

GE Energy
Digital Energy

Zenith Energy Commander

Paralleling Switchgear





Paralleling Switchgear (PSG)

Paralleling is an operation in which multiple power sources, usually two or more generator sets, are connected and synchronized to a common bus (same parameters in regards to frequency, phase angle, etc.).

Why Parallel?

There are several advantages to be realized when employing paralleling switchgear in an electrical design such as increased reliability, flexibility, ease of uninterruptible maintenance and application/operation cost savings. It is because of these advantages that paralleling switchgear has become one of the best choices for meeting today's power requirements.

Why GE Zenith Energy Commander?

GE's Zenith Energy Commander has been providing customer facilities with reliable power switching systems for many years and continues its excellence today.

Since the inception of paralleling switchgear, many successful Energy Commander installations have been supplied with a focus on providing reliability.

GE's Zenith Energy Commander has become the leader in supplying solutions to simple and very complex systems due to its design flexibility.

GE's Zenith Energy Commander has evolved and adapted to the changing technologies in engine generator design, switchgear controls and monitoring systems. It reflects GE's continuing commitment to reliable solutions for critical power applications.

Uptime

Systems in which part of the load is very critical may be best served by paralleling one or more generator sets. Under parallel operation all the generator sets are started at once. The first set to reach the proper parameters will assume the most critical portion of the load, with the remaining sets picking up lower priority loads. In addition, by using a load shedding application, the failure of one generator set will not interrupt power to the critical loads, as less important loads can be dropped off the line.

Flexibility

Paralleling power sources allows for a wide variety of choices in the generation, distribution and utilization of the system's power.

Uninterruptible Maintenance

When one engine - generator set is out of service for maintenance or repair, having others synchronized on the same bus can provide the needed back-up power, should an outage occur.

Capital Cost Savings

Savings can be realized on the application when a number of smaller generator sets would be less expensive than one large set or when the load makes it impractical to divide into several sections, each with its own generator.

Operational Cost Savings

Savings can also occur on the operation side when generator set life is extended from being used only when needed to support the load. Also, when it is anticipated that the load will grow significantly in the future, the capital investment can be reduced by starting with small sets and paralleling additional units as load increases dictate.



System Benefits

System Reliability

GE's Zenith Energy Commander Paralleling Switchgear product has several hardwired features which ensures trouble-free operation and maximum reliability. Annunciator panels, load control switches and meters are all hardwired components. Upon the unlikely failure of the master control, a back-up engine start operation is hardwired into the system. Also the programmable logic controller (PLC) which runs automatic operations is backed up with a true hardwired manual control.

Finally, as a leader of paralleling switchgear technology, Zenith Energy Commander has an extensive array of successful, trouble-free installations around the globe. The breadth of experience and system complexity all make Zenith Energy Commander second to none in the industry.



Outside

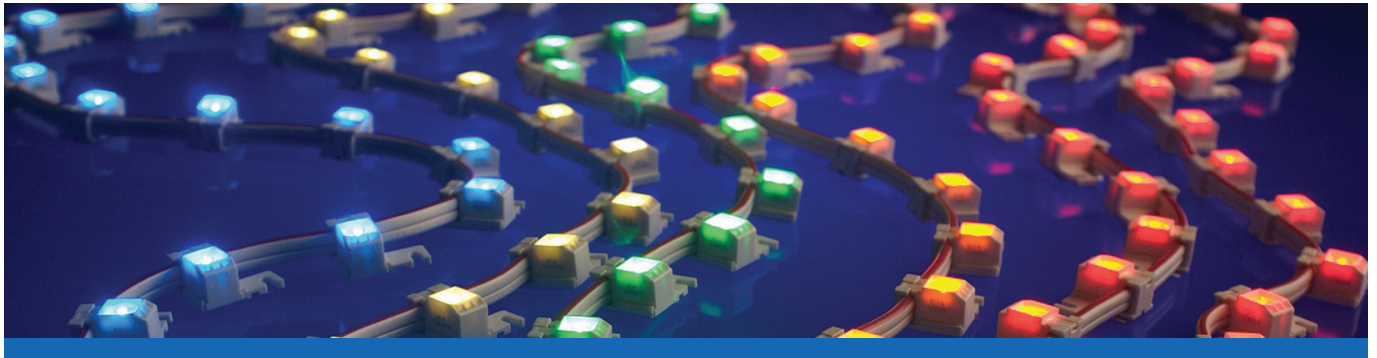
- 1 GE Multilin Protective Relays
- 2 Annunciator Boxes
- 3 Metering
- 4 GE Fanuc Operator Interface Panel
- 5 Control Switches & Breaker Status Indicators

