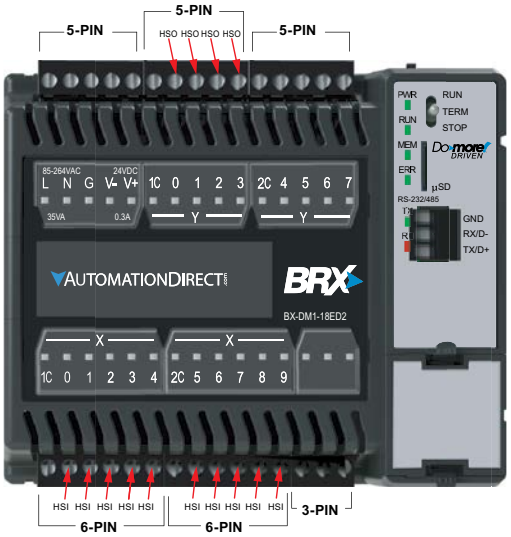
BX 18/18E MPUs

BX-DM1-18ED2

BRX MPU with Do-more! DM1 technology

- 120VAC required; serial port; microSD slot
- Discrete input: 10-point, sink/source
- Discrete output: 8-point, sourcing.



I/O Terminal Blocks sold separately.
(See Removable Terminal Block Specifications Table on BX 18/18E MPU Accessories page.)

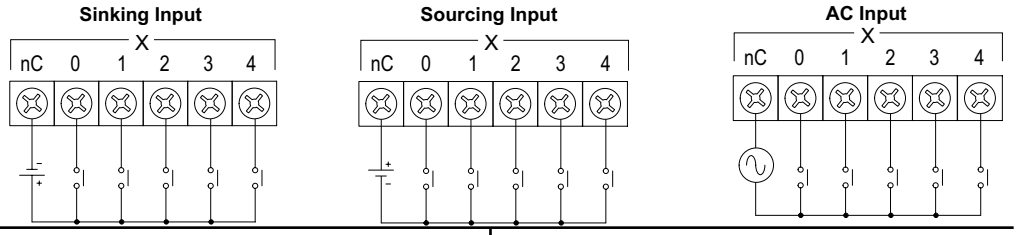
CPU Specifications	
Program Memory Type	FLASH memory
User Data Memory Type	Battery-backed RAM, user configurable
Serial Port	RS-232/485 3-Pin, Software selectable
Pluggable Option Module	RS-232, RS-485, Ethernet 10/100 BASE-T (1 Mbps throughput max), USB 2.0 Type B
Data Logging/File Management	microSD card slot (32G max)
Expansion Modules	4 expansion modules max
Real Time Clock Accuracy	±2.6 s per day typical at 25°C ±8s per day max at 60°C
Programming Software	Do-more! Designer – Ver. 2.0 or higher
Programming Cable Options	BX-PGM-CBL
Custom Label Window Size	0.75" x 2.25" (19mm x 57.2 mm)
MPU Weight	291g (10.3 oz)

Discrete Input Specifications	
Input Type	Sink/Source
Total Inputs per Module	10 High Speed * * All inputs may be used as standard inputs.
Commons	2 (5 points/common) Isolated
Nominal Voltage Rating	12–24 VAC/DC
Input Voltage Range	9–30 VAC/DC
Maximum Voltage	30 VAC/DC
DC Frequency	0–250kHz - High Speed
Minimum Pulse Width	0.5 µs - High Speed
AC Frequency	47–63 Hz (60–240Hz filter must be set in software for AC operation)
Input Impedance	3kΩ @ 24VDC
Input Current (typical)	6mA @ 24 VAC/DC
Maximum Input Current	12mA @ 30 VAC/DC
Maximum OFF Current	2.0 mA
ON Voltage Level	> 9.0 VAC/VDC
OFF Voltage Level	< 2.0 VAC/VDC
Status Indicators	Logic Side, Green

Discrete Output Specifications		
Output Type	Sourcing	
Total Outputs per Module	8 Total – 4 High Speed (Y0...Y3)* 4 Standard (Y4...Y7) *All outputs may be used as standard outputs	
Commons	2 (4 points/common) Isolated	
Maximum Current per Common	2A	
Nominal Voltage Rating	12–24 VDC	
Operating Voltage Range	5–36 VDC	
Maximum Voltage	36VDC	
Minimum Output Current	0.1 mA @ 24VDC	
Maximum Output Current	0.5 A per output, no derating over temperature range	
Maximum Leakage Current	10µA	
Maximum Switching Frequency	1m cable	250kHz
	10m cable	100kHz
Status Indicators	Logic Side, Green	

