

**INDUSTRIAL
ETHERNET
OVERVIEW**



**ELEVATING
ETHERNET
INTELLIGENCE**

PROTOCOLS

TURCK provides a complete line of Industrial Ethernet products including modular and block I/O systems, in-cabinet and on-machine Ethernet I/O, decentralized intelligence with programmable systems conforming to IEC 61131, or products that bring innovative technologies like RFID to the Ethernet layer.



EtherNet/IP™ is a communication protocol supported by the ODVA and is designed for use in industrial automation and process control applications. It takes the Common Industrial Protocol (CIP) and implements it onto the foundation of Ethernet. CIP envelops a wide-ranging suite of messages and services for a variety of applications, including safety, control, configuration and information. EtherNet/IP provides users with tools to deploy standard Ethernet technology for industrial applications.



PROFINET® uses the same Ethernet as offices and IT departments. However, its capabilities have been ruggedized to meet the tougher conditions faced in industrial applications. PROFINET is often a first option due to its ability to be used in basically any function in industrial automation. Utilizing its integrated Ethernet based communication and supported by PROFIBUS International, PROFINET is able to satisfy a wide assortment of requirements.



Quite simply, Modbus TCP™ is the Modbus RTU protocol with a TCP interface running on Ethernet. TCP/IP refers to Transmission Control Protocol and Internet Protocol, which provides the transmission channel for Modbus TCP/IP messaging. Modbus TCP/IP is used often in the industrial environments due to its ease of deployment and maintenance, and because it was developed specifically with industrial applications in mind.



EtherCAT® stands for Ethernet for Control Automation Technology, with a goal to create the ability to apply Ethernet to automation applications that require very short and quick upload times. EtherCAT uses a unique approach, "processing on the fly", in which data is not received, processed, and copied in order but rather processes data while passing through the device, allowing EtherCAT to operate at higher speeds than other protocols. This "processing on the fly" principle also allows flexibility in topology and provides data at nearly real-time. EtherCAT is commonly used in any application that requires motion or motion control.

TURCK

TURCK is a global leader in industrial automation technology. Over 2,500 employees in 25 countries strive to deliver the best sensor, connectivity, network and interface products on the market. To do this more efficiently, TURCK production facilities are strategically located across the globe, including sites in the United States, Germany, Switzerland, Mexico and China. This also helps TURCK adapt to specific market conditions, as well as bringing product to the market faster.

TURCK strives to provide our customers with not only the best products on the market, but also the best service and support. Our highly trained engineering staff is available to walk you through your system requirements and help find solutions to difficult application problems. Unlike other companies, when you call TURCK, you will always be able to speak directly with an engineer in a matter of minutes! Combine this with a network of 2,000 experts across the United States, and you literally have the finest assembly of industrial automation professionals at your doorstep.



INDUSTRIAL ETHERNET

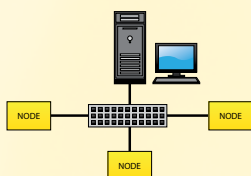
As customers continually search for faster and improved solutions for their industrial automation applications; many are discovering and choosing Industrial Ethernet for its ability to reduce expenses and improve communication.

What is Industrial Ethernet?

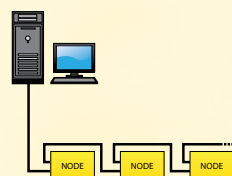
Ethernet itself is the commonly used computer networking technology for local area networks (LANs) and is standardized in IEEE 802.3. Industrial Ethernet is the result of taking traditional Ethernet standards for data communication and applying those same principles to industrial applications. In order to make that possible, industrial grade components are used that can stand up to the more demanding conditions for industrial environments including extreme temperatures and washdown applications. Industrial Ethernet also supports a variety of topologies including device-level ring, line, and star (shown below). Ethernet is low-cost and flexible, and can be connected and run with any Ethernet friendly device.

What are the major benefits of Industrial Ethernet?

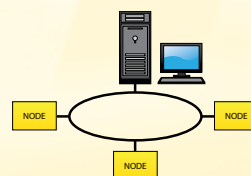
Industrial Ethernet benefits users by combining the tools used in current office environments for everyday communication such as emails, webpages, and enterprise data, but uses rugged components; this allows customers to apply Ethernet to their industrial applications. This allows the ability to have data available and sent across the entire plant floor as well as plant to plant. This availability of data on a global scale is a substantial benefit for industrial automation applications. Using industrial grade components with Ethernet allows usage in temperature ranges of -40°C to 70°C and encapsulated connectors allow devices to be rated up to IP69K as well as applications with high shock and vibration conditions.



