ASHRAE STANDARD

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

Approved American National Standard

ANSI

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Addendum 135*m* to ANSI/ASHRAE Standard 135-2004 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.

135-2004*m*-1. Resolve Foreign Device registration grace period and remaining time ambiguities, p. 1.
135-2004*m*-2. Improve Clause 5 FillWindow segment timeout constraints, p. 2.
135-2004*m*-3. Clarify the Priority Filter parameter in the GetEnrollmentSummary service request, p. 4.
135-2004*m*-4. Allow alarms to be re-acknowledged successfully, p. 5.
135-2004*m*-5. Add requirements to Alarm and Event BIBBs, p. 6.
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135-2004*m*-7. Clarify that a device may support only the ReinitializeDevice restart choices, p. 9.
135-2004*m*-8. Clarify DeviceCommunicationsControl and ReinitializeDevice interactions, p. 10.
135-2004*m*-9. Define "object," p. 13.
135-2004*m*-10. Add a Deadband property to the Loop object, p.14.
135-2004*m*-11. Correct the TO-FAULT conditions in the Life Safety objects' Reliability properties, p. 16.
135-2004*m*-12. Clarify the Trend Log's acquisition of Status_Flags, p.17.

In the following document, language to be added to existing clauses of ANSI/ASHRAE 135-2004 and Addenda is indicated through the use of *italics*, while deletions are indicated by ~~strikethrough~~. Where entirely new subclauses are added, plain type is used throughout.

135-2004*m*-1. Resolve Foreign Device registration grace period and remaining time ambiguities.

Rationale
When an Annex J Foreign Device registers with a BBMD, it supplies a period of time for which the registration should remain active. The BBMD adds a 30 second grace period to this time, after which it will purge the registrant's entry in the Foreign Device Table (FDT). The amount of time remaining for registrations can be read from the FDT, but it has not been clear whether this time included the 30 second grace period.

Addendum 135-2004*m*-1

[Change Annex **J.2.8.1**, pp. 567-568.]

J.2.8.1 Read-Foreign-Device-Table-Ack: Format

The Read-Foreign-Device-Table-Ack message consists of four fields:

BVLC Type: 1-octet   X'81'   BVLL for BACnet/IP
BVLC Function: 1-octet   X'07'   Read-Foreign-Device-Table-Ack
BVLC Length: 2-octets L   Length L, in octets, of the BVLL message
List of FDT Entries: N*10-octets

N indicates the number of entries in the FDT whose contents are being returned. Each returned entry consists of the 6-octet B/IP address of the registrant; the 2-octet Time-to-Live value supplied at the time of registration; and a 2-octet value representing the number of seconds remaining before the BBMD will purge the registrant's FDT entry if no re-registration occurs. *The time remaining includes the 30 second grace period as defined in J.5.2.3.*

[Change Annex **J.5.2.1**, p. 571.]

J.5.2.1 Foreign Device Table

Each device that registers as a foreign device shall be placed in an entry in the BBMD's Foreign Device Table (FDT). Each entry shall consist of the 6-octet B/IP address of the registrant; the 2-octet Time-to-Live value supplied at the time of registration; and a 2-octet value representing the number of seconds remaining before the BBMD will purge the registrant's FDT entry if no re-registration occurs. ~~This value will~~ *The number of seconds remaining shall* be initialized to the 2-octet Time-to-Live value supplied at the time of ~~registration.~~ *registration plus 30 seconds (see J.5.2.3), with a maximum of 65,535.*
…

[Change Annex **J.5.2.3**, p. 572.]

J.5.2.3 Foreign Device Table Timer Operation

Upon receipt of a BVLL Register-Foreign-Device message, a BBMD shall start a timer with a value equal to the Time-to-Live parameter supplied plus a fixed grace period of 30 seconds. If, within the period during which the timer is active, another BVLL Register-Foreign-Device message from the same device is received, the timer shall be reset and restarted. If the time expires without the receipt of another BVLL Register-Foreign-Device message from the same foreign device, the FDT entry for this device shall be cleared.

~~Upon receipt of a BVLC-Result message containing a result code of X'0000' indicating the successful completion of the registration, a foreign device shall start a timer with a value equal to the Time-to-Live parameter of the preceding Register-Foreign-Device message. At the expiration of the timer, the foreign device shall re-register with the BBMD by sending a BVLL Register-Foreign-Device message.~~

135-2004*m*-2. Improve Clause 5 FillWindow segment timeout constraints.

