

TECHNICAL ARTICLE

Purpose-built: Modern panelboards designed to deliver safety, ease and flexibility that data centers need



The data center industry is working hard to make their operations more efficient while preserving reliability and uptime. ABB's development work has produced a panelboard solution that addresses multiple unique data center challenges and is poised to help the industry reach the next level in its evolution.

Data Centers account for 1% to 2% of global electricity use

The data center industry is one of the most highly visible, and with good reason. The sector, which wasn't even considered its own category in years past, already accounts for 1% to 2% of global electricity use. But there are a number of characteristics that make data centers challenging from an electrification standpoint.

Computing equipment in top-tier data centers now consumes power at up to 15 kW per rack, and some systems consume 30 kW and even up to 50 kW. Clearly, the trend is upward, so power distribution systems must be able to operate at higher current/voltage and to scale up as demand increases.

It's also essential that panelboards be easy to install and re-configure as the facility evolves over time. It isn't always obvious what protection devices (breakers) are required, especially in co-location data centers, so flexibility regarding the configuration is important.

Data center power systems have to be flexible. Rapidly changing server technology and dizzying growth rates mean that power systems are constantly being reconfigured and upgraded, so it's imperative that the components in place be able to accommodate rising power levels and changing topologies.

Safety is another key concern. To enable data center operators and their staff to focus on their core business, their power distribution systems need to be simplified and touch-safe. Protection of personnel with fewer PPE requirements is an advantage. Protection of electrical equipment is also important, especially since a typical data center's power systems are in close proximity to transformers connecting the facility to the local grid. That closeness implies higher fault currents may need to be managed as well as coordination or selectivity with upstream protection devices.

Solution

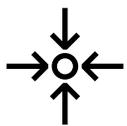
In 2019, ABB embarked on a research and development project in partnership with a hyperscale data center operator and a leading panel builder to develop requirements that would in turn yield a set of specifications for data center power distribution panels and other power system components.

The project study found that data centers in particular required:

- Designing for higher power to meet the increasing energy density and consumption of today's computing equipment
- Addressing the risk of cable connections, which can fail at the ring lug or screw
- Reducing the number of panelboard connections (input and cross-wiring)
- Developing a solution that could be used in IEC as well as UL regions

