TECHNICAL DATA SHEET
DS0132 rev 26

Cylon® FBXi

DESCRIPTION

The **FBXi Series** is a freely programmable range of BACnet® Controllers with native BACnet/IP communications support. The controllers are BTL listed BACnet Building Controller (B-BC) 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 **FBXi Series** controllers support multi-protocol communications simultaneously including BACnet/IP, BACnet MS/TP, Modbus® TCP and Modbus RTU.

Part of the Cylon® **FLXeon Line** of BACnet field controllers, the **FBXi Series** controllers feature support for up to sixteen FLX (**F**ield **L**evel e**X**pansion) series extension modules providing up to 256 points of control, and a dedicated input for Cylon® room sensors. **FLX** I/O expansion modules are available in a variety of options to allow maximum flexibility in achieving the required point configuration.

APPLICATION

The **FBXi Series** is 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 **FBXi Series** can be used as an integration platform and natively supports the routing of either BACnet MS/TP to BACnet/IP or Modbus RTU to Modbus TCP 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

BACnet/IP communications

with dual port Ethernet switch (star or daisy chain topology) and support for both DHCP and Static IP

Network Time Protocol (NTP) support

Multi-protocol communications support

for BACnet MS/TP, Modbus TCP, Modbus RTU, HTTPS for configuration

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

PRODUCT SELECTION CHART

		FBXi Series	CBXi-8R8	CBXi-8R8-H	FLX-4R4	FLX-4R4-H	FLX-8R8	FLX-8R8-H	FLX-16DI
Service		Main Controller	Main Controller	Main Controller	Expansion Module	Expansion Module	Expansion Module	Expansion Module	Expansion Module
I/O Point Qty	UniPuts with Relay[1]	0	8	8	4	4	8	8	0
	Universal Inputs	0	8	8	4	4	8	8	0
	Digital Inputs	0	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			✓	✓	✓	✓	✓	✓	✓
BACnet MS/TP-to-IP Routing		✓	✓	✓					
Modbus TCP[2]		✓	✓	✓					
RS-485 Port[3]		BACnet MS/TP or Modbus RTU	BACnet MS/TP or Modbus RTU	BACnet MS/TP or Modbus RTU					
Local Sensor bus		✓	✓	✓					

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

Note (2) : FBXi supports a maximum of 640 Modbus point (FBXi-X256) or 320 Modbus points (FBXi-X48) which can be a combination of Modbus RTU or TCP.

Note (3) : RS-485 Ports support one communication protocol at a time.

Note: FBXi acts only as a Modbus Client for Modbus TCP communications, and only as a Modbus Master for Modbus RTU communications.

SPECIFICATIONS

MECHANICAL

Size (excluding terminal plugs)	166 x 89.5 x 57 mm [6.54 x 3.5 x 2.24"]
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% … 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

Supply Requirements		24 V AC/DC ±20 % 50/60 Hz
Supply Rating	FBXi	20 VA (no FLX modules)
	FBXi + 1 x FLX	32 VA
	FBXi + 2 x FLX	44 VA
	FBXi + 3 x FLX	56 VA
	FBXi + 4 x FLX	68 VA
FLX Power Connection		Proprietary FLX bus connector carries power and communications from FBXi unit to power to up to 4 FLX modules. Using FLX-PS24 units allows 4 additional FLX modules per FLX-PS24 unit, up to a maximum of 16 FLX modules.

PROCESSOR

Type	TI Sitara AM335X Dual-core ARM Cortex A8
Clock Speed	1 GHz
System Memory	4 GB eMMC Flash + 512 MB DDR3 DRAM
Real-Time Clock	Yes, backed for 7 days typical

COMMUNICATIONS

Ethernet ports		Dual Switched 10/100BASE-TX (RJ45) Addressing: IP address or Hostname / DHCP Client or Static IP Connection Topology: Daisy-chain, supports Spanning Tree Modbus TCP, BACnet/IP
USB ports		2 x Type-A USB connectors USB 2.0 5 V DC 2.5W
RS485 Port 1		Software selectable BACnet MS/TP or Modbus RTU RS485 @ 9K6,19K2, 38K4(default), 57K6, 76K8 or 115k2 Baud. Max cable length 1.2 km @ default ¼ unit load device.
Sensor/RS485 Port 2		Software selectable BACnet MS/TP or Modbus RTU RS485 @ 9K6,19K2, 38K4(default), 57K6, 76K8 or 115k2 Baud. Max cable length 1.2 km @ default ¼ unit load device. RS485 sensor bus with a maximum cable length 500 m. Supports Cylon® room sensors.
Modbus		Total points – Modbus RTU or TCP/IP: FBXi-X256 : 640 FBXi-X48 : 320
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
Supported FLX modules	FBXi-X256 : FBXi-X48 :	16 modules 3 modules
Supported FLX hardware points	FBXi-X256 : FBXi-X48 :	256 points 48 points