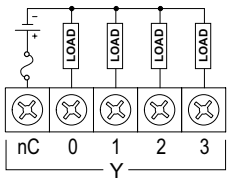
I/O Wiring

Discrete Input Wiring

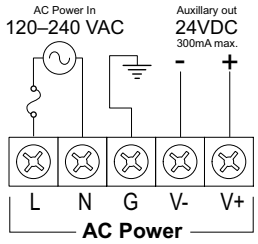


Discrete Output Wiring

Sourcing Output

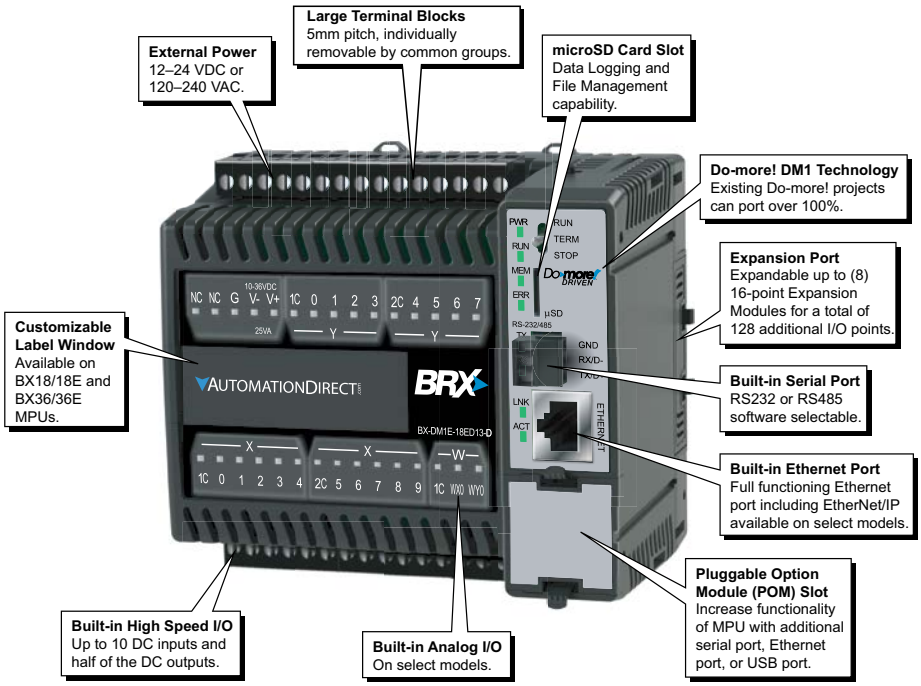


Supply Power Wiring



BRX Micro PLC Overview

The BRX platform enables you to choose from various communications ports. All BRX MPU models have a built-in RS232C/485 (software-selectable) serial port. However, an RJ45 Ethernet port (10/100 Mbps) is provided on select units. With support for EtherNet/IP, Modbus TCP, Modbus RTU, ASCII, K-sequence (DirectLOGIC users) and custom protocols, the BRX MPU platform provides supreme versatility for any application. BRX hardware is built to last and is engineered, assembled and supported right here in America; designed and fabricated by industrial automation veterans with hardware facilities in Tennessee and Florida. The compact modular architecture results in an outstanding controller package, with high performance, a small footprint, at a very low cost. The BRX platform has built-in high-speed I/O, motion control, on-board analog I/O, and many other features that enable you to build the ideal controller for your application. Below is a quick look at some of the standard features available on the BRX Platform.



General Specifications	
Operating Temperature	0° to 60°C [32° to 140°F]
Storage Temperature	-20° to 85°C [-4° to 185°F]
Humidity	5 to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Enclosure Type	Open Equipment
Agency Approvals	UL61010-2 - UL File # E185989 Canada and USA
	CE Compliant EN61131-2*
Noise Immunity	NEMA ICS3-304
EU Directive	See the "EU Directive" topic in the Help File

***Meets EMC and Safety requirements. See the D.O.C. for details.**

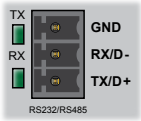
2 Year Warranty
All BRX PLCs are covered under a 2- year warranty.

