

**Building automation and control systems (BACS) -
Part 6: Data communication conformance testing
(ISO 16484-6:2024)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 16484-6:2025 sisaldab Euroopa standardi EN ISO 16484-6:2025 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 05.11.2025.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN ISO 16484-6:2025 consists of the English text of the European standard EN ISO 16484-6:2025.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 05.11.2025.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
---	---

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 31.220.10

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele. Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis- ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis- ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

Building automation and control systems (BACS) - Part 6:
Data communication conformance testing (ISO 16484-
6:2024)

Systèmes d'automatisation et de gestion technique du
bâtiment (BACS) - Partie 6: Essais de conformité de la
communication de données (ISO 16484-6:2024)

Systeme der Gebäudeautomation - Teil 6:
Datenübertragungsprotokoll - Konformitätsprüfung
(ISO 16484-6:2024)

This European Standard was approved by CEN on 29 December 2024.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a 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 European Standard 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.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

European foreword

This document (EN ISO 16484-6:2025) 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 European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2026, and conflicting national standards shall be withdrawn at the latest by May 2026.

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.

This document supersedes EN ISO 16484-6:2020.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Endorsement notice

The text of ISO 16484-6:2024 has been approved by CEN as EN ISO 16484-6:2025 without any modification.

CONTENTS

CLAUSE	PAGE
FOREWORD	vi
1. PURPOSE	1
2. SCOPE	1
3. DEFINITIONS	1
3.1 Terms Adopted from International Standardss	1
3.2 Abbreviations and Acronyms Used in the Standard	1
3.3 Common language used in tests	1
4. ELECTRONIC PICS FILE FORMAT	2
4.1 Character Encoding	2
4.2 Structure of EPICS Files	2
4.3 Character Strings	3
4.4 Notational Rules for Parameter Values	3
4.5 Sections of the EPICS File	5
5. EPICS CONSISTENCY TESTS	10
6. CONVENTIONS FOR SPECIFYING BACnet CONFORMANCE TESTS	12
6.1 TCSL Components	12
6.2 TCSL Statements	13
6.3 Time Dependencies	18
6.4 BACnet References	19
6.5 TD Requirements	19
6.6 Test Execution Considerations	19
7. OBJECT SUPPORT TESTS	21
7.1 Read Support for Properties in the Test Database	21
7.2 Write Support for Properties in the Test Database	23
7.3 Object Functionality Tests	29
8. APPLICATION SERVICE INITIATION TESTS	332
8.1 AcknowledgeAlarm Service Initiation Tests	332
8.2 ConfirmedCOVNotification Service Initiation Tests	334
8.3 UnconfirmedCOVNotification Service Initiation Tests	348
8.4 ConfirmedEventNotification Service Initiation Tests	352
8.5 UnconfirmedEventNotification Service Initiation Tests	398
8.6 GetAlarmSummary Service Initiation Tests	422
8.7 GetEnrollmentSummary Service Initiation Tests	422
8.8 GetEventInformation Service Initiation Tests	424
8.9 LifeSafetyOperation Service Initiation Tests	425
8.10 SubscribeCOV Service Initiation Tests	426
8.11 SubscribeCOVProperty Service Initiation Tests	427
8.12 AtomicReadFile Service Initiation Tests	432
8.13 AtomicWriteFile Service Initiation Tests	432
8.14 AddListElement Service Initiation Tests	433
8.15 RemoveListElement Service Initiation Tests	433
8.16 CreateObject Service Initiation Tests	434
8.17 DeleteObject Service Initiation Tests	434
8.18 ReadProperty Service Initiation Tests	435
8.19 ReadPropertyConditional Service Initiation Tests	437
8.20 ReadPropertyMultiple Service Initiation Tests	437
8.21 ReadRange Service Initiation Tests	440
8.22 WriteProperty Service Initiation Tests	443
8.23 WritePropertyMultiple Service Initiation Tests	446
8.24 DeviceCommunicationControl Service Initiation Tests	448
8.25 ConfirmedPrivateTransfer Service Initiation Test	449
8.26 UnconfirmedPrivateTransfer Service Initiation Test	450
8.27 ReinitializeDevice Service Initiation Tests	450
8.28 ConfirmedTextMessage Service Initiation Tests	451
8.29 UnconfirmedTextMessage Service Initiation Tests	452
8.30 TimeSynchronization Service Initiation Tests	452
8.31 UTCTimeSynchronization Service Initiation Tests	452
8.32 Who-Has Service Initiation Tests	453

