

ANSI/ASHRAE Addendum h  
to ANSI/ASHRAE Standard 135-2008



# ASHRAE STANDARD

## BACnet<sup>®</sup> — A Data Communication Protocol for Building Automation and Control Networks

Approved by the ASHRAE Standards Committee on January 23, 2010; by the ASHRAE Board of Directors on January 27, 2010; and by the American National Standards Institute on January 28, 2010.

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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

Addendum 135*h* to ANSI/ASHRAE Standard 135-2008 contains a number of changes to the current standard. 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 changes are summarized below.

- 135-2008*h*-1. Change Device\_Busy to Busy and apply to the Command Object type, p. 2.**
- 135-2008*h*-2. Prevent overflow and underflow in Pulse\_Converter object's Count property, p. 3.**
- 135-2008*h*-3. Add context tags to Clause 21 production BACnetPropertyStates, p. 4.**
- 135-2008*h*-4. Add new BACnetEngineering Units, p. 5.**
- 135-2008*h*-5. Define COV notification service Error returns, p. 6.**
- 135-2008*h*-6. Remove non-support for automatic cancellation of COV subscriptions, p. 8.**
- 135-2008*h*-7. [This section removed from this addendum]**
- 135-2008*h*-8. Add even and odd day support in Dates, p. 10.**

In the following document, language added to existing clauses of ANSI/ASHRAE 135-2008 and addenda is indicated through the use of *italics*, while deletions are indicated by ~~strike through~~. Where entirely new subclauses are added, plain type is used throughout.

**135-2008h-1. Add a new BUSY Error Code and apply to the Command Object type.**

**Rationale**  
The Command object is required to reject a write request to its Present\_Value property when its In\_Process property has the value BUSY, but none of the currently available error codes are exactly appropriate to the situation. A new error code, BUSY, is defined for this purpose.

**Addendum 135-2008h-1**

[Change Clause **12.10**, Command Object type, paragraph 3, p.176]

**12.10 Command Object type**

...  
The Command object defines the relationship between a given state and those values that shall be written to a collection of different objects' properties to realize that state. Normally, a Command object is passive. Its In\_Process property is FALSE, indicating that the Command object is waiting for its Present\_Value property to be written with a value. When Present\_Value is written, the Command object shall begin a sequence of actions. The In\_Process property shall be set to TRUE, indicating that the Command object has begun processing one of a set of action sequences that is selected based on the particular value written to the Present\_Value property. If an attempt is made to write to the Present\_Value property through WriteProperty services while In\_Process is TRUE, then a Result(-) ~~shall be issued~~ shall be returned with 'error class' = OBJECT and 'error code' = BUSY, rejecting the write.

[Add new Clause **18.2.X**, p.391]

**18.2.X BUSY** - A service request has been temporarily declined because the addressed object is involved in a process that precludes execution of the service.

[Change Clause **21**, production , p.445]

**Error** ::= SEQUENCE {  
...  
error-code ENUMERATED {  
    other (0),  
    ...  
    authentication-failed (1),  
    busy (82),  
    character-set-not-supported (41),  
    ...  
}

### 135-2008h-2. Prevent overflow and underflow in Pulse\_Converter object's Count property.

#### Rationale

Currently Adjust\_Value (datatype REAL) can be successfully written with values that can cause either overflow or underflow of the Pulse Converter object's Count property (datatype Unsigned), resulting in erroneous values in the Count property.

#### Addendum 135-2008h-2

[Change Clause 12.23.13, p. 240]

##### 12.23.13 Adjust\_Value

This property, of type REAL, is written to adjust the Present\_Value property (and thus the Count property also) by the amount written to Adjust\_Value.

~~If this property is writable the~~The following series of operations shall be performed atomically when this property is written:

- (1) The value written to Adjust\_Value shall be stored in the Adjust\_Value property.
- (2) The value of Count shall be copied to the Count\_Before\_Change property.
- (3) The value of Count shall be decremented by the value calculated by performing the integer division (Adjust\_Value/Scale\_Factor) and discarding the remainder.
- (4) The current date and time shall be stored in the Count\_Change\_Time property.

