HOT SWAP FAILSAFE BYPASS DESIGN REQUIREMENTS

The Failsafe Bypass is designed to provide an alternate Safe path of AC or UPS AC. The Failsafe Bypass uses a monitoring circuit and LED status indicators during any operation. The LED's provide easy indicators for utility, UPS and bypass functions.
The flexibility in design allows the integration of a secondary circuit that provides an Alternate AC input source such as a generator or an additional UPS system.

Fast '0" crossing activation/switching provides smooth functioning transfer of the UPS and or power source under all conditions. Hot Swap mean that the UPS may be removed without user intervention on the Bypass control button.. Bypass will occur with or without user intervention of the Bypass control button.

Main Function: The Hot Swap Failsafe Bypass has two main functions.

1) Provide a means of Bypassing the UPS system if removal or maintenance when needed.
2) Provides the automatic Transfer to Line, if the UPS malfunctions or fails without personnel intervention

Control

The Failsafe Bypass uses a single button control. This button provides the means of placing the system in an Auto mode or Bypass mode.

Auto Mode

The Auto mode allows the UPS to function as a separate derived power source protecting the equipment at all times. The UPS is in the circuit when the **Auto** position is used. The UPS will perform all of its normal functions. If a power failure or interruption does occur, the UPS will not change it's operational abilities.
The Auto mode allows the Failsafe to become Active. The monitoring circuit will transfer the 30 amp relays at a Zero Crossing. This will occur in 18 to 20ms. Internal snubber circuitry will minimize any line noise.

Bypass mode

The single switch can be used to transfer line power directly to the load at any time during normal operation of the UPS. By using the switch, the relays will transfer line power at 0 (zero) crossing in 18 to 20ms.

Forcing the unit into Bypass:

The Hot Swap Failsafe Bypass will automatically be forced into a Bypass mode under these conditions.

a) Personnel has used the button and placed the switch into bypass.
b) The UPS has failed.
c) The UPS has been turned off while it is still operating normally.
d) The UPS has not returned to normal operation after a long power failure.
e) The UPS connection cables have been removed.
f) The UPS has not been installed but the Hot Swap Failsafe Bypass is in the circuit.

Alternate Input Option

The Hot Swap Bypass has any configured to accept an alternate input source.
This input source can be qualified as:

1) Generator
2) Secondary Utility
3) Alternate UPS source

When the alternate source is specified, the Primary source is always latching. If the primary source is not available, and the secondary source is present, the switching to the secondary source will occur in 18 to 20ms.
When the primary source is available, the bypass will always latch to the primary source.

Status Indicators

The Failsafe Bypass has LED indicators. Line Available, Bypass, UPS On Line, UPS Available. Generator-Available (option). These are used to provide safe indications of the UPS and Failsafe status and operation during poor lighting conditions as well as Normal lighting conditions

1) Line Available	**Green:** Indicates that utility is present
2) Bypass	**Red:** Indicates that the system is in bypass
3) UPS On Line	**Yellow:** Indicates the UPS is On line providing power
4) UPS Available	**Green:** Indicates the UPS is available
5) Generator Available	**Green:** Indicates the Generator is available

Connection:

The Failsafe Bypass includes a quick disconnect Anderson Power Pole connector. This provides a means of connecting any UPS at any time when the Failsafe Bypass is installed. It also provides the means of removing the UPS at any time.
The Anderson connector provides safe isolated connections.
Each electrical path includes a neutral conductor of equal rating.
Black: Line Input
White: Line Neutral
Red: Line Load
White: Line Neutral
Green: Ground
Brown: Alternate Line
White: Alternate Neutral
Green: Alternate Ground

Relays Outputs:

The Hot Swap Failsafe Bypass include From C relay outputs for the following:

1) Line Available
2) Generator Available
3) UPS available
4) Bypass

Protection:

1) Input and output fuses shall be rated for a maximum of 30 amps.
2) Input and output fuses holders shall be front panel mounted.
3) The Generator input shall have a separate fuse rated for a maximum of 30 amps.