In the process industry, process functionality must be maintained under all circumstances

Playing it safe, twice over, with redundancy

Permanently supplied – part 1

Weidmüller's industry-specific solution concepts enable a high-availability, redundant power supply to be established. High-performance components form the basis for a consistent supply that meets the most ambitious of industrial requirements.

Increasing production quality and plant availability are the drivers for continuously optimising production procedures. This is coupled with an increasing level of automation, which in turn brings with it new challenges in ensuring a reliable 24 V DC power supply. As an industrial connectivity partner, Weidmüller provides versatile solutions which meet all the increases in requirements by interconnecting high-availability switched-mode power supply units with practical supplementary modules. One solution is the systematic establishment of a redundant supply.

Playing it safe, twice over

If a critical status occurs in traditional mechanical engineering – such as a blockage in materials handling or the failure of a robot – a safe status is usually reestablished by switching the system off. Things are different in the process industry, where mechanisms are used to, for example, prevent an explosion during chemical reactions. Fully shutting down the parts of the system in this case would be fatal. In these circumstances, process functionality must be maintained. Against this background, production processes in the process industry are set up with single or multiple redundancy. Requirements to this effect are therefore made of the electrical systems and not least, the AC power supply networks.

"For such cases, we offer two approaches to a redundant supply. Firstly plant developers can improve the availability of

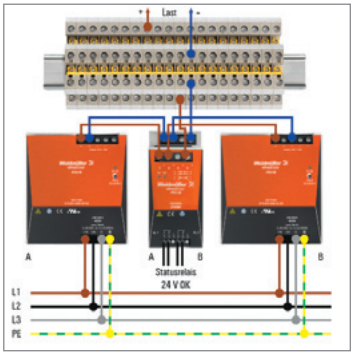
»Redundant power supplies always offer twice the benefit.«

their plants by setting up redundant systems with our PRO-M power supply modules, with the addition of the associated diode modules. One advantage of this solution is that it is very compact. When the various PRO-M modules are fitted in the cabinet, they can be lined up, right next to one another, because there is no need to separate them for cooling reasons," explains Klaus Schürmann, product manager for the power supply range. "The second solution is redundancy modules for our PRO-H family that we have developed especially for use in Ex zones and high-performance areas."

Using redundancy modules allows two PRO-H power supplies with exactly the same distributed load to be operated in parallel (active current sharing). Should one device fail, the other takes on the full load, greatly reducing the probability of failure. Thanks to high MTBF (Mean Time Between Failures), values of up to 1.8 million hours and scope for installing in Zone 2, this solution is ideally suited to the process industry and energy technology.

High-availability power supply in shipbuilding and wind energy

Weidmüller also has redundant power supply solutions for the requirements of other industry sectors, where high-availability power supplies are needed. Rather than two AC grids, for example, one AC grid can be coupled to a bank of batteries. One solution is to combine a PRO-M switched-mode power unit with a diode module and the Weidmüller DC/DC converter. In ungrounded voltage systems, such as those in the emergency power battery system built into ships, the control voltage must be separated from the battery voltage. Class III protection, coupled with high efficiency, makes the compact DC/DC converter ideal for applications of this kind. Another alternative is to use the PRO-M switched-mode power unit as the DC/DC converter and to couple it with a diode module and 110 or 220 V banks of batteries. Weidmüller also offers custom-fit solutions for comparable redundant concepts, such as those found in the electrical pitch systems of wind turbines. The switch-mode power supply, with a wide-ranging input from the PRO-M series, covers an input voltage range of 80 to 430 V DC and is ideal for such purposes.



With high-availability switched-mode power units and practical supplementary modules, Weidmüller has a power supply solution for every need

"Redundant power supplies always offer twice the benefit: the failure of either a grid or a power supply will not result in the 24 V DC control voltage collapsing. Each redundant branch is independently able to supply the full output load," says Schürmann, summing up the benefits of the solutions. "On the one hand, by using high-quality power supplies with high MTBF values and, on the other hand, by producing a redundant supply, machine and plant constructors in all industries achieve a significant improvement in application availability." ←

One way of building a redundant circuit to increase availability