TECHNICAL DATA SHEET
DS0119 rev 54

Cylon® CBX Series

DESCRIPTION

The **CBX Series** is a freely programmable range of BACnet® Controllers with native MS/TP communications support. The controllers are BTL listed BACnet Advanced Application Controller (B-AAC) and are ideally suited for a wide range of applications for intelligent control of HVAC equipment, and electrical systems including lighting control and metering applications. The CBX-8R8 and CBX-8R8-H controllers support multi-protocol communications simultaneously including BACnet MS/TP and Modbus® RTU.

Part of Cylon's **CB Line** of BACnet field controllers, the CBX-8R8 controller features 8 UniPuts™ with Relay, 8 Universal Inputs, as well as support for up to three FLX (Field Level e*X*pansion) series extension modules providing up to 64 points of control, and a dedicated input **ABB Cylon®** room sensors. The -H variant provides local override function through HOA switches. FLX I/O expansion modules are available in a variety of options to allow maximum flexibility in achieving the required point configuration.

APPLICATION

The **CBX-8R8 and CBX-8R8-H are** designed for a wide range of energy management applications for intelligent control of:

- HVAC equipment such as Central Plant, Boilers, Chillers, Cooling Towers, Pump Systems, Air Handling Units (Constant Volume, Variable Air Volume and Multi-zone), and Rooftop Units,
- Electrical systems such as lighting control, variable frequency drives and metering.

The **CBX Series** can be used as an integration platform and natively supports the routing of Modbus RTU to BACnet MS/TP without the need for gateways or additional hardware.

The controller accommodates available pre-engineered strategies or can be tailored to custom applications using **CXpro**^{HD} programming software.

CBX-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)

CBX-8R8-H

Additionally includes Hand/Off/Auto Local Override Function

Flexible onboard UniPut technology

allows expandable I/O configurations from 16 to 64 points through connected FLX modules

Multi-protocol communications support for BACnet MS/TP and Modbus RTU

Cylon Intelligent Room Sensor support

LED status on all I/O channels

provides indication of fault or override status

Compact form factor

to maximize enclosure space requirement

Uses FLX I/O expansion Modules

Accessories

Field Level eXpansion (FLX) I/O Modules (-H variants include Hand/Off/Auto Local Override Function)

FLX-4R4(-H) 4 UniPuts with Relay, 4 Universal Inputs

FLX-8R8(-H) 8 UniPuts with Relay, 8 Universal Inputs

FLX-16DI 16 Digital Inputs

FLX-PS24 Power Supply Module

FLX-RMC Remote Module Connector

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PRODUCT SELECTION CHART

		CBX-8R8	CBX-8R8-H	FLX-4R4	FLX-4R4-H	FLX-8R8	FLX-8R8-H	FLX-16DI
Service		Main Controller	Main Controller	Expansion Module	Expansion Module	Expansion Module	Expansion Module	Expansion Module
I/O Point Qty	UniPuts with Relay[1]	8	8	4	4	8	8	0
	Universal Inputs	8	8	4	4	8	8	0
	Digital Inputs	0	0	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	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		✓	✓	✓	✓	✓	✓	✓
RS-485 Port[2]		Modbus RTU	Modbus RTU					
CBT-STAT Bus (UCU Room Display)		✓	✓					

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

Note (2): CBX supports a maximum of 40 Modbus points across a maximum of 4 devices.

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SPECIFICATIONS

MECHANICAL

Size (excluding terminal plugs)	166 x 89.5 x 57 mm [6.5 x 3.55 x 2.25"]
Enclosure	Flame-Retardant ABS DIN 43880 type-2 compatible Enclosure IP 20
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^2) Min: AWG 22 (0.355 mm^2)

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% … 95% 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

Supply Requirements		24 V AC/DC ±20 % 50/60 Hz
Supply Rating	CBX	50 VA (no FLX modules)
	CBX + 1 x FLX	66 VA
	CBX + 2 x FLX	82 VA
	CBX + 3 x FLX	98 VA
FLX Power Connection		Proprietary FLX bus connector carries power and comms from CBX-8R8(-H) unit. CBX-8R8(-H) can supply power to up to 3 FLX modules.
Auxiliary Power		18 V DC / 60 mA output
BACnet® Loading		¼ unit load device

PROCESSOR

Type	STM32 ARM Cortex-M3 processor
Clock Speed	72 MHz
System Memory	1MByte external SRAM + 16 Mbyte external flash (soldered to PCB not removable)
Real-Time Clock	Battery backed for 2 years minimum

COMMUNICATIONS

Local serial port	USB Micro-B socket
BACnet® MS/TP port	RS485 @ 9K6,19K2, 38K4, 57K6, 76K8 or 115k2 Baud (defaults to 38K4). Max cable length 1.2 km
Modbus Port	Support for Modbus
Local Sensor Port	RS485 with a maximum cable length 500 m Supports ABB Cylon® room sensors
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

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 60mA per CBX unit, is available for powering sensors.

