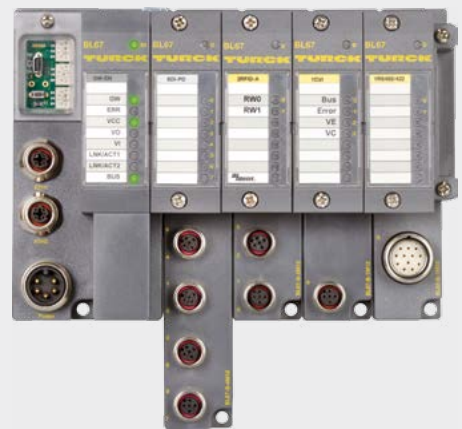


Your Global Automation Partner

TURCK

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

	Master	Server
Modbus TCP	■	■
Ethernet/IP		■
PROFINET		■

- -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

	Master	Server
Modbus TCP	■	■
Ethernet/IP	■	■
PROFINET	■	■
CANopen	■	■

- -40...+70 °C operating temperature
- IP68/IP69K Protection
- Onboard serial and configurable discrete I/O



Description	Part Number
IP67 4A Power Supply	PSU67-11-2440/M
AC Power to 3-pin Minifast Cordset	RKM 36-*-AC PWR MALE
IP68/IP69k Block PLC	TBEN-Lx-PLC-01
BL67 Programmable Gateway	BL67-PG-EN-V3
BL67 Ethernet Gateway (non-programmable)	BL67-GW-EN
BL67 Discrete Input Module	BL67-8DI-P with BL67-B-4M12 base
BL67 Discrete Output Module	BL67-8DO-0.5A-P with BL67-B-4M12 base
BL67 Analog Input Module	BL67-4AI-V/I with BL67-B-4M12 base
BL67 IO-Link Module	BL67-4IOL with BL67-B-4M12 base
BL67 RFID Module	BL67-2RFID-S with BL67-B-2M12 base
Ethernet Remote I/O Block (16 discrete)	TBEN-L1-16DXP
Ethernet Remote I/O Block (8 discrete)	TBEN-S1-8DXP
Ethernet Remote I/O Block (4 universal analog inputs)	TBEN-S2-4AI
Ethernet Remote I/O Block (4 IO-Link channels)	TBEN-S2-4IOL

*Indicates length in meters.

Connect BL Ident RFID to any PLC



Use Industrial Ethernet
for Communication

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



PLC



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

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

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:

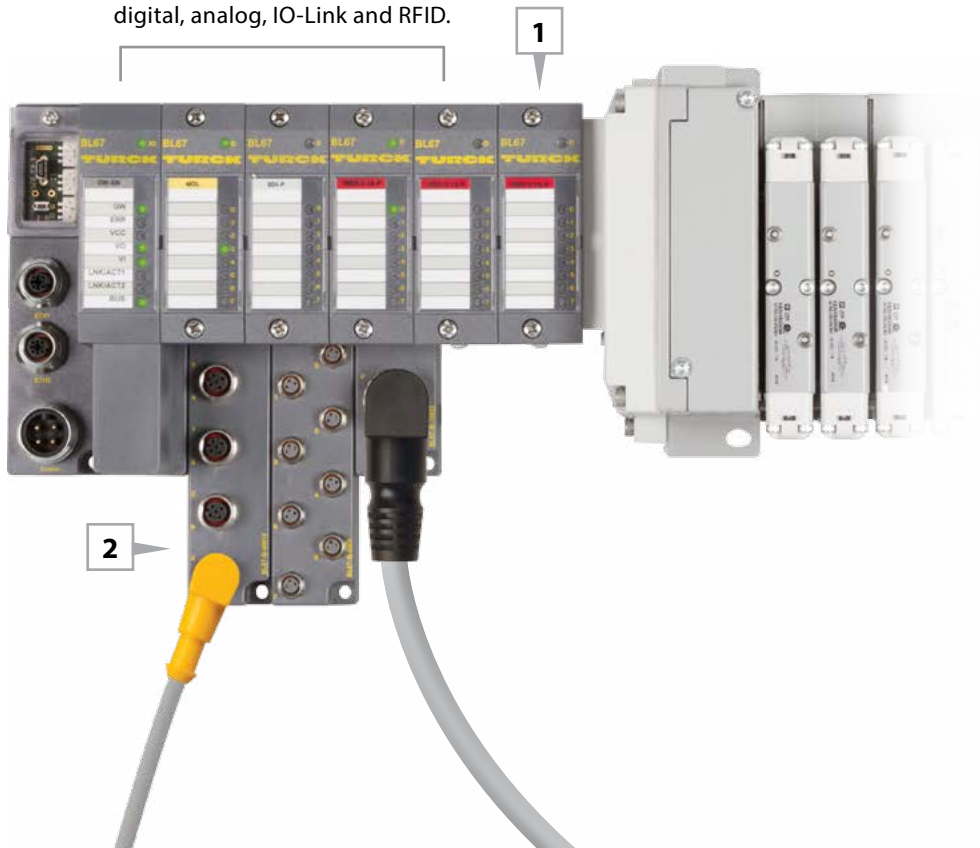
- Pressure, temperature, sensors and transmitters for use in pneumatic and hydraulic applications
- Programmable digital read out flow sensors
- Highly reliable and precise temperature sensors
- Ultrasonic sensors
- Linear analog sensors with wide range of housing styles and output options



