

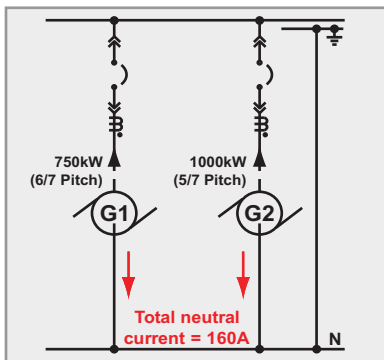


Challenge

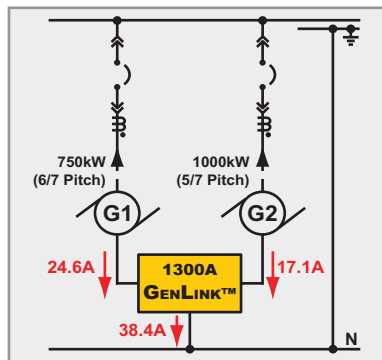
A large distribution facility servicing the fast food industry in Conroe, Texas had recently decided to expand its standby generation capacity and added a 1000 kW generator to the existing 750 kW unit at the site. The electrical contractor and generator supplier noticed that there was an excessive amount of neutral circulating current when both generators were paralleled and if left untreated could cause the generators to overheat or the circuit protection to trip inadvertently.

What the electrical contractor and generator supplier had failed to do was consider the fact that the winding pitch of the new generator was different than the winding pitch of the existing generator. Neutral circulating current will appear in paralleled generators that have different winding pitches due to the slight difference in voltage waveshape that each generator produces. This neutral current will typically be 3x the fundamental frequency and is often quite significant in magnitude. The amount of current being dependent upon the zero sequence impedance of the generators and cables and the instantaneous voltage difference that exists between the paralleled phase conductors.

The new 1000 kW generator had a 5/6P winding while the existing 750 kW generator was 6/7P. The circulating current that resulted was measured by the electrical contractor to be in excess of 150A. It was imperative that a solution be found to reduce this circulating current to prevent the possibility of generator overheating or false protection trips.



Two Dissimilarly Pitched Generators



**Two Dissimilarly Pitched Generators
with GENLINK™**

Solution

The electrical engineer contacted Mirus International and NSOEM Inc., the Sales Representative for Mirus in Texas, for problem analysis and recommendations for corrective action. After review of the 1-line diagram and field measurements provided by the contractor, the application of a Mirus' GenLink DPNL (Dissimilar Pitch Neutral Limiter) was recommended.

GenLink DPNL is specially designed and engineered to solve the challenges that arise when paralleling generators with different pitch properties and when paralleling 4-wire utility feeds with alternative energy supplies. A multiple winding reactor, GenLink DPNL is installed in the common neutral where it blocks the flow of circulating currents without significantly decreasing the 1-phase fault level of the system. The unique winding configuration accomplishes this by introducing approximately 45% impedance in the neutral circulating path at the triple frequency while adding < 1% impedance in the 1-phase fault path during a fault condition.

Mirus and NSOEM provided additional support with on-site testing, installation supervision and performance verification. Upon GenLink DPNL being installed, tests were run under peak load conditions which found that virtually all of the circulating current was eliminated.

Results

- Neutral Circulating Current Eliminated – Mirus' GenLink DPNL eliminated the neutral circulating current created by paralleling generators with different winding pitches.
- Expert Problem-Solving – Mirus and NSOEM provided the expertise that was needed to diagnose the problem and recommend a solution that met the client's needs and specifications.
- On-site Support and Real-World Testing – By providing installation support and on-site testing, Mirus and NSOEM were able to ensure GenLink DPNL was installed successfully and performed to expectation.

About Mirus International

Mirus designs and develops world class power quality improvement products for mission critical operations. Their uniquely specialized product line includes highly efficient harmonic filters, transformers, autotransformers and Data Center power distribution equipment. Comprised of a leading team of power quality experts, Mirus' solutions minimize disruption to the power supply, improve reliability and adhere to the strictest of regulatory requirements while also saving energy. Proven to perform, Mirus products are available globally and are real-world tested in its own Harmonics & Energy (H&E) Lab.