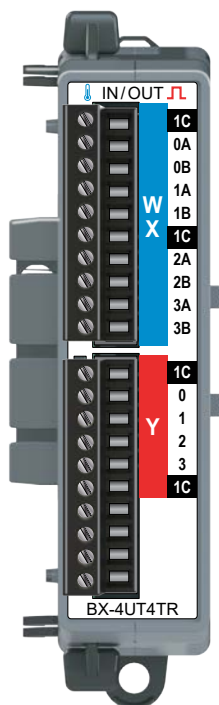# BX-4UT4TR Universal Temp. Input/ Relay Output

BX-4UT4TR
$235.00

Universal Temperature Input/
Relay Output Expansion Module
4-pt Universal Temperature Input
4-pt Relay Form A (SPST) Output

BX-RTB10 Terminal Blocks Included.
The BX-RTB10-1 or BX-RTB10-2
(purchased separately) can also be used.

NOTE: This device does not support *ZIP*Link Wiring Systems

IMPORTANT!

Hot-Swapping Information
Note: This device cannot be Hot Swapped.

Universal Temperature Input Specifications

Input Channels	4 Differential
Commons	1
Input Impedance	>5MΩ
Resolution	24-bit, 0.1°(C or F) See Data Range Specifications table
All Channel Update Rate	1s max (4 thermocouples enabled) 700ms max (4RTD/NTX/mV enabled)
Sample Duration Time	175ms
Open Circuit Detection Time	Within 5s
Maximum Ratings	-0.3 V to +5.3 V, <15mA
Common Mode Range	-0.3 V to +5.3 V
Common Mode Rejection	100dB@DC, 130dB@60Hz
Conversion Method	Sigma-Delta, 24-bit
Thermocouple Parameters	
Thermocouple Input Ranges	Type J: −210° to 1200°C (−346° to 2192°F) Type K: −265° to 1372°C (−445° to 2502°F) Type E: −265° to 1000°C (−445° to 1832°F) Type N: −265° to 1300°C (−445° to 2372°F) Type R: −50° to 1768°C (−58° to 3214°F) Type S: −50° to 1768°C (−58° to 3214°F) Type B: 40° to 1820°C (104° to 3308°F) Type T: −265° to 400°C (−445° to 752°F)
Linear Voltage Input Ranges	−31.25 to 31.25 mVDC −31.25 to 125mVDC −31.25 to 62.5 mVDC 0 to 1.0 VDC
Cold Junction Compensation	Automatic
Thermocouple Linearization	Automatic
Maximum Inaccuracy– Thermocouple	±(0.2°C + 3% of °C reading)
Maximum Inaccuracy–Voltage	±250µV
RTD/Thermistor Parameters	
Input Ranges (RTD Types)	10, 50, 100, 200, 500, 1000Ω Pt Platinum RTD 0.00385 European Curve: −200° to 850°C (−328° to 1562°F) 120Ω Ni N120 Nickel RTD 0.00672 Curve: −80° to 260°C (−112° to 500°F)
Thermistor Input Ranges	2.252 kΩ @ 25°C: −40° to 150°C (−40° to 302°F) 3 kΩ @ 25°C: −40° to 150°C (−40° to 302°F) 5 kΩ @ 25°C: −40° to 150°C (−40° to 302°F) 10k-AN Type 3 @ 25°C: −40° to 150°C (−40° to 302°F) 30 kΩ @ 25°C: −40° to 150°C (−40° to 302°F)
RTD Excitation Current	RTD 10, 100, 120, 200: 1mA RTD 500: 500µA RTD 1000: 250µA
Thermistor Excitation Current	NTC 2.252k, NTC 3k: 10µA NTC 5k, NTC 10k: 5µA NTC 30k: 1µA
RTD/Thermistor Linearization	Automatic
Maximum Inaccuracy	±0.2°C

Module General Specifications

Weight	98g (3.5 oz)
Heat Dissipation	3.6 W
Backplane Power Consumption	2.5 W
Agency Approvals	UL 61010-2 File E185989, Canada and USA
Software Version Required	Do-more! Designer 2.7 or later

