Technical Note
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Approved Power Solutions for Emerson Wireless Instrumentation Guide

Industrial wireless instrumentation is a critical component in industrial operations, ensuring seamless data acquisition for both monitoring and process control applications. However, the performance and safety of these instruments are heavily dependent on the power solutions used. Emerson recommends using only approved power solutions to mitigate significant risks associated with unapproved alternatives. This document outlines the key reasons for adhering to approved power solutions and the potential consequences of non-compliance.

Scope

These recommendations apply to the following part numbers and potentially others:

- 00G45-9000-0001
- 701PBKKF
- 701PGNKF
- A0701PBU
- 9000X-9000-0001

Safety concerns

The use of unapproved power solutions that do not incorporate essential safety functions could lead to serious hazards, including fire, explosion, mechanical failure, and electrical failure. Approved power solutions are designed with high-reliability intrinsic safety, ensuring that the stored and delivered energy remains within safe operating thresholds, even in fault conditions. Approved power solutions also include other battery management features, such as undervoltage protection.

Mechanical protection

Industrial environments are characterized by harsh conditions such as vibration, shock, and drops. Approved power solutions are engineered to withstand these mechanical stresses, providing:

- Enhanced structural integrity against impact and environmental factors
- Robust enclosures that protect against vibration-induced failures
- Consistent performance under mechanical stress

Emerson wireless field instruments are certified as intrinsically safe when the appropriate option is selected. Emerson wireless field instruments are not offered with explosion-proof or flameproof enclosures. While the enclosures of Emerson wireless field instruments are very robust, they do not meet the requirements for explosion-proof or flameproof enclosures, so it is critically important that all components meet intrinsic safety requirements. The intrinsic safety approval of Emerson wireless field instruments is only valid when approved power solutions are used. While there may be other intrinsically safe power sources on the market, until they are listed on Emerson's product certificate, they cannot be used without voiding the intrinsic safety approval for the host instrument.

Energy management

To maintain safe and reliable operation, the design must incorporate cell undervoltage limiting. Approved power solutions ensure that batteries operate within their specified voltage range, preventing deep discharge that could lead to instability, reduced capacity, and premature failure.

Use of correct cell type

Approved power solutions guarantee the use of the correct cell type tailored to the instrument's requirements. For example, Emerson's SmartPower™ products make use of single-use Lithium Thionyl Chloride ($Li/SOCl_2$) battery cells. The cells used in approved power solutions have been subjected to rigorous reliability and safety testing required for use

in hazardous areas. These include testing for thermal and spark ignition hazards not required by standards for use of batteries in ordinary locations.

Critical labeling and identification

Approved power solutions include critical labeling that provides essential information, such as voltage, capacity, and safety certifications. This labeling ensures compliance with industry standards and facilitates proper handling and replacement.

Power solutions in hazardous areas

Unapproved power solutions may not meet stringent hazardous area regulations, posing risks to personnel and equipment. Approved power solutions comply with certificates, ensuring safe handling and storage in hazardous environments.

Using unapproved power solutions will void the intrinsic safety approvals of the host instrument. This not only puts personnel and operations at risk but also results in regulatory non-compliance, potentially leading to costly downtime and liability issues. Some approved power solutions are intrinsically safe for in-field replacements. To ensure safe and reliable in-field replacement, use only approved power solutions.

Functional, performance, and reliability concerns

Unapproved power solutions can compromise the overall functionality, performance, and reliability of industrial wireless instrumentation, leading to:

- Reduced battery lifespan and increased overall maintenance costs
- Inaccurate power solution health metrics, affecting predictive maintenance strategies built into the instrument
- Unreliable performance across the full operating window, including temperature, humidity, shock, vibration, and chemical exposure
- Could cause damage to the transmitter

Regulatory compliance

Industrial wireless instrumentation is subject to rigorous regulatory standards to ensure safe operation in ordinary and hazardous locations. The use of unapproved power solutions can result in:

- Voiding of certifications and approvals
- Non-compliance with industry regulations
- Legal and financial repercussions due to regulatory violations

To ensure the safety, reliability, quality, and compliance of Emerson wireless instrumentation, it is important to only use approved power solutions. These solutions are specifically designed, tested, and certified to meet stringent industrial requirements, providing peace of mind to operators and ensuring the longevity of the equipment.
By adhering to these recommendations, organizations can avoid safety risks, regulatory issues, and operational disruptions, ultimately achieving greater efficiency and reliability in their industrial processes.

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