EG4 ELECTRONICS

Powering Off-Grid Living with the EG4 12000XP

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INTRODUCTION

EG4 Electronics provides a versatile suite of products for off-grid and hybrid energy setups, which are specially tailored to residential and light commercial needs. The 12000XP inverter, 6000XP inverter, and Indoor WallMount Battery each bring unique strengths for building resilient off-grid systems.

The 12000XP, with its 24kW PV solar capacity and flexible load management, supports high-demand applications and can scale up to 72kW with parallel units. The 6000XP, a 48V, 6kW split-phase inverter, handles off-grid or backup scenarios and scales up to 16 units for larger installations. Both inverters include dual MPPT inputs for efficient solar capture and cost-effective installation.

The Indoor WallMount Battery adds reliable, cost-effective energy storage and includes safety features like fire arrestors and an E-stop function, while integrating seamlessly with EG4 and other top inverters.

This white paper explores the technical capabilities and practical applications of EG4's products, demonstrating how they create adaptable, resilient systems for sustainable, uninterrupted power.

EG4 12000XP TECHNICAL OVERVIEW

The EG4 12000XP is a powerful off-grid inverter designed for homes and businesses needing reliable energy in high-demand settings. It efficiently captures solar energy, providing dependable power for both residential and light commercial use.

2.A Scalability and Flexibility

Supporting up to six units in parallel, the 12000XP can deliver up to 72kW, making it adaptable to growing energy demands. It features dual Maximum Power Point Trackers (MPPTs) with two inputs each, optimizing solar capture, and includes programmable AC coupling/smart load ports and a dedicated generator port for diverse configurations.

2.B Seamless Operation and Integration

The 12000XP is engineered to ensure smooth, uninterrupted operation. It is a 48V split-phase inverter/charger and includes a 100A bypass function, enabling seamless transitions between power sources and ensuring continuous power supply. Supporting a wide DC input voltage range of 100-480VDC, this inverter is highly adaptable to different solar power setups. The communication interfaces (RS485, Wi-Fi, and CAN) allow for easy integration with various batteries and supports real-time monitoring.

2.C Reliability and Compact Design

Safety is a key consideration in the design of the 12000XP. The inverter is equipped with a variety of protection features, including PV Arc Fault Protection, PV Ground Fault Protection, PV Reverse Polarity Protection, and more, ensuring safe and reliable operation in all environments. With its compact design, the 12000XP is easy to install and commission. It weighs just 110 lbs. and has dimensions of 29.5 x 20.5 x 11.2 inches, making it a manageable solution for installers.

2.D Specifications Overview

The EG4 12000XP offers impressive specifications, including a maximum PV input power of 24kW and a nominal power output of 12kW. It can handle a maximum charge/discharge power of 12kW and a maximum output current of 50A at 240VAC, with a maximum charge/discharge current of 250A. Equipped with two MPPTs, each rated at 35A with two inputs per MPPT, the system ensures efficient energy harvesting. For communication, it supports RS485, Wi-Fi, and CAN interfaces, making integration and monitoring seamless. The minimum generator size required is 5000W.

EG4 12000XP TECHNICAL OVERVIEW

2.E Warranty and Support

The EG4 12000XP is a powerful off-grid inverter designed for homes and businesses needing reliable energy in high-demand settings. It efficiently captures solar energy, providing dependable power for both residential and light commercial use.