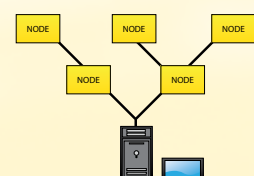
STAR TOPOLOGY



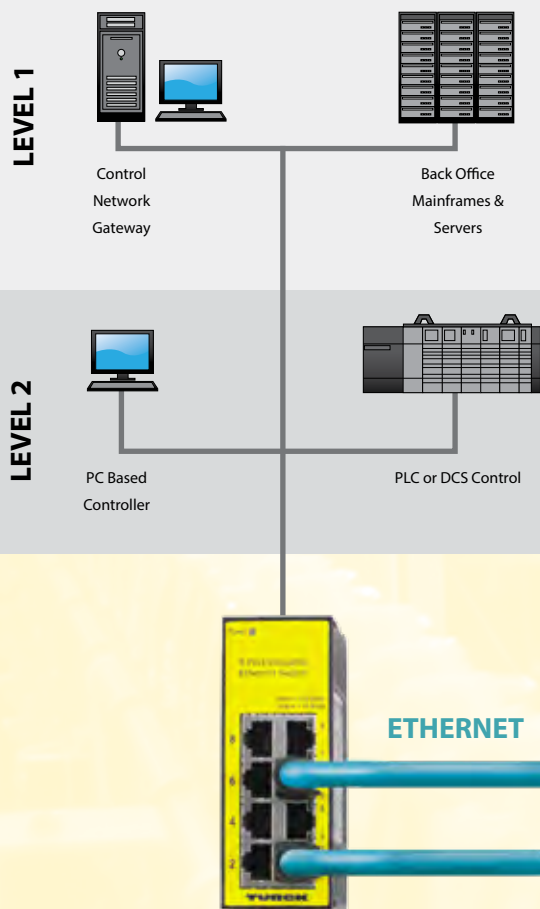
LINE TOPOLOGY



DEVICE-LEVEL RING (DLR) TOPOLOGY



TREE TOPOLOGY



Multiprotocol Ethernet Products

TURCK provides a complete line of Industrial Ethernet products, including on-machine, in-cabinet, block, and modular I/O. TURCK offers Ethernet solutions where I/O can connect directly or indirectly to Ethernet. The most recent innovation is the multiprotocol Industrial Ethernet concept. TURCK's innovative approach to Industrial Ethernet makes moving from another protocol or simply implementing a fieldbus for the first time plug-in simple. TURCK's multiprotocol products are self-configuring and offer a seamless transition to Ethernet, whatever Ethernet that may be.

1 Device = 3 protocols

- EtherNet/IP™, PROFINET®, and Modbus TCP™
- Gateway (slave) recognizes the master upon powerup and self-configures for master protocol
- Supports ODVA quick-connect, Device Level Ring (DLR) and multiple configuration options to support a variety of PLC environments
- PROFINET options include: PROFINET RT, PROFINET Fast Start-up (FSU) and Media Redundancy Protocol (MRP)
- PROFINET IRT available in standard product configuration
- EtherCAT® available in select product configurations
- Embedded web server for device configuration and diagnostics
- Embedded ethernet switch to support multiple topologies including linear & ring

SOFTWARE

I/O-Assistant/PACTWARE:

- FDT/DTM based technology
- For engineering, configuring, commissioning and diagnosing
- Download for free at www.turck.us

