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CLPA Guide Book

Overview of CC-Link Partner Association (CLPA)

The CC-Link Partner Association (CLPA) is a world leader in developing a truly open industrial network that accelerates the construction of smart factories.

CC-Link Family- the first field network from Japan and Asia.
CLPA has acquired ISO and IEC international standards for its open network family and grown into a global standard in manufacturing.
In order to accelerate the construction of smart factories utilizing IIoT, CLPA has launched the world's first industrial network "CC-Link IE TSN" using TSN (Time-Sensitive Networking), an expansion of standard Ethernet.
In response to the growing market demand for a wide range of devices in manufacturing sites, high-performance drive equipment, and protocol implementations for various types of equipment and applications, CLPA will provide a variety of development methods and develop truly open industrial networks on a global scale.

CC-Link IE TSN
Open the Future of Connected Industries

Message

The Chairman of CLPA
Fumihiko Kimura
Faculty of Science and Engineering,
Department of Mechanical Engineering
Professor emeritus of Tokyo University,
Doctor of Engineering

Information and communication technology has fundamentally changed our daily lives and industrial activities. Various activities, which used to be performed by human-to-human communication or document sharing, are now performed by digitalized methods and in an automated/autonomous manner. The production process now integrates many different lifecycle tasks. These include direct physical production activities, business processes, supply chains, after sales service and take back/recycling. Key to this integration is information and communication technologies. By flexibly combining complementary activity in related enterprises, new industrial sectors are emerging. With key words such as “Smart manufacturing” or “Cyber-physical production systems”, many projects from new industrial revolutions are being promoted in industrially advanced countries. Developing countries are also rapidly catching up on such trends.

One of the important factors for the drastic changes in production is the spread of information and communication infrastructure. This consists of industrial information networks connected to enterprise information networks. Hence the integration and utilization of comprehensive data about production assets is made possible. These assets may include equipment, materials, parts, products, manufacturing technology and environment. Such industrial information networks of production assets become indispensable infrastructure for advanced manufacturing.

To realize such an industrial information network in practical and meaningful scale and cost, it must be an open and standardized network which can be shared and utilized across the boundary of individual enterprises. Versatile functional requirements with respect to communication speed, data volume, network control methods and network complexity, etc. are also desirable. Finally, continuing development works should be performed to seek higher functionalities.

The CLPA has addressed these requirements for an open and standardized industrial network. This was begun with the CC-Link open fieldbus. Ethernet-based CC-Link IE followed, and high-performance CC-Link IE TSN was recently introduced. The CLPA will continue to respond to the ever expanding demands for advanced industrial networks. In this way, the CC-Link family of open networks will contribute to the development of future advanced manufacturing systems.

CLPA, the organization promoting open network as well as your business partner.

Support vendors and users in the global promotional activities of the CC-Link family.

Under the motto “CC-Link, the open field network, will become world’s de facto standard”, CLPA was established in November 2000. Ever since, the Board of Directors, Marketing Task Force and Technical Task Force have joined forces to help the vendors to develop compatible products and the users to build up open FA systems.

◎The Board of Directors consisting of nine firms operates CLPA and decides on major association issues.

◎Increase partner membership and adoption of the CC-Link family.

Marketing Task Force

Oversees a wide variety of promotional activities world wide, including fairs, conferences, seminars, advertising programs, social media and other activities.

◎Focuses on management of related technology and coordinates provision of information to members and outside standard-setting organizations.

Technical Task Force

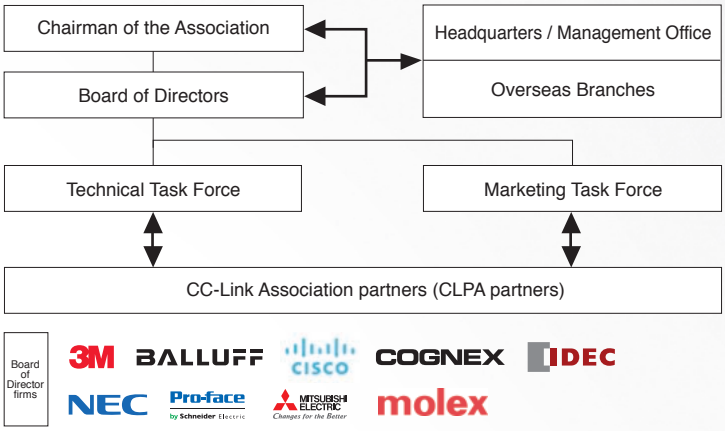
Develops new specifications for the CC-Link Family, including "CC-Link IE TSN", the first open industrial Ethernet to support TSN technology. Also develops technical materials such as installation manuals as well as conformance test specifications and addresses various technical issues.

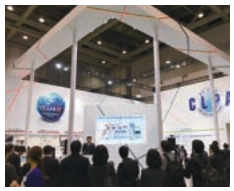
Get the membership to CLPA. The members can develop business opportunities and possibilities by receiving services such as support for developing compatible products.

The member firms are entitled to obtain the most up-to-date technological information and CC-Link Family specifications for free. In addition, support for conformance tests that are essential to establishing reliability is available at various stages of developing compatible products.

- Free distribution of CC-Link specifications
- Conducting conformance tests
- Technical support

■ Organization Chart for CC-Link Partner Association




Exhibition


Seminar

Distributing information

CC-Link IE TSN Specification

CC-Link Cable Installation Guide

Conformance test specification

■ CLPA membership categories (price excluding tax)

			Registered member	Regular member	Executive member	Board member
Annual dues			—	JPY 100,000	JPY 200,000	JPY 1,000,000
Initiation fee			—	—	—	JPY 1,000,000
Acquisition of product specification			Provided for free upon membership registration			
License to use CC-Link technology		SLMP*1	Included			
		Other than SLMP*1	—	Included		
Conformance test fee (per device)	CC-Link IE TSN		—	JPY 100,000*3	JPY 50,000*3	Included in the annual membership fee
	Master, local and intelligent device stations for CC-Link and normal station of CC-Link IE Control Master and local stations, intelligent device stations, remote device stations of CC-Link IE Field CC-Link IE Safety IESMAP(master) IESSLP(slave)			JPY 300,000	JPY 200,000	
	CC-Link remote device and I/O stations, cables and miscellaneous products CC-Link/LT master and slave stations, cables and miscellaneous products			JPY 200,000	JPY 100,000	
	CC-Link IE Field Basic*2			—	—	
	SLMP*1 connectable products			—	—	
Recommended product test fees (per model)	Recommended network wiring parts for CC-Link IE TSN CC-Link IE Control and CC-Link IE Field			JPY 100,000	JPY 50,000	
Use of CC-Link logo			—	Included		
Technical support			—	Included		
Including products in the on-line and paper product catalogues (no charge)			—	Included		
Promotion at fairs			—	Included		
Information about events Posting of corporate name on CLPA web site			Included			

*1. SLMP:Seamless Message Protocol
*2. Download the test tools and conduct a self-test.
*3. If you submit the result of a test conducted on behalf of the CC-Link Partner Association at a testing organization recognized by the CC-Link Partner Association, the cost will be as follows.
· Regular : 50,000 yen · Executive: 20,000 yen

Consolidating the forces of partner firms around the world, CC-Link will take another giant step forward.

CC-Link…making the next leap foward with CLPA Partners!

Board of directors

3M Company
3M Korea Ltd.
A&D Co., Ltd.
ABB AS, ROBOTICS
ABB K.K.
AC&T System CO.,LTD
Adullam Tech.
Advanet Inc.
Advantech Japan Co., Ltd.
Ailes Electronic Industry CO., LTD
Allied Automation,Inc.
Allied Telesis K.K.
ALPHA SYSTEMS CO.,LTD
Altima Corp.
Analog Devices
ANYWIRE CORPORATION
Asahi Enterprise Corporation
Asahi Glass Co., Ltd.
ASKA CORPORATION
ATEQ K.K.
Atlas Copco Industrial Technique AB
Azbil Corporation
B&PLUS KK
Balluff GmbH
Beckhoff Industrie Elektronik
Beijing D&S FieldBus Technology Co., Ltd.
Belden Electronics Division
Belden Hirschmann Industries (Suzhou) Ltd.
Berk-Tek LLC
Bihl+Wiedemann GmbH
Binder USA, LP
BROTHER INDUSTRIES LTD
Buerkert Werke GmbH & Co. KG
C.D.N CORPORATION
CANON ANELVA CORPORATION
CHINO CORPORATION
Chiyoda Co., Ltd
CHUBU NIHON MARUKO CO., LTD.
CHUO SEISAKUSHO, LTD.
Cisco Systems
CITIZEN FINE DEVICE CO., LTD.
CKD Corporation
CKD NIKKI DENSO CO., LTD.
Cognex Corporation
Conductix Wampfler
CONTEC CO.,LTD
CORRENS CORPORATION
COWIN.FA Co.,Ltd
CREVIS CO., LTD
DAI-ICHI DENTSU, LTD.
DAIICHI ELECTRONICS CO., LTD
DAINCUBE Corp.
Datalogic Automation s.r.l.
DENSO WAVE INCORPORATED
Diatrend Corporation
Dyadic Systems Co.,Ltd.
DYDEN CORPORATION
EAST WEST ELECTRIC WIRE CO.,LTD.
ELCO (TIANJIN) ELECTRONICS CO., LTD.
Emerson Industrial Automation - ASCO
ENDO KOGYO Co.,Ltd.
ESPEC TEST TECHNO CORP.
ESTIC CORPORATION
FAG Industrial Service GmbH
FANUC LTD
FASTECH Co., Ltd.
Festo AG & Co. KG
Fluidyne Control Systems (P) Ltd.
Fortinet Japan K.K.
Fortive ICG Japan Co., Ltd.
FUJI CONTROLS COMPANY LIMITED
FUJI ELECTRIC CABLE CO.,LTD.
Fuji Electric Co., Ltd
Fuji Electric F-Tech Co., Ltd.
Fujikin Incorporated
Fukushima SiC Applied Engineering Inc.
GIKEN INDUSTRIAL CO., LTD.
HAKARU PLUS CORPORATION
Hakko Electronics Co., Ltd
Hans Turck GmbH & Co. KG
Harmonic Drive Systems, Inc
HARTING JAPAN
Helmut Fischer GmbH Institut fuer Elektronik und Messtechnik
HELUKABEL GmbH
HERUTU ELECTRONICS CO., LTD.
HIGEN MOTOR CO., LTD
Hilscher GmbH
Hirata Corporation
Hirschmann Automation and Control KK.
Hitachi Industrial Equipment Systems Co., Ltd.
Hitachi Metals, Ltd.
Hivertec,inc.
HMS INDUSTIRAL NETWORKS
HMS Industrial Networks AB
HOKUYO AUTOMATIC CO., LTD.
HORIBA STEC Co., Ltd.
Hottinger Baldwin Messtechnik GmbH
HYUNDAI HEAVY INDUSTRIES CO., LTD
I Motion Plus Co., Ltd.
IAI Corporation
IAR Systems AB
IDEC Corporation
igus k.k.
IHI Corporation
Industrial Control Communications, Inc
Industrial Software Co.
INFOHOBBY.LTD
International Laboratory Corporation
ITOH DENKI CO., LTD.
JANOME SEWING MACHINE CO., LTD.
Japan Quality Assurance Organization (JQA)
Japan Telegartner Ltd.
JEL SYSTEM CO., LTD
JFE Plant Engineering Co., Ltd.
JISANG ELECTRIC CO., LTD.
JMACS Japan Co., Ltd.
JTEKT CORPORATION
JVCKENWOOD Public & Industrial Systems Corporation
Kanematsu Communications LTD.
Kawasaki Heavy Industries, LTD.
KEYENCE Corporation
Kistler Lorch GmbH
KITAZAWA ELECTRIC WORKS CO., LTD.
KK TFF Fluke Networks
KOGANEI CORPORATION
Korea Electronics Technology Institute
KOYOELECTRONICS INDUSTRIES CO.,LTD.
Kubota Corporation
KURAMO ELECTRIC CO., LTD
KURODA Pneumatics Ltd.
KWANG-IL ELECTRIC WIRE CO., LTD.
KYOEI ELECTRIC CO.,LTD
KYOWA ELECTRONIC INSTRUMENTS CO., LTD.
L Light
LAUMAS ELETTRONICA SRL
LEONI Cable (China) Co., Ltd.
Leoni Special Cables Friesoythe GmbH & Co.KG
Long Yang Enterprise Co., Ltd.
LS Cable&system Ltd.
Lutze Inc.
M-System Co., Ltd.
Magnescale Co., Ltd.
MARS TOHKEN SOLUTION CO. LTD.
Matrox Electronic Systems Ltd.
Matsusada Precision Inc.
MEIDENSHA CORPORATION
MELEC Inc.
METIS CO., LTD.
METTLER TOLEDO
METTLER TOLEDO AG
MICRO-LOG SYSTEMS
Minebea Intec GmbH
Minebea Mitsumi Inc.
MISUMI CORPORATION
MITSUBISHI ELECTRIC CORPORATION
MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED

