



BL APPLICATION GUIDE

Version 3.0

Overview Guide

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



HOW TO CREATE A CONTROL SYSTEM...

...WITHOUT A PANEL

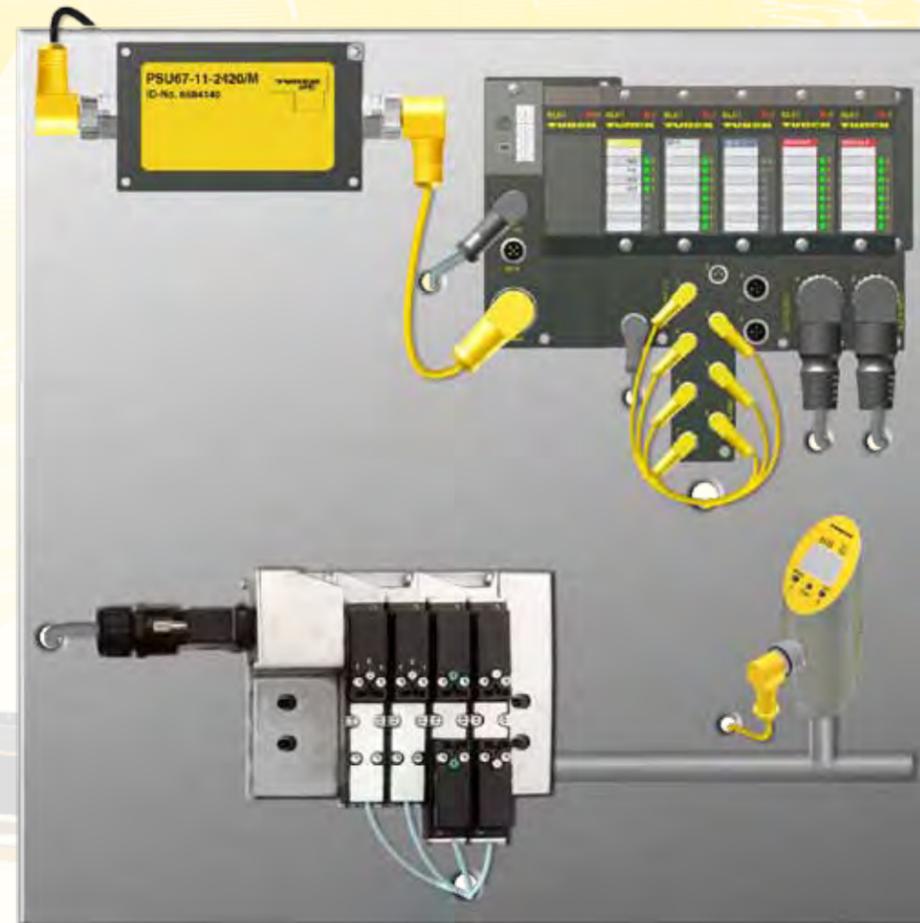
Using multiple programmable gateways in a system provides many benefits, including peer-to-peer communication over Ethernet. The gateways may also communicate with an upper level system for reporting purposes or for database connections utilizing OPC communication.



BL remote is a feature available on some gateway products that allows bridging device level networks to Ethernet. In the example shown here, it is used to expand the functionality of the programmable gateway by allowing networked devices to be used. Here we show discrete I/O and RFID being used over BL remote; however, other signals may be used, including analog, serial and thermocouple.



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



Description	Part Number
IP 67 4A Power Supply	PSU67-11-2440/M
BL67 Ethernet Programmable Gateway with BL remote	BL67-PG-EN-DN
BL67 RS232 Module to control display	BL67-1RS232 with BL67-B-1M12
BL67 Discrete Input Card	BL67-8DI-P with BL67-B-8M8
BL67 Analog Input Card	BL67-2AI-I with BL67-B-2M12
BL67 Discrete Output Cards	BL67-16DO-0.1A-P with BL67-B-1M23-19
BL67 to Air Pressure Sensor Cordset	RK 4.4T-*-RS 4.4T/S1119
Air Pressure Sensor	PS010V-503-LI2UPN8X-H1141
BL compact Input/Output Station	BLCDN-4M12S-8XSG-PD
30mm Barrel Inductive Proximity Switches	Bi10U-M30-AP6X-H1141
BL compact RFID Station	BLCDN-2M12S-2RFID-S
BL <i>ident</i> Cordset	RK 4.5T-*-RS 4.5T/S2501
BL <i>ident</i> CK40 RFID Transceiver	TN-CK40-H1147
BL <i>ident</i> 50mm Standard Tag	TW-R50-B128

