ADDENDA

ANSI/ASHRAE Addendum ar to
ANSI/ASHRAE Standard 135-2012

BACnet®—A Data Communication Protocol for Building Automation and Control Networks

Approved by the ASHRAE Standards Committee on January 26, 2013; by the ASHRAE Board of Directors on January 30, 2013; and by the American National Standards Institute on January 30, 2013.

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[This foreword and the "rationales" on the following pages are not part of this standard. They are merely informative and do not contain requirements necessary for conformance to the standard.]

FOREWORD

The purpose of this addendum is to present a proposed change for public review. These modifications are the result of change proposals made pursuant to the ASHRAE continuous maintenance procedures and of deliberations within Standing Standard Project Committee 135. The proposed changes are summarized below.

In the following document, language to be added to existing clauses of ANSI/ASHRAE 135-2012 and Addenda is indicated through the use of *italics*, while deletions are indicated by ~~strikethrough~~. Where entirely new subclauses are proposed to be added, plain type is used throughout. Only this new and deleted text is open to comment at this time. All other material in this addendum is provided for context only and is not open for public review comment except as it relates to the proposed changes.

135-2012*ar*-1 Add New Engineering Units

Rationale

Some units for metering devices are missing from the BACnet standard.

Note that these additions exceed the originally reserved range enumeration range of 0-255, so an additional range is allocated from an area of unlikely-to-be-used values at 47808-49999.

[Modify **Clause 21**, p. 669]

BACnetEngineeringUnits ::= ENUMERATED { -- See below for numerical order

--Electrical
...
ohm-meter-squared-per-meter (237),
...
--Energy
...
ampere-seconds (238),
volt-ampere-hours (239), -- i.e. VAh
kilovolt-ampere-hours (240),
megavolt-ampere-hours (241),
volt-ampere-hours-reactive (242), -- i.e. varh
kilovolt-ampere-hours-reactive (243),
megavolt-ampere-hours-reactive (244),
volt-square-hours (245),
ampere-square-hours (246),
...
--Power
...
joule-per-hours (247),
...
--Volumetric Flow
...
cubic-feet-per-day (248),
...
cubic-meters-per-day (249),
...
--Other
...
watt-hours-per-cubic-meter (250),
joules-per-cubic-meter (251),
mole-percent (252),
pascal-seconds (253),
...
-- Numerical Order Reference
...
-- see minutes-per-degree-kelvin (236),
-- see ohm-meter-squared-per-meter (237),
-- see ampere-seconds (238),
-- see volt-ampere-hours (239),
-- see kilovolt-ampere-hours (240),
-- see megavolt-ampere-hours (241),
-- see volt-ampere-hours-reactive (242),
-- see kilovolt-ampere-hours-reactive (243),
-- see megavolt-ampere-hours-reactive (244),

```
        -- see volt-square-hours                (245),
        -- see ampere-square-hours              (246),
        -- see joule-per-hours                  (247),
        -- see cubic-feet-per-day               (248),
        -- see cubic-meters-per-day             (249),
        -- see watt-hours-per-cubic-meter       (250),
        -- see joules-per-cubic-meter           (251),
        -- see mole-percent                     (252),
        -- see pascal-seconds                   (253),

        ...
        }
-- Enumerated values 0-255 and 47808-49999 are reserved for definition by ASHRAE.
-- Enumerated values 256-47807 and 50000-65535 may be used by others subject to the procedures
-- and constraints described in Clause 23.
```

[Change **Table 23-1**, p. 636]

Table 23-1. Extensible Enumerations

Enumeration Name	Reserved Range	Maximum Value
...	...	...
BACnetEngineeringUnits	0-255,*47808-49999*	65535
...	...	...

135-2012*ar*-2 Clarify Coercion Requirements

Rationale

The WriteGroup service was added in Addendum 135-2010*aa*, but the DS-WG-I-B and DS-WG-E-B BIBBs do not rule on datatype support, implying that DS-WG-I-B devices must support coercions for which they have no actual objects that would use them.