Rationale
There is a potential for unnecessary segment timeouts, depending upon the implementation of the Clause 5.4.3 FillWindow function, caused by starting the SegmentTimer before calling FillWindow. Starting SegmentTimer after calling FIllWindow may reduce this possibility.

Addendum 135-2004*m*-2

[Change Clause **5.4.4.2**, p. 27.]

5.4.4.2 SEGMENTED_REQUEST

In the SEGMENTED_REQUEST state, the device waits for a BACnet-SegmentACK-PDU for one or more segments of a BACnet-Confirmed-Request-PDU.

DuplicateACK_Received
> If a BACnet-SegmentACK-PDU whose 'server' parameter is TRUE is received from the network layer and InWindow('sequence-number' parameter of the BACnet-SegmentACK-PDU, InitialSequenceNumber) returns a value of FALSE,

> then restart SegmentTimer and enter the SEGMENTED_REQUEST state to await an acknowledgment.

NewACK_Received
> If a BACnet-SegmentACK-PDU whose 'server' parameter is TRUE is received from the network layer and InWindow ('sequence-number' parameter of the BACnet-SegmentACK-PDU, InitialSequenceNumber) returns a value of TRUE and there is at least one segment remaining to send,

> then set InitialSequenceNumber equal to the 'sequence-number' parameter of the BACnet-SegmentACK-PDU plus one, modulo 256; set ActualWindowSize equal to the 'actual-window-size' parameter of the BACnet-SegmentACKPDU; ~~restart SegmentTimer;~~ set SegmentRetryCount to zero; call FillWindow (InitialSequenceNumber) to transmit one or more BACnet-Confirmed-Request-PDUs containing the next ActualWindowSize segments of the message; *restart SegmentTimer;* and enter the SEGMENTED_REQUEST state to await an acknowledgment.

FinalACK_Received
> If a BACnet-SegmentACK-PDU whose 'server' parameter is TRUE is received from the network layer and InWindow ('sequence-number' parameter of the BACnet-SegmentACK-PDU, InitialSequenceNumber) returns a value of TRUE and there are no more segments to send,

> then stop SegmentTimer; start RequestTimer; and enter the AWAIT_CONFIRMATION state to await a reply.

Timeout
> If SegmentTimer becomes greater than T_{seg} and SegmentRetryCount is less than N_{retry},

> then increment SegmentRetryCount; ~~restart SegmentTimer;~~ call FillWindow(InitialSequenceNumber) to retransmit one or more BACnet-Confirmed-Request-PDUs containing the next ActualWindowSize segments of the message; *restart SegmentTimer;* and enter the SEGMENTED_REQUEST state to await an acknowledgment.

FinalTimeout
> If SegmentTimer becomes greater than T_{seg} and SegmentRetryCount is greater than or equal to N_{retry},then stop SegmentTimer; send CONF_SERV.confirm(-) to the local application program; and enter the IDLE state.

[Change Clause **5.4.5.4**, pp. 35-36.]

5.4.5.4 SEGMENTED_RESPONSE

In the SEGMENTED_RESPONSE state, the device waits for a BACnet-SegmentACK-PDU for a segment or segments of a BACnet-ComplexACK-PDU.

DuplicateACK_Received
If a BACnet-SegmentACK-PDU whose 'server' parameter is FALSE is received from the network layer and InWindow('sequence-number' parameter of the BACnet-SegmentACK-PDU, InitialSequenceNumber) returns a value of FALSE,

then restart SegmentTimer and enter the SEGMENTED_RESPONSE state to await an acknowledgment or timeout.

NewACK_Received
If a BACnet-SegmentACK-PDU whose 'server' parameter is FALSE is received from the network layer and InWindow('sequence-number' parameter of the BACnet-SegmentACK-PDU, InitialSequenceNumber) returns a value of TRUE and there is at least one segment remaining to send,

then set InitialSequenceNumber equal to the 'sequence-number' parameter of the BACnet-SegmentACK-PDU plus one, modulo 256; set ActualWindowSize equal to the 'actual-window-size' parameter of the BACnet-SegmentACKPDU; ~~restart SegmentTimer;~~ set SegmentRetryCount to zero; call FillWindow(InitialSequenceNumber) to issue an N-UNITDATA.request with 'data_expecting_reply' = TRUE to transmit one or more BACnet-ComplexACK-PDUs containing the next ActualWindowSize segments of the message; *restart SegmentTimer;* and enter the SEGMENTED_RESPONSE state to await an acknowledgment.