GE Power Breakers

- 6 Utility
- 7 Feeder
- 8 Generator Main
- 9 Generator

Inside

- 1 Engine Generator Controller
- 2 GE Fanuc Programmable Logic Controller
- 3 Wire Hiding Raceways, Relays, Terminal Blocks and Power Supply

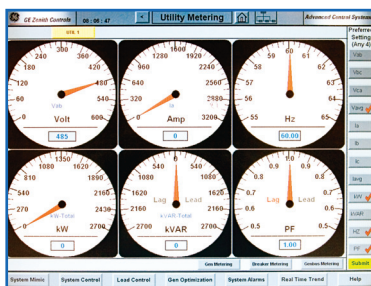


Ease of Use & Operations

A Master HMI panel can be useful to paralleling switchgear systems for user access and monitoring. The key control and monitoring functions in these systems include metering, annunciation, controlling breakers and engine generators in automatic operations, as well as manual.

This monitoring and control should be carefully considered when selecting which type of HMI is best suited for the operator and his facility. The greatest reliability in monitoring and control functions is realized with hardwired analog meters, switches and annunciation indicators, with very limited HMI access needs by the operator.

In some cases, critical facilities may be suitable for additional system monitoring, trouble-shooting and remote access ability. Operators in this case will require a more advanced Master HMI in addition to the system hardwired meters, switches and annunciation. The Energy Commander ACS "Advanced Control System" is recommended for these cases.



The Energy Commander Operator Interface Panel (OIP) is ideal for simpler systems. Since status of the system can be viewed in front of the line-up,

including all source metering, alarm, shutdown and status annunciation, the operator is not required to utilize the OIP to cycle through any screens for the system control and monitoring. The user is only required to use the touch panel for system testing purposes, non-critical settings and timing adjustments, and limited manual control redundant to the hardwired switches.

Standard Operator Interface Panel (OIP)

- > Intuitive interface makes operation simple. Little or no learning curve is required to operate the system.
- > A main screen with navigation buttons and non-system critical button/switches.
- > System testing screen allowing the operator to manually initiate automatic system testing operations.
- > Generator interface settings latched into the PLC control system upon entry.
- > System load add/shed manual control redundant to hardwired manual control switches in master control.
- > Generator optimization settings latched into the PLC control system upon entry.

Optional Advanced Control System (ACS) for Special Applications

- > Full functions of OIP with the addition of SCADA capabilities.
- > Optionally Internet capable - allows remote access via web.
- > Online controllable / programmable (behind customer's own firewall).
- > Advanced Event Logging & Source Trending allows statistical root cause analysis.
- > Duplicates System & Generator Annunciation.
- > Remote system diagnostics.
- > Alarm and maintenance messaging, including predictive maintenance.
- > Graphical user interface. Intuitive and user-friendly. Requires NO computer experience.
- > Password protection. Capable of hundreds of levels of authority.

System Applications



Emergency or Standby Power

> Features

The emergency system is used to supply power to building loads during a power failure.

Paralleling switchgear controls the system transfer to generators and return back to normal sequences of operations.

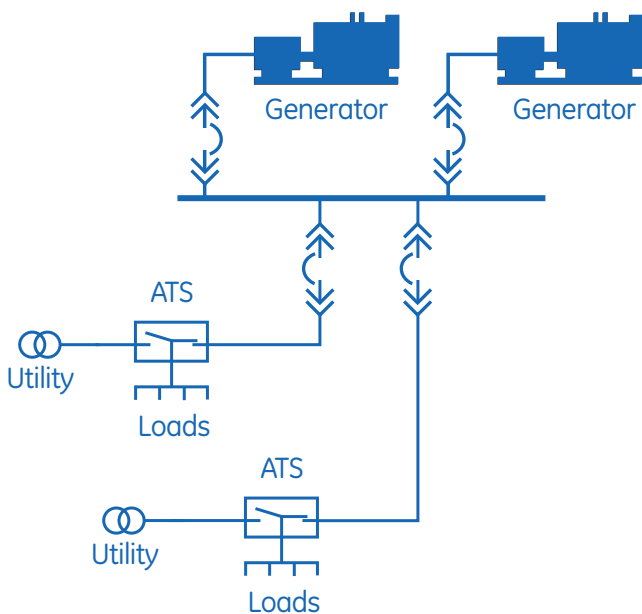
Paralleling switchgear controls the addition of load on/off generators (load add/shed).

