



California ISO

New Resource Integration Protection and Control Standard Requirements Revisions

Scott Vaughan, P.E.
Director, Transmission Assets

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Engagement Best Practices



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FERC Order 901 was issued on October 19, 2023
To address reliability concerns associated with Inverter
Based Resources (IBR). In 2025 FERC approved;

1. PRC-028-1: Disturbance Monitoring and Reporting Requirements for Inverter Based Resources
2. PRC-029-1: Frequency and Voltage Ride-through Requirements for Inverter-Based Resources
3. PRC-030-1: Unexpected Inverter-Based Resource Event Mitigation

In accordance with the NERC Implementation schedules the new IBRs must comply with these new standards on October 1, 2026.

PRC-028-1: Disturbance Monitoring and Reporting Requirements for Inverter Based Resources

Requirements R1-R7 define event recording triggers, facility signals, data granularity, time synchronism and data retention requirements .

Triggers are identified as:

- Ride through events
- Inverter-based unit trips
- Overfrequency and underfrequency events
- AC phase overvoltage and undervoltage events
- Neutral Overcurrent

Signals include :

- Voltage, current, real and reactive power at multiple facility locations.

Data recording characteristics:

- Minimum recording rate of 64 samples per cycle
- 2 cycles per-trigger with at least 2 seconds of data
- GPS time clock synchronized data

Continuous dynamic disturbance recording (DDR)

- Input sampling of 960 samples per second
- Record at 1 sample per cycle

Generator Interconnection Agreement Transient Data Recording Equipment Requirements

Appendix H of Appendix EE section vi, defines signal requirements.

Plant Level:

- (1) Plant three phase voltage and current
- (2) Status of ancillary reactive devices
- (3) Status of all plant circuit breakers
- (4) Status of plant controller
- (5) Plant control set points
- (6) Position of main plant transformer no-load taps
- (7) Position of main plant transformer tap changer (if extant)
- (8) Protective relay trips or relay target data

Inverter Level:

- (1) Frequency, current, and voltage during frequency ride-through events
- (2) Voltage and current during momentary cessation for transient high voltage events (when used)
- (3) Voltage and current during reactive current injection for transient low or high voltage events
- (4) Inverter alarm and fault codes
- (5) DC current
- (6) DC voltage

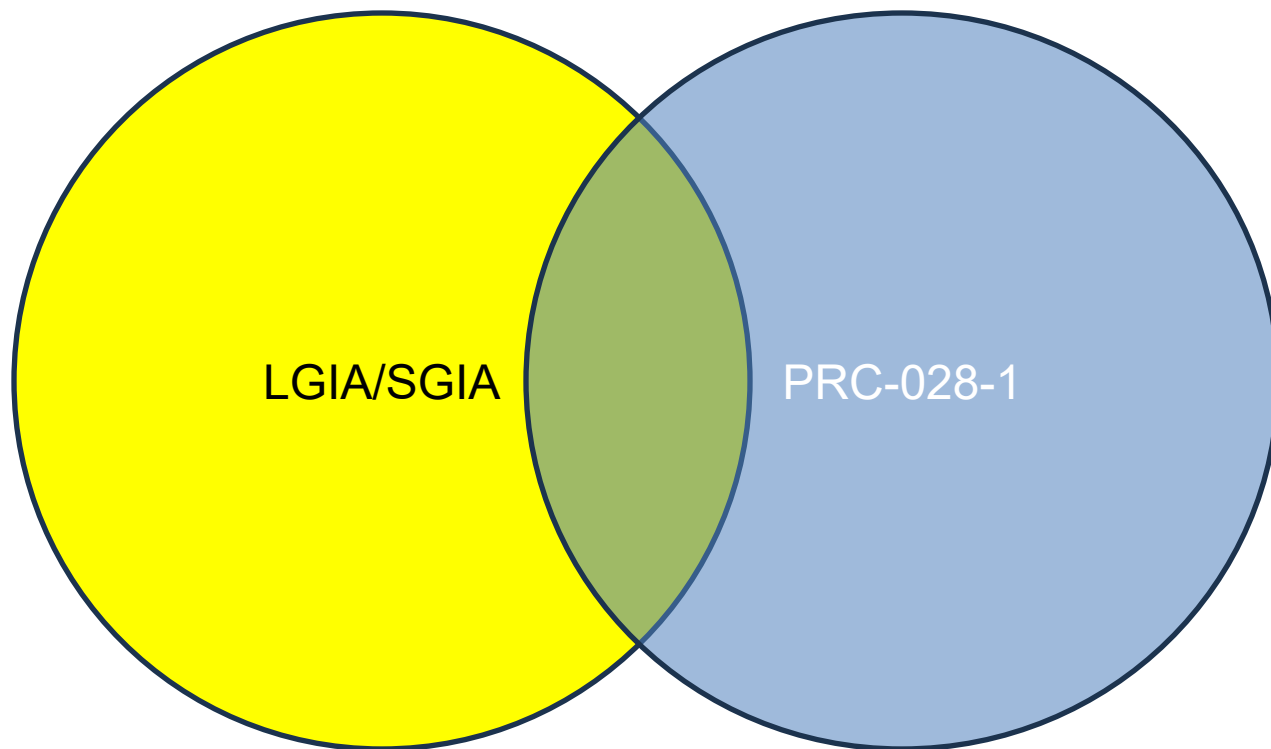
Triggers are identified as:

