NEP's BDM-550 & BDM-650 Microinverters

White Paper
August, 2025

...to enable more power while avoiding sub-panel upgrade thresholds

these models complement the BDM-800
ideal for modules over 400Wdc

The residential solar industry includes a myriad of hurdles that can cause setbacks both monetarily and in meeting deadlines. One major hurdle being main panel upgrades, which largely affects the smaller service ratings such as the 100A service panels.

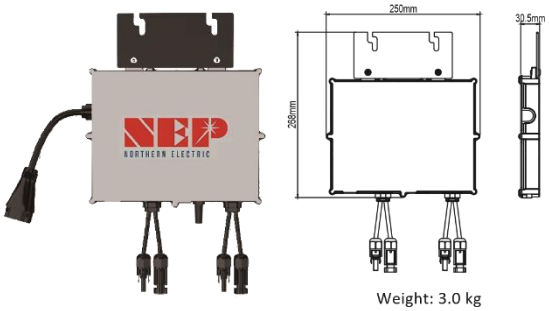
Why 100A Panels Often Need Upgrading

- **Limited capacity**: A 100A panel may not support the additional load from solar back-feed, especially if the home already has high electrical demand.
- **120% Rule**: NEC guidelines allow solar back-feed up to 120% of the panel rating. For a 100A panel, that's only 20A of allowable back-feed.

Upgrading a service panel can cost thousands on top of an already costly PV system and can delay project completions weeks, even months, in some cases. NEP has a solution that is cost effective and that helps to avoid these additional expenses and delayed completion timelines.

Strategic Advantages of NEP's BDM-550 & BDM-650 Microinverters

- **Avoids panel upgrade**: By optimizing the AC output current by precise divisibility into the maximum back-feed capacity, these models help stay within the 120% rule for back-feed on 100A panels.
- **Flexible system design**: Dual input microinverters reduce the number of branch circuits needed, simplifying layout and permitting.
- **Cost-effective scaling**: Especially with the BDM-550 & BDM-650, installers can deploy more units per circuit, maximizing system size without triggering main panel upgrades.



Advanced MLPE Solutions for High-Wattage Module PV Systems

NEP's BDM-550 and BDM-650 microinverters are optimized for homes with 100A panels, delivering high-efficiency solar without triggering costly electrical upgrades. Their low current draw and dual-panel support make them ideal for maximizing output while staying compliant with NEC back-feed limits.

When dealing with a **100A/100A main panel**, here's how NEP's **BDM-550** and **BDM-650** microinverters offer distinct advantages that help mitigate the need for costly panel upgrades.

Key Benefits of NEP's BDM-550 & BDM-650 Microinverters:

Feature	BDM-550	BDM-650	Benefit for 100A Panel
AC Output (1ϕ)	548W	640W	Lower current draw per unit reduces back-feed stress on limited panel capacity.
Rated Output Current	~2.3A	~2.7A	Enables more units per branch circuit under NEC 120% rule.
Max Units per 20A Branch	7 units	6 units	Efficient string sizing without overloading circuits
CEC Efficiency	95.5%	95.5%	High conversion efficiency minimizes wasted energy.
Dual MPPT Inputs	Yes	Yes	Supports two panels per inverter, fewer AC connections, lower panel load.
Compliance	UL 1741-SA/SB, IEEE 1547, NEC 690.12	Same	Meets rapid shutdown and grid interactivity requirements.

Key Features

1. High-Wattage Module Compatibility

- Supports high-efficiency modules up to 600W+ (1 module per microinverter) or 400W+ (2 modules per microinverter).
- Enables fewer modules per system with higher total output
- Perfect for space-constrained installations