Mitsubishi Electric FA Industrial Products Corporation
Mitsubishi Electric Information Network Corporation
MITSUBISHI ELECTRIC MECHATRONICS SOFTWARE CORPORATION
MITSUBISHI ELECTRIC MICRO-COMPUTER APPLICATION SOFTWARE COMPANY LIMITED
MITSUBISHI ELECTRIC SYSTEM & SERVICE CO., LTD.
Mitsubishi Electric TOKKI Systems Corporation
Mitsubishi Electric Turkey Elektrik Urunleri A.S.
Molex Inc.
MOXA Inc.
MTT Corporation
MYUNGBO CABLE CO.,LTD.
NADA ELECTRONICS, LTD
NADEX Co., Ltd.
Nanjing DECOWELL Automation CO. Ltd.
Nanjing Solidot Electronic Technology Co., Ltd.
NEC Corporation
Net One Systems Co., Ltd.
NICHIDEN SHOKO CO.,LTD.
Nichigoh communication electric wire co., Ltd.
NINGBO RONGHE WIRE & CABLE CO.,LTD.
Nippon Dempa Co., Ltd
NIPPON DENKI KENKYUSHO CO., LTD.
Nippon Seisen Cable, Ltd.
NITTA CORPORATION
NKE CORPORATION
Northwire,Inc.
NSD Corporation
NSK Ltd.
NTT Communications Corporation
O-DEAR INTERNATIONAL CORPORATION
OFS Fitel LLC
Okano Electric Wire Co.,Ltd.
Oki Electric Cable Co., Ltd.
OMRON Corporation
ONTEC CO.,LTD.
OPTEX FA CO.,LTD.
orientalmotor
ORing Industrial Networking Corp.
ORION ELECTRONICS
Palo Alto Networks k.k
panasonic Industrial Device SUNX Co
Panasonic Life Solutions Networks Co., Ltd.
Panduit, Corp.
Parker Hannifin
Pepperl + Fuchs GmbH
PEPPERL+FUCHS K.K.
Phoenix Contact GmbH & Co. KG
Phoenix Contact K.K
Pilz GmbH &Co
Pneumax S.P.A.
PROFICIENT（SHANGHAI）INTERNATIONAL CO.,LTD
Red Lion Controls
REJ Co., Ltd
Renesas Electronics Corporation
RKC INSTRUMENT INC.
Robostar Co., Ltd
ROBOTEC Inc.
SAMWON ACT CO.,LTD.
SANSHA ELECTRIC MFG. CO.,LTD.
SANTEST CO., LTD
Sanwa Engineering Corp
Sanyo Machine Works. Ltd.
Sasaki Sekkei Co., Ltd.
Schneider Electric Japan Holdings Ltd.
Seidensha Electronics co., ltd.
SEIKO EPSON CORPORATION
Sekisui Jushi Cap-Ai System Co.,Ltd.
Servoland Corporation
Shanghai Ashiya Trading LTD.
Shanghai Golytec Automation CO.,LTD.
Shanghai Powerful Automation Technology Development Co., Ltd
Shanghai SUNCHU Electromechanical Device Co., Ltd.
Shanghai Suntone Electronic Co., Ltd.
Sharp Corporation
SHIMADEN CO., LTD.
SHINKO TECHNOS CO.,LTD
SHOEI Electric Co., Ltd.
SHOSHIN CORPORATION
Sichuan Odot Automation System Co., Ltd.
SICK AG
SINKA JAPAN CO.,LTD.
SINSEONG IDOL
SMC CORPORATION
SN-TECH
Solartron Metrology Ltd
Spinner GmbH
SR Technology CO.,Ltd.
STMicroelectronics K.K.
Sumitomo Heavy Industries,Ltd.
SUNHO AUTOMATION
Surpass Industry Co., Ltd.
Suzhou Jia Zhan Science and Technology CO., Ltd.
SWCC SHOWA CABLE SYSTEMS CO., LTD.
TACHIBANA ELETECH CO., LTD.
TAIHAN ELECTRIC WIRE CO., LTD.
TAIYO CABLE（DONGGUAN）CO., LTD.
TAIYO CABLETEC CORPORATION
TAIYO ELECTRIC CO.,LTD.
TAIYO,LTD.
TAKEBISHI　CORPORATION
Takikawa Engineering Co., Ltd.
TAMADIC Co., Ltd.
TAMAGAWA SEIKI CO., LTD.
TATSUTA ELECTRIC WIRE & CABLE CO.,LTD.
TEAC Corporation
Technical & Try CO., LTD
TESSERA TECHNOLOGY INC.
THK CO.,LTD.
Thomas Cable Co., Ltd.
Tianjin Geneuo Technology Co., Ltd.
Tianjin Sentinel Electronics Co., Ltd.
TOGAMI ELECTRIC MFG. CO., LTD
Toho Technology Corporation
TOSHIBA MACHINE CO., LTD.
Toshiba Schneider Inverter Corporation
TOYO ELECTRIC CORPORATION
TOYO ELECTRIC MFG. CO.,LTD.
TOYOGIKEN CO., LTD.
TPC Mechatronics Corp.
Tyco Electronics Japan G.K.
U.I. Lapp GmbH
UNION DENSHI WORKS CO., LTD.
Unipulse Corporation
UNITEC Corp.
UNITED ELECTRIC WIRE（KUNSHAN）CO., LTD.
Valcom Co.,LTD.
VAT Vakuumventile AG
Wago Company of Japan, Ltd.
Weidmueller Interface GmbH & Co. KG
WITTENSTEIN ternary Co.,Ltd.
YAMAHA MOTOR CO., LTD.
YAMATO SCALE CO., LTD.
YASKAWA ELECTRIC CORPORATION
Yokogawa Electric Corporation
YOSHINOGAWA ELECTRICWIRE&CABLE
YOSIO ELECTRONIC COMPANY
Zhejiang Wanma Group Special Electronic Cable Co., Ltd.
Zhejiang Zhaolong Interconnect Technology Co., Ltd.

Alphabetical listing by company name

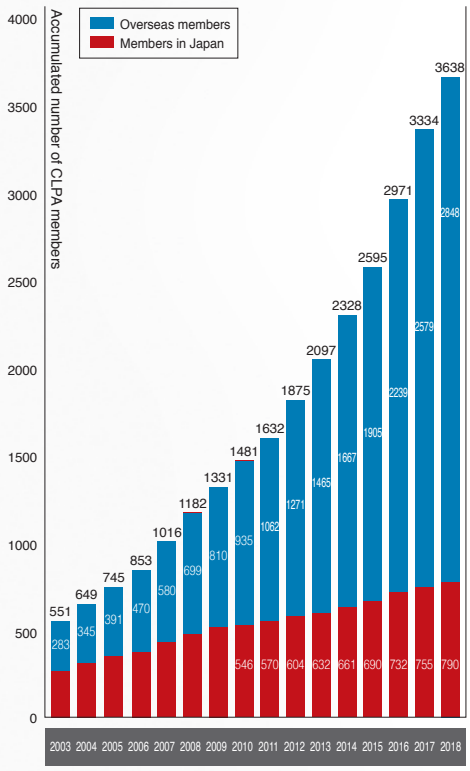
CC-Link Family goes further for the better to the manufacturing sites in the world. CLPA keeps it advancing.

These figures are self-explanatory about the development and growth on the global level.

Many member firms come crossing the boarders to join CC-Link Partner Association.

Though starting with only 134 member firms when CLPA was established, it is expected to reach more than 3638 member firms in financial year 2018 (as of the end of March 2018). The overseas firms account for as much as 80 % of the memberships, providing a solid evidence that the world has recognized that CC-Link Family have become true global standards.

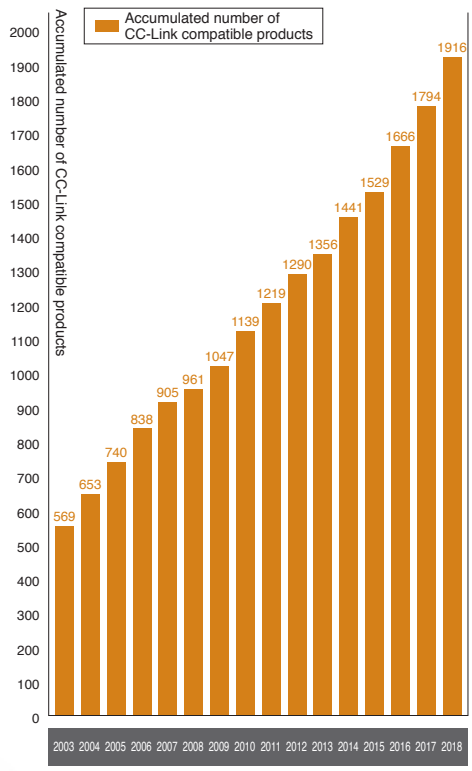
◎Growing CLPA members



A line of diversified CC-Link Family compatible products, as many as the number of user voices.

With the increasing number of vendor firms joining CC-Link Partner Association, the accumulated number of CC-Link Family compatible products is now over 1,916 models. Partner companies also receive the benefit of their products being promoted in various CC-Link Partner Association activities free of charge, including the CC-Link Product Catalog.

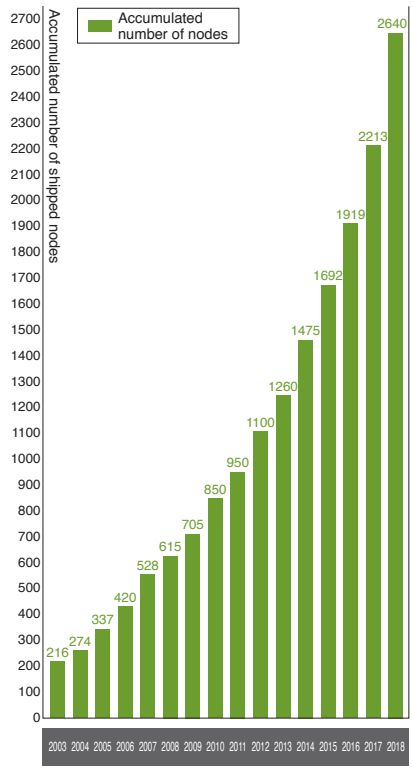
◎Increase of number of CC-Link compatible products



As a sign of our global acceptance, the total number of shipped devices is Approx. 26 million.

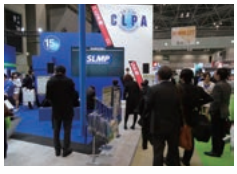
The growth of the installed base is being driven by the automotive, semiconductor and LCD panel industries. We expect that this growth will continue to accelerate as industries such as food and beverage, consumer packaged goods and others adopt our technology.

◎Increase of number of shipped nodes (Unit:10000 nodes)



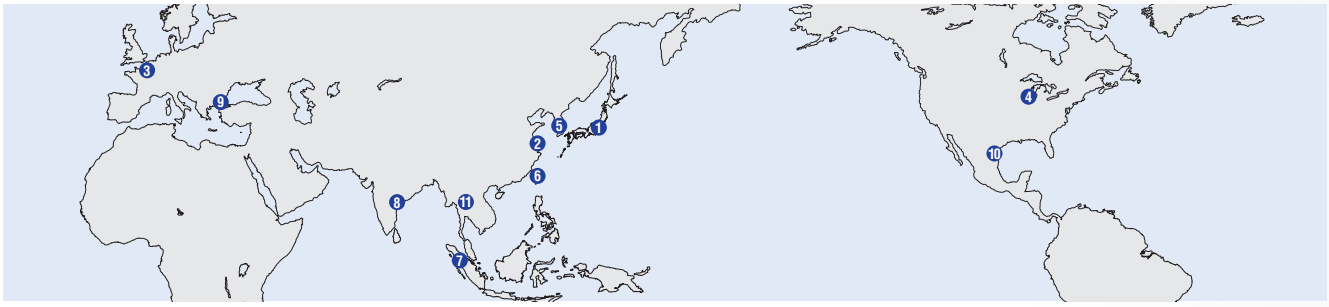
CC-Link, CC-Link Safety and CC-Link IE, ... The world keeps an eye with surprise on the industrial net work first from Japan.

As a key measure of our promotion and the best opportunities to exchange more information with more vendors and users, CLPA has participated in trade shows and exhibitions in Japan and overseas. We are going to actively participate in more trade shows and exhibitions of diversified industries to promote the technological understanding and propose our future concept that is well-represented by the CC-Link IE TSN.

