Executive definition & objectives: It is the expression and formalization from the customers needs into offer requirements. It corresponds to customer needs to which we have decided to answer. It is the project reference that becomes the commitment of the project team.

Note: the offer is material or immaterial. It includes product, equipment, solutions, systems, and services, provided by the company to satisfy the customer needs. The retained requirement should be associated to a validation; therefore it should be measurable and controllable.

|  |  |  |  |
| --- | --- | --- | --- |
| Deliverable Name |  | Stage Gate | |
|  |  | OPEN |  |
|  |  | SELECT |  |
|  |  | DO |  |
|  |  | IMPLEMENT |  |
|  |  | PRODUCE |  |
|  |  | SELL |  |
|  |  | CLOSE |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Status | Draft | In Review | Official |

|  |  |  |
| --- | --- | --- |
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| Approvers | **Solution Marketing**  **Engineering Manager** | **Paul Stephens**  **Bruce Dunbar** |

Refer to applicable Roles Assignment List to fill this table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Document Revision History | | | | |
| Version | Date yyyy/mm/dd | Authors | Modifications Details | Feedback File |
| V0.1 | 2013/02/28 | Harry Henneman | Version for first review |  |
| V0.2 | 2013/03/07 | Harry Henneman | Updated customer needs based on e-mail March 4 |  |
| V0.3 | 2013/03/13 | Harry Henneman | Issued for customer review |  |
| V0.4 | 2013/03/15 | Harry Henneman | Customer review comments integrated |  |
| V0.5 | 2013/03/20 | Harry Henneman | Updated specification to fulfill complete B-BC profile |  |
| V0.6 | 2013/04/11 | Harry Henneman | Removed DS-WPM-A as it is not required for B-BC profile. Comment from Polarsoft |  |
| V0.7 | 2013/04/19 | Harry Henneman | Note added for behavior after power cycle |  |
|  |  |  |  |  |
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V1.0 2008/03/18 J.Templeton Fist Official Version Embed final feedback file for Official versions

|  |  |  |  |
| --- | --- | --- | --- |
| Linked Documents | | | |
| Name | Reference | Author | Comments |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

Show hidden text to read the help (click on standard tool bar command: ¶)

**General guidelines to elaborate this document**

**1. Tailoring the template:**

* The template scheme and proposed content intend to help the author in the elaboration of the document: they match our processes definition and way of work and should apply well in most cases.
* Nevertheless, the author has to adapt the proposed content in case of specificities. When some proposed chapters are not applicable, the recommendation is to keep them inside the final document with a short justification of the inapplicability. When extra information is needed, the author is encouraged to structure and document it in the most convenient way.
* In any cases, filling a document rigorously respecting its template is not an objective in itself. It is preferable to reach the intended goal and function of the document than to fit to an inappropriate template scheme.
* A document is appropriate for its intended use if it is:
* Complete: each expected content is present
* Correct: each content is exact
* Consistent: the document fits other related data

**2. Updating automated fields:**

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* The field ‘Title’ is used for the ‘Project Name’
* The field ‘Subject’ is used for the ‘Deliverable Name’ (ex.: “Project Management Plan”, “CANopen Field Bus Product Specification”)
* The field ‘Comments’ is used for the ‘Version’ of the document
* Then update the fields values inside the document:
* Click inside the document
* key CTRL-A (‘Select all’)
* Key F9 to refresh.
* Double-click on page 2 or following Header or Footer
* key CTRL-A (‘Select all’)
* Key F9 to refresh
* The filename of the document is automatically inserted in the document header (ex: “Mirano Project Management Plan.doc”, “CANopen Field Bus Product Specification.doc”)

**3. Versioning rules:**

Use the following rules to manage the document versions:

* Draft and In Review: vX.X (ex: v0.1, v0.2, v0.3 increment at each published version)
* Official: vX.X (ex: major changes: v1.0, v2.0, v3.0… minor changes: v1.1, v1.2, v1.3…)

**4. Filling the Roles table (front page):**

Refer to the applicable Roles Assignment List document that gives default Function assignment for Authors, Reviewers and Approvers (stored in the same repository as the documents templates). Keep this table up-to-date for each document Version.