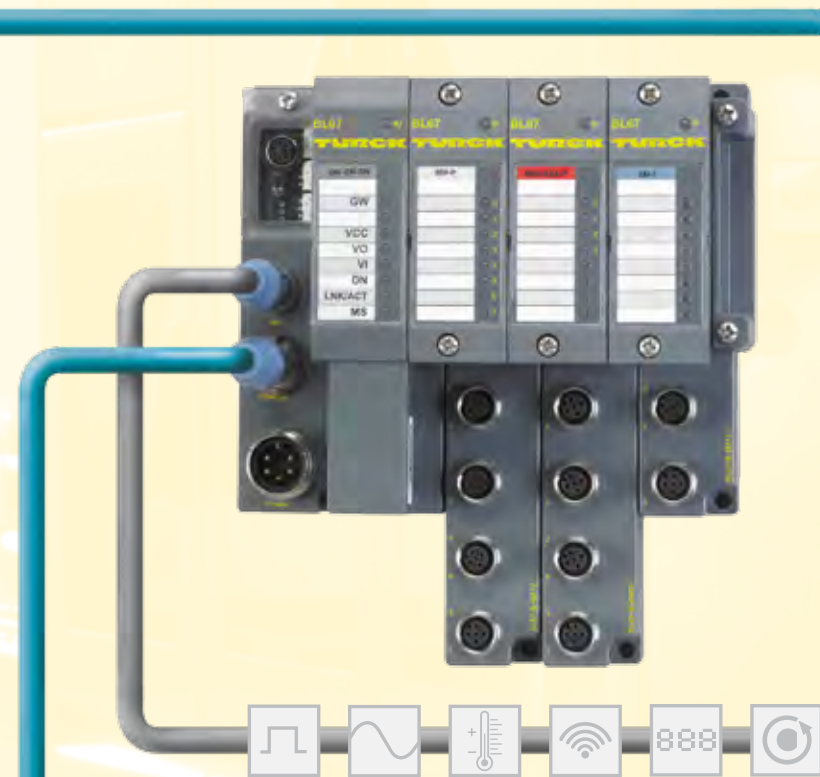


CoDeSys:

- IEC 61131-3 based programming software
- Allows programming in Ladder, Structured Text, Flow Chart, Sequential Function and Instruction List
- Download for free at www.turck.us

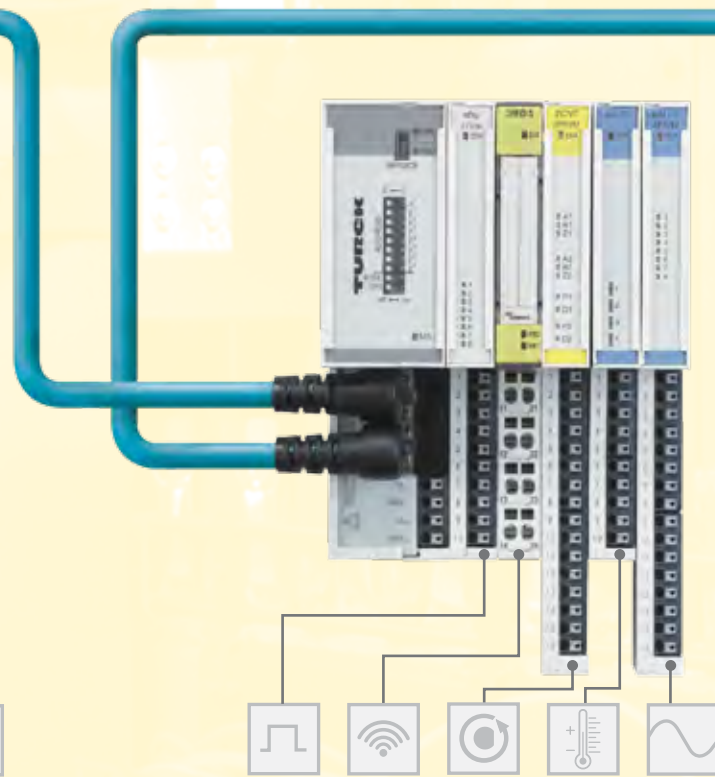


THE FULL RANGE FOR I



BL67: On-Machine Modular I/O

- Multiprotocol gateway with interface to the higher level control system
- Programmable features for local or distributed control
- **BL ident**® - RFID system featuring both HF and UHF technologies
- I/O subnet option to elevate existing fieldbus I/O to Ethernet
- M8 **picofast**®, M12 **euromast**®, M23 **multifast**® and 7/8-16 UN **minifast**® connection options



BL20: In-Cabinet Modular I/O

- Multiprotocol gateway with interface to the higher level control system
- Programmable features for local or distributed control
- **BL ident** - RFID system featuring HF and UHF technology
- I/O subnet option to elevate existing fieldbus I/O to Ethernet
- Economy I/O options for application flexibility and I/O density
- Tension clamp or screw terminal connections

SWITCHES

Ethernet Switches:

- IP20 featuring 5 and 8 ports
- IP67 featuring 5 and 9 ports
- Managed and unmanaged versions available
- Fiber optic option available



INDUSTRIAL ETHERNET CONNECTIVITY

CABINET, CONDUIT, WALL PLATE ADAPTERS, AND RECEPTACLES

BCA Conduit Adapter

- 3/4" mark 9 or form 8
- 1" form 7

BIC Cabinet Adapter

- Mounts to any cabinet to transition from M12 to RJ45

BPA Wall Plate Adapter

- Mounts to standard single gang to transition to M12

Ethernet Receptacles

- RJ45 to M12 adapter

INDUSTRIAL ETHERNET



FEN20: In-Cabinet Block I/O

- Available in a variety of I/O channels
- Universal I/O option - each channel can be an input or output
- IP20 rated for in-cabinet, fixed I/O applications
- 3 power zones for isolation flexibility
- Removable terminals for easy installation

