Fieldbus Technology
Application Guide
Create a control system without a panel

Turck programmable controllers provide up to IP68/IP69k protection, ideal for complete control of a system without the need for an enclosed control cabinet. These devices can function as a network master for remote I/O, additionally the flexible BL67 modular system allows for a variety of local I/O modules.

A small button podium may be used to house items that must be enclosed in the panel.

The CoDeSys 3 (IEC 61131-3) software provides a powerful control environment supporting multiple common programming languages including ladder, structured text, function block diagram, and sequential function chart. This software can be downloaded for free at www.turck.us.
These devices can function as a network master or remote I/O over multiple industrial fieldbus protocols including:

### BL67-PG-EN-V3

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modbus TCP</td>
<td>■</td>
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<tr>
<td>Ethernet/IP</td>
<td>■</td>
</tr>
<tr>
<td>PROFINET</td>
<td>■</td>
</tr>
</tbody>
</table>

- -40...+70 °C operating temperature
- IP67 Protection
- Up to 32 local I/O modules (Discrete, analog, IO-Link, RFID, serial, etc.)

### TBEN-Lx-PLC-01

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
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<tbody>
<tr>
<td>Modbus TCP</td>
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<td>Ethernet/IP</td>
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<td>PROFINET</td>
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<td>CANopen</td>
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- -40...+70 °C operating temperature
- IP68/IP69K Protection
- Onboard serial and configurable discrete I/O

**Description**

- IP67 4A Power Supply
- AC Power to 3-pin Minifast Cordset
- IP68/IP69k Block PLC
- BL67 Programmable Gateway
- BL67 Ethernet Gateway (non-programmable)
- BL67 Discrete Input Module
- BL67 Discrete Output Module
- BL67 Analog Input Module
- BL67 IO-Link Module
- BL67 RFID Module
- Ethernet Remote I/O Block (16 discrete)
- Ethernet Remote I/O Block (8 discrete)
- Ethernet Remote I/O Block (4 universal analog inputs)
- Ethernet Remote I/O Block (4 IO-Link channels)

*Indicates length in meters.
Connect BL Ident RFID to any PLC

BL Ident Read/Write Heads

- Wide range of shapes and sizes of HF heads to fit application constraints
- HF ranges all the way up to 500 mm
- Two sizes of UHF heads available to cover short to medium-long range applications
- Read/write heads are hot swappable
- Mix HF and UHF technology on the same I/O slice
- Turn read/write heads on and off within the program to prevent interference
- IP67, IP69K wash down heads available

Use Industrial Ethernet for Communication
BL Ident System

- HF (13.56 MHz, ISO-15693 compliant)
- UHF (902-928 MHz, ISO 18000-6C EPC global Class 1, Gen 2)
- IP20, IP67, IP69K RFID I/O systems available
- Up to 8 channels of RFID available per node (mixed HF and UHF)
- 50 meters between station and read/write head

BL Ident Tags

- Read/write times up to 2000 bytes/sec possible with FRAM Technology
- Standard tags include 128 byte EEPROM and 2 kbyte FRAM tags
- Available in high temperature packages, capable of up to 210 °C
- Variety of tags available: bolts, ID-cards, adhesive labels, autoclave, laundry, FDA approved
- Data storage for 10 years at ambient temperatures

BL Ident Applications

- Assembly line: record which steps have occurred and what the result was directly to the tag
- Sortation and distribution systems: no need for database connection if destination is written to tag at induction
- Flexible assembly lines: for custom build operations the required BOM could be stored into the tag and read out at each station
- Replace existing barcode system: barcode is reapplied due to paint or heat treatment where RFID can survive
Connect fieldbus technology products to analog input devices

BL remote is a feature available on some gateway products. This feature allows bridging of device level networks to Ethernet. In this example, BL67 is operating on EtherNet/IP and drops down to the BL compact station using BL remote.

Level Probe Series:
- Ideal for continuous level monitoring
- Uses magnetostrictive technology to monitor float location
- Analog output
- Programmable monitoring span
- Stroke length up to 288 inches
- FM approved

Rod Style Series:
- Rugged rod style housing to allow operation in high shock and vibration environments
- Hydraulic cylinder applications where rod can withstand up to 5000 PSI continuously
- Various analog output options
- 16-bit resolution
- Stroke length up to 168 inches

Q-track™ Series:
- Robust extruded aluminum housing
- Compact housing with 29 mm blind zones
- Stroke length up to 1 meter
- Programmable measuring range
- Diagnostic LED to indicate status of the sensor
- Various analog output, SSI and IO-Link outputs give absolute position
Analog Sensors:

- Pressure, temperature, sensors and transmitters for use in pneumatic and hydraulic applications
- Programmable digital read out flow sensors
- Highly reliable and precise temperature sensors
- Ultrasonic sensors
- Linear analog sensors with wide range of housing styles and output options

<table>
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<th></th>
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</table>
Connect BL67 to valve banks with molded cables and discrete outputs, IO-Link, or direct connection

BL67 I/O System can include digital, analog, IO-Link and RFID.

