Application Notes:
120 VDC UPS Applications

Features

BP HE Benefits

In addition to cost savings, the HE Series of UPS delivers an extensive array of standard and optional features not available in standard UPS systems:

- Continuous operation at 50 degrees C
- Heavy-duty air filters
- Coated circuit boards
- Heavy-duty external panels
- High inrush inverter

This makes the HE System the UPS of choice in applications requiring ultra-high reliability in harsh environments.

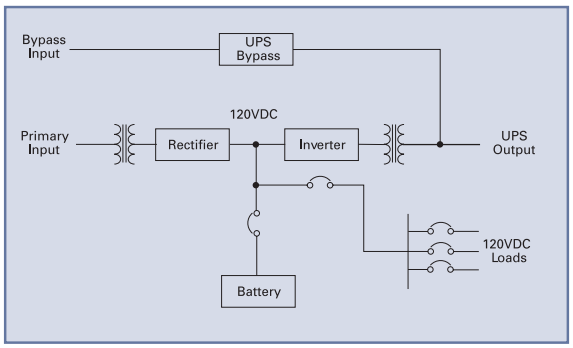

Figure 1

In an industrial environment there are often many loads that require a source of 120 VDC power. This may include circuit breaker and switching controls, electrically actuated valves, DC motors and many other types of loads. Where DC loads are small, the HE UPS with a 120 VDC link and oversized rectifier can be used to drive them directly, thus eliminating the need for a separate battery bank and rectifier. This saves the expense of separate equipment, associated ongoing maintenance costs, and floor space, and can also result in higher overall reliability due to fewer components in the system. See Figure 1.

In applications for which DC power usage is high, a large 120 VDC battery and rectifier bank are normally used along with separate inverters to supply any required AC loads. The HE UPS with its 120 VDC link can be used in conjunction with an existing battery to supply a secure source of AC power. In this situation a blocking diode is used to isolate the UPS charging circuit from the battery and prevent interaction with the existing rectifiers. The UPS adds the flexibility of being totally self-contained and able to continue supplying conditioned AC power even when the battery bank is offline for maintenance. This is not possible with a separate inverter system whose sole source of power is DC current supplied by the battery bank. See Figure 2.

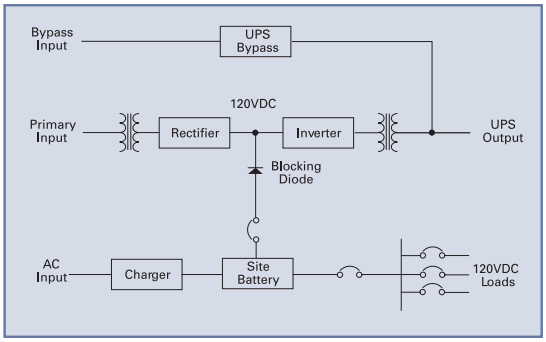

Figure 2

POWERWARE®

A 120 VDC battery offers substantial cost savings over higher voltage systems in critical applications requiring 20-year warranted lead-acid or nickel-cadmium batteries. The following examples illustrate potential savings:

Time	BPII HE UPS 120 VDC	Standard UPS 480 VDC	TYPICAL 120 VDC SAVINGS
15 min.	(60 cells of XT4J-9)	(240 cells XT4J-7)	**$15,828**
30 min.	(60 cells of XT3K-11)	(240 cells XT4J-7)	**$13,858**
60 min.	(60 cells of XT4L-9)	(240 cells XT4J-7)	**$11,281**
90 min.	(60 cells of XT2L-17)	(240 cells XT3K-11)	**$12,519**

The examples above demonstrate another important consideration - 20-year lead-acid batteries are usually only manufactured in larger amp-hour capacities (typically 100 amp-hour and up). For support times of 30 minutes or less, our competitors are often required to oversize the battery because smaller capacity cells are not available.

Nickel-cadmium (ni-cad) batteries also offer similar savings. While they are available in very small amp-hour capacities, their price increases quickly as the number of cells in the battery increases. For any given K rating, a low voltage, high amp-hour battery is always less expensive than a higher voltage, lower amp-hour system.

A major advantage in using a 120 VDC battery is increasing overall reliability. The reliability of any system is inversely proportional to the number of components in the system. A 120VDC battery system inherently has fewer components (cells) than a higher voltage system.

Another important consideration in the overall cost of ownership with a battery system is the ongoing maintenance cost. The cost for maintaining a battery system is directly related to the number of cells/connections in the system - not to the size of the cells. A battery consisting of 60 cells will require about 25% of the labor required to maintain a 240-cell battery.

Powerware

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