

**Reliability Standard Audit Worksheet[[1]](#footnote-1)**

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

***This section to be completed by the Compliance Enforcement Authority.***

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| **Audit ID:** | Audit ID if available; or REG-NCRnnnnn-YYYYMMDD |
| **Registered Entity:** | Registered name of entity being audited |
| **NCR Number:** | NCRnnnnn |
| **Compliance Enforcement Authority:** | Region or NERC performing audit |
| **Compliance Assessment Date(s)[[2]](#footnote-2):** | Month DD, YYYY, to Month DD, YYYY |
| **Compliance Monitoring Method:** | [On-site Audit | Off-site Audit | Spot Check] |
| **Names of Auditors:** | Supplied by CEA |

# **Applicability of Requirements**

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|  | **BA** | **DP** | **GO** | **GOP** | **IA** | **LSE** | **PA** | **PSE** | **RC** | **RP** | **RSG** | **TO** | **TOP** | **TP** | **TSP** |
| **R1** |  |  | X |  |  |  |  |  |  |  |  |  |  |  |  |
| **R2** |  |  | X |  |  |  |  |  |  |  |  |  |  |  |  |
| **R3** |  |  | X |  |  |  |  |  |  |  |  |  |  |  |  |
| **R4** |  |  | X |  |  |  |  |  |  |  |  |  |  |  |  |
| **R5** |  |  | X |  |  |  |  |  |  |  |  |  |  |  |  |
| **R6** |  |  | X |  |  |  |  |  |  |  |  |  |  |  |  |
| **R7** |  |  | X |  |  |  |  |  |  |  |  |  |  |  |  |
| **R8** |  |  | X |  |  |  |  |  |  |  |  |  |  |  |  |

NOTE: According to the Section 4.2, the Facilities that apply to PRC-028-1 include BES Inverter-Based Resources and Non-BES Inverter-Based Resources that either have or contribute to an aggregate nameplate capacity of greater than or equal to 20 MVA, connected through a system designed primarily for delivering such capacity to a common point of connection at a voltage greater than or equal to 60 kV

**Legend:**

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| Text with blue background: | Fixed text – do not edit |
| Text entry area with green background: | Entity-supplied information |
| Text entry area with white background: | Auditor-supplied information |

Findings

**(This section to be completed by the Compliance Enforcement Authority)**

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| **Req.** | **Finding** | **Summary and Documentation** | **Functions Monitored** |
| **R1** |  |  |  |
| **R2** |  |  |  |
| **R3** |  |  |  |
| **R4** |  |  |  |
| **R5** |  |  |  |
| **R6** |  |  |  |
| **R7** |  |  |  |
| **R8** |  |  |  |

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| **Req.** | **Areas of Concern** |
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| **Req.** | **Recommendations** |
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| **Req.** | **Positive Observations** |
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Subject Matter Experts

Identify the Subject Matter Expert(s) responsible for this Reliability Standard.

**Registered Entity Response (Required; Insert additional rows if needed):**

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| **SME Name** | **Title** | **Organization** | **Requirement(s)** |
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R1 Supporting Evidence and Documentation

**R1.** Each Generator Owner shall have sequence of event recording (SER) data for the following Elements that it owns:

* 1. Circuit breaker position (open/close) for circuit breakers associated with the main power transformer(s), collector bus(es), shunt static and dynamic reactive device(s), and AC-DC and DC-AC converters, if any, in case of VSC HVDC system with a dedicated connection to Inverter-Based Resource.

**1.2.** For IBR units in commercial operation after the effective date of this standard, the following data shall be recorded when triggered by ride-through operation or tripping of an IBR unit.

**1.2.1.** All fault codes.

**1.2.2.** All fault alarms.

**1.2.3.** High and low voltage ride-through mode status.

**1.2.4.** High and low frequency ride-through mode status.

**1.3.** For IBR units in commercial operation before the effective date of this standard, if capable, the following data shall be recorded when triggered by ride-through operation or tripping of an IBR unit.

