





At a higher level

A medium-voltage-level UPS for complete power protection

SOPHIE BENSON-WARNER – ABB has developed a range of medium-voltage (MV) uninterruptible power supplies (UPSs) with ratings up to 6MVA. Implementing a UPS at the MV level has many practical advantages and is an approach being adopted by customers in industry and in large data centers who have sensitive or critical loads. The PCS100 MV UPS range complements existing ABB low-voltage (LV) UPS and power conditioning products.

Title picture

Moving the UPS up to the MV level has many advantages for industrial users and data centers.

1 The PCS100 MV UPS is suitable for protecting sensitive loads.



Our modern society now relies on the ready availability of a vast amount of data. Almost every organization – health authorities, banks, government departments, retail outlets, corporations and so on – requires the safe storage of enormous amounts of information. Further, much industrial and domestic activity has become fully dependent on a wide range of electrical devices. An added complication is the arrival on the power grid of an ever-increasing number of renewable generators that has led to an increase in power-quality-related problems like spikes, swells, sags, noise and harmonics that pose a risk to all power users.

The dependence on a rock-solid supply of good-quality power has driven the massive growth in the UPS and power conditioner business in recent years. Traditionally, these devices are fitted at the LV level, but this can often pose a challenge if the space available is limited. Also, where many devices are to be protected, the sheer

number of UPSs needed can present problems in terms of management, supervision, maintenance and availability. The solution is to install the UPS at the MV level.

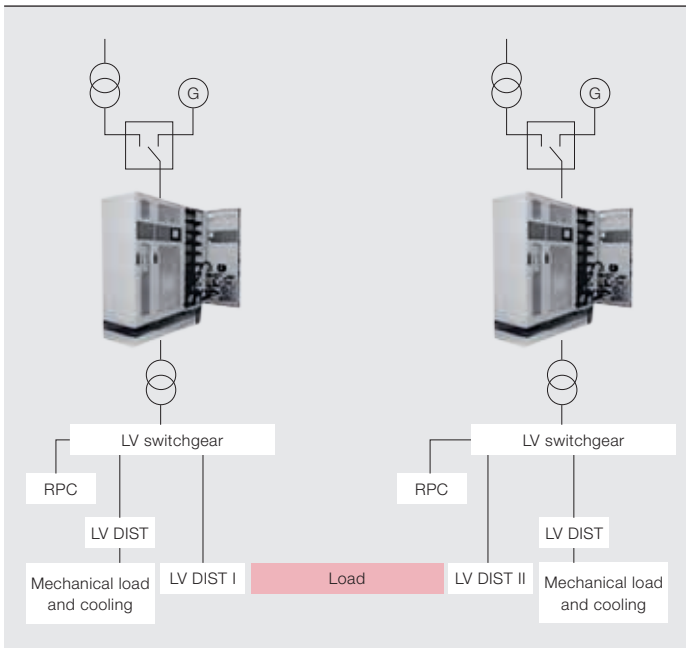
When installed at MV levels, the UPS can be put in less-crowded spaces away from the target devices – in MV electrical rooms or plant substations, for instance – thus freeing up space for more important infrastructure, such as servers or manufacturing tools.

ABB's PCS100 MV UPS range is aimed squarely at this market segment. It has been designed specifically to provide

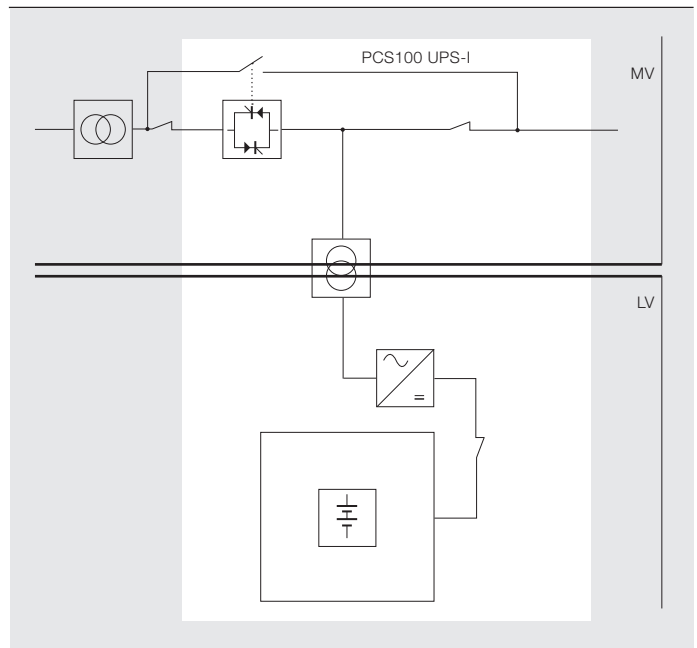
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clean, reliable and efficient power, and lower costs for customers in industry and in large data centers who have sensitive or critical loads.

2 An MV UPS can be configured to protect an entire data center load or just the mechanical loads.



3 Single-conversion topology is a natural choice for MV. Power electronics and power storage can remain at LV with transformer coupling to MV.



The PCS100 MV UPS can be installed to protect the complete supply or just selected sensitive loads → 1. In a data center this could include the mechanical loads → 2. Installing the UPS protection at the MV level provides the most energy efficient configuration as the lower currents at this voltage result in lower losses.

The first release is rated up to 6.6 kV and 6 MVA with even larger 15 kV class products to follow (including 11 kV and 13.2 kV options), rated at even higher MVA.

PCS100 MV UPS technology

The single-conversion topology used is a natural choice for MV as losses are extremely small, meaning efficiencies well in excess of 99.5 percent can be achieved. It also allows a system design where the power converter and energy storage can remain at LV, with a transformer coupling these to MV → 3. Also at the MV level is a thyristor-based utility disconnect switch which prevents back-feed into the grid in the event of a power loss or voltage sag.

Lower cost

Up-front cost is always important in equipment selection, but the total cost of ownership is usually the most important cost criterion for the customer. The unparalleled efficiency of the PCS100 MV UPS, its low maintenance costs and

small system footprint minimize ownership costs. The fact that the energy storage and converter is at the LV level also greatly simplifies maintenance and reduces system cost. Finally, the PCS100 MV UPS has many retrofit possibilities that allow custom designs that suit applications in plants that are currently unprotected or where traditional rotary UPS solutions require replacement.

Storage options

Because the energy storage is kept at LV levels, a wide range of energy storage options is available. The most common are ultracapacitors, lithium-ion batteries and high-discharge sealed lead-acid batteries. It is expected that ultracapacitors will be widely used in industrial applications due to their long life and compact size. For longer-autonomy applications, lithium-ion batteries similar to those used in electric cars offer reduced footprint and increased life when compared with the lowest-cost lead-acid solutions. Lithium-ion batteries have excellent cycle life characteristics and this opens up opportunities for smart grid support features, such as load shedding, to be added.

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