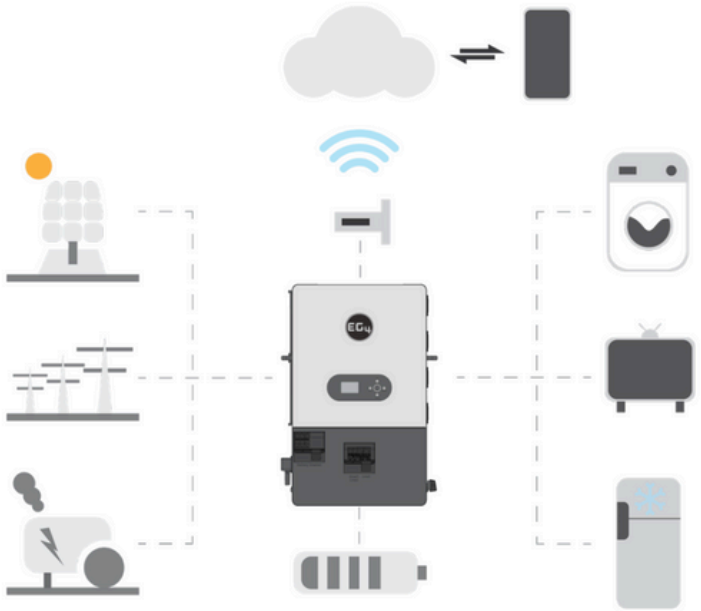
12000XP USE CASES

3.A Off-Grid Scenarios: Reliable Power Anywhere

The EG4 12000XP is ideal for off-grid applications, delivering reliable power where grid access is unavailable. Its unique design, featuring separate AC coupled and generator ports, allows seamless integration of multiple power sources. In off-grid setups, the 12000XP uses its built-in MPPTs to harness solar energy efficiently, charging batteries and powering loads. Capable of handling high-demand equipment like a 5-ton HVAC unit, it's suitable for homes and businesses with significant power needs. With 480VDC maximum input, it reduces cable sizing and eliminates the need for a combiner box, making it a streamlined and efficient off-grid solution.

3.B On-Grid Scenarios: Seamless Backup Power

In on-grid scenarios, the 12000XP offers reliable backup power, keeping homes or businesses running during outages. As Net Metering benefits decline in many markets, the 12000XP stands out as an alternative to traditional hybrid inverters, supporting true whole-home backup by providing seamless transitions between grid and off-grid sources. Its dual functionality for on- and off-grid use, along with customizable power integration, makes it a flexible solution for energy independence and sustainable power. Whether for blackout protection or a reliable energy source, the 12000XP delivers both performance and versatility.



12000XP INVERTER INTERFACE

The EG4 12000XP inverter interface offers streamlined controls for easy energy management. Key features like the Wi-Fi dongle, LCD panel, navigation controls, and dedicated interfaces for battery, grid, generator, and PV connections simplify setup and monitoring. Safety elements, including the EPS switch, PV disconnect, and load breakers, ensure reliable operation. This graphic highlights each component for quick reference. For a more in-depth look at the 12000XP's interface, take a look at section 5 of the 12000XP manual.