BX-4UT4TR Universal Temp. Input/ Relay Output

Voltage Relay Output Specifications

	BX-4UT4TR
Outputs per Module	4
Commons	1
Maximum Current per Common	8A
Nominal Voltage	5–48VDC, 24–240VAC
Operating Voltage Range	5–60VDC, 18–264VAC
Peak Voltage	60VDC, 264VAC
Minimum Output Current	0.1 mA @ 24VDC
Maximum Output Current	2A
Maximum Inrush Current	5A for 50ms
Maximum Leakage Current	1μA
ON Voltage Drop	0.2 V maximum
Fuses, Overcurrent Protection	N/A
OFF-ON Response	<10ms
ON-OFF Response	<10ms
Relay Cycle Life **Mechanical Endurance** **Electrical Endurance**	5 Million Operations 120,000 Operations
Status Indicators	Logic Side, Green

Data Range Specifications

| Thermocouple Selection	Temperature Range	Resolution	
		WXn	**RXn**
Type J	−210 to 1200 °C −346 to 2192 °F	Degrees x10 (One Implied Decimal)[1]	24-Bit Floating[1]
Type K	−265 to 1372 °C −445 to 2502 °F		
Type E	−265 to 1000 °C −445 to 1832 °F		
Type R	−50 to 1768 °C −58 to 3214 °F		
Type S	−50 to 1768 °C −58 to 3214 °F		
Type B	40 to 1820 °C 104 to 3308 °F [3]		
Type T	−265 to 400 °C −445 to 752 °F		
Voltage Selection	**Voltage Range**	**WXn[2]**	**RXn**
−31.25 to 31.25 mVDC	Bipolar 31.25 mVDC	0.95 μV per count (−32768 to 32767)	User Scaled
−31.25 to 62.5 mVDC	Bipolar 62.5 mVDC	1.9 μV per count (−16384 to 32767)	
−31.25 to 125 mVDC	Bipolar 125 mVDC	3.8 μV per count (−8192 to 32767)	
0 to 1.0 VDC	Unipolar 1.0 VDC	30.5 μV per count (0 to 32767)	
RTD Selection	**Temperature Range**	**WXn**	**RXn**
10, 50, 100, 200, 500, 1000Ω Pt **Platinum RTD 0.00385 European Curve**	−200 to 850 °C −328 to 1562 °F	Degrees x10 (One Implied Decimal)[1]	24-Bit Floating[1]
120Ω Ni **N120 Nickel RTD 0.00672 Curve**	−80 to 260 °C −112 to 500 °F		
Thermistor Selection	**Temperature Range**	**WXn**	**RXn**
Thermistor 2.252 kΩ @25°C	−40 to 150 °C −40 to 302 °F	Degrees x10 (One Implied Decimal)[1]	24-Bit Floating[1]
Thermistor 3kΩ @25°C			
Thermistor 5kΩ @25°C			
Thermistor 10k-AN Type 3 @25°C			
Thermistor 30kΩ @25°C			