BRX Micro PLC Overview

Built-in RS-232/485 Port Specifications

Port Name *	RS-232/RS-485 Serial Port
Description	Non-isolated serial port that can communicate via RS-232 or RS-485 (software selectable). Includes ESD protection and built-in surge protection.
Supported Protocols	Do-more Protocol (Default) Modbus RTU (Master & Slave) K-Sequence (Slave) ASCII (In & Out) Programming and Monitoring
Data Rates	1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200
Default Settings	RS-232, 115200 bps, No Parity, 8 Data Bits, 1 Stop Bit, Station #1
Port Type	3-pin terminal strip 3.5 mm pitch
Port Status LED	Green LED is illuminated when active for TXD and RXD
RS-485 Station Addresses	1-247
Cable Recommendations	RS-232 use L19772-XXX from AutomationDirect.com RS-485 use L19827-XXX from AutomationDirect.com
Replacement Connector	ADC Part # BX-RTB03S

Removable connector included.



Pinout	RS232	RS485
1	GND	GND
2	RXD	D-
3	TXD	D+

****When using RS-485 a termination resistor is available and is software selectable.***

CPU Status Indicators

Indicator	***Status***	***Description***
PWR	OFF	Base Power OFF
	Green	Base Power ON
	Yellow	Low Battery
RUN	OFF	CPU is in STOP Mode
	Green	CPU is in RUN Mode
	Yellow	Forces are Active
MEM	OFF	No ROM Activity, No SD Card
	Yellow	ROM Activity (Flash or SD Card)
	Green	SD Card Installed and Mounted
	Red	SD Card Installed and Not Mounted
ERR	OFF	CPU is functioning normally
	Red	CPU Fatal Hardware Error or Software Watchdog Error

CPU Mode Switch

RUN	CPU is forced into RUN Mode if no errors are encountered.
TERM	RUN, PROGRAM and DEBUG modes are available. In this position, the mode of operation can be changed through the Do-more! Designer Software.
STOP	CPU is forced into STOP Mode.

microSD Specifications

Port Name	microSD Card Slot			
Description	Standard microSD socket for data logging or file read/write			
Maximum Card Capacity	32GB			
Transfer Rate (ADATA microSDHC Class 4 memory card)	Mbps	Minimum	Typical	Maximum
	Read	14.3	14.4	14.6
	Write	4.8	4.9	5.1
Port Status LED	Green LED is illuminated when card is inserted/detected			
Optional microSD Card	ADC Part # MICSD-16G			

Pin	***SD***
1	DAT2
2	CD/DAT3
3	CMD
4	VDD
5	CLK
6	VSS
7	DAT0
8	DAT1

AC Power Supply Specifications

Nominal Voltage Rating	120–240 VAC
Input Voltage Range (Tolerance)	85–264 VAC
Rated Operating Frequency	47–63 Hz
Maximum Input Power	40VA
Cold Start Inrush Current	1.5A, 2ms
Maximum Inrush Current (Hot Start)	1.5A, 2ms
Internal Input Fuse Protection	Micro fuse 250V, 2A Non-replaceable
Isolated User 24VDC Output	24VDC @ 0.3 A max, <1V P-P Ripple, Integrated self-resetting short circuit protection
Voltage Withstand (dielectric)	1500VAC Power Inputs to Ground applied for 1 minute 1500VAC Ground to 24VDC applied for 1 minute

DC Power Supply Specifications

Nominal Voltage Rating	12–24 VDC
Input Voltage Range (Tolerance)	10-36 VDC
Maximum Input Voltage Ripple	<± 10%
Maximum Input Power	30W (14W for BX 10/10E MPUs)
Cold Start Inrush Current	5A, 2ms
Maximum Inrush Current (Hot Start)	5A, 2ms
Internal Input Protection	Reverse Polarity Protection and Undervoltage
Voltage Withstand (dielectric)	1500VAC Power Inputs to Ground applied for 1 minute

BX 18 MPUs

18 Discrete I/O Points: 10 Input, 8 Output

Features

- Models with DC inputs have:
  - 10 high-speed inputs rated up to 250kHz
  - can accept 12–24 nominal voltage, AC or DC
  - can be wired as sinking or sourcing
- Models with AC inputs can accept 120–240 nominal voltages
- Output types available are DC sinking, DC sourcing, and relay
- Models with DC outputs have 4 high-speed outputs rated up to 250kHz
- Support for 4 additional expansion modules
- Onboard RS-232/485 port with removable 3-Pin connector
- microSD card slot