**5. Reviewing the document:**

* Documents must be reviewed to transform them from the Draft state to the Official state.
* **Draft**: the document is not mature enough to enter the Review Process
* **In Review**: the document is in sufficient elaboration level so that Reviewers verify it and decisions are taken for solving found issues (or selection among alternatives)
* **Official**: the actors of the performed Review Process agreed that the document satisfies the expected quality criteria for its intended use: Completeness, Correctness, Consistency with other project data
* The author (in collaboration with the Project Manager / Review Leader) selects Reviewers and Approvers according to the default Roles Assignment List and involve them in the applicable review process (reference documents are accessible in the Documents Templates repository)
* The final feedback file is preferably embedded inside the Official document (template for Feedback form is accessible in the Documents Templates repository)

**6. Template revision history:**

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# Introduction

Objective of this document is to define new functionalities for the Ethernet BACnet IP communication modules requested by the customer Hoist Energy from Norway. This document describes the customer requirements to enhance the BACnet profile from BACnet –ASC to BACnet-BC.

Hoist Energy requires a fast solution to support BACnet schedules. There for the requirements are labeled with R1 and R2 to identify the 2 releases

R1 release is primary focused on supporting BACnet schedules and some enhancements for data sharing. This release is targeted for September 2013

R2 release is to complete the profile according to BACnet-BC. This release is targeted for 2014

# Requirements definition

## Targeted architectures

### BACnet architecture with BACnet client direct link

In this architecture multiple M168 controllers are connected in an Ethernet network. A building owner can monitor and control the various control systems through the local building management system.

Figure BACnet architecture with BACnet client direct link

### BACnet architecture with BACnet client remote link

In this architecture multiple M168 controllers are connected in an Ethernet network. A building owner can monitor and control the various control systems through the remote building management system.

Figure BACnet architecture with BACnet IP remote link

### Standalone architecture without BACnet

In this architecture multiple M168 controllers are connected in a non-Ethernet network. A building owner can monitor and control the various control systems through remote access, e.g. using the webgate functionality of the Magelis HMI.

Note: the standalone architecture is not using BACnet IP communication and can not use the BACnet schedules. For this type of architecture function blocks will be used to have a similar schedule as the BACnet IP schedule.

Figure Standalone architecture without BACnet

## BACnet schedule support

### TM168 BACnet IP communication module

MIR: BACnet schedules, exception schedules and calendars must be supported in the Ethernet BACnet IP communication module

MIR 1: The Ethernet BACnet IP communication module must support 96 schedule objects

MIR 2: The Ethernet BACnet IP communication module must support 3 calendar objects

MIR 3: It must be possible to create, modify or delete BACnet schedule objects through a BACnet client

MIR 4: It must be possible to create, modify or delete BACnet calendar objects through a BACnet client

Note: An application download in the M168 controller will overwrite the modification made by a BACnet client

### BIBB's

MIR 5: The BACnet Building Information Building Block support (BIBBs) must support SCHED-E-B, scheduling external B

MIR 6: The BACnet Building Information Building Block support (BIBBs) must support SCHED-I-B, scheduling internal B

### BACnet schedule objects

MIR 7: It must be possible to create, modify or delete schedule objects

MIR 8: It must be possible to create up to 6 time/values per day in the weekly schedule

