

## TECHNICAL DATA SHEET

DS0129 rev 9

# Field Level eXpansion (FLX) modules



## DESCRIPTION

Field Level eXpansion (FLX) modules provide I/O expansion to the CBXi and CBX Series of BACnet® field controllers. FLX expansion modules are available in a variety of models to allow maximum flexibility in achieving the required point configuration to meet the most complex applications.

Part of Cylon's CB Line and CBX System, FLX modules feature models with UniPuts™ with Relay, Universal Inputs as well as Digital Inputs.

## APPLICATION

Use the FLX I/O expansion modules with the CBX, CBXi and FBXi Series of BACnet controllers to extend their capacity to meet input and output point requirements for Air Handling Units, Boiler Rooms, Plants and Lighting Control applications.

### FLX-4R4

#### 4 UniPuts + Relays

Hardware connections that can be used as inputs, outputs or relays (software selectable)

4 Universal Inputs (supports a variety of thermistors and RTDs that range from 0 to 450 kΩ)

### FLX-8R8

#### 8 UniPuts + Relays

Hardware connections that can be used as inputs, outputs or relays (software selectable)

8 Universal Inputs (supports a variety of thermistors and RTDs that range from 0 to 450 kΩ)

### FLX-16DI

#### 16 Digital Inputs

### FLX-4R4-H, FLX-8R8-H

Additionally includes Hand/Off/Auto Local Override Function

LED status on all I/O channels provides indication of fault or override status

Compact form factor to maximize enclosure space

Easy module expansion using simple bus connectors

#### Accessories

FLX-PS24	Power Supply Module
FLX-RMC	Remote Module Connector

# PRODUCT SELECTION CHART

		FLX-4R4	FLX-4R4-H	FLX-8R8	FLX-8R8-H	FLX-16DI
Service		Expansion Module	Expansion Module	Expansion Module	Expansion Module	Expansion Module
I/O Point Qty	UniPuts with Relay <sup>(1)</sup>	4	4	8	8	0
	Universal Inputs	4	4	8	8	0
	Digital Inputs	0	0	0	0	16
Input Options	Voltage 0 ... 10 V @ 40 kΩ	✓	✓	✓	✓	
	Resistance 0 ... 450 kΩ	✓	✓	✓	✓	
	Temperature -40 °C ... +110 °C (-40 °F ... +230 °F)	✓	✓	✓	✓	
	Current 0 ... 20 mA @ 390 Ω	✓	✓	✓	✓	
	Digital Volt-Free contact	✓	✓	✓	✓	✓
	Digital 24 V AC detect	UniPuts only	UniPuts only	UniPuts only	UniPuts only	
	Pulse counting	✓	✓	✓	✓	✓
Output Options	Analog 0 ... 10 V	✓	✓	✓	✓	
	Digital 0 ... 10 V	✓	✓	✓	✓	
	Relay Contacts 24 V AC	✓	✓	✓	✓	
HOA Switch & Pot.			✓		✓	
18 V Aux Power		✓	✓	✓	✓	✓

Note (1) : UniPuts are software configurable for point types AI, DI, AO or DO-R.

# SPECIFICATIONS

## MECHANICAL

Size (excluding terminal plugs)	FLX-4R4 FLX-4R4-H FLX-8R8 FLX-8R8-H FLX-16DI	104 x 89.5 x 57 mm [4.1 x 3.55 x 2.25"]
Enclosure	Flame-Retardant ABS DIN 43880 type-2 compatible	
Mounting	DIN rail	

## CONNECTION

**Note:** Use Copper or Copper Clad Aluminum 70 °C (158 °F) conductors only.

Terminals	PCB mounted plug terminal connections
Conductor Area	Max: AWG 12 (3.31 mm <sup>2</sup> ) Min: AWG 22 (0.355 mm <sup>2</sup> )
Maximum No. of FLX Modules per controller	CBXi Series : 5 (requires a FLX-PS24) CBX Series : 3

## ENVIRONMENT

**Note:** This equipment is intended for field installation within an enclosure.

Ambient Temperature	-25 °C ... 50 °C (-13 °F ... 122 °F)
Ambient Humidity	0% ... 90% RH non-condensing
Storage Temperature	-30 °C ... +70 °C (-22 °F ... 158 °F)
EMC Immunity	EN 61326-1: 2013
EMC Emission	EN 61326-1: 2013 EN 61000-3-2: 2014 EN 61000-3-3: 2013
Approvals	UL Listed (CDN & US) UL916 Energy Management Equipment – File No. E176435
Safety	CE Approved

## ELECTRICAL

FLX Power Connection	Proprietary FLX bus connector carries power and comms from a CBX-8R8(-H) or CBXi- 8R8(-H) unit. A CBX or CBXi unit can supply power to up to 3 FLX modules.
Auxiliary Power	18 V DC / 60 mA output

## COMMUNICATIONS

FLX bus	115.2K Baud Max bus length (including extension cables): 30 m / 100 ft. using 18 AWG conductors 15 m / 50 ft. using 22 AWG conductors
FLX bus Connection	FLX bus connector carries inter-module communications and module power