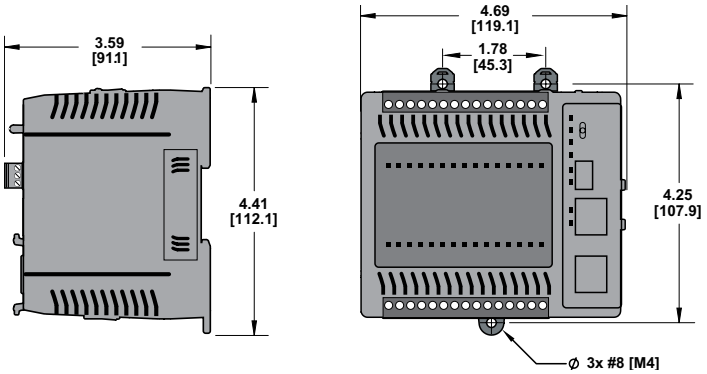
BX 18 Micro PLC Unit (MPU)

(No Built-in Analog or Ethernet port)

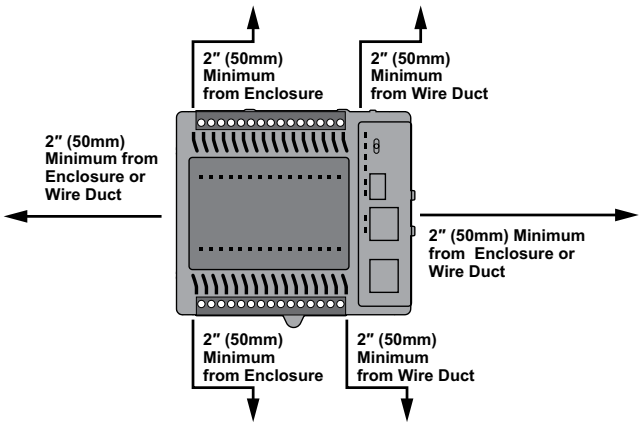
BX 18 MPUs					
Part Number	***Price***	***External Power***	***Discrete Input***	***Discrete Output***	***Expansion Modules***
BX-DM1-18ED1		120–240 VAC	10 High-speed DC Sinking or Sourcing	4 High-Speed 4 Standard DC Sinking	4
BX-DM1-18ED1-D		12–24 VDC			
BX-DM1-18ED2		120–240 VAC		4 High-Speed 4 Standard DC Sourcing	
BX-DM1-18ED2-D		12–24 VDC			
BX-DM1-18ER		120–240 VAC		8 Form A Relay	
BX-DM1-18ER-D		12–24 VDC			
BX-DM1-18AR		120–240 VAC	10 Standard AC		

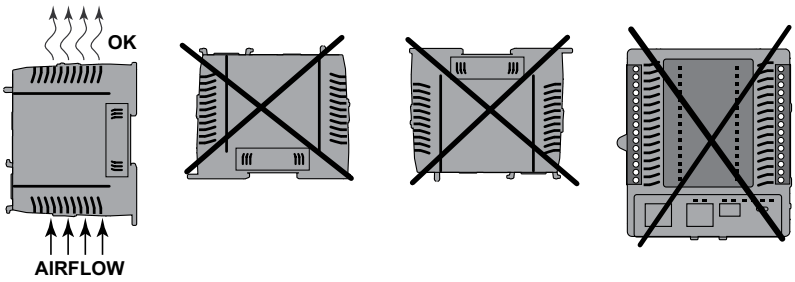
BX 18/18E MPUs

Dimensions, inches[mm]



Clearances and Mounting Restrictions





BX 18/18E MPUs Accessories

BX 18/18E MPU Wiring Termination Selection

The BX 18/18E MPUs ship with no predefined wiring termination option. This enables you to select the termination type that best suits your application. Several wiring options are available, including removable screw terminal connectors, removable spring clamp terminal connectors and pre-wired ***ZIP***Link cable solutions.

