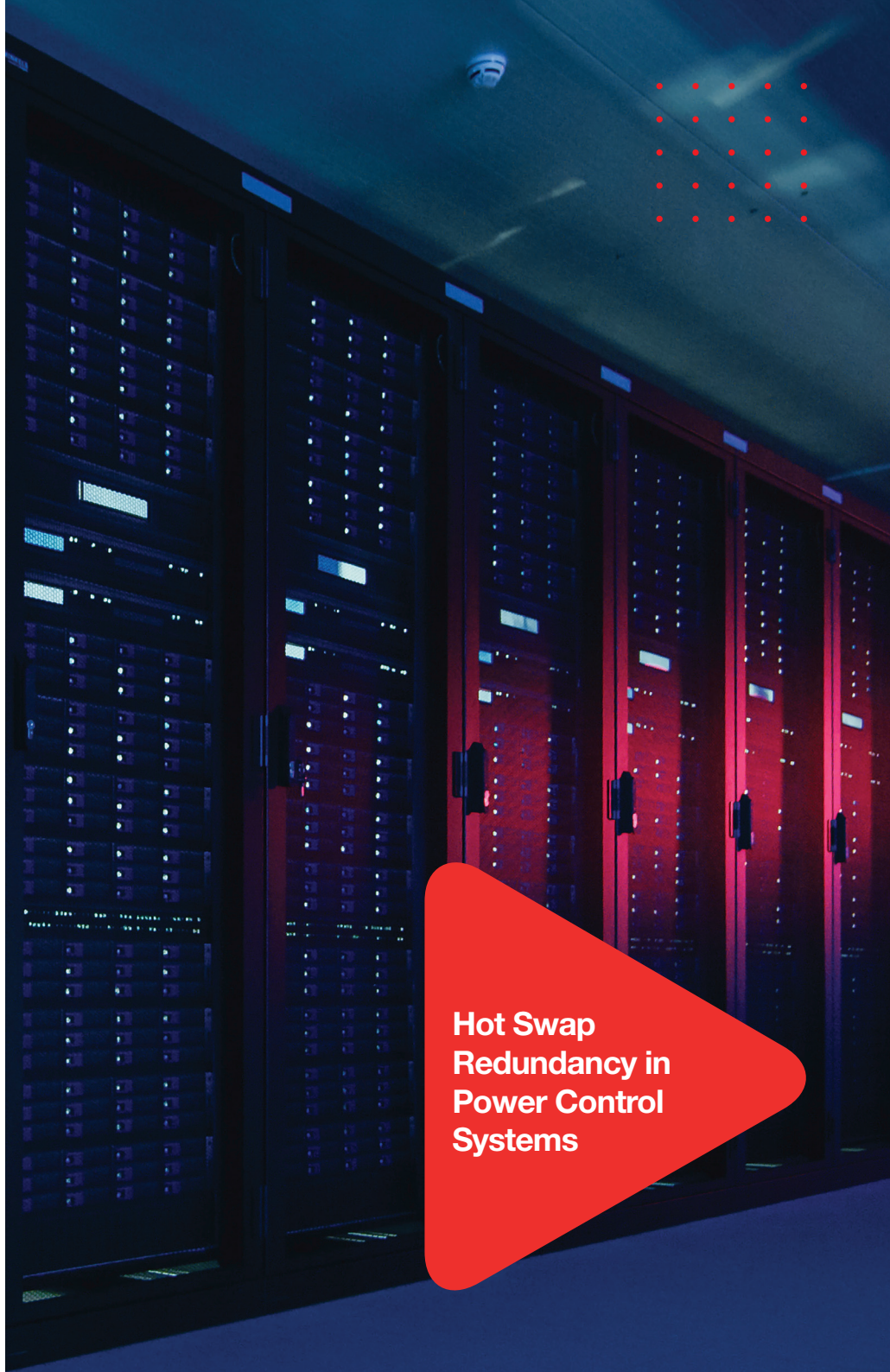
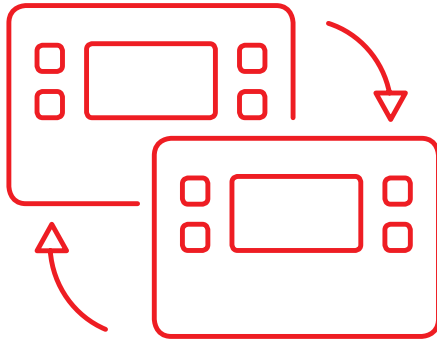


