ASHRAE ADDENDA

BACnet®

A Data Communication Protocol for Building Automation and Control Networks

Approved by the ASHRAE Standards Committee on June 25, 2011; by the ASHRAE Board of Directors on June 29, 2011; and by the American National Standards Institute on June 30, 2011.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE Web site (www.ashrae.org) or in paper form from the Manager of Standards.

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Approved American National Standard

ANSI

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SPECIAL NOTE

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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*ae* to ANSI/ASHRAE Standard 135-2010 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.

135-2010*ae*-1 Add a "Too large" error condition to the ERROR authentication encoding, p. 3
135-2010*ae*-2 Simplify the Initialization of Negative and Positive Access Rules, p. 4
135-2010*ae*-3 Replace Master_Exemption Property of the Access Credential Object Type, p. 5
135-2010*ae*-4. Add Fault Enumeration to Door_Status in Access Door Object Type, p. 12
135-2010*ae*-5. Clarify the behavior of Door_Unlock_Delay_Time and Present_Value of Access Door, p. 13

In the following document, language to be added to existing clauses of ANSI/ASHRAE 135-2010 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.

ANSI/ASHRAE Addendum ae to ANSI/ASHRAE Standard 135-2010

135-2010ae-1 Add a "Too large" error condition to the ERROR authentication encoding

Rationale

There is a need for a new Authentication Factor Value Encoding for the format type ERROR to indicate that the authentication factor that was read was too large to fit in the value field of the BACnetAuthenticationFactor data type.

[Change **Table P-1**, p. 926]

Table P-1: Authentication Factor Value Encoding Rules

Format Type (BACnetAuthenticationFactorType)	Authentication Factor Format Description	Authentication Factor Value Encoding[1]
...	...	...

ERROR	Error – this is used when the authentication factor value is not the value expected, or could not be interpreted as expected.	Octet String Size = n
		
		Octet [1] = error reason, as follows:
		
		    0 = Unspecific error
		
		    1 = Parity failure
		
		    2 = Too few data
		
		    3 = Too much data
		
		    4 = Incomplete read
		
		    5 = Too large
		
		    128..255 = Any proprietary error reason
		
		Octet[2..3] = authentication factor format type expected (if unknown or cannot be determined use UNDEFINED)
		
		Octet[4..n] = data array that *may* ~~holds~~ *store the* erroneous data.

...	...	...

ANSI/ASHRAE Addendum ae to ANSI/ASHRAE Standard 135-2010

135-2010ae-2. Simplify the Initialization of Negative and Positive Access Rules

Rationale

When the size of the Negative or Positive access rules array is increased without initial values being provided, the rule must default to be disabled. Although both the time range and location fields are set to unspecified reference values, which will cause the rule to evaluate to false, it is more obvious to the operator that the rule will have no effect if it is explicitly disabled by setting the Enable field to FALSE.

[Change **Clause 12.34.9.3**, p. 342]

12.34.9.3 Initializing New Array Elements When the Array Size is Increased

If the size of the Negative_Access_Rules array is increased without initial values being provided, then the new array elements, for which no initial value is provided, shall be initialized to contain SPECIFIED for the Time-Range-Specifier field, an unspecified reference in the Time-Range field, SPECIFIED for the Location-Specifier field, an unspecified reference in the Location field, and ~~TRUE~~ *FALSE* for the Enable field.

[Change **Clause 12.34.10.1**, p. 343]

12.34.10.1 Initializing New Array Elements When the Array Size is Increased

If the size of the Positive_Access_Rules array is increased without initial values being provided, then the new array elements, for which no initial value is provided, shall be initialized to contain SPECIFIED for the Time-Range-Specifier field, an unspecified reference in the Time-Range field, SPECIFIED for the Location-Specifier field, an unspecified reference in the Location field, and ~~TRUE~~ *FALSE* for the Enable field.

