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Technical Product Notes

The Use of EodHyst at the NV16KAC & NV12KAC Explained

DATE CREATED:	TN NUMBER:	PREPARED BY:
9/19/2025	TN-NV16KAC-004	Patrick Honegger

In the context of hybrid solar inverters, **EoDHyst** refers to **End-of-Discharge Hysteresis**.

- **EoD (End of Discharge)** is the programmed lower battery limit (e.g., 20% SOC or a voltage threshold) at which the inverter stops discharging the battery to protect it.
- **Hysteresis (Hyst)** adds a margin or buffer before the inverter allows the next action (like re-enabling discharge or starting grid charge).

How it works with Grid Charge:

1. Battery Discharge Stops at EoD
    - Set the EOD to 20% SOC. When the battery reaches the EoD setting (20% SOC), the inverter stops using battery power to supply the loads, protecting the battery from further discharge.
2. EodHyst Defines the Recovery Band
    - Set the EOD to 5%. In this case, the inverter will wait until the battery rises above 20% before discharging again, rather than starting immediately."
    - Instead of starting immediately, the battery must recharge up to **EoD + EodHyst** (20% + 5% = 25%) before discharge is re-enabled.

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3. **Relation to Grid Charging**

    - If grid charging is allowed, the inverter may use the grid to push the battery above this hysteresis point.

    - Without hysteresis, the inverter could toggle between charging/discharging at the EoD line.

    - With hysteresis, it ensures a stable switch: discharge only resumes once the battery has been sufficiently charged above the cutoff.

Conclusion:
EodHyst (End-of-Discharge Hysteresis) is the safety buffer that prevents the inverter from rapidly toggling between discharging and charging near the End-of-Discharge threshold. When grid charge is enabled, the grid may be used to top the battery up past the hysteresis margin before the inverter allows discharge again.

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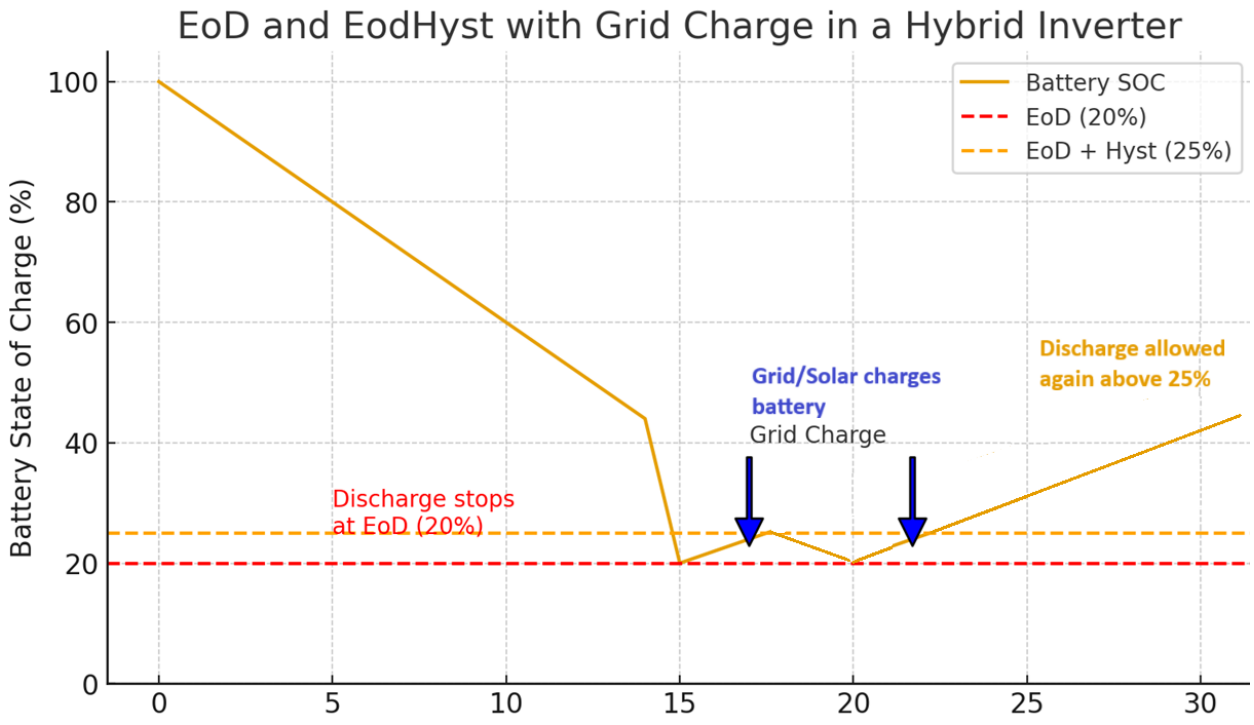
Diagram #1 showing how EoD (End of Discharge) and EodHyst work with grid charging in a hybrid inverter.



- The battery discharges down to 20% (EoD) → inverter stops discharging
- The grid or solar charges the battery backup (blue arrow)
- Once the SOC passes 25% (EoD + Hyst), the inverter allows discharge again.