Sensor	BL67-4AI-V/I & BL67-B-4M12	
	BLC**-*M12*4AI*-VI	
	BL67-2AI-I & BL67-B-2M12	BL67-2AI-V & BL67-B-2M12
	Current	Voltage
LI*P*-LI25LM*-LIU5X3-H1151	RK 4.5T-*-RS 4.5T/BL/S1535	RK 4.5T-*-RS 4.5T/BL/S1536
LT***E-Q21*-L***-H1141	RKS 4.5T-*-RS 4.5T/S1121	
LT***E-Q35*-L***-H1141	RKS 4.5T-*-RS 4.5T/S1121	
LT***E-R10-L***-H1151	RKS 4.5T-*-RS 4.5T/S1121	
PS***LI2UPN-H1141	RK 4.4T-*-RS 4.4T/S1119	
PS***LUUPN***H1141		RK 4.4T-*-RS 4.4T/S1119
PT***LI3*-H1131	RK 4.4T-*-RS 4.4T/S618/S1166/BL	
PT***LU2*-H1131		RK 4.4T-*-RS 4.4T/S618/S1165/BL
FCMI***-LI-UP8X-H1141	RK 4.4T-*-RS 4.4T/S1119	
FTCI***-LI-UP8X-H1141	RK 4.4T-*-RS 4.4T/S1119	
FCI***LIX-H1141	RK 4.4T-*-RS 4.4T/S1118	
FCS***LIX-H1141	RK 4.4T-*-RS 4.4T/S1118	
FCS***LIX-H1141/A	RK 4.4T-*-RS 4.4T/S1118	
TS***-L***-H1141	RK 4.4T-*-RS 4.4T/S1119	
TTM*-LIUPN*-H1190	RK 4.4T-*-RS 4.4T/S618/S1165/BL	
RU***-LIU2PN8X2T*-H1151	RK 4.4T-*-RS 4.4T/S1118	
Bi(Ni)***-LIU-H1141	RK 4.4T-*-RS 4.4T/S1119	RK 4.4T-*-RS 4.4T/S1118
WIM***-LIU-H1141	RK 4.4T-*-RS 4.4T/S1119	RK 4.4T-*-RS 4.4T/S1118
Bi(Ni)***-SIU-H1141	RK 4.4T-*-RS 4.4T/S1119	RK 4.4T-*-RS 4.4T/S1118
Bi***-LI2-H1141	RK 4.4T-*-RS 4.4T/S1119	
Bi***-LU-H1341		RK 4.4T-*-RS 4.4T/S1118
Bi***-LIU-V1141	PKG 4M-*-RS 4.4T/S1117	PKG 4M-*-RS 4.4T/S1116
WIM***-LIU-V1141	PKG 4M-*-RS 4.4T/S1117	PKG 4M-*-RS 4.4T/S1116
RS-06SA0S-8BAR-H1151/N0		RK 4.5T-*-RS 4.4T/S3055
B2N***-H1151 (x-axis)	RK 4.4T-*-RS 4.4T/S1118	
B2N***-H1151 (y-axis)	RK 4.4T-*-RS 4.4T/S1119	
B2N***-H1151 (both axes)	VB2-RK 4.4T-1/2RS 4.4T-*/S3088	

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.