ANSI/ASHRAE Addendum ae to ANSI/ASHRAE Standard 135-2010

135-2010*ae*-3. Replace Master_Exemption Property of the Access Credential Object Type

Rationale

Remove the Master_Exemption, Passback_Exemption and Occupancy_Exemption properties and add a new property, Authorization_Exemption, which is a list of authorization exemptions for this credential. Add additional exemptions for all additional authorization modes in the access point. Allow vendors to add proprietary authorization exemptions.

[Change Table 12-40, p. 345]

Table 12-40. Properties of the Access Credential Object Type

Property Identifier	Property Datatype	Conformance Code
…		
Authorization_Exemptions	*List of BACnetAuthorizationException*	*O*
~~Master_Exemption~~	~~BOOLEAN~~	~~O~~
~~Passback_Exemption~~	~~BOOLEAN~~	~~O~~
~~Occupancy_Exemption~~	~~BOOLEAN~~	~~O~~
Profile_Name	CharacterString	O

[Delete Clauses 12.35.25 through 12.35.27, p. 351]

~~12.35.25   Master_Exemption~~

~~This optional property, of type BOOLEAN, specifies a master exemption from authorization checks. Once authenticated, the credential, if active, is exempted from all standard authorization checks if master exemption is enabled (TRUE). It is a local matter as to whether the credential is exempted from proprietary authorization checks.~~

~~12.35.26   Passback_Exemption~~

~~This optional property, of type BOOLEAN, specifies an exemption from passback enforcement. If passback exemption is enabled (TRUE), then the credential is not denied access due to passback violations.~~

~~12.35.27   Occupancy_Exemption~~

~~This optional property, of type BOOLEAN, specifies an exemption from occupancy enforcement. If occupancy exemption is enabled (TRUE), then the occupancy count in the Access Zone object shall be updated as normal; however, the access credential shall not be denied access due to occupancy limit enforcement.~~

[Add new Clause 12.35.X for Access Credential Object Type, p. 351]

12.35.X   Authorization_Exemptions

This optional property, of type List of BACnetAuthorizationException, specifies the authorization checks from which this credential is exempt. When a credential is exempt from an authorization check, the access attempt shall not be denied due to this authorization criterion.

The following authorization exemption values are defined:

PASSBACK	The credential is exempt from passback enforcement. If a passback exemption is enabled for this credential, then the credential shall not be denied access due to passback violations.
OCCUPANCY_CHECK	The credential is exempt from occupancy enforcement. If an occupancy exemption is enabled for this credential, then the occupancy count in the Access Zone object shall be updated as normal; however, the access credential shall not be denied access due to occupancy limit enforcement.
ACCESS_RIGHTS	The credential is exempt from standard access rights checks at the access point. If an access rights exemption is enabled for this credential, then the credential shall not be denied access due to having insufficient access rights.
LOCKOUT	The credential is exempt from lockout enforcement at an access controlled point. If a lockout exemption is enabled for this credential, then the credential shall not be denied access due to the access controlled point being locked out.
DENY	The credential is exempt from being denied access due to the Authorization_Mode property of the Access Point object having the value DENY_ALL.
VERIFICATION	The credential is exempt from requiring secondary verification at an access controlled point when the Authorization_Mode property has the value VERIFICATION_REQUIRED.
AUTHORIZATION_DELAY	The credential is exempt from an authorization delay at an access controlled point when the Authorization_Mode has the value AUTHORIZATION_DELAYED.
<Proprietary Enum Values>	A vendor may use other proprietary enumeration values for exempting the credential from specific proprietary authorization checks. For proprietary extensions of this enumeration, see Clause 23 of this standard.

[Change **Clause 12.34.9.2,** p. 342]

12.34.9.2   Access Rules Authorization Check

...

If the respective Access Credential object ~~has a master exemption~~ *contains the value ACCESS_RIGHTS in the Authorization_Exemptions property*, then this authorization check is not performed and always considered successful.