### BACnet exception schedule

MIR 9: It must be possible to create, modify or delete exception schedules

MIR 10: The exception schedule must support at least 40 time/value pairs

This means maximum 20 dates or 20 periods or 20 recurrent dates can be supported

MIR 11: The exception schedule must support at least 3 calendar entries

### BACnet calendar objects

MIR 12: It must be possible to create, modify or delete calendar objects

MIR 13: The calendar object must support at least 10 entries

### BACnet schedule exception schedule and calendar sample

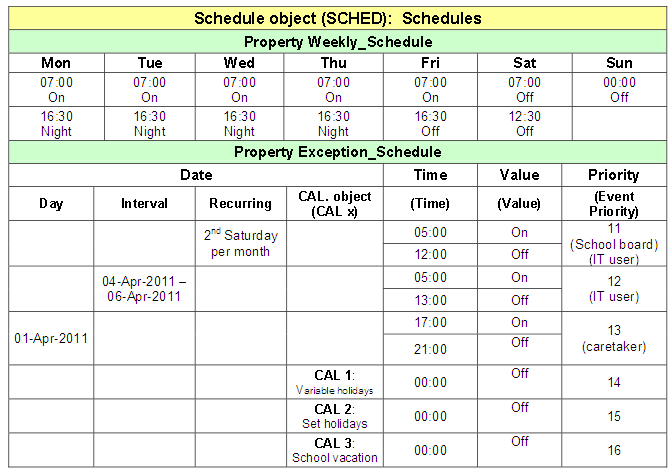


Figure Example BACnet weekly schedule and exception schedule



Figure Example of calendar objects

### Offline engineering in SoHVAC engineering tool

With the engineering tool SoHVAC, it shall be possible to define the BACnet schedules, including the weekly schedule and exception schedule.

After the application download in the M168 controller, the BACnet schedules are available on the BACnet IP communication module

MIR 14: It must be possible create, modify or delete BACnet schedule offline in the engineering tool SoHVAC

MIR 15: It must be possible create, modify or delete BACnet exception schedule offline in the engineering tool SoHVAC

MIR 16: It must be possible create, modify or delete BACnet calendar offline in the engineering tool SoHVAC

Note: An application download in the M168 controller will overwrite the modifications made by a BACnet client

Note: Modifications made by a BACnet client will not be lost after a power cycle of the M168 controller

MIR 17: It must be possible to create a report of all BACnet objects, including schedules, exception schedules and calendar objects in the engineering tool SoHVAC

MIR 18: It shall be possible to create an EDE report in the engineering tool SoHVAC

### Certification requirements

MIR 19: The BACnet IP communication module shall be BTL listed

MIR 20: The BACnet ASHRAE BACnet standard 135-2004 revision 1.4 must be used

MIR 21: The BACnet ASHRAE BACnet standard 135-2010 revision 1.12 shall be used

### M168 controller schedules (function blocks)

This section is only applicable for standalone installations, so without BACnet communication. The functionality of the function blocks are reduced compared to the BACnet schedules

MIR 22: The SoHVAC software must provide a schedule function

MIR 23: It must be possible to create at least 10 schedules

MIR 23: It must be possible to create at least 7 days in a weekly schedule

MIR 24: It must be possible to create at least 4 time/values pairs per day in the weekly schedule

MIR 25: It must be possible to create an exception schedule for each schedule

MIR 26: The exception schedule must support at least 12 time/value pairs

MIR 27: The exception schedule must support at least 3 calendar entries

MIR 28: The exception schedule must an exception schedule for a specific date

MIR 29: The exception schedule must an exception schedule for a specific date and time interval

MIR 30: The exception schedule must an exception schedule for a specific date interval

MIR 31: The exception schedule must an exception schedule for a specific date and time interval

MIR 32: The exception schedule must an exception schedule for a recurring date

MIR 33: The exception schedule must an exception schedule for a recurring date and time interval

MIR 34: It must be possible to create up to 3 calendar objects

MIR 35: The calendar must support at least 10 entries

MIR 36: The calendar entry must support individual date

MIR 37: The calendar entry must support date intervals

## BACnet data-sharing enhancement

In a typical HVAC system, a temperature sensor is shared by various control systems. E.g. an outdoor temperature sensor is connected to one M168 controller and its value is required by many other M168 controllers.