**1.3.1.** All fault codes.

**1.3.2.** All fault alarms.

**1.3.3.** High and low voltage ride-through mode status.

**1.3.4.** High and low frequency ride-through mode status.

**M1.** The Generator Owner has evidence (electronic or hard copy) of data, as applicable, as specified in Requirement R1. Evidence may include, but is not limited to: (1) actual data recordings; or (2) documents describing the device interconnections and configurations which may include a single design standard as representative for common installations; or (3) station or equipment drawings. The evidence to show IBR unit capability to record fault codes, alarms, or ride-through mode status may include, but is not limited to: (1) equipment specification, (2) letter from equipment manufacturer, or (3) documents describing lack of recording capability.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

Evidence Requested[[3]](#endnote-1):

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| **Provide the following evidence, or other evidence to demonstrate compliance.** |
| Sequence of event (SER) data for the following Elements that are owned: |
| Circuit breaker position (open/close) for circuit breakers associated with the main power transformer(s), collector bus(es), shunt static and dynamic reactive device(s), and AC-DC and DC-AC converters if any, in case of VSC HVDC system with a dedicated connection to Inverter-Based Resource. |
| For IBR units in commercial operation after the effective date of this standard, the following data shall be recorded when triggered by ride-through operation or tripping of an IBR unit: All fault codes, all fault alarms, high and low voltage ride-through mode status, and high and low frequency ride-through mode status. |
| For IBR units in commercial operation before the effective date of this standard, the following data shall be recorded, if capable, when triggered by ride-through operation or tripping of an IBR unit: All fault codes, all fault alarms, high and low voltage ride-through mode status, and high and low frequency ride-through mode status. |

Registered Entity Evidence (Required):

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| **The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.** | | | | | |
| **File Name** | **Document Title** | **Revision or Version** | **Document Date** | **Relevant Page(s) or Section(s)** | **Description of Applicability of Document** |
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Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):

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Compliance Assessment Approach Specific to PRC-028-1, R1

***This section to be completed by the Compliance Enforcement Authority***

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|  | (R1.) Verify entity had sequence of event recording (SER) data for the following Elements that are owned by the entity: |
|  | (Part 1.1) Circuit breaker position (open/close) for circuit breakers associated with the:   * main power transformer(s) * collector bus(es) * shunt static and dynamic reactive device(s) * and AC-DC and DC-AC converters, if any, in case of VSC HVDC system with a dedicated connection to Inverter-Based Resource |
|  | (Part 1.2) For IBR units in commercial operation after the effective date of this standard, verify the following data was recorded when triggered by ride-through operation or tripping of an IBR unit. |
|  | (Part 1.2.1) All fault codes. |
|  | (Part 1.2.2) All fault alarms. |
|  | (Part 1.2.3) High and low voltage ride-through mode status. |
|  | (Part 1.2.4) High and low frequency ride-through mode status. |
|  | (Part 1.3) For IBR units in commercial operation before the effective date of this standard, verify the following data was recorded, if capable, when triggered by ride-through operation or tripping of an IBR unit. |
|  | (Part 1.3.1) All fault codes. |
|  | (Part 1.3.2) All fault alarms. |
|  | (Part 1.3.3) High and low voltage ride-through mode status. |
|  | (Part 1.3.4) Hight and low frequency ride-through mode status. |
|  | (Part 1.3) Verify that a lack of capability is substantiated by evidence such as equipment specifications, letters from manufacturer or other applicable documents. |
| Note to auditor:  **Footnotes from PRC-028-1 Reliability Standard Language:**   1. For the purpose of this standard, the main power transformer is the power transformer that steps up voltage from the collection system voltage to the nominal transmission/interconnecting system voltage for Inverter-Based Resources. In case of dedicated VSC HVDC system connecting to an Inverter-Based Resource, a transformer isolating the DC-AC converter from the transmission system is also considered a main power transformer. 2. IBR unit includes the inverter, converter, wind turbine generator, or high voltage direct current converter connecting generating resource to alternating current Transmission network for this Standard Requirement. 3. Commercial operation means achievement of this designation indicating that the facility has received all approvals necessary for operation after completion of initial start-up testing. | |

**Auditor Notes:**

R2 Supporting Evidence and Documentation

**R2.** Each Generator Owner shall have triggered fault recording (FR) data to determine the following electrical quantities for Elements that it owns:

**2.1.** High-side of the main power transformer FR data:

**2.1.1.** Phase-to-neutral voltage for each phase.

**2.1.2.** Each phase current and the residual or neutral current.

**2.1.3.** Real and Reactive Power expressed on a three-phase basis.

**2.2.** Collector feeder breaker FR data:

**2.2.1.** Phase-to-neutral voltage for each phase.

**2.2.2.** Each phase current and the residual or neutral current.

**2.2.3.** Real and Reactive Power expressed on a three-phase basis.

**2.3.** Shunt dynamic reactive device FR data:

**2.3.1.** Phase-to-neutral voltage for each phase.

**2.3.2.** Each phase current and the residual or neutral current

**2.3.3.** Reactive Power output expressed on a three-phase basis.

**M2.** The Generator Owner has evidence (electronic or hard copy) of FR data that is sufficient to determine electrical quantities as specified in Requirement R2. Evidence may include but is not limited to: (1) actual data recordings or derivations; or (2) documents describing the device specifications and configurations which may include a single design standard as representative for common installations; or (3) station or equipment drawings.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

