



# Food power

## ABB's rugged UPS PowerLine DPA ensures food and beverage production facilities keep running

**DIANA GARCIA – For many industries such as food and beverage, the consequences of electrical power loss can be disastrous: Production lines may have to go through a complex and costly restart; expensive products may be ruined; valuable production time can be lost; process equipment can be damaged; and safety issues may arise. Because a reliable supply of clean power usually cannot be guaranteed by the grid, many enterprises turn to uninterruptible power supplies (UPSs) to make sure that their operation keeps running. For critical industrial applications, ABB has now introduced the rugged PowerLine DPA UPS, built to withstand the rough conditions encountered in many industrial settings. PowerLine DPA is based on ABB's proven decentralized parallel architecture (DPA) for UPSs. DPA is a modular architecture that, by its nature, provides not only the best availability but also the best serviceability and flexibility. Taken together, these features will deliver a low total cost of ownership (TCO) over the 15 years' lifetime of the PowerLine DPA UPS.**

### Title picture

ABB's rugged PowerLine DPA UPS ensures a constant supply of good-quality power for many rough industrial environments, such as food production facilities.

**T**here are few events more disruptive to a manufacturing or a production process than a power disturbance. And power disturbances come in many guises: On top of total power outages, the voltage may sag or swell over short periods. It may also do so over longer periods – so-called brownouts or overvoltages. Moreover, there can be electrical noise on the line, or frequency variation or harmonics may appear in the voltage. Such events can result in data loss, production downtime, unavailability of essential services, risk to hardware, financial losses and safety concerns. For these reasons, most professional enterprises protect their power supply with a UPS.

However, a UPS can itself become a focus of reliability and availability concerns. This is why ABB has developed an architecture that ensures the very best UPS design in terms of availability, flexibility, cost and ease of use – DPA.

### DPA

UPS systems with a centralized parallel architecture (CPA) have some degree of hierarchical, centralized control or hardware (eg, a static bypass). This makes CPA devices vulnerable should a failure arise on one of these centralized components; one fault can bring down the entire UPS. With DPA, on the other hand, the UPS is modularized and each module has

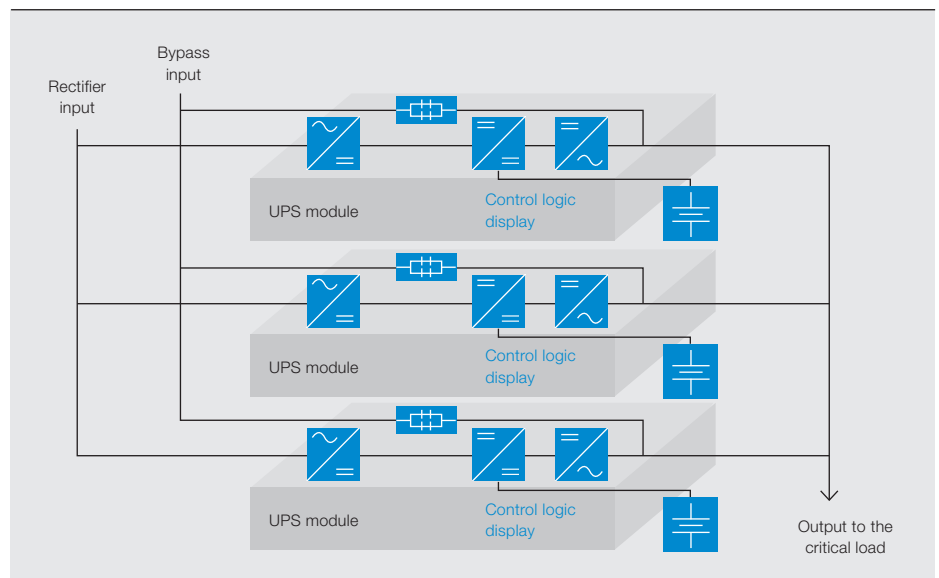
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all the hardware and software needed for autonomous operation: rectifier, inverter, battery converter, static bypass switch, backfeed protection, control logic, display, and mimic diagram for monitoring and control → 1. A module's output is not affected by failures elsewhere in the UPS. If one module is lost, the others take up its load. In other words, a multimodule system is fault tolerant and there are no single points of failure. Availability is maximized.

With DPA, the UPS is modularized and each module has all the hardware and software needed for autonomous operation.

1 Each UPS module has all the hardware and software it needs for autonomous operation; there are no shared critical elements.



The only UPS elements common to all modules are contained in the mechanical frame that accommodates the UPS modules – I/O connection, customer interface signaling, maintenance bypass and a system display. These elements are noncritical for UPS operation.