This kind of scenarario requires the DS-RP-A

### DS-RP-A (ReadProperty-A) (R1)

MIR 38: The BACnet Building Information Building Block support (BIBBs) MUST support DS-RP-A, ReadProperty-A

The user must be able to define the target BACnet device and object for reading within the BMS profile editor

### DS-RPM-A (ReadPropertyMultiple-A) (R2)

MIR 39: The BACnet Building Information Building Block support (BIBBs) SHOULD support DS-RPM-A, ReadPropertyMultiple-A

The user must be able to define the target BACnet device and object for reading within the BMS profile editor

### DS-WP-A (WriteProperty-A) (R1)

MIR 40: The BACnet Building Information Building Block support (BIBBs) MUST support DS-WP-A, WriteProperty-A

The user must be able to define the target BACnet device and object for reading within the BMS profile editor

### DS-COVU-A (COV-Unsolicited-A)(R2)

MIR 42: The BACnet Building Information Building Block support (BIBBs) SHOULD support DS-COVU-A

The user must be able to define the target BACnet device and object for creating an unsolicited COV within the BMS profile editor

### DS-COVU-B (COV-Unsolicited-B) (R2)

MIR 43: The BACnet Building Information Building Block support (BIBBs) SHOULD support DS-COVU-B

## Alarms and events enhancement

### AE-ESUM-B (Enrollment Summary-B) (R1)

The server must provide a list of event triggered objects to the client

MIR 44: The BACnet communication module MUST support the AE-ESUM-B (Enrollment Summary-B)

The user must be able to define alarm points for AV, BV and MSV objects within the BMS profile editor

## Schedule enhancement

### SCHED-E-B (Scheduling-External-B) (R1)

The server must support schedules from other BACnet devices

MIR 45: The BACnet communication module MUST support the SCHED-E-B (Scheduling-External-B)

The user must be able to define schedule and exception schedules within the BMS profile editor

The schedule and exception schedules must be stored in non-volatile memory. The schedule and exception schedule data is not lost during a power cycle.

The user must be able to create and delete schedules, exception schedules through the BACnet client

## Trends enhancement

### T-VMT-I-B (Viewing and Modifying Trends Internal-B) (R2)

The server must send trend data of internal datapoints to the client,

MIR 46: The BACnet communication module SHOULD support the T-VMT-I-B (Viewing and Modifying Trends Internal-B)

The user must be able to create and delete trends through the BACnet client

### T-ATR-B (Automated Trend Retrieval-B) (R2)

The server must inform the client that a number of defined entries is available in the trendlog bugger.

MIR 47: The BACnet communication module SHOULD support the T-ATR-B (Automated Trend Retrieval-B)

## Device management enhancement

### DM-UTC-B (UTCTimeSynchronization-B)

The BACnet standard specified that either DM-TC-B or DM-UTC-B must be supported. As the DM-TC-B is already supported by the BACnet communication module, there is no need for DM-UTC-B.

### DM-BR-B-B (Backup and Restore-B) (R2)

The server must send the configuration data (application program) to the client for backup

The server must restore the configuration data (application program) following a failure of the server

MIR 48: The BACnet communication module SHOULD support the DM-BR-B (Backup and Restore-B)

## BIBB allocation to releases

Following tables indicate the BIBBs supported for the BACnet module

|  |  |
| --- | --- |
| **X** | **Supported in BACnet FW V1.9** |
| **XR1** | **Planned for release 1** |
| **XR2** | **Planned for release 2** |