Evidence Requestedi:

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| **Provide the following evidence, or other evidence to demonstrate compliance.** |
| High-side of the main power transformer FR data and evidence of determination of the following electrical quantities for Elements owned by the entity:   * Phase-to-neutral voltage for each phase. * Each phase current and the residual or neutral current. * Real and Reactive Power expressed on a three-phase basis. |
| Collector feeder breaker FR data and evidence of determination of the following electrical quantities for Elements owned by the entity:   * Phase-to-neutral voltage for each phase. * Each phase current and the residual or neutral current. * Real and Reactive Power expressed on a three-phase basis. |
| Shunt dynamic reactive device FR data and evidence of determination of the following electrical quantities for Elements owned by the entity:   * Phase-to-neutral voltage for each phase. * Each phase current and the residual or neutral current. * Real and Reactive Power expressed on a three-phase basis. |

Registered Entity Evidence (Required):

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| **The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.** | | | | | |
| **File Name** | **Document Title** | **Revision or Version** | **Document Date** | **Relevant Page(s) or Section(s)** | **Description of Applicability of Document** |
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Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):

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Compliance Assessment Approach Specific to PRC-028-1, R2

***This section to be completed by the Compliance Enforcement Authority***

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|  | (R2.) Verify the triggered fault recording data used to determine the following electrical quantities for Elements owned by the entity: |
|  | (Part 2.1.) High-side of the main power transformer FR data. |
|  | (Part 2.1.1.) Phase-to-neutral voltage for each phase. |
|  | (Part 2.1.2.) Each phase current and the residual or neutral current. |
|  | (Part 2.1.3.) Real and Reactive Power expressed on a three-phase basis. |
|  | (Part 2.2.) Collector feeder breaker FR data. |
|  | (Part 2.2.1.) Phase-to-neutral voltage for each phase. |
|  | (Part 2.2.2.) Each phase current and the residual or neutral current. |
|  | (Part 2.2.3.) Real and Reactive Power expressed on a three-phase basis. |
|  | (Part 2.3.) Shunt dynamic reactive FR data. |
|  | (Part 2.3.1.) Phase-to-neutral voltage for each phase. |
|  | (Part 2.3.2.) Each phase current and the residual or neutral current. |
|  | (Part 2.3.3.) Real and Reactive Power expressed on a three-phase basis. |
| **Note to Auditor:** The intent is to capture sufficient FR data for Elements at each Inverter‐Based Resource to analyze the overall response of the Inverter‐Based Resource to a system disturbance. The required electrical quantities may either be directly measured or determinable if sufficient FR data is captured (e.g., residual, or neutral current if the phase currents are directly measured). | |

**Auditor Notes:**

R3 Supporting Evidence and Documentation

**R3.** Each Generator Owner shall have FR data as specified in Requirement R2 that meets the following:

**3.1.** High-side of the main power transformer FR data:

**3.1.1**. A single record or multiple records that include a pre-trigger record length of at least two cycles and a total record length of at least 2.0 seconds for the same trigger point.

**3.1.2.**  A minimum recording rate of 64 samples per cycle.

**3.1.3**. Trigger settings for at least the following:

**3.1.3.1**. Neutral (residual) overcurrent.

**3.1.3.2.** AC phase overvoltage and undervoltage.

**3.1.3.3.** Overfrequency and underfrequency.

**3.2.** Collector feeder breaker FR data:

**3.2.1.** A single record or multiple records that include a pre-trigger record length of at least two cycles and a total record length of at least 2.0 seconds for the same trigger point.

**3.2.2.** A minimum recording rate of 64 samples per cycle.

**3.2.3.** Trigger settings for at least the following:

**3.2.3.1.** Neutral (residual) overcurrent, if applicable.

**3.2.3.2.** AC phase overvoltage and undervoltage.

**3.2.3.3.** Overfrequency and underfrequency.

**3.3.** Shunt dynamic reactive device FR data:

**3.3.1.** A single record or multiple records that include a pre-trigger record length of at least two cycles and a total record length of at least 2.0 seconds for the same trigger point.

