ADDENDA

ANSI/ASHRAE Addendum bm to
ANSI/ASHRAE Standard 135-2016

A Data Communication Protocol for Building Automation and Control Networks

Approved by ASHRAE on June 15, 2018, and by the American National Standards Institute on June 15, 2018.

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

FOREWORD

The purpose of this addendum is to present changes to ANSI/ASHRAE Standard 135-2016. 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.

In the following document, language to be added to existing clauses of ANSI/ASHRAE Standard 135-2016 is indicated through the use of *italics*, while deletions are indicated by ~~strikethrough~~. Where entirely new subclauses are added, plain type is used throughout.

The use of placeholders like X, Y, Z, X1, X2, etc., should not be interpreted as literal values of the final standard. These placeholders will be assigned actual numbers/letters only with incorporation of this addendum into the standard for republication.

135-2016*bm*-1. Reduce allowed range for Usage Timeout

Rationale

The MS/TP parameter $\mathbf{T}_{\text{usage\_timeout}}$ as defined in Clause 9.5.3 has been misinterpreted by some implementers since it allows up to 100ms of delay for nodes to reply to PollForMaster or to begin using a passed token. The current language is unfortunately vague and implies that an implementation may use a value as small as 20ms or as large as 100ms. The intention was always that the definition of $\mathbf{T}_{\text{usage\_delay}}$ would require that devices always reply within 15ms, but the wide variation in $\mathbf{T}_{\text{usage\_timeout}}$ was misleading to some implementors. This creates an interoperability issue if a "20ms" device attempts to interoperate with a "100ms" device.

The range of $\mathbf{T}_{\text{usage\_timeout}}$ is reduced to 35 milliseconds maximum.

[Change **Clause 9.5.3, $\mathbf{T}_{\text{usage\_timeout}}$,** p. 99]

$\mathbf{T}_{\text{usage_timeout}} The ~~minimum~~ time without a DataAvailable or ReceiveError event that a node must wait for a remote node to begin using a token or replying to a Poll For Master frame: 20 milliseconds. (Implementations may use larger values for this timeout, not to exceed ~~100~~ *35* milliseconds.)

135-2016*bm*-2. Specify design choices for MS/TP devices.

Rationale

The standard allows for MS/TP devices to make various choices in their implementation. There is no standard method for determining some of the key choices.

Also, the current language limits the number of nodes per segment to 32 due to the EIA-485 standard. However, EIA-485 specifies 32 unit loads, not 32 nodes. Early EIA-485 transceivers were one unit load, but today, 1/2, 1/4, and even 1/8 load transceivers are available, allowing the possibility of up to 8 * 32, or 256 nodes per segment.

The PICS is extended to allow specification of the implementation choices, including unit loads, of the MS/TP product.

[Change **Clause 9.2.2,** p. 82]

9.2.2 Connections and Terminations

The maximum number of ~~nodes~~ *unit loads* per segment shall be 32 (as specified by the EIA-485 standard). Additional ~~nodes~~ *unit loads* may be accommodated by the use of repeaters, as described in Clause 9.9.

...

[Add new **Clause 9.X**, p. 122]

9.X Documenting MS/TP Device Design Choices

Every MS/TP device includes a collection of design choices that affect the behavior of the device. Among these, the following choices are important in terms of MS/TP interoperability:

(a) master or slave implementation
(b) isolated or non-isolated power source for EIA/TIA-485 transceiver
(c) whether local biasing is built-in to the device
(d) transceiver unit loading
(e) data rates supported by the device

Each MS/TP device shall indicate all of this information in its Protocol Implementation Conformance Statement (PICS). See Annex A.

9.X.1 Master or Slave Implementation

The PICS shall indicate whether the device implements a Master Node State Machine or Slave Node State Machine or either.

9.X.2 EIA/TIA-485 Power Isolation

The PICS shall indicate whether the EIA/TIA-485 transceiver implements an optically and magnetically isolated power source, or not. Designs that implement such a power source shall be called ISOLATED, and designs that do not shall be called NON-ISOLATED.

9.X.3 Local Biasing

The PICS shall indicate whether the device implements local biasing, by way of 47K ohms pull-up/pull-down (see 9.2.2), as having “Local Bias 47K.” Devices without 47K ohms biasing shall indicate “Local Bias none.”

9.X.4 Transceiver Unit Loading

Based on the characteristics of the EIA/TIA-485 transceiver of the device, the PICS shall indicate “Unit Load X” where X is 1, ½, ¼, or [.

9.X.5 Data Rates

The PICS shall include a list of each data rate supported by the device.

[Change **Annex A**, p. 937]

…

Data Link Layer Options:

☐ . . .
☐ MS/TP ~~master~~ (Clause 9)~~, baud rate(s):~~ _____
☐ Master ☐ Slave
☐ Non-isolated transceiver ☐ Isolated transceiver
☐ Local 47K ohms bias resistors ☐ None ☐ Other: _____
Transceiver unit loading: ☐ 1 ☐ ½ ☐ ¼ ☐ [
Data rates: ☐ 9600 ☐ 19200 ☐ 38400 ☐ 57600 ☐ 76800 ☐ 115200
~~☐ MS/TP slave (Clause 9), baud rate(s):~~ _____
☐ . . .

. . .

135-2016*bm*-3. Handle additional unwanted MS/TP frames in IDLE state.

Rationale

Some MS/TP frames sent to a master device being in IDLE state are not valid frames in that state, so they are unwanted frames and should be ignored. Except that the ReceivedValidFrame flag should be reset to FALSE to signal the message is processed and to allow a next received message being fed into the state machine.

A new condition is included in the master node's state machine state IDLE, in section ReceivedUnwantedFrame, to handle these unwanted frame types.

[Change **Clause 9.5.6.2**, p. 106]

9.5.6.2 IDLE

In the IDLE state, the node waits for a frame.

. . .

ReceivedUnwantedFrame

If ReceivedValidFrame is TRUE and either

(a) DestinationAddress is not equal to either TS (this station) or 255 (broadcast) or

(b) DestinationAddress is equal to 255 (broadcast) and FrameType has a value of Token, Test_Request, or a proprietary type known to this node that expects a reply (such frames may not be broadcast) or

(c) FrameType has a value that indicates a standard or proprietary type that is not known to this node *or*

(d) DestinationAddress is equal to TS and FrameType is equal to Reply To Poll For Master or Reply Postponed,

then an unexpected or unwanted frame was received. Set ReceivedValidFrame to FALSE, and enter the IDLE state to wait for the next frame.

. . .

[Add a new entry to **History of Revisions**, p. 1364]

(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	20	**Addendum *bm* to ANSI/ASHRAE Standard 135-2016** Approved by ASHRAE on June 15, 2018; and by the American National Standards Institute on June 15, 2018. 1. Reduce allowed range for Usage Timeout. 2. Specify design choices for MS/TP devices. 3. Handle unwanted MS/TP frames in IDLE state.

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