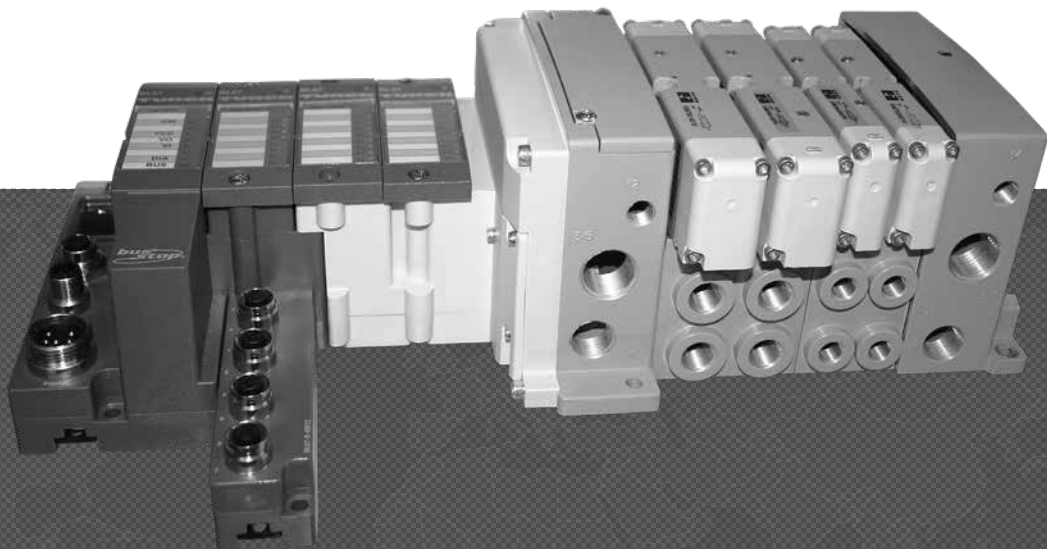




ROSS SERIAL BUS SYSTEM WITH TURCK MODULAR I/O



ROSS CONTROLS

ROSS Serial Bus System with TURCK Modular I/O – KEY FEATURES

- A complete Centralized Serial Bus communication offering for ISO valves W65 and W66 Series
- I/O system based on the TURCK Modular Industrial I/O System BL 67
- Communication module supports up to 32 station modules each supporting up to 8 I/O modules
- Input modules accept signals from sensors, photo eyes, limits and other field input devices
- Output modules provide signals to remote solenoid valves and other field output devices
- UL, C-UL, and CE certified

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The BL67 Solution

BL67 combines all the flexibility of an in-the-cabinet PLC I/O system with modularity, ruggedness and connectorization.

BL67 complements the AIM™, BL20 and piconet® product families to meet the needs of unique applications, such as small machine or conveyor systems requiring IP 67 protection.

The BL67 Concept

The BL67 modular concept is a very flexible approach to connectorized I/O. The gateway, base and electronic modules provide many benefits to the user.

- The gateway provides communication between the fieldbus and I/O modules; modules are not dependent on the fieldbus protocol.
- DIN-rail or frame mountable base modules are available with eurofast® (M12), minifast® (7/8-16UN), M23 and picofast® (M8) connectors.
- Electronic modules are hot swappable.
- Power distribution module (24 volts DC) supplies the connected I/O signals.

BL67's openness, flexibility, connectorization, compact housing and ruggedness provide a viable alternative to in-the-cabinet I/O.

Environmental Conditions

Intended Application Environments

- BL67 does not need an enclosure
- Mount directly on machine or conveyor
- Rugged design provides protection against dirt, dust and liquids

Not intended for These Environments

- Continuous submersion
- 100 percent humidity
- High pressure washdown

Note: For higher levels of protection consider fully potted AIM stations.

General Environmental	
Potential isolation	Via optocoupler
Operating temperature	32° to +131°F (0° to +55°C)
Storage temperature	-13° to +185°F (-25° to +85°C)
Relative humidity	5 to 95% (indoor), noncondensing
Vibration	1.0 g 5-10 Hz
Shock	15 g
Protection class	IP 67, NEMA 1, 3, 4, 12, 13
Electromagnetic compatibility (EMC)	According to EN 61131-2
Housing material	PC-V0 (Lexan), Nickel plated brass
Approvals	CE
	UL
	CSA

Maximum Size of a BL67 Station

BL67 stations consist of a gateway and a maximum of 32 modules (equivalent to 1 m station length). Some high-tech and analog I/O modules may consume or produce large amounts of data, and therefore may limit the number of modules that may be used per system. It is highly recommended that the I/O assistant software is used when planning and commissioning BL67 systems. This program allows you to build the BL67 node on your computer and verify that all restrictions with regard to power and size are met. The free I/O assistant software is available for download from www.turck.com.