1. **Temperatures reported in rounded integer to WXn and as scaled floating point 24bits resolution to RXn.**
2. **Raw Counts = −32768 to 32767.**
3. **Maximum value displayed in WXn is 32767. RXn will display the full range of 3308.0.**
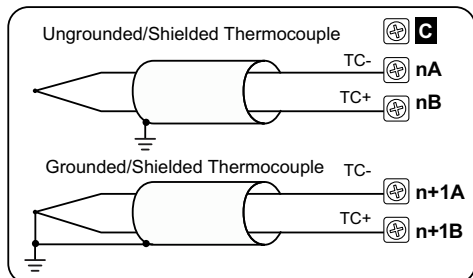
BX-4UT4TR Universal Temp. Input/ Relay Output
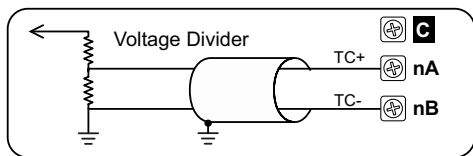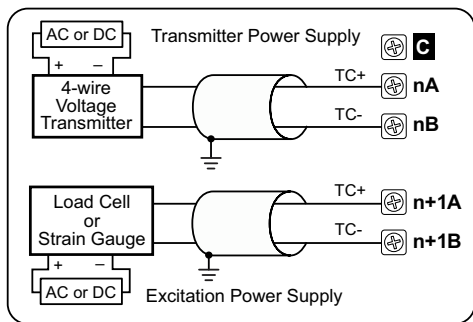
Universal Temperature Input/Relay Output Wiring
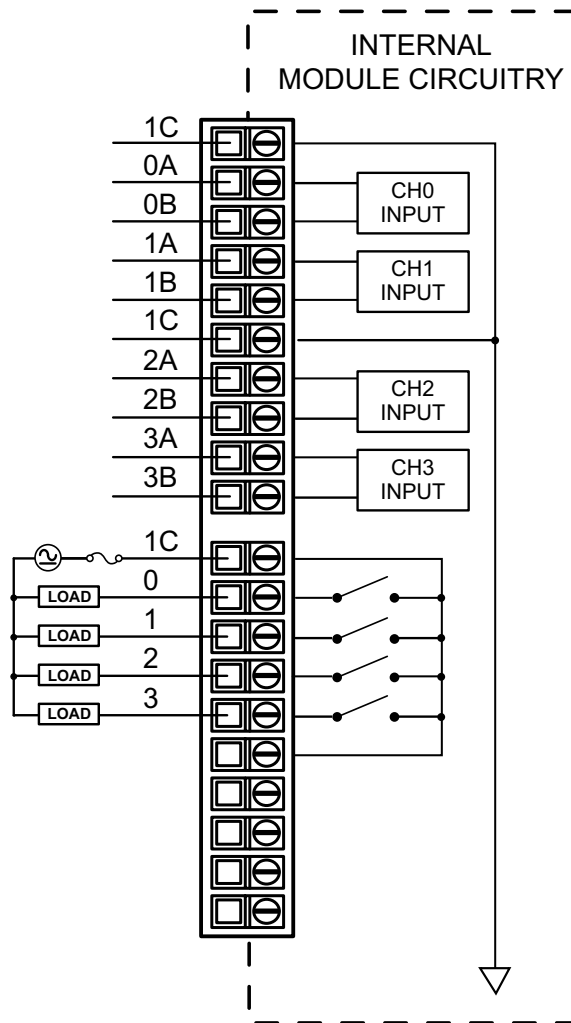
BX-4UT4TR Universal Temp. Input/ Relay Output

Universal Temperature Input Circuits

### Thermocouple and Voltage Sensors

NOTE: Thermocouple extension wire and proper thermocouple terminal blocks must be used to extend thermocouples. AutomationDirect thermocouple wire is recommended.
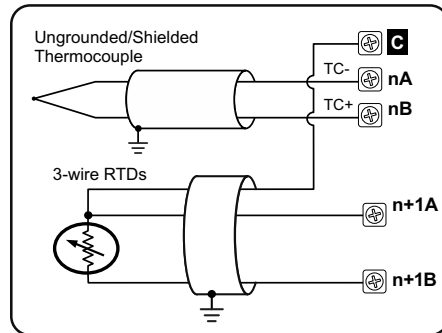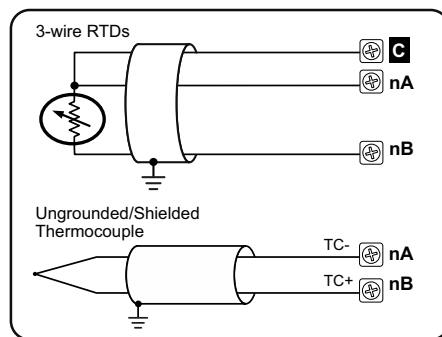

NOTE: Shield should be connected only at one end, to ground at the source device.

For maximum accuracy: Jumper unused inputs.

