

# LIEBERT® STS2 SR STATIC TRANSFER SWITCH

400-600A



## OVERVIEW

### Reliability

- 100% rated, fuseless design
- Hot-swappable circuit breakers
- Flash memory enables firmware updates while supporting critical load
- Rack-out control/power assembly on units up to 600A to allow maintenance, service or full replacement without disrupting the critical load

### Flexibility

- Internal CANBUS protocol: high-bandwidth communication between system components via twisted-pair cables. Options can be added as simple network nodes
- Dual-lug installation bus

### Low Total Costs of Ownership

- Conservative design margins and excellent overload capacity
- UL listed

## Keep It Powered

For maximum systems availability, a Liebert® STS2 SR provides manual and automatic transfers between two independent AC sources, to deliver fast, secure, break-before-make switching. This ensures smooth electrical transitions to enhance system availability.

### Standard Features

- Ultra fast switching under one-fourth of a cycle
- Front and rear access design for service and maintenance
- True internal redundancy
- Control and monitoring from a color touchscreen display
- Network connectivity via the Unity communications card
- Primary and secondary side switching configurations
- Top and bottom cable entry/exit access

### Optional Features

- Optimized Transfer is a patented industry leading transfer control algorithm.
- Remote source select
- Seismic anchors
- Output Programmable relay board (4 custom alarms)
- Input contact isolator board (8 custom alarms)
- Key lockout switch



Liebert® STS2 SR 400-600A

### Ideal for:

- Replacement for Liebert STS, first generation switches
- Footprint savings (400-600A)
- Maintaining critical loads in dual bus applications

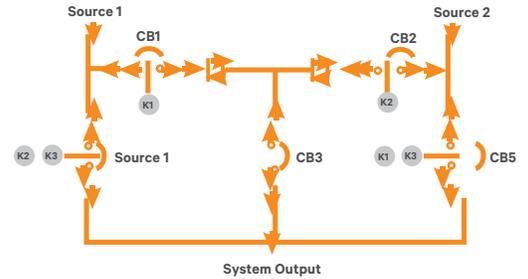
# LIEBERT® STS2 SR, STATIC TRANSFER SWITCH

Reliable Power Switching

## True Internal Redundancy

Every Liebert® STS2 has triple-redundant logic. Each DSP controller is capable of working independently, and each helps monitor the other two. If one malfunctions, the other two lock it out. Each controller has power feeds from both power supplies. The two power supplies feature true dual-bus power distribution. Both have dual inputs, one from each AC input source. All power connections have diode protection, so that internal or external faults cannot propagate. The result is a rugged, fault-resilient package that is optimized for real-world applications.

## One-Line Diagram



## Liebert offers a patented optimized transfer option for the Liebert STS2 that greatly improves operation when used in primary side switching applications.

The Liebert STS2 can be used in two different types of high-availability dual bus configurations—as primary or secondary side switches. For primary side switching, the unit is connected to the primary or input of a downstream transformer. On secondary side switching the Liebert STS2 is connected to the secondary or output of two transformers.

### One of the main advantages of using primary side switching is lower cost.

These savings are the result of only one power distribution unit, a lower current due to 480V vs. 208V, and lower installation and wiring cost thanks to use of smaller three wire cable.

The one drawback of this configuration is the creation of transformer inrush saturation current each time switching occurs. The downstream transformer can cause large peak saturation current during automatic transfers. The transformer saturation is caused by DC-flux built-up during transfer, especially when the sources are not in phase.

### Reduce the effects of a downstream transformer inrush.

The patented algorithm is designed to optimize transfer timing such that the volt-seconds applied to the downstream transformer primary is balanced, thus minimizing peak saturation current. This balance is achieved by directly computing the volt-second applied to the transformer during transfer events and determining the optimum time to turn on the alternate source SCRs in order to balance the volt-second within specified tolerance.