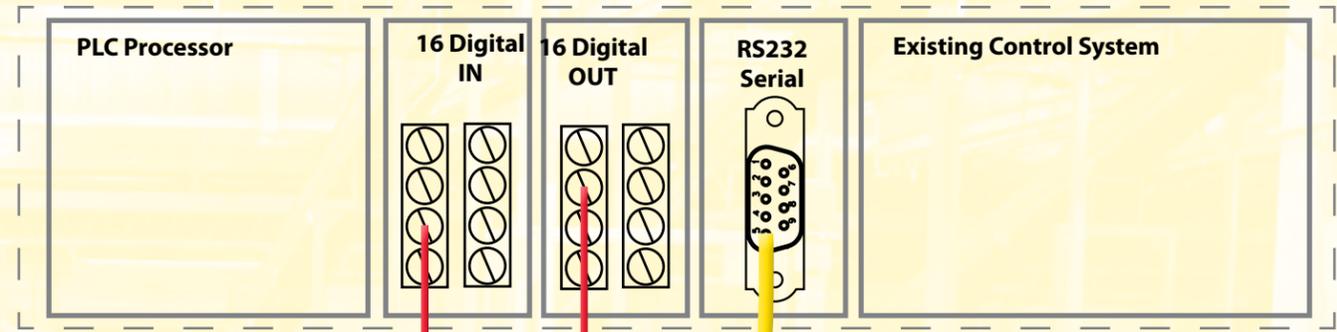
*Indicates length in meters.

HOW TO CONNECT BL *ident* RFID...

... TO ANY PLC



Use Discrete Bits for Communication



- BL *ident* System**
- 13.56 Mhz operation
 - ISO-15693 compliant system
 - IP 20 and IP 67 RFID systems
 - Up to 8 channels of RFID available per node
 - 50 meters between station and read/write head

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

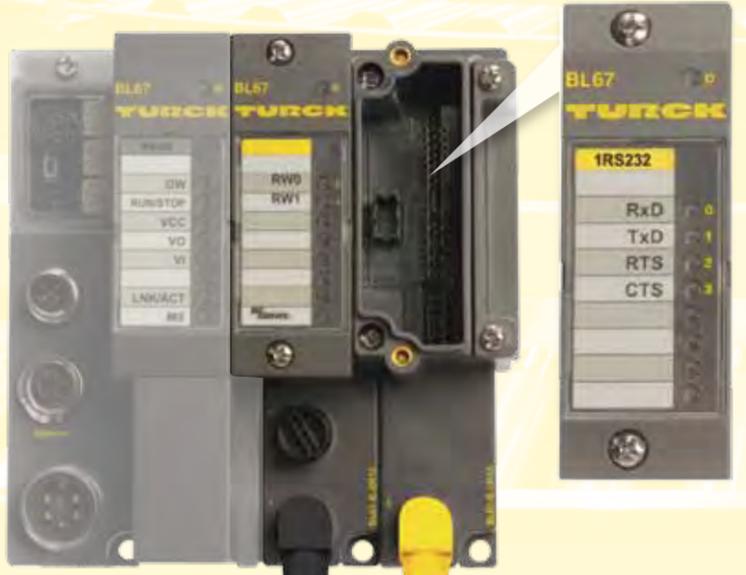


BL *ident* Tags

- 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* Read/Write Heads

- Cylindrical heads in M18 and M30 housings
- Rectangular heads with 40 mm and 80 mm square housings
- Long range sensors for larger conveyors available with up to 500 mm sensing range
- Read/write heads hot swappable
- Turn read/write heads on and off within the program to prevent interference



Use RS232 Communication

Possible BL *ident* Combinations

Communication	Programmable Gateway	RFID Slice	Base	Cordset	1st I/O Slice	Base	Cordset	2nd I/O Slice	Base	Cordset
Discrete	BL67-PG-EN	BL67-2RFID-A	BL67-B-2M12	RK 4.5T-*RS 4.5T/S2501	BL67-8DI-P	BL67-B-1M23	CSSM 12-12-* /S817	BL67-1600-0.1A-P	BL67-B-1M23-19	CSSM 19-19-*
RS232 without Handshaking	BL67-PG-EN	BL67-2RFID-A	BL67-B-2M12	RK 4.5T-*RS 4.5T/S2501	BL67-1RS232	BL67-B-1M12	RSC 4.5T-*DB9F/RS232			
RS232 with Handshaking	BL67-PG-EN	BL67-2RFID-A	BL67-B-2M13	RK 4.5T-*RS 4.5T/S2501	BL67-1RS232	BL67-B-1M12-8	RSC 8T-*DB9F/RS232			
Discrete	BL20-PG-EN	BL20-2RFID-A	BL20-S4T-SBBS	RK 4.5T-* /S2501	BL20-E-16DI-24VDC-P	N/A	N/A	BL20-E-1600-24VDC-0.5A-P	N/A	N/A
RS232 with(out) Handshaking	BL20-PG-EN	BL20-2RFID-A	BL20-S4S-SBBS	RK 4.5T-* /S2501	BL20-1RS232	BL20-S4S-SBBS	DB9F-*-/RS232			

* Indicates length in meters.

