

GE Consumer & Industrial
Power Protection

UPS technical note no. 8

Digital Energy™ Uninterruptible Power Supply

Common battery applications for three phase UPS

SitePro

400 Vac CE - Series 6

SG Series

400 Vac CE - Series 0

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CE



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1 Abstract

In typical applications whereas the UPS are configured as parallel units (RPA) or in Hot Standby (configuration known also as Isolated Redundant), each UPS is designed to operate with its own battery.

In limited installations, due to economical reason or system layout disposition, a common rectifier battery is used.

Even for this particular applications GE Digital Energy leave the designer free to select the proper UPS configuration according to the installation requirements, by using the common rectifier battery for both the possible configurations RPA or Hot Standby.

In particular the information included in this document are applicable to UPS type:

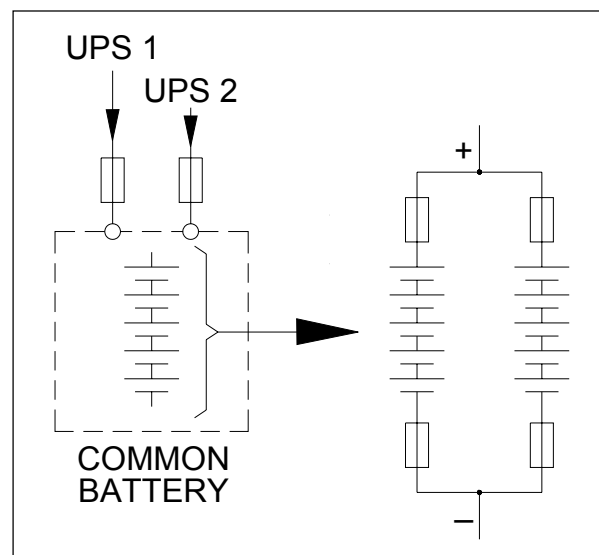
- SitePro 400 Vac Series 6
- SG Series 400 Vac CE Series 0

2 Considerations for common battery design

In UPS application the battery play an important role in the total system reliability and availability.

In common battery design a single battery has to maintain the load power supply of the whole redundant, parallel or hot standby, UPS system when the input mains fails. For this reason the following consideration should be taken into consideration during the battery design:

- parallel strings should be used, to guarantee a certain redundancy level against a total failure of the battery
- each strings should be equipped with fuses or circuit breaker in order to allow isolation of each string, during maintenance operation or in case of battery failure, without affecting the total battery
- parallel strings should be limited to four, to guarantee a proper charging/discharging of each string.



3 Rectifier paralleled on the same battery

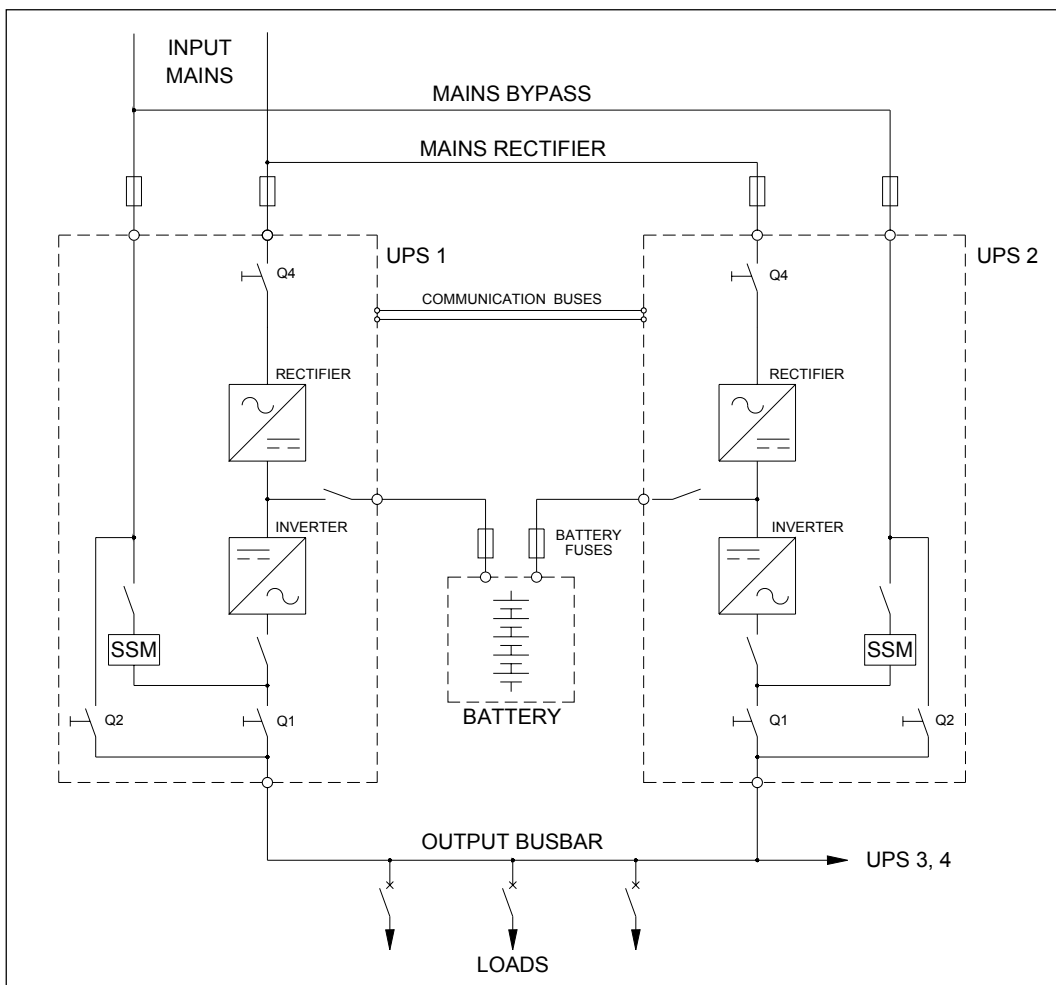
3.1 Functional description

In UPS in Redundant Parallel Architecture (RPA) the battery sharing manage among the parallel rectifiers is integrated in the UPS system communication buses.

The parallel UPS units installed on the same battery is limited to four.

This limitation is done to the difficulties to share the battery current among more than four units. Also it is not in the practice to have more then four UPS on the same battery.

This type of configuration is not common used; when used it is typically limited to two UPS on the same battery.



3.2 Consideration on system MTBF (Mean Time Between Failure)

It should be distinguished the two cases of Redundant Parallel Architecture (RPA) configuration:

Parallel units for redundancy

Common battery reduces the MTBF value of the whole parallel system, because the battery represents a single point of failure.

Parallel units for power capacity

Common battery configuration can be used without affecting the MTBF value, in the sense that the battery failure has the same effect as for single battery configuration.

4 Hot standby with common battery

4.1 Functional description

In hot standby configuration the inverter of UPS Master normally supplies the load.

The UPS Slave inverter is connected to the UPS input bypass of UPS Master.

If a failure on UPS Master inverter occur the load will be transferred to bypass, therefore the load will be supplied by the UPS Slave inverter. In case of additional failure on the UPS Slave inverter the load will be transferred to the Slave bypass.

The two UPS are not in RPA configuration, therefore no communication buses can be installed, and therefore no data relating their status is exchange between them.

For this reason the UPS Master rectifier is defined as responsible for the final battery recharge; this is realized by an appropriate setting of the battery floating voltage on the two UPS.

Obviously in case of failure of the UPS Master, the UPS Slave will supply the battery.

Same considerations on common battery design and MTBF as for parallel units for redundancy should be take into consideration.