**This results in a volt-second balancing algorithm that is independent of voltage wave shape, voltage failure decay rate, etc., making it superior to other algorithms based on voltage phase angle difference only.**

### The transfer control does more than balance the flux.

Transfer time should not be the only performance measure for this optimized switch. Vertiv seeks to minimize voltage disturbances while maintaining transformer flux balance.

**Vertiv uses a unique flux balance algorithm that doesn't just "sit and wait" for the balance point to occur. Rather, we "pulse fire" the SCRs as soon as possible in order to minimize the load discontinuity and hence the voltage disruption.**

The optimized Liebert STS2 and STS2 SR safely meets both the CBEMA standard (prior to 1996) and the latest ITIC standard (1996) for critical loads.

The patented optimized transfer control significantly reduces the downstream transformer inrush saturation.

Our patented Optimized Transfer has delivered over 22 million hours of demonstrated MTBF

## Optimized Transfer Option Enhances Cost-Efficient System Operation

### Smooth, Clean Transfers

Shown are results for the standard Liebert® STS2 SR (fig 1) and the optimized STS2 SR (fig 2) for the same condition (alternate source lags 120 degrees) respectively. Notice the optimized transfer control algorithm minimizes the transformer saturation current resulting from an out of phase transfer. The result is a cleaner sine wave.

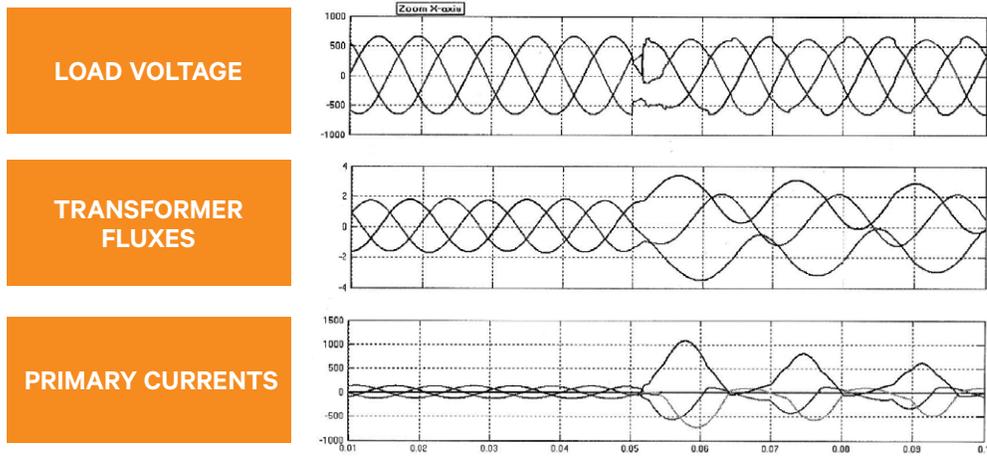


Figure 1 Standard STS2 transfer

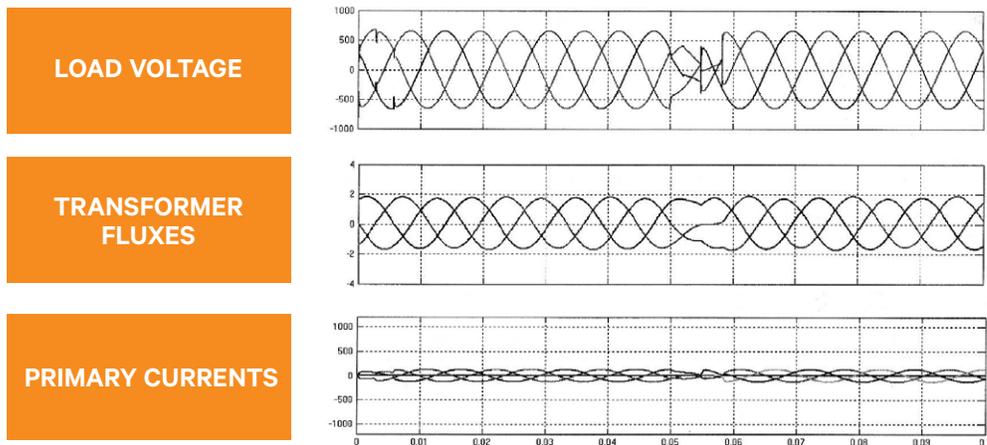


Figure 2 Optimized STS2 transfer

### Robust Communications

The Liebert STS2 SR includes the UNITY Card which supports two simultaneous 3rd party protocols for complete IT network and building management communications.