BACnet Interoperability Building Blocks (BIBBS) Support

**Data Sharing:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **BACnet Standard** | | | | | | | | **TM168BACW Device** |
| **BIBBS** | **description** | **B-AWS** | **B-OWS** | **B-OD** | **B-BC** | **B-AAC** | **B-ASC** | **B-SA** | **B-SS** |
| **DS-RP-A** | ReadProperty-A | **X** | **X** | **X** | **X** |  |  |  |  | **XR1** |
| **DS-RP-B** | ReadProperty-B | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |
| **DS-RPM-A** | ReadPropertyMultiple-A | **X** | **X** |  | **X** |  |  |  |  | **XR2** |
| **DS-RPM-B** | ReadPropertyMultiple-B |  |  |  | **X** | **X** |  |  |  | **X** |
| **DS-RPC-A** | ReadPropertyConditional-A |  |  |  |  |  |  |  |  |  |
| **DS-RPC-B** | ReadPropertyConditional-B |  |  |  |  |  |  |  |  |  |
| **DS-WP-A** | WriteProperty-A | **X** | **X** | **X** | **X** |  |  |  |  | **XR1** |
| **DS-WP-B** | WriteProperty-B |  |  |  | **X** | **X** | **X** | **X** |  | **X** |
| **DS-WPM-A** | WritePropertyMultiple-A | **X** | **X** |  |  |  |  |  |  |  |
| **DS-WPM-B** | WritePropertyMultiple-B |  |  |  | **X** | **X** |  |  |  | **X** |
| **DS-COV-A** | COV-A |  |  |  |  |  |  |  |  |  |
| **DS-COV-B** | COV-B |  |  |  |  |  |  |  |  | **X** |
| **DS-COVP-A** | COVP-A |  |  |  |  |  |  |  |  |  |
| **DS-COVP-B** | COVP-B |  |  |  |  |  |  |  |  |  |
| **DS-COVU-A** | COV-Unsolicited-A |  |  |  | **X** |  |  |  |  | **XR2** |
| **DS-COVU-B** | COV-Unsolicited-B |  |  |  | **X** |  |  |  |  | **XR2** |
| **DS-V-A** | View-A |  | **X** | **X** |  |  |  |  |  |  |
| **DS-M-A** | Modify-A |  | **X** | **X** |  |  |  |  |  |  |
| **DS-AV-A** | Advanced View-A | **X** |  |  |  |  |  |  |  |  |
| **DS-AM-A** | Advanced Modify-A | **X** |  |  |  |  |  |  |  |  |

BACnet Interoperability Building Blocks (BIBBS) Support

**Alarms and Events:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **BACnet Standard** | | | | | | | | **TM168BACW Device** |
| **BIBBS** | **description** | **B-AWS** | **B-OWS** | **B-OD** | **B-BC** | **B-AAC** | **B-ASC** | **B-SA** | **B-SS** |
| **AE-N-A** | Notification-A | **X** | **X** |  |  |  |  |  |  |  |
| **AE-N-I-B** | Notification Internal |  |  |  | **X** | **X** |  |  |  | **X** |
| **AE-N-E-B** | Notification External-B |  |  |  |  |  |  |  |  |  |
| **AE-ACK-A** | ACK-A | **X** | **X** |  |  |  |  |  |  |  |
| **AE-ACK-B** | ACK-B |  |  |  | **X** | **X** |  |  |  | **X** |
| **AE-ASUM-A** | Summary-A |  |  |  |  |  |  |  |  |  |
| **AE-ASUM-B** | Alarm Summary-B |  |  |  |  |  |  |  |  | **X** |
| **AE-ESUM-A** | Enrollment Summary-A |  |  |  |  |  |  |  |  |  |
| **AE-ESUM-B** | Enrollment Summary-B |  |  |  | **X** | **X** |  |  |  | **XR1** |
| **AE-INFO-A** | Information-A |  |  |  |  |  |  |  |  |  |
| **AE-INFO-B** | Information-B |  |  |  | **X** | **X** |  |  |  | **X** |
| **AE-LS-A** | LifeSafety-A |  |  |  |  |  |  |  |  |  |
| **AE-LS-B** | LifeSafety-B |  |  |  |  |  |  |  |  |  |
| **AE-AS-A** | Alarm Summary-A |  |  |  |  |  |  |  |  |  |
| **AE-VN-A** | View Notification-A | **X** |  | **X** |  |  |  |  |  |  |
| **AE-VM-A** | View Modify-A | **X** |  |  |  |  |  |  |  |  |
| **AE-AVM-A** | Advanced View Modify-A |  | **X** |  |  |  |  |  |  |  |
| **AE-AVN-A** | Advanced View Notifications-A |  | **X** |  |  |  |  |  |  |  |
| **AE-ELVM-A** |  | **1** |  |  |  |  |  |  |  |  |

