
01
Carefully review the project specifications for any references to harmonics or Institute of Electrical and Electronics Engineers (IEEE) 519:
The requirements for harmonic performance to adhere to the IEEE 519 standard are often overlooked in the bid process. As a result, additional delays and costs will occur as the project moves forward.
02
Encourage the specifying engineer to identify a realistic point of common coupling (PCC):
The PCC is often unnecessarily identified at the variable frequency drive (VFD)'s terminals. While this simplifies the calculations, it often adds unnecessary costs. IEEE 519-2014 encourages that the PCC be located at the transformer's secondary.
03
Identify any variable frequency drives (VFDs) that are designated as "standby":
It is not necessary to mitigate harmonics for nonoperating VFDs.
04
Determine if the facility's VFDs are centralized or distributed throughout the facility:
Centralized installations lend themselves to advanced harmonics mitigation solutions such as an active filter.
05
Secure a one-line diagram:
A one-line diagram will clarify the analysis task by identifying the locations of the VFDs, the PCC and other loads of interest as well as the electrical distribution system's ratings and configuration.
06
Do not forget about generator power:
The presence of a generator requires a second harmonic analysis. Data on the generator's capacity, impedance and the loading will be needed.
07
Identify which version of IEEE 519 is applicable:
While similar, the differences between IEEE 519-1992 and IEEE 519-2014 can result in a significantly different outcome.
08
Cable length can make a difference:
The cables' lengths add impedance to a system and affect the harmonics. Most often, the influence is minor. But when the calculation results are on the edge of compliance, this data can make a difference.
09
Power factor correction capacitors can cause problems:
Power factor capacitors, together with other impedances, will create a resonant point in the system. It is important to take these into account to prevent a potentially destructive instability.
10
Agree to a pass/fail criteria before on-site harmonics testing begins:
Occasionally, the requirement for on-site testing is included in the specification. Be sure to agree on the test plan and pass/fail criteria before beginning the work.