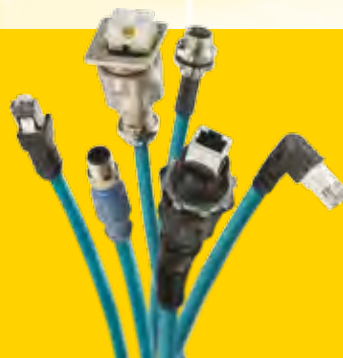
AIM: On-Machine Block I/O

- Per point diagnostics
- Up to 16 channels of I/O available
- Universal I/O option - each channel can be an input or output
- Environmental protection - IP67, 68, and 69K rated
- Operating temperature range of -40° C to +70° C
- 4 or 5 pin Auxiliary power connection options

FIELD BUS CABLES

Cables and Connectors for All Major Protocols:

- Ethernet - RJ45, 4 and 8-pin M12
- PROFINET®
- DeviceNet™
- FOUNDATION™ fieldbus
- PROFIBUS®-PA
- PROFIBUS®-DP
- AS-interface®





BL compact™: On-Machine Flexible Block I/O

Concept:

I/O systems installed between the control cabinet and in close proximity to sensors and actuators have become increasingly more rugged, efficient and user friendly. TURCK is supporting this trend with the **BL compact** flexible I/O station.

Features:

BL compact brings all of your I/O to the plant floor through a rugged, compact device. This product line provides a vast signal variety in packages rated up to IP69K that can operate in a wide temperature range.

BL compact provides an inexpensive means to add a variety of I/O in an environmentally hardened package that allows direct mounting onto a machine without the need for a separate enclosure.

Bus Connection

- Multiprotocol - BLCEN

Connectivity

- Tested and approved metal connectors for the I/O, fieldbus, and power connectors
- Available with 2, 3, 4, 5, 6, 8, and 16 I/O connections, M8 or M12, medium or large housing styles

BLCEN - 6M12LT - 2RFID - S - 8XSG - P

I/O Type Position #1

| | | |
|------------|------------|--------|
| 4DI-P(D) | 8DO-0.5A-P | 2AI-I |
| 4DI-N | 8DO-0.5A-N | 2AI-V |
| 8DI-N | 8DO-R-NO | 2AO-I |
| 8DI-P(D) | 2RFID-S | 2AO-V |
| 8XSG-P(D) | 1CNT-ENC | 2AI-PT |
| 4DO-0.5A-P | 1RS232 | 4AI-TC |
| 4DO-2A-P | 1RS485-422 | 4AI-VI |
| 4DO-2A-N | 1SSI | |
| 4DIDO-PD | | |

I/O Type Position #2

| | | |
|------------|------------|--------|
| 4DI-P(D) | 8DO-0.5A-P | 2AI-I |
| 4DI-N | 8DO-0.5A-N | 2AI-V |
| 8DI-N | 8DO-R-NO | 2AO-I |
| 8DI-P(D) | 2RFID-S | 2AO-V |
| 8XSG-P(D) | | 2AI-PT |
| 4DO-0.5A-P | | 4AI-TC |
| 4DO-2A-P | | 4AI-VI |
| 4DO-2A-N | | |
| 4DIDO-PD | | |

I/O Type Descriptions

| | | | |
|----------|-------------------------------|-----------|---|
| DI-P(D) | Digital Input - PNP (Diag) | AO-V | Analog Output - Voltage |
| DI-N | Digital Input - NPN | AIAO-VI | Analog Input - Voltage/Current, Analog Output-Voltage |
| DO-P | Digital Output - PNP | AI-PT | Analog Input - RTD |
| DO-N | Digital Output - NPN | SSI | Synchronous Serial Interface |
| XSG-P(D) | Configurable I/O PNP (Diag) | RS232 | Single Point Serial |
| AI-I | Analog Input - Current | RS485-422 | Multi-Point Serial |
| AI-V | Analog Input - Voltage | R-NO | Relay-Normally Open |
| AI-VI | Analog Input -Voltage/Current | RFID | Radio Frequency Identification |
| AI-TC | Analog Input -Thermocouple | CNT-ENC | Counter and Encoder |
| AO-I | Analog Output - Current | | |



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.....**Sense It!**.....**Connect It!**.....**Bus It!**.....**Solve It!**™