Leave it to CC-Link IE

Factories need a network
Your network se

Our new factory's network is finally ready.

Wait a minute!

What you select for your factory's network will affect your productivity.
Are you really sure you made the best selection?
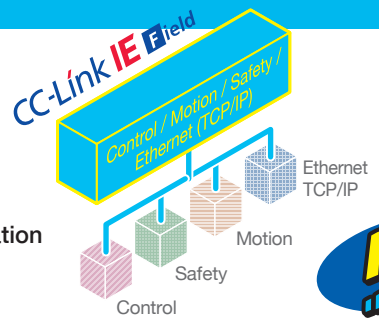
CC-Link IE

CC-Link MAN!

I didn't know that!

structure with high production efficiency
lection is the key to your success!!

POINT 1

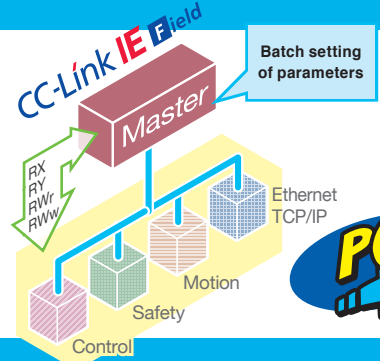### Create a single network for super high speeds and improved reliability

- Build the entire system from the information level to the field level with a single network.
- Create a network with no speed variation even when the communication data volume increases.

CC-Link IE **F**ield
Control / Motion / Safety / Ethernet (TCP/IP)

Ethernet TCP/IP

Motion

Safety

Control

P4

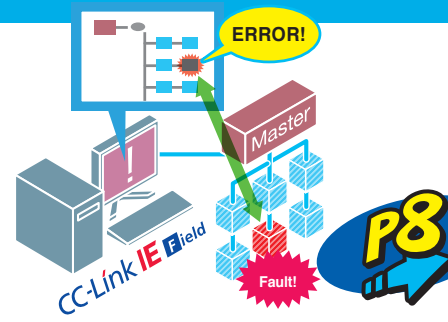**POINT 2**

Build systems that are simple and highly flexible

- Achieve high performance regardless of the operator's experience.
- Suppress costs and increase reliability with the flexible wiring system.

CC-Link IE **F**ield

Batch setting of parameters

Master

RX
RY
RWr
RWw

Ethernet TCP/IP

Motion

Safety

Control

P6

POINT 3

Avoid system crashes and make a quick diagnosis when trouble occurs

- Easily identify problems, and shorten recovery times.
- Build a network resistant to faults, and avoid system crashes.

ERROR!

Master
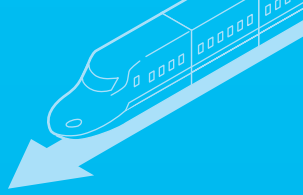
CC-Link IE **F**ield

Fault!

P8

Remember these **3** points when selecting your network!

For more information (FAQ, specifications) ········ P10

CC-Link IE is an Ethernet-based industrial network advocated by the CC-Link Partner Association (CLPA). Partner manufacturers around the world are joining forces to promote an open architecture.

CC-Link **IE**

With **CC-Link IE Field**, you can:

POINT 1

Create a single network for super high speeds and improved reliability!

You need to efficiently connect various equipment in your factory.

That's true…

Plus, you won't need a LAN for your personal computer system.

SPEED! & On Time!!

Your system would be useless if the speed dropped when the communication data volume increased.

I see!

Wow!!