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.

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).

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

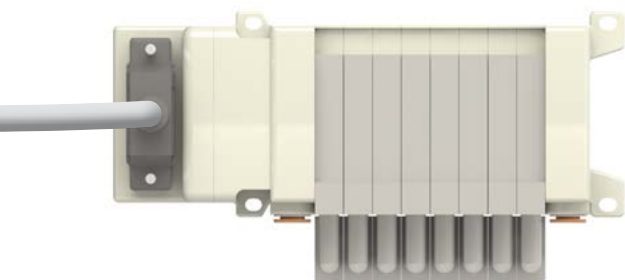
- Channel-related short-circuit monitoring
- Wire-break detection
- Configurable current monitoring
- Connection of multiple valve banks from different manufacturers
- Integration of valve banks with digital output modules with 4, 8 or 16 channels
- Base modules with 12 or 19-pin M23 male connectors
- 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

Manufacturer	Valve Bank P/N	I/O Slice (1)	Base (2)	Cordset (3)
SMC	SS5Q13-08FD0-D	BL67-16DO-0.1A-P	BL67-B-1M23-19	CSWM DB25 19-17-*/SMC
FESTO	197 334 MH1-A-24VDC-D-PI-16V-PRA-SE	BL67-16DO-0.1A-P	BL67-B-1M23-19	CSWM DBK25 19-17-*/FESTO
FESTO	539105 32E-MPM-E	BL67-8DO-0.5A-P	BL67-B-1M23	CSWM DBK25 12-9-*/FESTO
NUMATICS	2005 Series	BL67-16DO-0.1A-P	BL67-B-1M23-19	CSWM DB25F 19-995-*/CS12700
MAC	EBM800A-001A-16	BL67-16DO-0.1A-P	BL67-B-1M23-19	CSWM DBK25 19-17-*/MAC
MAC	EBM800A-002A-04	BL67-8DO-0.5A-P	BL67-B-1M23	CSWM DBK25 12-9-*/MAC
MAC	42 Series MacConnect	BL67-8DO-0.5A-P x2	BL67-B-1M23 x2	CSM CSM 12-12-*/M-DB25F/MAC
MAC	92 Series MacConnect	BL67-8DO-0.5A-P	BL67-B-1M23	CSWM DB9F 12-9-2/MAC
PARKER	Isys ISO Series	BL67-16DO-0.1A-P	BL67-B-1M23-19	CSWM DB25-19-17-2/PARKER

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.

Connect BL67 to rotary position sensors



Amusement



Hoist and hoist control systems for stage rigging systems move lights, sets and people using gear motors, brakes and winches.

Packaging



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

Automotive



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

Cable Management



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

Slice	Base	Cordset	Encoder
BL67-1SSI	BL67-B-1M12-8	E-RKC 8T-264-*-RSC 8T/BL/S1669	R1360P0-QR24-HESG25X3-H1181
BL67-1SSI	BL67-B-1M23	E-RKC 8T-264-*-CSM 12/BL/S1783	
BL20-1SSI	BL20-S4*-SBBS	E-RKC 8T-264-*	
BL67-1CNT/ENC	BL67-B-1M12-8	E-RKC 8T-264-*-RSS 8T	RI-01/02 RI-04/05 RI-08/09 RI-10/12 RI-65/96 RI-43 LM-2/5
BL67-1CNT/ENC	BL67-B-1M23	E-RKS 8T-264-*-CSM12/S3056	
BL20-1CNT/ENC	BL20-S4*-SBBS	E-RKC 8T-930-*/S1115	

Connect BL67 to PresencePLUS® vision systems

Fieldbus Connections

DeviceNet™

EtherNet/IP™

PROFI
BUS

PROFI
NET

CANopen

ModbusTCP/IP



Input/Output Devices



Encoders



BL ident (RFID)



