

How Does EtherCAT Work?

According to the EtherCAT Technology Group, EtherCAT is a high-performance, low-cost, easy-to-use Industrial Ethernet technology with a flexible topology. EtherCAT stands for Ethernet for Control Automation Technologies. As its name implies, the focus of this technology is on automation processes. There are multiple reasons why regular Ethernet is not suited for these applications, but the main one is speed. To understand where EtherCAT's speed comes from, we must first understand how it works.

How it Works

EtherCAT uses a Master/Slave configuration in which only a master node is allowed to send a data frame within the segment (this assures real-time operation and avoids delays). When the master sends it, it passes through each connected node as a stream. Each slave reads from the frame only the data addressed to it and inserts its own data while the frame continues to move forward to the next node. The last node in the segment then sends the frame back to the master with all the data written by each slave node.

Benefits of EtherCAT

Performance

EtherCAT is the fastest Ethernet technology available in the market. Additionally, it synchronizes clocks with nanosecond accuracy. The rapid reaction times reduce the wait times during the transitions between process steps, significantly improving application efficiency. Lastly, the EtherCAT system architecture typically minimizes the load on the CPU by 25 – 30 % compared to other bus systems.

Flexible Topology

EtherCAT uses full-duplex layers, and when an open port is detected in a specific node, it automatically returns the data frame to the master. This allows for multiple options in topology (star, tree, line, bus, ring).

Inexpensive

EtherCAT delivers the features of Industrial Ethernet at a price similar or even below that of a traditional Fieldbus system. The only hardware required by master devices is an Ethernet port. When using EtherCAT, the network does not require switches, so you save money on purchasing and configuring said systems.

Redundancy

When using a ring topology, since the master has nodes connected in the second port and the first, if a link within the network is down, the data stream returns to the master and goes out the other side to the pending nodes. This provides a redundancy effect in which you always contact all the nodes despite a network link going down.

Ordering Information

Within the Capacitive probe product lines, Lion Precision offers the EtherCAT digital output in the CPL590. In the Eddy Current product line, you can request EtherCAT in the ECD310. Please contact Lion Precision for ordering information.

We can be reached via email at info@lionprecision.com or via telephone at (651)-484-6544

Lion Precision products are subject to U.S. export control regulations. They may be subject to certain licensing requirements and restricted for export.