Good!
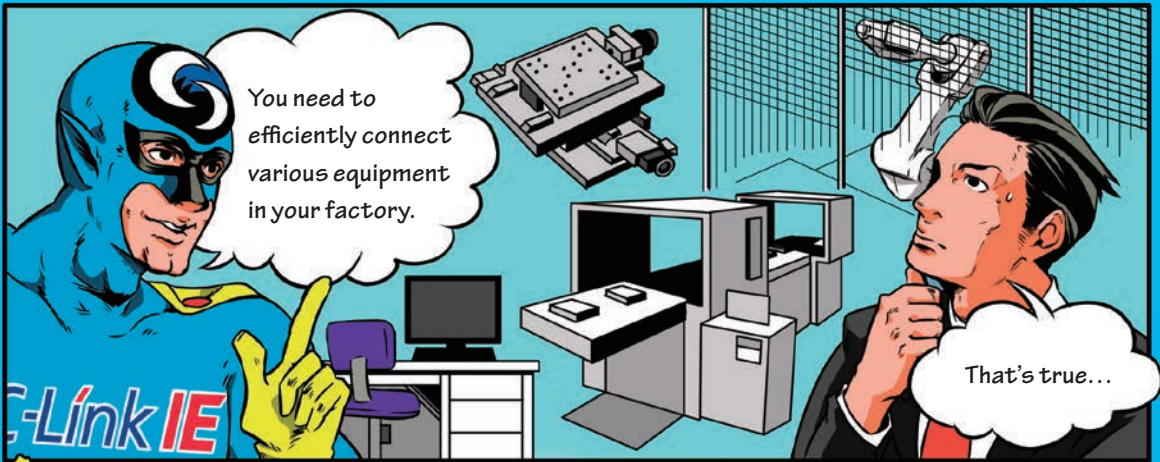
Increase the efficiency of your entire factory with a single network.

Plus! **You won't need LAN wiring for your personal computer.**

Get reliability that prevents speed from dropping even if the communication data increases.

Here's what you can do with
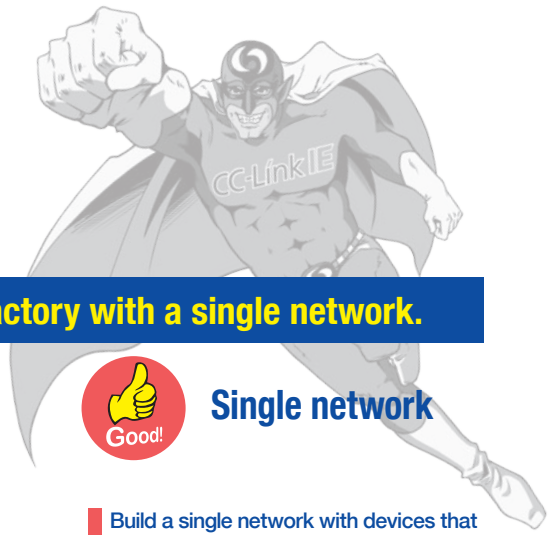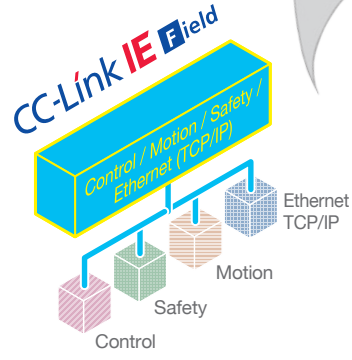
CC-Link IE Field

Increase the efficiency of your entire factory with a single network.

Bad
Traditionally, various networks were individually wired.

Good! **Single network**

Build a single network with devices that support information, control, motion and safety functions all on the same cable.

Build an efficient system without the need for a variety of networks.

Plus! There's no need for personal computer LAN wiring.

Bad
A separate LAN was needed from the personal computer.
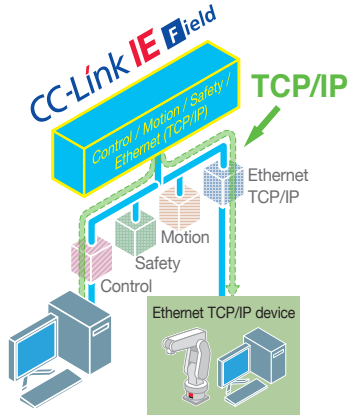
Good! **LAN wiring isn't needed**

Connect to Ethernet TCP/IP devices for communication with personal computers, etc.

There's no need to lay separate LAN cables for Ethernet TCP/IP devices.

Get a reliable, constant speed even when communication data increases.

Bad
Even highways get congested when there's heavy traffic.

Good! **Stable communication**

Due to the 1 Gbps high-speed communication and large data volume, high reliability is achieved, preventing the speed from changing or dropping while exchanging I/O (cyclic) data and diagnostic (transient) data.

Even in large-scale systems, high-speed devices and large volumes of data can be accommodated.

With CC-Link IE Field, you can:

POINT 2 Build systems that are simple and highly flexible!

Starting up a system means so many settings.

SETTING
SETTING
SETTING

There's so much work to do!

There is different wiring for the entire factory, line, individual devices and office spaces.

Don't forget about updating and adding equipment.

I see!