A write to this property results in a change in the value of Present\_Value. Whether the new value is computed as part of the atomic series of operations or when Present\_Value is read is a local matter.

*An attempt to write Adjust\_Value with a value that would cause an overflow or underflow condition in Count shall result in a Result(-) to be returned with an error class of PROPERTY and an error code of VALUE\_OUT\_OF\_RANGE.*

If Adjust\_Value has never been written, it shall have a value of zero.

### 135-2008h-3. Add context tags to Clause 21 production BACnetPropertyStates.

#### Rationale

The standard defines context tag declarations for each BACnet defined enumeration explicitly in production BACnetPropertyStates, Clause 21. Several of the BACnet defined enumeration datatypes lack these context tag declarations, so they are added here.

#### Addendum 135-2008h-3

[Change **Clause 21**, production **BACnetPropertyStates**, p. 471]

```
BACnetPropertyStates ::= CHOICE {  
-- This production represents the possible datatypes for properties that  
-- have discrete or enumerated values. The choice must be consistent with the  
-- datatype of the property referenced in the Event Enrollment Object.  
  
    boolean-value      [0] BOOLEAN,  
    ...  
    door-alarm-state   [15] BACnetDoorAlarmState  
    action              [16] BACnetAction,  
    door-secured-status [17] BACnetDoorSecuredStatus,  
    door-status        [18] BACnetDoorStatus,  
    door-value         [19] BACnetDoorValue,  
    file-access-method [20] BACnetFileAccessMethod,  
    lock-status        [21] BACnetLockStatus,  
    life-safety-operation [22] BACnetLifeSafetyOperation,  
    maintenance        [23] BACnetMaintenance,  
    node-type          [24] BACnetNodeType,  
    notify-type        [25] BACnetNotifyType,  
    security-level     [26] BACnetSecurityLevel,  
    shed-state         [27] BACnetShedState,  
    silenced-state     [28] BACnetSilencedState  
    ...  
}
```

#### 135-2008h-4. Add new BACnetEngineering Units.

##### Rationale

Requests were made from several sources for support for three additional engineering units, which are added here.

##### Addendum 135-2008h-4

[Change Clause 21, BACnetEngineeringUnits production, p. 451]

**BACnetEngineeringUnits** ::= {

...

--Electrical

...

megohms	(123),
<i>micro-siemens</i>	(190),
siemens	(173), -- 1 mho equals 1 siemens

...

--Volumetric Flow

cubic-feet-per-second	(142),
cubic-feet-per-minute	(84),
<i>cubic-feet-per-hour</i>	(191),
cubic-meters-per-second	(85),

...

liters-per-hour	(136),
<i>us-gallons-per-hour</i>	(192),
us-gallons-per-minute	(89),

...

... The last enumeration used in this version is 189.

### 135-2008h-5 Define COV notification service Error returns.

#### Rationale

Standard 135.1 defines Error returns for the ConfirmedCOVNotification service that are not required by the current edition of Standard 135; those Error returns are specified here for Standard 135.

#### Addendum 135-2008h-5

[Change Clause **13.6.2**, p. 309, ConfirmedCOVNotification service procedure]

##### 13.6.2 Service Procedure

After verifying the validity of the request, the responding BACnet-user shall take whatever local actions have been assigned to the indicated COV and issue a 'Result(+)' service primitive. If the service request cannot be executed, a 'Result(-)' service primitive shall be issued indicating the error encountered.

