

Power supplies with integrated decoupling function

## Redundant systems without a redundancy module

With increasingly sensitive and complex systems, a power supply failure can result in data loss or system downtime, which can cause long re-start times and high costs. Redundant power supply systems increase system availability and prevent financial losses resulting from downtime.



Figure 1: CP power supplies with integrated decoupling function

In principle, redundant power supply systems are based on individual power supplies connected in parallel. It is therefore important that the power supplies are decoupled from one another via diodes or MOSFETs so that a faulty device does not place a load on all the other devices in the event of a short-circuit. The task of decoupling is usually undertaken by an external redundancy module.

PULS specialises in redundancy systems and is continuously working on building systems that are even more user-friendly and compact. PULS has identified significant potential savings for users by using the decoupling function. The next development stage is DIN-rail power supplies with integrated decoupling function, which means that users can build 1+1 and n+1 redundancy systems without additional redundancy modules. This means significant space and cost savings, and reduces also the complexity of the redundancy systems.

**Smaller footprint, time-saving and less complexity**

PULS has already integrated this function into versions of the 1-phase power supplies CP10 (24V / 10A) and CP20 (24V / 20A). In doing so, it has been possible to integrate the decoupling function without having to change the width of the standard devices. Therefore, the CP power supplies with integrated decoupling are the same width as the standard CP10 (39mm) and CP20 (48mm). Thanks to the streamlined device design and the elimination of the external redundancy module, space savings of more than 45% are possible over standard redundancy systems. When it comes to efficiency and durability, the power supplies hold record values over the original CPs.



Figure 2: 45% space saving: PULS solution in comparison

The reduced amount of cabling means installation takes less time with the integrated decoupling function. The complexity of the system is also reduced and this also has a positive effect on system uptime. Fewer wiring operations reduce the risk of failures due to faulty connections resulting in an increase in the reliability of the entire system.

The devices also provide a noticeable degree of simplification in terms of sales and logistics. Only one device type needs to be ordered and kept in stock. The amount of work to maintain the device master data is halved.

**Long service life thanks to automatic load sharing and MOSFETs**

The power supplies are developed for plug-and-play usage and therefore do not need any setting up. All CP power supplies with integrated decoupling function are equipped with automatic load current sharing. This

function compensates for a certain voltage imbalance between the individual power supplies connected in parallel. This produces an optimised temperature balance between two power supplies, meaning a longer service life of the devices.

Voltage drops in the device are also reduced by using MOSFETs – instead of diodes – as decoupling elements. Diodes in standard redundancy modules cause a voltage drop of 500 mV between the input and output. Using the MOSFET technology has reduced this so the voltage drop between the input and output is less than 50mV.

Both the integrated load current sharing and the use of efficient MOSFETs permit less intrinsic warming of the power supplies. This has a positive effect on the service life of the power supplies and reduces the costs of replacement and maintenance.

#### **Maximum system availability via hot-swap**

For redundancy applications that require faulty devices to be rapidly replaced without interrupting ongoing operation, versions with hot-swap plug connectors (CP10.241-R2, CP20.241-R2) are available. Redundancy is restored immediately once the faulty device is replaced which is critical for high system availability. Conformal coated PCB versions are also available for use in particularly challenging conditions – for example in agricultural operations, paper-processing plants, protected outdoor areas, etc.

If hot-swap is not required or if persistent vibrations occur in the application, the CP10.241-R1 and CP20.241-R1 versions are the correct choice. They are equipped with vibration resistant spring-clamp terminals.

#### **Redundancy revolution**

Integrating the decoupling function into the power supplies allows PULS to construct redundancy systems without a redundancy module. The space saving, high efficiency and simplified construction opens up new options for users when building redundant power supply systems.