In China	In Korea	In Europe and North America	In Japan
			
SIAF Guangzhou	Smart Factory + Automation World	Hannover Messe	System Control Fair

CLPA is a global operation with local offices in 11 regions worldwide. Each office works to increase the adoption of CLPA networks by device makers, machine builders and end-users operating in these regions.

CLPA's 11 global offices are located in Japan, Korea, Taiwan, North America, Europe, China, ASEAN, India, Turkey, Mexico and Thailand. These offices promote CC-Link Family technology and provide a wide range of services for CLPA members.



1 Headquarters (Japan)

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TEL : +81-52-919-1588 FAX : +81-52-916-8655
E-mail : info@cc-link.org
URL : https://www.cc-link.org/

2 China

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No.1386 Hong Qiao Road, Shanghai, P.R.China
TEL : +86-21-64940523 FAX : +86-21-64940525
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3 Europe

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4 North America

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5 Korea

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URL : http://kr.cc-link.org/ko/

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E-mail : cclink01@ms63.hinet.net
URL : https://tw.cc-link.org/zh/

7 ASEAN

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8 India

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Pune - 411 026, Maharashtra, INDIA
TEL : +91-20-4624 2100 FAX : +91-20-4624 2200
E-mail : Clpa_India@asia.meap.com
URL : https://in.cc-link.org/en/

9 Turkey

Serifali Mahallesi Nutuk Sokak.No:5 34775Umraniye-istanbul /Turkey
TEL : +90-216-526-39-90 FAX : +90-216-526-39-95
E-mail : partners@tr.cc-link.org
URL : https://eu.cc-link.org/en/

10 Mexico

Mariano Escobedo 69, Zona Industrial - Tlalnepantla, 54030, Estado de Mexico, Mexico
TEL : +52-55-3067-7517
E-mail : info@cclinkamerica.org
URL : http://am.cc-link.org/sp/

11 Thailand

CC-Link Promotion Center - Thailand
101, True Digital Park Office, 5th Floor, Sukhumvit Road, Bangchak, Phra Khanong, Bangkok 10260
TEL : +66(2) 092-8600 Ext. 5506
Fax : +66(2) 043-1231-33
E-mail : info@cclinkthailand.com
URL : http://th.cc-link.org/th/

The High-level Technology and Ease-of-Use

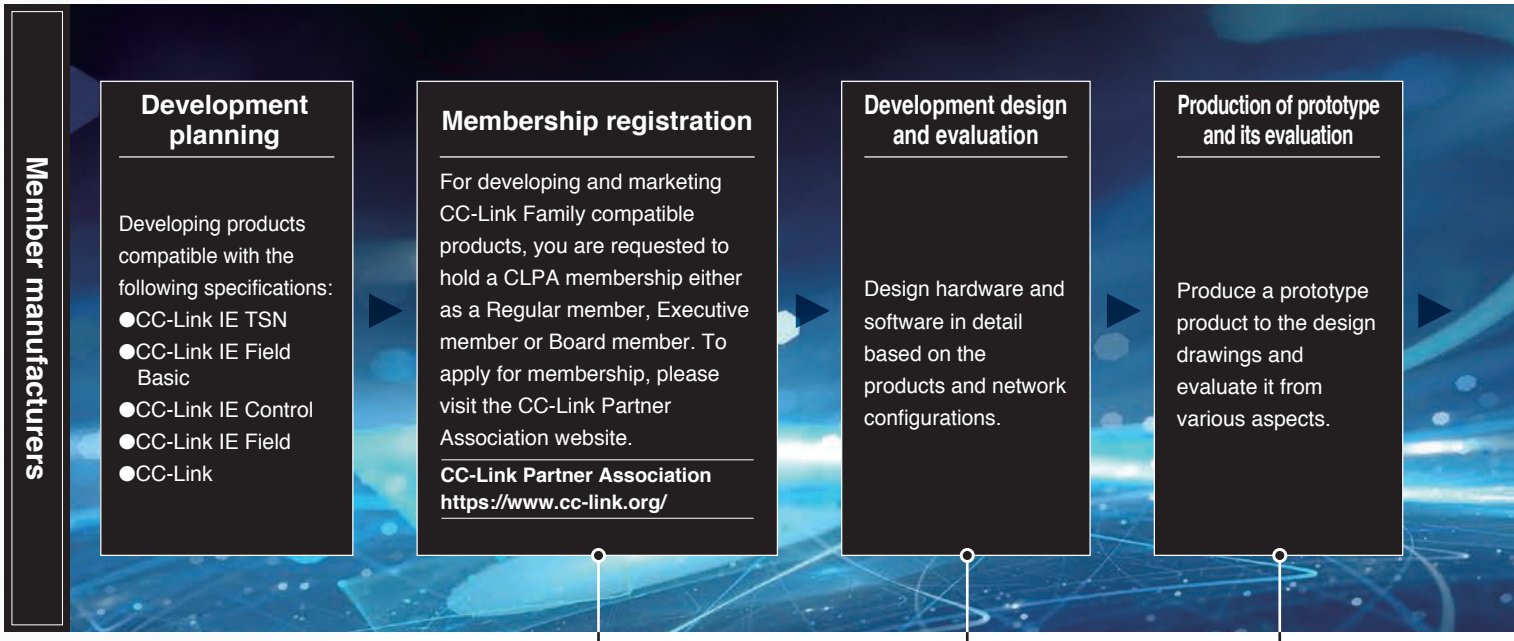
CC-Link has been certified to conform to international standards, IEC Standards and SEMI Standards for the semiconductor and FPD industries, in addition to Japanese Industrial Standards, Chinese National Standards, ISO Standards, Korean National Standards and Taiwanese Standards. An established de facto standard in Japan, now it is now also recognized as a global standard. It meets the conventional requirements for open networks, communication compatibility and a diverse lineup of compatible products. In addition, it can drastically improve the production efficiency of manufacturing systems and applications. Its high technological level and ease of use are internationally appreciated.

From a Japanese defacto standard to a Global Standard!!

International Standard: ISO	ISO15745-5: CC-Link approved January 2007.
International Standard: IEC	IEC61158: CC-Link approved December 2007.
	IEC61784: CC-Link approved December 2007.
	IEC61158: CC-Link IE Field approved August 2014.
	IEC61784: CC-Link IE Field approved August 2014.
	IEC61784-3-8: CC-Link IE Safety approved August 2016.
SEMI Standard	SEMI E54.12: CC-Link approved 2001.
	SEMI E54.23-0513: CC-Link IE Field approved May 2013.
Chinese National Standard: GB	GB/Z 19760-2005: CC-Link approved December 2005.
	GB/T 20229.4-6 Chinese BA (Building Automation) standard: CC-Link appeared in December 2006.
	GB/T 19760-2008 Chinese highest standard for industrial networks: CC-Link approved June 2009.
	GB/Z 29496.1.2.3-2013: CC-Link Safety approved June 2013.
	GB/T 33537.1~.3-2017: CC-Link IE approved April 2017.
	GB/Z 37085-2018: CC-Link IE Safety approved December 2018
Japan Industrial Standard: JIS	JIS TR B0031: CC-Link approved May 2013.
Korean National Standard: KS	KSB ISO 15745-5: CC-Link approved March 2008.
	KSC IEC 61158/61784: [CC-Link] Certified December 2011.
	KSC IEC 61784-5-8: [CC-Link/CC-Link IE] Certified December 2014.
	KSC IEC61784-3-8: CC-Link IE Safety approved July 2018
Taiwan Standard: CNS	CNS 15252X6068: CC-Link approved May 2009.

For developing compatible products that attract world's attention, come to CLPA. We will back you up in various scenes and stages.

To facilitate the quick development of CC-Link Family compatible products that match market needs, the CC-Link Partner Association provides a variety of support that includes everything from planning to design, evaluation, production, and conformance testing, as well as product sales promotion for certified products.



CLPA

Development support

As part of various support activities, in addition to CLPA-sponsored seminars, there are seminars hosted by our Board Members (such as Mitsubishi Electric Corporation). These are intended to provide useful information for all users of the CC-Link family, from novices to experts.

Provision of Technical Specs

The CLPA provides CC-Link Family protocol spec sheets free of charge. Development methodologies (dedicated communication LSI or built-in modules) prepared for different kinds of products may be used when developing products. OEMs are also available.

Providing the "CC-Link Conformance Test" specifications

CLPA offers the member firms the "CC-Link Conformance Test" specifications for free applicable to the developed compatible products.

What is Conformance Test?

- Conformance test is to be conducted on each model to ensure highly reliable communication between CC-Link Family compatible products.
- Your products need to be tested in CC-Link Family communication to be certified if your products meet CC-Link Family communication specifications and can be connected to CC-Link networks.
- We offer test tools for CC-Link IE Field Basic, SLMP and open tools for CC-Link IE TSN.

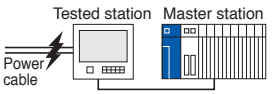
By conducting the conformance test, you can ···

- ensure the communication reliability of your product in CC-Link Family, and
- easily design system configuration where products of different manufacturers and models are connected.

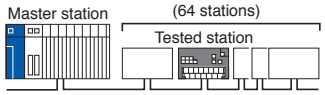
* The conformance test is to ensure that the product meets the common specification of CC-Link Family. The conformance test is not intended to ensure the performance and quality of the product itself.

Test Cases

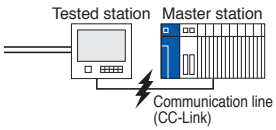
Power supply noise test (AC/DC)



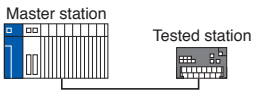
Fully loaded network test - 64 stations



Communication line noise test



Interoperability test



Implementing conformance tests

The member firm implements the conformance test according to the "CC-Link Conformance Test" specifications for each product model. To facilitate the conformance testing, CLPA has test centers in Japan and overseas.

Marketing

CLPA promotes and expand marketing of compatible products with materials highlighting their innovative, excellent features.

Laboratory testing

The member firms use the conformance test facilities to test CC-Link Family compatible products from various aspects. The noise test, hardware test, software test and combined test among others enable to appropriately check whether for instance, CC-Link Family compatible products can communicate normally.

Laboratory

Mitsubishi Electric Engineering Co., Ltd.
Nagoya Office CC-Link Test Center
139, Aza-Shimoyashiki, Shimoyashiki-cho, Kasugai-shi, Aichi 486-0906
Phone: 0568-36-3863 (Direct line) Fax: 0568-36-2045
E-mail: mei_mee_testlab@mp.mee.co.jp

Kanagawa Institute of Industrial Science and Technology
705-1, Shimoimaizumi, Ebina-shi, Kanagawa 243-0435, Japan
Phone: +81-46-236-1500 (Main switchboard) Fax: +81-46-236-1525
http://www.kanagawa-iri.jp/

Product promotion

A catalog in a printed and an electronic form (CD-ROM) is available, fully covering all the CC-Link Family compatible products that the member manufacturers have developed and put on market. CLPA provides users with diversified solutions.

Information registered and disclosed on web site

CLPA web site provides information on the CC-Link compatible products developed and marketed by the member manufacturers.

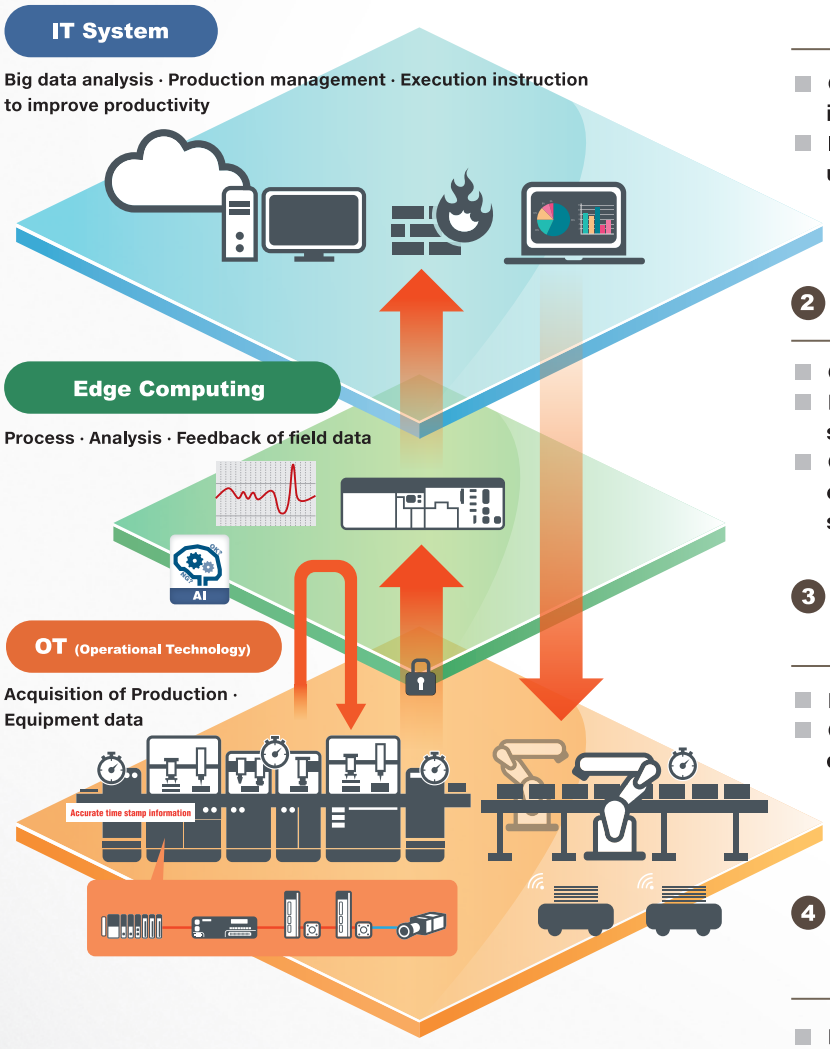
CC-Link IE TSN

Accelerate smart factory construction with TSN technology.
The first in the world applying TSN technology to open industrial Ethernet.

