Application Paper **AP03407005E**

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Using *XT* IEC power control to reduce costs

Wiring reduction = cost savings

The significant value of time

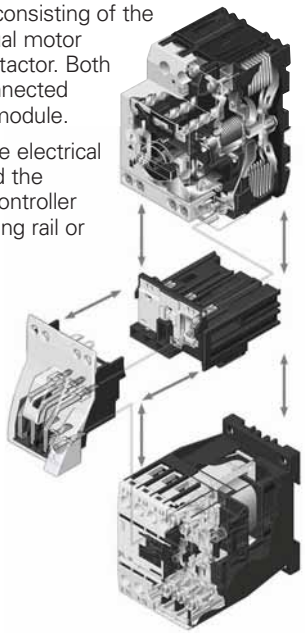
Today's cost-competitive environment is as strong as it has ever been. Even minor improvements to panel assembly can have a significant impact on cost management and productivity. Mounting and wiring motor protective circuit breakers and contactors can be a time-consuming and costly process, as well as a source of wiring errors, which add to already cost-sensitive production figures.

Thanks to Eaton's ***XT*** IEC product line and its toolless plug connection, motor starters can now be assembled and wired without any tools, and at a fraction of the time and cost. The plug connection design saves time in assembly and mounting of combination style controllers (consisting of a manual motor protector and a contactor), as well as reversing and star-delta contactors. Assembling the motor contactors and controllers with toolless plug connectors reduces mounting and wiring time by enabling standard motor starter components to be built quickly and error free.

Combination style controllers

With combination style controllers, such as the XTSC manual motor controller and the XTFC combination motor controller, the user simply "clicks" the components together. The combination style controller is a complete unit consisting of the proven standard XTPB/XTPR manual motor protector (MMP) and an XTCE contactor. Both switches are mechanically interconnected by means of the plug connection module.

A plug contact module provides the electrical connection between the MMP and the contactor. This combination style controller assembly can be fitted to a mounting rail or a busbar without the need for an additional adapter.



Reversing and star-delta contactors

Reversing and star-delta configurations require a large amount of time-consuming wire cutting, stripping, and installation. Several manufacturers have wiring link kits to help users spend less time wiring their contactors. However, the ***XT*** IEC contactor line takes wiring one step further. The ***XT*** has reversing and star-delta wiring links that simply plug-in to the face of the contactor, eliminating the wiring errors and the need to use tools. Additionally, the ***XT*** has a mechanical interlock that installs quickly without any tools.

These assembly benefits come without any sacrifice to safety or reliability. All poles in the contact modules are plastic-coated to protect against accidental contact, and the selected shapes prevent the contact modules from being fitted incorrectly. The toolless plug connection design produces a cleanly wired appearance that inspires trust in the reliability and safety of the assembly.

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Appearance is great...cost savings are even better

To find out exactly how much time users actually save, a practical test of the toolless plug connectors was performed by the Institute for International Product Safety (www.i2ps.de/en), an organization which offers its customers a wide range of testing services in the electrical engineering, electronics, and environmental specification fields. The test measured the installation time for combination style controllers, reversing contactors, and star-delta contactors. The following tasks were timed using a conventional design and the ***XT*** line:

- Contactors and/or manual motor protectors had to be mounted on a DIN rail and wired
- For the conventional design, wiring material and ferrules were provided. Cables had to be prepared by the users themselves. For the ***XT***, the appropriate plug connection kit is supplied
- Motor starter supply cable and motor feeder were already provided at the starter location

Results

As expected, mounting and wiring for ***XT*** required less time. However, the difference was considerably greater than previously expected. The combination style controller, and reversing and star-delta contactors could be assembled more than three times faster. In other words, **compared to the conventional method, the toolless plug connection design reduced the required time for mounting and wiring by almost 70 percent**, and could thus significantly reduce the wiring costs involved.

The ***XT*** family of products delivers the performance, savings, and reliability required for OEMs and panel builders to be competitive in markets around the world. Anyone who builds control systems and panels on a daily basis will appreciate the significance of this time advantage. The exclusion of sources for error is also very beneficial. Short-circuit proof connections and coordinated starters are other benefits of this system. Eaton motor starters consist of perfectly matched components and are always suitable for UL® 508A combination ratings and IEC Type 1 or 2 coordination. Please refer to Eaton's product application AP03407001E for a review of Type 1 and 2 coordination. Applicable UL 508A information can be found at www.eaton.com/UL508A.

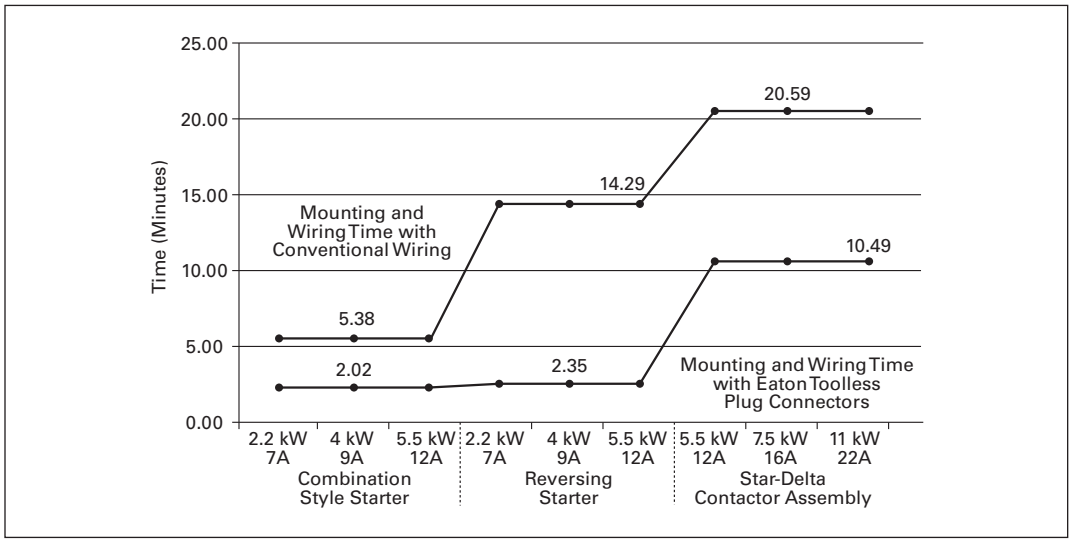

Figure 1. Mounting and wiring times for motor starter assemblies

Note: The data is based on the test results of the accredited Bonn Testing Laboratory of the Institute for International Product Safety GmbH.

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