HOW TO CONNECT BL PRODUCTS

... TO TURCK 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.



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

Profile Series:

- Low profile housing to allow installation in tight spaces
- Stroke length up to 180 inches
- Programmable zero and span points
- Diagnostic LED to indicate status of the sensor
- Various analog output, quadrature and digital outputs give absolute position
- Automatic gain control
- FM approved

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

Analog Sensors:

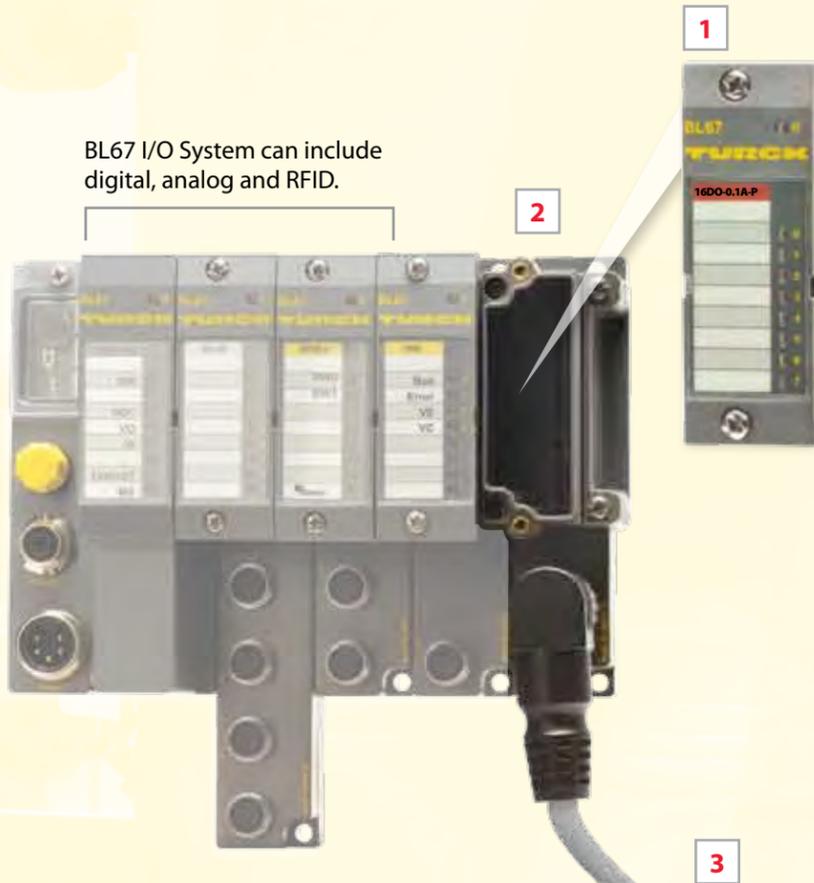
- Pressure, temperature, sensors and transmitters for use in pneumatic and hydraulic applications
- Programmable digital read out flow sensors
- Highly reliable and precise temperature sensors
- Ultrasonic sensors
- Linear analog sensors with wide range of housing styles and output options



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
LT***E-Q21R-L***-H1151	RKS 4.5T-*-RS 4.5T/S1121	
LT***E-Q35R-L***-H1151	RKS 4.5T-*-RS 4.5T/S1121	
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	
TT-***-LI6-H1141	RK 4.4T-*-RS 4.4T/S618/S1165/BL	
RU***-L*X-H1141	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
T8.3651.2544.1411		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	

HOW TO CONNECT BL67 TO VALVE BANKS...

...WITH MOLDED CABLES AND DISCRETE OUTPUTS



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

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

Parameters	Value
Station parameters	
Device-specific parameters	
open circuit monitoring:	activate
open circuit	10mA
over current monitoring:	activate
overcurrent/short-circuit	120mA
Hex parameter assignment	

Wire-break and short-circuit monitoring may be activated with standard module configuration, as well as setting the parameters for current monitoring.

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-DB2SF/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.

HOW TO CONNECT BL67 TO VALVE BANKS...

...VIA **CANopen**

The **BL67-1CVI** module was developed so CANopen enabled valve banks could be used within any available fieldbus.

