



EMP-HARDENED BATTERY SYSTEMS

STACK SERIES: PROVEN
UNDER *REAL* CONDITIONS



*Designed for mission-
critical reliability*

BE PREPARED

EMP-Hardened Stack Series



WHAT IS AN EMP?

Understanding Electromagnetic Pulses

Electromagnetic Pulses, or EMPs, are sudden bursts of electromagnetic energy. These EMPs act like a shockwave that overwhelms electrical circuits.

Unexpected surges can permanently fry electrical systems.

EMPs can come from:

- Nuclear EMPs
- Solar flares
- Geomagnetic storms
- Lightning events

While you can't predict EMPs, you can prepare for them.

Modern homes, businesses, farms, and communications systems rely on sensitive electronics every day. Even a brief electromagnetic disturbance can interrupt operations, damage infrastructure, and create long-term disruptions. Preparing critical systems with hardened energy storage adds another layer of protection when the unexpected happens.



WHY DOES EMP HARDENING MATTER?

Protect Critical Energy Infrastructure

Important for:

- Off-grid systems
- Backup power
- Communications
- Farms and rural operations
- Emergency preparedness
- Critical facilities

Benefits of hardened installations:

- Increased resilience
- Reduced system vulnerability
- Greater reliability during disturbances

EMP hardening is not just about preparing for rare catastrophic events. Many of the same principles that improve EMP resilience also help protect systems from lightning strikes, switching events, power surges, and electrical noise commonly encountered in real-world installations.

REAL-WORLD EXAMPLE:

THE CARRINGTON EVENT

The Largest Recorded Geomagnetic Storm

In September of 1859, the largest recorded geomagnetic storm occurred. In addition to aural displays, it also caused a huge solar flare. (In some places, the flare was so bright, people could read newspapers at night.) That flare triggered sparking and even fires in telegraph stations.

If a flare like that happened today, it would likely cause widespread electrical disruptions. Those disruptions would be so significant that it would cause global blackouts, GPS failures, and damage to satellites. Global travel, financial systems, and internet connections would stop. While people would be physically safe, the systemic collapse could cause trillions of dollars in damage.

Relying only on the traditional electrical grid is a huge gamble. An independent, certified EMP-hardened solar-powered battery backup creates stability that protects your home and business. An EMP-hardened battery keeps your lights on, food safe, and business running.

Be ready with EMP-hardened solutions.

Because energy infrastructure is now so interconnected, resilience matters more than ever. Independent backup systems help reduce reliance on vulnerable grid infrastructure and provide continuity during widespread electrical disturbances.



CERTIFICATION

Certification Is Only the Starting Point

MIL-STD-461G is the gold standard for validating a battery system's resilience against electromagnetic events. If a system carries that certification, it has cleared a rigorous bar. That matters. But it doesn't show how EMP-hardened solar systems testing was conducted.

One of the most important variables: was the system actually powered on during testing?

The Loophole Most Buyers Don't Know About

MIL-STD-461G allows manufacturers to test EMP-hardened solar batteries in a "non-operational" state.

In plain terms: the battery can be switched off during the test.

A system that passes while powered down has only proven it can survive an electromagnetic event as dead weight. It says nothing about whether the system will keep functioning when your mission depends on it.

For critical infrastructure and backup applications, continuous operation matters. Real-world systems are rarely powered down during an electrical disturbance, which is why operational testing provides additional insight into system performance under load.

The Powered-On Difference

Rubix Stack Series batteries are tested for EMP-hardness while powered on and under load. That means we're verifying continuous operation during an electromagnetic event, not just survival after one.

Because in real-world conditions, systems aren't powered down when disruption occurs.

**Tested to survive
is one thing.**

**Tested to keep
running is another.**



RUBIX EMP TESTING

STACK

SERIES: Built for Resilience

Electromagnetic threats don't come from a single source. They travel in the air, through the wiring, and across the power environment. At Rubix, we validate the Stack Series across four distinct test conditions based on how disturbances naturally occur.

Test	What it tests	Why it matters
RS105 Radiated Transient	High-intensity electromagnetic pulses (EMP) in the surrounding environment	Validates resilience against large-scale electromagnetic field exposure — the primary EMP threat.
CS115 Impulse Excitation	Fast, high-voltage spikes introduced through connected conductors	Replicates sudden electrical disturbances from switching events inside connected systems.
CS116 Damped Sine	Oscillating transient signals across a range of frequencies	Captures harmonic noise and resonance effects common in real-world power environments.
CS117 Lightning Transients	High-energy surge events comparable to a lightning strike	Ensures protection against one of the most frequent and severe external electrical threats.

Together, these tests provide a comprehensive view of electromagnetic resilience. While our batteries were tested with open loop communications, the other testing metrics show Rubix Stack Series batteries can work through the disturbance, not just survive them.

EMP-HARDENED INSTALLATION BEST PRACTICES

System Design Recommendations

While no electrical system can be guaranteed to be immune to every electromagnetic event, proper installation practices can significantly improve system resilience. A layered approach to grounding, shielding, and system design helps reduce vulnerability and supports long-term reliability in demanding environments.