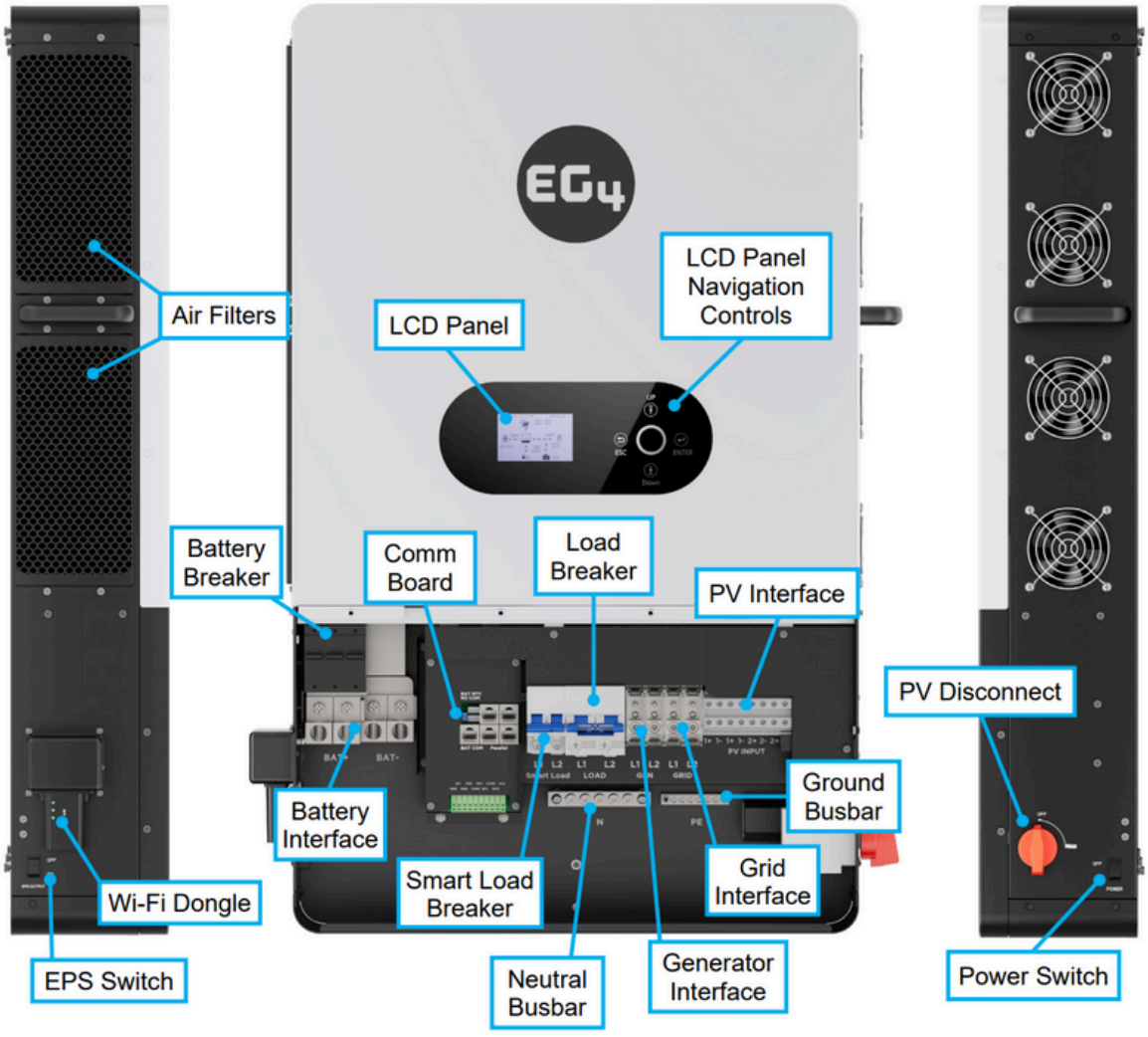


Figure 1. In-Depth 12000XP Inverter Interface

6000XP TECHNICAL OVERVIEW

While the 12000XP offers robust energy management with its intuitive interface, the 6000XP provides a similarly reliable and efficient solution tailored to diverse off-grid applications. Designed for flexibility, the 6000XP delivers high-performance power and scalability to meet varying residential and commercial energy demands.

4.A Off-Grid Power for Diverse Applications

The EG4 6000XP All-In-One Off-Grid Inverter provides high-performance and reliable power tailored to diverse off-grid applications. Designed as a 48V split-phase inverter/charger, it combines energy efficiency with scalability, making it ideal for residential and commercial energy needs. It can absorb up to 8kW of PV input and deliver 6kW of continuous AC output while simultaneously charging a connected battery bank. The 6000XP can scale up to 16 units for an impressive maximum output of 96kW.

4.B Advanced Transformerless Design

Equipped with a high-frequency, transformerless design, the EG4 6000XP generates a 120/240VAC split-phase output, ensuring superior efficiency and flexibility. It is engineered to run fully off-grid but can also operate in a hybrid mode with supplemental grid input, ensuring uninterrupted power in remote locations and during grid outages.

This inverter's two Maximum Power Point Trackers (MPPTs) support up to 8kW of solar input with a 480VDC limit, streamlining installation by reducing the need for a combiner box and minimizing cable size, which saves on installation costs.