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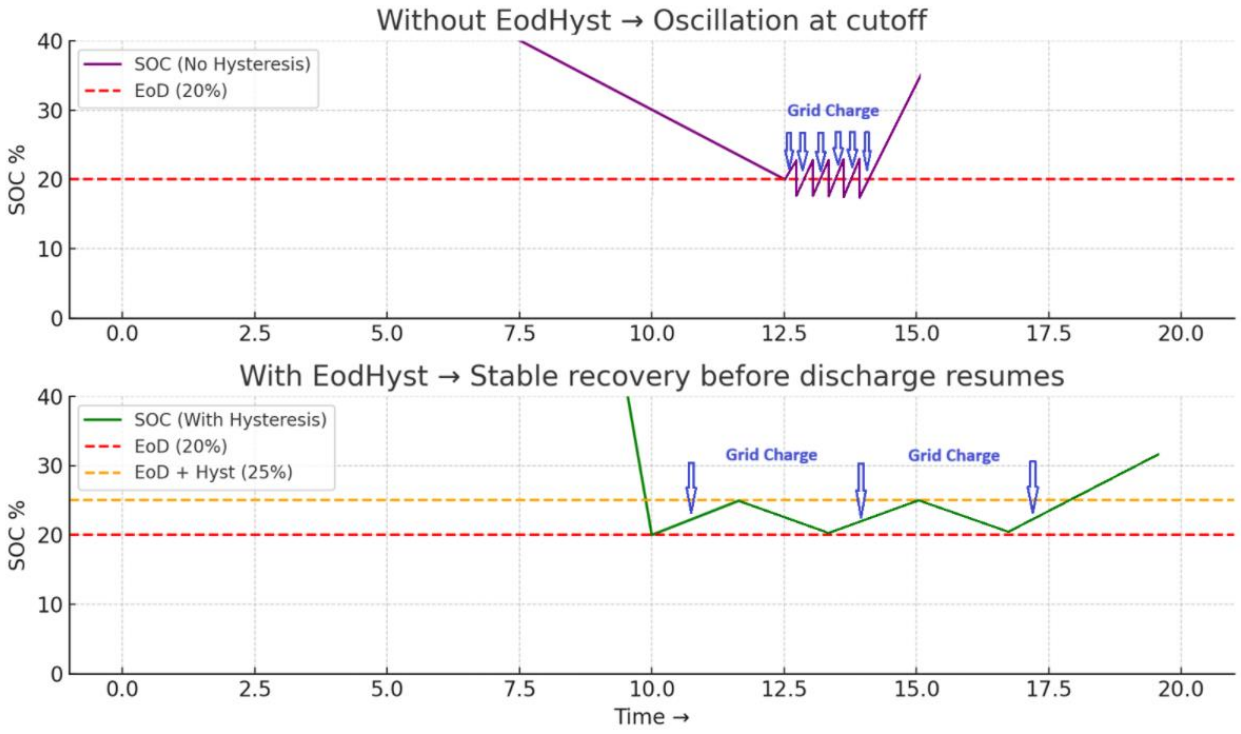
Diagram #2 shows the effect of battery charging and discharging with and without EodHyst.



Without hysteresis (top) – the SOC bounces around the 20% cutoff, making the inverter oscillate on/off between discharge and grid charge

With EodHyst (bottom) – discharge is blocked at 20% until the battery is recharged to above 25%, creating a stable transition with no oscillation

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Typical EodHyst Settings

- Range: Most inverter menus allow 2% → 10% of battery SOC (or the equivalent in voltage)
- Default: Many brands ship with ~5% hysteresis

Trade-offs When Setting EodHyst

1. Too Low (e.g., 1–2%)
    - Risk of "oscillating" → inverter may rapidly toggle between charging and discharging near the EoD point
    - This may overwork relays and MOSFETs and trigger unnecessary grid draw cycles.
2. Too High (e.g., 8–10%)
    - Provides stability but reduces usable battery capacity → you're forced to recharge more before discharge resumes
    - May cause more frequent grid charging if backup reserve is small
3. Balanced (e.g., 4–6%)
    - Smooth operation with minimal toggling
    - Protects the battery while still allowing reasonable usable capacity
    - This is the "sweet spot" most installers use.

Practical Example

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- EoD = 20%
- EodHyst = 5%
- Discharge stops at 20%
- The battery must be recharged (via solar or grid) to 25% before discharging resumes. Note: This ensures stability and prolongs battery and inverter life.

Recommended EodHyst Settings

System Focus	Typical EoD Setting	Recommended EodHyst	Why This Range Works
Backup-first (resilience)	20–30% SOC reserve	**6–10%**	Keeps a healthy buffer so the inverter doesn't oscillate during outages. Ensures the battery is "charged up" enough before discharge resumes.
Self-consumption-first (maximize solar use)	10–20% SOC reserve	**3–5%**	Smaller hysteresis means more usable battery capacity day-to-day but still prevents rapid toggling.
Battery longevity priority	20–30% SOC reserve	**5–8%**	Strikes a balance avoids deep cycling stress while keeping transitions stable.
Aggressive grid support / peak shaving	10–15% SOC reserve	**2–4%**	Keeps the battery actively cycling against the grid, but higher risk of toggling if too low.

Tip: Lithium (LFP) batteries respond well to smaller hysteresis (3–5%), since voltage vs. SOC curve is flat.

Version	Revision Date	Brief Description of Change
V1.1	12/12/2025	Document Grammer Adjustments and Title Change