FinalACK_Received
If a BACnet-SegmentACK-PDU whose 'server' parameter is FALSE is received from the network layer and InWindow('sequence-number' parameter of the BACnet-SegmentACK-PDU, InitialSequenceNumber) returns a value of TRUE and there are no more segments to send,

then stop SegmentTimer and enter the IDLE state.

Timeout
If SegmentTimer becomes greater than T_{seg} and SegmentRetryCount is less than Number_Of_APDU_Retries,

then increment SegmentRetryCount; ~~restart SegmentTimer;~~ call FillWindow(InitialSequenceNumber) to reissue an N-UNITDATA.request with 'data_expecting_reply' = TRUE to transmit one or more BACnet-ComplexACK-PDUs containing the next ActualWindowSize segments of the message; *restart SegmentTimer;* and enter the SEGMENTED_RESPONSE state to await an acknowledgment.

FinalTimeout
If SegmentTimer becomes greater than T_{seg} and SegmentRetryCount is greater than or equal to Number_Of_APDU_Retries,

then stop the SegmentTimer, and enter the IDLE state.

135-2004*m*-3. Clarify the Priority Filter parameter in the GetEnrollmentSummary service request.

Rationale
Since the entry in the GetEnrollmentSummary response indicates the current Event State of the event generating object, the Priority parameter should indicate the priority of the corresponding transition. For example, if the Event State of the returned event generating object is High_Limit, then the value of the Priority parameter must be the To-OffNormal priority from the related Notification Class object.

Addendum 135-2004*m*-3

[Change Clause **13.11.1.1.5**, p. 282.]

13.11.1.1.5 Priority Filter

This parameter consists of two parts, MinPriority and MaxPriority, each of datatype Unsigned8. It provides a means of restricting the summary to only those event-initiating objects that can generate event notifications with a Priority as specified by this parameter. The 'Priority Filter' parameter consists of two parts, MinPriority and MaxPriority. All event-initiating objects, such that MinPriority ≤ Priority ≤ MaxPriority, shall be included in the summary. *For the purpose of this filter, the Priority checked by the filter is the Priority associated with the most recent transition.* If 'Priority Filter' is omitted, all event-initiating objects shall be summarized without regard to their Priority.

135-2004*m*-4. Allow alarms to be re-acknowledged successfully.

Rationale
The language in Clause 13.5.2 is unclear on whether or not an acknowledgement should succeed or fail if the latest transition has already been acknowledged. This is changed so that the AcknowledgeAlarm service will succeed even if the transition was previously acknowledged.

Addendum 135-2004*m*-4

[Change Clause **13.5.2**, p. 270.]

13.5.2 Service Procedure

After verifying the validity of the request, the responding BACnet-user shall attempt to locate the specified object. If the object exists and if the 'Time Stamp' parameter matches the most recent time for the event being acknowledged, then the bit in the Acked_Transitions property of the object that corresponds to the value of the 'Event State Acknowledged' parameter is *shall be set* ~~acknowledged by changing the bit value~~ to ~~one~~*1*, ~~and~~ a 'Result(+)' primitive shall be issued*, and an event notification with a 'Notify Type' parameter equal to ACK_NOTIFICATION shall be issued*. Otherwise, a 'Result(-)' primitive shall be issued. ~~If the acknowledgment was successful, causing a 'Result(+)' to be issued, then an event notification, with a 'Notify Type' parameter equal to ACK_NOTIFICATION, shall also be issued. The~~ *An* acknowledgment notification shall use the same type of service (confirmed or unconfirmed) directed to the same recipients to which the original confirmed or unconfirmed event notification was sent.

135-2004*m*-5. Add requirements to Alarm and Event BIBBs.

Rationale
Several of the Alarm and Event BIBBs need additional requirements to better reflect the use of the required services.

Addendum 135-2004*m*-5

[Change Annex **K.22**, p. 580.]

K.2.2 BIBB - Alarm and Event-Notification Internal-B (AE-N-I-B)

Device B generates notifications about alarms and other events.

BACnet Service	Initiate	Execute
ConfirmedEventNotification	x	
UnconfirmedEventNotification	x	

Devices claiming conformance to AE-N-I-B shall also support either Intrinsic or Algorithmic reporting. Any device that supports the generation of event notifications that require operator acknowledgment ~~must~~ *shall* support ~~AE-ACK-B.~~ *AE-ACK-B and AE-INFO-B. Any device that supports the generation of TO-FAULT or TO-OFFNORMAL event notifications shall support AE-INFO-B.*

Devices that only support generation of life safety and/or buffer-ready notifications cannot claim support for this BIBB.