Addressing

As a node on a network, BL67 stations are addressed dependent on the network system being used. Each network gateway has a set of rotary switches used to set the address for the node. DeviceNet™ and CANopen gateways may be addressed between 0 and 63 via two switches (one for the 10's digit and one for the 1's digit). For example, to set the address to 37 you would set the 10's switch to 3 and the 1's switch to 7. The third switch on the gateway may be used to set the communication rate of the network interface. PROFIBUS®-DP gateways may be set from 1 to 125 by using three switches (one for the 100's, one for the 10's and one for the 1's).

Ethernet gateways allow different addressing schemes depending on the Ethernet addressing method being used in the overall system. Dynamic addressing schemes include BootP and DHCP, while hard-coding a static address is also allowed.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

BL67 Power Distribution

Power Overview

The power supply for a BL67 station is fed via the power connector on the PROFIBUS® gateway or directly from the network on the DeviceNet™ gateway. Power feeder modules can be added to the system at any point to provide a fresh isolated supply of power to all I/O connected to its right.

Internal Power Consumption via Module Bus

The amount of BL67 modules that may be supplied via the internal module bus depends on the respective nominal current I_{MB} of the individual modules on the module bus. The sum of the nominal current inputs of the connected BL67 module must not exceed 1.5 A. If the I/O assistant software is used, an error message is generated automatically via the <Station - Verify> as soon as the system supply via the module bus is no longer sufficiently guaranteed.

To calculate current draw on DeviceNet: Add $I_{MB(24)}$ for all modules. Then add V_I and V_O for electronic modules to the left of the first power feed module. Next, add the current draw of the I/O devices.

To calculate current draw on PROFIBUS gateway power connector for V_I : Add I_{MB} for all modules. Then add V_I current for all modules to the left of the first power feed module. Next, add the current draw of the input devices.

For V_O , add the V_O current for all modules to the left of the first power feed module. Next, add the current draw of the output devices.

V_{MB} = Module bus power

V_I = Input power

V_O = Output power

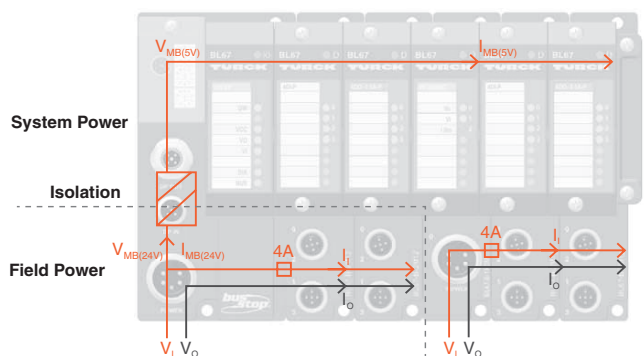
I_{MB} = Module bus current

$I_{MB(24)}$ = Effective current draw from gateway at 24 volts DC supply.

Module	Nominal 1 Current at 5 V I_{MB}	Effective Draw 2 from Gateway at 24 VDC $I_{MB(24)}$	Nominal 3 Current from V_I	Nominal 4 Current from V_O
BL67-GW-DPV1	—	≤150 mA		
BL67-GW-DN	—	≤100 mA		
BL67-PF-24VDC	≤30 mA	≤9 mA		
BL67-4DI-P	≤30 mA	≤9 mA	≤40 mA	
BL67-8DI-P	≤30 mA	≤9 mA	≤40 mA	
BL67-4DO-0.5A-P	≤30 mA	≤9 mA		≤100 mA
BL67-4DO-2A-P	≤30 mA	≤9 mA		≤100 mA
BL67-8DO-0.5A-P	≤30 mA	≤9 mA		≤100 mA
BL67-2AI-V	≤35 mA	≤10 mA	≤12 mA	
BL67-2AI-I	≤35 mA	≤10 mA	≤12 mA	
BL67-2AI-TC	≤35 mA	≤10 mA	≤30 mA	
BL67-2AI-PT	≤45 mA	≤13 mA	≤45 mA	
BL67-2AO-I	≤40 mA	≤12 mA		≤50 mA
BL67-2AO-V	≤60 mA	≤17 mA		≤50 mA
BL67-1RS232	≤100 mA	≤28 mA	≤50 mA	
BL67-8XSG-PD	≤30 mA	≤9 mA		≤100 mA
BL67-1SSI	≤50 mA	≤15 mA	≤50 mA	
BL67-4DI-PD	≤30 mA	≤9 mA		≤100 mA
BL67-8DI-PD	≤30 mA	≤9 mA		≤100 mA