- SNMP
- Modbus TCP or RTU(485)
- BACNet IP or MSTP(485)
- Email \*
- SMS Text
- HTTP
- LIFE™ Services
- Sensor Support



### Critical Support from Vertiv Services

#### Total Service Capability

Vertiv provides services that best fits your requirements. These programs include guaranteed four-hour response time, emergency service and preventive maintenance. With more than 300 Vertiv employed Customer Engineers and a network of over 900 factory authorized service personnel, our technical capabilities, geographical coverage and ability to respond are second to none.

#### Remote Monitoring — Always There, Always Alert

For customers who need to have these vital protection systems continuously monitored, but don't want to do it themselves, Vertiv Service offers Remote Monitoring Service. This seamless, rapid-response system is designed to maximize the capabilities of your Liebert equipment by maximizing the effectiveness of its monitoring capabilities.

Continuous 24-hour remote monitoring of UPS/power conditioning equipment, environmental products and other critical space support systems is available.

When a problem is detected, the monitoring system immediately alerts the Customer Response Center where each alarm is evaluated and processed. Vertiv will coordinate all service vendors, track the response and solution time for service calls and provide comprehensive reports on alarms and corrective actions.

## TECHNICAL SPECIFICATIONS

| ELECTRICAL PARAMETERS              |   |   |
|------------------------------------|---|---|
|                                    | 400A  | 600A  |
| Nominal Input/Output Voltage (VAC) | 208 or 480                                      | 208 or 480                                      |
| Nominal Voltage Range              | +/-10%  | +/-10%  |
| Nominal Frequency                  | 60Hz  | 60Hz  |
| Maximum Continuous Current         | 400A  | 600A  |
| Source Voltage Distortion          | up to 10% THD                                   | up to 10% THD                                   |
| Surge Protection                   | per ANSI C62.41 Cat B3                          | per ANSI C62.41 Cat B3                          |
| Overload Capability                | 125% for 120min                                 | 125% for 120min                                 |
|                                    | 150% for 2min                                   | 150% for 2min                                   |
|                                    | 500% for 15 cycles min                          | 500% for 15 cycles min                          |
| Short Circuit Withstand Capability | 65kA @ 208VAC                                   | 65kA @ 208VAC                                   |
|                                    | 65kA @ 480VAC                                   | 65kA @ 480VAC                                   |
| PHYSICAL CHARACTERISTICS           |   |   |
| Dimensions (WxDxH)                 | 32" (818mm) x 32" (818mm) x 68" (1727mm)        | 32" (818mm) x 32" (818mm) x 68" (1727mm)        |
| Weight, Unpacked                   | 1200lbs (544kg)                                 | 1200lbs (544kg)                                 |
| Color Options                      | BLACK, RAL7021                                  | BLACK, RAL7021                                  |
|                                    | OFF WHITE, RAL7034                              | OFF WHITE, RAL7034                              |
| ENVIRONMENTAL                      |   |   |
| Operating Temperature              | 32-104F (0-40C)                                 | 32-104F (0-40C)                                 |
| Relative Humidity                  | 0-95%, non-condensing                           | 0-95%, non-condensing                           |
| Operating Altitude                 | Up to 4000ft (1200m)                            | Up to 4000ft (1200m)                            |
| COMMUNICATIONS                     |   |   |
| Card Compatibility                 | UNITY-DP, PRB, ICI, Comms board                 | UNITY-DP, PRB, ICI, Comms board                 |
| Protocols Available                | ModbusIP, Modbus485, BACnet, SNMP, HTTP, RS-422 | ModbusIP, Modbus485, BACnet, SNMP, HTTP, RS-422 |