1

Parker Valve Manifolds

Parker supplies a BL67 valve adapter base to directly connect Isys ISO and Micro valve banks to the Turck BL67 modular I/O system. Standard Turck BL67-16DO-0,1A-P output modules insert into the adapter base to provide direct control of up to 32 valve solenoids.

Contact a local Parker distributor to order BL67 valve adapter and Parker valve banks.

2

IO-Link

IO-Link is a point-to-point protocol allowing power and communication to be sent over a standard 3-conductor cable; replacing more costly and complicated connections to field devices such as valve banks, passive distribution boxes, and analog devices.

Through the use of an active IO-Link valve or IO-Link valve adapter, an entire valve bank can be controlled through a single IO-Link connection to the BL67. The BL67-4IOL module with a BL67-B-4M12 base supports four IO-Link connections. Up to 15 IO-Link modules can be combined in a single BL67 system (interfacing up to 60 IO-Link field devices).

3
The 16-channel BL67-16DO-0.1A-P output module was specially developed for switching valve banks. It features:

- Channel-related short-circuit monitoring
- Wire-break detection
- Configurable current monitoring
- Connection of multiple valve banks from different manufacturers
- Integration of valve banks with digital output modules with 4, 8 or 16 channels
- Base modules with 12 or 19-pin M23 male connectors
- Soldered or crimped connection using prefabricated M23 plugs
- Molded M23 cordsets are available with open end or valve connector
- Standard and custom cordset lengths

### Possible Valve Bank Combinations

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Valve Bank P/N</th>
<th>I/O Slice (1)</th>
<th>Base (2)</th>
<th>Cordset (3)</th>
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<tr>
<td>SMC</td>
<td>S55Q13-08FD0-D</td>
<td>BL67-16DO-0.1A-P</td>
<td>BL67-B-1M23-19</td>
<td>CSWM DB25 19-17-*/SMC</td>
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<td>Festo</td>
<td>197 334 MH1-A-24VDC-D-PI-16V-PRA-SE</td>
<td>BL67-16DO-0.1A-P</td>
<td>BL67-B-1M23-19</td>
<td>CSWM DBK25 19-17-*/Festo</td>
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<td>Festo</td>
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<td>CSWM DBK25 12-9-*/Festo</td>
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<td>Numatics</td>
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<td>EBM800A-001A-16</td>
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<td>42 Series MacConnect</td>
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<td>CSM CSM 12-12-*/M-DB25F/Mac</td>
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<td>CSWM DB9F 12-9-2/Mac</td>
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<tr>
<td>Parker</td>
<td>Isys ISO Series</td>
<td>BL67-16DO-0.1A-P</td>
<td>BL67-B-1M23-19</td>
<td>CSWM DB25-19-17-2/Parker</td>
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</tbody>
</table>

Other combinations available. Please contact Turck for assistance.
* Indicates length in meters.

The BL67 system can connect to valves made by any manufacturer and any model, provided it uses discrete inputs to control the valve bank. Please contact our factory for assistance at 1-800-544-7769.
Hoist and hoist control systems for stage rigging systems move lights, sets and people using gear motors, brakes and winches.

Machine groups product into case quantities and applies shrink film. Encoder tracks length of product ensuring the bar carrying film does not touch product.

A shaft encoder is mounted to the drive rollers of a dynamometer to provide velocity feedback.

Encoder tracks rotations of a drum used to store cable.
Features of QR24 Rotary Position Sensors:

- Non-contact position measurement
- SSI communication interface
- Bus interface to CANopen
- Rugged IP68/IP69K rating
- Highly resistant to noise interference
- Extremely fast (up to 12,000 RPM) and precise (up to 29 bit resolution)
- Easy setup: IO-Link parameterization via Pactware
- Available with analog and incremental outputs

Features of Incremental Encoders:

- Optical technology
- Solid and hollow shaft models
- Differential and single-ended modes of operation
- High noise immunity and precision
- Extremely fast (up to 12,000 RPM)
- Standard M12 and M23 connection

<table>
<thead>
<tr>
<th>Slice</th>
<th>Base</th>
<th>Cordset</th>
<th>Encoder</th>
</tr>
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<td>BL67-B-1M12-8</td>
<td>E-RKC 8T-264-*.RSC 8T/BL/S1669</td>
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<td>E-RKC 8T-930-*S1115</td>
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Connect BL67 to PresencePLUS® vision systems