Applying Power to BL67

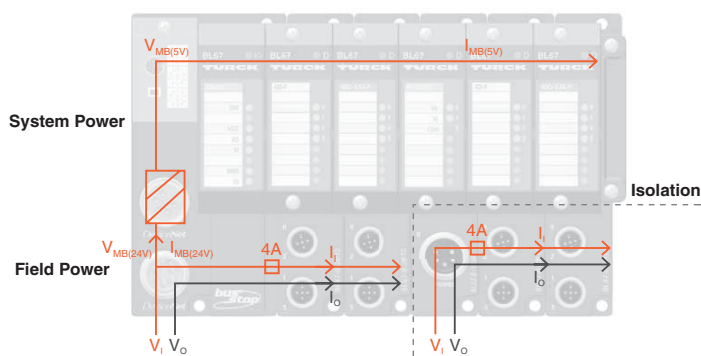
PROFIBUS®, Ethernet and CANopen System DeviceNet™ System



$I_{MB(5V)} < 1.5A$
 $I_I < 4A$ (protected)
 $I_O < 8A$

V_{MB} = Module Bus Power
 V_I = Input Power
 V_O = Output Power

A power feeder module provides a new isolated segment for all modules to its right.



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A power feeder module provides a new isolated segment for all modules to its right.

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Step 1

Select Communication Module

TURCK Serial Bus System

General Environmental	
DeviceNet Gateway	BL67-GW-DN
ModBus TCP/IP, Ethernet Gateways	BL67-GW-EN BL67-PG-EN (programmable)
Ethernet IP, Ethernet Gateways	BL67-GW-EN-IP BL67-PG-EN-IP (programmable)
Profinet, Ethernet Gateways	BL67-GW-EN-PN
PROFIBUS-DP Gateway	BL67-GW-DPV1 BL67-PG-DP (programmable)
CANopen Gateway	BL67-GW-CO

IP67 Certified.

Reference the following Document for installation instructions: AXXXXX.

See www.rosscontrols.com



Electrical:

- Operating Current: <600 mA from V_{MB}
- Input Supply Current: <4 A (from V_I)
- Output Supply Current: <8 A (from V_O)
- Backplane Current: <1.5 A (from V_{MB})

Mechanical:

- Operating Temperature: -12 to +55°C (-13 to +131°F)
- Protection: IP 67
- Vibration: 5 g @ 10-500 Hz

Material:

- Housing: PC-V0 (Lexan)

Diagnostics (Logical)

- Diagnostic information available through the DeviceNet I/O map

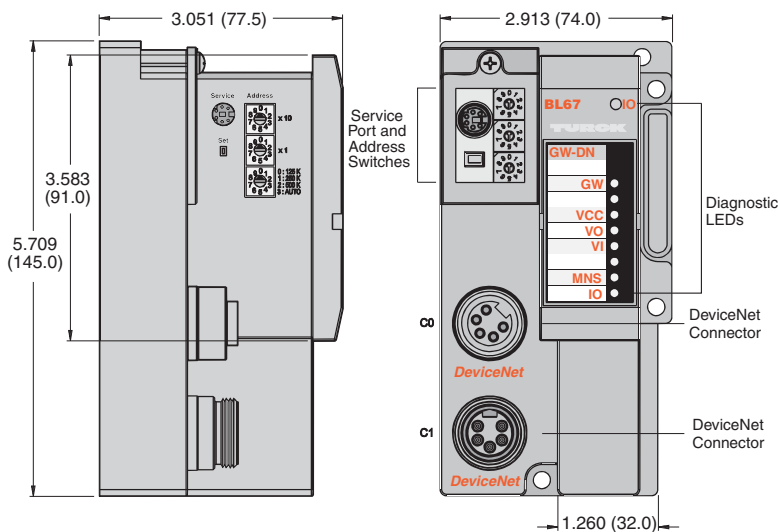
Diagnostics (Physical)

- LEDs to indicate status of DeviceNet and Module Bus communication

Programmability

- PG in model number designates a programmable gateway
- Programmable according to IEC 61131.3 using CodeSys (includes ladder logic)
- Use CodeSys to create logic programs to control local I/O

Dimensions – inches (mm)



IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Step 2

Select Input/Output Module

TURCK Serial Bus System

Power Distribution

Inputs: V_1

Outputs: V_o

Logic: V_{MB}

Mechanical:

Operating Temperature: +32 to +131°F (0 to +55°C)

Protection: NEMA 1,3,4,12,13 / IEC IP 67

Vibration: 5 g @ 10 – 500 Hz

Material:

Connectors: Nickel-plated brass

Housing PC-VO (Lexan)