Transfers between utilities and generators occur in open transition or passive momentary closed transition (no active synchronization of sources).

> Components

System typically consists of paralleling switchgear product and automatic transfer switches of which GE has a wide variety for many applications.

> Configuration Example



Prime Power

> Features

On-site prime power systems are most often used where there is no utility source available.

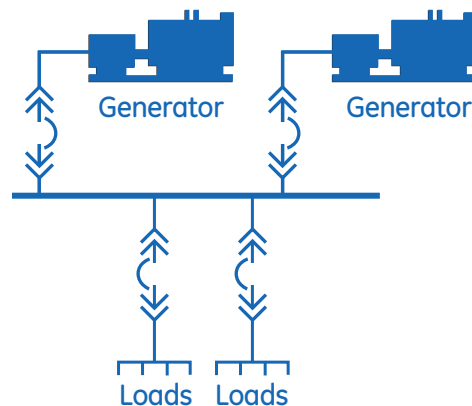
The required electricity is generated entirely on-site, typically at facilities such as island resorts, mines, mills or other remote locations.

Since utility is not available in prime power systems, ATS's/ATO's and utility/tie breakers are not required.

> Components

Generators are the only source of power. The system typically consists of PSG product with no ATS/ATO products.

> Configuration Example





Parallel with Utility

> Features

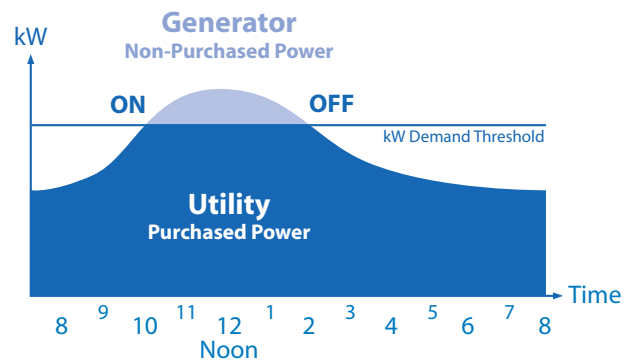
Parallel with utility systems are utilized whenever generators are to be actively synchronized and paralleled with utility sources for short or long durations.

These systems are often also used for standby use as well.

PSG controls the generators transfer operations with the utility source(s) as well as the power management (loading controls) to direct power the appropriate direction.

Transfers may occur in short duration (momentary closed transition), a somewhat longer duration (softload/unload closed transition), or a sustained duration (maintained parallel with utility).

Power management in maintained parallel situations includes controlling import levels from utility, export levels to utility, or base load levels where generators are loaded to set amount disregarding the import and export contribution from utility.

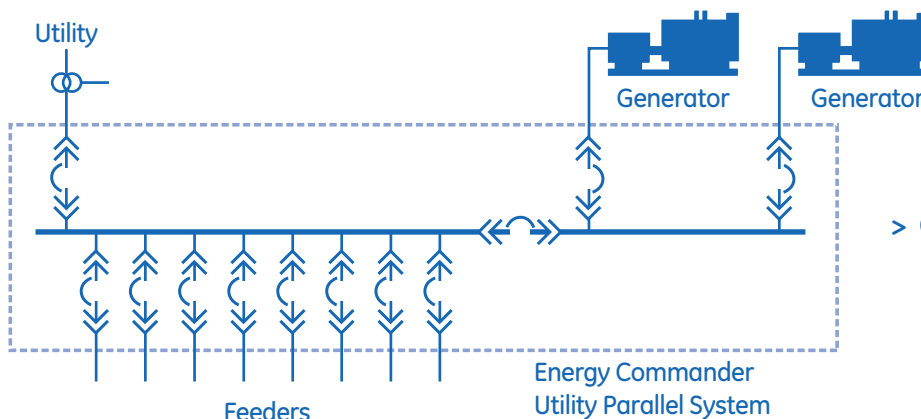


> Peak Shave Example

A "Peak Shaving" application is sometimes used to transfer non-critical loads onto generators during peak utility demand hours.

> Components

System combines generators with utility sources. GE's Zenith Energy Commander system controls load feeder breakers and utility import/export parallel loading.



> Configuration Example

Parallel with Utility application

Contact Us

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imagination at work



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