4.C User-Friendly Monitoring and Connectivity

For enhanced control, the EG4 6000XP includes a mountable Wi-Fi device that connects to EG4's monitoring software. Users can manage and monitor their systems in real-time via a mobile app or online portal, allowing for performance tracking, troubleshooting, and system optimization from any location. The closed-loop communication system integrates seamlessly with EG4's 48V batteries, such as the LifePower4, as well as other compatible brands (firmware updates may be required), maximizing the system's operational efficiency.

6000XP
TECHNICAL OVERVIEW

4.D Compact and Scalable Design

With a wide DC input voltage range of 100-480VDC and two MPPTs that achieve an impressive 99% efficiency, the EG4 6000XP maximizes solar energy capture and conversion. The inverter's compact size, measuring 18 × 25.5 × 5.25 inches and weighing 52.9 lbs. simplifies handling and installation. For larger energy needs, multiple units can be paralleled, supporting up to 16 units to deliver a combined 96kW of continuous AC power, meeting both small-scale and extensive power demands.

4.E Durable, Reliable, and Warranty-Supported

Backed by a 5-year warranty, the EG4 6000XP is built for durability and reliable operation, ensuring long-term performance and peace of mind. EG4's commitment to customer support reinforces the inverter's reliability, making it a strong choice for those seeking a resilient and scalable off-grid power solution.

6000XP USE CASES

The EG4 6000XP is engineered for a range of off-grid and backup power applications, making it suitable for diverse use cases that require reliable, high-performance energy solutions.

3.A Off-Grid Power Systems

The 6000XP is an ideal off-grid inverter for remote locations lacking reliable grid access. With a 6kW output and a power factor of 1, it delivers dependable power and can operate without a battery, adding flexibility where battery storage is optional. For extended power needs the maximum 96kW configuration makes it suitable for larger installations

3.B Backup Power and Emergency Solutions

The 6000XP is an effective backup power solution, ensuring uninterrupted energy during outages. It integrates seamlessly with generators via dedicated terminals for backup when solar and battery resources are low. With two MPPT solar charge controllers, it supports up to 480V PV input (optimal range 120VDC-385VDC), efficiently recharging batteries or directly powering loads.

3.C Enhanced Safety and Protection in Power Applications

Safety is prioritized in the 6000XP with built-in PV Arc Fault Protection and PV Ground Fault Protection. These features enhance operational security by detecting and mitigating potential issues, making the inverter a safe choice for environments where power stability and safety are essential.

3.D Remote Monitoring and Control for Large-Scale Off-Grid Systems

The 6000XP features CAN and RS485 ports for communication with lithium battery systems, enabling advanced battery management. Remote monitoring via the EG4 app or web portal allows users to track performance, update firmware, and manage settings from anywhere, making it ideal for large-scale systems requiring remote control and maintenance for optimal operation.

12000XP VS. THE 6000XP

The EG4 12000XP offers significant performance and scalability improvements over the EG4 6000XP, with higher PV input, better surge capacity, larger MPPT ratings, and cost savings due to reduced installation complexity. However, the 12000XP is also larger and heavier.

Feature	**6000XP**	**12000XP**	**Key Differences**
Usable Solar PV Capacity	8kW	24kW	12000XP supports 3x the solar input
Passthrough Capacity	50A	100A	12000XP doubles passthrough capactiy
Inverter Scaling (Units)	Up to 16 units (96kW max continuous AC)*	Up to 6 units (72kW max continuous AC)	6000XP scales to higher total capacity
Surge Capacity	15kW (10s)	18kW (5s)	12000XP offers higher surge capacity
MPPT Capacity	2x 17A MPPTs	2x 35A MPPTs	12000XP provides more MPPT current capacity

12000XP VS. THE 6000XP

Feature	6000XP	12000XP	Key Differences
Wiring and Installation	Standard wiring and installation	Saves on wiring and installation vs 2x 6000XPs	12000XP is more cost-effective in larger setups
Cost		~10% savings vs 2x 6000XPs	12000XP reduces wiring complexity
Idle Wattage	~30W	<55W	6000XP has lower idle power consumption
Dimensions	25.5x18x5.25 in	34.3x20.9x5.9 in	12000XP is larger in size
Weight	53 lbs. (24kg)	110 lbs. (50 kg)	6000XP is significantly lighter

EG4WALLMOUNT ALL-WEATHER BATTERY TECHNICAL OVERVIEW

The EG4WallMount All-Weather Battery is a powerful and durable energy storage solution designed for both residential and commercial off-grid and backup applications. With a storage capacity of 14.3kWh and a 200A max continuous discharge, this battery offers exceptional performance for a wide range of energy needs. Its self-heating feature ensures optimal operation in outdoor environments, making it well-suited for locations with extreme temperatures.

