

Innovative Ethernet Cables for tomorrow's standards

The technological advance of industrial automation and the increased need for networked connectivity have driven Ethernet protocol to be the cornerstone of today's modern cable applications. Since technical standards are constantly evolving, industrial Ethernet cables must develop concurrently.

Traditional Ethernet cables are used for data transmissions between individual functions within a local area network. The same Ethernet protocol that has been established in networking has also made its way into industrial automation, as the Internet of Things (IoT) has driven demand for these types of cables. Ethernet ports can now be found on virtually all aspects of automation, from motor drives and PLCs to cameras and robots.

Finding an Ethernet cable that can handle the mechanical demands of industrial applications and still function electrically, in accordance to the various Ethernet protocols, is a major challenge that customers face. It is also difficult, yet critical, for customers to find an Ethernet cable that combines high frequency and bandwidth with extended service life. To meet these requirements, chainflex® Ethernet cables from igus® are highly recommended. These cables meet various criteria, from electrical parameters such as transmission specifications, to mechanical parameters such as linear and torsional movement, reduced bend radii, appropriate temperature ranges, and chemical and oil resistance.

chainflex® Ethernet range and advanced features

The range of Ethernet solutions from igus® is vast. There are 35 raw cable options to choose from, as well as 12 families and over 300 configurations of ready-cable connectorized assemblies. For any system, igus® offers Ethernet cables for CAT5, CAT5e, CAT6, CAT6a and CAT7 so that the right solution for all data volumes is available. CAT5e and CAT6 chainflex® Ethernet cables are now designed with UL 300 V Power over Ethernet, or PoE. This means that the two Ethernet cables offer the possibility of connecting terminals that handle a supply through a network line. They also feature jacket materials that are hydrolysis and microbe-resistant, oil and coolant-resistant, flame-retardant, halogen-free and notch-resistant. CAT5e and CAT6 chainflex® cables are now available with UL CMX listing for field and machine



cabling with additional protection. The CAT5e and CAT6 Ethernet cables CFBUS with UL and CFBUS.LB. for smallest radii have recently successfully passed the test of CC-Link IE Field Network as well; these cables have a TPE outer jacket, are PVC and halogen-free, oil and bio-oil resistant, PVC and halogen-free, and hydrolysis and microbe-resistant.

The world's first CAT7 cable for continuous moving e-chains® is also among the chainflex® range. The special construction of the Ethernet CAT7 cable guarantees durability in continuous flexing applications. The cable's braiding has been increased substantially and overall shielding has 90 percent optical coverage, which ensures high-level functionality, even after millions of bending cycles. In addition, the special conductor and stranding techniques increase the cable's service life. The CAT7 cable is flame-retardant, as are all cables with the abrasion-resistant TPE outer jacket. It is also UL/CSA, EAC and CTP certified, as well as DESINA compliant.

Additionally, igus® offers Ethernet hybrid cables, made ready-to-connect in energy chains for moving applications. The hybrid design offers the four pairs needed for Ethernet, combined with four power conductors, giving users the option to power devices with more amperage than what is offered with typical PoE applications. The core structure is protected by a pressure-extruded, highly oil-resistant PUR outer jacket. These hybrid solutions have UL approval and meet the requirements of EAC and CTP. They also allow power supply to be implemented for network components, as well as data transmission, with just one cable. This can eliminate the need for another cable, therefore saving space in energy chains and reducing overall costs.

Electrical performance



Cable design

The foundation of chainflex® Ethernet cables—what sets them apart—is their unique design. chainflex® Ethernet combines the design logic of continuous flexing cable structure with the electrical function of Ethernet electrical characteristics. For example, Ethernet cables with two twisted pairs are mechanically problematic, as the two pairs nest together to form a cable core that is not conducive to continuous flexing. igus® two pair cables have a star quad design, which takes four insulated conductors twisted together, and with proper termination, they will function the same as traditional twisted pair cables. At the same time, this design provides continuous flexing performance during millions of cycles, unlike a two-pair design that causes failures early on. Other innovations in the chainflex® cable design, such as optimized pitch length, pressure-extruded inner jackets and special taping, are combined together to eliminate downtime.



star-quad structure of chainflex®

Applications and testing

igus® offers the largest global portfolio of Ethernet cables for various industrial applications. chainflex® Ethernet cables can accommodate linear, vertical hanging, torsional or robotic applications. Special requests for long travels or high tensile strength versions for hanging applications and rolling solutions are also a standard for igus®. chainflex® Ethernet cables are often used in packaging machines, machine tools, stacker cranes, clean rooms and more. No matter what the required mechanical and electrical performance, users can count on reliable, tried-and-tested cables and select the most affordable cable from our product range that will work in their application. To ensure that these special designs and materials perform in real-world applications, igus® annually conducts over one billion cable test cycles at its 29,600 square foot in-house test laboratory. These are continuous-flexing tests, which monitor the cables with a specially-designed AutΩMeS system from igus®. The test sequences are also used to continuously monitor Ethernet-relevant values as the cables are moving. This is done to ensure optimal data transmission qualities of the cables, otherwise they could cause significant problems over long periods of movement if they are poorly designed or manufactured. With the continuously-conducted tests that help to create high-performing designs, customers can be certain that chainflex® cables will excel for the duration of the extended, guaranteed service life.

Browse Ethernet cable options, visit our [online product finder](#) or call 1-800-521-2747 for more information.