CC-Link IE TSN

Open the Future of Connected Industries

With the adoption of TSN (Time-Sensitive Networking) Ethernet communication technology as a time sharing method to enable flexible IIoT system construction.



1 Accurate time stamp information and advanced analysis

- Collection of field data with accurate time stamp information
- Improvement of analysis accuracy by application using AI

2 Network integration

- Coexistence of multi-protocol on a single trunk
- Realize FA layer real time control and IT layer seamless communication at the same time
- Construct general communication, motion communication and safety communication on a single network

3 Realization of advanced motion control

- Fast and high accuracy synchronization control
- Optimize device performance by combining different communication cycles

4 Utilization of wireless network and 5G

Future concept

- Layout-free production line construction
- Wiring-free system construction

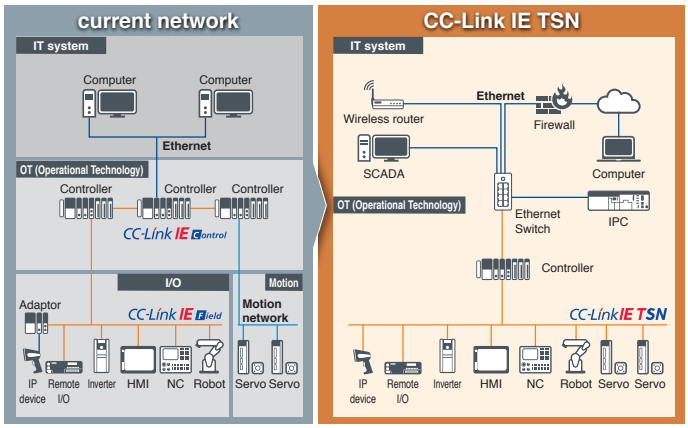
CC-Link IE TSN

Adopts TSN technology, significantly improving the performance and functions of the current CC-Link IE

By adopting TSN (Time-Sensitive Networking) which achieves real time communication by time sharing, different networks can coexist on a single cable. Also this efficient protocol will achieve high speed, accurate control.

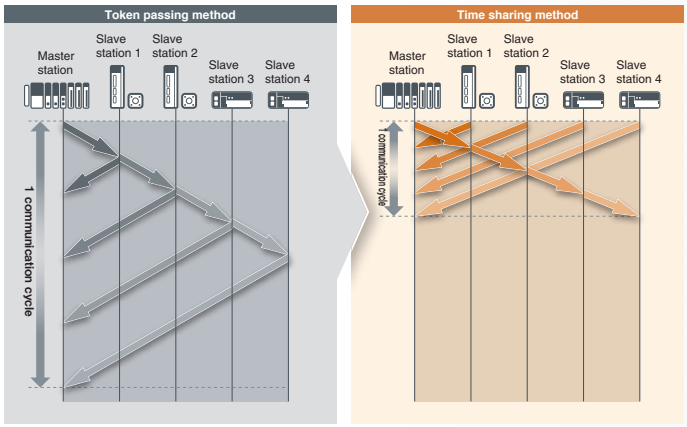
Integration of networks

◎Integrate multiple networks constructed for IT and OT systems. Increase system structure flexibility and reduce wiring cost.



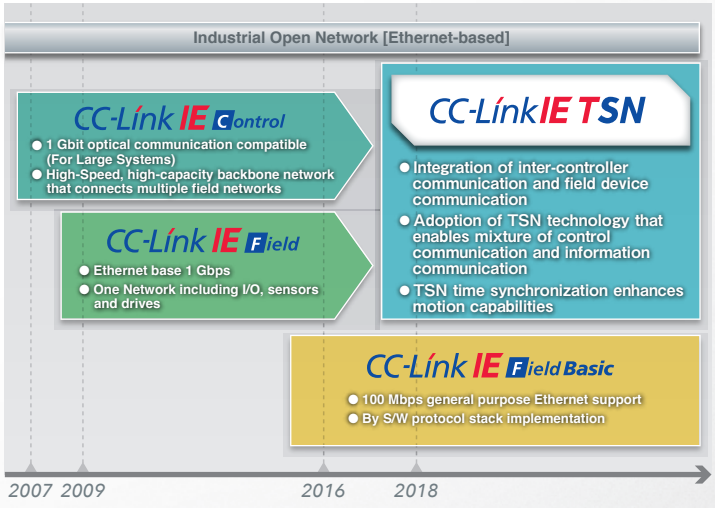
Dramatic reduction of communication period

◎Shorten cyclic data update time with time sharing. This simultaneously transmits and receives input and output communication frames in both directions by using network time synchronization.



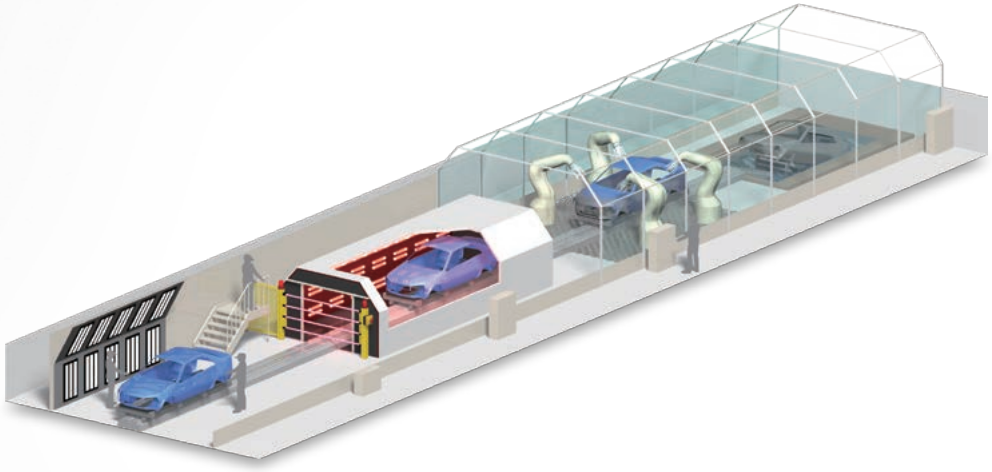
Roadmap

◎"CC-Link IE TSN" -a new industrial open network that combines traditional open networks (CC-Link IE Control/CC-Link IE Field) with motion control.
By adopting TSN technology, the network is made more open with enhanced performance and functions.

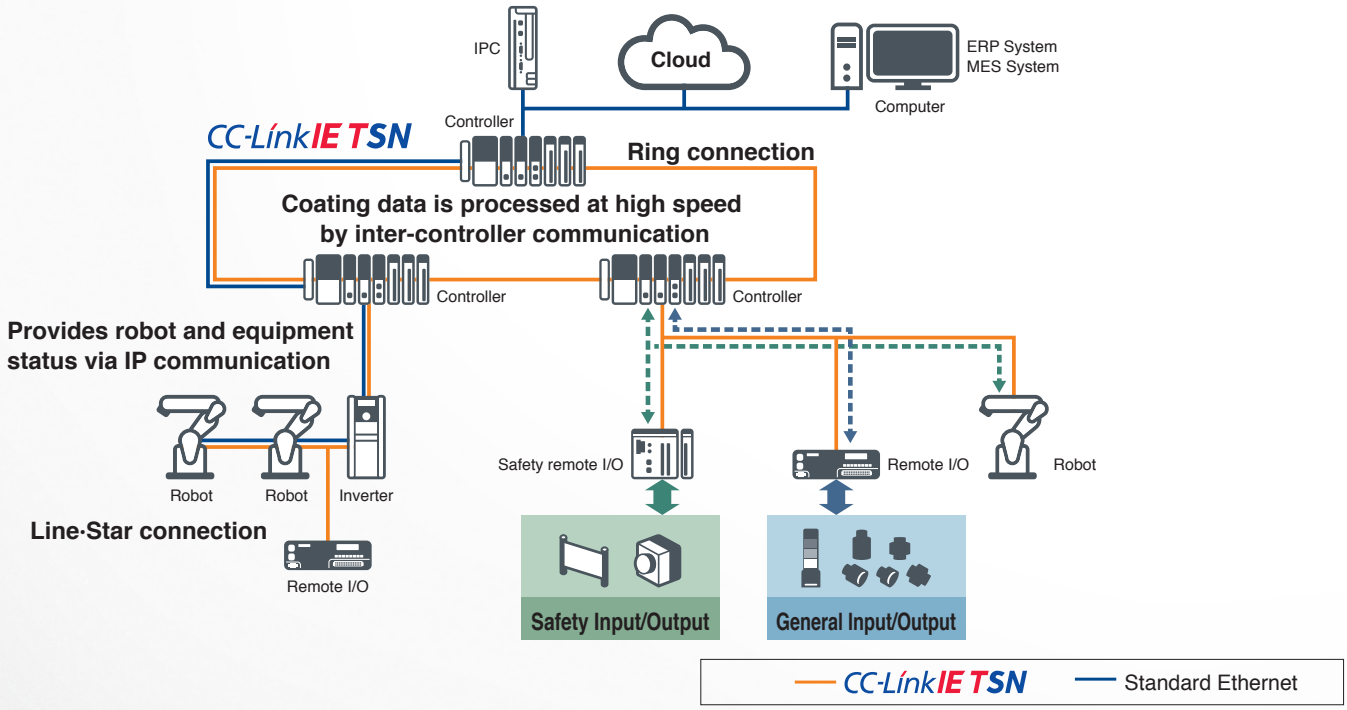


Use cases

CASE 1 Automotive (Paint shop)

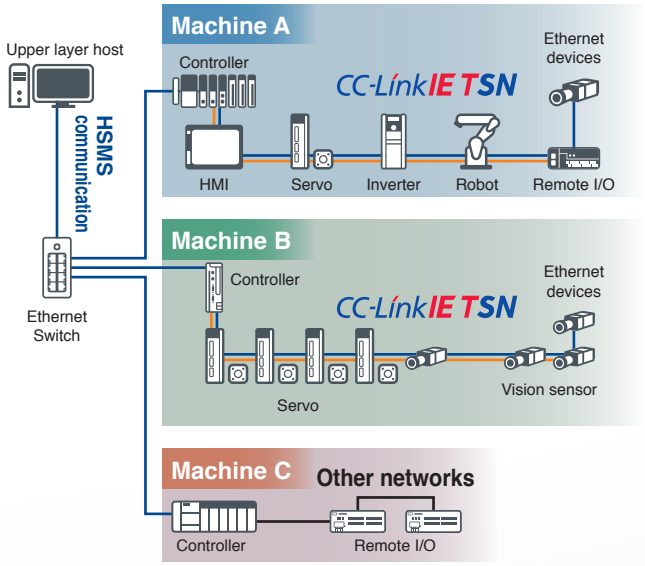


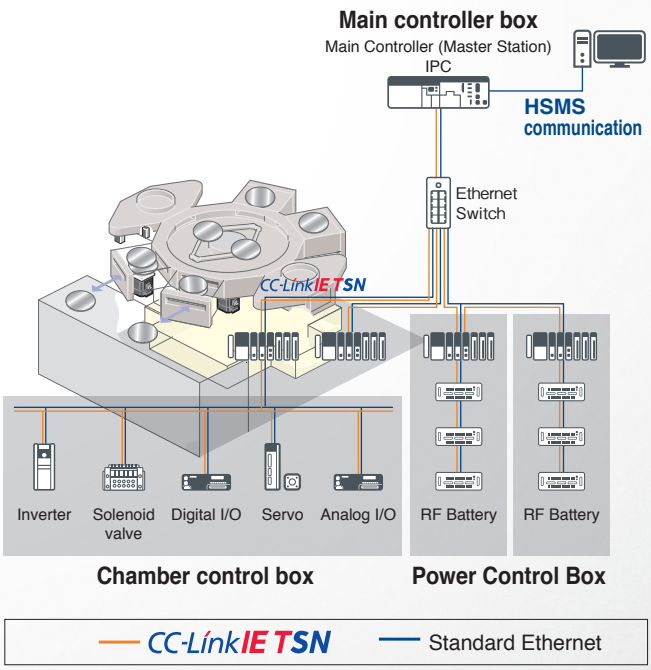
◎Communicates both safety and non-safety communication on a single network
◎Flexible cabling supporting Line/Star/Ring Topology
◎Supports from controller level, handling large amounts of data for plant monitoring on the same line