[Change Annex **K.2.3**, p. 580.]

K.2.3 BIBB - Alarm and Event-Notification External-B (AE-N-E-B)

Device B contains an Event Enrollment object that monitors values in another device. Device B is capable of generating event notifications for alarm conditions based on value(s) in another device. Devices conforming to this BIBB ~~must~~ *shall* conform to DS-RP-A, AE-N-I-B, and ~~must~~ *shall* support at least 1 Event Enrollment object with an Object_Property_Reference property that supports references to properties in objects contained in other devices. Any device that supports the generation of event notifications that require operator acknowledgment ~~must~~ *shall* support ~~AE-ACK-B.~~ *AE-ACK-B and AE-INFO-B. Any device that supports the generation of TO-FAULT or TO-OFFNORMAL event notifications shall support AE-INFO-B.*

Devices that only support Event Enrollment objects that only support generation of life safety and/or buffer-ready notifications cannot claim support for this BIBB.

[Change Annex **K.2.13**, p. 581.]
[Note: Annex **K.2.13** was modified in Addendum 135-2004*d*-4.]

K.2.13 BIBB - Alarm and Event-LifeSafety-B (AE-LS-B)

Life safety device B is able to generate life safety notifications and is able to process silence and reset operations on its life safety objects.

BACnet Service	Initiate	Execute
LifeSafetyOperation		x
ConfirmedEventNotification	x	
UnconfirmedEventNotification	x	

Devices claiming conformance to AE-LS-B shall support at least one instance of a Life Safety Point or Life Safety Zone object *and shall be able to generate ConfirmedEventNotification and UnconfirmedEventNotification service requests describing CHANGE_OF_LIFE_SAFETY event transitions.*

Any device that supports the generation of event notifications that require operator acknowledgment shall support AE-ACK-B and AE-INFO-B. Any device that supports the generation of TO-FAULT or TO-OFFNORMAL event notifications shall support AE-INFO-B.

135-2004*m*-6. Remove B-BC requirements for BIBBs without use cases.

Rationale
The standard requires the DS-COVU-A,B and DM-DOB-A BIBBs to be supported by B-BC devices, but there are no interoperable/configurable use cases for these BIBBs.

Addendum 135-2004*m*-6

[Change Annex **L.7**, p. 593.]

L.7 Profiles of the Standard BACnet Devices

The following tables indicate which BIBBs must be supported by each device type for each interoperability area.

	B-OWS	**B-BC**	**B-AAC**	**B-ASC**	**B-SA**	**B-SS**
Data Sharing	DS-RP-A,B	DS-RP-A,B	DS-RP-B	DS-RP-B	DS-RP-B	DS-RP-B
	DS-RPM-A	DS-RPM-A,B	DS-RPM-B	DS-WP-B	DS-WP-B	
	DS-WP-A	DS-WP-A,B	DS-WP-B			
	DS-WPM-A	DS-WPM-B	DS-WPM-B			
		~~DS-COVU-A,B~~				

…

	B-OWS	**B-BC**	**B-AAC**	**B-ASC**	**B-SA**	**B-SS**
Device &	DM-DDB-A,B	DM-DDB-A,B	DM-DDB-B	DM-DDB-B		
Network Mgmt	DM-DOB-A,B	DM-DOB-~~A~~,B	DM-DOB-B	DM-DOB-B		
	DM-DCC-A	DM-DCC-B	DM-DCC-B	DM-DCC-B		
	DM-TS-A	DM-TS-B or DM-UTC-B	DM-TS-B or DM-UTC-B			
	DM-UTC-A					
	DM-RD-A	DM-RD-B	DM-RD-B			
	DM-BR-A	DM-BR-B				
	NM-CE-A	NM-CE-A				

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135-2004*m*-7. Clarify that a device may support only the ReinitializeDevice restart choices.

Rationale
ReinitializeDevice originally supported a set of restart choices. Subsequently device backup and restore capability was added, but the intent was not to require that ReinitializeDevice always support backup and restore.

Addendum 135-2004*m*-7

[Change Clause **16.4**, p. 330.]

16.4 ReinitializeDevice Service

The ReinitializeDevice service is used by a client BACnet-user to instruct a remote device to reboot itself (cold start), reset itself to some predefined initial state (warm start), or to control the backup or restore procedure. Resetting or rebooting a device is primarily initiated by a human operator for diagnostic purposes. Use of this service during the backup or restore procedure is usually initiated on behalf of the user by the device controlling the backup or restore. Due to the sensitive nature of this service, a password may be required from the responding BACnet-user prior to executing the service.