Terminal Block Connectors

The terminal block connectors are provided in kits and can be ordered as a single part number. Each kit contains all the terminal block connectors required (6 pieces): (3) 5-pin 5mm terminal blocks, (2) 6-pin 5mm terminal blocks, and (1) 3-pin 5mm terminal block.

The BX 18/18E MPUs terminals are configured into groups of 5 inputs and 4 outputs each with an isolated common. For example, inputs X0–X4 are grouped with their common terminal. On the BX 18E MPU, the analogs are grouped as 3 terminals consisting of 1 input, 1 output and a shared isolated analog common. The I/O termination groups are isolated such that a single group connector can be removed without affecting other groups of I/O or the external power source.

BX-RTB18 Screw Terminal Block Kit

This terminal block kit includes (6 pieces): (3) 5-pin 5mm terminal blocks (BX-RTB05), (2) 6-pin 5mm terminal blocks (BX-RTB06), and (1) 3-pin 5mm terminal block (BX-RTB03). These are 90-degree screw terminal blocks. Wire is 180-degree pass through.

5-Pin
BX-RTB05

6-Pin
BX-RTB06

3-Pin
BX-RTB03

BX-RTB18-1 Spring Terminal Block Kit

This terminal block kit includes (6 pieces): (3) 5-pin 5mm terminal blocks (BX-RTB05-1), (2) 6-pin 5mm terminal blocks (BX-RTB06-1), and (1) 3-pin 5mm terminal block (BX-RTB03-1). These are 180-degree spring clamp wire terminal blocks.

5-Pin
BX-RTB05-1

6-Pin
BX-RTB06-1

3-Pin
BX-RTB03-1

Removable Terminal Block Specifications			Replacement 6-Pin	
Part Number	***BX-RTB18***	***BX-RTB18-1***	***BX-RTB06***	***BX-RTB06-1***
Price (pkg)				
Connector Type	Screw Type-90-degree	Spring Clamp Type-180-degree	Screw Type-90-degree	Spring Clamp Type-180-degree
Wire Exit	180-degree	180-degree	180-degree	180-degree
Pitch	5.0 mm	5.0 mm	5.0 mm	5.0 mm
Screw Size	M2.5	N/A	M2.5	N/A
Recommended Screw Torque	< 3.98 lb·in (0.45 N·m)	N/A	< 3.98 lb·in (0.45 N·m)	N/A
Screwdriver Blade Width	3.5 mm	3.5 mm	3.5 mm	3.5 mm
Wire Gauge (Single Wire)	28–12 AWG	28–14 AWG	28–12 AWG	28–14 AWG
Wire Gauge (Dual Wire)	28–16 AWG	28–16 AWG (Dual wire ferrule required)	28–16 AWG	28–16 AWG (Dual wire ferrule required)
Wire Strip Length	0.3 in (7.5 mm)	0.37 in (9.5 mm)	0.3 in (7.5 mm)	0.37 in (9.5 mm)
Equiv. Dinkle P/N	5ESDV-0nP-BK*	5ESDSR-0nP-BK*	5ESDV-06P-BK	5ESDSR-06P-BK

*** Replace n with: (3) 3-terminal, (5) 5-terminal or (6) for 6-terminal.**

Wiring Solutions

*ZIP*Link Pre-Wired Cable Solutions

ZIPLinks eliminate the normally tedious process of wiring between devices by utilizing prewired cables and DIN-rail mount connector modules. ***ZIP***Links are as simple as plugging in a cable connector at either end or terminating wires at only one end. Prewired cables keep installation clean and efficient, using less space at a fraction of the cost of standard terminal blocks. ***ZIP***Link prewired cables can connect directly to a ***ZIP***Link remote terminal block module or with the pigtail option, allowing for a convenient solution to wire the BRX platform to third-party devices. For the BX 18/18E MPUs, two (2) cables and two (2) ***ZIP***Link feedthrough modules are needed to connect to all the onboard wiring termination points.

Two (2) feedthrough module options are available: the ZL-RTB20 and the ZL-RTB20-1. The ZL-RTB20 is a standard feedthrough terminal module while the ZL-RTB20-1 is a feedthrough terminal block having a more compact footprint, requiring less space in the control cabinet.