**3.3.2.** A minimum recording rate of 64 samples per cycle.

**3.3.3.** Trigger settings for at least the following:

**3.3.3.1**. Neutral (residual) overcurrent.

**3.3.3.2.** AC phase overvoltage and undervoltage.

**M3.** The Generator Owner has evidence (electronic or hard copy) that FR data meets Requirement R3. Evidence may include, but is not limited to: (1) actual data recordings or derivations, or (2) documents describing the device specification and device configuration or settings.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

Evidence Requestedi:

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| **Provide the following evidence, or other evidence to demonstrate compliance.** |
| FR data (as specified in Requirement R2) which meets the following criteria for applicable High-side of the main power transformer(s) (Part 3.1.), collector feeder breaker(s) (Part 3.2.) and shunt dynamic reactive device(s) (Part 3.3.): |
| A single record or multiple records that include a pre-trigger record length of at least two cycles and a total record length of at least 2.0 seconds for the same trigger point. |
| A minimum recording rate of 64 samples per cycle. |
| Trigger settings for at least the following: Neutral (residual) overcurrent, AC phase overvoltage and undervoltage, overfrequency, and underfrequency. (NOTE-Shunt dynamic reactive FR data triggers do not include overfrequency and underfrequency settings). |

Registered Entity Evidence (Required):

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Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):

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Compliance Assessment Approach Specific to PRC-028-1, R3

***This section to be completed by the Compliance Enforcement Authority***

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|  | (R3.) Verify that FR data (as specified in Requirement R2) meets the following: |
|  | (Part 3.1.) High-side of the main power transformer FR data: |
|  | (Part 3.1.1.) A single record or multiple records that include a pre-trigger record length of at least two cycles and a total record length of at least 2.0 seconds for the same trigger point. |
|  | (Part 3.1.2.) A minimum recording rate of 64 samples per cycle. |
|  | (Part 3.1.3.) Trigger settings for at least the following: |
|  | (Part 3.1.3.1.) Neutral (residual) overcurrent. |
|  | (Part 3.1.3.2.) AC phase overvoltage and undervoltage. |
|  | (Part 3.1.3.3.) Overfrequency and underfrequency. |
|  | (Part 3.2.) Collector feeder breaker FR data: |
|  | (Part 3.2.1.) A single record or multiple records that include a pre-trigger record length of at least two cycles and a total record length of at least 2.0 seconds for the same trigger point. |
|  | (Part 3.2.2.) A minimum recording rate of 64 samples per cycle. |
|  | (Part 3.2.3.) Trigger settings for at least the following: |
|  | (Part 3.2.3.1.) Neutral (residual) overcurrent, if applicable. |
|  | (Part 3.2.3.2.) AC phase overvoltage and undervoltage. |
|  | (Part 3.2.3.3.) Overfrequency and underfrequency. |
|  | (Part 3.3.) Shunt dynamic reactive FR data: |
|  | (Part 3.3.1.) A single record or multiple records that include a pre-trigger record length of at least two cycles and a total record length of at least 2.0 seconds for the same trigger point. |
|  | (Part 3.3.2.) A minimum recording rate of 64 samples per cycle. |
|  | (Part 3.3.3.) Trigger settings for at least the following: |
|  | (Part 3.3.3.1.) Neutral (residual) overcurrent. |
|  | (Part 3.3.3.2.) AC phase overvoltage and undervoltage. |
| **Note to Auditor:** Shunt dynamic reactive FR data triggers do not include overfrequency and underfrequency settings. | |

**Auditor Notes:**

R4 Supporting Evidence and Documentation

**R4.** Each Generator Owner shall have continuous dynamic disturbance recording (DDR) data and storage to determine the following electrical quantities for each main power transformer(s) it owns*:*

**4.1** . One phase-to-neutral or positive sequence voltage on high-side of the main power transformer(s).

**4.2.** The phase current for the same phase at the same voltage corresponding to the voltage in Requirement R4, Part 4.1, or the positive sequence current.

**4.3.** Real Power and Reactive Power flows expressed on a three-phase basis corresponding to each main power transformer(s) where current measurements are required.

**4**.**4**. Frequency of any one of the voltage(s) in Requirement R4, Part 4.1

**M4.** The Generator Owner has evidence (electronic or hard copy) of continuous DDR data recording and storage to determine electrical quantities as specified in Requirement R4. Evidence may include, but is not limited to: (1) actual data recordings or derivations; or (2) documents describing the device specifications and configurations, which may include a single design standard as representative for common installations; or (3) station drawings.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

Evidence Requestedi:

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| **Provide the following evidence, or other evidence to demonstrate compliance.** |
| Continuous dynamic disturbance recording (DDR) data and storage which allows the entity to determine the following electrical quantities for each main power transformer(s) it owns: |
| One phase-to-neutral or positive sequence voltage on high-side of the main power transformer(s). |
| The phase current for the same phase at the same voltage corresponding to the voltage in Requirement R4, Part 4.1, or the positive sequence current. |
| Real Power and Reactive Power flows expressed on a three-phase basis corresponding to each main power transformer(s) where current measurements are required. |
| Frequency of any one of the voltage(s) in Requirement R4, Part 4.1. |

Registered Entity Evidence (Required):

