

Fig. 5: Parallel Configuration (Inside out)

Cross-Link

In the parallel configuration, the DR-UPS modules and critical load is connected to one output busbar. Where two separate systems are required, a "cross-link" system is ideal as the two clusters normally operate as independent parallel systems but when any module is taken out of service, the cross-link breaker will close. The control system maintains synchronism between the two clusters at all times. Redundancy can therefore be shared between the two clusters. The cross-link will not be closed under fault conditions so as not to propagate the fault from one cluster to the other.

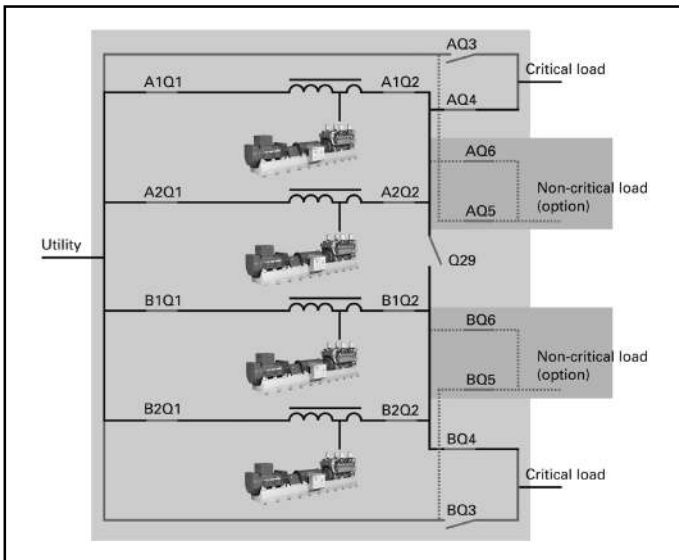


Fig. 6: Cross-link Configuration

Isolated Redundant

If the critical load to be supported is greater than the UPS capacity that can be achieved by connecting units in parallel, say for fault current reasons, then the Isolated Redundant configuration provides a means of achieving an N+1 redundant system. Fig. 7 shows that normally individual units supply their own critical loads. A dedicated additional unit (the "redundant" unit) provides the N+1 redundancy. When a unit is taken out of service, e.g. for maintenance, the critical load will be transferred, without interruption, to the "redundant" unit via the redundant busbar circuit.

Additionally, when all units are available the available power from the "redundant" unit can be used to supply the non-critical load. When a unit is not available, the non-critical load will be transferred back to the utility supply.

Distributed Redundant

While the Distributed Redundant configuration is still an N+1 design it does not have a dedicated additional (redundant) unit. Instead, this role is shared equally among all the units. In normal operation each DR-UPS is part loaded so that when required it can take up part of another unit's critical load.

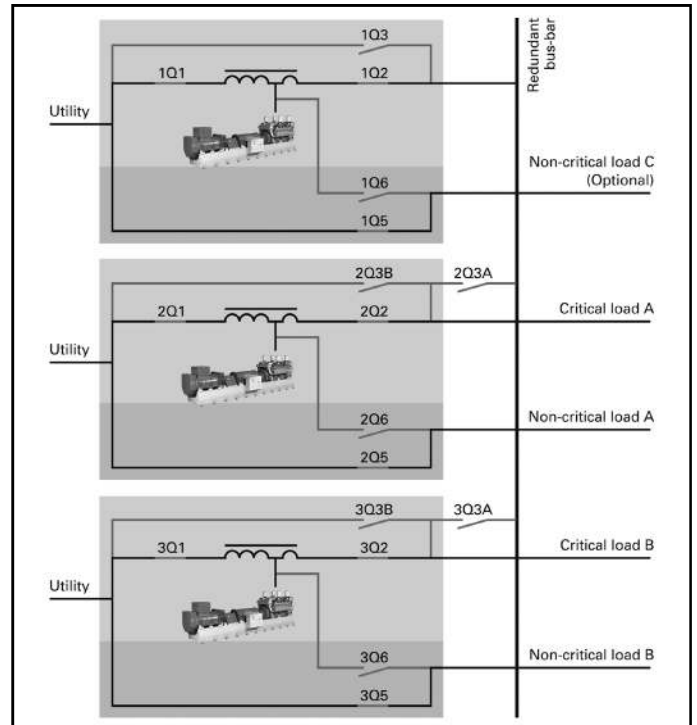


Fig. 7: Isolated Redundant Configuration

The overall critical load is divided into N groups on each module. A three DR-UPS unit example is shown in Fig.8. Each DR-UPS unit is connected to its N groups of critical load through the primary input of automatic transfer switches (ATS). The secondary inputs to the ATSs are shared equally among the other units. So, when a unit is taken out of service, each group of critical load will be transferred, without interruption, to its own "redundant" unit by the ATS.

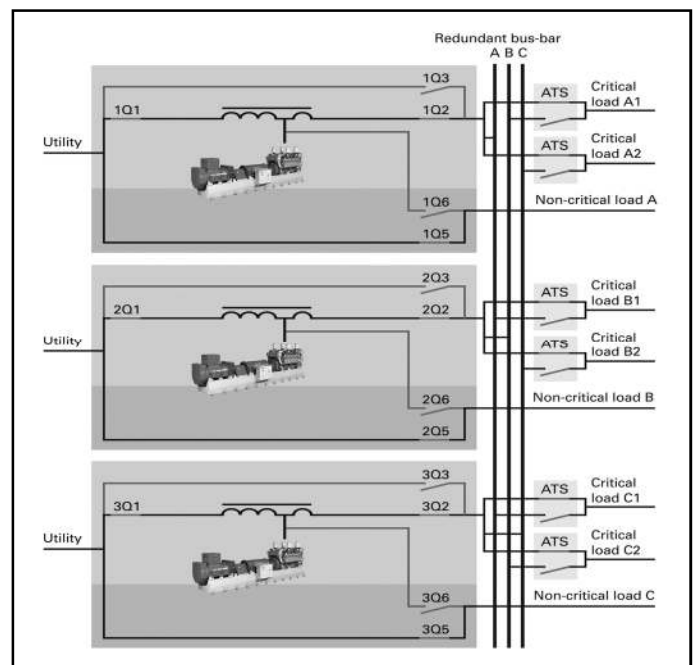


Fig. 8: Distributed Redundant Configuration

Hitec Power Protection has the experience to deliver all the above configurations. Obviously, modifications to each concept are possible to even better suit your typical requirements.