A BACnet device may support the ReinitializeDevice service by supporting only the restart choices COLDSTART and WARMSTART. Support for the backup and restore features of this service is claimed separately.

[Change Annex **K.5.15**, p. 586.]

K.5.15 BIBB - Device Management-ReinitializeDevice-A (DM-RD-A)

Devices claiming conformance to DM-RD-A shall be able to initiate ReinitializeDevice requests containing the Password parameter. ~~This shall be both for warm and cold start.~~ *Devices claiming conformance to DM-RD-A are only required to support the WARMSTART and COLDSTART service choices.*

[Change Annex **K.5.16**, p. 586.]

K.5.16 BIBB - Device Management- ReinitializeDevice-B (DM-RD-B)

The B device performs reinitialization requests from the A device. The optional password field shall be supported.

BACnet Service	Initiate	Execute
ReinitializeDevice		x

Devices claiming conformance to DM-RD-B are only required to support the WARMSTART and COLDSTART service choices.

[Change Annex **K.5.17**, p. 586.]

K.5.17 BIBB - Device Management- Backup and Restore-A (DM-BR-A)

Devices claiming conformance to DM-BR-A are required to support all service choices of the ReinitializeDevice service. In addition, devices~~Devices~~ *claiming conformance to DM-BR-A* ~~must~~*shall support the device A capabilities as described in 19.1.*

[Change Annex **K.5.18**, p. 586.]

K.5.18 BIBB - Device Management- Backup and Restore-B (DM-BR-B)

Devices claiming conformance to DM-BR-B are required to support all service choices of the ReinitializeDevice service. In addition, devices~~Devices~~ *claiming conformance to DM-BR-B* ~~must~~ *shall support the device B capabilities as described in 19.1. Once a Restore procedure has been initiated on the device, the Read_Only property of configuration File objects shall contain the value FALSE and the File_Size property of the configuration File objects shall be writable if the size of the configuration file can change based on the device's configuration.*

135-2004*m*-8. Clarify DeviceCommunicationsControl and ReinitializeDevice interactions.

Rationale
Devices with communications disabled via DeviceCommunicationControl should ignore ReinitializeDevice requests containing a 'Reinitialized State of Device' parameter value other than COLDSTART or WARMSTART.

Addendum 135-2004*m*-8

[Change Clause **16.1.1.1.1**, p. 328.]

16.1.1.1.1   Time Duration

This optional parameter, of type Unsigned16, indicates the number of minutes that the remote device shall ignore all APDUs except DeviceCommunicationControl and, if supported, ReinitializeDevice APDUs. If the 'Time Duration' parameter is not present, then the time duration shall be considered indefinite, meaning that only an explicit DeviceCommunicationControl or ReinitializeDevice APDU shall enable communications. The 'Time Duration' parameter shall be ignored and the time period considered to be indefinite if the 'Enable/Disable' parameter has a value of ENABLE.

If the responding BACnet-user does not have a clock and the time duration is not indefinite, then the request shall be considered invalid and the responding BACnet-user shall issue a Result(-) response.

[Change Clause **16.1.1.1.2**, p. 328.]

16.1.1.1.2   Enable/Disable

This parameter is an enumeration that may take on the values ENABLE, DISABLE, or DISABLE_INITIATION. It is used to indicate whether the responding BACnet-user is to enable all, disable initiation, or disable all communications on the network interface. When this parameter has a value of ENABLE, communications shall be enabled. When this parameter has a value of DISABLE, ~~all~~ *network* communications shall be disabled *as described in the DeviceCommunicationControl service procedure*. When this parameter has a value of DISABLE_INITIATION, the initiation of communications shall be disabled *as described in the DeviceCommunicationControl service procedure.* ~~When network communications are completely disabled, only DeviceCommunicationControl and ReinitializeDevice APDUs shall be processed and no messages shall be initiated. When the initiation of communications is disabled, all APDUs shall be processed and responses returned as required and no messages shall be initiated with the exception of I Am requests, which shall be initiated only in response to Who Is messages. In this state, a device that supports I Am request initiation shall send one I Am request for any Who Is request that is received if and only if the Who Is request does not contain an address range or the device is included in the address range.~~

[Change Clause **16.1.1.3.1**, p. 329]