It features:

- Integration of CANopen valve banks from different manufacturers
- No special CANopen knowledge required
- Use of any available BL67 gateway to bring the CANopen data onto other fieldbuses (DeviceNet™, EtherNet/IP™, PROFIBUS®, PROFINET®, Modbus TCP/IP, CANopen)

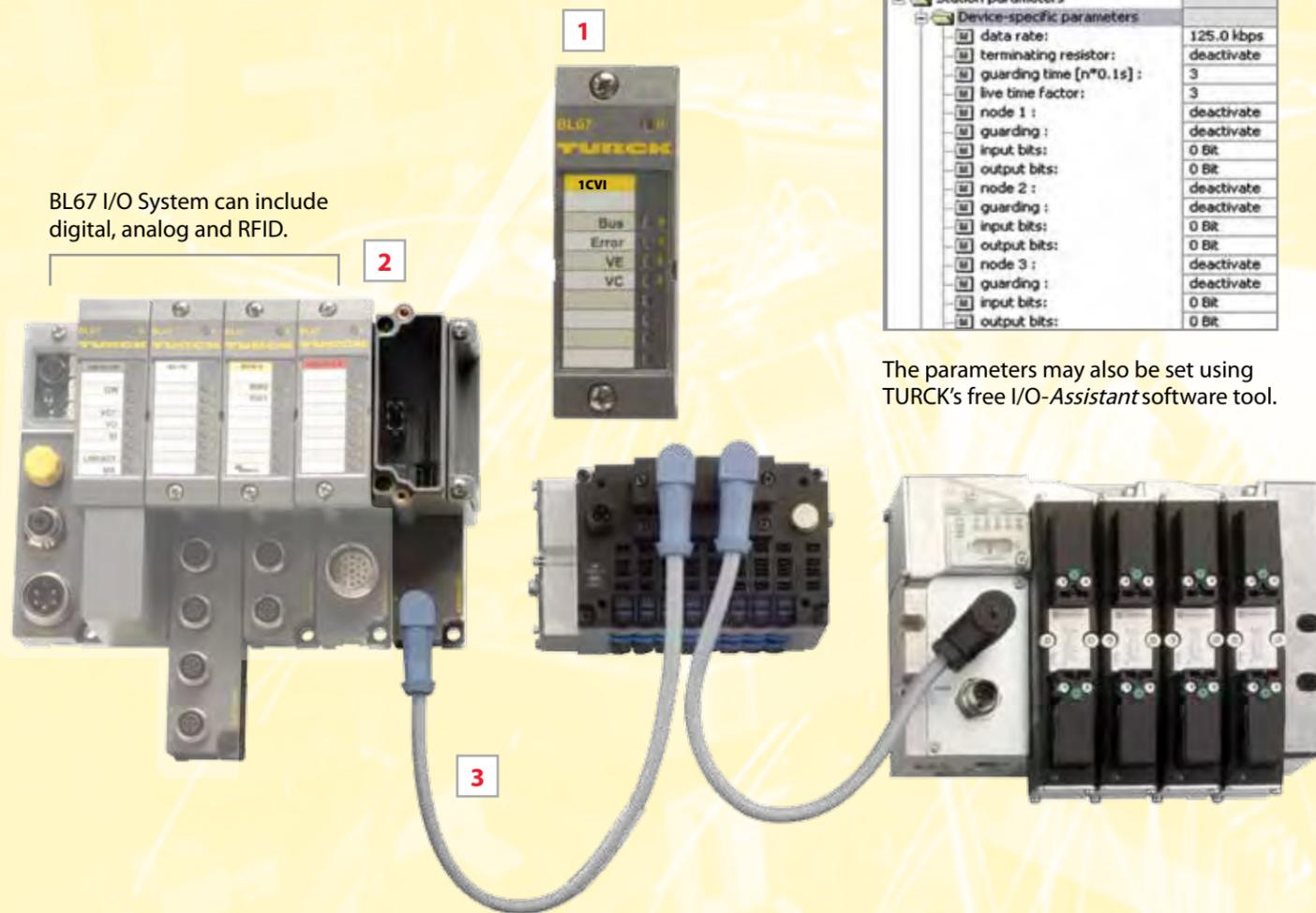
- Monitoring of individual nodes with configurable watchdog timer
- Use of standard M12-CANopen/DeviceNet fieldbus cable
- 8 bytes of input data and 8 bytes of output data may be configured
- The parameters can be set in the master using configuration files, such as GSD, GSDML, or EDS

The available parameters per CANopen node are:

- Node active/inactive
- Guarding active/inactive
- Number of input bits (4, 8...32 bit)
- Number of output bits (4, 8...32 bit)

Parameters	Value
Station parameters	
Device-specific parameters	
data rate:	125.0 kbps
terminating resistor:	deactivate
guarding time [n*0.1s]:	3
live time factor:	3
node 1:	deactivate
guarding:	deactivate
input bits:	0 Bit
output bits:	0 Bit
node 2:	deactivate
guarding:	deactivate
input bits:	0 Bit
output bits:	0 Bit
node 3:	deactivate
guarding:	deactivate
input bits:	0 Bit
output bits:	0 Bit

The parameters may also be set using TURCK's free *I/O-Assistant* software tool.



