactor or motor-controlled circuit breaker. The process only takes a few moments and is virtually undetectable to the naked eye by on-board crew and passengers.

Make-Before-Break

Classic description of a transfer system that first closes one energy source together with another before removing a second. The intent is to not suffer a loss of source energy to the system during transfer.

Break-Before-Make

Classic description of a transfer system that removes one energy source from a system before adding a second. The intent is to change between energy sources with a loss of energy to the system, for several cycles, where the sources are incompatible and cannot be paralleled. This is a solution commonly applied where voltage perturbations will not affect loads and visually perceptible lighting fluctuations and loss of supply voltage are acceptable.

Electro-Mechanical-Switch

A commercially available device (a variation of Break-Before-Make) which attempts a nearly instantaneous change between energy sources in a system. The intent is to change between energy sources with a loss of energy to the system for typically one full cycle, where the sources are incompatible and cannot be paralleled. This is a solution commonly applied where voltage perturbations will not affect loads and visually perceptible lighting fluctuations are acceptable.

dv/dt

dv/dt is literally the rate of change in voltage over time. Reference to dv/dt is made to describe the instantaneous change in voltage when suddenly removing an energy source from an electrical system. This high dv/dt rate is discussed insofar as it can be responsible for damage to electronic components where the peak voltage generated is beyond the component's rating.

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