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| **File Name** | **Document Title** | **Revision or Version** | **Document Date** | **Relevant Page(s) or Section(s)** | **Description of Applicability of Document** |
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Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):

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Compliance Assessment Approach Specific to PRC-028-1, R4

***This section to be completed by the Compliance Enforcement Authority***

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|  | (R4.) Verify continuous dynamic disturbance recording (DDR) data and storage is available and used to determine the following electrical quantities for each main power transformer(s) owned by the entity: |
|  | (Part 4.1.) One phase-to-neutral or positive sequence voltage on high-side of the main power transformer(s). |
|  | (Part 4.2.) The phase current for the same phase at the same voltage corresponding to the voltage in Requirement R4, Part 4.1, or the positive sequence current. |
|  | (Part 4.3.) Real Power and Reactive Power flows expressed on a three-phase basis corresponding to each main power transformer(s) where current measurements are required. |
|  | (Part 4.4.) Frequency of any one of the voltage(s) in Requirement R4, Part 4.1. |
| **Note to Auditor:** DDR data contains the dynamic response of the Inverter‐Based Resource to a system disturbance and is used for analyzing complex power system events. This recording is typically used to capture short‐term and long‐term disturbances. Since the data of interest is changing over time, DDR data is normally stored in the form of RMS values or phasor values, as opposed to directly sampled data as found in FR data. | |

**Auditor Notes:**

R5 Supporting Evidence and Documentation

**R5.** Each Generator Owner responsible for DDR data for the electrical quantities identified in Requirement R4 shall have DDR data that meet the following:

**5.1.** Input sampling rate of at least 960 samples per second.

**5.2.** Output recording rate of electrical quantities of at least 60 times per second.

**M5.** The Generator Owner has evidence (electronic or hard copy) that DDR data meets Requirement R5. Evidence may include, but is not limited to: (1) documents describing the device specification, device configuration, or settings (R5, Part 5.1; R5, Part 5.2); or (2) actual data recordings (R5, Part 5.2).

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

Evidence Requestedi:

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| **Provide the following evidence, or other evidence to demonstrate compliance.** |
| Evidence the DDR data for the electrical quantities identified in Requirement R4 meet an input sampling rate of at least 960 samples per second. |
| Evidence the DDR data for the electrical quantities identified in Requirement R4 meet an output recording rate of electrical quantities of at least 60 times per second. |

Registered Entity Evidence (Required):

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| **The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.** | | | | | |
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Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):

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Compliance Assessment Approach Specific to PRC-028-1, R5

***This section to be completed by the Compliance Enforcement Authority***

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|  | (R5.) Verify that the DDR data for the electrical quantities identified in Requirement R4 meet the following criteria: |
|  | (Part 5.1.) Input sampling rate of at least 960 samples per second. |
|  | (Part 5.2.) Output recording rate of electrical quantities of at least 60 times per second. |
| **Note to Auditor:** An input sampling rate of at least 960 samples per second, which corresponds to 16 samples per cycle on the input side of the DDR equipment (960 samples/sec/60 Hz – 16 samples/cycle). An output recording rate of electrical quantities of at least 60 times per second refers to the recording rate of the device.  Sampling rate describes the rate a device is collecting and recording a specific number of data points (samples) over a period of time. | |

**Auditor Notes:**

R6 Supporting Evidence and Documentation

**R6.** Each Generator Owner shall time synchronize all SER, FR, and DDR data to meet the following:

**6.1.** Synchronization to Coordinated Universal Time (UTC) with or without a local time offset.

**6.2.** The IBR unit synchronized device clock accuracy within ± 100 milliseconds of UTC. For all other devices, synchronized device clock accuracy within ± 1 milliseconds of UTC.

**M6.** The Generator Owner has evidence (electronic or hard copy) of time synchronization described in Requirement R6. Evidence may include, but is not limited to: (1) documents describing the device specification, configuration, or setting; (2) time synchronization indication or status; or 3) station drawings.

**Registered Entity Response (Required):**

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

Evidence Requestedi:

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| **Provide the following evidence, or other evidence to demonstrate compliance.** |
| Evidence that all SER, FR, and DDR data are time synchronized to the Coordinated Universal Time (UTC) with or without a local time offset. |
| Evidence that all SER, FR, and DDR data have a synchronized device clock accuracy within +/- 100 milliseconds of UTC for IBR units. |
| Evidence that all SER, FR, and DDR data have a synchronized device clock accuracy within +/- 1 milliseconds of UTC for all other devices. |
| Basis documents such as installation drawings or device configurations supporting the time synchronization of all DDR, SER, and FR data as described in Requirement R6. |

Registered Entity Evidence (Required):