4.A Key Features and Performance

The EG4WallMount Battery features a 200A Battery Management System (BMS) and supports over 8000 cycles at 80% depth of discharge (DOD), delivering up to 82.6MWh of lifetime energy production. This ensures long-term reliability with high capacity and performance. Designed to integrate seamlessly with EG4 inverters like the 18kPV, 12kPV, 6000XP, and the new 12000XP, the WallMount battery offers smooth system integration. Its weather-tight quick connects and 600A internal busbars provide secure connections, eliminating the need for external busbars and simplifying installation. Multiple terminals further enhance system setup flexibility.

4.B Specifications Summary

The EG4WallMount All-Weather Battery operates at 51.2V with a 280Ah capacity, offering reliable energy storage. It measures 34.6 x 22.3 x 9.1 inches and weighs 308.6 lbs. Designed for durability, it supports 8000 deep cycles and delivers 82.6MWh of lifetime production. Certified with UL 1973 and backed by a 10-year warranty, this battery is built for long-term reliability in diverse environments, making it an ideal high-performance solution.

4.C Enhanced Safety Features

Safety is another feature of the EG4WallMount Battery, which is EMP-hardened to withstand electromagnetic pulse disruptions from both natural and man-made sources, ensuring reliability in extreme conditions. It also includes thermal runaway protection with dual fire arrestors, adding an extra safety layer. An E-Stop button enables quick emergency shutdown, while the on-board LCD touchscreen provides real-time BMS monitoring and closed-loop communication with EG4 inverters and compatible devices.

WALLMOUNT ALL WEATHER BATTERY USE CASES

The WallMount 280Ah All Weather battery is ideal for low-voltage residential and light commercial energy storage, especially in off-grid or backup applications. Built with lithium iron phosphate (LiFePO4) cells, it offers superior safety and longevity, making it an excellent choice for outdoor environments.

2.A Off-Grid Energy Storage
With its intelligent Battery Management System (BMS), the WallMount Battery ensures efficient performance by monitoring voltage, current, and temperature. Its self-heating feature supports reliable operation in colder climates, making it a strong choice for off-grid systems.

2.B Backup Power Solutions
For homes or businesses requiring backup power, the weather-resistant battery offers safe, reliable energy storage. Its fire arrestors and weather-tight quick connects ensure durability and protection during outages.

2.C Flexible Integration with Inverters
Equipped with an onboard LCD touch screen, the battery integrates seamlessly with inverters from brands like EG4, Schneider, and Sol-Ark. This makes it a versatile solution for residential, commercial, and hybrid energy setups.

2.D Scalability and Multi-Inverter Configurations
Built-in 600A internal busbars make paralleling batteries and inverters easy, providing a scalable solution for larger homes or commercial systems without needing external busbars.

2.E Safety and Control Features
The battery includes an emergency stop function to disconnect all units at once, offering added safety. Combined with fire arrestors and advanced BMS features, it ensures safe and efficient operation in diverse environments.

CONCLUSION

EG4's range of inverters and batteries offers a solid foundation for building flexible off-grid and hybrid power systems. The powerful 12000XP and scalable 6000XP inverters, along with the durable WallMount Battery, support various energy needs in residential and light commercial settings. Together, these products offer reliable backup power and enhanced energy independence.

With advanced safety features, remote monitoring, and straightforward integration, EG4 products enable effective energy management in off-grid environments. Whether for daily use or essential backup during outages, EG4 solutions deliver dependable and adaptable energy support.