

**NEW**

# Announcing the future of open industrial Ethernet

## CC-Link **IE TSN**



- **Performance:** Highest productivity Industry 4.0 solution combines gigabit Ethernet with TSN
- **Connectivity:** Open technology provides freedom of choice for end users, OEMs and device vendors
- **Intelligence:** A wealth of intelligent features reduce time to market and downtime while increasing productivity



**CC-Link *IE TSN***

# Be ready for the future of manufacturing with CC-Link IE TSN

## The only open industrial Ethernet to combine gigabit bandwidth with TSN

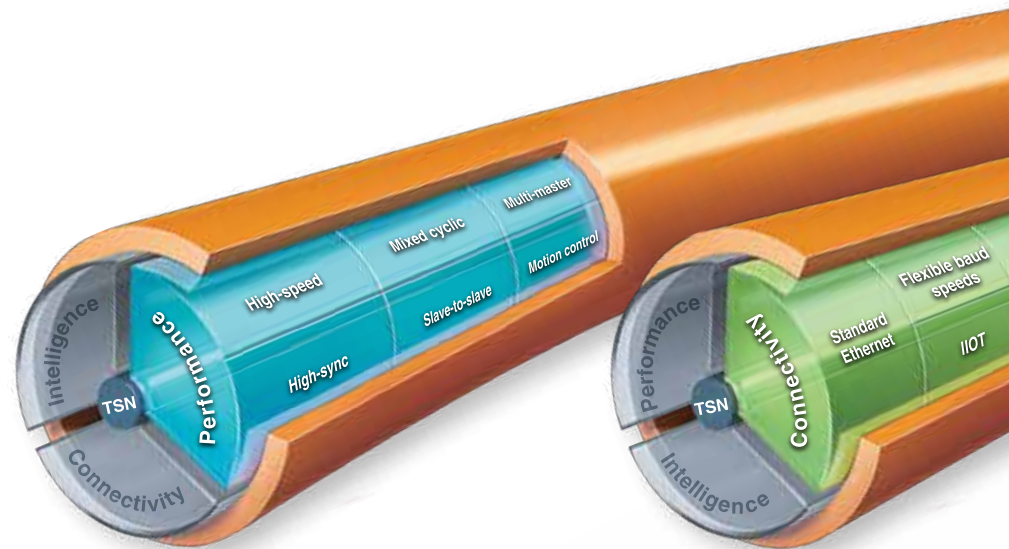
The CC-Link Partner Association introduces CC-Link IE TSN. CC-Link IE TSN builds on our successful pedigree of open automation networks by combining the unmatched bandwidth of open gigabit Ethernet with the future proof technology of Time-Sensitive Networking (TSN).

### Overview

CC-Link IE TSN offers manufacturing industries the technology they need to address the challenges of Industry 4.0 by focussing on three key areas:

### Performance

Current Industry 4.0 manufacturing trends dictate high speed, accurate cycle times together with the management of large amounts of data in order to meet demanding productivity and quality targets.

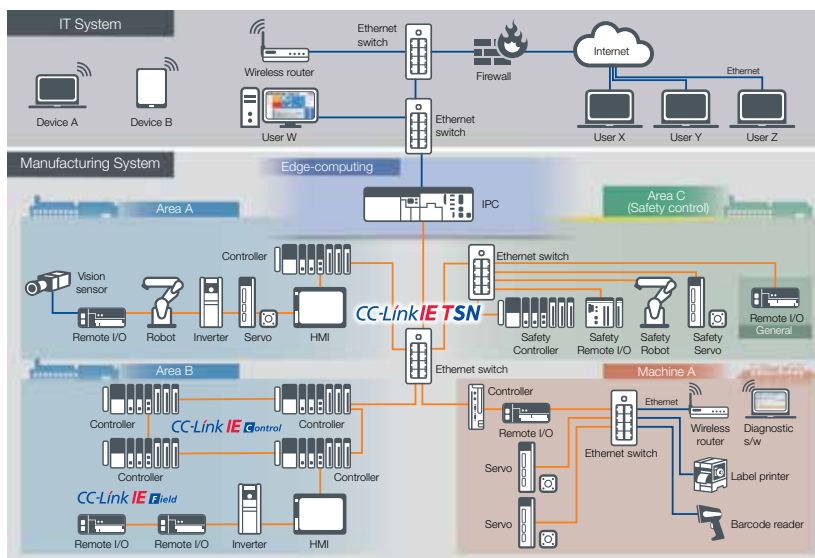


CC-Link IE TSN meets these requirements now and in the future by combining unmatched gigabit bandwidth with Time-Sensitive Networking (TSN) as defined by IEEE 802.1. This allows the high productivity shortening of cycle times by integrating control, safety and motion with general TCP/IP traffic, without compromising performance.