[Change **Clause 12.31.14,** p. 317]

12.31.14   Authorization_Mode

This property, of type BACnetAuthorizationMode, determines how authorization is performed at the Access Point. An Access Point object is not required to support all of these authorization modes but is required to support at least AUTHORIZE.

AUTHORIZE	The access rights of an active credential are evaluated, in addition to other possible authorization checks. *If a credential has the value ACCESS_RIGHTS in the Authorization_Exemptions property, then access is granted unless other authorizations checks fail.*
GRANT_ACTIVE	An active credential is granted access without evaluating the access rights assigned to the credential. Other authorization checks can still lead to denying access.
DENY_ALL	All credentials are denied access and the Access_Event property is set to DENIED_DENY_ALL. ~~When a credential has a master exemption it is granted access unless other authorization checks fail.~~ *If a credential has the value DENY in the Authorization_Exemptions property, then access is granted unless other authorizations checks fail.*
VERIFICATION_REQUIRED	The access rights of an active credential are evaluated, *unless an ACCESS_RIGHTS exemption exists for this credential*, in addition to other possible authorization checks. Granting access requires external verification. In this case the Access_Event property is set to VERIFICATION_REQUIRED and the access point waits for the external verification. The external verification process and the mechanism by which the verification result is provided to the access point is a local matter.

If the external verification process denies access, then the Access_Event property shall be set to DENIED_VERIFICATION_FAILED.

If there is no external verification result within the time specified by the Verification_Time property, then the Access_Event property shall be set to DENIED_VERIFICATION_TIMEOUT.

If the credential has a VERIFICATION exemption, then the external verification step shall be omitted. |
| AUTHORIZATION_DELAYED | The access rights of an active credential are evaluated, *unless an ACCESS_RIGHTS exemption exists for this credential*, in addition to other possible authorization checks. Granting access is delayed by the time specified by the Verification_Time property. This provides an external verification process the opportunity to deny access. In this case the Access_Event property is set to AUTHORIZATION_DELAYED and the access point waits for the external verification. The external verification process and the mechanism by which the verification result is provided to the access point is a local matter.

If the external verification process denies access within the time specified in the Verification_Time property then the Access_Event property shall be set to DENIED_VERIFICATION_FAILED.

If there is no external verification result within the time specified by the Verification_Time property then this authorization check succeeded.

If the credential has an AUTHORIZATION_DELAY exemption, then the authorization delay step shall be omitted. |

NONE   No authorization functionality takes place at this access point and no authorization events (e.g., grant or any deny events) are generated. This may be used to implement special access point functionality, such as a guard tour or muster point, where authorization checks are not required.

<Proprietary Enum Values>   A vendor may use other proprietary enumeration values to allow proprietary authorization modes other than those defined by the standard. For proprietary extensions of this enumeration, see Clause 23.1 of this standard.

[Change **Clause 12.31.16,** p. 319]

12.31.16   Lockout

This optional property, of type BOOLEAN, is an indication whether (TRUE) or not (FALSE) the access controlled point this object represents is in a lockout state. When the access point is in a lockout state, any access request shall always be denied, except for an active credential ~~that has a master exemption~~ *for which the value LOCKOUT is contained in the Authorization_Exemptions property of the corresponding Access Credential object*. For each denied access request, the Access_Event property shall be set to DENIED_LOCKOUT. An Access Point object may be set to a lockout state due to too many failed access attempts, as defined in the Max_Failed_Attempts property, or by writing TRUE to this property.