[Change **Clauses K.1.22** and **K.1.23**, p. 883]

K.1.22 BIBB - Data Sharing-WriteGroup-Internal-B (DS-WG-I-B)
The B device shall contain one or more Channel objects that may be influenced by WriteGroup service requests from device A.

BACnet Service	Initiate	Execute
WriteGroup		x

Devices claiming conformance to DS-WG-I-B shall support configuration of Channel object BACnetDeviceObjectPropertyReference values that contain references to objects inside of device B only.

When performing datatype coercion of values to be written to objects internal to device B, the B device shall support coercions to all datatypes used by objects implemented in device B but is not required to support coercions for other datatypes.

K.1.23 BIBB - Data Sharing-WriteGroup-External-B (DS-WG-E-B)
The B device shall contain one or more Channel objects that may be influenced by WriteGroup service requests from device A.

BACnet Service	Initiate	Execute
WriteGroup		x
WriteProperty	x	

Devices claiming conformance to DS-WG-E-B shall also support DS-WG-I-B and DS-WP-A. The B device shall also support configuration of Channel object BACnetDeviceObjectPropertyReference values that contain Device Instances outside of device B, and shall be capable of initiating WriteProperty and optionally WritePropertyMultiple.

When performing datatype coercion of values to be written to objects by device B, the B device shall support coercions to all the datatypes shown in Table 12-63 – Datatype Coercion Rules.

135-2012*ar*-3 Specify SubscribeCOVProperty Error Codes

Rationale

Error situations were identified for SubscribeCOV in addendum 135-2008*h*, but not for SubscribeCOVProperty. This proposed change aligns the error situations for SubscribeCOVProperty with those for SubscribeCOV.

[Change **Clause 13.6.2**, p. 532]

13.15.1.3.1 Error Type

This parameter shall consist of two component parameters: (1) the 'Error Class' and (2) the 'Error Code'. See Clause 18. *The 'Error Class' and 'Error Code' to be returned for specific situations are as follows:*

Situation:	*Error Class:*	*Error Code:*
Specified object does not exist	*OBJECT*	*UNKNOWN_OBJECT*
Specified property does not exist	*PROPERTY*	*UNKNOWN_PROPERTY*
Specified object does not support COV notifications	*OBJECT*	*OPTIONAL_FUNCTIONALITY_NOT_SUPPORTED*
Specified property does not support COV notifications	*PROPERTY*	*NOT_COV_PROPERTY*
No context can be created due to resource limitations	*RESOURCES*	*NO_SPACE_TO_ADD_LIST_ELEMENT*
The Lifetime parameter is outside the range supported by the device	*SERVICES*	*VALUE_OUT_OF_RANGE*

135-2012*ar*-4 Add Slave Proxy BIBBs

Rationale

The Slave Proxy functionality was added in Protocol_Revision 4, but no corresponding BIBBs were generated to allow devices to claim support for it.

[Add new **Clauses K.5.X1 and K.5.X2,** p. 905]

K.5.X1 BIBB - Device Management-Slave Proxy-View and Modify-A (DM-SP-VM-A)

The A device displays and modifies the slave proxy related properties in a slave proxy device.

BACnet Service	Initiate	Execute
ReadProperty	x	
ReadRange	x	
AddListElement	x	
RemoveListElement	x	
WriteProperty	x	

Devices claiming conformance to DM-SP-VM-A shall be able to read and present the Slave_Proxy_Enable, Manual_Slave_Address_Binding, Auto_Slave_Discovery and the Slave_Address_Binding properties of the Device object.

When a device is proxying for a large number of MS/TP slave devices, the Manual_Slave_Address_Binding and Slave_Address_Binding properties can contain very large values. For this reason, the A device shall support initiation of the ReadRange service so as to be able to retrieve large values for these properties.

The A device shall be capable of configuring the Slave_Proxy_Enable, Manual_Slave_Address_Binding, Auto_Slave_Discovery, and Slave_Address_Binding properties.