## INPUTS / OUTPUTS

**Note:** Shielded cable is recommended for all input connections.

### UniPuts with Relay



### When configured as Input:

#### Analog Input

Range: 0 ... 10 V @ 40 kΩ  
Accuracy: ±0.5% full scale [50mV]

#### Resistance measurement

Range: 0 ... 450 kΩ  
Accuracy: ±0.5% of measured resistance

#### Temperature measurement

Range: -40 °C ... +110 °C (-40 °F ... +230 °F)  
Accuracy: 10k NTC sensors (e.g. 10k Type 2  
(10K3A1) or 10k Type 3 (10K4A1): ±0.3 °C, -40 to  
90 °C (-40°F to 194°F); ±0.4 °C > 90 °C (194°F)

#### Current input

Range: 0 ... 20 mA @ 390 Ω

**Note:** Current Input requires user-supplied external  
390 Ω resistance.

Accuracy: depends on user supplied external  
resistor

Digital Volt-Free contact, 2 mA contact-wetting current

Digital 24 V AC detect

Pulse counting up to 20 Hz, 25 ms - 25 ms

### When configured as Output:

Analog Output 0 ... 10 V @ 20 mA max load, 12-bit  
resolution

Digital Output 0 ... 10 V @ 20 mA max load

Relay Contacts with ability to switch up to 24 V AC  
Maximum Load: 24 V AC, 2 (1) A resistive (inductive)  
for all relay contacts

### Universal Inputs



#### Analog Input

Range: 0 ... 10 V @ 130 kΩ  
Accuracy: ±0.5% full scale [50mV]

#### Resistance measurement

Range: 0 ... 450 kΩ  
Accuracy: ±0.5% of measured resistance

#### Temperature measurement

Range: -40 °C ... +110 °C (-40 °F ... +230 °F)  
Accuracy: 10k NTC sensors (e.g. 10k Type 2  
(10K3A1) or 10k Type 3 (10K4A1): ±0.3 °C, -40 to  
90 °C (-40°F to 194°F); ±0.4 °C > 90 °C (194°F)

#### Current input

Range: 0 ... 20 mA @ 390 Ω  
Accuracy: ±0.5% full scale [100μA]