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| **The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.** | | | | | |
| **File Name** | **Document Title** | **Revision or Version** | **Document Date** | **Relevant Page(s) or Section(s)** | **Description of Applicability of Document** |
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Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):

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Compliance Assessment Approach Specific to PRC-028-1, R6

***This section to be completed by the Compliance Enforcement Authority***

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|  | (R6.) Verify that all SER, FR and DDR data are time synchronized to meet the following: |
|  | (Part 6.1.) Synchronization to Coordinated Universal Time (UTC) with or without a local time offset. |
|  | (Part 6.2.) The IBR unit synchronized device clock accuracy within ± 100 milliseconds of UTC. For other devices, synchronized device clock accuracy within ± 1 milliseconds of UTC. |
| **Note to Auditor:** Auditors should rely on basis documents such as installation drawings or device configurations to the extent synchronization cannot be determined by reviewing the data. Accuracy of time synchronization applies only to the clock used for synchronizing the monitoring equipment. The equipment used to measure the electrical quantities must be time synchronized to ± 1 millisecond accuracy; however, accuracy of the application of this time stamp and therefore, the accuracy of the data itself is not mandated. This is because of inherent delays associated with measuring the electrical quantities and events such as breaker closing, measurement transport delays, algorithm, and measurement calculation techniques, etc. | |

**Auditor Notes:**

R7 Supporting Evidence and Documentation

**R7.** Each Generator Owner shall provide all requested SER, FR, and DDR data to its Transmission Planner, Planning Coordinator, Transmission Operator, Balancing Authority, Reliability Coordinator, Regional Entity, or NERC in accordance with the following*:*

* 1. Data shall be retrievable for the period of 20 calendar days, inclusive of the day the data was recorded.
  2. Data subject to Part 7.1 shall be provided within 15 calendar days of a request unless an extension is granted by the requestor.
  3. SER data shall be provided in ASCII Comma Separated Value (CSV) format following Attachment 1.
  4. FR data shall be provided either in CSV format with appropriate headers or in electronic files that are formatted in conformance with C37.111, IEEE Standard Common Format for Transient Data Exchange (COMTRADE), revision C37.111- 1999 or later.
  5. DDR data shall be provided either in CSV format with appropriate headers or in electronic files that are formatted in conformance with C37.111, IEEE Standard Common Format for Transient Data Exchange (COMTRADE), revision C37.111- 1999 or later.

Data files shall be named in conformance with C37.232, IEEE Standard for Common Format for Naming Time Sequence Data Files (COMNAME), revision C37.232-2011 or later.

**M7.** The Generator Owner has evidence (electronic or hard copy) that data was submitted upon request in accordance with Requirement R7. Evidence may include, but is not limited to: (1) actual data recordings; (2) dated transmittals to the requesting entity with formatted records; or (3) documents describing data storage capability, device specification, configuration, or settings.

**Registered Entity Response (Required):**

**Question: Have any requests for SER, FR, or DDR data from the entity’s Transmission Planner, Planning Coordinator, Transmission Operator, Balancing Authority, Reliability Coordinator, Regional Entity or NERC been received?** If Yes, provide a list of such requests with the date of the request and requesting entity.

Yes  No

[Note: A separate spreadsheet or other document may be used. If so, provide the document reference below.]

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

Evidence Requestedi:

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| **Provide the following evidence, or other evidence to demonstrate compliance.** |
| For any requests received, evidence they were responded to in the following manner: |
| Data was retrieved for the period of 20 calendar days, inclusive of the day the data was recorded. |
| Data subject to Part 7.1 shall be provided within 15 calendar days of a request unless an extension is granted by the requestor. |
| SER data shall be provided in ASCII Comma Separated Value (CSV) format following Attachment 1. |
| FR data shall be provided either in CSV format with appropriate headers or in electronic files that are formatted in conformance with C37.111, IEEE Standard Common Format for Transient Data Exchange (COMTRADE), revision C37.111- 1999 or later. |
| DDR data shall be provided either in CSV format with appropriate headers or in electronic files that are formatted in conformance with C37.111, IEEE Standard Common Format for Transient Data Exchange (COMTRADE), revision C37.111- 1999 or later. |
| Data files shall be named in conformance with C37.232, IEEE Standard for Common Format for Naming Time Sequence Data Files (COMNAME), revision C37.232-2011 or later. |

Registered Entity Evidence (Required):

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| **The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.** | | | | | |
| **File Name** | **Document Title** | **Revision or Version** | **Document Date** | **Relevant Page(s) or Section(s)** | **Description of Applicability of Document** |
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Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):

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Compliance Assessment Approach Specific to PRC-028-1, R7