1 Not required for devices conformance to a Protocol Revision less than 7

BACnet Interoperability Building Blocks (BIBBS) Support

**Schedules:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **BACnet Standard** | | | | | | | | **TM168BACW Device** |
| **BIBBS** | **description** | **B-AWS** | **B-OWS** | **B-OD** | **B-BC** | **B-AAC** | **B-ASC** | **B-SA** | **B-SS** |
| **SCHED-A** | Scheduling - A |  |  |  |  |  |  |  |  |  |
| **SCHED-B** |  |  |  |  |  |  |  |  |  |  |
| **SCHED-I-B** | Scheduling - Internal-B |  |  |  |  | **X** |  |  |  |  |
| **SCHED-E-B** | Scheduling - External-B |  |  |  | **X** |  |  |  |  | **XR1** |
| **SCH-VM-A** | Scheduling - View Modify |  | **X** |  |  |  |  |  |  |  |
| **SCH-AVM-A** | Scheduling - Advanced View Modify | **X** |  |  |  |  |  |  |  |  |
| **SCH-WS-A** | Scheduling - Weekly Schedule-A |  |  |  |  |  |  |  |  |  |
| **SCH-WS-I-B** | Scheduling - Weekly Schedule Internal-B |  |  |  |  |  |  |  |  |  |
| **SCH-R-B** | Scheduling - Readable-B |  |  |  |  |  |  |  |  |  |

**Trends:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **BACnet Standard** | | | | | | | | **TM168BACW Device** |
| **BIBBS** | **description** | **B-AWS** | **B-OWS** | **B-OD** | **B-BC** | **B-AAC** | **B-ASC** | **B-SA** | **B-SS** |
| **T-VMT-A** | Viewing and Modifying Trends-A |  |  |  |  |  |  |  |  |  |
| **T-VMT-I-B** | Viewing and Modifying Trends Internal-B |  |  |  | **X** |  |  |  |  | **XR2** |
| **T-VMT-E-B** | Viewing and Modifying Trends External-B |  |  |  |  |  |  |  |  |  |
| **T-ATR-A** | Automated Trend Retrieval-A |  |  |  |  |  |  |  |  |  |
| **T-ATR-B** | Automated Trend Retrieval-B |  |  |  | **X** |  |  |  |  | **XR2** |
| **T-V-A** | View-A |  | **X** |  |  |  |  |  |  |  |
| **T-A-A** | Archiving-A |  |  |  |  |  |  |  |  |  |
| **T-AVM-A** |  | **X** |  |  |  |  |  |  |  |  |