Resistive and Thermistor Sensors

2-wire RTD's or Thermistors

3 or 4 wire RTD's

✕ **NC** The fourth wire of a 4-wire RTD is not connected.
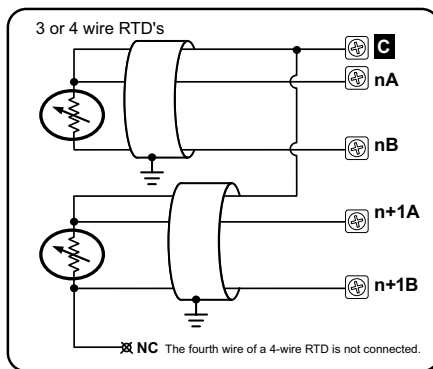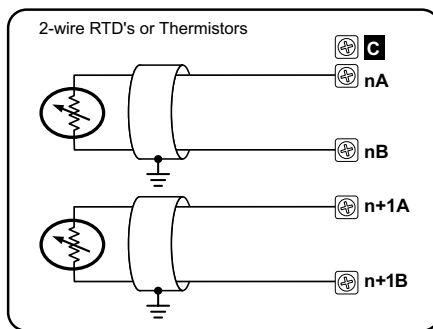
Mixed Resistive and Thermocouple Sensors

3-wire RTDs

Ungrounded/Shielded Thermocouple

Notes for maximum accuracy:

1. All wires to an RTD must be equal length and type. Refer to RTD manufacturer's recommendations.
2. Do not use cable shield as sensing wire.
3. When applicable, connect shield to RTD common only, otherwise connect to module common only. Do not connect shield to both ends.
4. Jumper unused inputs.

BRX - Programmable Controller tBRX-153
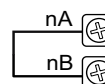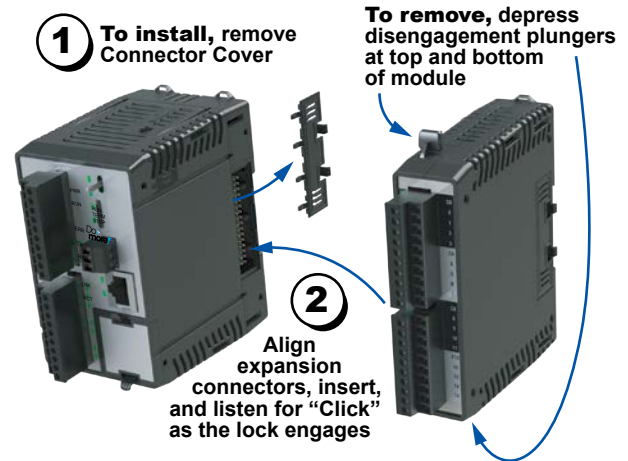
BRX Analog Expansion Modules

Overview

One of the unique features of the BRX platform is its ability to expand its capability to fit your application solution. One of the ways the BRX platform can do this is by using expansion modules that conveniently "snap-on" to the side of any BRX MPU. Once the expansion module has been snapped in place and is added to the project, it instantly adds I/O to the MPU with little to no additional setup required.

The analog expansion modules give you the ability to add analog I/O as needed and are identified as an analog input module, temperature input module, or analog output module. On the front panel of the analog I/O expansion modules, a color scheme and a

symbol are used to denote the module type.

Analog modules are available with current inputs or outputs, unipolar/bipolar voltage inputs or outputs, thermocouple inputs, RTD inputs and thermistor inputs. Input/output combination modules are also available.

With the exception of temperature input modules, the modules ship without wiring terminals. This allows you to select the termination style that best fits your application. Several wiring options are available, including screw terminal connectors, spring clamp terminal connectors and pre-wired *ZIP*Link cable solutions.

① To install, remove Connector Cover

To remove, depress disengagement plungers at top and bottom of module

②
Align expansion connectors, insert, and listen for "Click" as the lock engages

| Hot-Swapping Information |
|---|
| Note: This device cannot be Hot Swapped. |

General Specifications

All BRX analog input and output modules and temperature input modules have the same general specifications listed in the table below.

General Specifications	
Storage Temperature	−20° to 70°C (−4° to 158°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
Noise Immunity	NEMA ICS3-304
EU Directive	See the "EU Directive" topic in the BRX Help File
Agency Approvals (unless otherwise noted on individual module specifications)	UL 61010-1 and UL 61010-2-201 File E139594, Canada and USA CE (EN 61131-2 EMC, EN 61010-1 and EN 61010-2-201 Safety)

Operating Temperature Range		
Operating Temperature	0° to 45°C (32° to 113°F)	0° to 60°C (32° to 140°F)
Module	*Module Revision**	
BX-08AD-1		
BX-08AD-2B	Rev A (Prior to May 2018)	Rev B (After May 2018)
BX-04THM		
BX-08DA-1		
BX-08DA-2B	Rev B (Prior to May 2018)	Rev C (After May 2018)
All other Analog and Temperature Expansion Module part numbers	N/A	Rev A (After May 2018)

* Module Revision can be found in the last letter (last or second-to-last character) of the module serial number.

