



Safeguarding the Grid: The Role of NERC PRC-024-3

What is NERC PRC-024-3?

Effective since July 17, 2020, the primary objective of NERC PRC-024-3 is to mandate protection settings that prevent generating resources from disconnecting during specified frequency and voltage deviations. This standard ensures that generating units stay connected and contribute to grid stability during disturbances, thereby supporting the overall reliability of the Bulk Electric System (BES). By specifying "no trip zones" for both frequency and voltage excursions, PRC-024-3 aims to enhance the resilience of the power grid against fluctuations that could otherwise lead to widespread outages.

PRC-024-3 comprises of four main requirements, each targeting different aspects of frequency and voltage protection settings for generating resources.

Frequency Protection Settings

R1 mandates that each generator owner set its applicable frequency protection according to Attachment 1 of PRC-024. This ensures that during a frequency excursion, the protection settings do not cause the generating resource to trip or cease injecting current within the "no trip zone." Exceptions are allowed for documented regulatory or equipment limitations as per R3. This provision ensures that generating resources can withstand and remain operational during certain frequency variations, thus maintaining grid stability.

Voltage Protection Settings

Similar to R1, R2 specifies that generator owners must set their voltage protection in line with Attachment 2 of PRC-024. This ensures generating resources do not trip or stop injecting current within the "no trip zone" during voltage excursions. Exceptions include allowances for less stringent settings if approved by the transmission planner or documented equipment limitations under R3. This requirement guarantees that voltage disturbances do not lead to unnecessary disconnections, thereby supporting the continuous operation of generating resources.

Documentation of Limitations

R3 requires generator owners to document any known regulatory or equipment limitations that prevent compliance with R1 or R2. This includes limitations identified through studies, actual events, or manufacturer's advice. The generator owner must communicate these limitations, or their removal, to the planning coordinator and transmission planner within 30 calendar days of identification or change. This transparency ensures all stakeholders are aware of potential vulnerabilities and can plan accordingly to mitigate risks.

Provision of Protection Settings

Finally, R4 mandates that generator owners provide their protection settings related to R1 and R2 to the relevant planning coordinator or transmission planner within 60 calendar days of receiving a written request. Additionally, any changes to these settings must be reported within the same timeframe, unless the requesting entity states otherwise. This requirement facilitates coordinated planning and modeling efforts, ensuring that the protection settings are integrated into broader grid reliability analyses.



How can SynchroGrid help?

SynchroGrid provides specialized services to help generator owners comply with PRC-024-3, ensuring the reliability of the Bulk Electric System. Our expertise in power system protection and compliance includes setting and verifying frequency and voltage protection parameters, analyzing and documenting regulatory and equipment limitations, and communicating with planning coordinators and transmission planners. SynchroGrid ensures timely provision and updates of protection settings, supporting continuous compliance and optimal performance of generating resources during voltage and frequency excursions. Through these tailored services, SynchroGrid helps clients maintain robust grid stability and reliability.

SynchroGrid has extensive experience in ensuring compliance with NERC PRC-024 standards across various clients and projects. For example, we have conducted studies for wind and solar farms, as well as synchronous generation. We have also conducted several dozens of studies for nearly 100 individual units that involve comprehensive review of the under/over frequency and voltage protection and provided detailed reports recommendations to fix non-compliant relays. SynchroGrid is proficient in delivering tailored solutions to meet stringent NERC standards, thereby enhancing the reliability and stability of their clients' power systems.

PRC-024-3 is a vital NERC standard that ensures generating resources are equipped with appropriate frequency and voltage protection settings to remain operational during defined excursions. Through its detailed requirements for setting, documenting, and communicating protection settings, PRC-024-3 significantly contributes to the stability and reliability of the Bulk Electric System. As the power grid faces increasing demands and challenges, standards like PRC-024-3 are essential for maintaining a resilient and secure energy infrastructure. SynchroGrid's expertise and experience in this domain make us a valuable partner for generator owners striving to comply with these critical standards.

Reference:

<https://www.nerc.com/pa/Stand/Reliability%20Standards/PRC-024-3.pdf>