

ARTICLE

PCS100 UPS-I protecting dairy operations



Customer Problem

A dairy operation in Washington DC, produces several million “one time use” plastic coffee creamers per day. The operation includes forming the small individual cup cartons, filling them, then sealing them on a high speed packaging line.

The electrical utility supply is 480 V via a medium voltage 12.5 kV distribution line. However the site is subject to many storms in Spring and Summer and these cause recloser switches to operate on the local electrical utility network. The recloser operations can result in reduced voltage or, in extreme cases, complete loss of voltage from a micro-cut lasting several seconds.

The voltage variations cause major disruptions to the high speed creamer line. When the line stops, product has to be scrapped, and equipment cleaned and sterilized before restarting. This can take several hours even though the drop in voltage may last for only a small fraction of a second.

The ABB Chosen Solution

In 2007 the Dairy operation decided to install dedicated power protection to the high speed creamer line. They chose to use a combination of an PCS100 AVC (Active Voltage Conditioner Standard) to eliminate voltage sags and an

PCS100 UPS-I with 10 seconds of back-up, in order to eliminate the network generated micro-cuts.

Benefits

The PCS100 AVC is an on-line device which corrects the voltage sags. It continuously monitors the voltage and corrects even minor variations within a fraction of a cycle. It provides a steady constant output voltage to the high speed form-fill-seal (FFS) machine.

The PCS100 UPS-I is an off line device which corrects complete outages of short duration. It consists of an inverter and electrical storage (e.g. batteries, or ultra capacitors) which can carry the full load for a predetermined amount of time. Based on analysis of site data, battery storage for 10 seconds was chosen as the storage medium.

Performance

During the fall of 2007 the PCS100 AVC device corrected a number of voltage sags and when a power outage or very deep sag is detected the PCS100 UPS-I comes into play. This unit disconnects the load from the utility supply via a static switch (Utility Disconnect), and at the same time supplies the load with energy from the battery storage via the inverter. The inverter

converts the battery DC voltage to 3 phase AC. The change over occurs within a fraction of one cycle (<1/4 cycle) and allows the sensitive load to continue to operate without disruption.

When the utility voltage is restored to normal, the PCS100 UPS-I will synchronize the load with the utility supply, open the static switch and restore the load to normal operation, again within a fraction of a cycle.

The dairy operation reports that several storms have caused electrical problems in Spring 2008 and that in one case they experienced a power loss of some six seconds. The creamer high speed line continued working without incident during this event but other equipment in the operation, not protected by the PCS100 UPS-I, suffered a power interruption and stopped working.

To find out more about ABB's power protection solutions:

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Additional information

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