Dimensions

3.25" [82.6mm]

1.08" [27.5mm]

4.57" [116.2mm]

4.24" [107.8mm]

1.00" [25.4mm]

2X Ø #8 Thru all
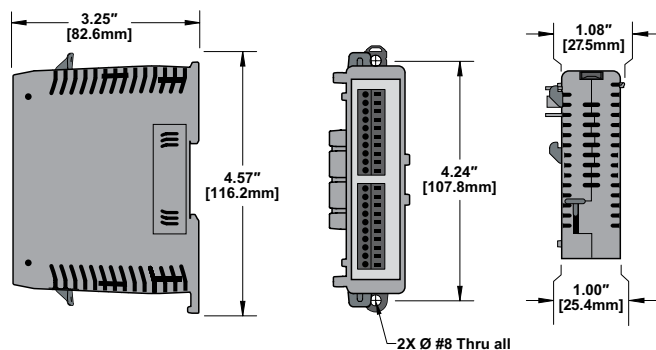
NOTE: When removing an expansion module, make sure there is room for the module to slide away from the system. Failure to do so will result in difficulty removing the module.

# BRX Analog Expansion Modules

Analog Input Modules

Nine (9) analog input modules are available, with current or voltage inputs. Analog input module faceplates have a blue terminal bar to distinguish them as inputs, with symbols ╱ or ◢ to signify current or voltage, respectively.
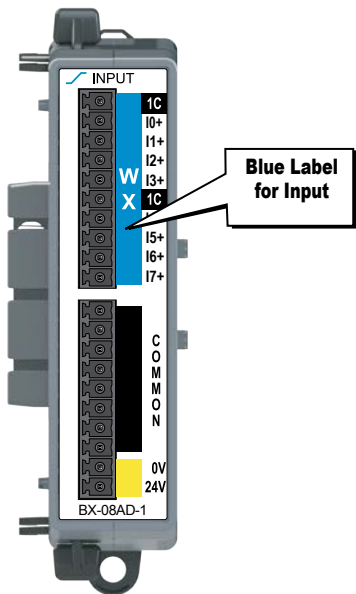
Analog Input Modules				
Part Number	*Points*	*Input Type*	*Resolution*	*Price*
BX-04ADM-1	4	Current Sink 0–20 mA, 4–20 mA	14-bit	$182.00
BX-04AD-1	4	Current Sink 0–20 mA, 4–20 mA	16-bit	$230.00
BX-08AD-1	8			$255.00
BX-16AD-1	16			$363.00
BX-04AD-2B	4	Voltage ± 10VDC, ± 5VDC, 0–5 VDC, 0–10 VDC	16-bit	$230.00
BX-08AD-2B	8			$255.00
BX-16AD-2B	16			$363.00
BX-04AD-3	4	Current Sink 0–20mA, 4–20mA Voltage ±10VDC, ±5VDC, 0–5VDC, 0–10VDC	16-bit	$188.00
BX-08AD-3	8			$212.00

