Plastic-moulded circular plug connectors
For every situation

Circular plug connectors are essential components for connecting devices. Wherever reliable data, signal, and power transmission are required in industrial environments, circular plug connectors are at the core of electrical connection technology. Plastic-moulded circular plug connectors provide advantages over freely configurable variants in many applications (Figure 1).

Figure 1 Electrical connection technology at its core: rugged molded circular plug connectors for data, signal, and power transmission.

The demands placed on plug connection technology have become more diverse and tougher in recent years. The high stresses in the industrial environment and the increasing use under outdoor conditions require rugged connector housings, secure contact solutions, and plug systems that sit tightly. For the cable side, Phoenix Contact provides comprehensive solutions based on PUR (polyurethane) moulding.
PUR-moulded plug-in connectors for harsh application conditions

Conventional plug-in connectors for field assembly consist of many components and are complex to assemble. Field assembly is time-consuming and error-prone for users, thus potentially resulting in costly, unforeseeable work delays. In order to avoid this, plastic-moulded plug-in connectors have been on the market for years – initially in sizes M5, M8, and M12. Since 2013, plastic-moulded plug-in connectors have been available in a full range of sizes, including M17, M23, and M40. These new plug-in connector series were developed for especially harsh environmental conditions in machine and systems engineering.

High vibration resistance and secure contacting

Particular emphasis is placed on vibration resistance. Both the housing and the wire connection area inside the plug-in connector are moulded in typical solutions available on the market. The contacts are no longer floating, and vibration can cause microscopic movements that lead to increased contact wear.

Phoenix Contact now provides a solution in the sizes M17, M23, and M40 in which the moulding material is applied only to the outside of the shield sleeve and the housing. As a result, the contacts are still floating, and high contact reliability is thus maintained even when subjected to higher temperatures. In addition, the metallic shield sleeve ensures reliable 360° shielding (Figure 2).

Advantages in logistics

The moulded plug-in connectors are also interesting for users from a logistical point of view. moulded cable assemblies for data, signal, and power applications can be ordered in all standard sizes. Users benefit by no longer having to procure the cable and the individual plug components. Special crimping tools are not required, and subsequent manipulation is impossible for moulded plug-in connectors. Customers are thus freed to concentrate on their core tasks.
Molded circular plug connectors

Data, facts, and advantages

- Plug & play allows simple installation
- Specialised personnel not required for assembly
- No wiring errors
- No testing required by customer
- Minimal storage requirements
- Absolutely impermeable
- UL/CSA approvals
- High-quality PUR (polyurethane) molding
- Standard or quick locking technology with Speedcon
- All pin assignments from the standard M17, M23, and M40 series
- Full electrical testing of each article
- Large temperature range from -40°C to +105°C
- UV-resistant
- High resistance to oil and chemicals
- Resistant to microbes and termites
- Integrated lug for attaching dust protection caps
- Halogen-free materials
- Low weight
- Reduced plant and machine assembly times
- Attachment to corrugated pipes possible

Ready availability

Users demand ready availability of articles matched to their requirements, in addition to a wide variety of designs and customised versions. The Cable Assembly production facility at Phoenix Contact’s Coninvers subsidiary in Herrenberg, Germany, has a broad range of standard cables in stock for industrial applications. In addition to a variety of catalogue articles, custom-made moulded plug-in connectors are readily available to customers.

Moulded plug-in connectors can be adapted to the wide variety of customer requirements, which will be listed as independent articles. The user selects the optimum solution from a wide range of cable types and cable lengths. Cable markings and labels can be also designed to comply with the user’s specifications. Typical requirements include moulding on one side or on both sides, or even in combination with components from other manufacturers.

In addition to the normal black moulding, additional UL-approved colour batches are available on demand. This allows users to match the components to their corporate design. To this end, the company’s logo may also be implemented in the moulding tool.

The quick-locking design of Speedcon

The moulded plug-in connectors also work with the standard Speedcon quick-locking design. This concept allows cable and device plugs to be connected easily and locked with just a quarter turn, even under poor visibility conditions. With this quick-connection technology, sealing and vibration resistance are just like for a conventional screw thread. All sizes of moulded plastic plug-in connectors, from M5 to M40, are provided both with standard and Speedcon quick locking technology.
Plastic-moulded variants of cable and coupler plugs are available in straight and angled designs (Figure 3). An M23 moulded T-coupler including the 3+PE and 4+PE pins for 30 A is available for power distribution. All well-known pin assignments in the M17, M23, and M40 series can be assembled including the corresponding cables and then moulded.

**New moulded M23 hybrid plug-in connector**

A new product was added to the family of moulded plug-in connectors at PLC/IPC/Drives 2014: Phoenix Contact is the only manufacturer offering a plug-in connector with both a straight and angled moulded plug-in technology and a hybrid pin assignment for transmitting data according to Cat5, as well as signals and power. The cable outlet orientation of the angled plug-in connector is freely adjustable by +/-90 degrees after attachment to the device. These plug-in connectors are also fully electrically tested. This also applies to the data transmission properties of the Cat5 element. Equipped with four separately shielded data contacts, four signal contacts, and five power contacts, as well as a cable tailored to the pin assignment, users have all components matched to their hybrid applications, from a single source (Figure 4).

**Global connection**

In addition to a plug-in connector range’s scope and universality and the technical reliability of the components, many users want to know: Are the products available worldwide and even in their specific country as stock articles? Is there worldwide sales and technical support? With 50 subsidiaries and more than 30 agencies around the globe, Phoenix Contact is able to provide a high level of service on site.

moulded circular plug connectors in sizes ranging from M5 to M40 provide users with high flexibility. The PUR-moulded plug-in connectors exceed the freely configurable variants in
important aspects, with a high protection rating and impermeability, a high level of manipulation security, and an attractive price/performance ratio.

If you are interested in publishing this article, please contact Alicia Armand, aarmand@phoenixcontact.ca or 800.890.2820