Sensors



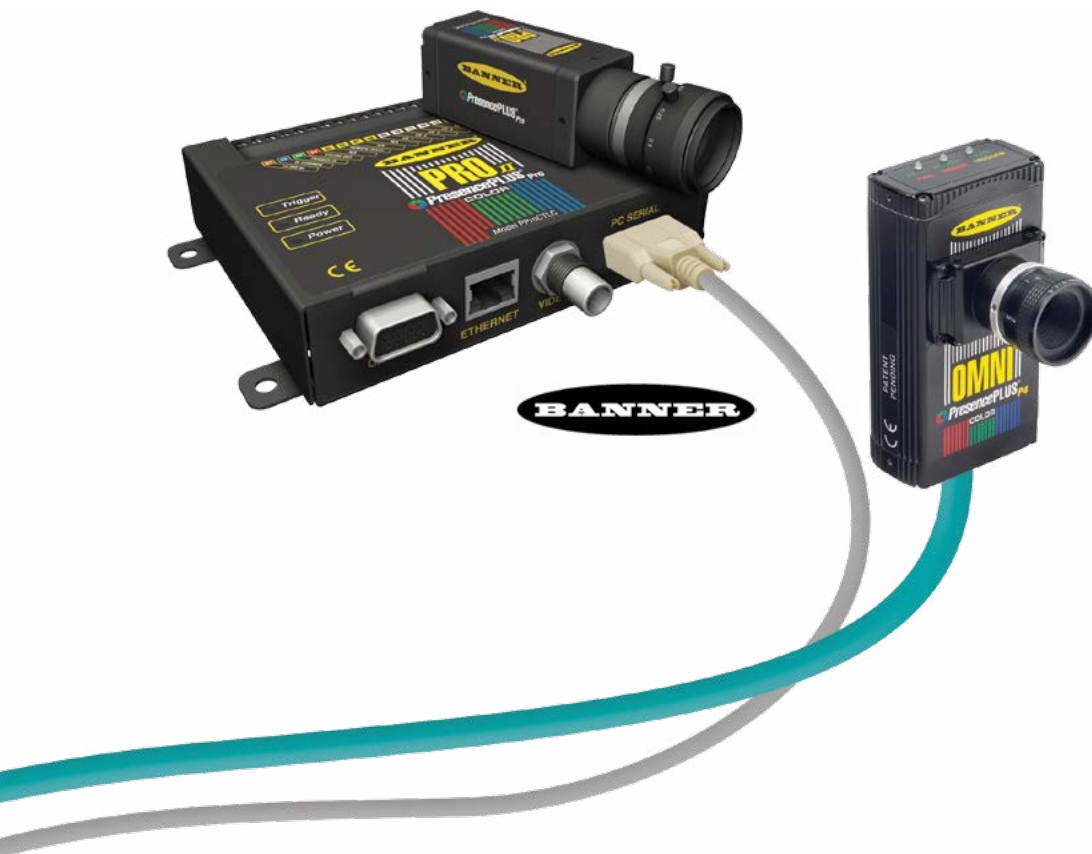
Solenoids



Motor Starters

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 PROFIBUS, 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



Machine Vision



Color Vision



Bar Code Vision



Features of PresencePLUS® Systems:

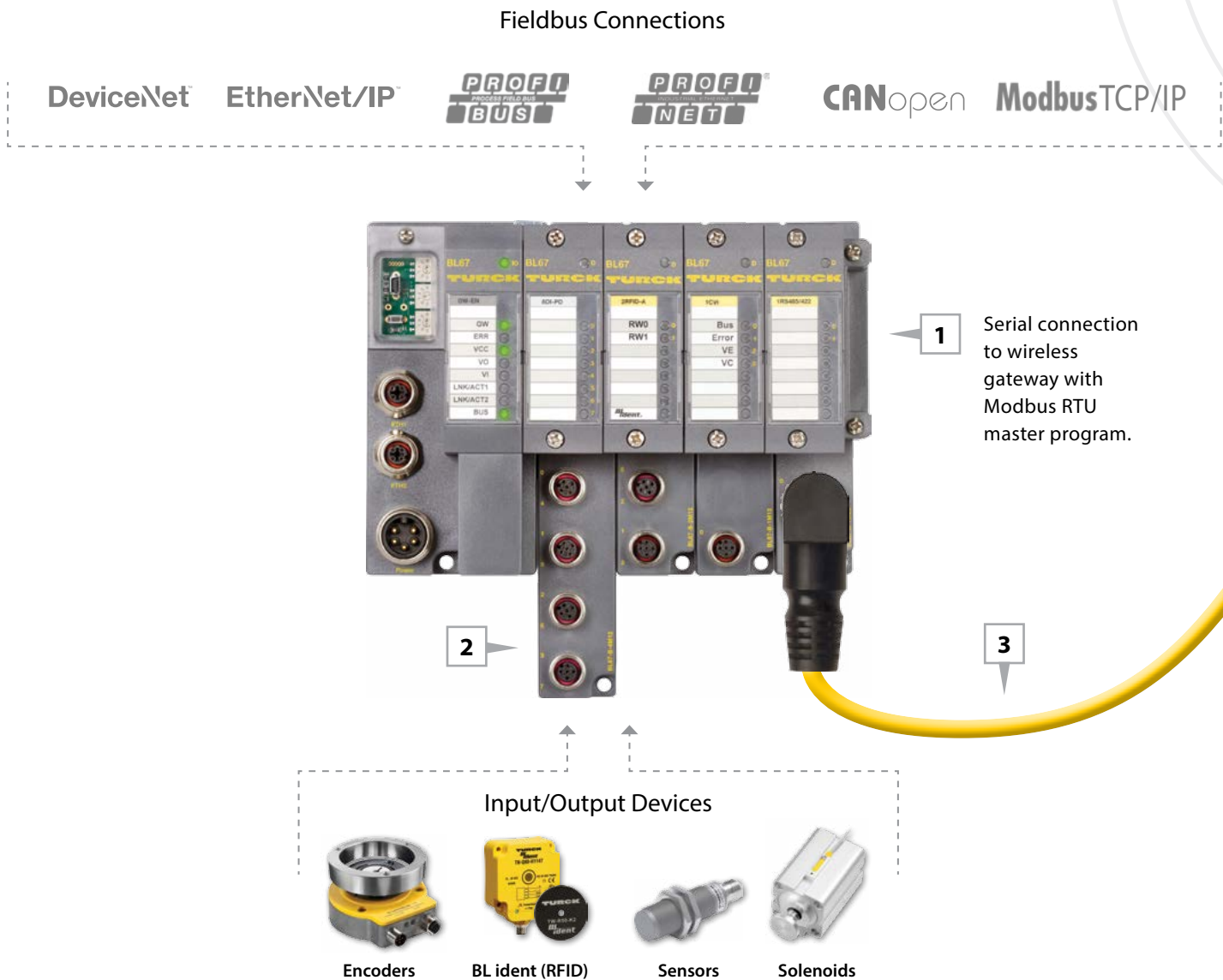
- All PresencePLUS vision sensors include built-in serial, EtherNet/IP and Modbus TCP/IP drivers with 4 (P4) or 6 (PROII) programmable I/O. A PresencePLUS sensor, with the Turck BL67 delivers expanded I/O, DeviceNet, PROFIBUS or PROFINET connectivity
- General-purpose or dedicated-function vision sensors
- Gray scale pattern and color spectrum analysis
- Two convenient form factors: one-piece PresencePLUS P4 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

Manufacturer	Vision System	Communication	BL Gateway	I/O Slice	Base	Cordset
Banner Engineering	P4 PresencePLUS	RS232	BL67-*	BL67-1RS232	BL67-B-1M12	RS 4.5T-*-DB9M CR/RS232
Banner Engineering	P4 PresencePLUS	Ethernet	BL*-PG-EN*	N/A	N/A	N/A