BACnet Interoperability Building Blocks (BIBBS) Support

**Device Management:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **BACnet Standard** | | | | | | | | **TM168BACW Device** |
| **BIBBS** | **description** | **B-AWS** | **B-OWS** | **B-OD** | **B-BC** | **B-AAC** | **B-ASC** | **B-SA** | **B-SS** |
| **DM-DDB-A** | Dynamic Device Binding - A | **X** | **X** | **X** | **X** |  |  |  |  | **X** |
| **DM-DDB-B** | Dynamic Device Binding - B | **X** | **X** | **X** | **X** | **X** | **X** | **2** | **2** | **X** |
| **DM-DOB-A** | Dynamic Object Binding - A |  |  |  | **X** |  |  |  |  | **X** |
| **DM-DOB-B** | Dynamic Object Binding - B | **X** | **X** | **X** | **X** | **X** | **X** | **2** | **2** | **X** |
| **DM-DCC-A** | DeviceCommunicationControl-A | **X** |  |  |  |  |  |  |  |  |
| **DM-DCC-B** | DeviceCommunicationControl-B |  |  |  |  |  |  |  |  | **X** |
| **DM-PT-A** | Private Transfer-A |  |  |  |  |  |  |  |  |  |
| **DM-PT-B** | Private Transfer-B |  |  |  |  |  |  |  |  |  |
| **DM-TM-A** | Text Message-A |  |  |  |  |  |  |  |  |  |
| **DM-TM-B** | Text Message-B |  |  |  |  |  |  |  |  |  |
| **DM-TS-A** | TimeSynchronization-A |  |  |  |  |  |  |  |  |  |
| **DM-TS-B** | TimeSynchronization-B |  |  |  | **X** | **X** | **X** |  |  | **X** |
| **DM-UTC-A** | UTCTimeSynchronization-A |  |  |  |  |  |  |  |  |  |
| **DM-UTC-B** | UTCTimeSynchronization-B |  |  |  | **X** | **X** |  |  |  |  |
| **DM-RD-A** | ReinitializeDevice-A | **X** |  |  |  |  |  |  |  |  |
| **DM-RD-B** | ReinitializeDevice-B |  |  |  | **X** | **X** | **X** |  |  | **X** |
| **DM-BR-A** | Backup and Restore-A | **X** |  |  |  |  |  |  |  |  |
| **DM-BR-B** | Backup and Restore-B |  |  |  | **X** |  |  |  |  | **XR2** |
| **DM-R-A** | Restart-A |  |  |  |  |  |  |  |  |  |
| **DM-R-B** | Restart-B |  |  |  |  |  |  |  |  |  |
| **DM-LM-A** | List Manipulation-A |  |  |  |  |  |  |  |  |  |
| **DM-LM-B** | List Manipulation-B |  |  |  |  |  |  |  |  |  |
| **DM-OCD-A** | Object Creation and Deletion-A | **X** | **X** |  |  |  |  |  |  |  |
| **DM-OCD-B** | Object Creation and Deletion-B |  |  |  |  |  |  |  |  |  |
| **DM-VT-A** | Virtual Terminal-A |  |  |  |  |  |  |  |  |  |
| **DM-VT-B** | Virtual Terminal-B |  |  |  |  |  |  |  |  |  |
| **DM-ANM-A** |  | **X** |  |  |  |  |  |  |  |  |
| **DM-ADM-A** |  | **X** |  |  |  |  |  |  |  |  |
| **DM-MTS-A** |  | **X** | **X** |  |  |  |  |  |  |  |

2 Not required if the device is a BACnet MS/TP Slave

BACnet Interoperability Building Blocks (BIBBS) Support

**Network Management:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **BACnet Standard** | | | | | | | | **TM168BACW Device** |
| **BIBBS** | **description** | **B-AWS** | **B-OWS** | **B-OD** | **B-BC** | **B-AAC** | **B-ASC** | **B-SA** | **B-SS** |
| **NM-CE-A** | Connection Establishment-A | **X** |  |  | **X** |  |  |  |  |  |
| **NM-CE-B** | Connection Establishment-B |  |  |  |  |  |  |  |  |  |
| **NM-RC-A** | Router Configuration-A |  |  |  |  |  |  |  |  |  |
| **NM-RC-B** | Router Configuration-B |  |  |  |  |  |  |  |  |  |