***This section to be completed by the Compliance Enforcement Authority***

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|  | (R7) For SER, FR, and DDR data requests (sampling may be performed by the CEA), verify that entity provided the data to the responsible entity (TP, PC, TOP, BA, or RC), Regional Entity or NERC in accordance with the following: |
|  | (Part 7.1) Data was retrievable for the period of 20 calendar days, inclusive of the day the data was recorded. |
|  | (Part 7.2) Data was provided within 15 calendar days of a request unless an extension was granted by the requestor. |
|  | (Part 7.3) SER data provided in ASCII CSV format following Attachment 1 of this Reliability Standard. |
|  | (Part 7.4) FR data provided in either CSV format with appropriate headers or in electronic files that are formatted in conformance with C37.111 IEEE COMTRADE, revision C37.111-1999 or later. |
|  | (Part 7.5) DDR data provided in either CSV format with appropriate headers or in electronic files that are formatted in conformance with C37.111 IEEE COMTRADE, revision C37.111-1999 or later. |
|  | (Part 7.6) Data files named in conformance with C37.232 format per IEEE COMNAME, revision C37.232-2011 or later. |
| **Note to Auditor:** It is important to note that applicable entities should account for any expected delays in retrieving data and this may require devices to have data available for more than 20 days. To clarify the 20-calendar daytime frame, let’s assume that event occurs on Day 1. If a request for data is made on Day 6, then that data must be provided to the requestor within 20 calendar days after a request or a granted time extension. However, if a request for the data is made on Day 21, that is outside the 20 calendar days specified in the Requirement, and an entity would not be out of compliance if it did not have the data.  If an event has occurred, the Regional Entity may have data available through the events analysis process which should be considered viable evidence to support compliance. Regions may need to consider data holds for compliance purposes soon after an event. Note that IEEE COMTRADE may not include formatting for certain attributes required by the Standard. This should not be a compliance issue as the entity is not in direct control of the IEEE COMTRADE changes.  ASCII – American Standard Code for Information Interchange | |

**Auditor Notes:**

R8 Supporting Evidence and Documentation

**R8.** Each Generator Owner shall, upon the discovery of a failure of the recording capability for the SER, FR, or DDR data:

* + Restore the recording capability within 90 calendar days, or
  + Submit a Corrective Action Plan (CAP) to the Regional Entity within 90 calendar days and then implement it according to CAP timeline.

**M8.** The Generator Owner has dated evidence (electronic or hard copy) that meets Requirement R8. Evidence may include but is not limited to: (1) dated reports of the discovery of a failure, (2) documentation noting the date the data recording was restored, (3) SCADA records, or (4) dated Corrective Action Plan transmittals to the Regional Entity and evidence of Corrective Action Plan implementation.

**Registered Entity Response (Required):**

**Question: Did you experience a failure of recording capability for SER, FR or DDR Data?** If Yes, provide a list of such failures including data type, location, and date of failure.

Yes  No

[Note: A separate spreadsheet or other document may be used. If so, provide the document reference below.]

**Compliance Narrative:**

Provide a brief explanation, in your own words, of how you comply with this Requirement. References to supplied evidence, including links to the appropriate page, are recommended.

Evidence Requestedi:

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| **Provide the following evidence, or other evidence to demonstrate compliance.** |
| Process(es) in place for discovering the failure of the recording capability for the SER, FR or DDR data. |
| For any discovered failure of the recording capability of the SER, FR or DDR data, evidence that either: |
| Recording capability was restored within 90 calendar days. |
| A Corrective Action Plan (CAP) was submitted to the Regional Entity within 90 calendar days AND implemented in accordance with its respective timeline. |

Registered Entity Evidence (Required):

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| **The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.** | | | | | |
| **File Name** | **Document Title** | **Revision or Version** | **Document Date** | **Relevant Page(s) or Section(s)** | **Description of Applicability of Document** |
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Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):

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Compliance Assessment Approach Specific to PRC-028-1, R8

***This section to be completed by the Compliance Enforcement Authority***

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|  | (R8) For discovered SER, FR, and DDR data recording failures (sampling may be performed by the CEA), verify that either occurred: |
|  | Recording capability was restored within 90 calendar days OR |
|  | A Corrective Action Plan (CAP) was submitted to the Regional Entity within 90 calendar days AND then implemented in accordance with its respective timeline. |
| **Note to Auditor:** If the recording capability cannot be restored within 90 calendar days due to limitations such as budget cycle, service crews, vendors, needed outages, etc., the entity is required to submit a Corrective Action Plan for restoring the recording capability to the Regional Entity and implement it. It is treated as a failure of the recording capability if it is out of service for maintenance and/or testing for greater than 90 calendar days. An outage of the monitored Element does not constitute a failure of the disturbance monitoring capability.  CAPs will be submitted to the CEA through the Periodic Data Submittals module of Align. Auditors should review data within Align to verify implementation, timelines, etc. | |

**Auditor Notes:**

Additional Information:

Compliance Dates in the United States

BES Inverter-Based Resources

Requirements R1 - R7

* BES IBR In Commercial Operation on/before April 1, 2025:
  + R1-R7: 50% of BES IBR by January 1, 2029; 100% by January 1, 2030
* BES IBR in Commercial Operation after April 1, 2025:
  + R1-R7: by July 1, 2026, or the commercial operation date, whichever is later.