Blue Label for Input

BX-08AD-1

Temperature Input Module

Six (6) temperature input modules are available, with thermocouple, RTD, and/or thermistor inputs. The thermocouple input modules can also be configured for millivolt-level voltage inputs, and the RTD input module can also be configured for resistance input. Temperature module faceplates have a blue terminal bar to distinguish them as inputs, and 🌡 symbol to signify temperature.
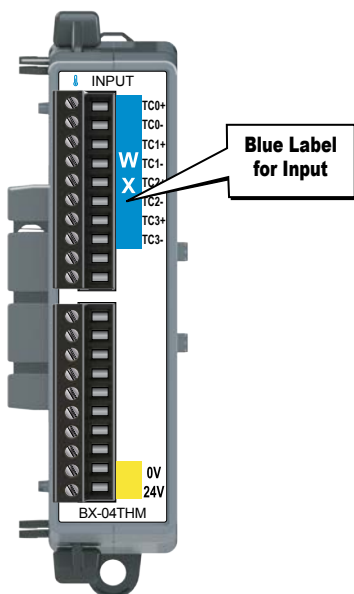
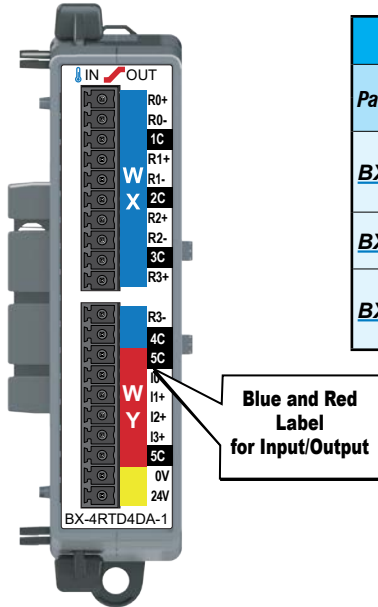| Temperature Input Modules			
Part Number	*Points*	*Input Type*	*Price*
BX-04THM	4	Thermocouple	$241.00
BX-08THM	8	Thermocouple	$269.00
BX-06RTD	6	RTD	$255.00
BX-08NTC	8	Thermistor	$269.00
BX-04UT	4	Universal Temperature (Thermocouple, RTD, Thermistor supported)	$211.00
BX-08UT	6	Universal Temperature (Thermocouple, RTD, Thermistor supported)	$235.00

Blue Label for Input

BX-04THM

BRX Analog Expansion Modules
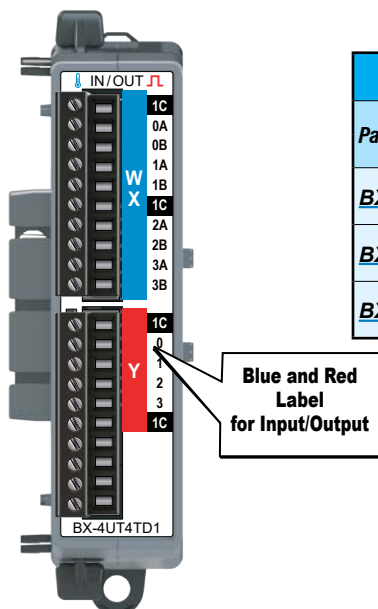
Temperature/Analog Combo Module

Three (3) combination modules are available, with thermocouple, RTD or universal temperature inputs and current sourcing outputs. The thermocouple input modules can also be configured for millivolt-level voltage inputs, and the RTD input module can also be configured for resistance input. The Input/Output faceplate terminal bar is in blue and red, making it easy to distinguish between inputs and outputs, and the 🌡 and 〰 symbols signify temperature and current, respectively.

Blue and Red Label for Input/Output

| Temperature Input / Analog Output Combo Modules					
Part Number	Points		Input Type	Output Type	Price
	Input	Output			
BX-4RTD4DA-1	4	4	Resistance Temperature Detector (RTD)	Current Source 0–20mA, 4–20mA	$472.00
BX-4THM4DA-1	4	4	Thermocouple	Current Source 0–20mA, 4–20mA	$472.00
BX-4UT4DA-3	4	4	Universal Temperature	Current Source: 0–20mA, 4–20mA Voltage:±10VDC, ±5VDC, 0–5VDC, 0–10VDC	$412.00

Temperature/Discrete Combo Module

Three (3) combination modules are available with universal temperature inputs and DC sinking, sourcing or relay outputs. The thermocouple inputs can also be configured for millivolt-level voltage inputs, and the RTD inputs can also be configured for resistance input. The Input/Output faceplate terminal bar is in blue and red, making it easy to distinguish between inputs and outputs, and the 🌡 and ⊓ symbols signify temperature and discrete signals, respectively.