I get it!
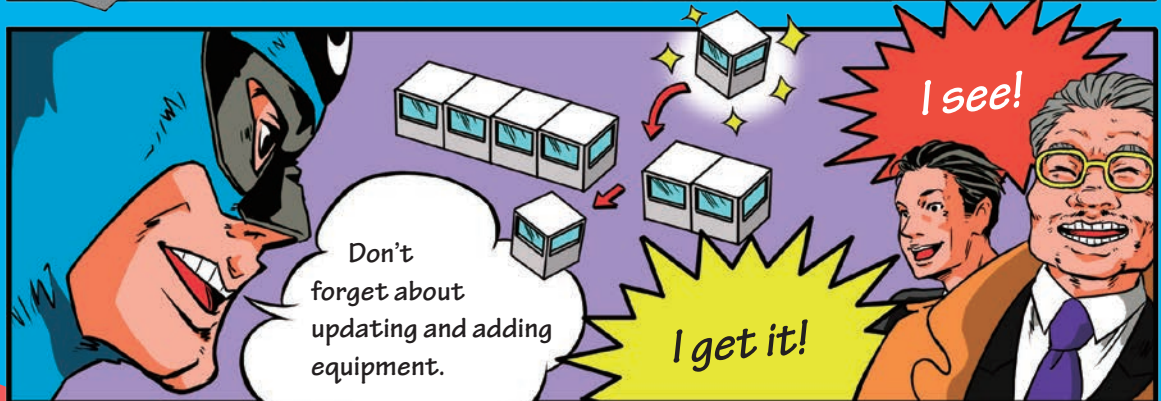
Good!

Easy network startup!

Plus! **Easily add and change devices.**

The flexible wiring methods reduce wiring costs and improve reliability.

CC-Link IE

Here's what you can do with
CC-Link IE Field
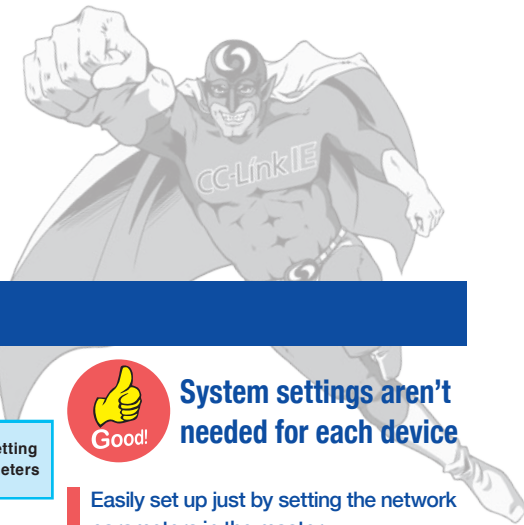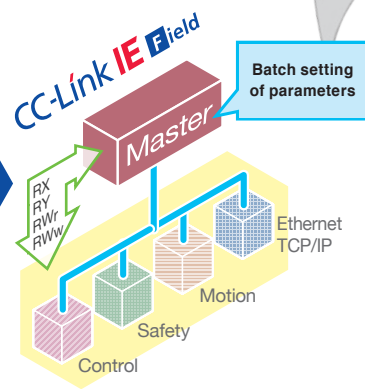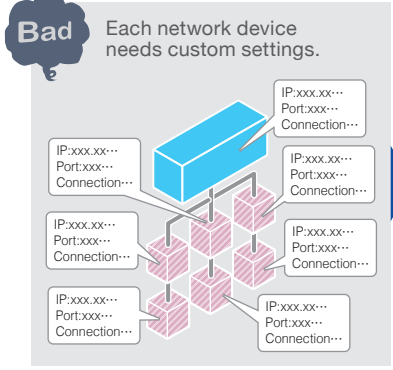
Easily set up your network

Bad — Each network device needs custom settings.