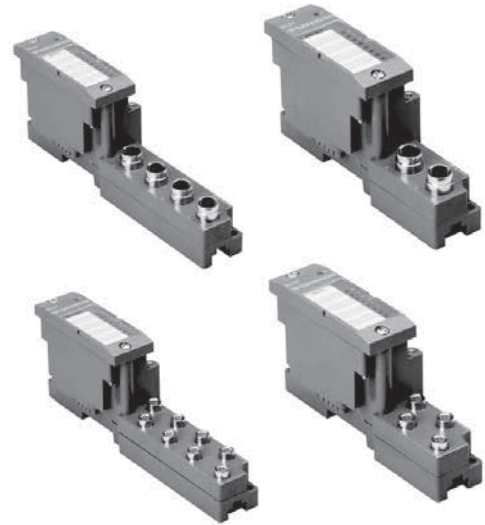
Diagnostics (Logical)

Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

LEDs to indicate status of DeviceNet and Module Bus communication

LEDs for each I/O point to indicate on/off status



Model Description	Inputs	Outputs	Model Number	Operating Current			Output Current from V _o	Type
				from V _{MB}	from V ₁	from V _o		
Inputs								
Discrete Inputs	4		BL67-4DI-P	<30 mA	<40 mA			PNP
Discrete Inputs	4		BL67-4DI-N	<30 mA	<1 mA			NPN
Discrete Inputs	8		BL67-8DI-P	<30 mA	<40 mA			PNP
Discrete Inputs	8		BL67-8DI-N	<30 mA	<1 mA			NPN
Discrete Inputs	4		BL67-4DI-PD	<30 mA	<100 mA			PNP
Discrete Inputs	8		BL67-8DI-PD	<30 mA	<100 mA			PNP
Analog Inputs	2		BL67-2AI-V	<35 mA	<12 mA			-10/0 to 10V
Analog Inputs	2		BL67-4DI-I	<35 mA	<12 mA			0/4 to 20mA
Analog Inputs	2		BL67-4DI-V/I	<35 mA	<12 mA			-10/0 to 10V, 0/4 to 20mA
Temperature Inputs	2		BL67-2AI-TC	<35 mA	<30 mA			Thermocouple
Temperature Inputs	2		BL67-2AI-PT	<45 mA	<30 mA			RTD
Outputs								
Discrete Outputs		4	BL67-4DO-0.5A-P	<30 mA		<100 mA	<0.5 A	PNP
Discrete Outputs		4	BL67-4DO-2A-P	<30 mA		<100 mA	<2 A	PNP
Discrete Outputs		4	BL67-4DO-2A-N	<30 mA		<100 mA	<2 A	NPN
Discrete Outputs		8	BL67-8DO-0.5A-P	<30 mA		<100 mA	<0.5 A	PNP
Discrete Outputs		16	BL67-16DO-0.5A-P	<30 mA		<100 mA	<0.5 A	PNP
Analog Outputs		2	BL67-2AO-V	<60 mA	<50 mA			-10/0 to 10V
Analog Outputs		2	BL67-2AO-I	<40 mA	<50 mA			0/4 to 20mA
Inputs / Outputs								
Discrete Inputs /Outputs	8	8	BL67-8XSG-P	<30 mA		<100 mA	<0.5 A	PNP
Discrete Inputs /Outputs	8	8	BL67-8XSG-PD	<30 mA		<100 mA	<0.5 A	PNP
Discrete Inputs /Outputs	4	4	BL67-4DI4DO-PD	<30 mA		<100 mA	<0.5 A	PNP

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Select Optional CANopen Interface / Serial Communication Modules

Power Distribution

Inputs: V_1
Outputs: V_0
Logic: V_{MB}

Mechanical:

Operating Temperature: +32 to +131°F (0 to +55°C)
Protection: NEMA 1,3,4,12,13 / IEC IP 67
Vibration: 5 g @ 10 – 500 Hz

Material:

- Connectors: Nickel-plated brass
- Housing: PC-VO (Lexan)

Diagnostics (Logical):

- Diagnostic information available through the fieldbus gateway

Diagnostics (Physical):

- LED to indicate module bus communication status as well as I/O diagnostics
- LEDs for each I/O point to indicate on/off status

Functional Description:

- Connect up to 8 CANopen slaves to this module
- Map the slaves into any available fieldbus



Shown with
BL67-B-4M12 base

Model Description	Model Number	Operating Current		
		from V _{MB}	from V	from V Supply
Inputs				
Discrete Inputs	BL67-4DI-P	<30 mA	<50 mA	<100 mA
Outputs				
Discrete Outputs	BL67-1RS485/422	<140 mA	<50 mA	
Discrete Outputs	BL67-1RS232	<60 mA	<50 mA	
Discrete Outputs	BL67-1SSI	<50 mA	<50 mA	

Select Optional CANopen Interface / Serial Communication Modules

Electrical:

Operating CurrentInputs: V_1
Outputs: V_0
Logic: V_{MB}

Power Distribution:

Accepts 24 volts DC supply to provide V_1 and V_0 for downstream modules

Material:

Connectors: Nickel-plated brass
Housing PC-VO (Lexan)

Diagnostics (Logical)

