

Sunshine Sugar, Australia

Sweet success

“AC or DC?” was the question on everyone’s mind when Sunshine Sugar decided to replace its aging centrifugal drive system. After considering all the options, the company chose a Siemens AC drive-motor combination. The unique solution has helped the company reduce energy consumption by 40%.

Sunshine Sugar manufactures raw sugar from sugar-cane supplied at its mills in the Northern Rivers region of New South Wales and also operates the Manildra Harwood Sugar Refinery (MHS) in a 50:50 joint venture with Manildra Group of companies. All of Sunshine Sugar’s raw sugar production is sold to MHS, which has capacity to process all of the raw sugar produced by the three mills

Matthew Krums



The decision to replace the 298 kW DC centrifugal drive system with a 184 kW AC motor-drive combination was not an easy one, but Siemens was determined to prove the value of its unique solution. Plant manager Stephen King explained how Siemens supported the company in its decision making, which ultimately led to the upgrade of the centrifugal drive system on time and even under budget. “Siemens drew on their 1,200 worldwide

reference sites with successful centrifuges operated by AC drives. They also provided detailed analysis of their success with reducing the size of motors and drives by controlling the switching rate of the insulated-gate bipolar transistor (IGBT). And they even sent out a global expert on drives from their Sugar Competence Center in Germany to reassure us that this was the right solution,” said King.

Brian Jackson, Sunshine Sugar's senior electrical superintendent, was also impressed: "We were convinced by the 184 kW drive system when we learned about the Active Front End technology, which is a standard feature in Sinamics drive systems. This allows us to reduce the size of the motor and drive without losing power, achieve harmonics of less than 1%, and consequently reduce our energy costs significantly."

Choosing the right technology

AC drives are particularly well suited for centrifuges, as they can provide the performance required. The

device to interface to the existing Bailey distributed control system for bidirectional communication.

Substantial savings

Since the commissioning of the new drive, Sunshine Sugar has achieved a substantial reduction in power consumption. "Power recordings have confirmed a reduction from 1.7 to 1.0 kWh per ton of massecuite, despite the recording being made prior to optimizing the drive. So we're planning to undertake further analysis soon to determine the final savings," says Jackson. Due to the success of this solution,

Active Front End

The technology used as a standard feature in the converters of centrifugal drives provides several important benefits:

- Self-commutated converters with IGBTs and a clean power filter in the input
- Sinusoidal currents and voltages with no mains-typical harmonics and thus absolute minimum mains pollution on the line side; thus, compensation and filter circuits are no longer needed and the overall power factor is $\cos \phi = 1$
- No conduction-through with fuse tripping in response to mains undervoltage or failure in generator mode, thanks to active tripping; this makes the solution especially suitable for weak or unstable systems
- Compensation of mains undervoltages by voltage step-up mode
- Exceptional dynamic response
- No mains voltage distortion due to commutating voltage dips
- No effects on mains voltage caused by mains system resonance due to harmonics



The new AC motor-drive solution for Sunshine Sugar's centrifuge has saved the sugar manufacturer more than 40% in energy consumption

largest centrifuge available can handle 1,200 kg of massecuite in a single charge. Variable-speed AC drive systems require very little maintenance. They are robust and durable, can operate continuously throughout a campaign, and offer much better reliability than variable-speed DC drives. Sunshine Sugar installed the Sinamics AC drive and motor solution, and it was commissioned and optimized locally by Siemens. Siemens also provided an I/O

Sunshine Sugar has placed a second order with Siemens to upgrade the drive and motor of a second centrifuge. ■

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