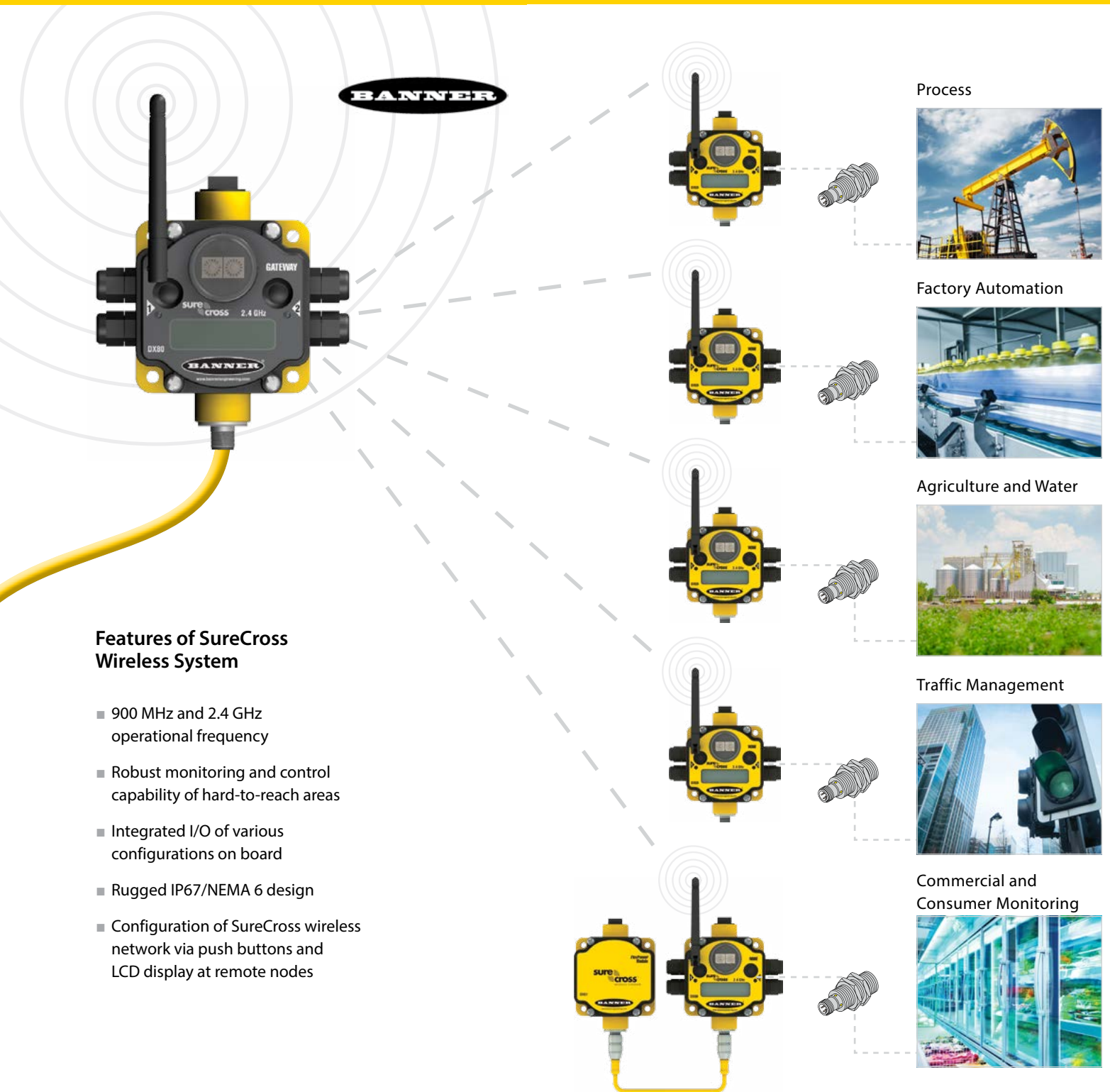
* Indicates length in meters.

Connect BL67 to wireless networks with DX80 wireless gateways



BL67 I/O System

- Rugged IP67 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
- 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



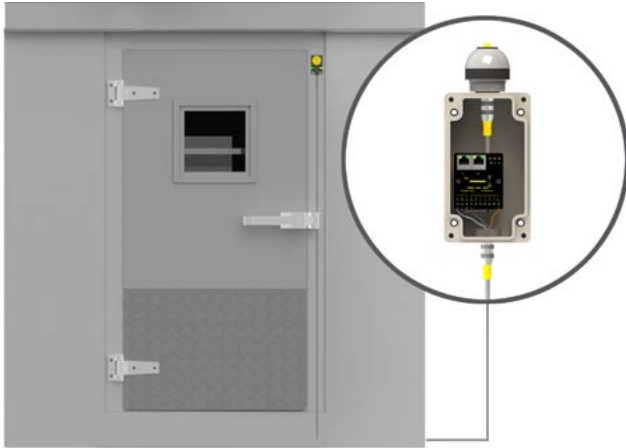
Possible Wireless Combinations

Manufacturer	Wireless Gateway	I/O Slice (1)	Base (2)	Cordset (3)
Banner Engineering	DX80 Series	BL67-1RS485	BL67-B-1M23-VI	CSWM 12 RKC 572-*M/BWG
Banner Engineering	DX80 Series	BL20-1RS485	BL20-S4S-SBBS	RK 4.5T-*

* Indicates length in meters.