Blue and Red Label for Input/Output

| Temperature Input / Discrete Output Combo Modules					
Part Number	Points		Input Type	Output Type	Price
	Input	Output			
BX-4UT4TD1	4	4	Universal Temperature	12–24 VDC Sinking	$235.00
BX-4UT4TD2	4	4		12–24 VDC Sourcing	$235.00
BX-4UT4TR	4	4		Relay Form A (SPST)	$235.00

BRX Analog Expansion Modules
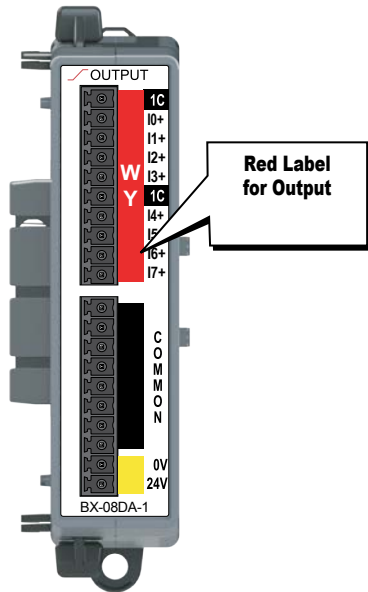
Analog Output Modules

Six (6) analog output modules are available, in current and voltage outputs. Analog output module faceplates have a red terminal bar to distinguish them as outputs, with symbols ∿ or ◢ to signify current or voltage, respectively.

Red Label for Output

Analog Output Modules			
Part Number	**Points**	**Output Type**	**Price**
BX-04DA-1	4	Current Source 0–20 mA, 4–20 mA	$269.00
BX-08DA-1	8		$350.00
BX-04DA-2B	4	Voltage ± 10VDC, ± 5VDC, 0–5 VDC, 0–10 VDC	$269.00
BX-08DA-2B	8		$350.00
BX-04DA-3	4	Current Source 0–20mA, 4–20mA	$231.00
BX-08DA-3	8	Voltage ±10VDC, ±5VDC, 0–5VDC, 0–10VDC	$294.00
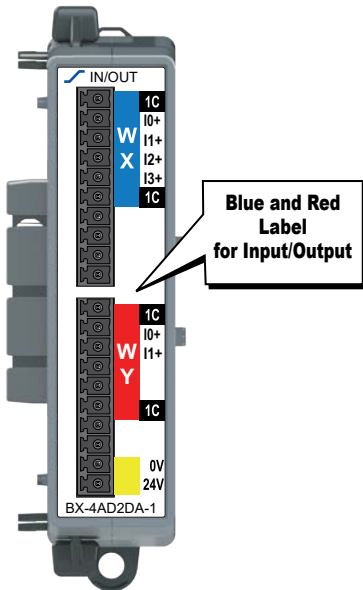
Analog Combo Input / Output Modules

Six (6) analog input/output combo modules are available with current or voltage inputs and outputs. The Input/Output faceplate terminal bar is in blue and red, making it easy to distinguish between inputs and outputs. Symbols ∿ and ◢ signify current and voltage, respectively.

Blue and Red Label for Input/Output

Analog Combo Input / Output Modules					
Part Number	**Points**		**Input Type**	**Output Type**	**Price**
	Input	**Output**			
BX-2AD2DA-1	2	2	Current Sink 0–20mA, 4–20mA	Current Source 0–20mA, 4–20mA	$309.00
BX-4AD2DA-1	4	2			$378.00
BX-2AD2DA-2B	2	2	Voltage ±10VDC, ±5VDC, 0–5VDC, 0–10VDC	Voltage ±10VDC, ±5VDC, 0–5VDC, 0–10VDC	$309.00
BX-4AD2DA-2B	4	2			$378.00
BX-2AD2DA-3	2	2	Current Source 0–20mA, 4–20mA Voltage ±10VDC, ±5VDC, 0–5VDC, 0–10VDC	Current Source 0–20mA, 4–20mA Voltage ±10VDC, ±5VDC, 0–5VDC, 0–10VDC	$269.00
BX-4AD4DA-3	4	4			$330.00

Expansion Module Support by Controller	
Controller Type	**# Expansion Modules**
BX-DM1E-M	8
BX-DM1-10	2
BX-DM1E-10	2
BX-DM1-18	4
BX-DM1E-18	8
BX-DM1-36	4
BX-DM1E-36	8
BX-DMIO*	8
BX-EBC100*	8
BX-MBIO*	8

* Remote I/O controllers do not support Motion Control and Communications Modules.

