Protecting Singapore's Changi Airport Power with Automatic Transfer Switches

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Singapore's Changi Airport is the 18th busiest in the world. In 2014, it served more than 40 million passengers and 1.8 million tons of air freight. As a critical nerve center of the global economy and Asia, it is important that every airport systems keeps running, regardless of power outages or power disruptions.

In order to ensure that crucial systems, such as baggage handling systems, keep working in the event of power disruptions, airports rely on backup power systems. Typically, major airports are served by two or more independent AC grids and backed up by several very large emergency generators or uninterruptible power supplies (UPS). However, Changi Airport's power is protected by another option: TSi Power's automatic transfer switches.

Thales Group, a large French military and civilian aviation systems integrator and ST Electronics, a large Singapore-based contractor and systems integrator work closely with Singapore Changi Airport. Thales Group wanted to provide failsafe and redundant AC power for Changi's distributed control system (DCS) cabinets used for vital airport operations including baggage systems.

In 2008, Thales selected TSi Power's ATS-1000E automatic transfer switch, which is essentially a battery-less UPS system with two autonomous input AC sources , to protect Changi's systems because they are highly energy efficient, extremely reliable and cost effective.

Before Thales and ST Electronics would install TSi Power's ATS-1000E units, they required a lengthy evaluation to test the systems for performance and reliability. During 2008 and 2009, the systems integrators installed several ATS-1000E units for a trial period. After 12 months, the units performed flawlessly, so Thales ordered more than 300 additional units which were installed by ST Electronics by 2010.

The performance and reliability of TSi Power's ATS-1000E have been excellent. Less than once percent of the units have required repair or replacement in the four years of operation from early 2010 to early 2015.

The technology behind the automatic transfer switch

In order to protect sensitive electronic and electrical equipment from unstable AC mains voltage, UPS (uninterruptible power supply) is commonly used. However, UPS is not always an optimal power protection solution due to its high purchase price, low power conversion efficiency (typically around 90%) and high costs due to maintenance, repair and battery replacement.

Automatic transfer switches act as a redundant AC power source for protecting mission-critical equipment. TSi Power's ATS line of very fast automatic transfer switches (which can switch between both in-phase and out-of-phase AC power sources in less than 8 milliseconds), is designed for mission-critical equipment which must continue operating without interruption even if one of the two AC sources is interrupted from a few seconds to several hours or even for a several days.

Advantages and benefits of using automatic transfer switch

Automatic transfer switches have several advantages over a traditional UPS with batteries.

1. Because automatic transfer switch is a 100 percent solid-state device and does not depend on a battery, it is inherently much more reliable than a traditional UPS system which must rely on failure-prone batteries as the backup power source.

2. Typical battery backup time of battery based UPS systems is actually a "standby power source" which provides a few minutes of battery backup (or a few hours of battery backup at most) In comparison, automatic transfer switch with two autonomous primary AC power sources (such as power from two independent power generating plants) can power the critical load equipment for an infinite period (for hours, days or even weeks). It is truly an "uninterrupted power supply" because it does not depend on a few minutes of energy stored in failure-prone batteries.

3. Automatic transfer switches are only a fraction of the size, weight and cost of a UPS system which is large, heavy and expensive.

4. TSi Power's new ATS line of automatic transfer switches with relay are approximately 99.7 percent efficient, while a typical double-conversion online UPS is about 90 percent efficient. This results in substantial operating expense savings due to reduction in wasted electricity over the product's lifetime.

5. Unlike a UPS, automatic transfer switches do not require periodic maintenance and battery replacement. This results in a dramatic OP-EX reduction of 90~95%.

6. The higher reliability of ATS means lower system down times for the protected mission-critical equipment. This results in substantial improvements in productivity and quality-of-service, as well as improved customer satisfaction and customer retention rates.

In part because of success of the ATS-1000E automatic transfer switch at Singapore's Changi Airport, Thales Group recently won a similar airport expansion and upgrade contract from Manila Airport in Philippines. They plan to install more than 100 of TSi Power's new relay-based ATS-1000 units in 2015.

Since 2000, several hundred major organizations have relied on TSi Power's ATS-1000. ABB Automation, Siemens, Westinghouse, American Electric Power, Emerson Process Management, Invensys, Raytheon Shipboard Systems, Lockheed-Martin, Time-Warner Cable and Amazon are some of the key customers.

For more information about TSi Power and its products, visit www.tsipower.com.

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