A device claiming support for DM-SP-VM-A is interoperable with devices that support DM-SP-VM-B.

K.5.X2 BIBB - Device Management-Slave Proxy-B (DM-SP-B)

The B device implements the slave proxy functionality and provides I-Am messages on behalf of MS/TP slave devices.

BACnet Service	Initiate	Execute
ReadProperty	x	x
ReadRange		x
AddListElement		x
RemoveListElement		x
WriteProperty		x
Who-Is		x
I-Am	x	

Devices claiming conformance to DM-SP-B shall support the Slave_Proxy_Enable, Manual_Slave_Address_Binding, Auto_Slave_Discovery and the Slave_Address_Binding properties of the Device object. Slave proxies shall be capable of performing the slave proxy function on any or all of the directly connected MS/TP networks.

Devices claiming conformance to this BIBB shall be capable of proxying for at least 32 MS/TP slaves devices per directly connected MS/TP network.

When the B device is proxying for a large number of MS/TP slave devices, the Manual_Slave_Address_Binding and Slave_Address_Binding properties can contain very large values. For this reason, the B device shall support execution of the ReadRange service.

A device claiming support for DM-SP-VM-B is interoperable with devices that support DM-SP-VM-A and with MS/TP slave devices.

135-2012*ar*-5 Allow Unicast I-Have Messages

Rationale

Currently, I-Am requests can be sent as either broadcast or unicast, but I-Have requests are required to be broadcast. It is not clear why there is this difference between the two services, as there may be situations in which it is desirable to send I-Have as a unicast in order to minimize the use of broadcasts.

[Change **Clause 16.9.4**, p. 579]

16.9.4 Service Procedure

The sending BACnet-user shall broadcast *or unicast* the I-Have unconfirmed request. ~~Such broadcasts~~ *If the I-Have is broadcast, this broadcast* may be on the local network only, a remote network only, or globally on all networks at the discretion of the application. If the I-Have is being transmitted in response to a previously received Who-Has, then the I-Have shall be transmitted in such a manner that the BACnet-user that sent the Who-Has will receive the resulting I-Have. Since the request is unconfirmed, no further action is required. A BACnet-user may issue an I-Have service request at any time.

135-2012*ar*-6 Require Both Time Sync Services for Time Masters

Rationale

For the best level of interoperability, a device functioning as a Time Master should be able to transmit both TimeSynchronization and UTCTimeSynchronization services, since the receiving devices can potentially support either. However, as the footnotes are written today, a device is allowed to choose to support only one of these services. This change collects all the time sync properties together into an indivisible bundle.

[Change **Table 12-13**, p.199]

Table 12-13. Properties of the Device Object Type

Property Identifier	Property Datatype	Conformance Code
…		
Time_Synchronization_Recipients	List of BACnetRecipient	O[5]
…		
UTC_Time_Synchronization_Recipients	List of BACnetRecipient	O[5]
Time_Synchronization_Interval	Unsigned	O[~~4~~5]
Align_Intervals	BOOLEAN	O[~~4~~5]
Interval_Offset	Unsigned	O[~~4~~5]
…		

...

[5] *These properties shall be present only if all of them are present.* If present, ~~this property~~ *these properties* shall be writable.

...

[Add a new entry to **History of Revisions**, p. 1026]

(This History of Revisions is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard.)

HISTORY OF REVISIONS

Protocol		***Summary of Changes to the Standard***
Version	***Revision***	
…	…	**…**
1	15	**Addendum *ar* to ANSI/ASHRAE 135-2012** Approved by the ASHRAE Standards Committee January 26, 2013; by the ASHRAE Board of Directors January 30, 2013; and by the American National Standards Institute January 30, 2013. 1. Add New Engineering Units 2. Clarify Coercion Requirements 3. Specify SubscribeCOVProperty Error Codes 4. Add Slave Proxy BIBBs 5. Allow Unicast I-Have Messages 6. Require Both Time Sync Services for Time Masters

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ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating standards and guidelines.

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ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.