

# FX20, FX40, and FX60 Protocol Implementation Conformance Statement

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# **FX20, FX40, and FX60 Protocol Implementation Conformance Statement**

## **Document Introduction**

This document contains the Protocol Implementation Conformance Statement (PICS) and BACnet® Interoperability Building Blocks (BIBBs) for the FX20, FX40, and FX60 controllers as required by the American National Standards Institute/American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ANSI/ASHRAE) Standard 135-2004, BACnet protocol.

The PICS is a written document created by the manufacturer of a device to identify the particular options specified in the BACnet standard and implemented in the device.

BACnet interoperability building blocks are collections of one or more BACnet services. This document includes a listing of the BIBBs currently supported by the FX20, FX40, and FX60.

## **Annex A - Protocol Implementation Conformance Statement (Normative)**

**Table 1: BACnet Protocol Implementation Conformance Statement**

<b>Date</b>	June 17, 2008
<b>Vendor Name</b>	Johnson Controls, Inc.
<b>Product Name</b>	FX20, FX40, FX60
<b>Product Model Numbers</b>	FX4020A-0, FX4021A-0, FX4022A-0, FX4023A-0, FX2011N-0, FX6011N-0
<b>Applications Software Version</b>	2.0
<b>Firmware Version</b>	2.0
<b>BACnet Protocol Revision</b>	4

### **Product Description**

The FX20, FX40, and FX60 controllers provide the ability to view, monitor, and control BACnet devices over Internet Protocol (IP) or Master-Slave/Token-Passing (MS/TP) media. Devices, points, schedules, and logs can be learned and managed from an FX20, FX40, and FX60. In addition, FX20, FX40, and FX60 points, schedules, histories, and alarms can be exposed to BACnet devices for monitor and control by foreign BACnet clients.

### **BACnet Standardized Device Profile (Annex L)**

- BACnet Operator Workstation (B-OWS)
- BACnet Building Controller (B-BC)
- BACnet Advanced Application Controller (B-AAC)
- BACnet Application Specific Controller (B-ASC)
- BACnet Smart Sensor (B-SS)
- BACnet Smart Actuator (B-SA)

**Note:** For a complete listing of the additional BIBBs supported (Annex K), see the *Annex K - BACnet Interoperability Building Blocks (BIBBs) (Normative)* section of this document.

## Segmentation Capability

**Table 2: BACnet Building Controller BIBBs Support**

Feature	Supported	Window Size
Transmit Segmented Messages	<input checked="" type="checkbox"/>	10
Receive Segmented Messages	<input checked="" type="checkbox"/>	2 (Responses) Any (Requests)

## Standard Object Types Supported

The following is a list of the standard object types as defined by ASHRAE. The objects checked are currently supported in the FX20, FX40, and FX60 controllers. See the section of this document for details on the supported object type.

- Analog Input
- Analog Output
- Analog Value
- Averaging
- Binary Input
- Binary Output
- Binary Value
- Calendar
- Command
- Device
- Event Enrollment
- File
- Group
- Life Safety Point
- Life Safety Zone
- Loop
- Multistate Input
- Multistate Output
- Multistate Value
- Notification Class
- Program
- Schedule
- Trend Log

## Analog Input

**Table 3: Analog Input**

<b>Dynamically Creatable</b>	<b>Dynamically Deletable</b>	<b>Optional Properties Supported</b>	<b>Writable Properties</b>
<input type="checkbox"/>	<input type="checkbox"/>	Description Device Type Reliability Min Pres Value Max Pres Value Resolution COV Increment Time Delay Notification Class High Limit Low Limit Deadband Limit Enable Event Enable Acked Transitions Notify Type Event Time Stamps	Object Name Description Out of Service COV Increment Time Delay Notification Class High Limit Low Limit Deadband Limit Enable Notify Type

## Analog Output

**Table 4: Analog Output**

<b>Dynamically Creatable</b>	<b>Dynamically Deletable</b>	<b>Optional Properties Supported</b>	<b>Writable Properties</b>
<input type="checkbox"/>	<input type="checkbox"/>	Description Device Type Reliability Min Pres Value Max Pres Value Resolution COV Increment Time Delay Notification Class High Limit Low Limit Deadband Limit Enable Event Enable Acked Transitions Notify Type Event Time Stamps	Object Name Description Out of Service Relinquish Default COV Increment Time Delay Notification Class High Limit Low Limit Deadband Limit Enable Notify Type