CASE 2 Semiconductor manufacturing machine

◎Provides rapid communications for large amounts of recipe and traceability data
◎Does not affect operational communication determinism while co-existing with HSMS communication
◎Ethernet devices communicate directly with the host on the upper layer
◎Use current design assets by implementing a software protocol stack on top of the main controller (Master Station) IPC



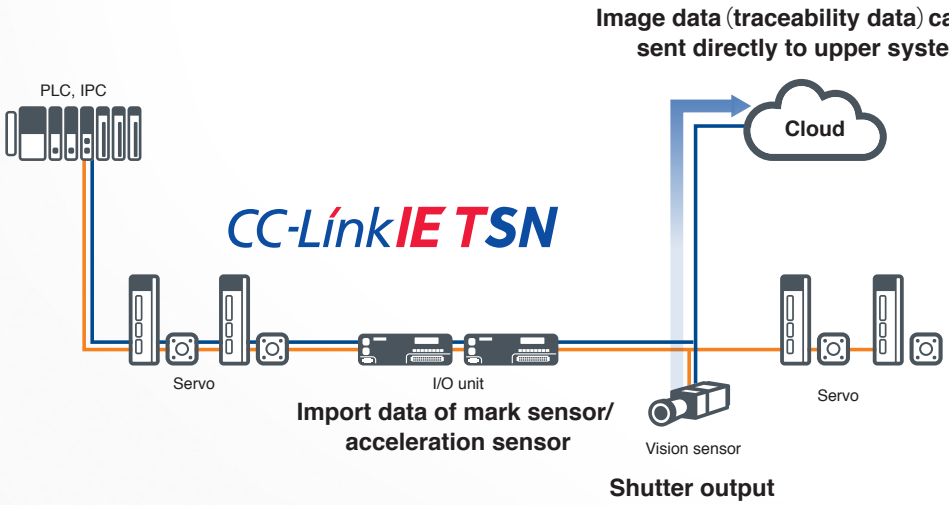


Use cases

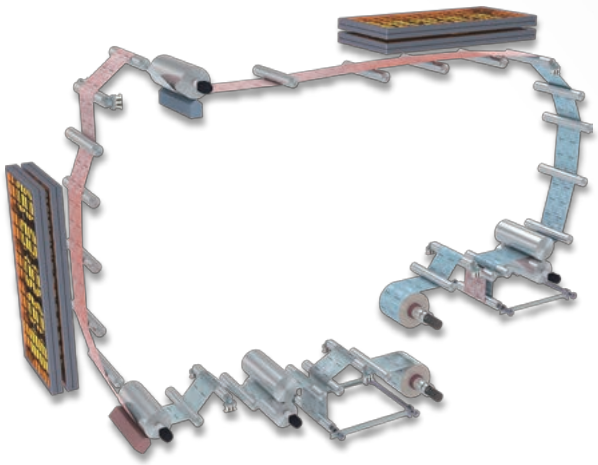
CASE 3 Printing machine

◎Vision system integration. Combine vision system IP traffic on the same line with motion control data while communicating with upper systems.

◎High speed, accurate servo system

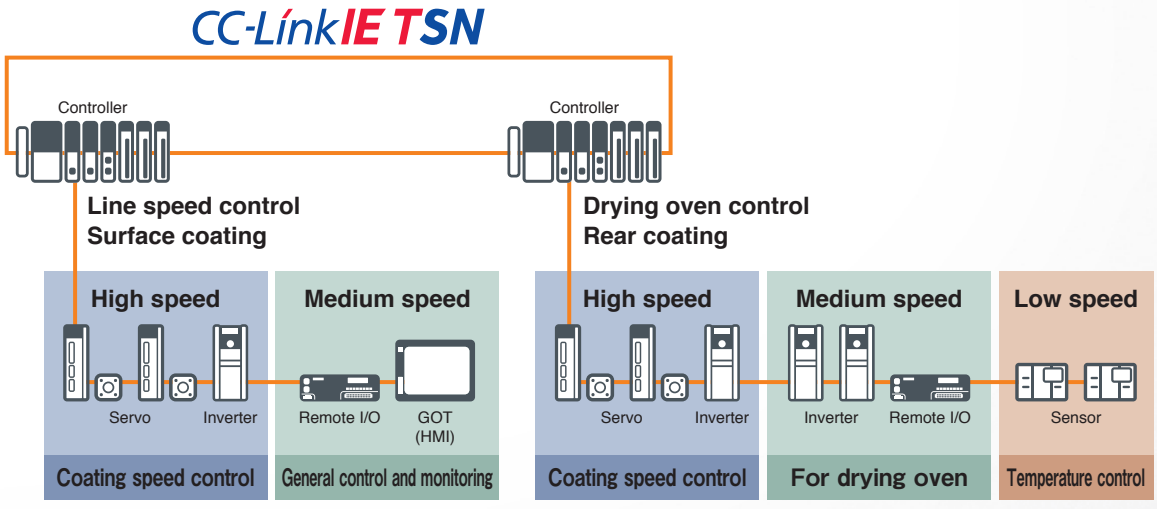


CASE 4 Lithium ion battery manufacturing machine



◎High accuracy control synchronization for multiple combined servo and inverter axes.

◎Increase machine performance by combining fast communication cycle devices (e.g. servo) with slower devices (e.g. inverter).



Cyclic communication is enabled by suppressing the effect of each slave station's response performance.

CC-Link IE TSN

Network List

CC-Link IE TSN

TSN technology makes it possible to mix different networks on the same trunk line and provide real-time communication through time synchronization. Thus the motion control capabilities have been significantly enhanced.

CC-Link IE Field Basic

CC-Link IE communication using general-purpose Ethernet technology can be easily applied to small-scale equipment not requiring high-speed control. This is easy to use and develop. Cyclic communication on the CC-Link IE Field network can be realized by software implementation alone.

CC-Link IE Control

The Industrial Ethernet network that realizes high reliability by duplexing the transmission path. The core network that bundles each field or motion network and provides controller-level distributed control with Gigabit speed large data capacity.
With the newly added safe communication function, safety data can be shared between controllers.

CC-Link IE Field

The new Industrial Ethernet field network for intelligent manufacturing systems. Provides real-time integrated distributed control of I/O while also linking numerous networks at Gigabit speed.
The safe communication function and motion communication function have been newly added allowing systems to be configured simply.

CC-Link CC-Link/LT CC-Link Safety

CC-Link is the existing fieldbus network for typical field control applications. CC-Link/LT is a cost saving network for small I/O applications. CC-Link Safety is specialized for use to meet demanding safety network requirements.

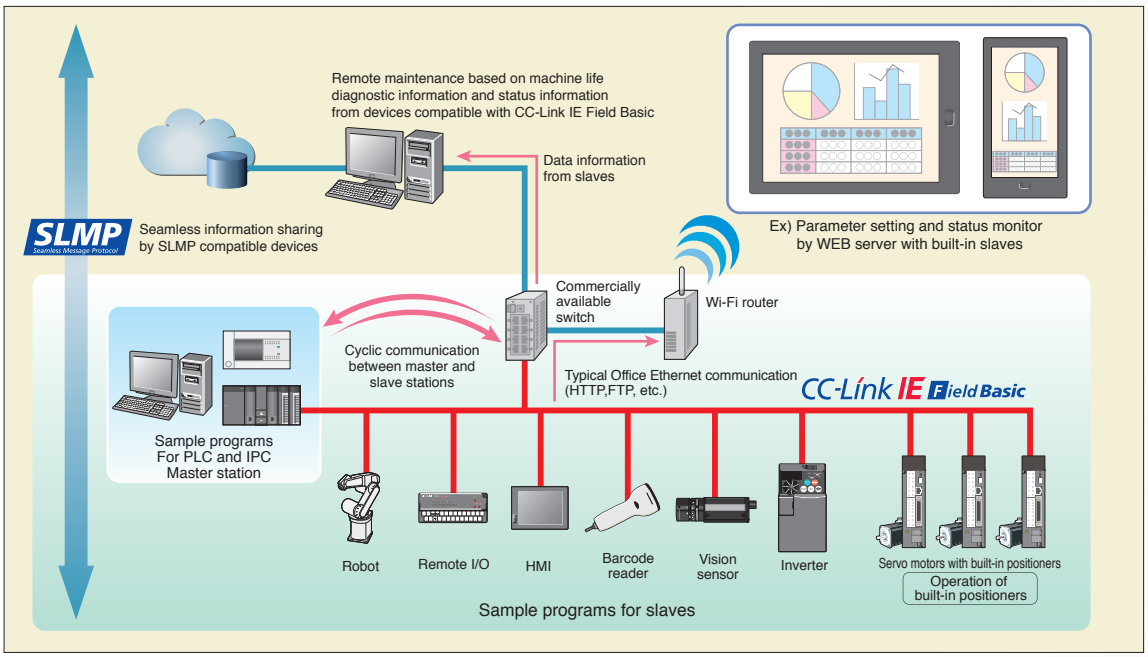
SLMP

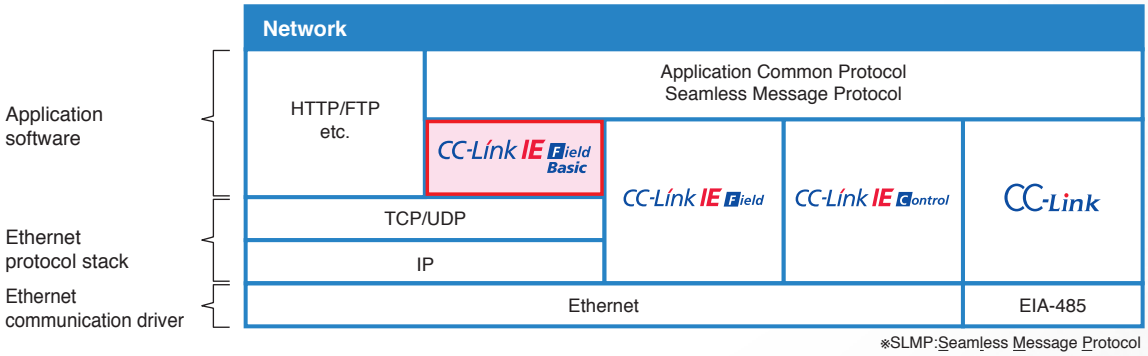
Seamless Message Protocol

The SLMP (Seamless Message Protocol) is a common protocol for realizing system management and operation regardless of the differences between networks.
The SLMP ensures direct transmission of information between production site and IT system and facilitates extensive information sharing.

CC-Link IE Field Basic | Realizing CC-Link IE communication using general-purpose Ethernet on field network applicable to small-scale equipment

CC-Link IE communication using general-purpose Ethernet technology which can be easily applied to small-scale equipment not requiring high-speed control and is easy to use and develop. Realizing cyclic communication on the CC-Link IE Field network by software.





※SLMP:Seamless Message Protocol

Cyclic communication on CC-Link IE Field network is realized by software.

◎The system can be developed easily, and a wide lineup of applicable devices can be provided earlier.

The communication can be done simultaneously with standard Ethernet TCP/IP communication (HTTP, FTP, etc.).

◎Wiring for control is not required, and the Ethernet network can be unified.

The master station can be easily realized on IPC or personal computer.

◎The master station can be realized without a dedicated interface board.
*Cyclic communication is implemented as application software on Ethernet based on sample source code.

A field network system compatible with standard Ethernet communication can be constructed at low cost.

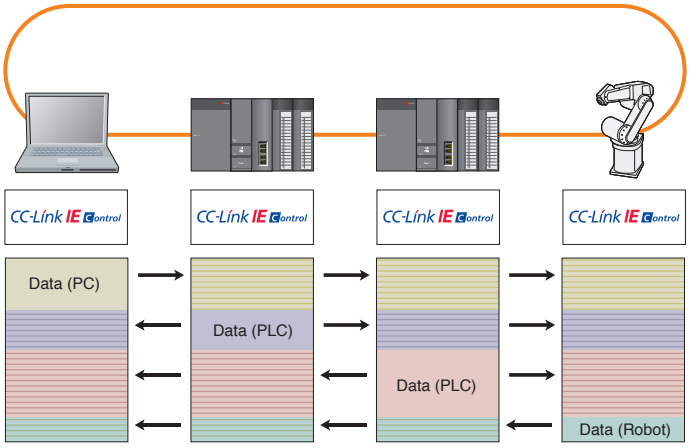
CC-Link IE Control | A wide factory backbone network utilizing Gigabit Ethernet technology.