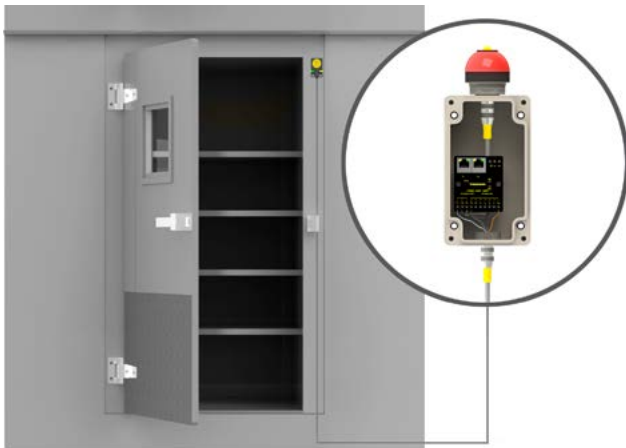
Stand alone I/O solutions powered by ARGEE

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.



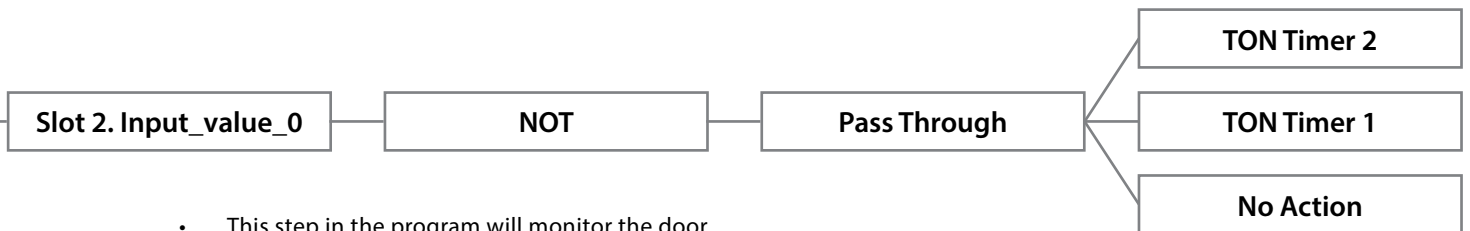
Door Opened

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

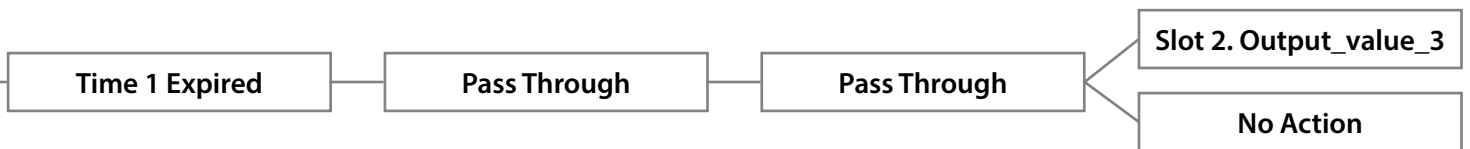


Door Opened for 20 Secs or More

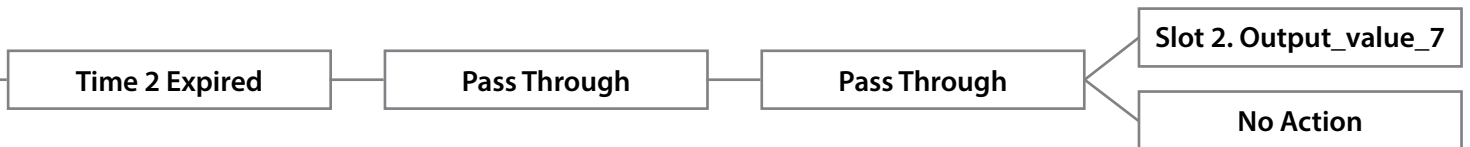
With the freezer door open for more than 20 seconds an audible alarm is turned on as well. When the door is closed at any time, the light and alarm are turned off and the timers are reset to zero.



- 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.

TURCK



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60 representations worldwide!

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