Digital Volt-Free contact, 2 mA contact-wetting current

Pulse counting up to 20 Hz, 25 ms - 25 ms

### Digital Inputs

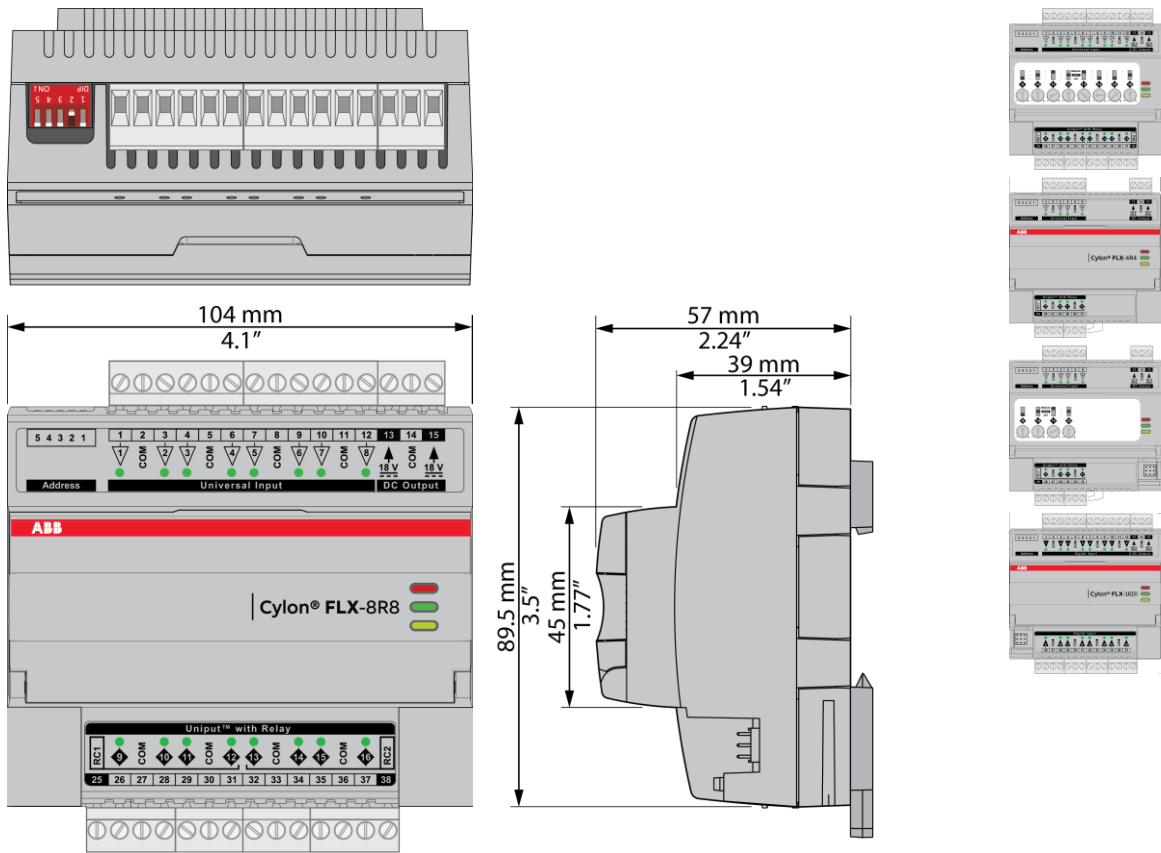


Digital Volt-Free contact, 2 mA contact-wetting current

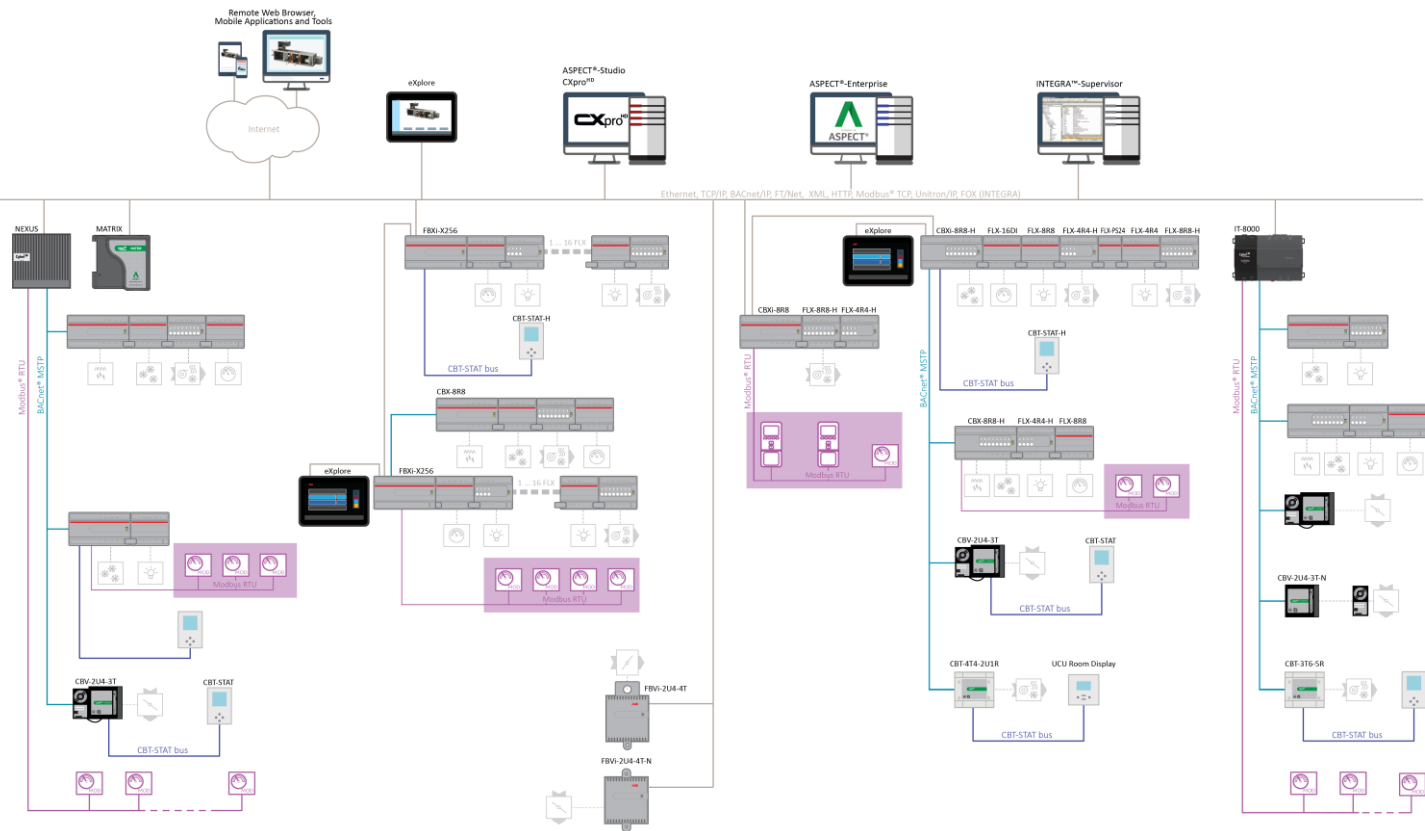
Pulse counting up to 20 Hz, 25 ms - 25 ms

**Notes:** 1) All inputs and outputs are protected against short circuit, as well as  
over-voltage up to 24 V AC.  
2) Inputs use on-board 16-bit analog to digital convertor.  
3) 18 V DC supply, max 60 mA per FLX unit, is available for powering  
sensors.

DIMENSIONS



SYSTEM ARCHITECTURE



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