CC-Link IE is designed to ensure a highly reliable network through the use of full duplex fiber optic transmission paths, delivering high-speed, large-capacity distributed control.
It's the backbone network that provides assured control of each field network.

Network shared memory for cyclic communication with ultra high speed & ultra large capacity

◎To achieve stable communication independent of transmission delay CC-Link IE adopts a token passing protocol for data transmission control.

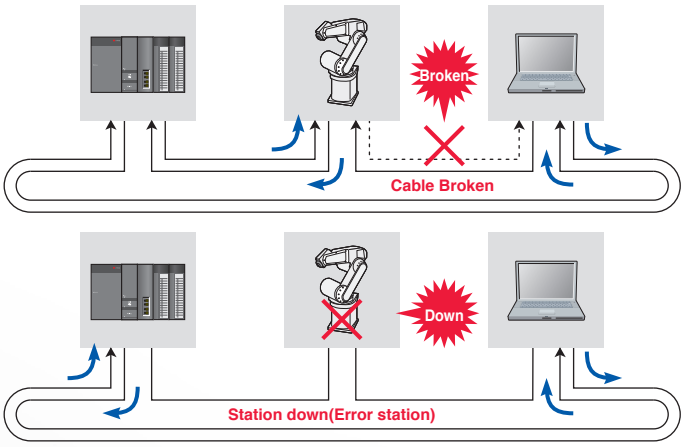
◎Each controller passes data to the network shared memory only when it has the token, ensuring fully deterministic and high speed real-time comunication.



High speed & reliability by redundant fiber optic loop technology

◎By adoption of redundant loop topology, each station continues communication by looping back upon detection of a broken cable or station error.

◎This integrated redundancy is provided without additional equipment and without increasing network cost.

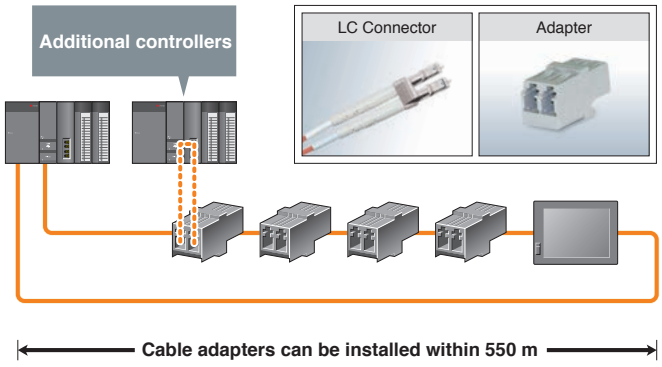


Adoption of standard Ethernet cables, connectors and adapters

◎Easy and world-wide purchasing of standard Ethernet cabling parts by using Ethernet technology.

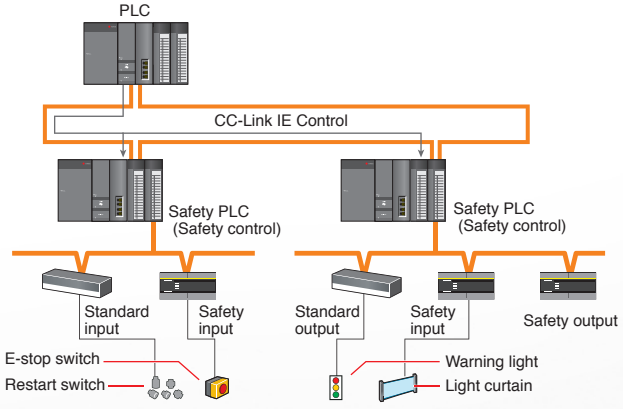
◎By using cable adapters, wiring debugging and installation can be started even if all the equipment in the line has not been fully installed.

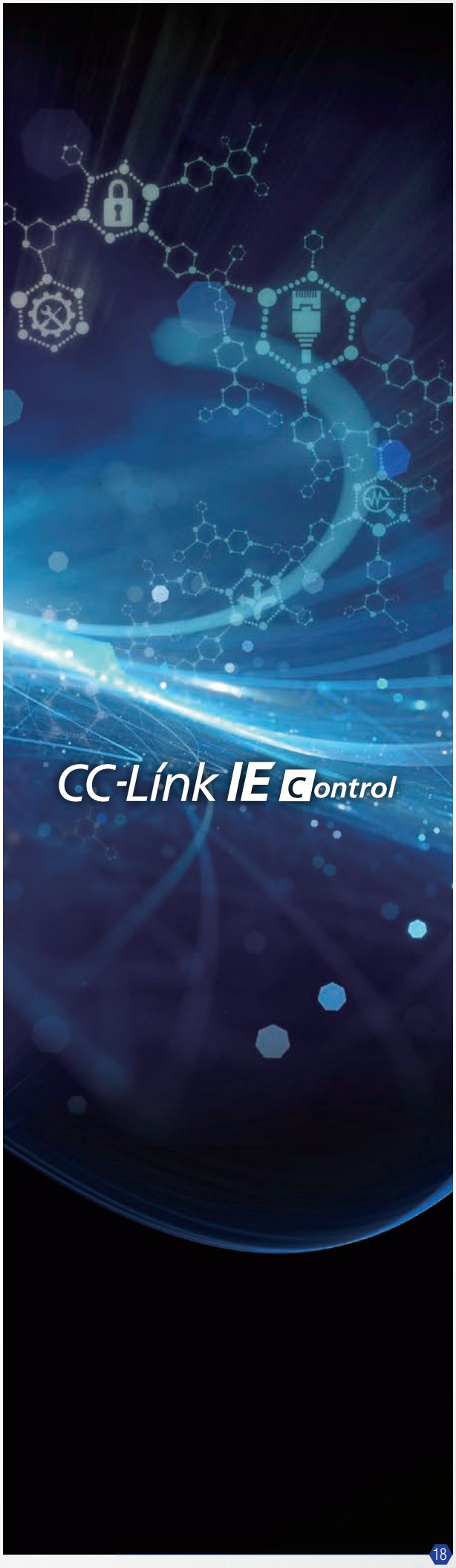
■IEEE802.3z (1000BASE-SX)
■LC connector (IEC61754-20)



IEC061508 SIL3 IEC61784-3 (2010) Compliant Safety Communication Function

◎The safety communication function has been added to the CC-Link IE Control network allowing safe communication to be shared between controllers.





CC-Link IE Field

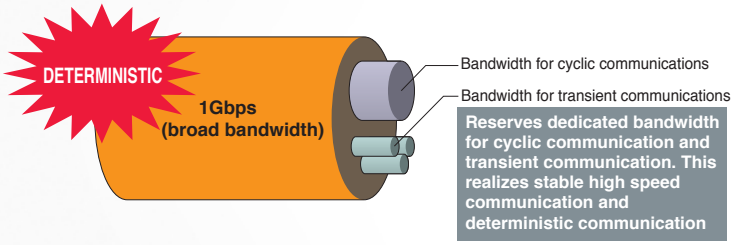
Ultra-high-speed ... supremely useable ... seamless ... and fully compatible with the Ethernet standards We're bringing the benefits of "Gigabit & Ethernet" to the field level!

CC-Link IE Field is an ultra high speed & ultra large capacity network, which provides both synchronous deterministic (cyclic) communication and asynchronous on-demand messaging (transient) communication. I/O control, motion control and safety functions can be combined seamlessly.

Ultra High Speed

◎Gigabit transmission and real-time protocol enables easy and reliable data communication and remote I/O communication independent of transmission delay.

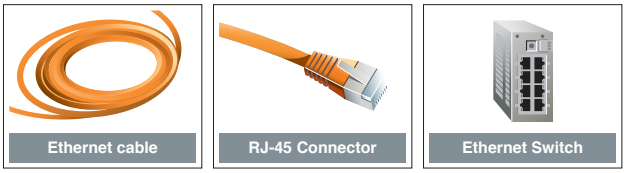
◎High-speed communication for the management information of the devices and trace information as well as the transmission of control data.



Ethernet Cable and Connector

◎Since the physical and data link layers of the CC-Link IE Field Network use standard Ethernet technology, conventional cables, switches and hubs can be used.

◎The availability of materials and selectivity of equipment for the network installation and adjustment are enhanced.



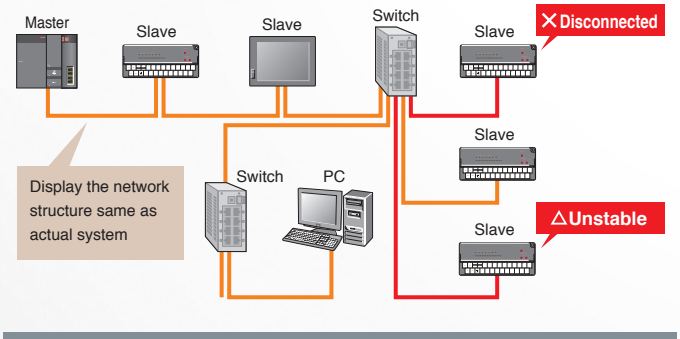
Easy Networking

◎Flexible network topology (ring, line and star are all possible)

◎The network shared memory allows communication among controllers and field devices.

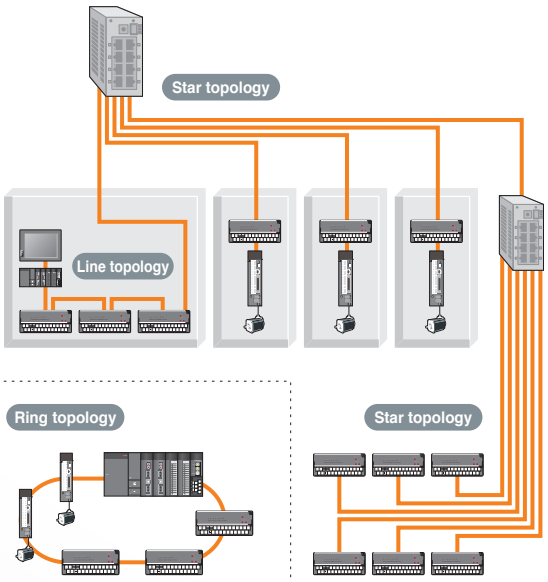
◎Easy configuration and network diagnosis enables a total engineering cost reduction from system start-up to maintenance.

Easy network trouble shooting



When the trouble occurs, the cause can be found. Then system down time can be minimized.

Flexible network topology



Seamless Networking

◎CC-Link IE Field can access field devices directly by remote engneering tools, across the network hierarchy.

◎Devices can be monitored or configured from anywhere in the network, which increases the engineering efficiency with remote management.

IEC061508 SIL3 IEC61784-3 (2010) Compliant Safety Communication Function

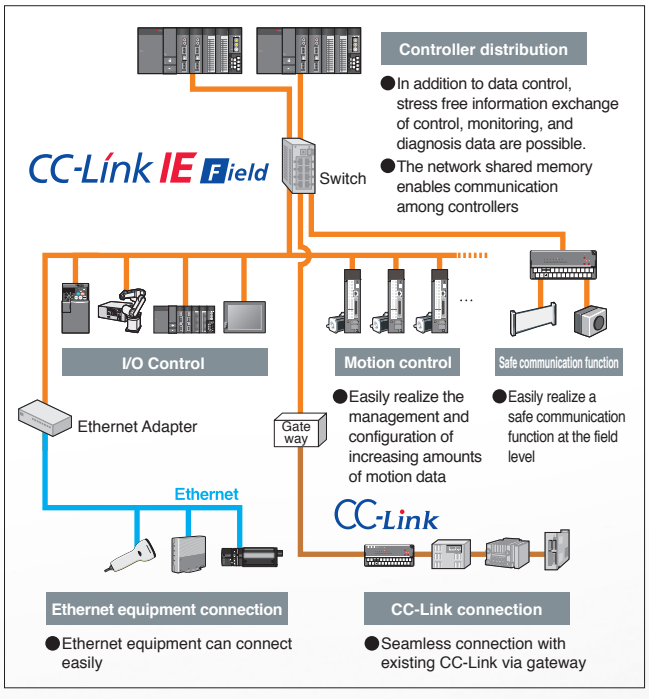
◎The safety communication function has been added to the CC-Link IE Field network allowing safe communication at the field level.

◎Allows flexible arrangement matching the device layout by connecting the PLC and Safety PLC with a single network.