2. Compliance & Safety

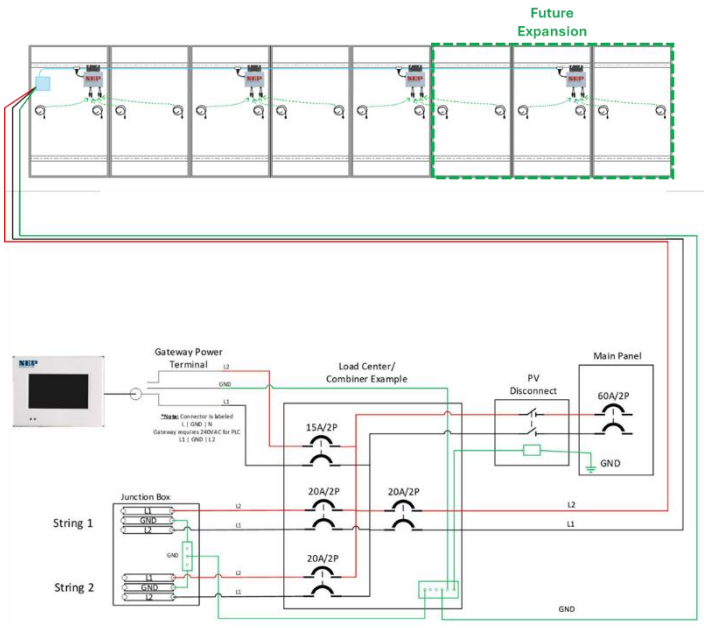
- UL 1741-SA/SB, CSA C22.2, IEC/EN 62109-1/2
- Complies with Rule 21 and other grid codes: IEEE 1547, VDE-AR-N 4105, G83/2, AS 4777.2/.3, EN50438, CEI 21
- NEC 2020 compliance:
    - 690.11 DC Arc-Fault Protection
    - 690.12 Rapid Shutdown
    - 705.12 AC Arc-Fault Protection
    - Protection features: Over/under voltage & frequency, anti-islanding, overload, reverse polarity

4. Durability & Install Flexibility

- IP67-rated enclosure for harsh environments
- Lightweight yet rugged aluminum chassis
- Integrated grounding
- Compatible with most racking systems
- Simple system expansion

5. Intelligent Communication & Monitoring

- Seamless integration with NEP's gateway (BDG-256)
- Optional Wi-Fi microinverter version
- Real-time performance monitoring and diagnostics
- Firmware is upgradable via PLC or Wi-Fi



Contact NEP Support

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Technical Support: **(888) 598-9901**

Technical Specifications

Model	BDM-550	BDM-650
Input (DC)		
Recommended Max PV Power:	420W x 2	480W x 2
Max DC Open Circuit Voltage:	60 Vdc	60 Vdc
Max DC Input Current:	20A x 2	20A x 2
MPPT Tracking Accuracy:	> 99.5%	> 99.5%
MPPT Tracking Range:	22– 55Vdc	22–55 Vdc
Maximum Back-feed Current to Array:	0A	0A
Output (AC)		
Peak AC Output Power:	550W	650W
Max Continuous Output Power(1φ):	548W	640W
Max Continuous Output Power(3φ):	548W	640W
Nominal Power Grid Voltage:	1φ: 240 Vac (adjustable)	
	3φ: 208 Vac (adjustable)	
Allowable Power Grid Voltage:	1φ: 211-264 Vac	
	3φ: 183-228 Vac	
Rated Output Current:	1φ: 2.3 A	1φ: 2.7 A
	3φ: 2.6 A	3φ: 3.1 A
Maximum Units Per Branch (20A): *(All NEC adjustment factors considered)*	1φ: 7 units	1φ: 6 units
	3φ: 6 units	3φ: 5 units
Maximum Units Per Branch (30A): *(All NEC adjustment factors considered)*	1φ: 10 units	1φ: 8 units
	3φ: 9 units	3φ: 7 units
Protection Function		
Over/Under Voltage Protection:	Yes	
Over/Under Frequency Protection:	Yes	
Anti-Islanding Protection:	Yes	
Over Current Protection:	Yes	
Reverse DC Polarity Protection:	Yes	
Overload Protection:	Yes	
Protection Degree:	NEMA-6 / IP-66 / IP-67	
Ambient Temperature:	-40°F to +149°F (-40°C to +65°C)	
Operating Temperature:	-40°F to +185°F (-40°C to +85°C)	