SLOVENSKI STANDARD
SIST EN ISO 16484-5:2018/A1:2020

01-julij-2020

Sistemi za avtomatizacijo stavb in regulacijo - 5. del: Protokol za izmenjavo podatkov - Dopolnilo A1 (ISO 16484-5:2017/Amd 1:2020)

Building automation and control systems (BACS) - Part 5: Data communication protocol - Amendment 1 (ISO 16484-5:2017/Amd 1:2020)

Systeme der Gebäudeautomation - Teil 5: Datenkommunikationsprotokoll (ISO 16484-5:2017) - Anderung (ISO 16484-5:2017/Amd 1:2020)

Systèmes d'automatisation et de gestion technique du bâtiment - Partie 5: Protocole de communication de données - Amendement 1 (ISO 16484-5:2017/Amd 1:2020)

Ta slovenski standard je istoveten z: **EN ISO 16484-5:2017/A1:2020**

ICS:

35.240.67	Uporabniške rešitve IT v gradbeništvu	IT applications in building and construction industry
97.120	Avtomatske krmilne naprave za dom	Automatic controls for household use

SIST EN ISO 16484-5:2018/A1:2020 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 16484-5:2017/A1

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English Version

Building automation and control systems (BACS) - Part 5: Data communication protocol - Amendment 1 (ISO 16484-5:2017/Amd 1:2020)

Systèmes d'automatisation et de gestion technique du bâtiment - Partie 5: Protocole de communication de données - Amendement 1 (ISO 16484-5:2017/Amd 1:2020)

This amendment A1 modifies the European Standard EN ISO 16484-5:2017; it was approved by CEN on 18 April 2020.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN ISO 16484-5:2017/A1:2020) has been prepared by Technical Committee ISO/TC 205 "Building environment design" in collaboration with Technical Committee CEN/TC 247 “Building Automation, Controls and Building Management” the secretariat of which is held by SNV.

This Amendment to the European Standard EN ISO 16484-5:2017 shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2020, and conflicting national standards shall be withdrawn at the latest by November 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 16484-5:2017/Amd 1:2020 has been approved by CEN as EN ISO 16484-5:2017/A1:2020 without any modification.

INTERNATIONAL STANDARD

ISO 16484-5

Sixth edition
2017-05

AMENDMENT 1
2020-04

Building automation and control systems (BACS) —

Part 5: Data communication protocol

AMENDMENT 1

Systèmes d'automatisation et de gestion technique du bâtiment —
Partie 5: Protocole de communication de données

AMENDEMENT 1

Reference number
ISO 16484-5:2017/Amd.1:2020(E)

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Foreword

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 205, *Building environmental design,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 247, *Building Automation, Controls and Building Management*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 16484 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

(This foreword is not part of the standard. It is merely informative and does not contain requirements necessary for conformance to the standard.)

FOREWORD

The purpose of this addendum is to add several independent substantive changes to the BACnet standard. The changes are summarized below.

135-2016bd-1. Add Staging Object Type.
135-2016be-1. Add Lighting BIBBS and Device Profiles.
135-2016bi -1. Add Audit Reporting.
135-2016bi -2. Change DeviceCommunicaitonControlService for Audit Reporting.
135-2016bi -3. Modify Logging Objects to Allow for Extremely Large Logs.
135-2016bk -1. Expand the reserved range of BACnetPropertyIdentifier.
135-2016bl - 1. Clarify Result(-) response for failed WritePropertyMultiple requests.
135-2016bl - 2. Clarify ReadPropertyMultiple response on OPTIONAL when empty.
135-2016bl - 3. Clarify Out_Of_Service.
135-2016bm-1. Reduce allowed range for Usage Timeout.
135-2016bm-2. Specify design choices for MS/TP devices.
125-2016bm-3. Handle unwanted MS/TP frames in IDLE state.
135-2016bn-1. Make SCHED BIBBs consistent on supported datatypes, and add BOOLEAN.
135-2016bn-2. Clarify COV and COVP related BIBBs.
135-2016bn-3. Clock is required for support of AE-ACK-A.
135-2016bp-1. Make rules for POST consistent with rules for PUT.
135-2016bp-2. Make 'type' consistent at all levels and introduce 'effectiveType'.
135-2016bp-3. Fully specify the behavior of "includes".
135-2016bp-4. Remove the path syntax from the 'select' query parameter.
135-2016bp-5. Resolve conflicting statements about configuring external authorization servers.
135-2016bp-6. Remove incorrect table for callback formats.
135-2016bp-7. Allow plain text POSTs for primitive data.
135-2016bp-8. Allow extended error numbers.
135-2016bp-9. Add new error numbers.
135-2016bp-10. Add formal definition for JSON equivalent to XML's <CSML>.
135-2016bp-11. Specify 'name' safety check for setting data.
135-2016bp-12. Specify how to evaluate relative paths for collections of links.
135-2016bp-13. Allow proprietary categories for the 'metadata' query.
135-2016bq-1. Fix the Absentee_Limit property of the Access Credential object type.
135-2016bq-2. Ensure that the denied or granted access event is generated last.