Motion communication function capable of highly accuracy synchronous communication

◎Highly accurate synchronization is possible by compensating the delay time in propagating data from the master station to the slave station.

◎Able to set up not only the synchronization required, but also the information of I/O and sensors which synchronization is not required, on the same CC-Link IE Field network.



CC-Link obtains SEMI certification
The open field network as a global standard

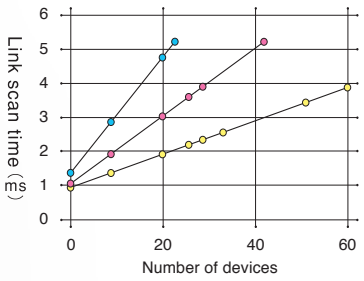
CC-Link is the high-speed field network able to simultaneously handle both control and information data. With the high communication speed of 10 Mbps, CC-Link can achieve the maximum transmission distance of 100 meters and connect to 64 stations.

High-speed and Highly Deterministic Input-Output Response

In addition to high speed 10 Mbps operation, CC-Link is extremely deterministic. Being able to rely on a predictable, unvarying I/O response allows system designers to provide reliable, real-time control.

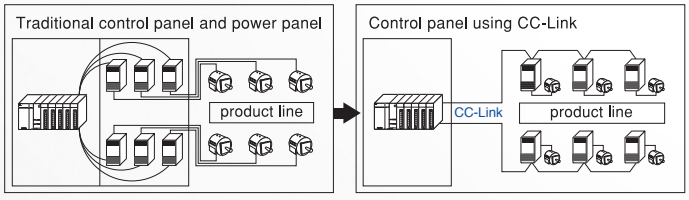
■Link scan time
(at communication speed of 10 Mbps)

- Only remote I/O connected
- Only remote Device connected (Each occupy one station)
- Only Local/ Intelligent Device connected (Each occupy one station)



Efficiency through Reduced Wiring

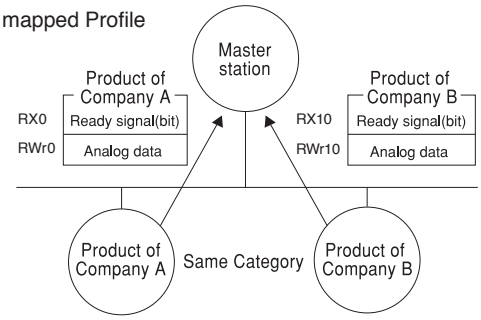
CC-Link significantly reduces the amount of control and power wiring needed in today's complex production lines. It reduces wiring and installation costs, minimizes the work needed to accomplish the wiring and drastically improves maintenance operations.



CC-Link Provides Compatibility between Multiple Vendor Products

CLPA provides a "memory mapped profile" that definesdata for each product type. This definition includes the control signal and data layout (addressing). Multiple vendors can develop CC-Link compatible products to match this "profile". Users are then able to easily change from one product brand to another without needing to change connections or control programs.

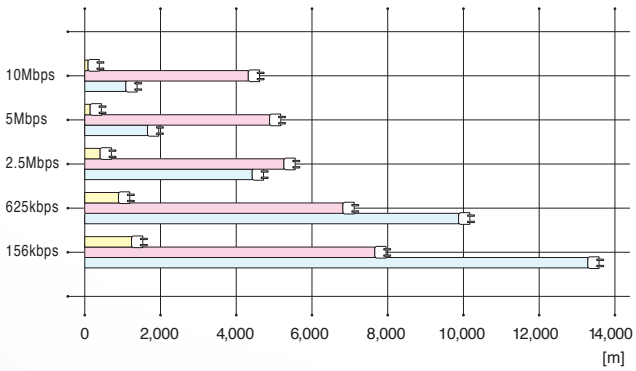
■Memory mapped Profile



Easy to Extend Transmission Distance

The maximum overall cable length is 100 meters when 10 Mbps is selected. This length can be extended to 1.2 km when the network speed is 156 Kbps. The use of cable repeaters and optical repeaters allows even greater distances to be covered. CC-Link supports large-scale applications and reduces the work needed for wiring and device installation.

■CC-Link transmission distance

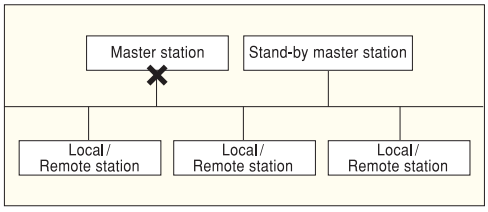


CC-Link Realizes High Reliability with RAS Function.

The RAS (Reliability, Availability, Serviceability) function is another of CC-Links features. Functions including stand-by master, detaching slave station, automatic return and testing and monitoring provide high reliability net-work system and allow the system down time to minimize.

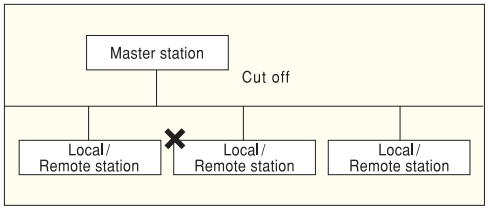
Stand-by master function

Using CC-Link, a Standy-by Master station can as-sume control of network communications in the event that the Primary Master station becomes inoperable.



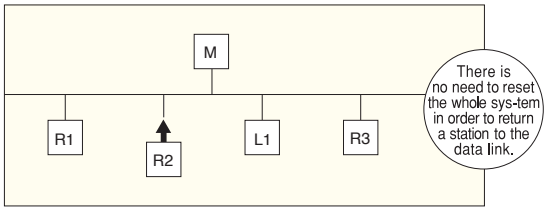
Slave Station Detaching function

In the event that a slave station stops communi-cating, CC-Link allows communication to contin-ue with all other stations.



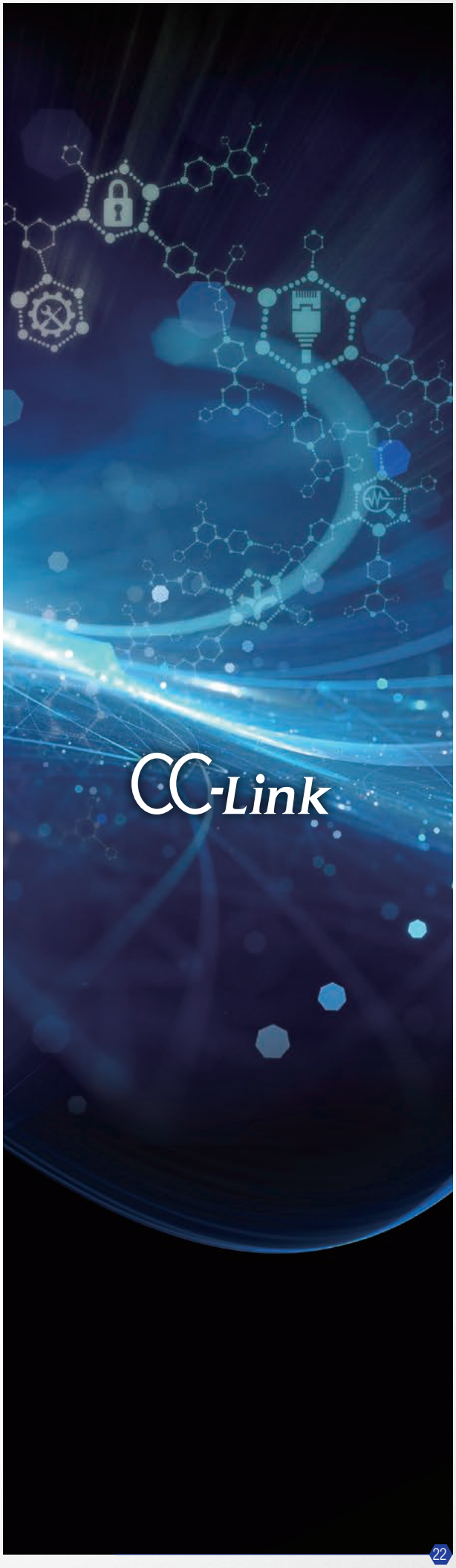
Automatic Return function

CC-Link automatically returns a disconnected station to full network operation when the fault is corrected.



Testing and Monitoring function

This function monitors data link status, and con-ducts a series of hardware and circuit tests.



CC-Link IE TSN Specification

Item			Specifications
Communication speed			1Gbps/100Mbps
Maximum cyclic size per station			Max. 4G (4,294,967,296) octet in total per station
Transient transmission			With the server function and client function for each station The transmission capacity is the same as SLMP.
Communication method			Time sharing method
Synchronization function			Compliant with IEEE802.1AS and IEEE1588v2
Number of nodes connected to a single network			64,770 devices (total of master/slave stations) Up to 65535 devices for IP address class A.
Maximum distance between nodes			• Twisted pair cable (compliant with IEEE 802.3): 100 m • Optical fiber (IEEE 802.3 compliant multimode fiber): 550 m • Optical fiber (SI-POF): 20m • Optical fiber (SI-HPCF):100m
Maximum no. of branches			No upper limit
Topology			Line, star, line/star mixed, ring, ring/star mixed, mesh
Connection specifications	Twisted pair cable specifications	Cable specifications	• 1 Gbps: IEEE 802.3 1000BASE-T compliant cable ANSI/TIA/EIA-568-B (Category 5e or higher) compliant shielded or double shielded type is recommended. • 100 Mbps: IEEE 802.3 100BASE-TX compliant cable ANSI/TIA/EIA-568-B (Category 5 or higher) shielded or double shielded type is recommended. Under noise environment, double shielding is recommended.
		Connector specifications	• RJ45 connector(1 Gbps): The shielded RJ45 compliant with ANSI/TIA/EIA-568-B 8-pin connectors is recommended. • RJ45 connector (100 Mbps): The shielded RJ45 compliant with the ANSI/TIA/EIA-568-B 4-pin or 8-pin connector is recommended. • M12 connector (1 Gbps): The X-Coding 8-pin connector compliant with IEC 61076-2-109 is recommended. • M12 connector (100 Mbps): The D-Coding 4-pin connector compliant with IEC 61076-2-101 or X-Coding 8-pin connector compliant with IEC 61076-2-109 is recommended.
	Optical fiber cable specifications (1Gbps)	Optical fiber specification	Optical fiber cable compliant with IEEE 802.3 1000BASE-SX (MMF)
		Standard	IEC 60793-2-10 Types A1a.1 (50/125 µm multimode)
		Transmission loss (max)	3.5 (dB/km) or less (λ = 850 nm)
		Transmission band (min)	500 (MHz/km) or higher (λ = 850 nm)
		Optical fiber specification	GI type plastic optical fiber cable (GI -POF)
		Standard	Proposing IEC 60793-2-40 (core 55 µm, external diameter 490 µm multimode)
		Transmission loss (max)	100 (dB/km) or less (λ = 850 nm)
		Transmission band (min)	350 (MHz/km) or higher (λ = 850 nm)
		Connector specifications	Duplex LC type connector
		Standard	IEC 61754-20: Type LC connector
		Connection loss	0.3 (dB) or less
		Polished surface	PC polishing
	Optical fiber cable specifications (100Mbps)	Optical fiber specification	SI type plastic optical fiber cable (SI-POF)
		Standard	—
		Transmission loss (max)	170 (dB/km) or less (λ = 650 nm)
		Transmission band (min)	10 (MHz/km) or higher (λ = 650 nm)
		Optical fiber specification	SI type plastic clad fiber cable (SI-PCF)
		Standard	—
		Transmission loss (max)	19 (dB/km) or less (λ = 650 nm)
		Transmission band (min)	14 (MHz/km) or higher (λ = 850 nm)
		Connector specifications	F07 type connector
		Standard	IEC 61754-16: Type PN connector
		Connection loss	0.8 (dB) or less (for master fiber)
		Polished surface	Not defined

*1. For the ring/star mixed and mesh wiring, use switches that can configure each topology.

CC-Link IE Controller Network Specifications

Item			Specifications
Communication speed/data link control			1Gbps / Standard Ethernet
Communication control method			Token passing method
Communication control method			Ring
Redundant system function			Redundant data transfer as standard
Number of connected stations per network			Up to 120 stations
Max. number of networks			239
Max. number of groups			32
Optical fiber cable	Optical fiber specification		Optical fiber cable for 1000BASE-SX (MMF)
		Standard	IEC60793-2-10 Types A1a.1 (50/125μm multimode)
		Transmission loss (max)	3.5(dB/km) or less (λ=850nm)
		Transmission band (min)	500(MHz-km) or more (λ=850nm)
	Total length (total length of optical cable)		66 km (when 120 stations connected)
	Maximum distance between nodes		550 m (core/clad=50/125(μm))
	Connector specifications		Duplex LC connector
		Standard	IEC61754-20:Type LC connector
		Connection loss	0.3 (dB) or less
		Polished surface	PC polishing
	Transmission line type		Dual loop
Twisted pair cable	Communication medium		Shielded twisted pair cable (category 5e)
	Connector		RJ45 connector, M12 X-Code connector
	Total length		12,000m
	Distance between stations (max.)		100m
Cyclic communication (Max. number of link points per network)			Control data (Max. number of link points)
			LB :32768 bits
			LW :131072 words
			LX :8192 bits
			LY :8192 bits

The CC-Link IE Control network achieves a communication speed of 1 Gbps. It uses token passing as the data transfer control method. This prevents frame collisions, improving the throughput of communication. Therefore, it is optimal for networks where regularly scheduled communication is required.