16.1.1.3.1   Error Type

This parameter consists of two components 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
The password is invalid or absent when one is required	*SECURITY*	*PASSWORD_FAILURE*
The device does not have a clock and the 'Time Duration' parameter is not set to "indefinite"	*SERVICES*	*OPTIONAL_FUNCTIONALITY_NOT_ SUPPORTED*

16.1.2   Service Procedure

~~After verifying the validity of the request, including the password, the responding BACnet-user shall respond with a 'Result(+)' service primitive and, if the 'Enable/Disable' parameter is DISABLE, discontinue responding to any subsequent messages except DeviceCommunicationControl and, if supported, ReinitializeDevice messages and discontinue initiating messages.~~

After verifying the validity of the request, including the 'Time Duration' and 'Password' parameters, the responding BACnet-user shall respond with a 'Result(+)' service primitive. If the request is valid and the 'Enable/Disable' parameter is DISABLE, the responding BACnet-user shall discontinue responding to any subsequent messages except DeviceCommunicationControl and, if supported, ReinitializeDevice messages, and shall discontinue initiating messages. If the request is valid and the 'Enable/Disable' parameter is DISABLE_INITIATION, the responding BACnet-user shall discontinue the initiation of messages except for I-Am requests issued in accordance with the Who-Is service procedure. Communication shall be disabled in this manner until either the 'Time Duration' has expired or a valid DeviceCommunicationControl (with 'Enable/Disable' = ENABLE) or, if supported, a valid ReinitializeDevice (with 'Reinitialized State of Device' = WARMSTART or COLDSTART) message is received.

If the responding BACnet-user does not have a clock and the 'Time Duration' parameter is not set to "indefinite," the APDU shall be ignored and a 'Result(-)' service primitive shall be issued. If the *'Password' parameter* ~~password~~ is invalid or absent when *a password* ~~one~~ is required, the APDU shall be ignored and a 'Result(-)' response primitive shall be issued.

16.4.1.1.1 Reinitialized State of Device

This parameter allows the client user to specify the desired state of the device after its reinitialization. The value of the parameter may be one of COLDSTART, WARMSTART, STARTBACKUP, ENDBACKUP, STARTRESTORE, ENDRESTORE, or ABORTRESTORE.~~.~~ WARMSTART shall mean to reboot the device and start over, retaining all data and programs that would normally be retained during a brief power outage. The precise interpretation of COLDSTART shall be defined by the vendor.

If the value of the parameter is WARMSTART and the device is not ready due to a configuration procedure in progress, the request shall be considered invalid and the responding BACnet user shall issue a Result(-) response.

If the value of the parameter is one of STARTBACKUP, ENDBACKUP, STARTRESTORE, ENDRESTORE, or ABORTRESTORE and communication has been disabled due to receipt of a DeviceCommunicationControl request with 'Enable/Disable' equal to DISABLE, the request shall be considered invalid and the responding BACnet user shall issue a Result(-) response.

The use of the backup and restore commands are defined in 19.1.

16.4.1.3.1   Error Type

This parameter consists of two components 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
The password is invalid or absent when one is required.	*SECURITY*	*PASSWORD_FAILURE*
The device is in the process of being configured.	*DEVICE*	*CONFIGURATION_IN_PROGRESS*

Communication has been disabled due to receipt of a SERVICES COMMUNICATION_DISABLED DeviceCommunicationControl request.

[Change Clause **16.4.2** p. 330.]

16.4.2   Service Procedure

After verifying the validity of the request, including the ~~password~~ *'Reinitialized State of Device' and 'Password' parameters*, the responding BACnet-user shall pre-empt all other outstanding requests and respond with a Result(+) primitive. If *the request is valid and* ~~the request~~ *'Reinitialized State of Device'* is WARMSTART or COLDSTART*, then* the responding BACnet-user *shall* ~~will~~ immediately proceed to perform any applicable shut-down procedures prior to reinitializing the device as specified by the requesting BACnet-user in the request.

If *'Reinitialized State of Device' is* ~~the service request is for~~ WARMSTART and the device is not ready due to its initial characterization being in progress, a 'Result (-)' response primitive shall be issued.