BX 18/18E *ZIP*Link Selector

MPU Part Number	*Component Type*	*Module Part Number*	*Max Quantity Needed*	*Cable Part Number**	*Max Quantity Needed*
BX-DM1-18ED1	Feedthrough	ZL-RTB20 (Standard) OR ZL-RTB20-1 (Compact)	2	ZL-BX-CBL15 ZL-BX-CBL15-1 ZL-BX-CBL15-2	2
BX-DM1-18ED1-D					
BX-DM1-18ED2					
BX-DM1-18ED2-D					
BX-DM1-18ER*					
BX-DM1-18ER-D*					
BX-DM1-18AR*					
BX-DM1E-18ED13					
BX-DM1E-18ED13-D					
BX-DM1E-18ED23					
BX-DM1E-18ED23-D					
BX-DM1E-18ER3*					
BX-DM1E-18ER3-D*					
BX-DM1E-18AR3*					

*** Select the cable length: Blank = 0.5 m, -1 = 1.0 m, -2 = 2.0 m.**
Available pigtail cables: ZL-BX-CBL15-1P = 1.0 m, ZL-BX-CBL15-2P = 2.0 m.
**** The relay outputs are derated not to exceed 2A per common when used with the ZIPLink wiring system.**

Wiring Solutions

*ZIP*Link Pre-wired Cables

Custom molded ***ZIP***Link prewired cables allow for fast and easy connection of field wiring and remote I/O to the BRX platform.

The prewired cable is 0.5 meter in length. Pigtail cables are used to connect the BRX platform directly to third-party devices, reducing your wiring time and cost.

The pigtail cable is 1 meter in length.

Pre-wired *ZIP*Link Cable

***ZIP*Link Pigtail Cable**

*ZIP*Link Remote Feedthrough Modules

Feedthrough modules provide low-cost and compact field wiring screw termination solutions for quickly connecting with the BRX platform.

Two (2) modules are available for use with the BRX platform, the ZL-RTB20 and the ZL-RTB20-1. The ZL-RTB20 is a standard 2-row, 20-pin, DIN-rail mountable feedthrough module.

The ZL-RTB20-1 is a compact 3-row, 24-pin, DIN-rail mountable feedthrough module with a smaller footprint design.

***ZIP*Link Module Specifications**		
Part Number	***ZL-RTB20*** ***(Maximum of 4 needed)***	***ZL-RTB20-1*** ***(Maximum of 4 needed)***
Number of Positions	20 screw terminals, 2 rows	24 screw terminals, 3 rows
Screwdriver Width	1/8 in (3.8 mm) maximum	
Screw Torque	4.4 lb·in (0.5 N·m)	4.4 lb·in (0.5 N·m)

ZL-RTB20

ZL-RTB20-1

BRX Pluggable Option Modules (POM)

Overview

All BRX Do-more! MPUs have an available slot to receive one BRX Pluggable Option Module (POM). Available POM configurations are:

- RS-232 3-pin serial port
- RS-232 5-pin serial port
- RS-232 RJ12 port
- RS-422 5-pin serial port
- RS-485 serial port
- Ethernet port (RJ45)
- USB Type B Port

POM modules are hot swappable giving you the ability to utilize different communication options while the system is running. For example, you can configure the system using a POM RJ45 Ethernet port to talk with a C-more panel. Then hot swap to the USB POM for programming. When programming is complete hot swap back to the RJ45 Ethernet POM without needing to power cycle or reconfigure the system.

BX-P-SER2-TERM
RS-232 Port

BX-P-SER2-TERMFC
RS-232 Port
w/ Flow Control

BX-P-SER4-TERM
RS-485 Port

BX-P-SER422-TERM
RS-422 Port

BX-P-SER2-RJ12
RS-232 Port (RJ12)

BX-P-ECOMLT
Ethernet Port (RJ45)

BX-P-ECOMEX
Ethernet Port

BX-P-USB-B
USB Type B Port

NOTE: Pluggable Option Modules cannot be installed in BRX Remote I/O modules (e.g., BX-DMIO, BX-MBIO, BX-EBC100).