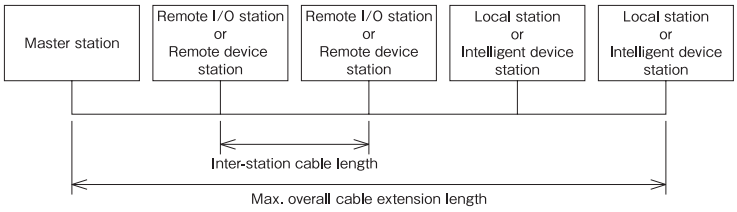
CC-Link IE Field Network Specifications

Item	Specifications
Ethernet Standards	IEEE802.3ab (1000BASE-T) compliant
Communication speed	1Gbps
Communication media	Shielded twisted pair cable (Category 5e), RJ-45 connector
Communication control method	Token passing method
Topology	Line, star, ring
Maximum number of connected units	254 modules (total of master and slave stations)
Maximum station-to-station distance	100m
Cyclic communication (Master slave method)	Control signal (bit data): max. 32768 bits (4096 octets) RX (slave → master): 16384 bits RY (master → slave): 16384 bits Control data (word data): Max. 16384 words (32768 octets) RWr (slave → master): 8192 words RWw (master → slave): 8192 words
Transient communication (message communication)	Message size: Max. 2048 octets

CC-Link IE Field Basic Specifications

Item		Specifications
Communication speed		100Mbps
Implementation method		Software
Connection form		Start (connection with switching hub)
Cable		Ethernet category 5e or higher
Max. number of connected stations per network (open specification)		64
Cyclic communication		Allowed
Max. number of link points/network	RX,RY	512 octets each (4K points)
	RWr,RWw	4K octets each (2K points)
Max. number of link points/station (More than one station can be occupied.)	RX,RY	8 octets each (64 points) (fixed)
	RWr,RWw	64 octets each (32 points) (fixed)
Link scan time (16 stations connected)		10ms
Transient transmission		Possible (max. 2K octets)
Mix of communication protocols, TCP and IP		Allowed

CC-Link Specification

<table>
<tr><th colspan="4" rowspan="2">Item</th><th colspan="5">Specification</th></tr>
<tr><th>Ver. 1.10</th><th colspan="4">Ver. 2.00</th></tr>
<tr><td rowspan="15">Control specification</td><td rowspan="3">Maximum number of link points</td><td colspan="2">Remote I/O(RX, RY)</td><td>2048 points each</td><td colspan="4">8192 points each</td></tr>
<tr><td colspan="2">Remote register (RWr)</td><td>256 words</td><td colspan="4">2048 words (Slave station to Master station)</td></tr>
<tr><td colspan="2">Remote register(RWw)</td><td>256 words</td><td colspan="4">2048 words (Master station to Slave station)</td></tr>
<tr><td colspan="3">Extended cyclic setting</td><td>–</td><td>1 time setting</td><td>2 time setting</td><td>4 time setting</td><td>8 time setting</td></tr>
<tr><td rowspan="8">Number of link points per unit</td><td rowspan="2">1 station occupied</td><td>RX, RY</td><td colspan="2">32 points each</td><td>32 points each</td><td>64 points each</td><td>128 points each</td></tr>
<tr><td>RWr, RWw</td><td colspan="2">4 words each</td><td>8 words each</td><td>16 words each</td><td>32 words each</td></tr>
<tr><td rowspan="2">2 stations occupied</td><td>RX, RY</td><td colspan="2">64 points each</td><td>96 points each</td><td>192 points each</td><td>384 points each</td></tr>
<tr><td>RWr, RWw</td><td colspan="2">8 words each</td><td>16 words each</td><td>32 words each</td><td>64 words each</td></tr>
<tr><td rowspan="2">3 stations occupied</td><td>RX, RY</td><td colspan="2">96 points each</td><td>160 points each</td><td>320 points each</td><td>640 points each</td></tr>
<tr><td>RWr, RWw</td><td colspan="2">12 words each</td><td>24 words each</td><td>48 words each</td><td>96 words each</td></tr>
<tr><td rowspan="2">4 stations occupied</td><td>RX, RY</td><td colspan="2">128 points each</td><td>224 points each</td><td>448 points each</td><td>896 points each</td></tr>
<tr><td>RWr, RWw</td><td colspan="2">16 words each</td><td>32 words each</td><td>64 words each</td><td>128 words each</td></tr>
<tr><td colspan="3">Maximum number of occupied stations</td><td colspan="5">4 stations</td></tr>
<tr><td rowspan="11">Communication specification</td><td colspan="3">Communication speed</td><td colspan="5">10M / 5M / 2.5M / 625k / 156kbps</td></tr>
<tr><td colspan="3">Communication system</td><td colspan="5">Broadcast polling system</td></tr>
<tr><td colspan="3">Synchronization system</td><td colspan="5">Frame synchronization system</td></tr>
<tr><td colspan="3">Encoding system</td><td colspan="5">NRZI</td></tr>
<tr><td colspan="3">Transmission path format</td><td colspan="5">Bus format (EIA RS485 conformance)</td></tr>
<tr><td colspan="3">Transmission format</td><td colspan="5">HDLC conformance</td></tr>
<tr><td colspan="3">Error control system</td><td colspan="5">CRC ($X^{16}+X^{12}+X^5+1$)</td></tr>
<tr><td colspan="3">Max. number of units connected</td><td colspan="5">64 units</td></tr>
<tr><td colspan="3">The number of slave station</td><td colspan="5">1-64</td></tr>
<tr><td colspan="3">Max. overall cable extension length and inter-station cable length</td><td colspan="5"> 

CC-Link Ver. 1.10 compatible cable (Using 110Ω terminators)
<table>
<tr><th>Communication speed</th><th>inter-station cable length</th><th>Max. overall cable extension length</th></tr>
<tr><td>156Kbps</td><td rowspan="5">20 cm or longer</td><td>1200m</td></tr>
<tr><td>625Kbps</td><td>900m</td></tr>
<tr><td>2.5Mbps</td><td>400m</td></tr>
<tr><td>5Mbps</td><td>160m</td></tr>
<tr><td>10Mbps</td><td>100m</td></tr>
</table>
If a system uses modules compatible with Ver. 1.00, 1.10 and Ver. 2.00, and cables compatible with Ver. 1.00 and 1.10, then follow the Ver. 1.00 specification for maximum overall cable extension length and inter-station cable length.</td></tr>
<tr><td colspan="3">Connection cable</td><td colspan="5">CC-Link Ver. 1.10 compatible cable (Shielded, 3-core twisted pair cable)
* Mixture of different brand cables is possible only when they are all Ver. 1.10 compatible cables.</td></tr>
</table>

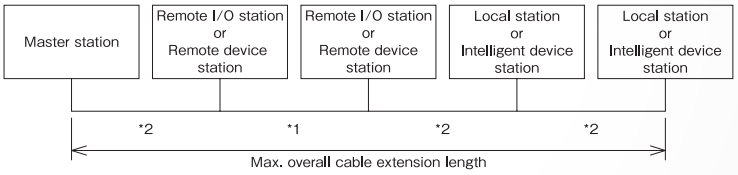
Difference between CC-Link Ver.1.10 and Ver.2.00 in the number of connected units

	Number of units connected
Ver.1.10	Max. 64 stations. But it should satisfy the conditions below 1. Number of all stations a+b×2+c×3+d×4≤64 a : Number of units that occupies 1 station, b : Number of units that occupies 2 stations c : Number of units that occupies 3 stations, d : Number of units that occupies 4 stations 2. Number of units connected 16×A+54×B+88 C≤2304 A : Number of remote I/O station units ..... Max. 64 units B : Number of remote device station units ..... Max. 42 units C : Number of local station, stand by master station and intelligent device station units ..... Max. 26 units
Ver.2.00	Max. 64 stations. But it should satisfy the conditions below 1. Number of all stations (a+a2+a4+a8)+(b+b2+b4+b8)×2+(c+c2+c4+c8)×3+(d+d2+d4+d8)×4≤ 64 2. Total number of remote I/O points (a×32+a2×32+a4×64+a8×128)+(b×64+b2×96+b4×192+b8×384) +(c×96+c2×160+c4×320+c8×640)+(d×128+d2×224+d4×448+d8×896)≤ 8192 3. Total number of remote register points (a×4+a2×8+a4×16+a8×32)+(b×8+b2×16+b4×32+b8×64) +(c×12+c2×24+c4×48+c8×96)+(d×16+d2×32+d4×64+d8×128)≤ 2048 a : The number of units with 1 station occupied and 1 time setting b : The number of units with 2 stations occupied and 1 time setting c : The number of units with 3 stations occupied and 1 time setting d : The number of units with 4 stations occupied and 1 time setting a2: The number of units with 1 station occupied and 2 times setting b2: The number of units with 2 stations occupied and 2 times setting c2: The number of units with 3 stations occupied and 2 times setting d2: The number of units with 4 stations occupied and 2 times setting a4: The number of units with 1 station occupied and 4 times setting b4: The number of units with 2 stations occupied and 4 times setting c4: The number of units with 3 stations occupied and 4 times setting d4: The number of units with 4 stations occupied and 4 times setting a8: The number of units with 1 station occupied and 8 times setting b8: The number of units with 2 stations occupied and 8 times setting c8: The number of units with 3 stations occupied and 8 times setting d8: The number of units with 4 stations occupied and 8 times setting 4. Number of units connected 16×A+54×B+88×C≤ 2304 A : Number of remote I/O station units ..... Max. 64 units B : Number of remote device station units ..... Max. 42 units C : Number of local station, stand by master station and intelligent device station units ..... Max. 26 units *In the case of units compatible with Ver. 1, the number is calculated with one time setting.

CC-Link Ver. 1.00 model (Differences from Ver. 1.10)

There are two differences in specifications between CC-Link Ver. 1.10 and Ver. 1.00 as shown below.

- Max. overall cable extension length and inter-station cable length
- Connection cable

<table>
<tr><th>Item</th><th>Specification</th></tr>
<tr><td>Max. overall cable extension length and inter-station cable length</td><td>


*1: Inter-station cable length between remote I/O or remote device stations
*2: Inter-station cable length between the master station and a local station or between an intelligent device station and the precedingor following station
CC-Link Ver. 1.10 compatible cable (Using 110Ω terminators)
<table>
<tr><th rowspan="2">Communication speed</th><th colspan="2">inter-stationcable length</th><th rowspan="2">Max. overall cable extension length</th></tr>
<tr><th>*1</th><th>*2</th></tr>
<tr><td>156Kbps</td><td rowspan="3">30 cm or over</td><td rowspan="7">1 m or over (A) / 2 m or over (B)</td><td>1200 m</td></tr>
<tr><td>625Kbps</td><td>600 m</td></tr>
<tr><td>2.5Mbps</td><td>200 m</td></tr>
<tr><td rowspan="2">5Mbps</td><td>30 cm to 59 cm*</td><td>110 m</td></tr>
<tr><td>60 cm or over</td><td>150 m</td></tr>
<tr><td rowspan="3">10Mbps</td><td>30 cm to 59 cm*</td><td>50 m</td></tr>
<tr><td>30 cm to 59 cm*</td><td>80 m</td></tr>
<tr><td>1 m or over</td><td>100 m</td></tr>
</table>
(A): 1 m or longer: In the case of a system comprising only remote I/O or remote device stations
(B): 2 m or longer: In the case of a system comprising local and intelligent device stations
*: If even a cable between remote I/O or remote device stations is to be wired within this range, the maximum overall cable length shown above applies.
</td></tr>
<tr><td>Connection cable</td><td>CC-Link Ver. 1.10 compatible cable (Shielded, 3-core twisted pair cable)
* Cables of different manufacturers cannot be used together.</td></tr>
</table>

●How to become a member

Would you like to improve your FA, BA, and PA devices by making them compatible with the CC-Link Family? Are you interested in open FA devices that satisfy international standards? CLPA will support you by promoting related technologies and holding exhibitions and seminars in Japan and overseas.

◎ How to apply for a membership: Please access from our website.

※FA:Factory Automation / BA:Building Automation / PA:Process Automation

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