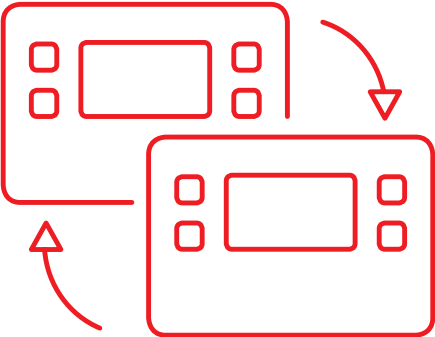
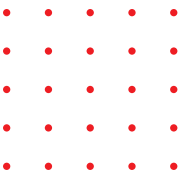


**Hot Swap
Redundancy in
Power Control
Systems**

The Crucial Role of Hot Swap Redundancy in Power Control Systems for Mission-Critical Applications

In the digital age, where datacenters and hospitals form the backbone of modern society, maintaining a constant and reliable power supply is crucial. Imagine if the power control system for such critical installations were to encounter a sudden, unexpected failure. This could lead to an immediate power disruption and outages for essential services, potentially resulting in data loss, compromised patient care, or even life-threatening situations.

How can potential risks to the stability of critical systems be mitigated? One solution is to adopt **Hot Swap Redundancy** in your power control systems. In this article, we will explore the necessity of redundancy in critical installations and demonstrate how ComAp's advanced controllers safeguard against power disruptions through the use of this feature and a specific failover process.



The Risks of Insufficient Redundancy

As a first step, it is crucial to understand the potential risks associated with an inadequate power generation control system for mission-critical applications, such as datacenters and hospitals. Some of these risks include:

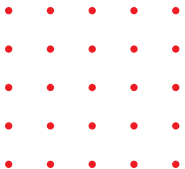
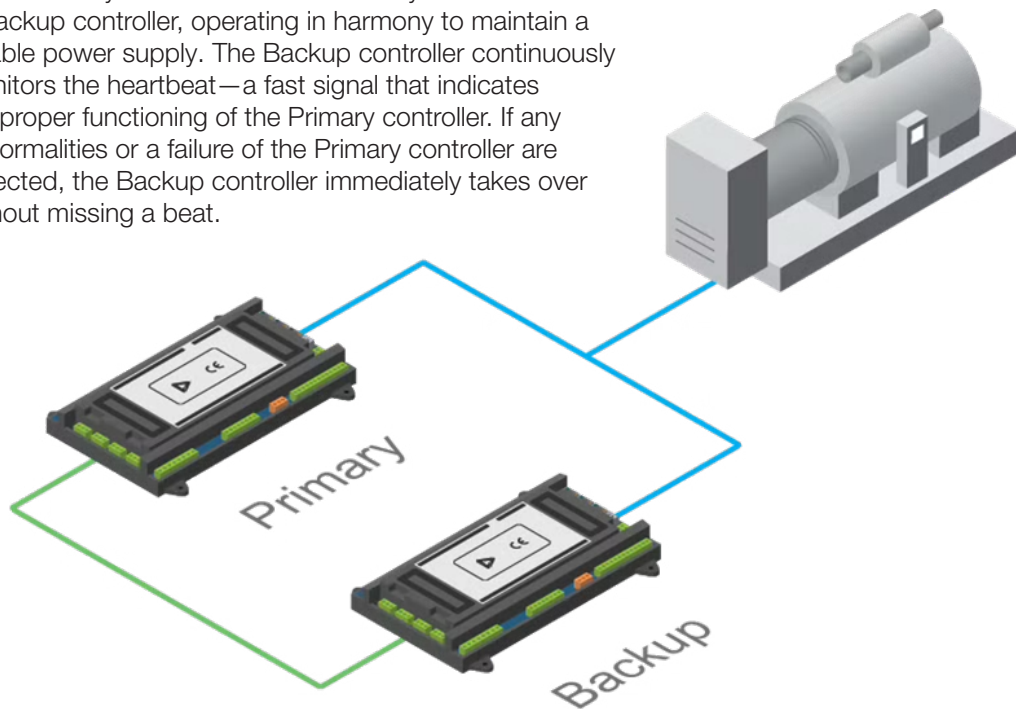
- **Downtime and Data Loss:** In datacenters, an unexpected power failure can lead to server downtime and data loss, severely impacting business operations and client services. Data recovery is often time-consuming and costly, making it essential to prevent such occurrences.
- **Disrupted Medical Services:** Hospitals depend on continuous power for life-saving equipment, patient monitoring systems, and electronic medical records. A power outage could threaten patient safety and interrupt critical medical procedures.
- **Financial Loss:** Power-related disruptions can result in significant financial losses, both in terms of direct operational costs and potential damage to an organisation's reputation. For example, in 2017, due to a single datacenter blackout in the UK, British Airways had to cancel over 400 flights for roughly 75,000 passengers. This led to additional costs of more than 100 million euros for the airline.