## Analog Value

**Table 5: Analog Value**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description Reliability Priority Array Relinquish Default Min Pres Value Max Pres Value COV Increment Time Delay Notification Class High Limit Low Limit Deadband Limit Enable Event Enable Acked Transitions Notify Type Event Time Stamps	Object Name Description Out of Service Relinquish Default COV Increment Time Delay Notification Class High Limit Low Limit Deadband Limit Enable Notify Type

## Binary Input

**Table 6: Binary Input**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description Device Type Reliability Inactive Text Active Text Change of State Time Change of State Count (0) Time of State Count Reset Elapsed Active Time (0) Time of Active Time Reset Time Delay Notification Class Alarm Value Event Enable Acked Transitions Notify Type Event Time Stamps	Object Name Description Out of Service Inactive-Text Active Text Change of State Count (0) Elapsed Active Time (0) Time Delay Notification Class Alarm Value Notify Type

## Binary Output

**Table 7: Binary Output**

<b>Dynamically Creatable</b>	<b>Dynamically Deletable</b>	<b>Optional Properties Supported</b>	<b>Writable Properties</b>
<input type="checkbox"/>	<input type="checkbox"/>	Description Device Type Reliability Inactive Text Active Text Change of State Time Change of State Count (0) Time of State Count Reset Elapsed Active Time (0) Time of Active Time Reset Minimum Off Time Minimum On Time Time Delay Notification Class Feedback Value Event Enable Acked Transitions Notify Type Event Time Stamps	Object Name Description Out of Service Inactive Text Active Text Change of State Count (0) Elapsed Active Time (0) Minimum Off Time Minimum On Time Relinquish Default Time Delay Notification Class Notify Type

## Binary Value

**Table 8: Binary Value**

<b>Dynamically Creatable</b>	<b>Dynamically Deletable</b>	<b>Optional Properties Supported</b>	<b>Writable Properties</b>
<input type="checkbox"/>	<input type="checkbox"/>	Description Reliability Inactive Text Active Text Change of State Time Change of State Count (0) Time of State Count Reset Elapsed Active Time (0) Time of Active Time Reset Minimum Off Time Minimum On Time Priority Array Relinquish Default Time Delay Notification Class Alarm Value Event Enable Acked Transitions Notify Type Event Time Stamps	Object Name Description Out of Service Inactive Text Active Text Change of State Count (0) Elapsed Active Time (0) Minimum Off Time Minimum On Time Relinquish Default Time Delay Notification Class Alarm Value Notify Type

## Calendar

**Table 9: Calendar**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description	Object Name Description Date List

## Device

**Table 10: Device**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Location Description Protocol Object Types Supported Max Segments Accepted Local Time Local Date UTC Offset Daylight Savings Status APDU Segment Timeout Max Master Max Info Frames Active COV Subscriptions Configuration Files Last Restore Time Backup Failure Timeout	Location Description Backup Failure Timeout

## File

**Table 11: File**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description	Object Name Description Archive File Size <sup>1</sup>

1. The File Size property of File objects is only writable if the underlying system file is changeable.

## Loop

**Table 12: Loop**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description Reliability Proportional Constant Proportional Constant Units Integral Constant Integral Constant Units Derivative Constant Derivative Constant Units Bias Maximum Output Minimum Output COV Increment Time Delay Notification Class Error Limit Event Enable Acked Transitions Notify Type Event Time Stamps	Object Name Description Out of Service Setpoint <sup>1</sup> Proportional Constant Integral Constant Derivative Constant Bias Maximum Output Minimum Output COV Increment Time Delay Error Limit

1. The Setpoint property of Loop objects is writable only if the setpoint is not linked from within Niagara<sup>AX</sup>.