*The 'Error Class' and 'Error Code' to be returned for specific situations are as follows:*

<i>Situation:</i>	<i>Error Class:</i>	<i>Error Code:</i>
<i>No subscription exists for the specified object, property, and process identifier. Devices may ignore this condition and return a BACnet-SimpleACK-PDU.</i>	<i>SERVICES</i>	<i>UNKNOWN_SUBSCRIPTION</i>

[Change Clause **13.14.2**, p. 326, SubscribeCOV service procedure]

##### 13.14.2 Service Procedure

...

If a new context is created, or a re-subscription is received, then the COV context shall be initialized and given a lifetime as specified by the 'Lifetime' parameter, if present, or zero if the 'Lifetime' parameter is not present. The subscription shall be automatically cancelled after that many seconds have elapsed unless a re-subscription is received. A lifetime of zero shall indicate that the subscription is indefinite and no automatic cancellation shall occur. In either case, a 'Result(+)' shall be returned. A ConfirmedCOVNotification or UnconfirmedCOVNotification shall be issued as soon as possible after the successful completion of a subscription or re-subscription request, as specified by the 'Issue Confirmed Notifications' parameter.

*The 'Error Class' and 'Error Code' to be returned for specific situations are as follows:*

<i>Situation:</i>	<i>Error Class:</i>	<i>Error Code:</i>
<i>Specified object does not exist</i>	<i>OBJECT</i>	<i>UNKNOWN_OBJECT</i>
<i>Specified object does not support COV notifications</i>	<i>OBJECT</i>	<i>OPTIONAL_FUNCTIONALITY_NOT_SUPPORTED</i>
<i>No context can be created due to resource limitations</i>	<i>RESOURCES</i>	<i>NO_SPACE_TO_ADD_LIST_ELEMENT</i>
<i>The Lifetime parameter is out of the range supported by the device</i>	<i>SERVICES</i>	<i>VALUE_OUT_OF_RANGE</i>

[Add new Clause **18.2.X**, p. 391]

**18.2.X OPTIONAL\_FUNCTIONALITY\_NOT\_SUPPORTED** – The requested action cannot be executed because the specified object does not support the optional functionality required.



[Add new Clauses **18.6.X** and **18.6.Y**, p. 393]

**18.6.X UNKNOWN\_SUBSCRIPTION** – No subscription can be found that matches the specified object, property, and process identifier for the received notification.

**18.6.Y VALUE\_OUT\_OF\_RANGE** – The requested action cannot be executed because one of the parameters provided is outside of the range supported by the device.

[Change Clause **21, Error** production, p. 445]

```
Error ::= SEQUENCE {  
  ...  
  error-code    ENUMERATED {  
    other                (0),  
    ...  
    unknown-property    (32),  
    unknown-subscription (79),  
    -- this enumeration was removed (33),  
    unknown-vt-class    (34),  
    ...  
    -- see unknown-subscription (79),  
    ...  
}
```

### **135-2008h-6. Remove non-support for automatic cancellation of COV subscriptions.**

#### **Rationale**

The service procedure for the SubscribeCOV service states that a device is allowed to have no support for automatic cancellation of COV subscriptions. This lack of capability was deprecated, so the statement is being removed.

#### **Addendum 135-2008h-6**

[Change Clause **13.14.2**, SubscribeCOV service, p. 326]

##### **13.14.2 Service Procedure**

If neither 'Lifetime' nor 'Issue Confirmed Notifications' are present, then the request shall be considered to be a cancellation. Any COV context that already exists for the same BACnet address contained in the PDU that carries the SubscribeCOV request and has the same 'Subscriber Process Identifier' and 'Monitored Object Identifier' shall be disabled and a 'Result(+)' returned. Cancellations that are issued for which no matching COV context can be found shall succeed as if a context had existed, returning 'Result(+)'.