Requirement R8 – January 1, 2026

Non-BES Inverter-Based Resources

Requirements R1 - R7

* Non- BES IBR In Commercial Operation on/before May 15, 2026:
  + R1-R7: 100% by January 1, 2030
* Non- BES IBR in Commercial Operation after May 15, 2026:
  + R1-R7: July 1, 2026, or the commercial operation date, whichever is later.

Requirement R8 – April 1, 2027

Reliability Standard



The full text of PRC-028-1 may be found on the NERC Web Site (www.nerc.com) under “Program Areas & Departments”, “Reliability Standards.”

In addition to the Reliability Standard, there is an applicable Implementation Plan available on the NERC Web Site.

In addition to the Reliability Standard, there is background information available on the NERC Web Site.

Capitalized terms in the Reliability Standard refer to terms in the NERC Glossary, which may be found on the NERC Web Site.

Sampling Methodology

Sampling is essential for auditing compliance with NERC Reliability Standards since it is not always possible

or practical to test 100% of either the equipment, documentation, or both, associated with the full suite of enforceable standards. The Sampling Methodology Guidelines and Criteria (see NERC Web Site), or sample guidelines, provided by the Electric Reliability Organization help to establish a minimum sample set for monitoring and enforcement uses in audits of NERC Reliability Standards.

Regulatory Language

In the United States, Reliability Standard PRC-028-1 was approved in a letter order issued by FERC on February 20, 2025 in Docket No. RD25-2-000.

**Revision History for RSAW**

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| --- | --- | --- | --- |
| **Version** | **Date** | **Reviewers** | **Revision Description** |
| 1 | 4/1/2025 | NERC Compliance Assurance, Operations and Planning Compliance Task Force | New Document for FERC approved PRC-028-1 |

1. NERC developed this Reliability Standard Audit Worksheet (RSAW) language in order to facilitate NERC’s and the Regional Entities’ assessment of a registered entity’s compliance with this Reliability Standard. The NERC RSAW language is written to specific versions of each NERC Reliability Standard. Entities using this RSAW should choose the version of the RSAW applicable to the Reliability Standard being assessed. While the information included in this RSAW provides some of the methodology that NERC has elected to use to assess compliance with the Requirements of the Reliability Standard, this document should not be treated as a substitute for the Reliability Standard or viewed as additional Reliability Standard Requirements. In all cases, the Regional Entity should rely on the language contained in the Reliability Standard itself, and not on the language contained in this RSAW, to determine compliance with the Reliability Standard. NERC’s Reliability Standards can be found on NERC’s website. Additionally, NERC Reliability Standards are updated frequently, and this RSAW may not necessarily be updated with the same frequency. Therefore, it is imperative that entities treat this RSAW as a reference document only, and not as a substitute or replacement for the Reliability Standard. It is the responsibility of the registered entity to verify its compliance with the latest approved version of the Reliability Standards, by the applicable governmental authority, relevant to its registration status. The RSAW may provide a non-exclusive list, for informational purposes only, of examples of the types of evidence a registered entity may produce or may be asked to produce to demonstrate compliance with the Reliability Standard. A registered entity’s adherence to the examples contained within this RSAW does not necessarily constitute compliance with the applicable Reliability Standard, and NERC and the Regional Entity using this RSAW reserve the right to request additional evidence from the registered entity that is not included in this RSAW. This RSAW may include excerpts from FERC Orders and other regulatory references which are provided for ease of reference only, and this document does not necessarily include all applicable Order provisions. In the event of a discrepancy between FERC Orders, and the language included in this document, FERC Orders shall prevail. [↑](#footnote-ref-1)
2. Compliance Assessment Date(s): The date(s) the actual compliance assessment (on-site audit, off-site spot check, etc.) occurs. [↑](#footnote-ref-2)
3. Items in the Evidence Requested section are suggested evidence that may, but will not necessarily, demonstrate compliance. These items are not mandatory and other forms and types of evidence may be submitted at the entity’s discretion. [↑](#endnote-ref-1)