## Multistate Input

**Table 13: Multistate Input**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description Device Type Reliability State Text Time Delay Notification Class Alarm Values Event Enable Acked Transitions Notify Type Event Time Stamps Fault Values	Object Name Description Out of Service State Text Time Delay Notification Class Alarm Values Notify Type

## Multistate Output

**Table 14: Multistate Output**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description Device Type Reliability State Text Time Delay Notification Class Feedback Value Event Enable Acked Transitions Notify Type Event Time Stamps	Object Name Description Out of Service State Text Relinquish Default Time Delay Notification Class Notify Type

## Multistate Value

**Table 15: Multistate Value**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description Reliability State Text Priority Array Relinquish Default Time Delay Notification Class Alarm Values Notify Type Event Time Stamps Event Enable Fault Values Acked Transitions	Object Name Description Out of Service State Text Relinquish Default Time Delay Notification Class Alarm Values Notify Type

## Notification Class

**Table 16: Notification Class**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description	Object Name Description Priority Ack Required Recipient List <sup>1</sup>

1. The Recipient List property of the Notification Class object maintains entries that are internally configured within Niagara.

## Schedule

**Table 17: Schedule**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description Weekly Schedule Exception Schedule	Object Name Description Effective Period Weekly Schedule Exception Schedule Schedule Default List of Object Property References <sup>1</sup> Priority for Writing <sup>2</sup> Out of Service

1. The List of Object Property References property of the Schedule object maintains entries internally configured within Niagara.
2. The Priority for Writing property of Schedule objects is not important for internal Niagara operation, as the priority at which a point is commanded is determined by the input to which the Schedule output is linked.

## Trend

**Table 18: Trend**

Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
<input type="checkbox"/>	<input type="checkbox"/>	Description Start Time Stop Time Log Device Object Property Log Interval COV Resubscription Interval Client COV Increment Notification Threshold Records Since Notification Last Notify Record Notification Class Acked Transitions Notify Type Event Time Stamps Event Enable	Object Name Description Log Enable <sup>1</sup> Start Time Stop Time Log Interval <sup>1, 2</sup> Record Count (0) <sup>1</sup> Notification Class Notify Type

1. These Trend Log object properties are not writable if the backing history for the exported Trend Log is a Niagara-generated history. If the history is created as a BACnet Trend Log, then the properties are writable.
2. Trend Logs in Niagara are either COV or Interval. So the Log Interval property cannot be written to a value other than 0 for COV logs, or to 0 for interval logs.

## Data Link Layer Option

- BACnet Internet Protocol (IP) (Annex J)
- BACnet IP (Annex J), Foreign Device
- ISO 8802-3, Ethernet (Clause 7)
- ANSI/ATA 878.1, 2.5 MB ARCNET® network (Clause 8)
- ANSI/ATA 878.1, RS-485 ARCNET network (Clause 8), baud rates: \_\_\_\_\_
- MS/TP master (Clause 9), baud rates: 9600; 19,200; 38,400; 76,800
- MS/TP slave (Clause 9), baud rates: \_\_\_\_\_
- Point-To-Point, EIA 232 (Clause 10), baud rates: \_\_\_\_\_
- Point-To-Point, modem (Clause 10), baud rates: \_\_\_\_\_
- LonTalk® protocol (Clause 11), medium: \_\_\_\_\_
- Other: \_\_\_\_\_

## Device Address Binding

- Yes     No    **Is static device binding supported?** (required for two-way communication between Master-Slave/Token-Passing [MS/TP] slaves and other devices)

## Networking Options

- Router, Clause 6:    Router Configurations: Ethernet-IP, Ethernet-MS/TP, IP-MS/TP
  - Annex H, BACnet Tunneling Router over IP
  - BACnet/IP Broadcast Management Device (BBMD)
- Does the BBMD support registrations by Foreign Devices?     Yes     No

## Character Sets Supported

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

- ANSI X3.4
- IBM®/Microsoft® Double-Byte Character Set (DBCS)
- ISO 8859-1
- ISO 10646 Universal Character Set-2 (UCS-2)
- ISO 10646 (UCS-4)
- Japanese Industrial Standard (JIS) C 6226

If this product is a communication gateway, describe the types of non BACnet equipment/network(s) that the gateway supports:

This product supports communication between BACnet network, a LONWORKS® network, and a Johnson Controls® N2 Bus and/or Metasys® N2 bus.

