

DLC Large Power Application - Additional Questionnaire for Datacenters

Customer Responses

- 1. What is the percentage of the computing/server load, the lighting load, the power distribution losses, and the cooling load of the total MW consumption of the data center? What is the overall data center power factor?**
 - a. Does the percentage change during different seasons and different times of the day? If yes, a gross estimate like Summer Day/ Summer Night and Winter Day/Winter Night would help.
- 2. If the data center has some form of forced cooling system, what is this comprised of?**
 - a. Computer Room Air Conditioners (CRACs) with internal compressors
 - b. Computer Room Air Handlers (CRAHs) supplied with chilled water.
 - c. Air-Handling Units (AHUs) dedicated to the data center space
 - d. Other (please describe)
- 3. Are the motor-driven components of the cooling systems driven by:**
 - a. Single-speed motors that are operated across the line (Motors connected directly to the AC supply)
 - b. Motors controlled by variable/adjustable speed drives or electronically commutated motors (ECMs)
 - c. Other methods (please specify)
- 4. At what voltage sag levels and durations below which, the components within the data center disconnect from the grid?**
 - a. Voltage sag level/duration at which the computer/server load disconnects from the utility system (these may transfer to a local UPS)?
 - b. Voltage sag level/duration at which the cooling load disconnects from the system (these may transfer to an emergency generator or local power source)?
 - c. Are the voltage sags measured on a per phase basis for the disconnection action or are these measured as rms considering the 3 phases?
- 5. At what voltage swell levels and durations above which, the components within the data center disconnect from the grid?**
 - a. Voltage swell level/duration at which the computer/server load disconnects from the utility system (these may transfer to a local UPS)?
 - b. Voltage swell level/duration at which the cooling load disconnects from the system (these may transfer to an emergency generator or local power source)?
 - c. Are the voltage swells measured on a per phase basis for the disconnection action or are these measured as rms considering the 3 phases?
- 6. Are there any frequency thresholds below and above which the data center computer/server load may disconnect from the system?**
- 7. If the loads disconnect from the utility grid, how do they reconnect back when the voltage and frequency returns to normal values?**
 - a. Do they reconnect immediately when the voltage and frequency recovers to certain levels. Please specify the voltage and frequency levels.
 - b. Do they reconnect with a delay when the voltage and frequency recovers to certain levels. Please specify the voltage and frequency levels and delays.
 - c. Do you reconnect manually?
 - d. Do they reconnect with a ramp as or after voltage and frequency recovers to a certain level, please specify the voltage and frequency levels and ramp rate at which these loads get reconnected back (if it's in steps please approximately provide information on how that happens).
- 8. Is there a backup system to supply the data center in the event of disconnection from the grid?**

- a. What is the size of the data center Emergency Generator (EG) and/or Battery Energy Storage (BESS) in relation to the data center load
- b. Can the EG and BESS be dispatched to support the entire/partial load during system events? If so, for how many hours?
- c. Can the Data center be Islanded with only the EG and BESS in event of a planned or unplanned disconnection from grid?
- d. Can the Data Center participate on demand side management in a grid emergency or as an ancillary service?
- e. How much of the server farm load could be picked up by or redistributed to redundant server sites across the world?
- f. In the event of a data center being tripped offline, how much of that load would they transfer somewhere else?
- g. How fast can this load transfer be done?