



# ADDENDA

**ANSI/ASHRAE Addendum ak to  
ANSI/ASHRAE Standard 135-2010**

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

Approved by the ASHRAE Standards Committee on June 23, 2012; by the ASHRAE Board of Directors on June 27, 2012; and by the American National Standards Institute on June 28, 2012.

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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*ak* 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*ak*-1 Specify Address Range Requirements, p. 2**

**135-2010*ak*-2 Specify 'abort-reason' Values, p. 4**

**135-2010*ak*-3 Add Serial\_Number Property, p. 5**

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 ~~strike through~~. Where entirely new subclauses are proposed to be added, plain type is used throughout.

## 135-2010ak-1 Specify Address Range Requirements

### Rationale

The standard currently does not specify what ranges of device instances and MAC addresses a device is required to support for its local identity; however, allowing devices to restrict the range is not in the best interest of interoperability. Therefore, explicit requirements will be stated.

[Add new entry to **Clause 3.2**, p 1]

**configurable**: a property, setting, or value in a device is configurable if it can be changed via BACnet services or some other method. A property, setting, or value that is one-time writable or not changeable in situ is not considered to be configurable.

[Change **Clause 22.1.5**, p 633]

### 22.1.5 Minimum Device Requirements

A device that conforms to the BACnet protocol and contains an application layer shall:

- (a) contain exactly one Device object,
- (b) execute the ReadProperty service,
- (c) execute the Who-Has and Who-Is services (and thus initiate the I-Have and I-Am services) unless the device is an MS/TP slave device,
- (d) execute the WriteProperty service if the device executes the WritePropertyMultiple, AddListElement or RemoveListElement services,
- (e) allow the WriteProperty service to modify any properties that are modifiable by the AddListElement or RemoveListElement services, ~~and~~
- (f) execute the WriteProperty service if the device contains any objects with properties that are required to be writable, *and*
- (g) *have a configurable device instance that can take on any value across the range 0 .. 4194302.*

[Change **Clause 8.2**, p. 77]

### 8.2 Parameters Required by the LLC Primitives

The DL-UNITDATA primitive requires source address, destination address, data, and priority parameters. The source and destination addresses each consist of the logical concatenation of a medium access control (MAC) address, link service access point (LSAP), and a system code (SC). The MAC address is a 1-octet value determined by the network interface hardware; the LSAP used to indicate that an LSDU contains BACnet data is the single octet value X'82'; and the SC used to indicate a BACnet frame is the single-octet value X'CD'. The data parameter is the NPDU from the network layer. Since the ARCNET MAC sublayer only operates at a single priority with only one class of service, the value of the priority parameter is not specified in this standard.

*BACnet ARCNET devices shall support a settable MAC address and shall be able to be set to any valid unicast MAC address. Where a device has multiple ARCNET ports, each port shall be settable to any valid value regardless of the MAC address settings of the other ARCNET ports.*

[Change **Clause 9.3**, paragraph 4, p. 92]

The Destination and Source Addresses are one octet each. A Destination Address of 255 (X'FF') denotes broadcast. A Source Address of 255 is not allowed. Addresses 0 to 127 are valid for both master and slave nodes. Addresses 128 to 254 are valid only for slave nodes.

*MS/TP devices shall support configurable MAC addresses, and each shall be able to be set to any valid unicast address (0..127 for masters and 0..254 for slaves). Where a device has multiple MS/TP ports, the MAC address of each port shall be settable to any valid value regardless of the MAC address settings of the other MS/TP ports.*

[Change **Clause J.1.2**, p. 832]

### J.1.2 Addressing within B/IP Networks

In the case of B/IP networks, six octets consisting of the four-octet IP address followed by a two-octet UDP port number (both of which shall be transmitted most significant octet first) shall function analogously to the MAC address of the technologies of Clauses 7, 8, 9, and 11 with respect to communication between individual devices and inclusion in the Clause 6 NPCI, where a DADR or SADR is required. This address shall be referred to as a B/IP address. The default UDP port for both directed messages and broadcasts shall be X'BAC0' and all B/IP devices shall support it. In some cases, e.g., a situation where it is desirable for two groups of BACnet devices to coexist independently on the same IP subnet, the UDP port may be configured locally to a different value without it being considered a violation of this protocol. Where the "B/IP broadcast address" is referred to in this Annex, it means an IP address with the subnet of the broadcasting device in the network portion and all 1's in the host portion of the address and the UDP port of the devices on the B/IP network in question. An IP multicast address in conjunction with an appropriate UDP port may be used in lieu of the B/IP broadcast address under the circumstances defined in J.8.