Grounding

Proper grounding is one of the most important elements of an EMP-hardened installation. Grounding helps provide a controlled path for excess electrical energy and may reduce the impact of induced surges on connected equipment.

Follow established NEC grounding practices and ensure conductors are properly sized for the application. Bonding system components together can help minimize voltage differences during electrical disturbances and improve overall system stability.

Rubix batteries include integrated grounding busbars to support proper installation and simplify grounding connections within the system.

Proper grounding also helps support lightning mitigation strategies by creating a lower-resistance path for excess electrical energy. Consistent bonding throughout the installation can improve overall electrical stability and reduce unintended voltage differences between system components.

Enclosures

Metallic enclosures provide an added layer of physical and electromagnetic protection for sensitive electrical components. Whenever possible, use metal breaker panels, junction boxes, and equipment housings as part of a hardened installation strategy.

To maximize effectiveness, ensure enclosure lids, fittings, and connections are tightly secured. Reducing unnecessary openings and maintaining solid metal-to-metal contact can help limit unwanted electromagnetic intrusion.

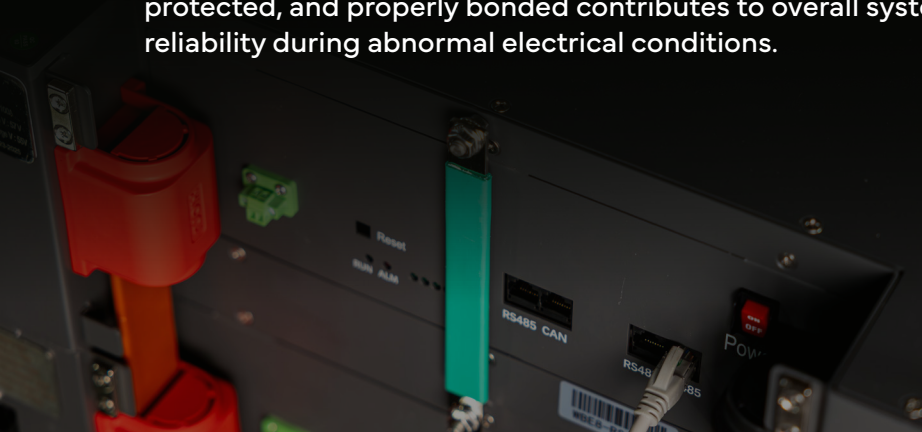
Equipment placement and enclosure integrity play an important role in reducing electromagnetic exposure. A well-designed enclosure strategy helps create a more durable and resilient electrical environment.

Conductors & Conduit

Wiring methods play a major role in system resilience. Metallic conduit can help shield conductors from induced electromagnetic energy while also providing physical protection in demanding environments.

Minimize exposed wiring whenever possible and route conductors carefully to reduce unnecessary vulnerability. Properly sealed conduit systems and reduced gaps in the installation can help support a more robust and resilient electrical system.

Thoughtful conductor routing can also reduce exposure to transient electrical disturbances. Keeping wiring organized, protected, and properly bonded contributes to overall system reliability during abnormal electrical conditions.



APPLICATIONS

Ideal Places for Rubix Stack Series

We designed the Stack Series to work anywhere you want solar-generated electricity.

Stack Series can deliver for:

- Off-grid homes
- Agricultural operations
- Emergency backup systems
- Communications infrastructure
- Security applications
- Remote facilities

The Stack Series is especially valuable anywhere continuous power availability is critical and grid reliability may be uncertain or inconsistent

Our Warranty Protects You

With Rubix Stack Series batteries, you don't have to worry about EMP events. We've built them to withstand EMP activity, plus our hassle- and worry-free warranty covers your batteries if something does go wrong. We'll make things right no matter what caused the problem.



NEXT STEPS

Ask the Right Questions

Yes, testing is important, but not all EMP-hardness testing conditions for solar batteries reflect real-world use. The details of how testing was conducted are important. When evaluating any battery system for electromagnetic resilience, it's worth asking:

- ❓ Was the system powered on and under load during testing?
- ❓ Was it tested in its installed configuration?
- ❓ Did it maintain continuous operation, or require a restart?
- ❓ Can the manufacturer provide verified test data?
- ❓ Were communication systems and battery management electronics active during testing?
- ❓ What surge protection and grounding methods are recommended for installation?
- ❓ How does the battery respond to voltage spikes or induced surges?
- ❓ What enclosure, conduit, or shielding recommendations are required for optimal protection?
- ❓ Has the system been designed specifically for resilience, or simply tested to minimum compliance standards?

Asking detailed questions helps separate systems designed for real-world resilience from systems tested only for minimum compliance requirements.

Built for Real-World Performance

Rubix Stack Series systems are EMP-hardened solar batteries and engineered and tested for the conditions they'll actually face. They deliver reliable performance when it matters most.



**See the data.
Start the conversation.**

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Rubix Stack Series — EMP-Hardened Energy Storage