

A plug for simplicity

X-Plug™ wiring technology for the ZX family of switchgear

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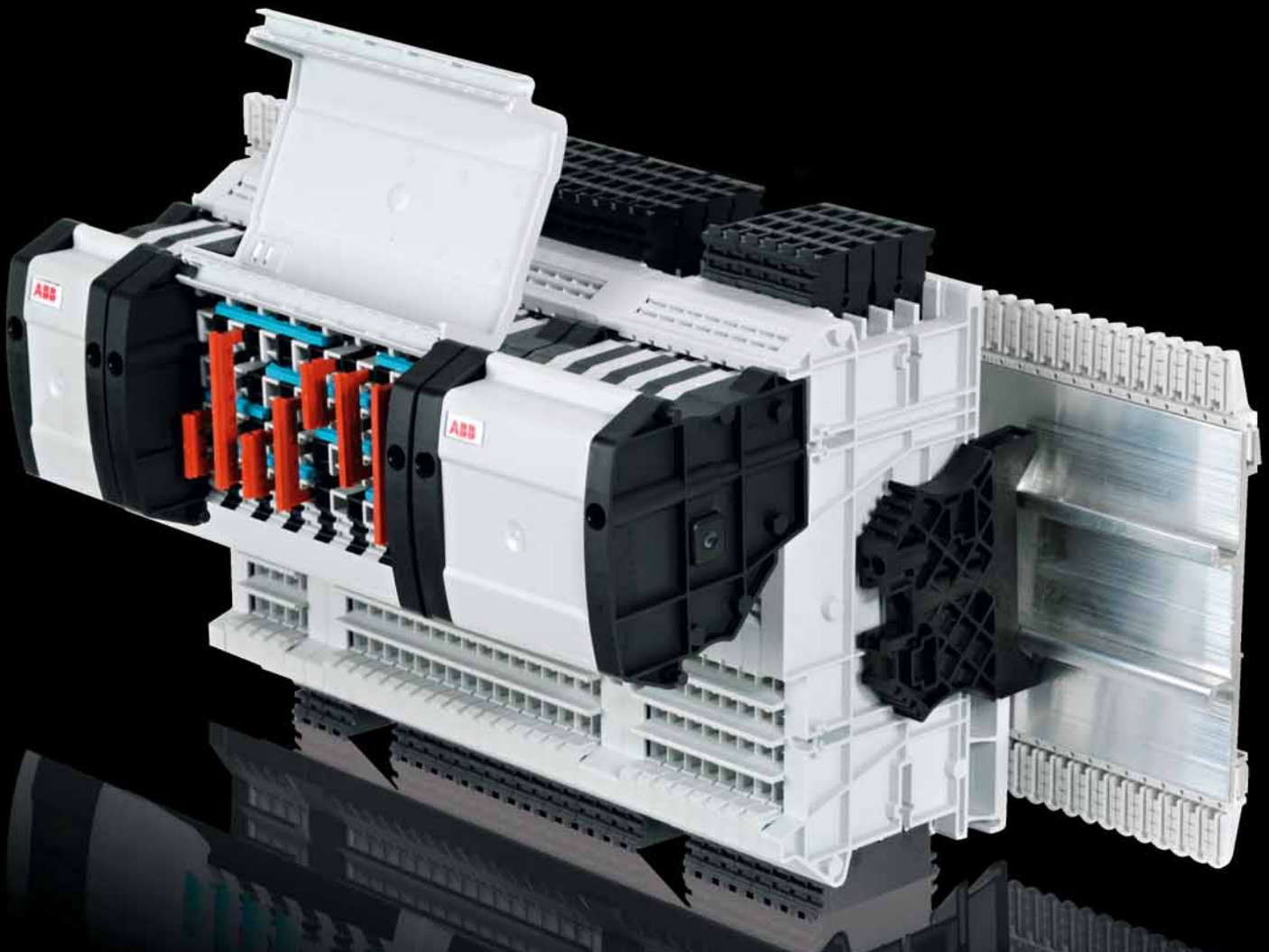


ABB has introduced its X-Plug™ wiring concept for wiring the low-voltage compartments of its ZX family of medium-voltage gas-insulated switchgear. The new X-Plug module simplifies installation and provides the ability to make use of standardized cable harnesses.