In the following document, language to be added to existing clauses of EN ISO 16484-5 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.

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.

Building automation and control systems (BACS) —

Part 5:
Data communication protocol

AMENDMENT 1

135-2016*bd*-1 Add a Staging Object Type

Rationale

The Staging object type provides a way for BACnet devices to map analog values onto multiple Binary Value, Binary Output, or Binary Lighting Output objects.

A common use case is in lighting applications, where a level, identified by a numeric value, sets the appropriate values of multiple binary outputs (on or off).

Support of this new object type is excluded from all data sharing BIBBs for life safety and access control.

[Insert new **Clause 12.X**]

12.X Staging Object Type

The Staging object type defines a standardized object whose properties represent the externally visible characteristics of a staged value. A "Staging" maps a numeric value onto multiple discrete ranges that define individual “stages” ($\mathbf{N_{stages}}$). Each Staging object is associated with a collection of references to binary valued objects ($\mathbf{N_{references}}$). Each Staging object may therefore control Binary Output, Binary Value, or Binary Lighting Output objects. Every stage specifies an arbitrary combination of ACTIVE/INACTIVE values to be written to these referenced objects. Stages are defined by a limit, a deadband, and the collection of values for the referenced objects.

Figure 12-X shows a typical Staging object application with four stages ($\mathbf{N_{stages}}$ =4) and two referenced binary objects ($\mathbf{N_{references}}$ = 2).

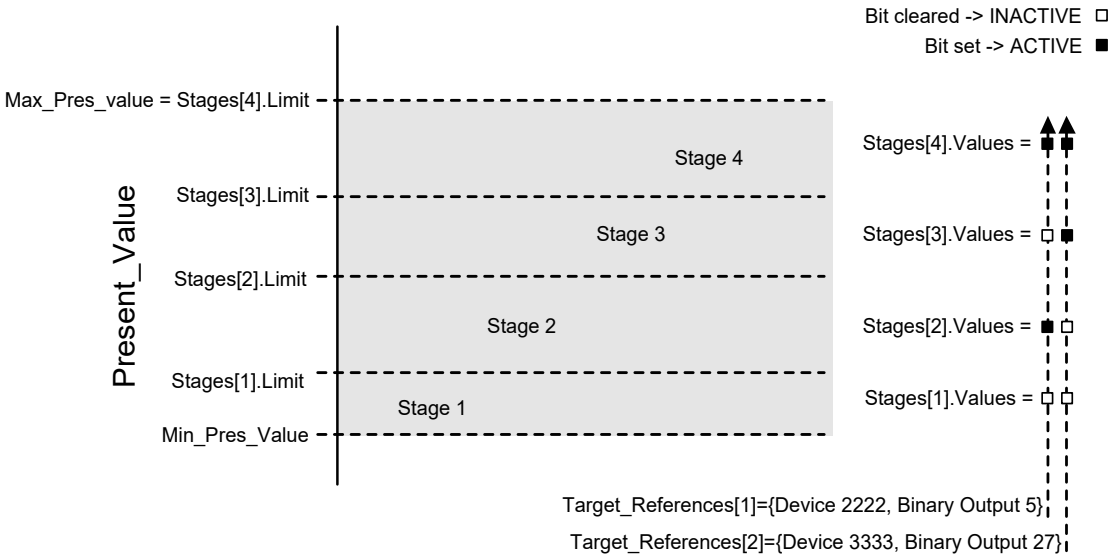

Figure 12-X. Typical Staging Application (N_{stages} =4, $N_{references}$ = 2)