IP:xxx.xx···
Port:xxx···
Connection···

CC-Link IE Field

Master

Batch setting of parameters

RX
RY
RWr
RWw

Ethernet TCP/IP

Motion

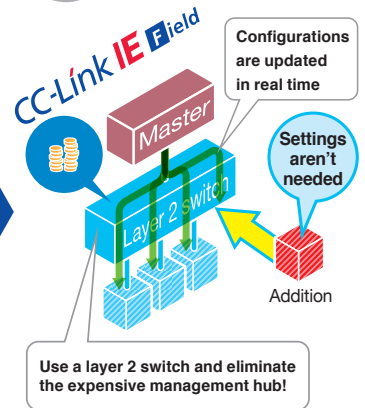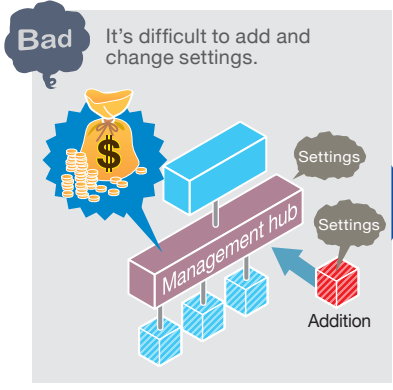Safety

Control

Good! **System settings aren't needed for each device**

Easily set up just by setting the network parameters in the master.

Ethernet expertise is not required. Achieve maximum performance regardless of the system architect.

Constant device performance is guaranteed regardless when or where the device is installed.

Plus! It's easy to add and change devices

Bad — It's difficult to add and change settings.

$ Settings

Management hub

Settings

Addition

CC-Link IE Field

Master

Configurations are updated in real time

Layer 2 switch

Settings aren't needed

Addition

Use a layer 2 switch and eliminate the expensive management hub!

Configurations are updated in real-time when a device is added to the layer 2 switch.

Suppress costs by using universal Ethernet TCP/IP devices for the layer 2 switch and wiring cables.

Use a shielded twisted pair cable (Category 5e) and RJ-45 connectors.

CLPA provides information on devices suitable for your FA network.

Contain costs and increase reliability with the flexible wiring system.

● **Highly reliable** [Ring type]
● **Simple structure**

● **Layer 2 switch supported** [Star type] [Line type]

Master

Ring type wiring

Master

Layer 2 switch

Star type wiring
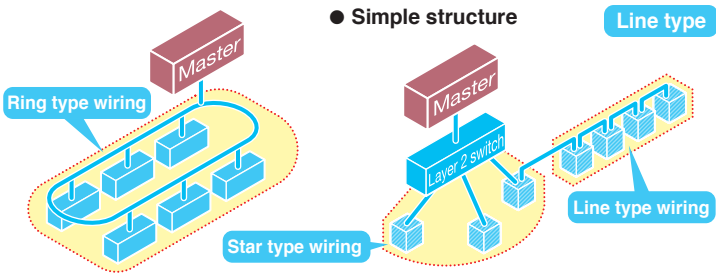
Line type wiring

Good! **Reliability and low costs**

Various connection methods to achieve reliability and suit your wiring layout are supported.

Combine the star type and line type wiring to achieve a variety of wiring layouts.

CC-Link IE Field

Field

7

With **CC-Link IE Field**, you can:

POINT 3 Avoid system crashes and make a quick diagnosis when trouble occurs!

ERROR

STOP... STOP... STOP

You must avoid situations that cause the entire system to stop when a fault occurs.

CC-Link

You'll lose lots of money if you don't quickly identify the cause of the problem.

You're right!

Time is Money!

nk IE

Good!
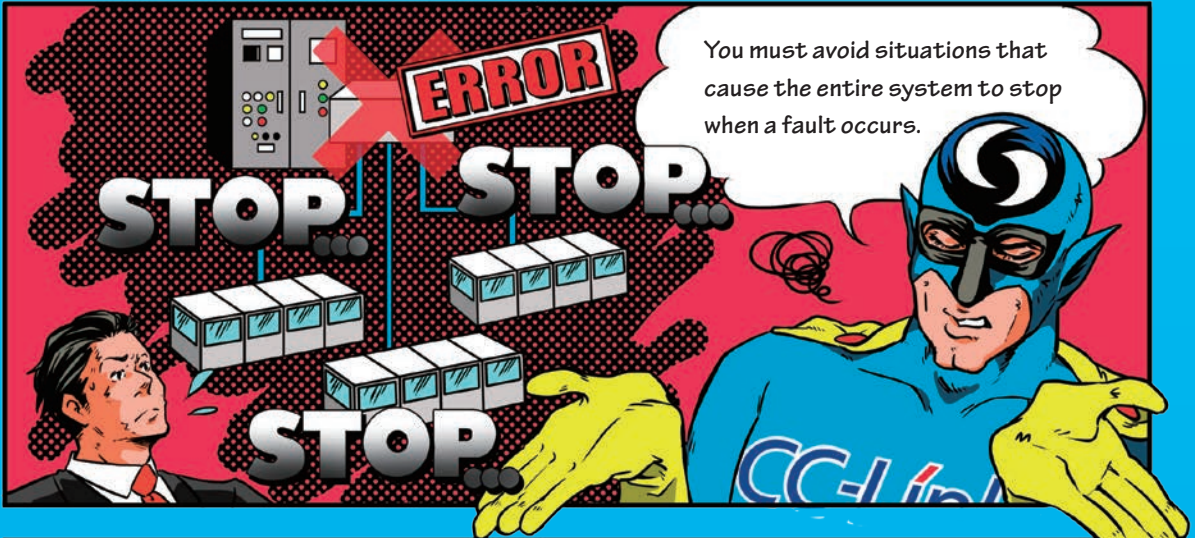
Easily diagnose the cause of the problem.