A conventional secondary low-voltage compartment used for the control of a switchgear installation contains a wide range of discrete components. These include push buttons, indicator lights, indicator instruments for current and voltage, measurement transformers, intelligent electrical devices (IEDs), auxiliary relays and auxiliary mechanical contacts. To make these assorted items fulfill their intended functions and work together as one protection and control cabinet, they have to be wired accordingly. However, the topology of this wiring varies from application to application. The broad range of possible functions, components and customer demands and specifications mean it has until now not been possible to standardize to any appreciable degree. Every cabinet had to be wired individually in a time-consuming and costly process.

Rather than individually wiring each device to all the others, the X-Plug™ makes it possible to connect all devices to one module.

Furthermore, the broad range of possible applications leaves little potential for standardized cable harnesses (preconfigured bundles of cables with plugs on both ends). The wiring of such cabinets can easily acquire a

spaghetti-like aspect, presenting a potential source of errors and impeding maintenance and modifications.

Now what if all this could be replaced by a simpler concept?

The X-Plug™ concept

ABB has introduced a new wiring approach to its ZX family of medium-voltage switchgear **1**. Rather than individually wiring each device to all the others, the X-Plug™ makes it possible to connect all devices to one module using standardized cable harnesses. The individual marshalling of all signals is managed inside the plug, and the connection topology has been

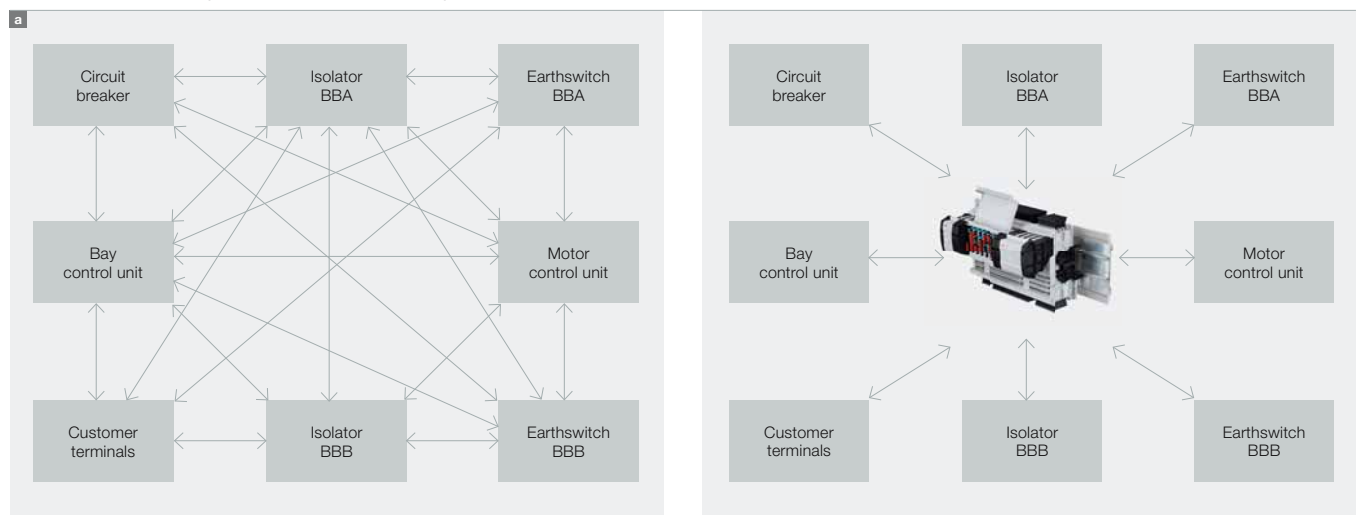
moved from the panel to the inside of these plugs **2**.