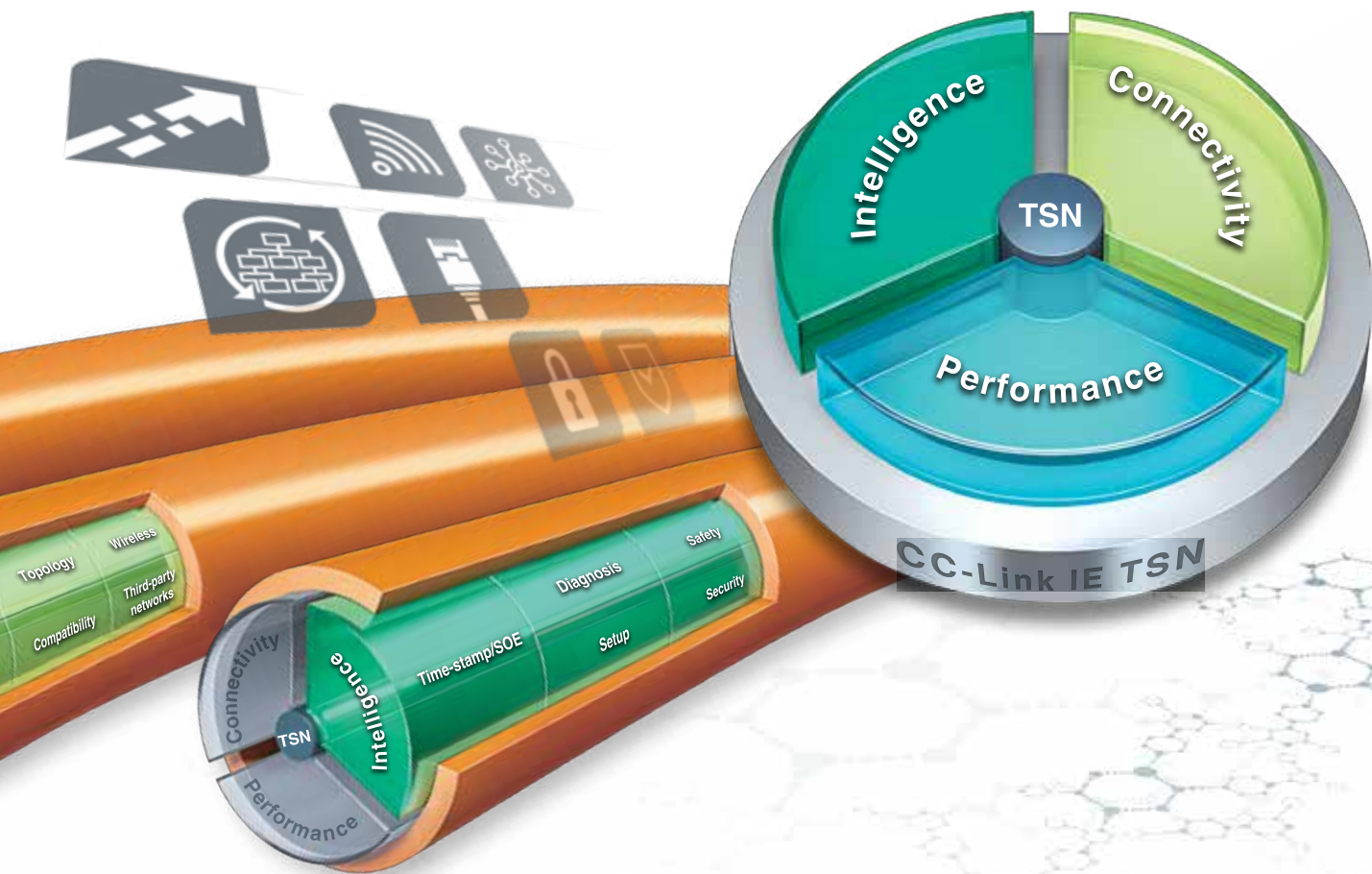
### Connectivity

Being a fully open technology, CC-Link IE TSN permits full freedom of choice for end users, OEMs and device vendors. Hence systems that use best-in-class devices can be constructed while guaranteeing full multi-vendor interoperability. Moreover, flexible development methods mean that device vendors can respond to market demands in a variety of different ways, reducing time to market and reducing cost.

