

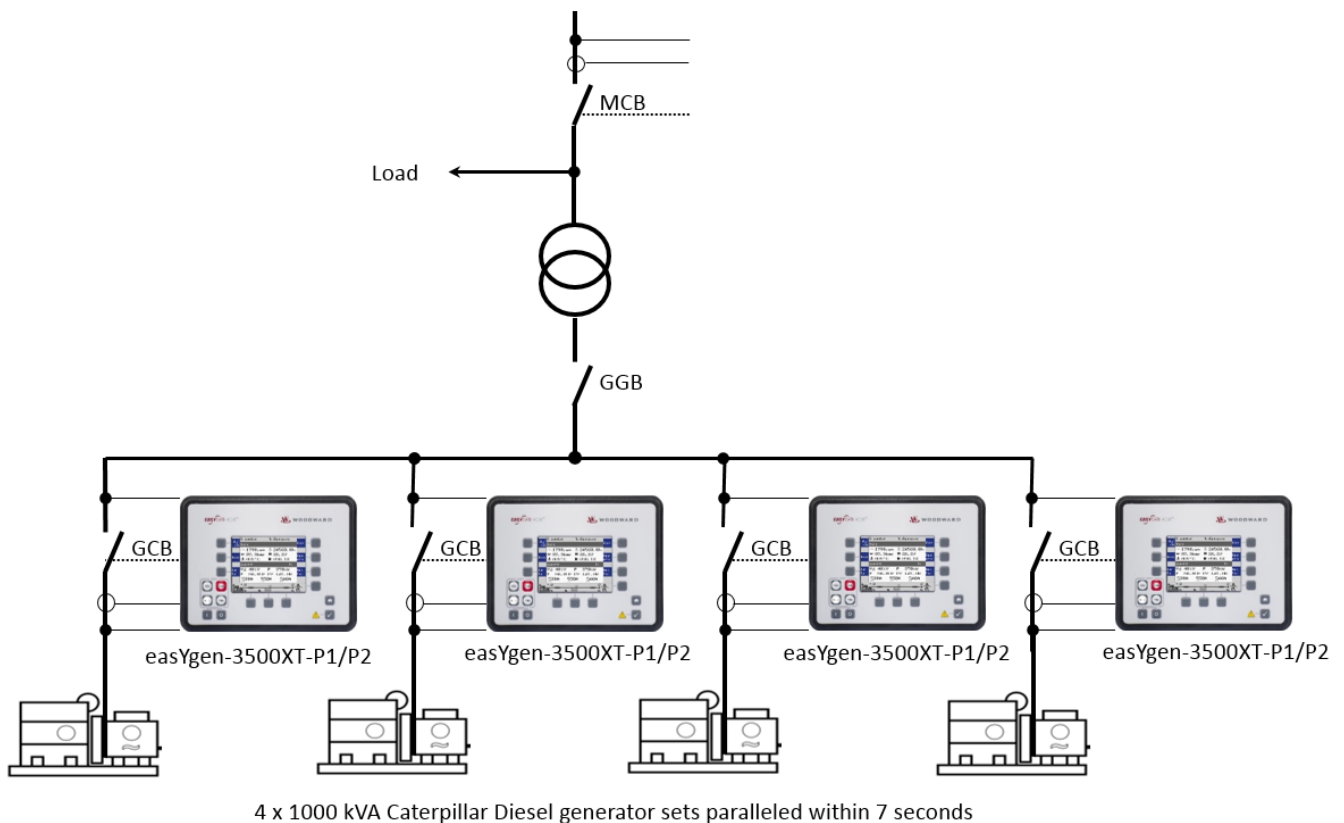
Customer problem:

Want to parallel $n+1$ backup gensets together in shortest possible time within only some seconds,

to shrink Battery UPS backup system, to be able to provide suddenly power for heavy load one genset alone cannot provide, or be able to provide total genset load beyond 10 or 15 seconds which is a requirement in many critical applications like Datacenters, Hospitals, Airport, Chemical & Process Industry .

Solution: Run-Up Sync:

All the generators are paralleled together by closing their circuit breakers during the engine start sequence. Then after a certain speed is achieved the voltage regulators are enabled and the generators will produce voltage. The run-up synchronization method is used to get several synchronous generators onto load in a very short time. This time is determined by the engine start time and the AVR on-excitation.



Each easYgen-3500 controller is measuring generator side (3xU, 3xI), Bus (2xU P1 Package, 3xU P2 Package) and Mains side (3xU, 1xI). Each easYgen controls Generator Breaker GCB, all easYgen-3500's controlling Generator Group Breaker GGB and Mains Circuit Breaker MCB.

As well easYgens are offering as well phase angle compensation (0-359°) for the bus- and mains sensing system, so easYgens are capable to synchronize breakers if step-up transformers are between

Please find under below YouTube link a good clip about run-up sync. As well other wording for same application is used like static paralleling, unexcited startup, Russian synchronization, dead field synchronization.

You can see what is possible with an integrated, high sophisticated Woodward easYgen-3500 P/N 8440-1935 (same in successor easYgen-3500XT-P1/P2 controls 8440-2085/2088) genset controller without using additional external control logic/PLC. The HMI Panel in the center of the panel is just used to show the complete application on a touch-panel HMI.

<http://www.youtube.com/watch?v=6zqqAdUSqpU>



Data center in Ankara/ Turkey, Customer Turkey Telecom

- 4 x 1MW Caterpillar diesel generator sets, engines preheated in Stand-By waiting for Black out
- All for sets are in standby, datacenter supplied by local grid
- Mains failure, black out (18.sec during the movie)
- Mains failure delay time configured to 7 seconds (:18.-:25. Sec during the movie) to make sure there is really a black out and not just a short mains break
- After 7 seconds all 4 generator sets equipped with Woodward easYgen-3500 controllers are starting together without activated excitation (AVR switched off) with a closed Generator Circuit Breaker GCB
- All 4 diesel generator sets are running on nominal speed (:29 sec during the movie)
- After, all 4 AVR's are switched on simultaneously and group breaker (as well served from easYgen-3500 controller) is closed after all 4 sets are running on nominal speed. (:31.sec full load supplied by diesel generator sets)
- 4 MW diesel generator provided within 6 seconds (from diesel generator start command to full load supply)