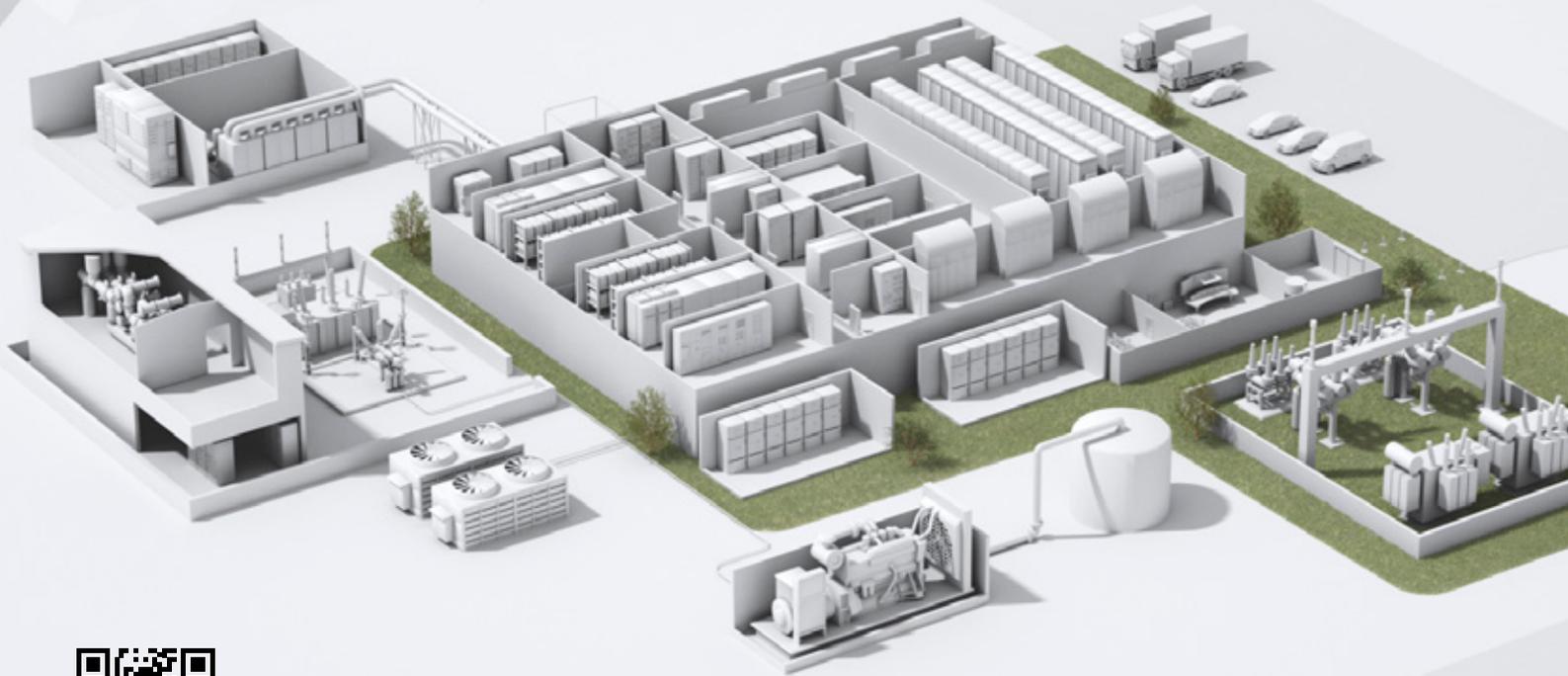
ABB incorporated these elements into its design of the SMISLINE TP, a new panelboard rated at 250 A based on an existing 125 A design used in other critical power applications. In fact, the underlying concept is 30 years old and thus already well proven.

SMISLINE TP's main design innovation is a UL- and IEC-compliant version with fewer cable connections. This allows users to add, remove and reposition any number of components quickly and easily while minimizing the risk of touching live conductors. As always, users must exercise caution, use safe work practices and follow all local regulations regarding work on energized equipment.



30%
space savings

—
2 columns, vertical installation
Tmax® XT4 main breaker, direct feed
250 A each column
IP20 touch-safe design
Pluggable MCBs



Scan QR code to take a tour through our data center landscape. Use the following route to identify an application example where Smisline TP could be used. Power distribution -> LV distribution -> Remote power panel (ANSI)

Users from other critical power installations have shown increasing interest in future-proofing their power distribution systems with SMISLINE TP.

Breakers, surge arresters, disconnect switches, motor protection—almost any number of components just snap on to a plastic framework. There is no input or cross-wiring to do, and no special PPE is required when working on the equipment. This innovation represents a significant improvement over conventional DIN rail installations. It's even possible to keep spare modules (unenergized) right on the panel.

Users can swap out miniature circuit breakers and change phases without taking the panelboard offline¹, currently an innovation unique to ABB. Much of the configuration can be done digitally, too—coordination of protection schemes can be programmed so that the smallest breaker trips during a fault, minimizing exposure to other equipment.

¹: Practice not allowed in some countries. Users must follow all local regulations regarding work on energized equipment.