~~If the requested state is one of STARTBACKUP, ENDBACKUP, STARTRESTORE, ENDRESTORE, or ABORTRESTORE, then the device shall behave as described in 19.1.~~ *If 'Reinitialized State of Device' is one of STARTBACKUP, ENDBACKUP, STARTRESTORE, ENDRESTORE, or ABORTRESTORE and communication has been disabled due to receipt of a DeviceCommunicationControl request with 'Enable/Disable' equal to DISABLE, the responding BACnet user shall respond with a Result(-) primitive. Otherwise, the responding BACnet user shall behave as described in 19.1.*

If the password is invalid or is absent when one is required, a 'Result (-)' response primitive shall be issued.

[Add to Clause **18.6**, Error Class – SERVICES, p. 359]

18.6.x   COMMUNICATION_DISABLED – Communication has been disabled due to receipt of a DeviceCommunicationControl request.

[Add to Error production, page 406]

Error ::= SEQUENCE {
   …
   error-code   ENUMERATED {
              …
              character-set-not-supported   (41),
              communication-disabled   *(83),*
              configuration-in-progress   (2),
              …

              -- see property-is-not-an-array   (50),
              ...
              -- see communication-disabled   *(83),*
      }
      -- Enumerated values 0-255 are reserved for definition by ASHRAE. Enumerated values
      -- 256-65535 may be used by others subject to the procedures and constraints described
      -- in Clause 23. ~~The last enumeration used in this version is 47.~~
  }

135-2004*m*-9. Define "object".

Rationale
The sentence "These properties are required if the object supports intrinsic reporting" was found to be unclear as to whether it referred a specific instance of an object type or whether it referred to all objects of that type.

Addendum 135-2004*m*-9

[Add new Clause **3.2.38**, p. 4, and renumber subsequent clauses.]

    3.2.37 object type: a generic classification of data that is defined by a set of properties.

    3.2.38 object*: a specific instance of an object type. While an object type is identified by a unique Object_Type property, an object is identified by its Object_Identifier property.*

135-2004*m*-10. Add a Deadband property to the Loop object.

Rationale
The Loop object requires a Deadband property in order to support intrinsic notification using the FLOATING_LIMIT algorithm.

Addendum 135-2004*m*-10

[Modify Table **12-20**, p. 206.]

Table 12-20. Properties of the Loop Object Type

Property Identifier	Property Datatype	Conformance Code
…	…	…
Error_Limit	REAL	O[5]
Deadband	*REAL*	*O[5]*
Event_Enable	BACnetEventTransitionBits	O[5]
…	…	…

[Add new clauses **12.17.32.1** and **12.17.32.2**, p. 211.]

12.17.32.1 Conditions for Generating a TO-OFFNORMAL Event

A TO-OFFNORMAL event is generated under these conditions:

(a) the Error must exceed the Error_Limit for a minimum period of time, specified in the Time_Delay property, and

(b) the TO-OFFNORMAL flag must be set in the Event_Enable property,

where Error is defined as AbsoluteValue(Setpoint — Controlled_Variable_Value). From the perspective of the FLOATING_LIMIT algorithm, the limits are calculated as:

High_Diff_Limit = Error_Limit
Low_Diff_Limit = —Error_Limit

12.17.32.2 Conditions for Generating a TO-NORMAL Event

Once the Error_Limit has been exceeded, a TO-NORMAL event is generated under these conditions:

(a) the Error must fall below the Error_Limit minus the Deadband for a minimum period of time, specified in the Time_Delay property, and

(b) the TO-NORMAL flag must be set in the Event_Enable property,

where Error is defined as AbsoluteValue(Setpoint — Controlled_Variable_Value).

[Add new Clause **12.17.33**, p. 211, and renumber subsequent clauses.]

12.17.33 Deadband

This property, of type REAL, shall specify a positive offset from the Error_Limit property, which defines a band around the Error (the difference between the Setpoint and the Controlled_Variable_Value properties) within the range of (Error_Limit — Deadband) and ((—Error_Limit)+Deadband).The Error must remain within this range for a TO-NORMAL event to be generated under these conditions :

(a)   the Error must fall below the Error_Limit minus Deadband,
(b)   the Error must exceed the —Error_Limit plus the Deadband,
(c)   the Error must remain within this range for a minimum period of time, specified in the Time_Delay property, and
(d)   the TO-NORMAL flag must be set in the Event_Enable property.

This property is required if intrinsic reporting is supported by this object.

[Change **Annex C**, p. 460.]

LOOP ::= SEQUENCE {
    …
    error-limit   [34] REAL OPTIONAL,
    deadband   [25] REAL OPTIONAL,
    event-enable [35] BACnetEventTransitionBits OPTIONAL,
    …
    }

[Change **Annex D.17**, p. 477.]