*B/IP devices shall support configurable IP addresses and each shall be able to be set to any valid unicast IP address. B/IP devices shall also support a configurable UDP port number and shall support, at a minimum, values in the ranges 47808 - 47823 and 49152 - 65535. For B/IP devices that support multiple B/IP ports, the UDP port number for each B/IP port shall be settable across the above noted valid range.*

## 135-2010ak-2 Specify 'abort-reason' Values

### Rationale

In the transport state machine descriptions, one or more cases exist where the TSM is instructed to send an Abort-PDU to the other device and indicate an abort to the application layer, but the abort reason to be included in the PDU is not specified.

[Change **Clause 5.4.4.1**, IDLE, p.28]

#### UnexpectedSegmentInfoReceived

If an unexpected PDU indicating the existence of an active server TSM (BACnet-ComplexACK-PDU with 'segmented-message' = TRUE or BACnet-SegmentACK-PDU with 'server' = TRUE) is received from the network layer,

then issue an N-UNITDATA.request with 'data\_expecting\_reply' = FALSE to transmit a BACnet-Abort-PDU with 'server' = FALSE and 'abort-reason' = *INVALID\_APDU\_IN\_THIS\_STATE* and enter the IDLE state.

[Change **Clause 5.4.5.2**, SEGMENTED\_REQUEST, p.38]

#### UnexpectedPDU\_Received

If an unexpected PDU (BACnet-Confirmed-Request-PDU with 'segmented-message' = FALSE or BACnet-SegmentACK-PDU with 'server' = FALSE) that is secured with the same settings as the original PDU is received from the network layer,

then stop SegmentTimer; issue an N-UNITDATA.request with 'data\_expecting\_reply' = FALSE to transmit a BACnet-Abort-PDU with 'server' = TRUE; and 'abort-reason' = *INVALID\_APDU\_IN\_THIS\_STATE* and enter the IDLE state.

### 135-2010ak-3 Add Serial\_Number Property

#### Rationale

The standard currently does not have a specific way to define a serial number. The logical place would be in the device object, but there is no specific property to hold this information. For this reason, the serial number is often mentioned in the device description, for example, “Controller Chiller (SN 12445XYZ6789).” This change provides a standard property to hold this information.

[Change Table 12.13, Properties of the Device Object Type, p. 196]

Property Identifier	Property Datatype	Conformance Code
...	...	...
Interval_Offset	Unsigned	O <sup>14</sup>
Serial_Number	CharacterString	O
Profile_Name	CharacterString	O
...	...	...

[Change Clause 12.11.6. p. 198]

#### 12.11.6 Vendor\_Identifier

This *read-only* property, of type Unsigned16, is a unique vendor identification code, assigned by ASHRAE, which is used to distinguish proprietary extensions to the protocol. See Clause 23.

[Change Clause 12.11.7. p. 198]

#### 12.11.7 Model\_Name

This *read-only* property, of type CharacterString, is assigned by the vendor to represent the model of the BACnet Device.

[Add new Clause 12.11.X, p. 204]

#### 12.11.X Serial\_Number

This *read-only* property, of type CharacterString, is assigned by the vendor to represent the serial number in a vendor-specific model series. The combination of Model\_Name, Vendor\_Identifier and Serial\_Number uniquely identifies a device.

[Change Clause 21, p. 613]

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

```

...
segmentation-supported (107),
serial-number (372),
...
-- -numerical order reference
...
-- see serial-number (7372),
}

```

[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	14	<b>Addendum <i>ak</i> to ANSI/ASHRAE 135-2010</b> Approved by the ASHRAE Standards Committee <b>June 23, 2012</b> ; by the ASHRAE Board of Directors <b>June 27, 2012</b> ; and by the American National Standards Institute <b>June 28, 2012</b> .  <ol style="list-style-type: none"><li>1. Specify Address Range Requirements</li><li>2. Specify 'abort-reason' Values</li><li>3. Add Serial_Number Property</li></ol>



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FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES**

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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.