SOFTWARE FEATURES

Maximum number of Strategy Modules	FBXi-X256 : FBXi-X48 :	5000 2500
Maximum number of Trendlog Modules	255	
Entries per Trendlog	1024	
Maximum BACnet Schedules	16	
Maximum number of Exposable BACnet Points	FBXi-X256 : FBXi-X48 :	5000 1200

SECURITY

Data Security	Strategy and Set points backed up in Flash
Transport Layer Security	Support for TLS 1.3
Upgrade Security	Upgrade software bundles are signed

INTERFACE

Engineering Software	CXpro[HD]	
Touchscreen	eXplore	

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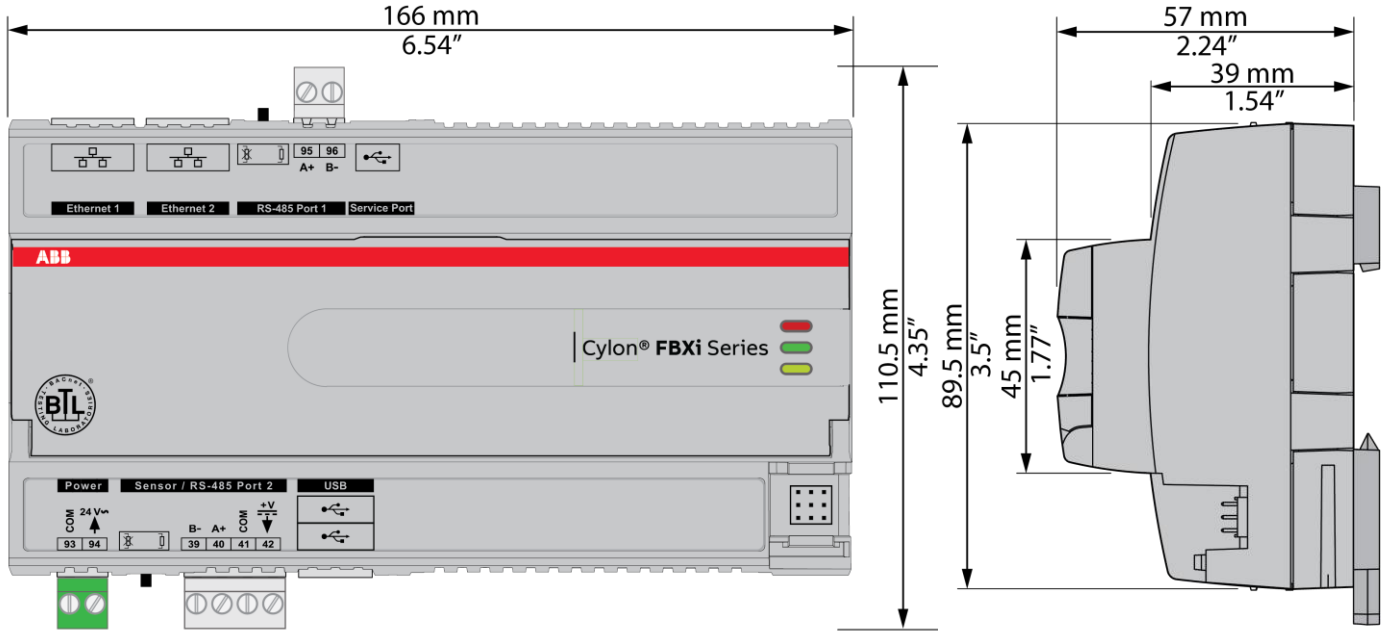
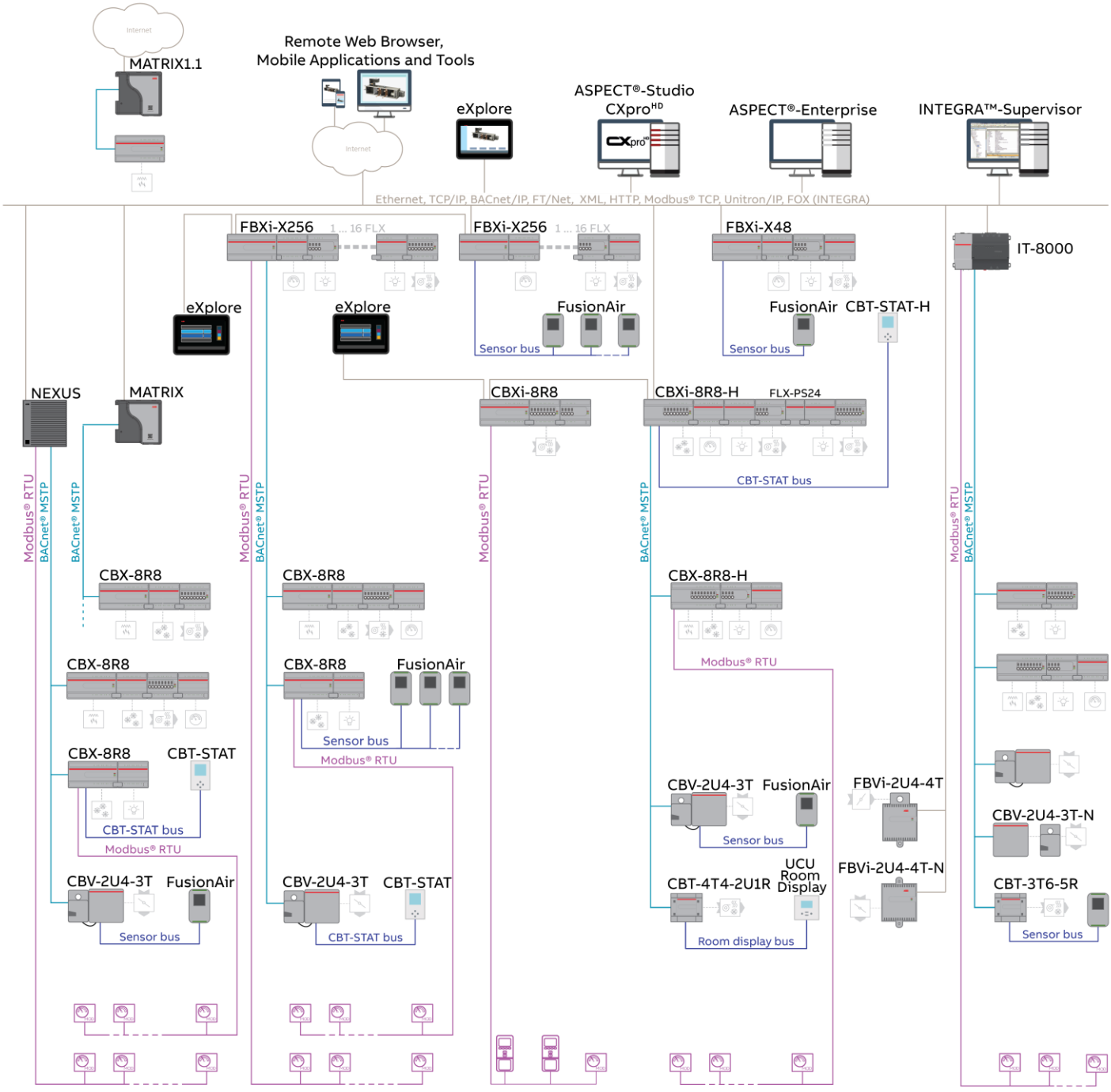
DIMENSIONS



SYSTEM ARCHITECTURE



FBXi-X256 / CBXi-8R8 / CBX-8R8

CBXi-8R8-H / CBX-8R8-H

CBV-2U4-3T

FLX-8R8 / FLX-4R4 / FLX-16DI

FLX-8R8 -H

FLX-4R4-H

FLX-PS24

CBT-4T4-2U1R

FBVi-2U4-4T

FBVi-2U4-4T-N

eXplore

NEXUS Series

MATRIX Series

INTEGRA Series

Fusion Smart Sensor

CBT-STAT

UCU Room Display