Diagnostic information available through the fieldbus gateway

Diagnostics (Physical)

LEDs to indicate status of DeviceNet and Module Bus communication
LEDs for each I/O point to indicate on/off status



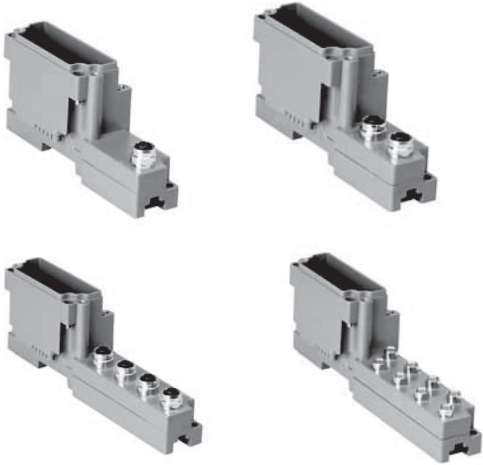



Model Description	Model Number	Operating Current	
		from V_{MB}	for downstream I/O
Power Feeding Module	BL67-PF-24 volts DC	<30 mA	<10 mA

IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Step 6

Select Base Modules for BL67 I/O

TURCK Serial Bus System

 <p>eurofast®</p>				 <p>picofast®</p>	 <p>M23</p>	 <p>minifast®</p>
Connector Type	Number of Connectors	Number of Pins	Model Number	Description		
eurofast®	2	2 (ea)	BL67-B-2M12	When used with 4 input or 4 output modules, each connector has 2 I/O points.		
eurofast®	2	2 (ea)	BL67-B-2M12-P	Each connector has 2 I/O points, paired so consecutive points are on the same connector.		
eurofast®	4	2 (ea)	BL67-B-2M12	When used with 8 input or 8 output modules, each connector has 2 I/O points.		
eurofast®	4	2 (ea)	BL67-B-2M12-P	Each connector has 2 I/O points, paired so consecutive points are on the same connector.		
eurofast®	1	5	BL67-B-1M12	Typically used with serial I/O modules.		
eurofast®	1	8	BL67-B-1M12-8	Typically used with serial I/O modules.		
picofast®	4		BL67-B-4M8	Typically used with 4-input or 4-output modules.		
picofast®	8		BL67-B-8M8	Typically used 8-input or 8-output modules with.		
M23	1	12	BL67-B-1M23	Typically used with 8-output or SSI Modules.		
M23	1	12	BL67-B-1M23-VI	Base module that allows full 4 A available from V+ pins.		
M23	1	19	BL67-B-1M23-19	For use with 16-output module.		
minifast®	1	5	BL67-B-1RSM	For use with the power feeding module, five wire power scheme.		
minifast®	1	4	BL67-B-1RSM-4	For use with the power feeding module, four wire power scheme.		