Understanding the gravity of these risks, our team at ComAp has developed an advanced power generation control system that incorporates Hot Swap Redundancy, ensuring an uninterrupted power supply even in the event of unforeseen controller failures.



ComAp's Hot Swap Redundancy: How does it work?

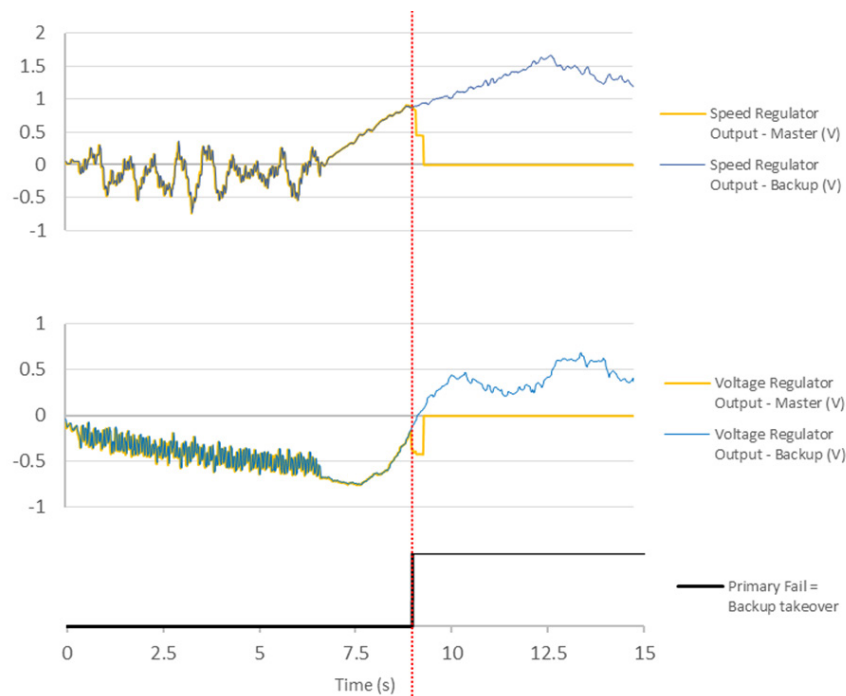
Our control system consists of a Primary controller and a Backup controller, operating in harmony to maintain a reliable power supply. The Backup controller continuously monitors the heartbeat—a fast signal that indicates the proper functioning of the Primary controller. If any abnormalities or a failure of the Primary controller are detected, the Backup controller immediately takes over without missing a beat.



Seamless Failover Process

During regular operation, both the Primary and the Backup controllers share the generator output values over the CAN synchronisation line. This ensures that the Backup controller is always aware of the precise state of the generator. When the Primary controller fails, the Backup controller takes over and uses the up-to-date information it has been continuously receiving to ensure a smooth transition of power control.

To better illustrate the effectiveness of our Hot Swap Redundancy, see the chart below, which showcases the outputs of both the Primary and Backup controllers. The chart data comes from ComAp's internal validation of the Hot Swap functionality and clearly displays how the Speed Regulator Output (SRO) and the Voltage Regulator Output (VRO) are shared between the Primary and Backup controllers.



ComAp's innovative Hot-Swap redundancy solution helps maintain the stability of critical installations and ensures that the critical load is strong enough to tackle any power-related challenges that may arise. The best defence against power disruptions is a proactive and robust redundancy solution, where seamless continuity is the ultimate power.



Reliable and Secure
Control System
for Datacentres

ComAp [®]
The heart of smart control

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how ComAp can help you with
products, design, installation and commissioning,
please email us at this address:

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