25%
faster to install

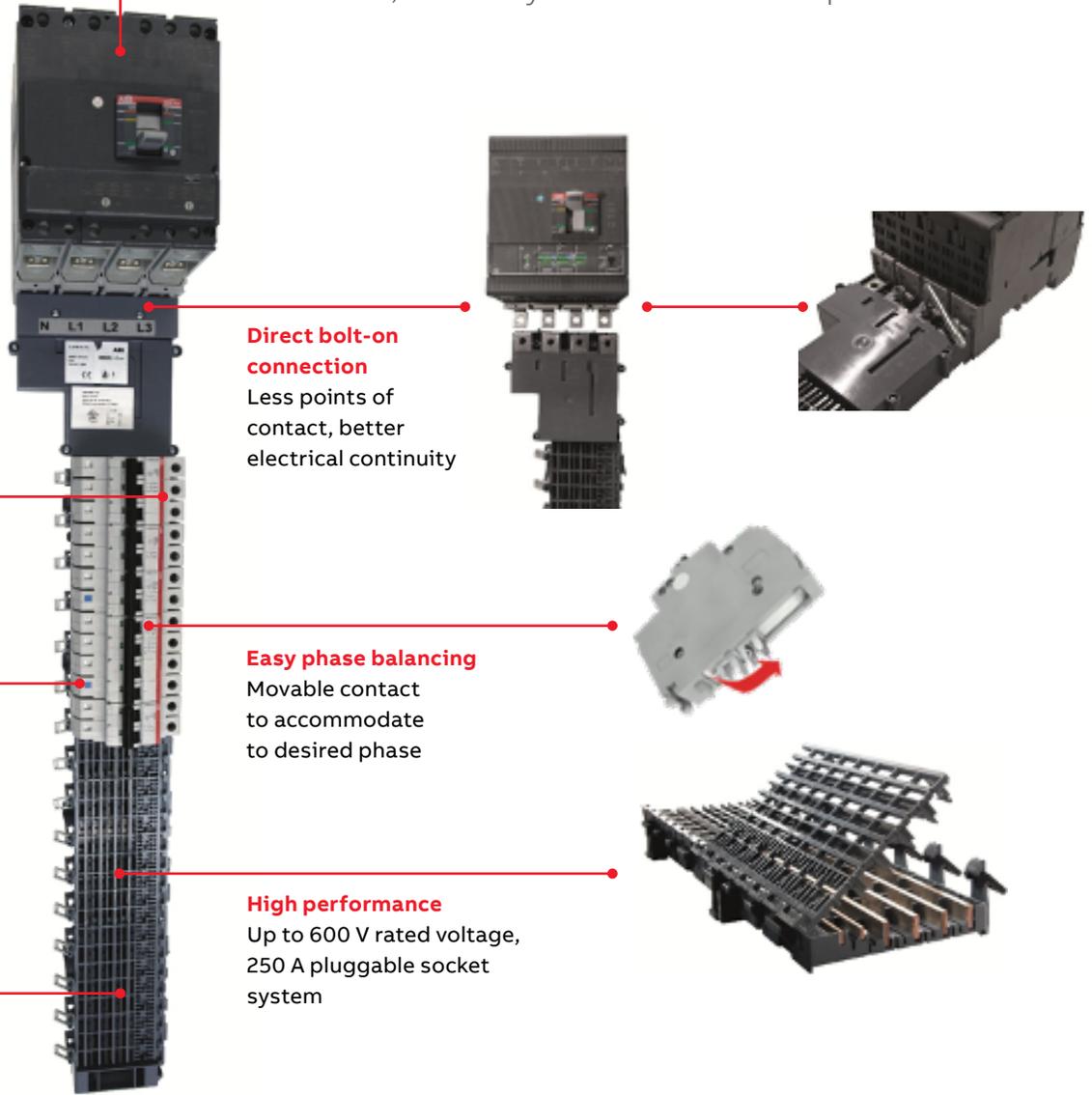
The design elements that help make SMISLINE TP safer and easier to work with also make it up to 25% faster to install. The optional vertical arrangement and mixed pole layout options yield up to 30% space savings over conventional panelboards. It's not surprising, then, that since its introduction, users from other critical power installations, such as hospitals, telecom and airports, have shown increasing interest in future-proofing their power distribution systems with SMISLINE TP.

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Key features

Saves space and time
Tmax XT4 main breaker
with plug-in kit

Users can swap out miniature circuit breakers and change phases without taking the panelboard offline, currently an innovation unique to ABB.



Direct bolt-on connection
Less points of contact, better electrical continuity

Easy to install
Direct pluggable MCBs up to 30 A

Easy to identify
Phase indicator window

Easy phase balancing
Movable contact to accommodate to desired phase

High performance
Up to 600 V rated voltage, 250 A pluggable socket system

More flexibility
Up to 80 modules total for higher power density solutions

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