

Case Story | VACON® NX

Electrosteel Castings achieves highest productivity with zero downtime using Danfoss Hybridization solution for multi-motor applications



Background:

Electrosteel Castings Limited, is one of the largest manufacturers of Ductile Iron (DI) Pipes in the Indian sub-continent, based out of Kolkata, India. The company has a production capacity of 280,000 MT per annum. The present turnover of the company is US\$277 Million. Electrosteel was the pioneer in setting up a Ductile Iron Spun Pipe Plant in India in 1994 and is among the five largest producers of Spun Iron pipes in the world.

Challenges faced by Electrosteel:

The customer has existing power plants with a capacity of 12MW, which runs synchronised with local Grid. Local Grid is volatile and frequent voltage dip is a regular phenomenon. For this auxiliary system of the plant suffers from frequent tripping specially in the monsoon season. This resulted in significant downtime and subsequently in a loss of profitability. The process requires demineralised water which is also wasted because of the system tripping.

Solution Offered:

Products Installed:

- NXI0730 (DC-DC Converter),
- NXP0385 (Variable Frequency Drive),
- MCD5-0331B (Soft Starter),
- NXP0300 (Variable Frequency Drive),
- MCD5-0331B (Soft Starter),
- NXP0105 (Variable Frequency Drive)

Danfoss supplied a complete LT VFD line-up package to the customer, for their new power plant of 5MW to cope up with similar problem as a proactive measure, which consisted of 9 numbers of AC VFDs, 4nos. Soft-starter and 1 common DC-DC converter for the complete system. While on stable grid supply, the VFDs operate normally from AC auxiliary system and run the auxiliary fans and pumps of the 5MW power plant. The common DC-bus is constantly being monitored and is connected to the DC-DC converter, which in turn is connected to a single battery bank back-up system consisting of 2V x 200 cells for a 1-minute backup. The batteries are being charged when the grid supply is stable, through the DC-DC converter. The minute the system monitors a fluctuation or voltage sag in the grid, the DC-DC converter discharges the batteries and feeds the critical VFDs

power to continue running without interruptions. This eliminates unplanned tripping of the fans and pumps which were commonplace prior to installation of this system. The soft-starter bypass arrangement in the high-power ratings provides additional redundancy to improve uptime, in case of VFD maintenance or preventive checks.

West Bengal, where the plant has been put-up, was subject to one of the worst cyclones in its history in April 2020. Fortunately, due to Danfoss' hybridization solution for the multi-motor application, the customer did not notice voltage fluctuations or downtime inside the power plant even under those extreme circumstances.

The customer was extremely satisfied with this solution and would certainly recommend it to anyone facing similar challenges. You will recover your investment before the Danfoss team even leaves the site!

From Commissioning to After sales support:

Danfoss and the local partner team supported throughout the installation, pre-commissioning, commissioning, and monitoring stage. Batteries were installed and set up, to enable ease of operation and maintenance. Pre-commissioning and commissioning were carried out gradually and meticulously for each component – both working and standby – to ensure maximum uptime and reliability of the system. After commissioning, Danfoss and local partner team were deputed at site for a significant amount of time to observe, monitor and ensure satisfactory performance of the system. Due to the unique nature of the equipment used in the solution, there was limited knowhow at client-end for the DC-DC converter, the common DC VFDs, the various electrical interlocks in place, and care was taken to provide a full-fledged training to the customer's engineering team.

There was another challenge faced in the selection and sizing of the batteries – where again Danfoss team played a crucial role – in order to optimize the selection and sizing of the batteries, to bring down the overall capital expenditure of the project without compromising on reliability and uptime.



A prototype of the hybridization system running full capacity at the Danfoss facility in Oragadam, Chennai stood as a testimonial and has increased the confidence in the system.

The Outcome:



Increase in uptime by 100%



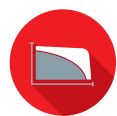
Reduced loss of raw material & resources



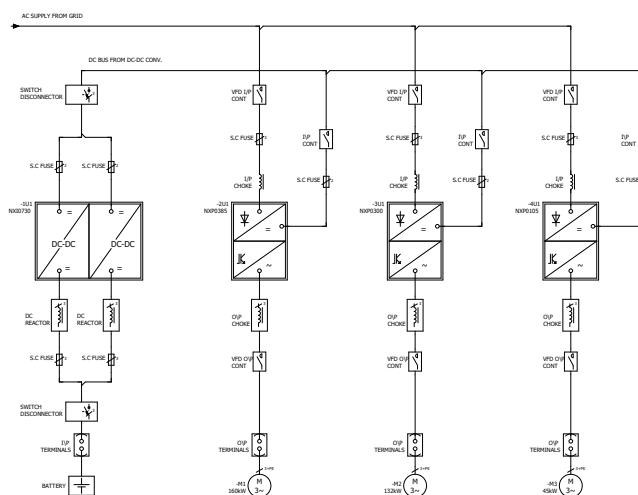
Higher production output



Reduced loss of raw material & resources due to unplanned downtime



Corresponds to a conservative estimate of \$665,000 annually



"At the time of placing the order to Danfoss, we were confident and happy with the solution provided by them. We were happy to see that they exceeded our expectations when it came to the execution of the project. We have had trouble-free operation of the system for two years now and are satisfied with our complete experience with Danfoss, particularly for this project. The fact that we have placed an order for a similar, stand-alone system for another critical application in our factory is testament to our satisfaction with the solution and its performance." – Electrosteel Castings Ltd.

Conclusion:

The execution of Danfoss' hybridization solution at Electrosteel Castings Ltd. is a huge success. The results were phenomenal, and the overall savings generated due to the solution are unparalleled. The root cause of the problem has been mitigated and the solution enabled the smooth operation of the system. The customer had an extremely short return-on-investment in the solution. The downtime due to voltage dips and grid volatility has reduced to NIL, because of which the system is always running and have eliminated all process-induced losses and material wastage. Our mechanical and associated maintenance costs have also gone down drastically, and the investment of resources on maintenance/downtime has gone down significantly."