



# Generators synchronized for parallel operation



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# What is parallel operation of generator sets?

The configuration for parallel operation consists of synchronizing two or more generator sets that are coupled together with the same frequency and voltage. They then operate jointly, supplying power to the same network. In this way, energy can be generated in large quantities, which could never be supplied by a single generator set with the same specifications.

The parallel operation system keeps one main generator set switched on and connected to the network at all times. The main generator set may be a different unit from time to time. By alternating the operation of the generator sets in this way, their working hours are distributed across the generator sets, staggering their maintenance.

As soon as the demand for electricity increases beyond a pre-set limit, the system starts up the next generator set and automatically connects it to the network.

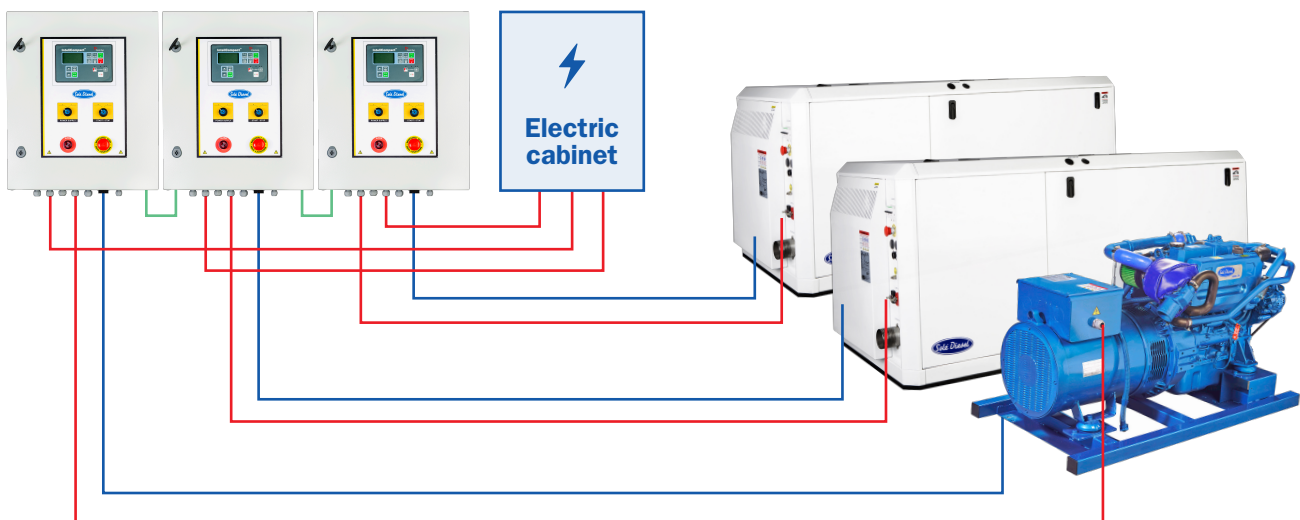
The load is then distributed equally among all the generator sets that are connected.

When the load falls below the pre-set limit, the appropriate generator sets are automatically switched off and stopped.

For maintenance purposes, it is possible to keep providing the power supply even if one of the generator sets is out of use. The system detects this, and will disregard this equipment.

## Some of the most important advantages of using parallel operation systems are:

- The possibility of supplying quantities of energy in a way that is **more efficient and consumes less fuel**. This is due to the fact that parallel operation systems are better able to adapt to the current energy needs. They are able use one unit when there is low consumption, and connect or disconnect more units depending on the level of network load.
- The **reliability** provided by the fact that more than one generator set is operating at the same time. This avoids failures, and guarantees that there is a power supply at all times.
- The **safety** provided by a system that allows maintenance tasks to be carried out on one of the units while the other units continue to operate, maintaining the power supply at all times, under any circumstances. This power supply would be guaranteed if the main unit fails, or is undergoing maintenance.
- The **reduction in maintenance** required for each generator set, as the operating hours for each unit are decreased.



# Why is parallel operation with Solé Diesel generator sets the best option?

At Solé Diesel, we want to make things convenient for our customers, facilitating the start up of this complex equipment. As a result, we have set ourselves apart from the other solutions that are on the market, by offering a **Plug & Play** system. This consists of a generator set that is ready for parallel operation, as well as an electrical cabinet that includes a power switching system and a controller which are fully configured for this application.

Technological advances have made it possible for these operations to be carried out automatically, using a specific controller for the parallel operation of generator sets. Each generator set has a controller that regulates the frequency and voltage.

These parameters must be maintained in the same proportion in all the generators to ensure optimum performance. In addition, these controllers succeed in delivering a significant reduction in time, complications and costs incurred during start-up.

## What options do we offer?

At Solé Diesel, we offer two supply levels for the parallel operation generator set system. The combination of both levels provides an easy to install experience that is 100% safe and effective.

### OPTION 1

**The Parallel Operation Ready Generator Set is ideal for replacing one or more generator sets that are integrated within an existing parallel operation system.**

It includes the Generator set, the electronic controller and the Engine Control Unit ECU. The scope of this supply would not include any control panels, or synchronizing or switching equipment.

#### Equipment Option 1

##### Parallel Operation Ready Generator Set

- Generator Set that is ready for parallel operation. The panel and the control and power cabinet are not included.
- ECU
- Electronic Actuator
- Control wiring





## OPTION 2

### Parallel Operation Ready Generator Set (Option 1)

+ Parallel Operation Control and Power Kit. This complements the Parallel Operation Ready Generator Sets level, including all the equipment needed to set up a functional parallel operation system.

This is our **Full Equip** option, which is highly recommended for boats where a parallel operation system is being installed for the first time.

As it is **Plug&Play**, there is no need to carry out any complex configuration or installation of the parallel operation system. Simply connect the Cabinet Kit to the generator set, and to the network.

This is the option that is **recommended** by Solé Diesel, as it saves the user money on engineering and installation costs.

Solé Diesel's  
recommended option

### Equipment Option 2

#### Parallel Operation Ready Generator Set (Option 1) + Parallel Operation Control and Power Kit

- Generator Set that is ready for parallel operation. The panel and the control and power cabinet are not included.
- ECU
- Electronic Actuator
- Control wiring
- IntelliGen2000 Control Panel
- Control and Power Cabinet For parallel operation
- Communication wiring
- Control wiring
- Load break switch
- Amperometric transformers
- Electrical protections



The cabinet kit that contains the **Parallel Operation Control and Power Kit** consists of an electrical cabinet which has a load break switch in it that connects the generator set to the network.

Additionally, it contains an Inteligen2000 controller that communicates with the parallel operation system and allows the generator set to be started and stopped manually or automatically. It also provides different measuring and control equipment to ensure that the parallel operation system functions efficiently and correctly.

Finally, it has all the necessary protections to keep both people and equipment safe.

#### More information

Please contact us for more details about our Generators synchronized for parallel operation.

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