

factsheet

Typical Data Center MPS Topologies

INTRODUCTION

There are three basic topologies that are used in most data centers. Generac can provide each of these as a complete system easier than others due to the integrated paralleling on each generator.

BLOCK REDUNDANT

Typically this is done with large single engines, each bus has a generator. Loads are dual corded and switched to an alternate bus if a failure occurs. This is the most simple system, but loads can be constrained to just two generators. Failure of one generator puts all loads at risk, since the N+1 reserve has been used. Shown here, Generac can offer N+1 on each bus, scalable in this topology up to 9MW per bus.

SINGLE BUS PARALLELING

Although this system is not Tier III compliant, it is a very popular topology due to its simplicity and low cost.

Switchgear typically has a low failure rate, so not having a redundant bus is acceptable to some.

Redundant Bus Paralleling Adding redundant buses does not add much cost if the controls and switching are on the generator. The redundant bus topology is compliant to Uptime Tier IV due to a redundant path and segregation. Maintenance and commissioning are easily accomplished using the spare bus. This offers the best of both; scalability and redundancy.

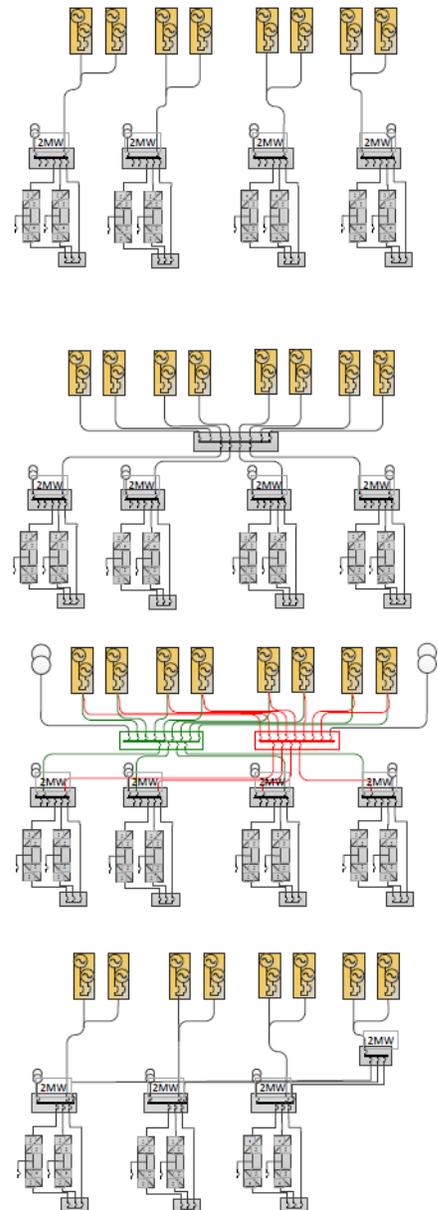
IMPROVED CATCHER BUS

The catcher bus topology can be improved by adding redundancy and scalability to each bus.



The MPS controller board makes paralleling easy and reliable. With over 1600 systems in the field, you can rely on this system to provide all the benefits of paralleling without the complicated and costly paralleling switchgear

Switching is also included on each generator to provide a complete modular system, capable of all the topologies shown here.



Why Data Centers Use Generac

INCREASE YOUR RELIABILITY

Statistical reliability is greatly improved when more, smaller, generators are paralleled. Typically the real load is far less than the design load, so those extra generators act to provide “N+ excess”. If there were 4 MW of 500kW generators installed, and the actual load were 3 MW, we would have N+2. Binomial distribution on this if 98% probability is assumed would be 99.958% per <http://stattrek.com/online-calculator/binomial.aspx>

COMPLY WITH UPTIME TIER III AND IV REQUIREMENTS FOR GENERATORS

These generators can comply with all requirements for Uptime Tier III and Tier IV certifications. Our customers have received certification on their facilities which use Generac. There are no run time limitations on these generators. Prime power ratings are on the generator data sheets. Generac offers a “Mission Critical Continuous” rating. The application would need to be reviewed before installation to verify 70% loading.

GROW AT YOUR OWN PACE

Day one costs are decreased dramatically when generators are paralleled. To achieve N+1 in a non-paralleled system requires two very large generators on day one. With MPS, the generators can be smaller, since you can add capacity to each bus as you grow. Final build out would also be much more efficient.

PROVIDE REDUNDANT PATHS

There is no single point of failure, yet you have all the benefits of paralleling. By synchronizing and switching on each generator, two separate paths can be fed from each generator. If one path needs maintenance, the other path can be used. This allows more robust layers of redundancy in the primary path.

USE LESS UPS BATTERIES

When the probability of the generators being available is very high, UPS battery capacity can be decreased. Flywheel UPS's can even be used with confidence due to the fast sync times (<10 seconds). A full statistical report for your specific application can be provided on request.

TRUST THE EXPERIENCE

Generac has over 1600 paralleled installations, many in data centers like this. The controls have a design that is proven and widely supported. Digital technology allows faster synchronizing, and more control.

HAVE CONFIDENCE THROUGH REDUNDANCY

Robust distributed architecture places controls on each generator to synchronize and share between the generators. If communications are lost, there are hardwired back-ups, and even without hardwired back-ups, the generators can operate and share using just the waveforms on the bus.

RECEIVE A WIDER PRODUCT LINE

- Diesel systems up to 9MW per bus
- Natural Gas systems up to 6MW per bus
- Bi-fuel™ extends run-time by up to 4x compared to standard diesel design run-times