#### DPA – serviceability

One major advantage of DPA is that the modules can be swapped online, ie, removed or inserted without the need to power down or transfer to raw mains supply and without risk to the critical load. This unique aspect of modularity directly addresses continuous uptime requirements, significantly reduces MTTR (mean time to repair), reduces inventory levels of specialist spare parts and simplifies system upgrades. Modularity pays off too when it comes to serviceability: Local service personnel do not need special skills, visiting service engineers spend less time on site, and any risks of data or production loss are minimized.

#### DPA – scalability

As UPS power requirements change – eg, if a new process line is opened – the modular nature of DPA makes it simple to add modules and increase power capability. This means the initial configuration does not have to be overspecified to cater for future expansion – modules are simply added (or removed, if power requirements shrink) when needed. In this way, the user only cables, powers

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and cools what is needed. Power consumption is a topic of great concern for many operators and the energy savings made by the modular expansion approach over the service life of the UPS are substantial.

This online-swap technology, as well as having a significant impact on overall costs, can also help achieve so-called six nines (99.9999 percent) availability – a highly desirable target for installations in pursuit of zero downtime.



ABB's new PowerLine DPA UPS is based on DPA and has been designed specifically to overcome the many challenges faced when deploying such sophisticated electrical equipment in rough industrial settings.

### PowerLine DPA

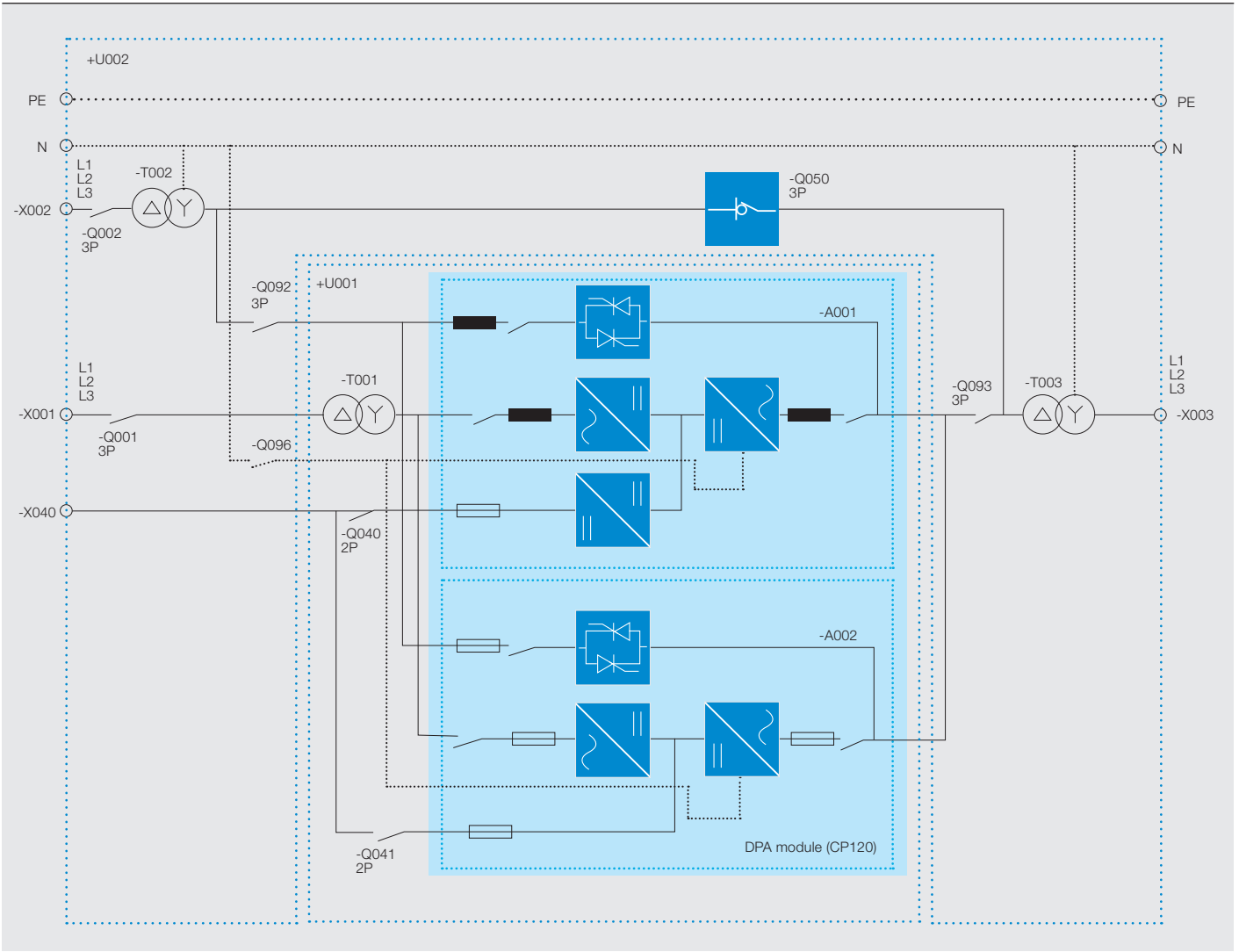
ABB already markets power protection products that are based on DPA and the ABB PowerLine DPA UPS is the latest addition to this product portfolio → 2-3. The PowerLine DPA UPS is specifically designed to overcome the many environmental challenges faced when deploying such sophisticated electrical equipment in a rough industrial setting.