Supported BACnet Object Types (Summary)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Protocol Revisions** | | **BACnet Standard** | | | | | | | | **TM168BACW Device** | | |
| **ID** | **description** | **Introduced** | **Updated** | **B-AWS** | **B-OWS** | **B-OD** | **B-BC** | **B-AAC** | **B-ASC** | **B-SA** | **B-SS** | **Supported Protocol Revisions** | **Createable** | **Deletable** |
| 23 | **Accumulator** | 4 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 0 | **Analog Input** | 0 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 1 | **Analog Output** | 0 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 2 | **Analog Value** | 0 | 1 | **X** |  |  |  |  |  |  |  |  | **N** | **N** |
| 18 | **Averaging** | 1 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 3 | **Binary Input** | 0 | 1 | **X** |  |  |  |  |  |  |  |  |  |  |
| 4 | **Binary Output** | 0 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 5 | **Binary Value** | 1 |  | **X** |  |  |  |  |  |  |  |  | **N** | **N** |
| 6 | **Calendar** | 0 |  | **X** | **X** |  |  |  |  |  |  |  | **Y** | **Y** |
| 7 | **Command** | 0 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 8 | **Device** | 0 | 1 | **X** | **X** | **X** | **X** | **X** | **X** | **X** | **X** |  | **N** | **N** |
| 9 | **Event Enrollment** | 0 | 4 | **X** | **X** |  | **X** | **X** |  |  |  |  | **N** | **N** |
| 10 | **File** | 0 | 1, 9 | **X** |  |  |  |  |  |  |  |  | **N** | **N** |
| 11 | **Group** | 0 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 21 | **Life Safety Point** | 2 | 4, 5 | **X** |  |  |  |  |  |  |  |  |  |  |
| 22 | **Life Safety Zone** | 2 | 4, 5 | **X** |  |  |  |  |  |  |  |  |  |  |
| 12 | **Loop** | 0 | 7 | **X** |  |  |  |  |  |  |  |  |  |  |
| 13 | **Multi-state Input** | 0 | 1 | **X** |  |  |  |  |  |  |  |  |  |  |
| 14 | **Multi-state Output** | 0 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 19 | **Multi-state Value** | 1 | 1 | **X** |  |  |  |  |  |  |  |  | **N** | **N** |
| 15 | **Notification Class** | 0 | 1, 4 | **X** | **X** |  | **X** | **X** |  |  |  |  | **N** | **N** |
| 16 | **Program** | 0 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 24 | **Pulse Converter** | 4 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 17 | **Schedule** | 0 | 1, 4 | **X** | **X** |  | **X** | **X** |  |  |  |  | **Y** | **Y** |
| 20 | **Trend Log** | 1 | 7 | **X** | **X** |  | **X** |  |  |  |  |  | **Y** | **Y** |
| 30 | **Access Door** | 6 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 25 | **Event Log** | 7 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 28 | **Load Control** | 6 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 29 | **Structured View** | 5 |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 27 | **Trend Log Multiple** | 7 |  | **X** |  |  |  |  |  |  |  |  |  |  |
|  | Lighting Output2 | 9i |  |  |  |  |  |  |  |  |  |  |  |  |
|  | **Access Credential** | 9 |  | **X** |  |  |  |  |  |  |  |  |  |  |
|  | **Access Point** | 9 |  | **X** |  |  |  |  |  |  |  |  |  |  |
|  | **Access Rights** | 9 |  | **X** |  |  |  |  |  |  |  |  |  |  |
|  | **Access User** | 9 |  | **X** |  |  |  |  |  |  |  |  |  |  |
|  | **Access Zone** | **9** |  | **X** |  |  |  |  |  |  |  |  |  |  |

Supported BACnet Object Types (Summary - Continued)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Protocol Revisions** | | **BACnet Standard** | | | | | | | | **TM168BACW Device** | | |
| **ID** | **description** | **Introduced** | **Updated** | **B-AWS** | **B-OWS** | **B-OD** | **B-BC** | **B-AAC** | **B-ASC** | **B-SA** | **B-SS** | **Supported Protocol Revisions** | **Createable** | **Deletable** |
| 37 | **Credential Data Input** | **9** |  | **X** |  |  |  |  |  |  |  |  |  |  |
| 38 | Global Group2 | 9p |  |  |  |  |  |  |  |  |  |  |  |  |
| 39 | CharacterString Value2 | 9w |  |  |  |  |  |  |  |  |  |  |  |  |
| 40 | DateTime Value2 | 9w |  |  |  |  |  |  |  |  |  |  |  |  |
| 41 | Double Value2 | 9w |  |  |  |  |  |  |  |  |  |  |  |  |
| 42 | BitString Value2 | 9w |  |  |  |  |  |  |  |  |  |  |  |  |
| 43 | OctetString Value2 | 9w |  |  |  |  |  |  |  |  |  |  |  |  |
| 44 | Time Value2 | 9w |  |  |  |  |  |  |  |  |  |  |  |  |
| 45 | Singed Value2 | 9w |  |  |  |  |  |  |  |  |  |  |  |  |
| 46 | Unsigned Value2 | 9w |  |  |  |  |  |  |  |  |  |  |  |  |
| 47 | Date Value2 | 9w |  |  |  |  |  |  |  |  |  |  |  |  |

1 Implied requirements of Device Profile are in respect to the protocol revision support by the device. If the object type did not exist in the BACnet standard for the revision supported by the device it is not required.

2 Object types proposed for ASHRAE standard by SSPC 135 committee but not currently approved