By using standard Ethernet combined with TSN, CC-Link IE TSN permits support of TCP/IP traffic and even the integration of third-party network protocols. This all runs on a standard Ethernet infrastructure that also includes support for wireless communications.



Network architecture



## Intelligence

Intelligent networks that allow extensive maintenance and easy setup of devices while maintaining security are essential with industrial communications. CC-Link IE TSN supports third-party diagnostic software such as SNMP tools, enabling trouble-shooting of all network devices (including standard Ethernet). Time-stamping of network event errors is supported to easily evaluate the actual cause of errors, together with the auto-generation of network system architecture and parameters to simplify commissioning.

## Target industries

Many different industries can benefit from the array of features CC-Link IE TSN offers:

- Automotive
- Food & beverage
- Consumer electronics
- Semiconductor
- Converting
- And more

## Key support

CC-Link IE TSN has been developed under the supervision of the CC-Link Partner Association (CLPA), by its leading partner companies including Mitsubishi Electric, a global leader in automation and the number one choice in Asian markets.

The CLPA was founded in 2000 with the open fieldbus CC-Link. It was the first to offer open gigabit Ethernet with CC-Link IE in 2008. Today its membership is over 3,000 companies and organizations. This has led to a global installed base of more than 22 million products from over 300 manufacturers. CC-Link IE TSN will further strengthen this leading position as third-party support from leading vendors increases.

The CLPA also enjoys cooperation with other leading open technology associations in order to increase process transparency.

## Backwards compatibility

CC-Link IE TSN has been designed with the aim of protecting existing plant investments. Therefore, it is compatible with existing gigabit and 100Mbit CC-Link IE networks.

## Open development

Since CC-Link IE TSN is an open technology administered by the CLPA, any vendor can develop products for it after becoming a member of the association. In order to offer the maximum flexibility to potential vendors, a full spectrum of development options exist. This includes the possibility to develop devices that use a gigabit or 100Mbit physical layer, implemented using hardware or software. These possibilities apply at both the master and slave levels.



# CC-Link IE TSN device development options

No.	Device development options			CC-Link IE TSN	CC-Link IE Field Basic
	Communication speed	Master	Slave		
1	1 Gbps	Hardware	Hardware	Supported	Supported
2		Software			
3		Hardware	Software		Not supported
4		Software			
5	100 Mbps	Hardware	Hardware		
6		Software			
7		Hardware	Software		Supported
8		Software			

\*Hardware\*: implemented by dedicated ASIC or FPGA.

\*Software\*: implemented by software stack running on standard Ethernet platforms.

## Technical specifications

No.	Items	CC-Link IE TSN	CC-Link IE Field	CC-Link IE Field Basic
1	Baud rate	1Gbps/100Mbps	1Gbps	100Mbps
2	Maximum input/output size per master	4G Octet(Byte)	36K Octet(Byte)	9K Octet(Byte)
3	Transient transmission	Supported	Supported	Supported
4	Communication method	Time sharing	Token passing	Broadcast polling
5	Synchronization method	Time synchronization	Frame reception timing/transmission path delay measurement	-
6	Maximum station No. per network	64,770 stations (Master: m stations, Slave: 64,770-m stations)	254 stations (Master: m stations, Slave: 254-m stations)	65 stations (Master: 1 station, Slave: 64 stations)
7	Topology	Line, Star, Ring, Line + Star, Line + Ring, Ring + Star, Mesh	Line, Star, Ring, Line + Star	Line, Star
8	Cable specification	IEEE 802.3 1000BASE-T (Category 5e or above)/100BASE-TX (Category 5 or above) compatible cable. * Shielded or double shielded cable recommended.		
9	Connector specification	RJ-45 connector (1Gbps/100Mbps) ANSI/TIA/EIA-568-B compliant. 8 pin shielded connector recommended. * M12 connector (1Gbps/100Mbps) IEC61076-2-109 compliant. 8 pin connector recommended. * M12 connector (100Mbps) IEC61076-2-101 compliant. 4 pin connector recommended. *		

\*100Mbps compatible cable / connector cannot be used for CC-Link IE Field.

## CLPA board members



BALLUFF



COGNEX



molex

NEC



CC-Link Partner Association - Europe | Tel: +49 2102 486 7988  
email: partners@eu.cc-link.org | eu.cc-link.org