Increase reliability to avoid system crashes.

Plus! Continue operation even if the master fails.

CC-Link IE

Here's what you can do with
CC-Link IE Field

Easily diagnose the cause of problems

Bad
It is difficult to identify problems on a screen.
Comparing systems with the design drawings takes time to find the cause.

?

Master

Fault!

CC-Link IE Field

ERROR!

Master

Fault!

Good! **Easily identify the error**

The location of the fault appears on the actual system configuration drawing displayed on the personal computer's monitor.
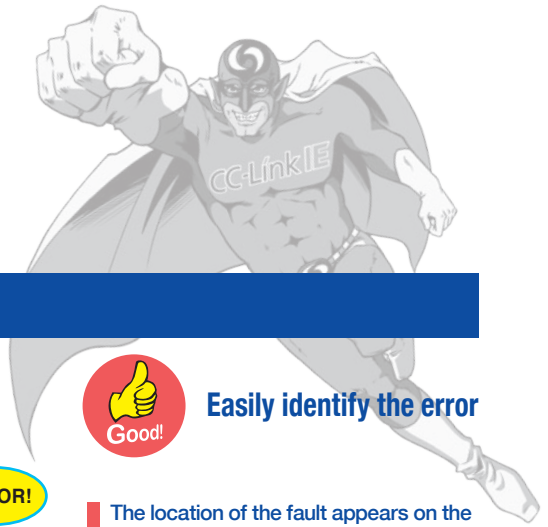
Even if the device structure is different from the design drawings, the structure information is updated in real time.

Increase reliability to avoid system crashes.

Bad
Damage increases when the trunk line is cut off.

Master

Disconnected

Trunk line

CC-Link IE Field

Master

Ring type wiring

Disconnected

Good! **Continue operation with ring type wiring**

Use highly reliable and fault tolerant ring type layout.

Continue operation even if the trunk line is disconnected in one place.

Plus! Continue operation even if the master fails.

Failure

Master

Local

Sub-master continues control

CC-Link IE Field

System doesn't crash even when the master fails.

Sub-master takes over operation of the network.

Field

More information on CC-Link IE Field

FAQ

Frequent questions

Q1	What does the IE in CC-Link IE stand for?	A	IE is the abbreviation for Industrial Ethernet, and refers to Ethernet used in an industrial setting.
Q2	Why should we use Ethernet?	A	When Ethernet, commonly used in host information networks such as personal computers and servers, is used in an industrial control system network, a connection can be established with the host information system network that otherwise couldn't be connected with conventional separate networks.
Q3	What's different between CC-Link and CC-Link IE?	A	(1) The physical layer of the network used for communication is different. CC-Link is a serial communication network (RS-485), while CC-Link IE is an industrial Ethernet network. (2) The amount of data exchanged is different. CC-Link IE can exchange upwards of 8x more data than CC-Link.
Q4	Can we connect to a host information system such as a personal computer?	A	For CC-Link or CC-Link IE, a dedicated communication board can be used to connect the network to a personal computer. In addition, since CC-Link IE is an Ethernet network, connection via Ethernet is possible.
Q5	What's better about CC-Link IE Field compared to other networks?	A	Some of the CC-Link IE Field network features include: (1) The high-speed/large volume communication (1 Gbps) allows the control data and information data to be exchanged separately, so that the information data is exchanged without affecting the control data. (2) The network is easy to understand and the interchangeability with CC-Link is high so that even designers without IT expertise can build a network. (3) Distributed control, I/O control, motion control and safety control can all be handled with a single network. (4) Networks can be structured flexibly (star, line or ring). (5) Faults can be visibly identified with the diagnosis function.
Q6	Can we connect to other networks?	A	While a direct connection using the same Ethernet cable is not possible, a gateway connection can be established to exchange data. Connection to Ethernet TCP/IP is possible by using an Ethernet Adaptor product, or via the front Ethernet TCP/IP port on Mitsubishi Electric programmable controllers.

