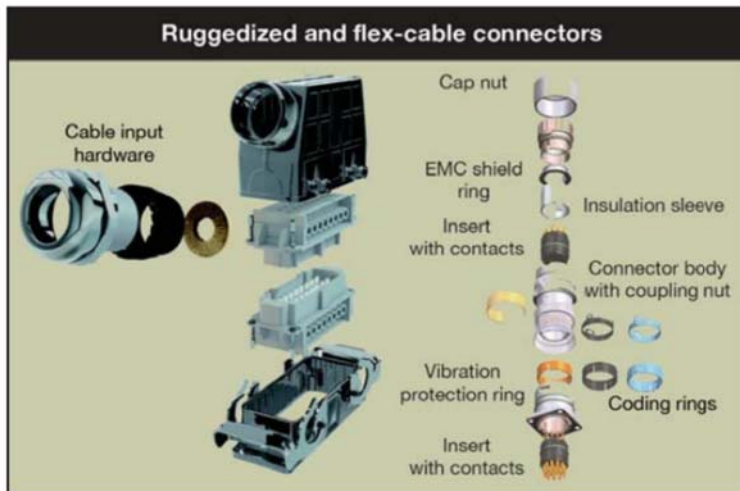


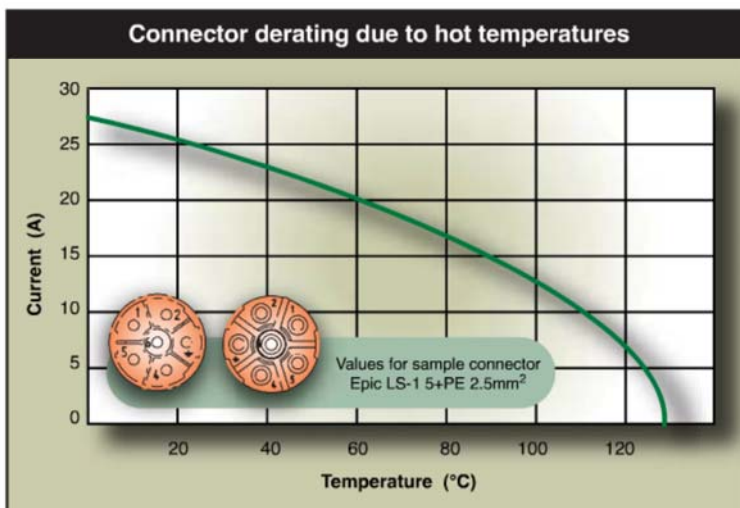
Connector specifications

A typical manufacturing plant has thousands of electrical connections on both fixed equipment and moving machines. When those connections wear out or fail, it brings production machines to a dead stop — because hardwiring new replacement cable can take hours. One way to minimize such downtime is to fit multi-conductor power and signal cables with quick connectors at both ends, so that cables can be replaced in just minutes.

This month's handy tips provided by Jack Gayara, EPIC Product Manager, Lapp USA, Florham Park, N.J. For more information, visit lappusa.com.



Options abound in cable connectors. Left is a ruggedized connector; right is component that incorporates shielding.



Extreme installations require consideration of the five general parameters, plus other criteria. In hot applications, for example, designers must account for the fact that connectors are gradually derated with increasing temperatures.

Q&A

In what kinds of applications are connectors necessary?

Typically, connectors are required for cabling on highly dynamic applications — to 1,000 V, 125 A, and 280 contacts where required. Elsewhere, connectors are used on machinery that must withstand extreme environments — with protection to IP 65, 67, 68 and NEMA 4, 4X, or 12.

What parameters define a connector?

Dozens of connector varieties and thousands of individual connectors exist, but five key parameters help narrow the options:

① **Number of contacts:** It may seem obvious that the number of contacts in the connector should match or exceed the number in the cable — but one common mistake is to miscount by not counting ground. Cable conductor counts typically include ground, while connectors do not.

② **Wire gauge (AWG):** Cable's wire gauge must be within the allowed range of the connector contacts. In general, screw contacts accommodate a broader range of wire gauges than comparable crimped contacts.

③ **Cable outside diameter (OD):** This dimension is often overlooked during specification. A poor seal results if the cable OD is too small relative to the connector, whereas an oversized cable OD may prevent it from fitting into the connector.

④ + ⑤ **Maximum voltage and current:** Perhaps the most important specification to ensure a safe design, a connector must be rated to handle the voltage and current of an application.

Other parameters must be taken into consideration for difficult operating environments or unusual electrical requirements — as when, for example, a connector sports the correct number of contacts, wire gauge, and OD, but an insufficient current or voltage rating.

Must design engineers use connectors?

No — unless downtime must be reduced. Power and signal disruptions have many mechanical and electrical causes, from forklift accidents to over-current conditions. In installations where critical electrical connections abound, some will eventually get damaged. Connectors add a small premium to the initial cost of cabling, but can pay for themselves by eliminating even a few minutes of inevitable downtime on a busy production line.