Possible Valve Bank Combinations

Manufacturer	Valve Bank P/N	I/O Slice (1)	Base (2)	Cordset (3)
FESTO	539217 50E-F14GA-S	BL67-1CVI	BL67-B-1M12	RSC RKC 572-*M
FESTO	539217 50E-F14GB-S	BL67-1CVI	BL67-B-1M12	RSC CBC5 572-*M
Norgren	VS18 Series	BL67-1CVI	BL67-B-1M12	RSC RKC 572-*M

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

CANopen Media Combinations

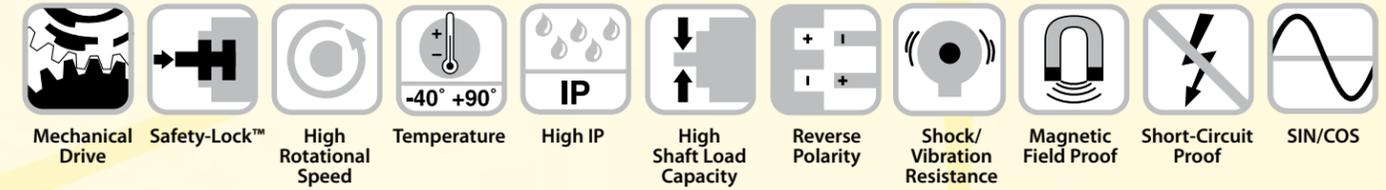
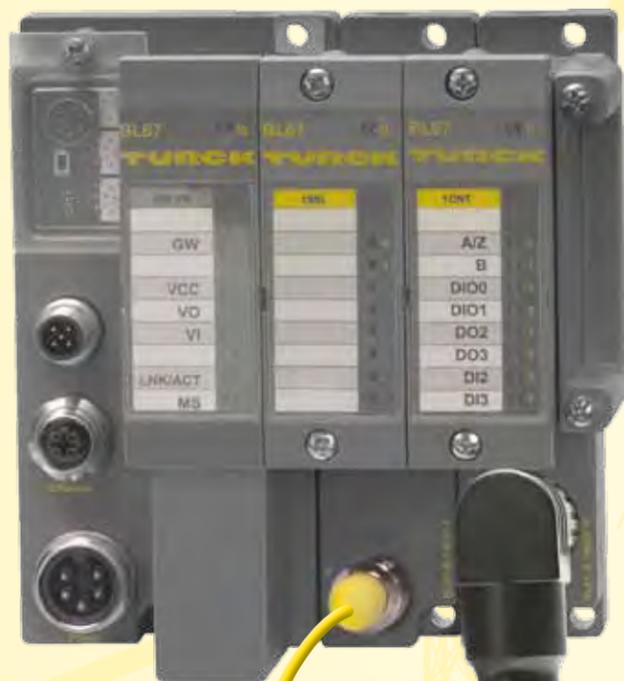
	RSC	RKC	WSC	WKC
RSC				
CBC5	RSC CBC5 57x-*M	RKC CBC5 57x-*M	WSC CBC5 57x-*M	WKC CBC5 57x-*M
DB9F	RSC DB9F 57x-*M	RKC DB9F 57x-*M	WSC DB9F 57x-*M	WKC DB9F 57x-*M
DB9S	RSC DB9S 57x-*M	RKC DB9S 57x-*M	WSC DB9S 57x-*M	WKC DB9S 57x-*M
RSC	RSC RSC 57x-*M	RSC RKC 57x-*M	RSC WSC 57x-*M	RSC WKC 57x-*M
RKC	RSC RKC 57x-*M	RKC RKC 57x-*M	WSC RKC 57x-*M	RKC WKC 57x-*M

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

The BL67 system can connect to any valve model made by any manufacturer provided it uses a CANopen protocol and requires less than 32 bits of input and 32 bits of output data.

HOW TO CONNECT BL67...

...TO SENDIX ENCODERS



Features of Sendix Absolute Encoders:

- Singleturn and multiturn with hollow or solid shaft
- SSI communication interface
- Bus interface to CANopen and PROFIBUS-DP
- Rugged IP 67 rating
- Highly resistant to magnetic interference
- Extremely fast (up to 12,000 RPM) and precise (up to 29 bit resolution)
- No additional programming tools required; Comes fully configured
- Easy setup: LED diagnostic, M12, M23, connectivity, SET and DIR Inputs

Features of Sendix 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

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 shrinkfilm. Encoder tracks length of product ensuring the bar carrying film does not touch product.

