



Improved Reliability

Discussing the enhancements made to our products that result in increased reliability

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Convrq Innovations (Convrq), formally Westgen Technologies, has consistently prioritized reliability as a core value when it comes to designing and enhancing our products.

With a strong commitment to being a trusted solution in the industry, Convrq engineers our products to provide dependable performance. The EPOD (Engineered Power on Demand) product line exemplifies this approach with a range of fail-safes and redundancies. The electrical system has been carefully designed to incorporate redundancy, ensuring uninterrupted power supply. Similarly, the mechanical systems have been engineered to be robust and dependable, capable of withstanding demanding conditions. Through our dedication to reliability, we at Convrq have established ourselves as a reliable and dependable provider of innovative power solutions.

In this white paper, we'll take a deep dive into the various methodologies employed to integrate reliable design and engineering principles into our products, including electrical redundancies, power management, and effective problem mitigation—among other critical aspects.



Electrical Reliability

REDUNDANT SYSTEM

In the AP (Air and Power) product line, ensuring reliable power is of utmost importance, and we've incorporated multiple power redundancies into our units in order to achieve this goal. The primary power source for AP units is a generator. Additionally, solar arrays are integrated into the units to provide a secondary power source. The solar energy generated is stored in UPS (Uninterruptible Power Supply) batteries. These UPS batteries are also charged by the generator. This design ensures uninterrupted power supply, even in the event of a generator failure or when solar power alone cannot meet the demand. By combining two power sources—generator and solar—along with the UPS system, the AP units possess a redundant power system that ensures continuous and reliable operation.

The EPODs incorporate a redundant duplex compressor configuration, which offers an additional level of reliability. In the event of a compressor failure, this configuration allows the EPOD to utilize the extra air compressor, ensuring uninterrupted operation. Furthermore, the duplex configuration enables the air compressors to run at lower duty cycles, effectively extending their lifespan and maintenance cycles. This not only enhances reliability through redundant systems, but also reduces the likelihood of failures occurring. By combining redundancy and optimized operation, the duplex compressor configuration in EPODs provides a robust and dependable solution for sustained performance in various applications.

BUILT TO LAST

Within the AP product line, the generator plays a crucial role in ensuring a reliable system. However, to minimize generator usage, the UPS (Uninterruptible Power Supply) is regularly utilized as an alternative power source. When the batteries are fully charged, the system operates off the batteries, resulting in a significant reduction in generator runtime. This approach not only decreases generator hours, but also improves maintenance life and efficiency, as operating at 70-80% full load is considered optimal (Stellar, 2023). By relying less on the generator for

continuous power, the system becomes more self-sufficient. Additionally, the units are equipped with a backup generator connection, providing a contingency plan in case the generator requires servicing or replacement, always ensuring uninterrupted power supply for the EPOD.

FUTURE PROOF

Convrq has implemented remote monitoring capabilities in our EPOD system to facilitate data gathering and real-time updates. This remote monitoring functionality allows operators to access and monitor the status of their units, enabling them to promptly detect alarms and predict maintenance periods. The data collected through remote monitoring plays a crucial role in enhancing the product's reliability. By providing greater visibility into infield problems and common alarms, this data enables Convrq to continually improve the design of the EPOD system. Utilizing this valuable data, Convrq can identify areas for optimization and implement ongoing enhancements, ensuring that the EPOD remains at the forefront of performance, efficiency, and reliability.



Mechanical Reliability

REDUNDANT SYSTEM

To increase the level of redundancy in the instrument air system, the EPOD incorporates an auxiliary compressor connection. By providing this backup option, the EPOD system ensures a consistent supply of instrument air, particularly during maintenance or unexpected compressor failures. This feature not only facilitates ease of servicing, but also adds an extra layer of protection to the overall system, enhancing its reliability and operational resilience overall.

LONGER MAINTENANCE PERIODS

The generators used in the EPODs have modifications to extend the maintenance and overall lifespan. The modification allows the generators to need oil changes less often, leading to less downtime.

The EPODs are specifically designed for off-grid and oil field applications. However, these environments often result in fuel gas that contains particulate matter, which can pose significant challenges for generators (Donaldson Filtration Solutions, 2023). A common issue that occurs is that the accelerated maintenance cycle leads to a reduced lifespan for the generator, primarily caused by particulate matter clogging filters and inducing abrasive wear on moving components. To mitigate these problems, the implementation of a coalescing filter becomes essential for effectively purifying the fuel gas. By incorporating a coalescing filter, the EPOD system ensures reliable power generation in oil field and off-grid scenarios, minimizing maintenance requirements and enhancing overall system longevity.

The EPOD system is carefully designed to cater not only to off-grid and oil field applications, but also to on-grid scenarios. In the latter, power quality can often be inconsistent and referred to as “dirty” power due to several factors, such as power factor variations, voltage fluctuations, frequency deviations, and surges. To address these challenges, the EPOD system incorporates Variable Frequency Drives (VFDs), which efficiently convert single-phase power to three-phase power for air compressors. The

VFDs also play a crucial role in limiting inrush current during compressor startup, preventing sudden power spikes. Additionally, line reactors are employed to act as current smoothers and protectors for the VFDs, effectively mitigating electrical noise and transient events. Furthermore, the EPOD system incorporates an UPS as an additional layer of protection, ensuring continuous power supply in cases of extremely low power quality or power outages. Collectively, these components work together to ensure reliable operation of the EPOD system in on-grid applications, effectively compensating for the challenges associated with dirty power and enhancing overall system performance and resilience.

SUMMARY

Convrg consistently prioritizes the enhancement of product reliability through rigorous testing, monitoring, and customer feedback.

The company places immense importance on meeting the specific needs of our customers' sites, ensuring that the EPODs are designed with functionality and dependability in mind. By incorporating redundant systems and employing robust engineering principles, Convrg strives to deliver products that are synonymous with reliability. Our continuous efforts in improving reliability demonstrate our commitment to providing trustworthy solutions that customers can rely on in various applications and environments.

REFERENCES

Donaldson Filtration Solutions. (2023). Dirty Fuel Damages Engines. 1.

Retrieved from <https://www.donaldson.com/en-us/bulk-fluid-storage/technical-articles/dirty-fuel-damages-engines/>

Stellar. (2023). Electrical Engineer. PortablePowerGuides, 1.

Retrieved from <https://portablepowerguides.com/is-it-ok-to-run-a-generator-without-a-load/>



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