



CC-Link IE Control

Gigabit Industrial Ethernet

An Open Integrated Ethernet Automation network

Open-technology, CC-Link IE Control brings vast new possibilities to the world of automation.

To meet the changing demands for optimized control, openness, reliable, and deterministic handling of data on industrial communication networks, the CC-Link Partner Association (CLPA) announces this 1-Gigabit Ethernet-based integrated network. CC-Link IE Control enables seamless data communication from the plant-level enterprise network to the production floor network. This integrated industrial network philosophy also provides cost reduction for the total system engineering task from system start-up, operation, and maintenance.

High speed, deterministic Ethernet networking.

CC-Link IE Control Network is the first open standard 1Gbps manufacturing network to be released globally.

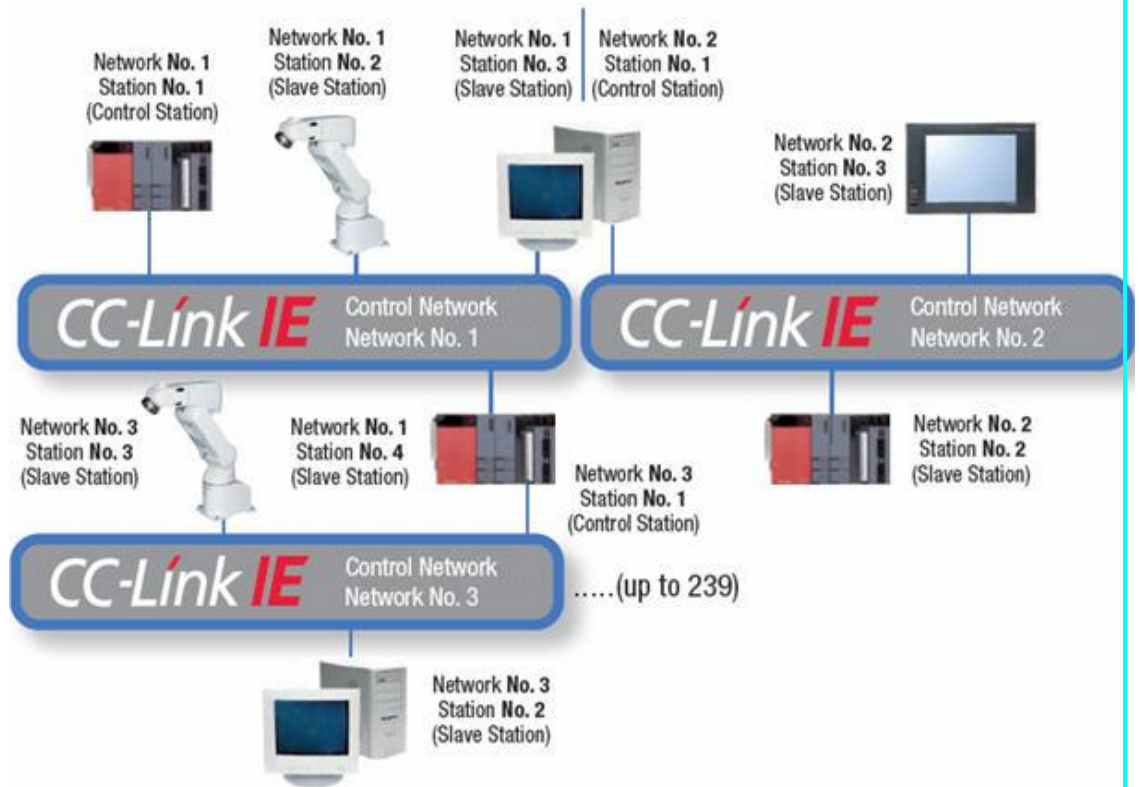
- In addition to control data transmission, it enables information processing for maintenance and diagnostics to provide improved collaboration and productivity.
- High-speed 1Gbps data transmission uses widely-available, standard fiber optic cable and connectors.
- Determinism over Ethernet is ensured through the use of network common memory and does not require the use of additional hubs or switches. Determinism over Ethernet is accomplished through the use of a token passing technique.



- Seamless communication is enabled from the enterprise network layer to the controller network layer to the field network layer.



- Allows for the interconnection of multiple Control level networks.





- Enables logging data for production tracking and manufacturing process improvement
- Provides for device diagnostics data for equipment predictive maintenance
- Because CC-Link IE Control is an open-technology network, the global CLPA organization supports and assists partner companies in the development of their CC-Link IE Control compatible products. This allows the end-user to choose from a variety of value-added products for their automation systems.

Features of CC-Link IE Control

Industry Need	CC-Link IE Control Feature
Physical Ruggedness	Redundant media Multi-mode fiber optics
High Reliability	High immunity to EMF (due to use of fiber optics) Uninterrupted service through cable, station failures Automatic ID of segment failures Uses standardized IEEE physical layer Dual loop design
Low Latency	Guaranteed by design No impact from intermittent services Real-time communication with guaranteed QoS
Ease of Use	Daisy chain topology Can encapsulate other protocols Off-the-shelf Ethernet cables can be used Off-the-shelf network analyzers can be used Automatic identification of network fault location Network communications transparent to applications
Scalability	1 GB network speed 550 Meter segment length Each network supports more than 100 stations Networks can be joined to cover an entire plant Capable of high data capacity transient messaging

CC-Link IE Control cyclic (real-time) communication provides a transparent service to automation applications. The service is transparent because of the CC-Link IE Control shared memory model. Applications can be designed without being aware of any networked communications, which are managed by the network independently. Applications do not know (or need to know) which data originates on the network, where data is sourced from, or where data must be delivered. The cyclic communication service automatically handles this service. Since this cyclic communication service is automatically built-in, minimal configuration is required in order to start up the real-time communications.

This is an important distinction between CC-Link IE Control and other industrial Ethernet automation networks. Using this shared memory model and communication, high reliability as well as easy configuration and set up is assured. Other industrial Ethernet protocols require longer transmission cycles and exponentially complicated configurations as the size and complexity of the network expands.

Through the use of a token passing protocol, each CC-Link IE Control network controller passes the token and transmits the same data length. Since the data size is fixed, stable real-time network performance is assured. This also assures that real-time communication takes precedence over transient communication. Thus any spike in transient communication will have no impact on the real-time communication service; instead, the transient communication timing will vary should it exceed its allotted network capacity.

Like the automatic backup Master capability of CC-Link, CC-Link IE Control also has an automatic network control switch capability, a key feature for network stability. Even if one control station fails, another station will automatically take over the control of the network and maintain communication. Going beyond the standard CC-Link functionality, if two CC-Link IE Control stations fail simultaneously, the network will separate and one station will take control of each segment.

Specifications for CC-Link IE Control

Specifications

Ethernet Standard	IEEE 802.3z (1000Base-SX)
Communication Speed	1Gbps
Ethernet Cable	Multimode Fiber Optic Cable (IEC60793-2-10 Types A1a.1(50/125µm))
Ethernet Connector	Type LC Duplex Connector (IEC61754-20)
Media Access Control	Token Passing
Network Topology	Duplex Loop (Ring)
Number of Stations	120
Maximum cable length between stations	550 meters between each station
Cyclic transmission (Common Memory Communication)	Max 32k bits (4,096 bytes) Max 128k words (256k bytes)
Transient transmission (Peer-to-Peer)	Message size: Max 960 bytes
Maximum number of interconnected networks	239