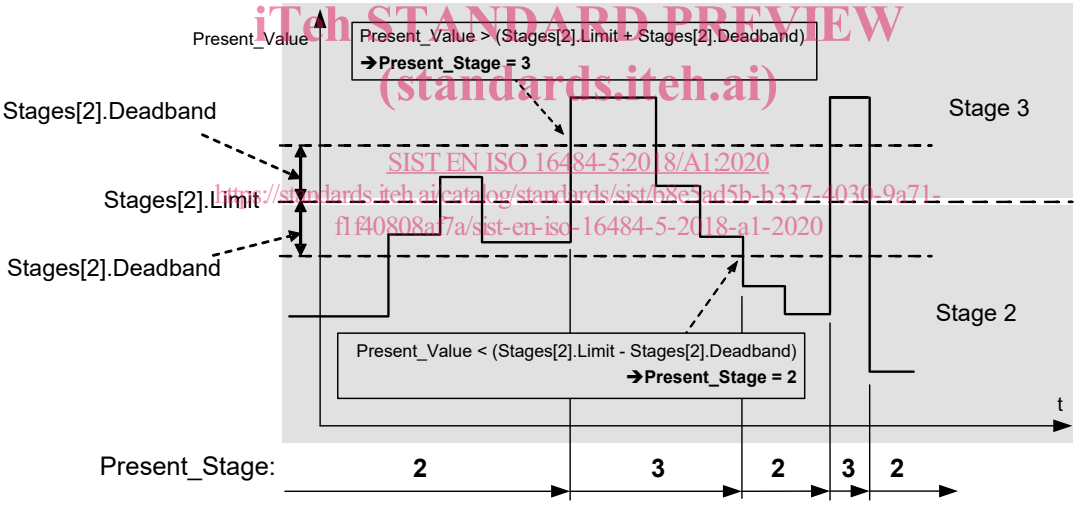

Figure 12-X2. Stage Limits incorporate hysteresis through the use of a Deadband around each Limit

Stages are defined by limits with a symmetrical deadband. A deadband greater than zero is used to prevent unwanted oscillation when the Present_Value is close to a limit. As the Present_Value increases, if it rises above the limit for a stage plus the deadband for that stage, the Present_Stage transitions to that stage+1. Similarly, as the Present_Value decreases, it must fall below the limit for a stage minus the deadband for that stage before Present_Stage transitions to that stage. The deadband is allowed to be zero (0.0).

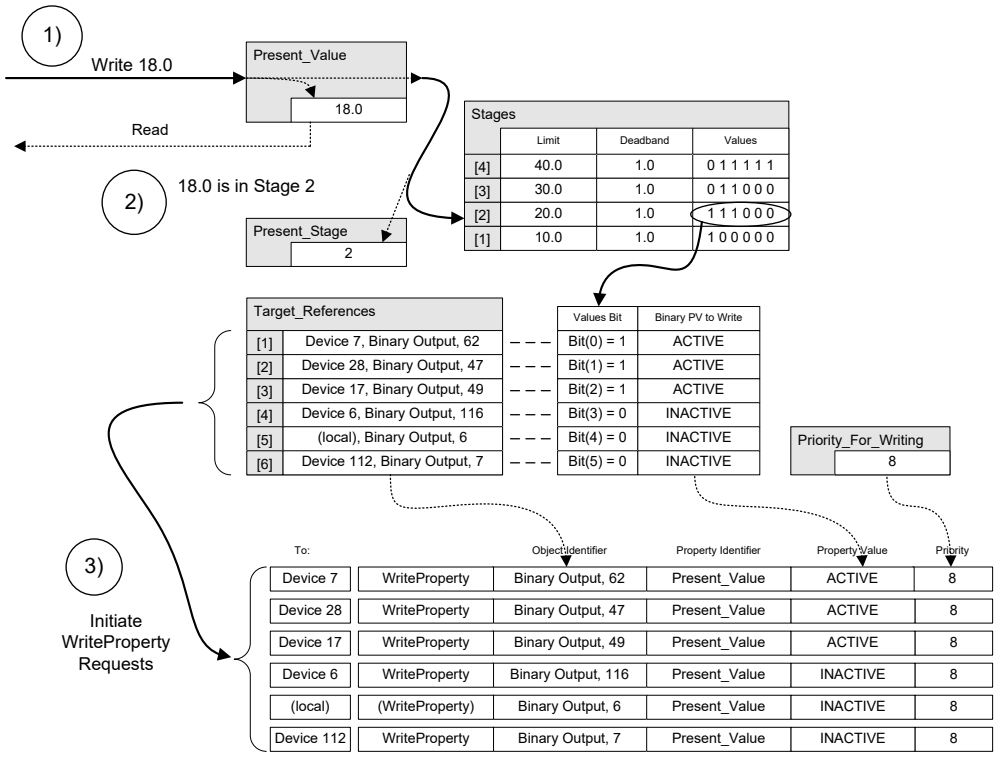

Figure 12-X3. Pipeline of operations when Present_Value is written

Staging objects may optionally support intrinsic reporting to facilitate the reporting of fault conditions. Staging objects that support intrinsic reporting shall apply the NONE event algorithm.

The object and its properties are summarized in Table 12-X and described in detail in this clause.

