



Summary of the ERCOT NOGRR 245 requirements applied to SMA converters

The intent of this document is to describe how SMA SC (Sunny Central) and SCS (Sunny Central Storage) inverters meet the requirements outlined in the NOGRR 245 (Nodal Operating Guide Revision Request) published by ERCOT (Electric Reliability Council of Texas) in January 11th, 2023.

Few **notes** SMA would like to highlight about the proposed NOGRR 245:

- It is still in the drafting phase thus the requirements are subject to change ("pending status").
- It applies to new IBRs (Inverter- Based Resources) to be installed and existing IBRs in operation within ERCOT's network
- It is applicable at the POIB (Point Of Interconnection Bus) of IBRs, while SMA response is based on performance at inverter AC terminals.

For **new SC(S)-UP-US SMA converters**, SMA can meet the requirements of the NOGRR 245 with:

- Software Settings: Proper parameterization settings (as described in the SMA benchmarking validation report following test cases described in ERCOT's Dynamics Working Group Procedure Manual)
- Hardware Settings: Specific inverter hardware configuration of the SMA converters (more details about required hardware options below).

Breakdown of the NOGRR 245 requirements when applied to SMA SC(S)-UP-US products (new units in production):

1. **Voltage Ride Through:** converters are within the LVRT (Low Voltage Ride Through) and the HVRT (High Voltage Ride Through) requirements, as described in the SMA ride-through capabilities of our technical documents
2. **Frequency Ride Through:** converters are within the LFRT (Low Frequency Ride Through) and the HFRT (High Frequency Ride Through) requirements, as described in the SMA ride-through capabilities of our technical documents
3. **Transient High Voltage Ride Through:** converters comply with the instantaneous phase voltage requirement, with the selection of the TrOV Auxiliary Power Supply hardware (configurable option)
4. **Dynamic Grid Support during FRT (Fault Ride Through):** converters present different control modes with customizable parameters for definition of piecewise gradient characteristics to accommodate multiple dynamic grid support functions per interconnection requirements
5. **Consecutive Ride-Through Events:** converters meet this requirement with the selection of the larger buffer hardware (buffer was already developed as a hardware option to comply with IEEE1547.2018 consecutive ride-through requirement).
6. **ROCOF (Rate Of Change Of Frequency):** the 5Hz/sec requirement can be met with appropriate parameter settings (as described in the SMA benchmarking validation report)
7. **Phase Angle Jump (Phase Lock Loop Loss of Synchronism):** converters meet the 45° angle jump depending on network strength at POI (SMA benchmarking report tests shows ride-through events over 60° of phase angle jump at SCR (Short Circuit Ratio) equals 5 and X/R ratio equals 8)
8. **Fault Recording:** solution needs to be coordinated with the generator owner, the converters save the data in an encrypted format using first in first out rolling data retention, thus data needs to be either sent to SMA ennexOS (via

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EDML-Gateway, which is an additional option available) or saved onsite using fault storage media provided by the site owner.

For **existing SMA converters** in operation at the ERCOT system, we partially meet the attached NOGRR245 requirements.

Additional info:

- SC/SCS (UP) series:
 - SMA services need to implement hardware and software upgrades in the converters.
 - Hardware changes include the TrOV upgrade kits as well as the larger buffer.
 - Hardware upgrades need to be planned as there is currently a long lead time to obtain the necessary components.
- CP series and the HE series:
 - Still under investigation

SMA may share additional information under NDA. If you need more details, please reach out to your SMA Application Engineer contact.

Thank you and sincerely.

Applications Engineering Department
SMA America LLC