~~If the 'Lifetime' parameter is present and has a non-zero value but the device does not support automatic cancellation of subscriptions, then a 'Result(-)' shall be returned.~~ If the 'Lifetime' parameter is not present but the 'Issue Confirmed Notifications' parameter is present, then a value of zero (indefinite lifetime) shall be assumed for the lifetime. If the 'Issue Confirmed Notifications' parameter is present but the object to be monitored does not support COV reporting, then a 'Result(-)' shall be returned. If the object to be monitored does support COV reporting, then a check shall be made to locate an existing COV context for the same BACnet address contained in the PDU that carries the SubscribeCOV request and has the same 'Subscriber Process Identifier' and 'Monitored Object Identifier'. If an existing COV context is found, then the request shall be considered a re-subscription and shall succeed as if the subscription had been newly created.

**135-2008h-7.** [this section has been removed]

### 135-2008h-8. Add even and odd day support in Dates.

#### Rationale

Resource conservation sometimes requires schedules to be able to turn on automated watering systems on either even- or odd-numbered days of the month. Adding enumerations to support this would facilitate automated scheduling of such operations.

#### Addendum 135-2008h-8

[Change Clause **20.2.12**, p. 422]

##### 20.2.12 Encoding of a Date Value

The encoding of a date value shall be primitive, with four contents octets.

Date values shall be encoded in the contents octets as four binary integers. The first ~~contents~~ octet shall represent the year minus 1900; the second octet shall represent the month, with January = 1; the third octet shall represent the day of the month; and the fourth octet shall represent the day of the week, with Monday = 1. A value of X'FF' = D'255' in any of the four octets shall indicate that the corresponding value is unspecified. If all four octets = X'FF', the corresponding date may be interpreted as "any" or "don't care."

*A number of special values for the month and day octets have been defined. The following special values shall not be used when conveying an actual date value, such as the Local\_Date property of the Device object or in a TimeSynchronization-Request. A value of 13 in the second octet shall indicate odd months. A value of 14 in the second octet shall indicate even months. A value of 32 in the third octet shall indicate the last day of the month. A value of 33 in the third octet shall indicate odd days of the month. A value of 34 in the third octet shall indicate even days of the month.*

[Change Clause **21, Date**, p. 448]

```
Date ::= [APPLICATION 10] OCTET STRING (SIZE(4)) -- see 20.2.12
-- first octet   year minus 1900           X'FF' = unspecified
-- second octet month (1..14)              1 = January
--                                     13 = odd months
--                                     14 = even months
--                                     X'FF' = unspecified
-- third octet  day of month (1..3234),
--                                     32 = last day of month
--                                     33 = odd days of month
--                                     34 = even days of month
--                                     X'FF' = unspecified
-- fourth octet day of week (1..7)         1 = Monday
--                                     7 = Sunday
--                                     X'FF' = unspecified
```

[Add a new entry to **History of Revisions**, p. 688]

**(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**

<i>Protocol</i>		<i>Summary of Changes to the Standard</i>
<i>Version</i>	<i>Revision</i>	
...	...	...
1	10	<p><b>Addendum h to ANSI/ASHRAE 135-2008</b>                      Approved by the ASHRAE Standards Committee January 23, 2010; by the ASHRAE Board of Directors January 27, 2010; and by the American National Standards Institute January 28, 2010.</p> <ol style="list-style-type: none"> <li>1. Change Device_Busy to Busy and apply to the Command Object type.</li> <li>2. Prevent overflow and underflow in Pulse_Converter object's Count property.</li> <li>3. Add context tags to Clause 21 production BACnetPropertyStates.</li> <li>4. Add new BACnetEngineering Units.</li> <li>5. Define COV notification service Error returns.</li> <li>6. Remove non-support for automatic cancellation of COV subscriptions.</li> <li>7. [This section removed from this addendum]</li> <li>8. Add even and odd day support in Dates.</li> </ol>

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FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES**

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted standards and the practical state of the art.

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As an ongoing goal, ASHRAE will, through its Standards Committee and extensive technical committee structure, continue to generate up-to-date standards and guidelines where appropriate and adopt, recommend, and promote those new and revised standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date standards and design considerations as the material is systematically revised.

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