

Wire ahead

Pluggable connections and prewiring solutions boost productivity



VINCENT MENAGER – The globalization of the electrical equipment business has forced original equipment manufacturers (OEMs) to venture into international markets. The intense competition they find there means that the traditional one-to-one wiring methods they previously employed to wire up control panels, field devices and the like are no longer economically viable. The new wiring techniques they have come up with include prewiring solutions using pluggable terminal blocks, in association with prewired harnesses.

There is an old, and very true, saying in industry that the top three causes of failure in the field are cables, cables and cables. Wiring errors can cause project delays or trigger severe financial penalties and are a sure way for a company to damage its reputation. These factors – and increased global competition – have forced manufacturers to come up with new and more efficient wiring concepts – namely modular, pluggable and prewiring techniques.

Modularity brings assembly flexibility

In a modular wiring concept, assemblies and subassemblies are manufactured separately – often by a specialist subcontractor – and are only put together for testing and final installation. Assemblies can be individually tested at the module level, thus reducing the complexity of the test equipment. Because the modules are standardized, swapping modules when wiring has to be rejigged – for example, for fault tracing – is simple. Modularity offers great flexibility to equipment manufacturers.

However, modular design would be pointless if not used in association with pluggable functionality.

Wiring flexibility with pluggable functions

In contrast to the traditional terminal block, a pluggable terminal block is equipped with a removable plug that allows quick assembly or disassembly of the equipment.

Pluggable terminal blocks are characterized by the type of technology used (screwless, screw, insulation displacement connection, etc.) and the number of connections, plugs and circuits. ABB provides the full scope of pluggable terminal blocks – for example, PI-Spring (combining push-in and spring technologies) and ADO System® for harsh environments, and screw clamp technology for general industry.

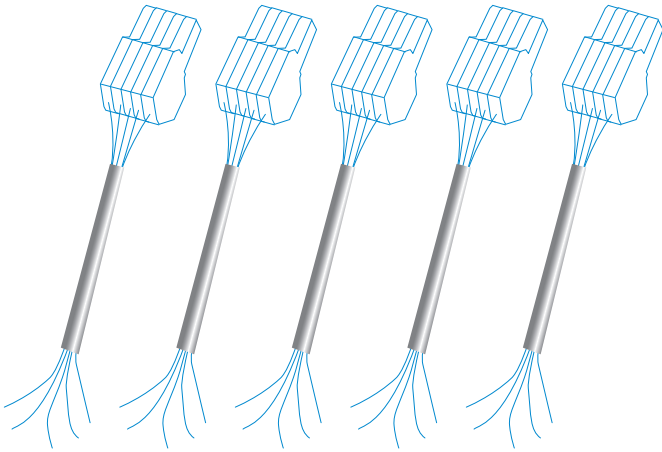
Prewiring

With plugs, wires can be easily combined into harnesses – a task that can be performed prior to complete equipment mounting and testing → 1. The ability to prewire and pretest removes potentially high-risk manufacturing steps from the project critical path and brings major positive benefits:

Serialized production and testing

Wiring is usually subcontracted to a specialist who uses automatic wiring machines for the time-consuming tasks of

1 Combining wires into harnesses simplifies assembly and testing



2 Pluggable and prewired connections are particularly useful in electronics-laden modern trains, where space is limited.



Pluggable terminal blocks facilitate and considerably accelerate assembly, test and factory commissioning.

wire cutting, stripping, crimping and identification or marking. This results in a high-quality product and is usually far more cost-effective than performing the task in-house. Pretesting can easily be automated and set up for serial production.

Equipment assembling and testing, factory commissioning

Before delivering equipment to the final customer, the equipment must be assembled in the workshop and fully tested – a procedure considerably accelerated when pluggable terminal blocks are used.

Transportation and installation

For larger items, transportation may involve dismantling before shipping and reassembly on site – a process greatly facilitated by pluggable terminal blocks. Further, screwless technologies such as ABB's PI-Spring or ADO system tech-

nologies guarantee a vibration-proof and shockproof connection, so are ideal for equipment that has to be shipped already wired up.

Railways

Prewired solutions are a major contributor to the efficiency increases sought by European railway manufacturers in response to global price erosion. ABB is a leading supplier of terminal blocks – particularly the pluggable type – to the railway market → 2.

ABB's PI-Spring terminal blocks, being compact (space for equipment on trains is limited) and resistant to shock and vibration, are ideal for making reliable connections in trains. ADO System terminal blocks offer significant productivity savings as well as secure and reliable connections. These connector systems are tested to the latest international standards for rolling stock, such as IEC 61373 for vibration and shock, and EN 45545-2/NFPA 130 for flammability and toxicity of plastic material.

Process automation

Process automation applications typically handle thousands of signals and, here again, prewiring and pluggable solutions offer significant system simplification and better wiring reliability. ABB's Interfast prewiring system for programmable logic controllers (PLCs) and digital control systems (DCSs), for example, can reduce installation time by up to 98 percent.

Switchgear

Switchgear equipment is constantly evolving and newer products include high-end electronics as well as digital communication. ABB's SNK pluggable terminal blocks makes the expansion of these complex switchgear systems simple. The SNK series provides double-plug connection, which allows daisy chaining of signals and easy system expansion.

Railways, process automation and switchgear are just three areas where prewiring solutions are making a significant impact. There are countless others. Pluggable terminal blocks and prewiring solutions can create productivity savings in any applications that have a heavy dependency on wiring.

Title picture

Prewiring is an essential tool for electrical equipment manufacturers. (Shown is ABB's pluggable terminal block).

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