BRX Programmable Option Modules

Expansion Module Part No.	Price	Description
BX-P-SER2-TERM		Non-isolated Serial port for communication via RS-232. Includes ESD protection and built-in surge protection.
BX-P-SER2-TERMFC		Non-isolated Serial port for communication via RS-232, with flow control. Includes ESD protection and built-in surge protection.
BX-P-SER4-TERM		Non-isolated Serial port for communication via RS-485. Includes ESD protection and built-in surge protection.
BX-P-SER422-TERM		Non-isolated Serial port that can communicate via RS-422. Includes ESD protection and built-in surge protection.
BX-P-SER2-RJ12		Non-isolated Serial port for communication via RS-232 Includes ESD protection and built-in surge protection.
BX-P-ECOMLT		Standard transformer isolated Ethernet port (1 Mbps throughput max) with built-in surge protection.
BX-P-ECOMEX		General-purpose standard transformer isolated Ethernet port (10/100 Mbps) with built-in surge protection.
BX-P-USB-B		USB Type B Port for programming.

General Specifications

General specifications common to all the POM modules are listed in the table below.

General Specifications

Operating Temperature	0° to 60°C (32° to 140°F)
Storage Temperature	-20° to 85°C (-4° to 185°F)
Humidity	5% to 95% (non-condensing)
Environmental Air	No corrosive gases permitted
Vibration	IEC60068-2-6 (Test Fc)
Shock	IEC60068-2-27 (Test Ea)
Enclosure Type	Open equipment
Agency Approvals	UL 61010-2 - UL File # E185989 Canada and USA CE Compliant E185989*
Noise Immunity	NEMA ICS3-304
EU Directive	See the "EU Directive" in Appendix B of the User Manual or topic DMD0331 in the Help File.
Weight	7g (0.25 oz)

***Meets EMC and Safety requirements. See the D.O.C. for details.**

BRX POM Capabilities

	BX-P-SER2-TERM	BX-P-SER2-TERMFC	BX-P-SER4-TERM	BX-P-SER422-TERM	BX-P-SER2-RJ12	BX-P-ECOMLT*	BX-P-ECOMEX	BX-P-USB-B
Monitoring & Programming	X	X	X	X	X	X	X	X
Do-more! Protocol	X	X	X	X	X	X	X	
Modbus RTU Master	X	X	X	X	X		X	
Modbus RTU Slave	X	X	X	X	X		X	
Modbus TCP (Server)						X	X	
HTTP							X	
MQTT Client							X	
FTP							X	
EtherNet/IP							X	
K-Sequence (Slave)	X	X	X	X	X	X	X	
ASCII (In & Out)	X	X	X	X	X		X	
Custom Protocols	X	X	X	X			X	

*** Limited to 1 Mbps throughput max**

BRX Programming Software & Cable Assembly

Do-more! Designer Programming Software

Free Download
Part No. DM-PGMSW-USB

FREE

Do-more! Designer Programming software is a full-featured programming software for all BRX Series PLCs, Do-more! H2 Series PLCs and Do-more! T1H Series PLCs. Do-more! Designer Software is free. It can be downloaded from Automationdirect.com, or can be purchased on CD-ROM or USB.

BX-PGM-CBL

The programming cable assembly connects your PC to any BRX MPU and enables you to program and configure the BRX MPU using the free Do-more! Designer software. BX-PGM-CBL includes (1) BX-P-USB-B USB POM module and (1) USB-CBL-AB6 standard USB Type A to USB Type B connector cable.

BRX Accessories

Replacement Battery

D0-MC-BAT

A battery is included with all BRX MPUs and is used to retain the time and data along with any tagnames values that are set up as retentive. It is recommended that the battery be replaced once every five years or when one year of cumulative OFF time has been exceeded.

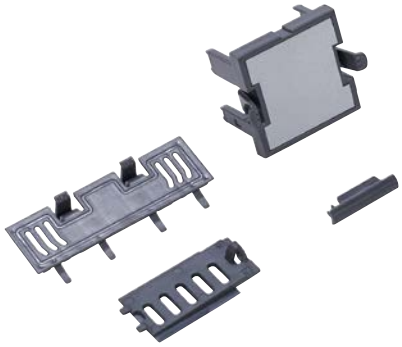
Battery	
D0-MC-BAT	Coin type, 3.0V Lithium battery, number CR2032

BRX Blank Custom Slot Labels

BX-LBL-1

BRX Blank custom slot labels, package of 10. For use with 18-point and 36-point BRX PLCs. (10) labels and (1) custom label slot cover included.

BRX Access Cover Kit

BX-ACC-1

BRX Access cover kit, replacement. For use with all BRX PLCs. Includes (1) battery cover, (1) expansion slot cover, (1) blank POM slot insert and (1) custom label slot.