SOFTWARE FEATURES

Maximum number of Strategy Modules	1024
Maximum number of Trendlog Modules	64
Entries per Trendlog	1024
Maximum BACnet Schedules	10
Exceptions per Schedule	5
Maximum number of Exposable BACnet Points	224
Data Security	Strategy and Set points backed up in Flash

INTERFACE

Engineering Software	CXpro[HD]	

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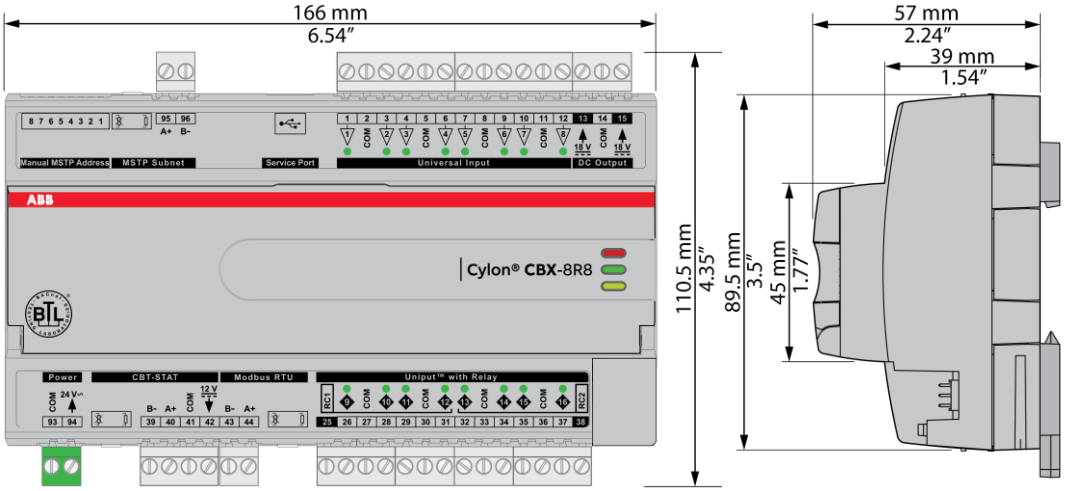
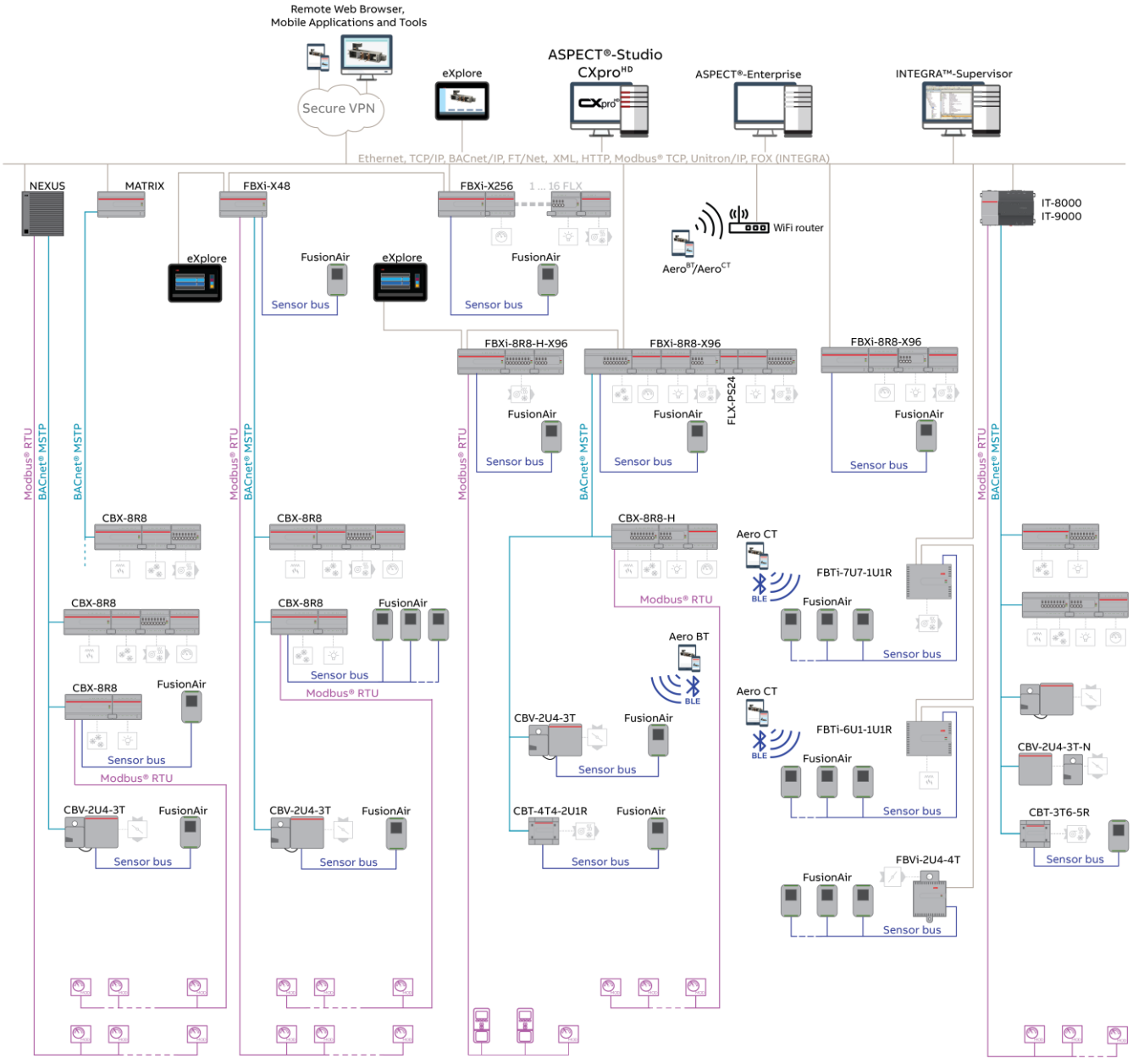
DIMENSIONS



SYSTEM ARCHITECTURE



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