[Change **Clause 21 BACnetPropertyIdentifier production,** p. 613]

BACnetPropertyIdentifier ::= ENUMERATED { -- see below for numerical order

```
    ...
    authentication-status              (260),
    authorization-exemptions           (364),
    ...
    masked-alarm-values                (234),
    master-exemption                   (284),
    ...
    occupancy-count-enable             (292),
    occupancy-exemption                (293),
    ...
    packet-reorder-time                (333),
    passback-exemption                 (299),
    ...
    -- see occupancy-count-enable      (292),
    -- see formerly: occupancy-exemption   (293),    removed in version 1 revision 13
    ...
    -- see occupancy-upper-limit-enforced  (298),
    -- see formerly: passback-exemption    (299),    removed in version 1 revision 13
    ...
    -- see lockout-relinquish-time     (283),
    -- see formerly: master-exemption  (284),    removed in version 1 revision 13
    ...
    -- see event-message-texts         (351),
    -- see authorization-exemptions    (364),
}
```

[Add to **Clause 21**, p. 588]

BACnetAuthorizationException ::= ENUMERATED {
*   passback   (0),*
*   occupancy-check   (1),*
*   access-rights   (2),*

ANSI/ASHRAE Addendum ae to ANSI/ASHRAE Standard 135-2010

                    lockout   *(3),*
                    deny   *(4),*
                    verification   *(5),*
                    authorization-delay *(6),*
                    ...
                    }

   -- Enumerated values 0-63 are reserved for definition by ASHRAE. Enumerated values
   -- 64-255 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
...	...	...
BACnetAuthorizationExemption	*0-63*	*255*
...	...	...

135-2010*ae*-4. Add Enumerations to Door_Status and Lock Status in Access Door Object Type.

Rationale

Add a DOOR_FAULT enumeration to the Door_Status property to provide a means of indicating that the input associated with the door contact is unreliable. Also, change Lock_Status to avoid the use of the plain term "FAULT", which has a well established meaning elsewhere in the standard.

The UNKNOWN enumeration of the Lock_Status property is changed to be consistent with the definition of UNKNOWN in the Door_Status property.

Add an UNUSED enumeration to both the Door_Status and Lock_Status properties to be used when the properties exist but there is no physical status associated with the property. The Secured_Status property is modified to reflect these new enumerations. Note that the numerical enumeration values preserve backward compatibility.

[Change **Clause 12.26.12,** p. 282]

12.26.12 Door_Status

This optional property, of type BACnetDoorStatus, represents the open or closed state of the physical door. The values that may be taken on by this property are:

CLOSED	The door is closed.
OPENED	The door is open or partially open.
UNKNOWN	It is unknown whether the door is opened or closed.
DOOR_FAULT	*The door status input associated with the physical door is unreliable.*
UNUSED	*There is no door status input associated with the door.*

This property, if present, is required to be writable when Out_Of_Service is TRUE.

[Change **Clause 12.26.13,** p. 282]

12.26.13 Lock_Status

This optional property, of type BACnetLockStatus, represents the monitored (as opposed to the commanded) status of the door lock. The values that may be taken on by this property are:

LOCKED	The door lock is locked.
UNLOCKED	The door lock is unlocked.
UNKNOWN	*It is unknown whether the door lock is locked or unlocked*.
~~FAULT~~*LOCK_FAULT*	The lock status input associated with the door lock is unreliable.
~~UNKNOWN~~*UNUSED*	There is no lock status input associated with the door ~~and therefore the status of the physical lock is unknown~~.

This property, if present, is required to be writable when Out_Of_Service is TRUE.

[Change **Clause 12.26.14,** p. 282]

12.26.14 Secured_Status

This optional property, of type BACnetDoorSecuredStatus, represents whether or not the physical door is in a secured state. This property shall have a value of SECURED if, and only if, all of the following conditions are met:

(a) the IN_ALARM flag of the Status_Flags property is FALSE, and
(b) the Masked_Alarm_Values list, if it exists, is empty , and
(c) the Door_Status property has a value of CLOSED *or UNUSED*, and
(d) the Present_Value property has a value of LOCK, *and*
(e) the Lock_Status property, if it exists, has a value of LOCKED or ~~UNKNOWN~~*UNUSED*.

