



Ensuring Reliability with NERC PRC-002-2 Regulations

What is NERC PRC-002-2?

The North American Electric Reliability Corporation's (NERC) PRC-002-2 regulation, effective since November 24, 2015, requires transmission and generator owners to have adequate data available to facilitate analysis of Bulk Electric System (BES) disturbances. The emphasis of PRC-002-2 is not on how disturbance monitoring data is captured, but what Bulk Electric System data is captured. Under NERC PRC-002-2, transmission and generator owners are obligated to report the following three general types of data:

- 1) Sequential event recordings (SER) for circuit breaker positions.
- 2) Fault recording (FR) of high-resolution electric quantities with conditions on minimum recording rate and duration.
- 3) Dynamic disturbance recording (DDR) defined by continuous recording of low-resolution data with a minimum rate and retention period. It's important to note that the requirement for DDR may vary depending on the regional entity's interpretation and implementation of the regulation.

Sequential Event Recordings (SER) for circuit breaker positions are essential components of grid disturbance analysis and protection system evaluation. SER captures the chronological sequence of circuit breaker operations, recording crucial details such as opening and closing actions during disturbances or planned operations. This data, enriched with timestamps and metadata like circuit identification, offers precise insights into the timing and nature of switching events. By analyzing SER data, potential issues with circuit breaker operations, such as misoperations or delayed responses, can be identified, thereby ensuring grid reliability and resilience.



Fault Recording (FR) of high-resolution electric quantities is a critical aspect of grid monitoring and fault analysis. FR entails the recording of detailed electric parameters, such as voltage and current waveforms, during fault conditions. These waveforms, sampled at high frequencies, enable the capture of transient events with precision, offering valuable insights into fault location, type, and the clearing process. By adhering to the requirements outlined in NERC PRC-002-2, which mandate minimum recording rates and durations, FR data ensures the availability of sufficient resolution for in-depth fault analysis. The comprehensive nature of FR data facilitates post-event analysis, aiding in the identification of root causes and the development of effective mitigation strategies to enhance grid reliability and protection system performance.

Dynamic Disturbance Recording (DDR) of low-resolution data is a fundamental aspect of grid monitoring aimed at capturing the behavior of the power system during dynamic disturbances. DDR involves continuous recording of key grid parameters, including voltage magnitude, frequency, and power flows, with timestamps for analysis. While sampled at lower frequencies compared to Fault Recording (FR), DDR data offers a broad overview of grid dynamics during disturbances, enabling the identification of system-wide trends and abnormal operating conditions. Complying with the requirements stipulated in NERC PRC-002-2 ensures sufficient data coverage, with minimum recording rates and retention periods specified to support dynamic disturbance analysis. Analyzing DDR data supports system-wide monitoring, early detection of emerging issues, and proactive management of grid stability. It also aids in post-event analysis and the development of corrective measures to enhance grid resilience.

NERC PRC-002-2 regulation plays a critical role in enhancing grid reliability by facilitating the timely detection, analysis, and mitigation of disturbances. Compliance with PRC-002-2 ensures accountability and adherence to regulatory standards, reducing the risk of grid failures and ensuring the continuous delivery of electricity to consumers.

How can SynchroGrid help?

SynchroGrid's experienced engineers stay up to date with the latest regulatory requirements, assisting clients with maintaining compliance and grid reliability while avoiding exorbitant fines. We offer solutions for PRC-002 to PRC-027. Specifically for PRC-002, SynchroGrid can review systems and recommend improvements to ensure that adequate data is available to facilitate analysis of Bulk Electric System (BES) Disturbances.

SynchroGrid has conducted comprehensive reviews of multiple clients' Digital Fault Recorders (DFRs), relay settings, and operational procedures to ensure compliance with NERC PRC-002 standards. These reviews covered all 12 requirements outlined in the standard and resulted in the creation of detailed reports intended for NERC audits. In instances where deficiencies were identified, SynchroGrid facilitated necessary updates to both DFRs and relay settings to bring them into full compliance. As an example, for one specific client, SynchroGrid meticulously examined the DFRs and relay settings across three substations, ensuring alignment with the relevant stipulations of NERC PRC-002-2.

Reference:

<https://www.nerc.com/pa/Stand/Reliability%20Standards/PRC-002-2.pdf>