Cable Management



Encoder tracks rotations of a drum used to store cable.

Automotive

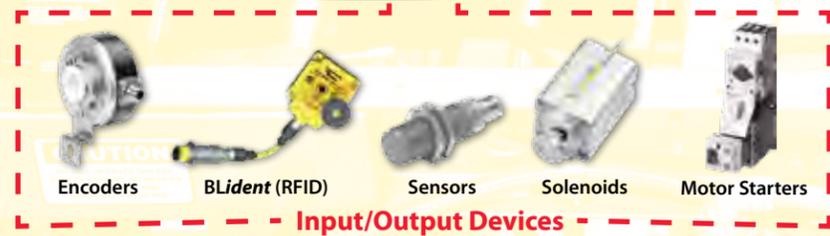
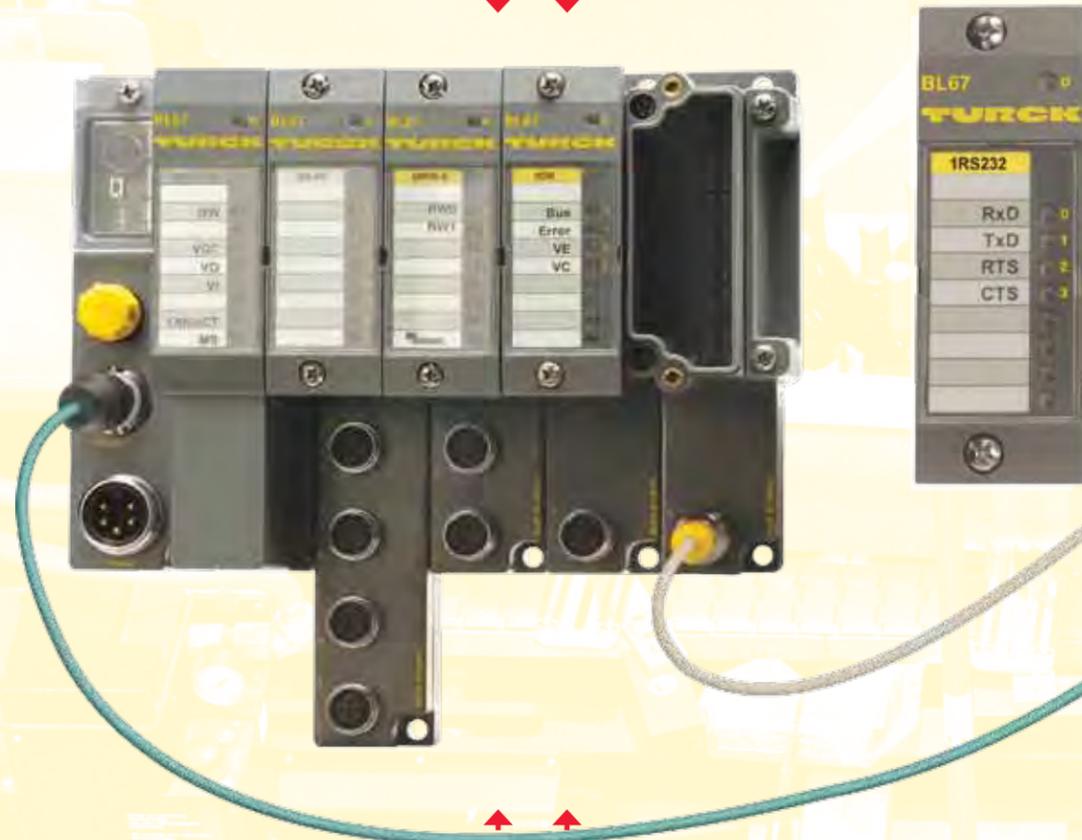


A shaft encoder is mounted to the drive rollers of a dynamometer to provide velocity feedback.

Slice	Base	Cordset	Encoder
BL67-1SSI	BL67-B-1M12-8	E-RKC 8T-264-*-RSS 8T	T8.5853
BL67-1SSI	BL67-B-1M23	E-CKM CKS 12-6901-*A	T8.5873
BL20-1SSI	BL20-S4*-SBBS	E-RKC 8T-264-* E-CKS 12-6901-*A	T8.5863 T8.5883
BL67-1CNT	BL67-B-1M12-8	E-RKC 8T-264-*-RSS 8T	T8.24** T8.36**
BL67-1CNT	BL67-B-1M23	E-RKS 8T-264-*-CSM12/S3056	T8.37** T8.50**
BL20-1CNT	BL20-S4*-SBBS	E-RKC 8T-930-*/S1115	T8.5800-5825 T8.A02* T8.Li20 T8.Li50

HOW TO CONNECT BL67...