- Ride through events
- Inverter-based unit trips
- Overfrequency and underfrequency events

Data Recording characteristics

- All data GPS synchronized to 1ms
- Inverter data shall be recorded at 10mS intervals
- Phase angle measuring unit – not a synchrophasor unit- at facility main substation transformer.
- 150ms per-trigger with 1 seconds of data after event trigger
- Data available within 10 calendar days, available for 30 days

Disturbance Monitoring and Reporting Requirements for Inverter Based Resources in the CAISO are inclusive of both PRC-028-1 and the LGIA/SGIA



Conflicting Disturbance Monitoring and Reporting Requirements for Inverter Based Resources - Examples

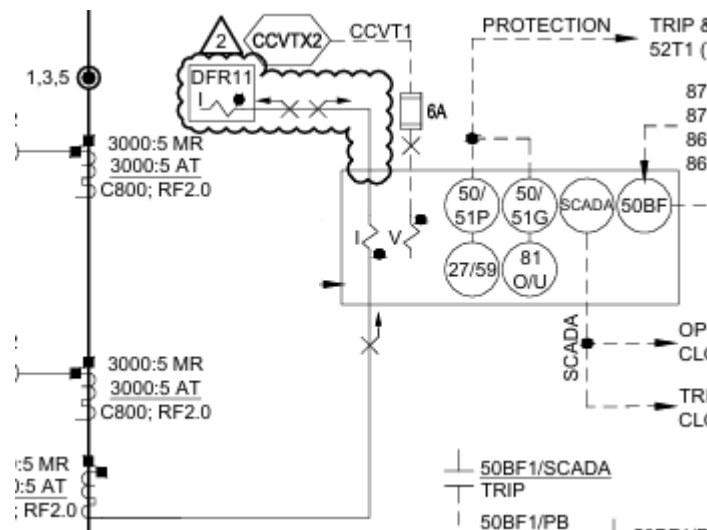
When the requirements conflict the more stringent requirement will apply;

1. PRC-028-1 does not list individual inverter data logging but the LGIA/SGIA requires specific prescriptive inverter 10ms data. **LGIA requirements will be enforced.**
2. PRC-028-1 requires a Dynamic Disturbance Recording (DDR) but the LGIA/SGIA does not. **PRC-028-1 requirements must be implemented.**
3. The LGIA/SGIA requires all data to be synchronized to within 1ms of UTC while PRC-028-1 allows IBR units to be synchronized within 100mS of UTC. **LGIA requirements will be enforced.**
4. The LGIA data response and data retention requirements are 10 days and 30 days respectfully. PRC-028 requires a 15 day response and the data be retained for 20 days. **LGIA requirements will be enforced.**
5. PRC-028-1 requires specific signals to be recorded at 64 samples per cycle while the LGIA only requires 16 samples per cycle. **PRC-028-1 requirements must be implemented.**

New NRI Approval process: ControlProtectionDataRecording

Documents needed to complete approval:

1. Equipment configuration, signal list and trigger settings for data recording devices.
2. Single line diagram issued for protective relaying approval shall include identification of data recording signal connections.



PRC-029-1: Frequency and Voltage Ride-through Requirements for Inverter-Based Resources

- Requirements R1-R3 define ride through requirements during and after defined frequency and voltage excursions.
- Revises and replaces criteria established in PRC-024.
 - Attachment 1 : Voltage Ride Through Criteria for IBRs
 - Attachment 2 : Frequency Ride Through Criteria for IBRs
- New values do not affect LGIA ride through performance criteria
- Existing NRI process will be utilized to verify ride through settings

LGIA Appendix H requirements:

“An Asynchronous Generating Facility shall remain online for the voltage disturbance caused by any fault on the transmission grid,...having a duration equal to the lesser of the normal three-phase fault clearing time (4-9 cycles) or one-hundred fifty (150) milliseconds.

PRC-030-1: Unexpected Inverter-Based Resource Event Mitigation

- Requirements R1-R3 defines the process requirement to be put in place to identify, analyze and mitigate unexpected Inverter-Based Resource sudden changes in power output.
- The scope of PRC-030 -1 is not considered in the New Resource Integration process since it is only applicable to facilities that are operating.

Questions

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