But is this approach not just shifting the wiring problem from the cabinet to the plug? No, because rather than all devices in the cabinet potentially having to be connected to all other devices calling for a large range of connections, wire lengths and wire routings, the equipment now only needs to be connected to the X-Plug using standardized connectors. As all wires coming from the equipment now end at the plug's terminals, this reduces the number of wire connections (X-Plug can save up to 50 wires for a ZX2 double busbar panel) and

1 ZX-family gas-insulated switchgear

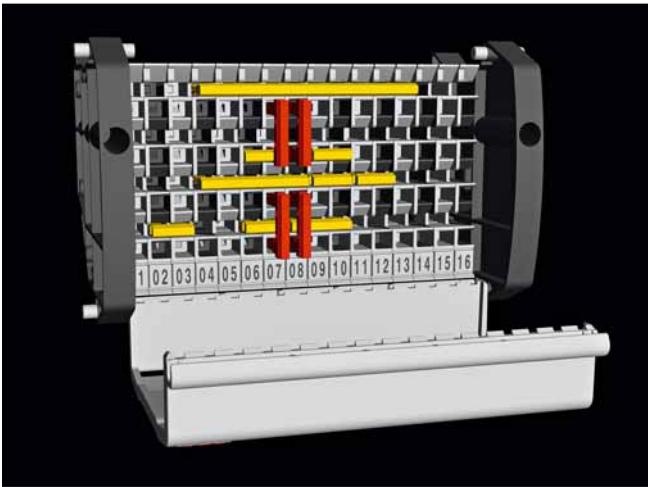


2 Connection topology: traditional **a** and X-Plug **b**

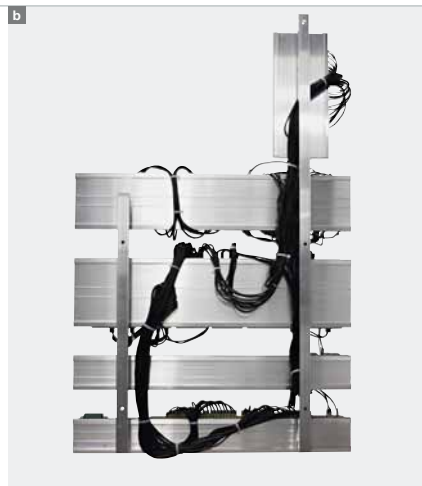
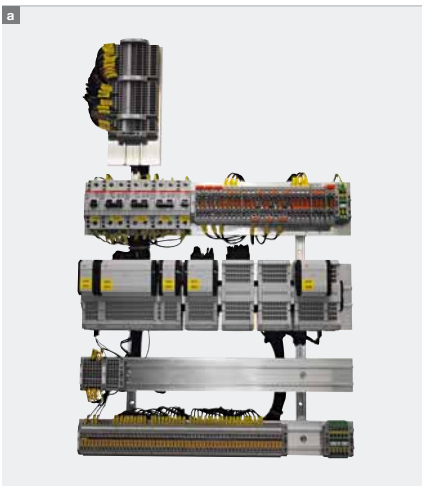


Innovative connections

The X-Plug replaces complex wiring with a simple plug



3 Front a and rear b sides of the X-Plug wiring frame



increases uniformity in terms of cable lengths, permitting cable harnesses to be used instead of individual cables. 3 shows the front and rear sides of a wiring frame using X-Plug technology. The environment of the X-Plug is completely standardized, and customization is managed inside the plug.

Reprogramming requires only a simple change of plugs, thus greatly reducing downtime and the risk of wiring errors.

One of the great strengths of this approach is that cabinets can be easily reprogrammed. All it takes for such reprogramming is a change of plugs, without any wires having to be

touched, thus greatly reducing downtime and the risk of wiring errors (especially if the X-Plugs are delivered to the site preconfigured and pretested).

It is possible for example, to change an incomer panel to an outgoing feeder or double busbar functions to single busbar functions simply by substituting X-Plugs with a different coding.

Inside the X-Plug

The X-Plug can be preconfigured, reducing installation time, yet it remains modifiable so that the customer need not sacrifice any of the flexibility that conventional wiring offers.

Inside the X-Plug is a regular matrix of terminals. The basic module is four-level (the terminal blocks are arranged on four horizontal levels)

and is available in widths of four, eight and 16 terminals.

These terminals can be interconnected horizontally, vertically and diagonally using jumper plugs.

Using the X-Plug

The X-Plug is exclusively designed for ABB and is IP (intellectual property) protected.

By the end of its first month on the market, 390 ZX panels with X-Plug terminals had been designed by ABB, accounting for 86 percent of panel orders in August 2009. These panels were shipped to chemical industries, utilities and mining businesses, greatly reducing the amount of on-site configuration required while giving customers unprecedented flexibility in making modifications and so protecting the value of their investment.

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