BRX Wiring Termination Options

Terminal Block Connectors

The terminal block connectors are provided in kits of multiple connectors that are ordered as a single part number. There are 2 different types of kits to choose from; one kit for the five (5), eight (8) and 12-point discrete, and one kit for the analog modules and 16-point discrete modules. The five (5), eight (8) and 12-point discrete module kits each have (3) 5-pin 5mm connectors. The 8-point modules will use only 2 of the 5-pin connectors.

The five (5) and 12-point modules will use all three connectors. The analog and 16-point digital module kits include (2) 10-pin 3.81 mm connectors.

Terminal Block Connectors, 5, 8 and 12-Point Discrete Modules

Terminal Block Kits for 5-point, 8-point and 12-point Expansion Modules

BX-RTB08 (Kit - 3 pieces)

BX-RTB08-1 (Kit - 3 pieces)


BX-RTB08-2 (Kit - 3 pieces)

Terminal Block Specifications 5-, 8- & 12-Point Type			
Part Number Single Block Set of 3 Blocks	BX-RTB05 BX-RTB08	BX-RTB05-1 BX-RTB08-1	BX-RTB05-2 BX-RTB08-2
Price (Single Block)	$8.50	$7.00	$8.00
Price (Kit)	$15.00	$14.50	$15.00
Connector Type	Screw Type - 90-degree	Spring Clamp Type - 180-degree	Screw Type - 180-degree
Wire Exit	180-degree	180-degree	180-degree
Pitch	5.0 mm	5.0 mm	5.0 mm
Screw Size	M2.5	N/A	M2.5
Screw Torque Recommended	< 3.98 lb·in (0.45 N·m)	N/A	< 3.98 lb·in (0.45 N·m)
Screwdriver Blade Width	3.5 mm	3.5 mm	3.5 mm
Wire Gauge (Single Wire)	28–12 AWG	28–14 AWG	28–12 AWG
Wire Gauge (Dual Wire)	28–16 AWG	28–16 AWG (Dual Wire Ferrule Required)	28–16 AWG
Wire Strip Length	0.3 in (7.5 mm)	0.37 in (9.5 mm)	0.3 in (7.5 mm)
Equiv. Dinkle P/N	5ESDV-05P-BK	5ESDSR-05P-BK	5ESDF-05P-BK

Terminal Block Connectors, Analog Modules and 16-Point Discrete Modules

Terminal Block Kits for Analog and 16-point Discrete Expansion Modules

BX-RTB10 (Kit - 2 pieces)
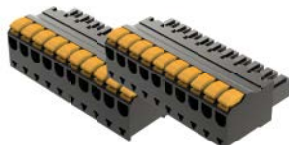
BX-RTB10-1 (Kit - 2 pieces)

BX-RTB10-2 (Kit - 2 pieces)

Terminal Block Specifications 16-Point Type			
Part Number	BX-RTB10	BX-RTB10-1	BX-RTB10-2
Price (Kit)	$21.50	$24.00	$22.50
Connector Type	Screw Type 90-degree	Spring Clamp Type 180-degree	Screw Type 180-degree
Wire Exit	180-degree	180-degree	180-degree
Pitch	3.81 mm	3.81 mm	3.81 mm
Screw Size	M2	N/A	M2
Screw Torque Recommended	<1.77 lb·in (0.2 N·m)	N/A	<1.77 lb·in (0.2 N·m)
Screwdriver Blade Width	2.5 mm	2.5 mm	2.5 mm
Wire Gauge (Single Wire)	28–16 AWG	26–18 AWG	30–16 AWG
Wire Gauge (Dual Wire)	28–18 AWG	30–20 AWG (Dual Wire Ferrule Required)	30–18 AWG
Wire Strip Length	0.24 in (6mm)	0.35 in (9mm)	0.26 in (6.5 mm)
Equiv. Dinkle P/N	EC381V-10P-BK	ESC381V-10-BK	EC381F-10P-BK

NOTE: BX-RTB10 terminal blocks are included with Temperature Input modules.