Survivability is crucial, so particular attention has been paid to physical robustness. PowerLine DPA's IP31 protection can easily cope with dust, water condensation, excessive humidity (up to 95 percent), corrosive air contamination and rough manhandling. The UPS is designed to operate in a temperature range of -5 to +45 °C. High priority has been given to safety and PowerLine DPA features a high degree of protection for users and maintenance staff. The device's compliance with the relevant standards – IEC/EN 62040-1 for general and safety aspects, IEC/EN 62040-2 for EMC and IEC/EN 62040-3 for performance and test – has been verified.

Real estate for electrical equipment is often a limited or expensive commodity. The PowerLine DPA UPS has not only a small footprint but also cable access at the front (top and bottom), which eliminates the necessity for rear access and the associated extra space this entails.

PowerLine DPA is an online double conversion UPS: The incoming AC is first converted to DC, from which the output AC is then synthesized – giving a clean sinusoid. These two conversion steps give rise to the “double conversion” term and isolate the output voltage waveform from any disturbances on the input AC side.

The UPS is based on a pulse-width modulation (PWM) principle and uses power electronic components that reduce harmonic content in the input current to under 3 percent, thus decreasing any mains voltage distortion that might affect the operation of other equipment connected to the mains supply. Input/output isolation transformers can be installed inside the UPS to increase



safety levels, and to provide galvanic isolation for the UPS and the downstream load. This might be necessary, for example, where the UPS AC input power comes from switchgear or a motor control center and shares bus connections with electrically noisy loads such as variable-speed drives.

Step-up/down transformers are available to meet specific voltage requirements. In addition, PowerLine DPA has a high overload capacity and robust short-circuit capability, and is available with rated powers of 20 to 120 kVA. With input and output (three-phase) voltages in the range of 220 to 415 VAC

the UPS requires no onerous electrical installation considerations and is straightforward to service.

**PowerLine DPA's IP31-rated protection can easily cope with dust, water condensation, humidity up to 95 percent, corrosive air contamination and rough manhandling.**

An anti-condensation heater, lifting eye-lets, dust filters, IP42 protection, halogen-free cables and black start capability are some of PowerLine DPA's other features that are designed specifically for deployment in demanding industrial situations.

### Battery bank

Most industrial processes will draw substantial amounts of power from a UPS. Therefore, PowerLine DPA is equipped with valve-regulated lead-acid (VLRAs) or NiCad batteries to support autonomy times up to 10 h. Fast recharging is also catered for to get the UPS battery bank back up to operational levels as quickly as possible.

### Remote monitoring

In a power fail situation, it is important for all relevant personnel to be quickly and fully informed of the system status. For this reason, the PowerLine DPA UPS can be supplied with relay boards and a network management card that provide connection to a DCS (distributed control system) or SCADA (supervisory control and data acquisition) system via SNMP, Modbus TCP or Modbus

together with the process control system and makes UPS data available throughout the entire value chain and supply chain in real time. A presence on the network enhances the overall capabilities of data acquisition, operations, maintenance and advanced service.

Local control and metering are provided via an HMI (human-machine interface) consisting of a graphical display showing the UPS mimic diagram, UPS operating status (normal, battery and bypass), and programmable alarms.

### A UPS for the future

The guarantee of a continuous supply of clean power for their critical operations has become an essential prerequisite for the success of many enterprises – transportation, mining, and the food and beverage industry to name but a few. The PowerLine DPA UPS, designed to withstand the rigors of rough industrial environments, can provide this guarantee. PowerLine DPA's modular architecture makes it simple to service or expand and because its online swapping attributes mean it never has to be switched off (it is designed to run up to 15 years continuously), first-class availability is achieved.

With its efficiency of up to 97 percent and unity power factor, the PowerLine DPA UPS offers improved efficiency and optimization of investment as well as ease-of-use and enhanced safety in a wide variety of industrial environments. Combined with ease of serviceability these characteristics mean PowerLine delivers a very low TCO over the lifetime of the product.

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PowerLine DPA is equipped with VLRAs or NiCad batteries to support long autonomy times of 1 to 10 h.

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RS 485. These interfaces allow environmental monitoring, extensive alarm handling and dispatching, redundant UPS monitoring, integration of PowerLine DPA into multivendor and multiplatform environments and the supply of UPS data to Web applications.

Connectivity via interfaces such as Modbus and SNMP allows the UPS to be a part of the IoTSP (Internet of Things, Services and People) too. This makes the UPS part of a network that enables industrial production systems to exchange information and interact. The IoTSP allows the UPS to work

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