Labels for labeling electronic modules

BL67-Label/DIN-A4-50-PCS

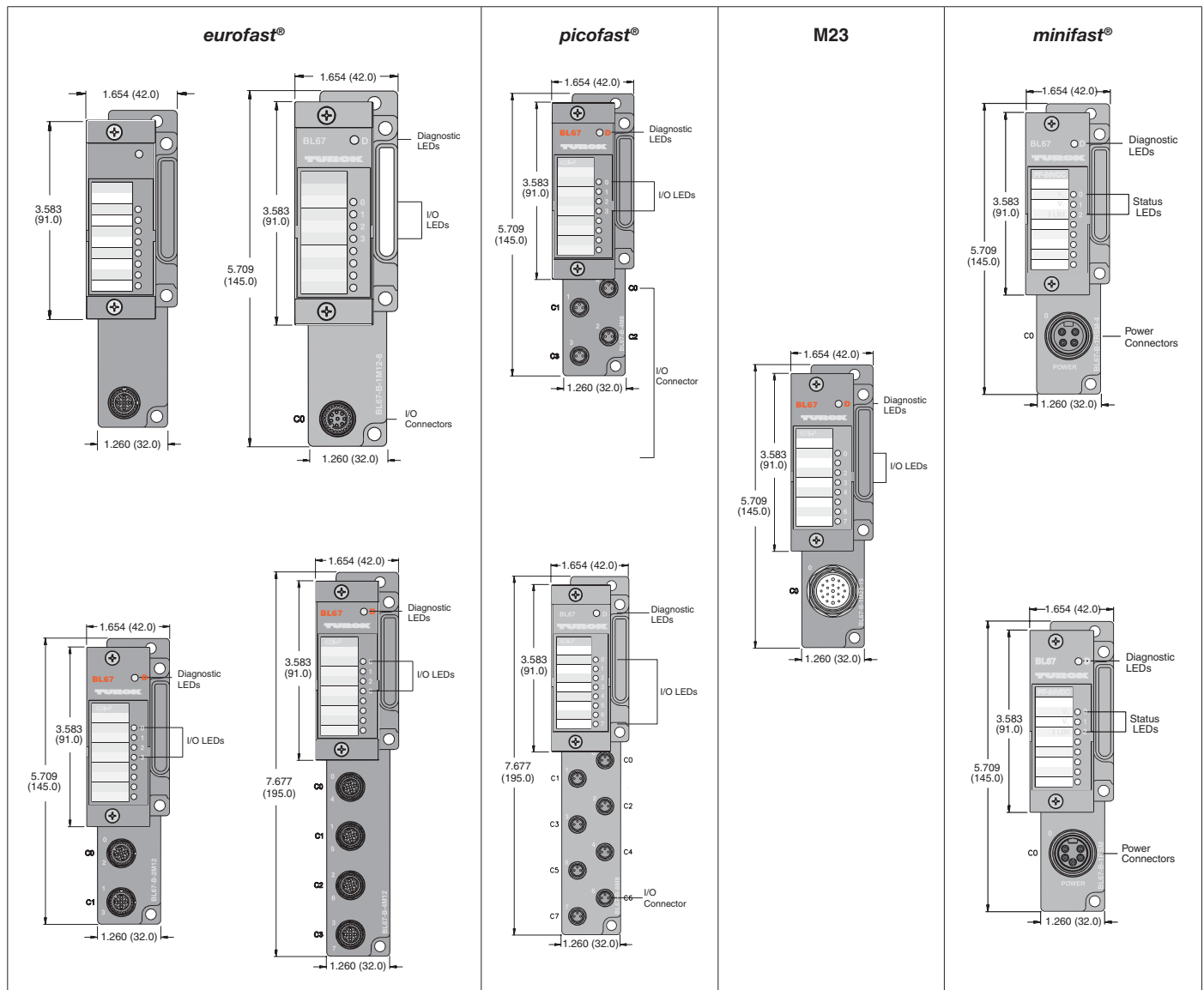
Programming Cable -
For connecting the BL20/BL67 system to
the I/O Assistant software
XN-PS2-CABLE

DIN A4 sheet size



IMPORTANT NOTE: Please read carefully and thoroughly all of the **CAUTIONS, WARNINGS** on the inside back cover.

Dimensions – inches (mm)



TURCK Products Warranty Terms and Conditions

RISK OF LOSS

Delivery of the equipment to a common carrier shall constitute delivery to the Purchaser and the risk of loss shall transfer at that time to Purchaser. Should delivery be delayed due to an act or omission on the part of the Purchaser, risk of loss shall transfer to the Purchaser upon notification by TURCK Inc. that the order is complete and ready for shipment.

WARRANTIES

TURCK INC. (herein after "TURCK") offers five (5) WARRANTIES to cover all products sold. They are as follows:

1) The **12-MONTH WARRANTY** is available for the products listed - generally those not covered by LIFETIME, 5-YEAR, 24-MONTH or 18-MONTH warranty. No registration required.

2) The **18-MONTH WARRANTY** is available for the products listed - generally those not covered by LIFETIME or 5-YEAR WARRANTY. No registration is required.

3) The **24-MONTH WARRANTY** is available for the products listed - generally those not covered by LIFETIME, 5-YEAR or 18-MONTH. No registration is required.

4) The **5-YEAR WARRANTY** is available generally for the products listed. No registration is required.

5) A **LIFETIME WARRANTY** is available for the products listed. It becomes effective when the accompanying TURCK LIFETIME WARRANTY REGISTRATION is completed and returned to TURCK.

GENERAL TERMS AND CONDITIONS FOR ALL WARRANTIES

• 12-MONTH STANDARD WARRANTY

• 18-MONTH STANDARD WARRANTY

• 24-MONTH STANDARD WARRANTY

• 5-YEAR WARRANTY

• LIFETIME WARRANTY

TURCK warrants the Products covered by the respective WARRANTY AGREEMENTS to be free from defects in material and workmanship under normal and proper usage for the respective time periods listed above from the date of shipment from TURCK. In addition, certain specific terms apply to the various WARRANTIES.

THESE EXPRESS WARRANTIES ARE IN LIEU OF AND EXCLUDE ALL OTHER REPRESENTATIONS MADE - BOTH EXPRESSED AND IMPLIED.

THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE FOR PRODUCTS COVERED BY THESE TERMS AND CONDITIONS.

TURCK warrants that the goods sold are as described, but no promise, description, affirmation of fact, sample model or representation, oral or written shall be part of an order, unless set forth in these terms and conditions, or are in writing and signed by an authorized representative of TURCK. These WARRANTIES do not apply to any Product which has been subject to misuse, negligence, or accident -or to any Product which has been modified or repaired, improperly installed, altered, or disassembled -except according to TURCK's written instructions.