...TO PresencePLUS® VISION SYSTEMS



Machine Vision



Color Vision



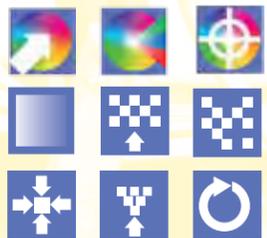
Bar Code Vision



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

Vision Tools



Analysis Tools



Location Tools



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

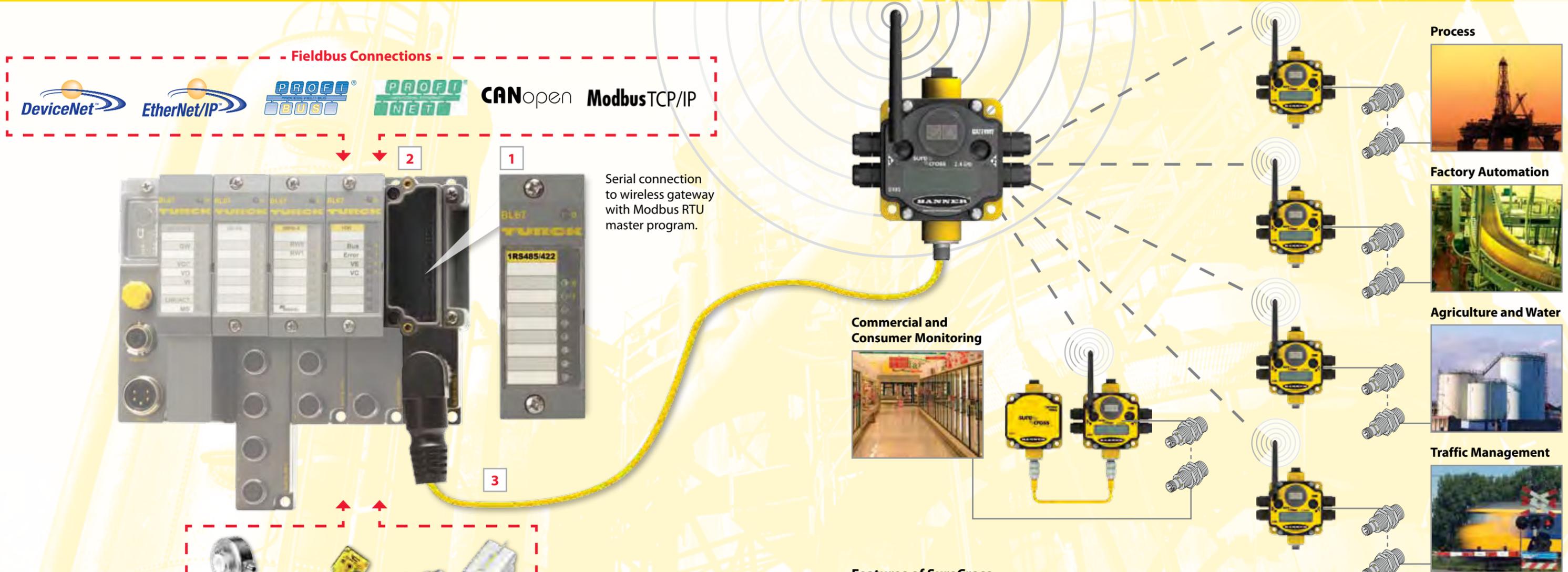
Possible Combinations

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.

HOW TO 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 **euromast**®, 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
- Reliable and secure frequency hopping spread spectrum technology
- Robust monitoring and control capability of hard-to-reach areas
- FlexPower™ System provides power management flexibility
- Integrated I/O of various configurations on board
- Rugged IP 67 / NEMA 6 design
- Per point status information in addition to systems health-check, node operational status and signal integrity
- Easy plug-and-play deployment
- Configuration of SureCross wireless network via push buttons and LCD display at remote nodes
- Variety of kits available to accommodate virtually any system integration