**Fieldbus Connections**

- DeviceNet™
- EtherNet/IP™
- PROFINET®
- CANopen
- Modbus TCP/IP

**BL 67 I/O System**

- Rugged IP 67 construction allows for mounting directly on a machine without the use of an enclosure
- Modular design allows for various I/O connections: up to 32 electronic modules, 256 digital or 64 analog
- Support current and voltage I/O, RTDs, thermocouples, CAN Valve interface, RS232, RS422/485 and serial synchronous interfaces
- Support of PROFINBUS, DeviceNet, CANopen, EtherNet/IP, Modbus TCP/IP, and PROFINET fieldbus
- System diagnostic and per point diagnostic
- Fast and easy connectorization using 7/8-16 UN Minifast®, M12 Eurofast®, M8 Picofast® or M23 Multifast®
- Configuration using free I/O-Assistant software or rotary switches

**Input/Output Devices**

- Encoders
- BL ident (RFID)
- Sensors
- Solenoids
- Motor Starters
Features of PresencePLUS® Systems:

- All PresencePLUS vision sensors include built-in serial, EtherNet/IP and Modbus TCP/IP drivers with 4 (P4) or 6 (PROII) programmable I/O. A PresencePLUS sensor, with the Turck BL67 delivers expanded I/O, DeviceNet, PROFIBUS or PROFINET connectivity.
- General-purpose or dedicated-function vision sensors
- Gray scale pattern and color spectrum analysis
- Two convenient form factors: one-piece PresencePLUS® or compact PresencePLUS Pro sensor with a separate DIN-mountable controller
- Rugged IP 68-rated models suitable for washdown applications
- Discrete I/O on-board
- Wide range of mounting brackets, lighting and lenses
- Remote TEACH functionality to adjust image without PC
- Simple and intuitive user interface with three-step, point-and-click operation

Possible Combinations

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Vision System</th>
<th>Communication</th>
<th>BL Gateway</th>
<th>I/O Slice</th>
<th>Base</th>
<th>Cordset</th>
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* Indicates length in meters.
Connect BL67 to wireless networks with DX80 wireless gateways

BL67 I/O System

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- Modular design allows for various I/O connections: up to 32 electronic modules, 256 digital or 64 analog
- Support current and voltage I/O, RTDs, thermocouples, CAN Valve interface, RS232, RS422/485 and serial synchronous interfaces
- System diagnostic and per point diagnostic
- Fast and easy connectorization using 7/8-16 UN Minifast®, M12 Eurofast®, M8 Picofast® or M23 Multifast®
- Configuration using free I/O-Assistant software or rotary switches
- Support a wide variety of fieldbuses including:
  - EtherNet/IP™
  - Modbus TCP/IP
  - PROFINET
  - DeviceNet™
  - PROFIBUS*-DP
  - CANopen
Features of SureCross Wireless System

- 900 MHz and 2.4 GHz operational frequency
- Robust monitoring and control capability of hard-to-reach areas
- Integrated I/O of various configurations on board
- Rugged IP67/NEMA 6 design
- Configuration of SureCross wireless network via push buttons and LCD display at remote nodes

Possible Wireless Combinations

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<thead>
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<td>BL20-54S-5BB5</td>
<td>RK 4.5T-*</td>
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* Indicates length in meters.
Stand alone I/O solutions powered by ARGEE

Programming with an FLC (field logic controller) powered by ARGEE for a stand alone application could not be simpler. In the ARGEE Flow editor, a ladder like diagram editor, users use a drop down menu to select inputs, operations and outputs. When the program is running, the FLC carries out the program logic. Take the following stand alone freezer door application for example:

**Door Closed**

When the door is closed the input sensor is on. No ARGEE actions take place in this condition.

**Door Opened**

When the freezer door is open for more than 10 seconds a warning light is turned on.

**Door Opened for 20 Secs or More**

With the freezer door open for more than 20 seconds an audible alarm is turned on as well. When the door is closed at any time, the light and alarm are turned off and the timers are reset to zero.
• This step in the program will monitor the door.
• When the door is closed, our input value is on.
• With this **condition**, we utilize the Boolean NOT operation to prevent Timer 1 and Timer 2 from starting.
• With this logic, when the door opens, the action of starting Timer 1 and Timer 2 will begin.

• When Timer 1 is expired, turn on Output 3 and illuminate our warning light.

• When Timer 2 is expired, turn on Output 7 and sound our audible alarm.
28 subsidiaries and over 60 representations worldwide!