

## BACHMANN Whitepaper

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# Retrofitting inline PDUs

## Energy management for passive PDUs

### Existing data centres/passive PDUs

Until just a few years ago, data centres were built to last 20-30 years. Although this long-term planning was able to consider capacity needed later on to some extent, it was impossible to predict technological developments or changes in boundary conditions defined by legislation, standards or directives. Consequently, many operators are faced with a reality where the status quo in their existing data centres cannot be altered because 100% availability is needed. As the familiar saying goes: “never change a running system”.

### Problems with “grandfathering”

“Grandfathering” can actually be advantageous in a normative sense. After all, specific transition periods or provision for grandfathering in such standards can initially shield operators from costly and complex conversions. Potential sources of faults, unbalanced loads or even failures are not rectified by prolonged transitions and system lifetimes, however. On the contrary: as experience has shown, any problems will continue to grow exponentially.

### Solutions on a product and process level

Numerous manufacturers have given data centre operators the option of step-by-step expansion with modular solutions, such as in the case of UPS systems. Modern concepts for data centres are based on modular container solutions. Today, efficient operation of a data centre does not purely rely on cutting-edge measuring technology: European Standard EN 50600 concerning data centres now provides the first normative approaches. There is still no solution at present for the problem of modernisation measures in final circuits. Here, too, the concept of “never change a running system” applies.

### Final circuits in existing data centres

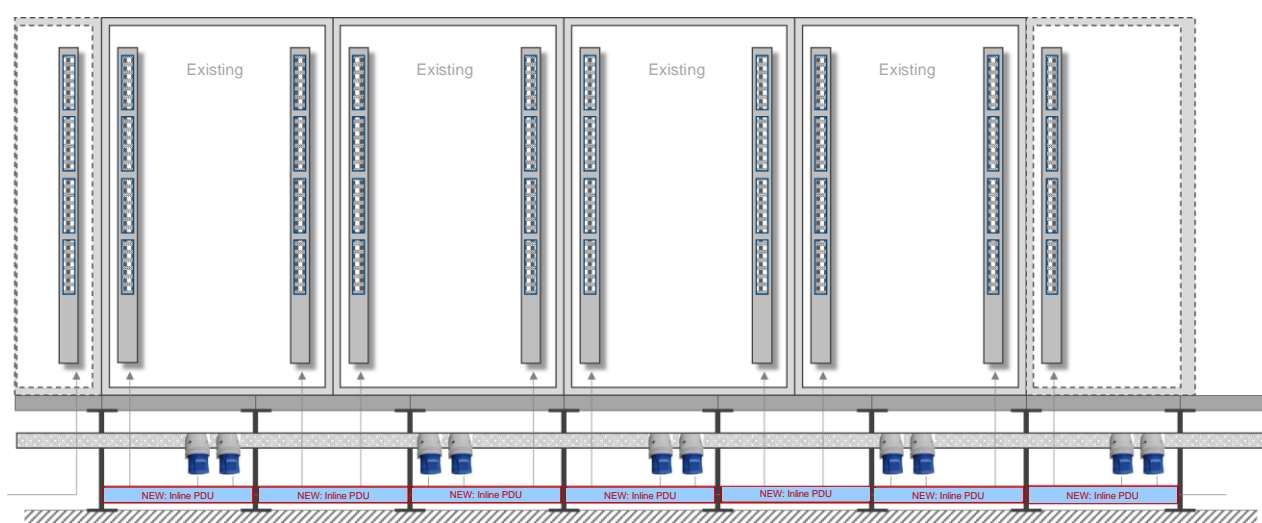
Part 2-2 (“Power distribution”) of European Standard EN 50600 mentioned above describes a series of “granularity levels”. In this context, a data centre is hypothetically sub-divided into the following 3 levels: primary distribution, secondary distribution and tertiary distribution – essentially the “sockets” in final circuits. Depending on the requirements of the customer or the data centre operators themselves, measurement must be performed up to level 3. Both existing and newly built data centres frequently feature built-in panel meters in the primary and secondary distribution systems, and this was perfectly adequate until some years ago. Modern server virtualisation makes it extremely difficult to predict the utilisation of individual racks. In addition, unnecessary energy is consumed during periods of low utilisation because it is impossible to identify which equipment is not required. Required A/B redundancies on the level of the racks are likewise not monitored if the necessary measuring technology is missing from the final circuits.

### Retrofitting inline PDUs

“Inline adapters” are increasingly being used to definitively satisfy the stipulations of standard EN 50600 across the board, thus guaranteeing existing data centres’ operation right down to the final circuits in terms of both energy and redundancy. Solutions of this kind essentially possess the full array of electronics and measuring technology found in modern PDUs. Inline adapters can also be

optionally supplemented by Type B residual-current monitoring (RCM) in order to detect even the most minor faults in the tertiary distribution and end devices.

The redundancy of the existing passive PDUs in the server rack is the absolute prerequisite for expansion. Using a clamp meter, a qualified electrician can very easily determine the power consumption before consulting with you (and with the customer, if necessary) to decide whether to consecutively reinforce infeed A and infeed B with smart measuring technology (inline adapters). This means that existing PDUs can remain in the server rack and continue to be used. This is especially important when access to the customer's racks is limited.



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