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## **Annex K - BACnet Interoperability Building Blocks (BIBBs) (Normative)**

Table 19 lists all the BIBBs which, per ANSI/ASHRAE Standard 135-2001, should be supported by a BACnet Building Controller (B-BC). The checked BIBBs are supported by the FX40.

**Table 19: BACnet Building Controller BIBBs Support (Part 1 of 2)**

<b>Application Service (B-BC)</b>	<b>Designation</b>	<b>Supported</b>
Data Sharing - Read Property - A	DS-RP-A	<input checked="" type="checkbox"/>
Data Sharing - Read Property - B	DS-RP-B	<input checked="" type="checkbox"/>
Data Sharing - Read Property Multiple - A	DS-RPM-A	<input checked="" type="checkbox"/>
Data Sharing - Read Property Multiple - B	DS-RPM-B	<input checked="" type="checkbox"/>
Data Sharing - Write Property - A	DS-WP-A	<input checked="" type="checkbox"/>
Data Sharing - Write Property - B	DS-WP-B	<input checked="" type="checkbox"/>
Data Sharing - Write Property Multiple - B	DS-WPM-B	<input checked="" type="checkbox"/>
Data Sharing - COV - A	DS-COV-A	<input checked="" type="checkbox"/>
Data Sharing - COV - B	DS-COV-B	<input checked="" type="checkbox"/>
Data Sharing - COV - Unsolicited - A	DS-COVU-A	<input checked="" type="checkbox"/>
Data Sharing - COV - Unsolicited - B	DS-COVU-B	<input checked="" type="checkbox"/>
Alarm and Event - Notification - A	AE-N-A	<input checked="" type="checkbox"/>
Alarm and Event - Notification Internal - B	AE-N-I-B	<input checked="" type="checkbox"/>
Alarm and Event - ACK - A	AE-ACK-A	<input checked="" type="checkbox"/>
Alarm and Event - ACK - B	AE-ACK-B	<input checked="" type="checkbox"/>
Alarm and Event - Information - B	AE-INFO-B	<input checked="" type="checkbox"/>
Alarm and Event - Summary - B	AE-ASUM-B	<input checked="" type="checkbox"/>
Alarm and Event - Enrollment Summary - B	AE-ESUM-B	<input checked="" type="checkbox"/>
Scheduling - Scheduling - A	SCHED-A	<input checked="" type="checkbox"/>
Scheduling - Internal - B	SCHED-I-B	<input checked="" type="checkbox"/>
Scheduling - External - B	SCHED-E-B	<input checked="" type="checkbox"/>
Trending - Viewing and Modifying Trends External - B	T-VMT-E-B	<input checked="" type="checkbox"/>
Trending - Viewing and Modifying Trends - A	T-VMT-A	<input checked="" type="checkbox"/>
Trending - Viewing and Modifying Trends Internal - B	T-VMT-I-B	<input checked="" type="checkbox"/>
Trending - Automated Trend Retrieval - A	T-ATR-A	<input checked="" type="checkbox"/>
Trending - Automated Trend Retrieval - B	T-ATR-B	<input checked="" type="checkbox"/>
Device Management - Dynamic Device Binding - A	DM-DDB-A	<input checked="" type="checkbox"/>
Device Management - Dynamic Device Binding - B	DM-DDB-B	<input checked="" type="checkbox"/>
Device Management - Dynamic Object Binding - A	DM-DOB-A	<input checked="" type="checkbox"/>
Device Management - Dynamic Object Binding - B	DM-DOB-B	<input checked="" type="checkbox"/>

**Table 19: BACnet Building Controller BIBBs Support (Part 2 of 2)**

<b>Application Service (B-BC)</b>	<b>Designation</b>	<b>Supported</b>
Device Management - Device Communication Control - B	DM-DCC-B	☒
Device Management - Time Synchronization - B	DM-TS-B	☒
Device Management - UTC Time Synchronization - B	DM-UTC-B	☒
Device Management - Reinitialize Device - B	DM-RD-B	☒
Device Management - List Manipulation - A	DM-LM-A	☒
Device Management - List Manipulation - B	DM-LM-B	☒
Device Management - Backup, Restore - B	DM-BR-B	☒
Network Management - Connection Establishment - A	NM-CE-A	☒

**Building Efficiency**

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