Specifications

CC-Link IE Field Network Specifications

Ethernet Standards	IEEE802.3ab (1000BASE-T) compliant
Communication speed	1 Gbps
Communication media	Industrial Ethernet shielded twisted pair cable (Category 5e), RJ-45 connectors
Communication control method	Token passing method
Topology	Line type, star type, ring type (line type/star type can be used together)
Maximum number of connected units	254 modules (total of master and slave stations)[1]
Maximum station-to-station distance	100 m
Cyclic communication (Master slave method)	Control signal (bit data): Max. 32768 bits (4096 bytes) RX (slave -> master): 16384 bits RY (master -> slave): 16384 bits Control data (word data): Max. 16384 words (32768 bytes) RWr (slave -> master): 8192 words RWw (master -> slave): 8192 words
Transient communication (Message communication)	Message size: Max. 2048 bytes

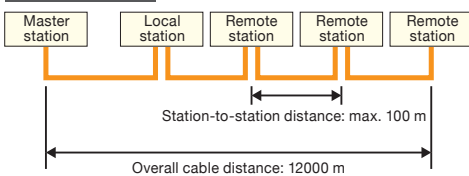[1] Up to 121 Mitsubishi Electric Corporation master units can be connected.

Comparison of network specifications

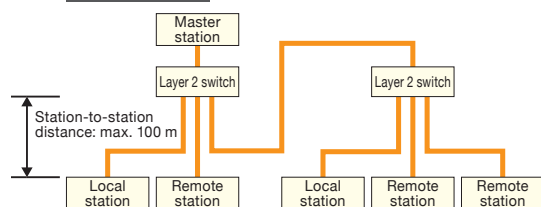|		CC-Link IE Field	CC-Link
Communication speed		1 Gbps	10 Mbps (max.)
Maximum number of link points per network	RX/RY	16K points each	2K points each
	RWr/RWw	8K words each	256 words each
Maximum number of link points per station	RX/RY	2K points each	128 points each (When 4 stations are occupied)
	RWr/RWw	1K words each	16 words each (When 4 stations are occupied)
Maximum number of connected stations per network		254	64
Distance	Total extension distance (km)	12	1.1[2] (10 Mbps)
	Maximum station-to-station distance (m)	100	100 (10 Mbps)
Wiring	Topology	Line, star, or ring	Bus, T-branch, or star
	Cable	Industrial-purpose Ethernet cable (Category 5e or better, double shielded, twisted pair)	Twisted cable (CC-link-dedicated cable)

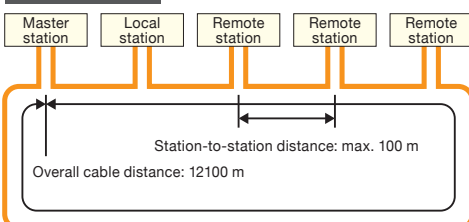[2] When using repeater

CC-Link IE Field Network topology examples

Line topology

Master station — Local station — Remote station — Remote station — Remote station

Station-to-station distance: max. 100 m

Overall cable distance: 12000 m

Star topology

Master station

Layer 2 switch   Layer 2 switch

Station-to-station distance: max. 100 m

Local station   Remote station   Local station   Remote station   Remote station

Ring topology

Master station — Local station — Remote station — Remote station — Remote station

Station-to-station distance: max. 100 m

Overall cable distance: 12100 m

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[Comic Production]
Kyoto Seika University is the literary agent for all comic illustrations in this booklet.
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Comic illustrations may not be revised, changed or modified.

Global influence of CC-Link IE and CC-Link continues to spread

CC-Link IE and CC-Link are supported globally by CLPA. With offices throughout the world, support for partner companies can be found locally.
Each regional CLPA office undertakes various support and promotional activities to further the influence of CC-Link IE & CC-Link in that part of the world. For companies looking to increase their business in their local area, CLPA is well placed to assist these efforts through offices in all major regions.

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