D.17 Example of a Loop Object
…
Property: Error_Limit =   5.0
Property: Deadband =   1.0
Property: Event_Enable =   {TRUE, TRUE, TRUE}
…

135-2004*m*-11. Correct the TO-FAULT conditions in the Life Safety objects' Reliability properties.

Rationale
The language for the Reliability property of the Life Safety Point and Life Safety Zone objects is incorrect in its description of generating TO-FAULT events.

Addendum 135-2004*m*-11

[Change Clause **12.15.10.1**, page 196]

12.15.10.1 Conditions for Generating a TO-FAULT Event

A TO-FAULT event is generated under these conditions:

(a) the TO-FAULT flag must be enabled in the Event_Enable property, and
(b) the Present_Value must equal at least one of the values in the Fault_Values list.
(a) the Reliability property becomes not equal to NO_FAULT_DETECTED, and
(b) the TO-FAULT flag is enabled in the Event_Enable property.

[Change Clause **12.16.10.1**, page 202]

12.16.10.1 Conditions for Generating a TO-FAULT Event

A TO-FAULT event is generated under these conditions:

(a) the TO-FAULT flag must be enabled in the Event_Enable property, and
(b) the Present_Value must equal at least one of the values in the Fault_Values list.
(a) the Reliability property becomes not equal to NO_FAULT_DETECTED, and
(b) the TO-FAULT flag is enabled in the Event_Enable property.

135-2004*m*-12. Clarify the Trend Log's acquisition of Status_Flags.

Rationale
The language describing the acquisition of Status_Flags by the Trend Log buffer needs clarification that it is recommended that the Status_Flags property be read in the same service request by which the data value is acquired.

Addendum 135-2004*m*-12

[Change Clause **12.25**, p.246]

12.25 Trend Log Object Type

A Trend Log object monitors a property of a referenced object and, when predefined conditions are met, saves ("logs") the value of the property and a timestamp in an internal buffer for subsequent retrieval. The data may be logged periodically or upon a change of value. Errors that prevent the acquisition of the data, as well as changes in the status or operation of the logging process itself, are also recorded. Each timestamped buffer entry is called a trend log "record."

The referenced object may reside in the same device as the Trend Log object or in an external device. The referenced property's value may be recorded upon COV subscription or periodic poll. *If the value of the monitored object's Status_Flags property is available, then it may optionally be recorded along with the value of the referenced property.* Where status flags are available (such as when the COVNotification or ReadPropertyMultiple services are used), they are also acquired and saved with the data.

[Change Clause **12.25.14**, p.249]

12.25.14 Log_Buffer

This property is a list of up to Buffer_Size timestamped records of datatype BACnetLogRecord, each of which conveys a recorded data value, an error related to data-collection, or status changes in the Trend Log object. Each record has data fields as follows:

Timestamp   The local date and time when the record was collected.

LogDatum   The data value read from the monitored object and property, an error encountered in an attempt to read a value, or a change in status or operation of the Trend Log object itself.

StatusFlags   ~~The Status_Flags property of the monitored object, if present and available atomically associated with the LogDatum data value. If the Status_Flags property is not present or not available atomically associated with the data value, this item shall not be included in the log record.~~ *If this field is present in the log record, then it shall contain the value of the Status_Flags property of the monitored object. If the monitored object is in a different device than the Trend Log object, then it is recommended that the Status_Flags and the data value in the monitored object property be acquired together with a single service request, such as COVNotification or ReadPropertyMultiple.*

(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	7	**Addendum *m* to ANSI/ASHRAE 135-2004** Approved by the ASHRAE Standards Committee October 12, 2008; by the ASHRAE Board of Directors October 24, 2008; and by the American National Standards Institute October 27, 2008. 1. Resolve Foreign Device registration grace period and remaining time ambiguities. 2. Improve Clause 5 FillWindow segment timeout constraints. 3. Clarify the Priority Filter parameter in the GetEnrollmentSummary service request. 4. Allow alarms to be re-acknowledged successfully. 5. Add requirements to Alarm and Event BIBBs. 6. Remove B-BC requirements for BIBBs without use cases. 7. Clarify that a device may support only the ReinitializeDevice restart choices. 8. Clarify DeviceCommunicationsControl and ReinitializeDevice interactions 9. Define "object." 10. Add a Deadband property to the Loop object. 11. Correct the TO-FAULT conditions in the Life Safety objects' Reliability properties. 12. Clarify the Trend Log's acquisition of Status_Flags.

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.