These WARRANTIES are subject to the following conditions:

1) These WARRANTIES are limited to the electronic and mechanical performance only, as expressly detailed in the Product specifications and NOT to cosmetic performance.

2) These WARRANTIES shall not apply to any cables attached to, or integrated with the Product. However, the 18-MONTH WARRANTY shall apply to cables sold separately by TURCK.

3) These WARRANTIES shall not apply to any Products which are stored, or utilized, in harsh environmental or electrical conditions outside TURCK's written specifications.

4) The WARRANTIES are applicable only to Products shipped from TURCK subsequent to January 1, 1988.

ADDITIONAL SPECIFIC TERMS FOR - (12-MONTH STANDARD WARRANTY) for Linear Displacement Transducers and RFID products.

(18-MONTH STANDARD WARRANTY) FOR ULTRASONIC SENSORS, CABLES AND ALL NON-SENSING PRODUCTS SOLD BY TURCK INC. INCLUDING MULTI-SAFE, MULTI-MODUL, MULTI-CART AND RELATED AMPLIFIER PRODUCTS, RELAYS AND TIMERS.

(24-MONTH STANDARD WARRANTY) FOR ENCODERS.

5-YEAR WARRANTY FOR INDUCTIVE AND CAPACITIVE PROXIMITY

SENSORS: The periods covered for the above WARRANTIES and Products shall be 12 MONTHS, 18-MONTHS, 24-MONTHS and 5-YEARS, respectively, from the date of shipment from TURCK.

LIFETIME WARRANTY (OPTIONAL - REGISTRATION REQUIRED) FOR INDUCTIVE, INDUCTIVE MAGNET OPERATED AND CAPACITIVE PROXIMITY SENSORS SOLD TO THE ORIGINAL PURCHASER FOR THE LIFETIME OF THE ORIGINAL APPLICATION.

The following terms apply to the LIFETIME WARRANTY in addition to the General Terms:

1) This WARRANTY shall be effective only when the LIFETIME WARRANTY REGISTRATION has been completed, signed by the End User and an authorized TURCK Representative or Distributor and has been received by TURCK no later than six (6) months after installation in the End User's Plant, or two (2) years from the date product was shipped from TURCK, whichever is sooner.

2) This warranty is available only to TURCK's authorized Representatives, Distributors and to the Original User. (The term "Original User" means that person, firm, or corporation which first uses the Product on a continuous basis in connection with the operation of a production line, piece of machinery, equipment, or similar device.) In the event the ownership of the product is transferred to a person, firm or corporation other than the Original User, this WARRANTY shall terminate.

3) This WARRANTY is applicable only to the Original Application. In the event the machinery, equipment, or production line to which the Product is connected, or on which it is installed, is substituted, changed, moved or replaced, the WARRANTY shall terminate.

4) This WARRANTY shall be valid only if the Product was purchased by the Original User from TURCK, or from an authorized TURCK Distributor, or was an integral part of a piece of machinery and equipment obtained by the Original user from an Original Equipment Manufacturer, which itself, was purchased directly from TURCK or from an authorized Distributor.

PURCHASER'S REMEDIES

This Remedy shall apply to all WARRANTIES. If a TURCK Distributor desires to make a WARRANTY Claim, the Distributor shall, if requested by TURCK, ship the Product to TURCK's factory in Minneapolis, Minnesota, postage or freight prepaid. If the User desires to make a WARRANTY Claim, they shall notify the authorized TURCK Distributor from whom it was purchased or, if such Distributor is unknown, shall notify TURCK. TURCK shall, at its option, take any of the following two courses of action for any products which TURCK determines are defective in materials or workmanship.

1) Repair or replace the Product and ship the Product to the Original Purchaser or to the authorized TURCK Distributor, postage or freight prepaid; or

2) Repay to the Original Purchaser that price paid by the Original Purchaser; provided that if the claim is made under the LIFETIME WARRANTY, and such Product is not then being manufactured by TURCK, then the amount to be repaid by TURCK to the Original Purchaser shall be reduced according to the following schedule:

Number of Years Since Date of Purchase by Original Purchaser	Percent of Original Purchase Price To Be Paid by TURCK
10	50%
15	25%
20	10%
More than 20	5%

PURCHASER'S REMEDIES SHALL BE LIMITED EXCLUSIVELY TO THE RIGHT OF REPLACEMENT, REPAIR OR REPAYMENT AS PROVIDED AND DOES NOT INCLUDE ANY LABOR COST OR REPLACEMENT AT ORIGINAL PURCHASER'S SITE. TURCK SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF ANY WARRANTY, EXPRESSED OR IMPLIED, APPLICABLE TO THE PRODUCT, INCLUDING WITHOUT LIMITATION, ANY DAMAGES RESULTING FROM PROPERTY DAMAGE, PERSONAL INJURY OR BUSINESS INTERRUPTION.