If one or more of the previous conditions are not met, *then* the property shall have a value of UNSECURED. If the device *cannot* ~~can not~~ determine any of the previous conditions, then the property shall have a value of UNKNOWN.

[Change **Clause 21**, **BACnetDoorStatus** enumeration, p. 590]

BACnetDoorStatus ::= ENUMERATED {
        closed   (0),
        opened   (1),
        unknown   (2),
        door-fault   *(3),*
        unused   *(4)*
        }

[Change **Clause 21**, **BACnetLockStatus** enumeration, p. 605]

BACnetLockStatus ::= ENUMERATED {
        locked   (0),
        unlocked   (1),
        ~~fault~~ *lock-fault*   (2),
        ~~unknown~~ *unused* (3),
        unknown   *(4)*
        }

135-2010*ae*-5. Clarify the behavior of Door_Unlock_Delay_Time and Present_Value of Access Door

Rationale

When the Door_Unlock_Delay_Time property has a non-zero value the door lock shall delay unlocking for that period of time when a PULSE_UNLOCK or EXTENDED_PULSE_UNLOCK value is written to the Present_Value property. This does not apply when an UNLOCK value is written to the Present_Value. This change clarifies the behavior of an unlock delay time.

[Change **Clause 12.26.4**, p. 280]

12.26.4 Present_Value (Commandable)

This property, of type BACnetDoorValue, reflects the current active command of the access door object. The Present_Value is commandable and has one of the following values:

LOCK	The door is commanded to the locked state.
UNLOCK	The door is commanded to the unlocked state.
PULSE_UNLOCK	The door will be commanded to the unlocked state for a maximum of the time specified by Door_Pulse_Time, after which the value will be automatically relinquished from the priority array at the commanded priority. It is permissible for the local controller to relinquish the value from the priority array before the time specified by Door_Pulse_Time has expired. The conditions when this may occur are considered a local matter.

If an unlock delay is in effect when the value of PULSE_UNLOCK is written at the given priority, then the door shall remain in the locked state for Door_Unlock_Delay_Time tenths of seconds before it is commanded to the unlocked state.

If a value of PULSE_UNLOCK is written at a given priority and the Present_Value is currently being commanded, at any value, at a higher priority then the lower priority value will be relinquished immediately.

EXTENDED_PULSE_UNLOCK — The door will be commanded to the unlocked state for a maximum of the time specified by Door_Extended_Pulse_Time, after which the value will be automatically relinquished from the priority array at the commanded priority. It is permissible for the local controller to relinquish the value from the priority array before the time specified by Door_Extended_Pulse_Time has expired. The conditions when this may occur are considered a local matter.

If an unlock delay is in effect when the value of EXTENDED_PULSE_UNLOCK is written at the given priority, then the door shall remain in the locked state for Door_Unlock_Delay_Time tenths of seconds before it is commanded to the unlocked state.

If a value of EXTENDED_PULSE_UNLOCK is written at a given priority and the Present_Value is currently being commanded, at any value, at a higher priority then the lower priority value will be relinquished immediately.

...

ANSI/ASHRAE Addendum ae to ANSI/ASHRAE Standard 135-2010

[Add a new entry to **History of Revisions**, p. 1006]

(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

…	…	…
1	13	**Addendum *ae* to ANSI/ASHRAE 135-2010** Approved by the ASHRAE Standards Committee June XX, 2011; by the ASHRAE Board of Directors June XX, 2011; and by the American National Standards Institute June XX, 2011. 1. Add a "Too large" error condition to the ERROR authentication encoding 2. Simplify the Initialization of Negative and Positive Access Rules 3. Replace Master_Exemption Property of the Access Credential Object Type 4. Add Fault Enumeration to Door_Status in Access Door Object Type 5. Clarify the behavior of Door_Unlock_Delay_Time and Present_Value of Access Door

**POLICY STATEMENT DEFINING ASHRAE'S CONCERN
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.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the standards and guidelines as established by itself and other responsible bodies.

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.

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.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

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.