Table 12-X. Properties of the Staging Object Type

Property Identifier	Property Datatype	Conformance Code
Object_Identifier	BACnetObjectIdentifier	R
Object_Name	CharacterString	R
Object_Type	BACnetObjectType	R
Present_Value	REAL	W
Present_Stage	Unsigned	R
Stages	BACnetARRAY[N] of BACnetStageLimitValue	R[1]
Stage_Names	BACnetARRAY[N] of CharacterString	O[1]
Status_Flags	BACnetStatusFlags	R
Event_State	BACnetEventState	R
Reliability	BACnetReliability	R
Out_Of_Service	BOOLEAN	R
Description	CharacterString	O
Units	BACnetEngineeringUnits	R
Target_References	BACnetARRAY[N] of BACnetDeviceObjectReference	R[2]
Priority_For_Writing	Unsigned(1..16)	R
Default_Present_Value	REAL	O
Min_Pres_Value	REAL	R
Max_Pres_Value	REAL	R
COV_Increment	REAL	O[3]
Notification_Class	Unsigned	O[4,5]
Event_Enable	BACnetEventTransitionBits	O[4,5]
Acked_Transitions	BACnetEventTransitionBits	O[4,5]
Notify_Type	BACnetNotifyType	O[4,5]
Event_Time_Stamps	BACnetARRAY[3] of BACnetTimeStamp	O[4,5]
Event_Message_Texts	BACnetARRAY[3] of CharacterString	O[5,6]
Event_Message_Texts_Config	BACnetARRAY[3] of CharacterString	O[5]
Event_Detection_Enable	BOOLEAN	O[4,5]
Reliability_Evaluation_Inhibit	BOOLEAN	O
Property_List	BACnetARRAY[N] of BACnetPropertyIdentifier	R
Value_Source	BACnetValueSource	O[7,8,9]
Tags	BACnetARRAY[N] of BACnetNameValue	O
Profile_Location	CharacterString	O
Profile_Name	CharacterString	O

[1] The array size of this property is $\mathbf{N}_{\mathbf{stages}}$.
[2] The array size of this property is $\mathbf{N}_{\mathbf{references}}$.
[3] This property is required if the object supports COV reporting.
[4] These properties are required if the object supports intrinsic reporting.
[5] These properties shall be present only if the object supports intrinsic reporting.
[6] This property, if present, is required to be read-only.
[7] This property is required if the object supports the value source mechanism.
[8] This property shall be present only if the object supports the value source mechanism.
[9] This property shall be writable as described in Clause 19.5.

12.X .1 Object_Identifier

This property, of type BACnetObjectIdentifier, is a numeric code that is used to identify the object. It shall be unique within the BACnet device that maintains it.

12.X .2 Object_Name

This property, of type CharacterString, shall represent a name for the object that is unique within the BACnet device that maintains it. The minimum length of the string shall be one character. The set of characters used in the Object_Name shall be restricted to printable characters.

12.X .3 Object_Type

This property, of type BACnetObjectType, indicates membership in a particular object type class. The value of this property shall be STAGING.

12.X .4 Present_Value

This property, of type REAL, indicates the current value, in engineering units, of the Staging object. If Present_Value is written with a value less than Min_Pres_Value, then it shall be clamped to Min_Pres_Value. If Present_Value is written with a value greater than Max_Pres_Value, then it shall be clamped to Max_Pres_Value.

Whenever Present_Value is changed, the new value shall be compared with the 'Limit' values for the entire Stages array using the following algorithm:

```
ops = current Present_Stage
npv = new Present_Value

//check if value should remain in the current stage
If (ops != 0) then
   upperBound = Stages[ops].Limit + Stages[ops].Deadband
   if (ops > 1) then
      lowerBound = Stages[ops-1].Limit - Stages[ops-1].Deadband
   else
      lowerBound = Min_Pres_Value
   endif
   if (npv <= upperBound AND npv >= lowerBound) then
      Present_Value = npv
      exit algorithm //no change to current stage, stop algorithm
   endif
endif

// calculate the new stage
Present_Stage = Nstages
for (i=1 to Nstages-1, step +1)
   if npv <= (Stages[i].Limit) then
      Present_Stage = i
      exit for    //found the correct stage, stop iteration
   endif
next i

Present_Value = npv
```


Figure 12-X4. Pseudocode Algorithm for Evaluating Present_Value and Present_Stage

12.X.4.1 Writing to Referenced Objects

Changes to Present_Stage shall cause a write of ACTIVE or INACTIVE to the corresponding object's Present_Value for each Target_References array element. For each bit (Index = 0 to $N_{references}$ -1) in the Stages[Present_Stage].Values bitstring, if the bit is set (1), an ACTIVE value shall be written, or if clear (0), then an INACTIVE value shall be written to the Target_References[Index +1] object's Present_Value.

Writes to Present_Value that subsequently trigger writing to referenced objects due to reevaluation of Present_Stage, are not expected to wait until the reference writes occur before returning a Result(+) or Result(-) for the write to Present_Value. Subsequently if any write to a referenced object fails, Reliability shall be changed to COMMUNICATION_FAILURE. The COMMUNICATION_FAILURE shall remain in effect until all reference writes have been completed successfully. How a particular implementation handles other failures during writing to referenced objects shall be a local matter except that Reliability shall indicate a value other than NO_FAULT_DETECTED.

The order of evaluation of references and any referenced object write delay shall be a local matter.