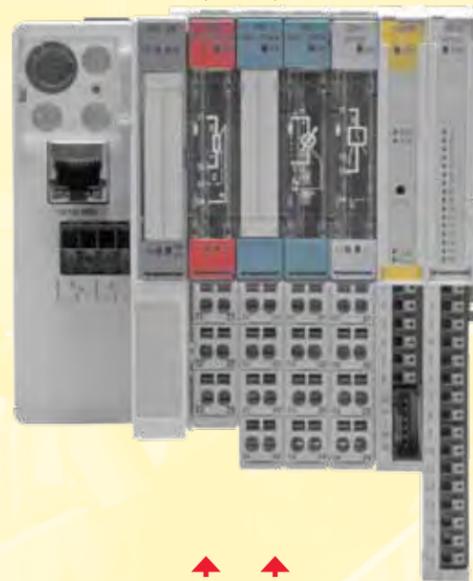
Possible Wireless Combinations

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-*

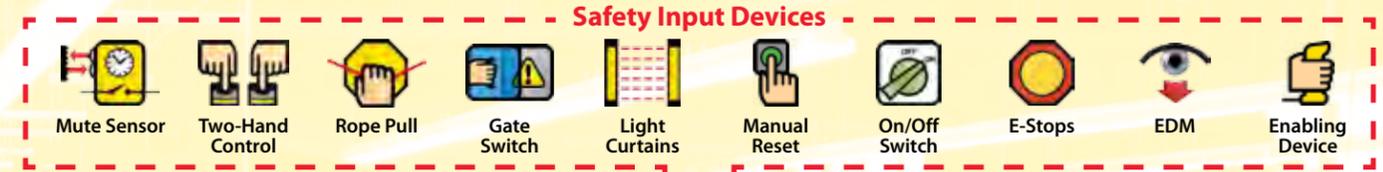
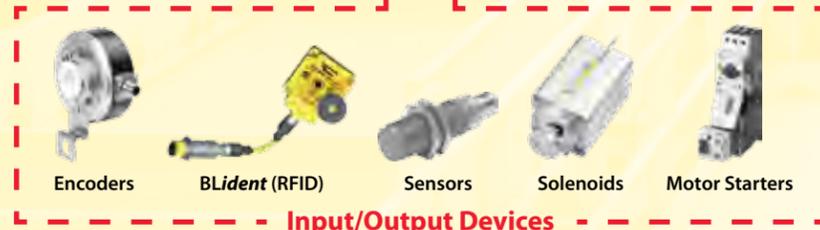
* Indicates length in meters.

HOW TO CONNECT A FIELDBUS TO...

...MONITOR YOUR SAFETY CONTROLLER



Use up to 10 discrete signals to monitor the status of the safety controller



Features of Safety Controller:

- Replace multiple safety modules with a single controller
- Significantly reduce complexity of safety logic configuration and documentation with PC Interface
- Minimize installation and configuration time with Controller's Onboard interface screen



- Support up to 22 input safety or non-safety devices:
 - » E-Stops
 - » Interlock Switches
 - » Safety Light Screens
 - » Two-Hand Controls
 - » Safety Mats and Edges
 - » Rope Pulls
 - » Muting Sensors
 - » Enabling Devices
 - » Bypass Switches
- Support 3 redundant safety outputs and 10 status outputs
- Monitor and manage safety related function for Category 2, 3 and 4

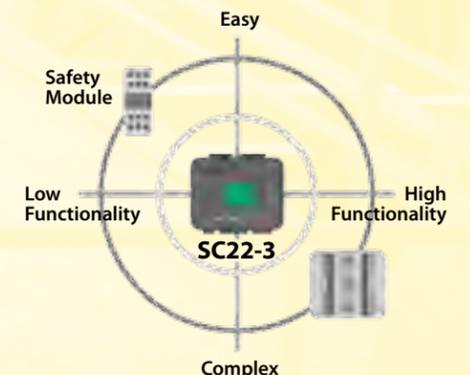


SC22-3 Safety Controller

Great Flexibility and Ease of Use

The SC22-3 Safety Controller's flexibility allows the user to configure and troubleshoot with ease. The combination of high functionality with an easy-to-use interface is right on target.

Specifications	
Power	24 VDC, 400 mA
Housing	35 mm DIN Mount
Inputs	22 (Safety or Non-Safety inputs)
Safety Outputs	3 independent, Dual Channel, 750 mA each @ 24 VDC (per output)
Status Outputs	10 Single Channel PNP outputs (Non-Safety)
Performance Standards	SIL 3 per IEC 62061 and IEC 61508, Category 4 (PL e) per ISO 13849-1
Approvals	UL, CSA and CE (pending)



BL20 I/O System

- Accommodate any combination of input and output devices
- Available I/O modules include:
 - » Digital Input/Output
 - » Analog Input/Output
 - » Relay
 - » Temperature
 - » RS232/RS485
 - » Motor starter
 - » RFID
- Tension clamp or screw terminal wiring option
- Electronic modules can be pulled and plugged for maintenance without disconnecting field-wired devices
- Built-in programmable controller allows for small machine control or distributed system control
- Support a wide variety of fieldbuses including:
 - » EtherNet/IP™
 - » Modbus TCP/IP
 - » PROFINET
 - » DeviceNet™
 - » PROFIBUS®-DP
 - » CANopen



USA

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