CONSIDER SAFETY AND PROTECTION PRECAUTIONS

TURCK takes great care to design and build reliable and dependable products, however, some products can fail eventually. You must take precautions to design your equipment to prevent property damage and personal injury in the unlikely event of failure. As a matter of policy, TURCK does NOT recommend the installation of electronic controls as the sole device FOR THE PROTECTION OF PERSONNEL in connection with power driven presses, brakes, shears and similar equipment and, therefore, the customer should build in redundancy or dual control using approved safety devices for these applications.

CAUTIONS, WARNINGS And STANDARD WARRANTY

ROSS OPERATING VALVE, ROSS CONTROLS®, ROSS DECCO®, and AUTOMATIC VALVE INDUSTRIAL, collectively the "ROSS Group".

PRE-INSTALLATION or SERVICE

1. Before servicing a valve or other pneumatic component, be sure all sources of energy are turned off, the entire pneumatic system is shut down and exhausted, and all power sources are locked out (ref: OSHA 1910.147, EN 1037).
2. All ROSS Group Products, including service kits and parts, should be installed and/or serviced only by persons having training and experience with pneumatic equipment. Because any product can be tampered with and/or need servicing after installation, persons responsible for the safety of others or the care of equipment must check ROSS Group Products on a regular basis and perform all necessary maintenance to ensure safe operating conditions.
3. All applicable instructions should be read and complied with before using any fluid power system to prevent harm to persons or equipment. In addition, overhauled or serviced valves must be functionally tested prior to installation and use. If you have any questions, call your nearest ROSS Group location.
4. Each ROSS Group Product should be used within its specification limits. In addition, use only ROSS Group components to repair ROSS Group Products.

WARNINGS: *Failure to follow these instructions can result in personal injury and/or property damage.*

FILTRATION and LUBRICATION

1. Dirt, scale, moisture, etc., are present in virtually every air system. Although some valves are more tolerant of these contaminants than others, best performance will be realized if a filter is installed to clean the air supply, thus preventing contaminants from interfering with the proper performance of the equipment. The ROSS Group recommends a filter with a 5-micron rating for normal applications.
2. All standard ROSS Group filters and lubricators with polycarbonate plastic bowls are designed for compressed air applications only. Use the metal bowl guard, where provided, to minimize danger from high pressure fragmentation in the event of bowl failure. Do not expose these products to certain fluids, such as alcohol or liquefied petroleum gas, as they can cause bowls to rupture, creating a combustible condition and hazardous leakage. Immediately replace crazed, cracked, or deteriorated bowls.
3. Only use lubricants which are compatible with materials used in the valves and other components in the system. Normally, compatible lubricants are petroleum base oils with oxidation inhibitors, an aniline

point between 180°F (82°C) and 220°F (104°C), and an ISO 32, or lighter, viscosity. Avoid oils with phosphate type additives which can harm polyurethane components, potentially leading to valve failure which risks personal injury, and/or damage to property.

WARNINGS: *Failure to follow these instructions can result in personal injury and/or property damage.*

AVOID INTAKE/EXHAUST RESTRICTION

1. Do not restrict air flow in the supply line. To do so could reduce the pressure of the supply air below minimum requirements for the valve and thereby causing erratic action.
2. Do not restrict a valve's exhaust port as this can adversely affect its operation. Exhaust silencers must be resistant to clogging and must have flow capacities at least as great as the exhaust capacities of the valves. Contamination of the silencer can result in reduced flow and increased back pressure.

WARNINGS: *Failure to follow these instructions can result in personal injury and/or property damage.*

SAFETY APPLICATIONS

1. Mechanical Power Presses and other potentially hazardous machinery using a pneumatically controlled clutch and brake mechanism must use a press control double valve with a monitoring device. A double valve without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All double valve installations involving hazardous applications should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.
2. Safety exhaust (dump) valves without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All safety exhaust valve installations should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.
3. Per specifications and regulations, the ROSS L-O-X® and L-O-X® with EEZ-ON®, N06 and N16 Series operation products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

WARNINGS: *Failure to follow these instructions can result in personal injury and/or property damage.*

STANDARD WARRANTY

All products sold by the ROSS Group are warranted for a one-year period [with the exception of Filters, Regulators and Lubricators ("FRLs") which are warranted for a period of seven (7) years] from the date of purchase. All products are, during their respective warranty periods, warranted to be free of defects in material and workmanship. The ROSS Group's obligation under this warranty is limited to repair, replacement or refund of the purchase price paid for products which the ROSS Group has determined, in its sole discretion, are defective. All warranties become void if a product has been subject to misuse, misapplication, improper maintenance, modification or tampering. Products for which warranty protection is sought must be returned to the ROSS Group freight prepaid.

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