8.33	I-Have Service Initiation Tests	454
8.34	Who-Is Service Initiation Tests	454
8.35	I-Am Service Initiation Tests	455
8.36	VT-Open Service Initiation Tests	455
8.37	VT-Close Service Initiation Tests	456
8.38	VT-Data Service Initiation Tests	457
8.39	RequestKey Service Initiation Tests.....	459
8.40	Authenticate Service Initiation Tests.....	459
8.41	WriteGroup Service Initiation Tests.....	462
8.42	SubscribeCOVPropertyMultiple Service Initiation Tests.....	463
8.43	AuditLogQuery Initiation Tests.....	467
9.	APPLICATION SERVICE EXECUTION TESTS	468
9.1	AcknowledgeAlarm Service Execution Tests	468
9.2	ConfirmedCOVNotification Service Execution Tests.....	493
9.3	UnconfirmedCOVNotification Service Execution Tests.....	498
9.4	ConfirmedEventNotification Service Execution Tests.....	501
9.5	UnconfirmedEventNotification Service Execution Tests.....	505
9.6	GetAlarmSummary Service Execution Tests	507
9.7	GetEnrollmentSummary Service Execution Tests	508
9.8	GetEventInformation Service Execution Tests.....	511
9.9	LifeSafetyOperation Service Execution Test	513
9.10	SubscribeCOV Service Execution Tests	517
9.11	SubscribeCOVProperty Service Execution Tests.....	527
9.12	AtomicReadFile Service Execution Tests	538
9.13	AtomicWriteFile Service Execution Tests	544
9.14	AddListElement Service Execution Tests	553
9.15	RemoveListElement Service Execution Tests.....	556
9.16	CreateObject Service Execution Tests.....	557
9.17	DeleteObject Service Execution Tests.....	562
9.18	ReadProperty Service Execution Tests.....	563
9.19	ReadPropertyConditional Service Execution Tests.....	568
9.20	ReadPropertyMultiple Service Execution Tests	568
9.21	ReadRange Service Execution Tests	577
9.22	WriteProperty Service Execution Tests.....	589
9.23	WritePropertyMultiple Service Execution Tests	596
9.24	DeviceCommunicationControl Service Execution Test	611
9.25	ConfirmedPrivateTransfer Service Execution Tests.....	618
9.26	UnconfirmedPrivateTransfer Service Execution Tests.....	619
9.27	ReinitializeDevice Service Execution Tests.....	619
9.28	ConfirmedTextMessage Service Execution Tests	623
9.29	UnconfirmedTextMessage Service Execution Tests	624
9.30	TimeSynchronization Service Execution Tests	625
9.31	UTCTimeSynchronization Service Execution Tests	625
9.32	Who-Has Service Execution Tests	626
9.33	Who-Is Service Execution Tests.....	633
9.34	VT-Open Service Execution Tests	636
9.35	VT-Close Service Execution Tests.....	637
9.36	VT-Data Service Execution Tests	639
9.37	RequestKey Service Execution Test.....	639
9.38	Authenticate Service Execution Tests	641
9.39	General Testing of Service Execution	644
9.40	AuditLogQuery Service Execution Tests	645
9.41	WriteGroup Tests	647
9.42	SubscribeCOVPropertyMultiple Service Execution Tests.....	651
10.	NETWORK LAYER PROTOCOL TESTS	665
10.1	General Network Layer Tests.....	665
10.2	Router Functionality Tests	666
10.3	Half-Router Functionality Tests	690
10.4	B/IP PAD Tests	697
10.5	Initiating Network Layer Messages.....	699
10.6	Non-Router Functionality Tests	700

10.7	Route Binding Tests	703
10.8	Virtual Routing Functionality Tests	707
11.	LOGICAL LINK LAYER PROTOCOL TESTS	726
11.1	UI Command and Response	726
11.2	XID Command and Response	726
11.3	TEST Command and Response	727
12.	DATA LINK LAYER PROTOCOLS TESTS	728
12.1	MS/TP State Machine Tests	728
12.2	PTP State Machine Tests	786
12.3	BACnet/IP Functionality Tests	818
12.4	BACnet/IPv6 Functionality Tests	849
12.5	Secure Connect Functionality Tests	863
13.	SPECIAL FUNCTIONALITY TESTS	912
13.1	Segmentation	912
13.2	Time Master	920
13.3	Character Sets	925
13.4	Malformed PDUs	925
13.5	Slave Proxy Tests	926
13.6	Automatic Network Mapping	928
13.7	Automatic Device Mapping	929
13.8	Backup and Restore Procedure Tests	929
13.9	Application State Machine Tests	943
13.10	Workstation Scheduling Tests	943
14.	Reporting Test Results	961
	ANNEX A – EXAMPLE EPICS (INFORMATIVE)	962
	HISTORY OF REVISIONS	977

FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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) and with the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).

This fifth edition cancels and replaces the fourth edition (ISO 16484-6:2020), which has been technically revised.

The main changes are as follows:

— See the detailed list of changes on pages 977 to 981.

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.

Building automation and control systems (BACS) —

Part 6:

Data communication conformance testing

1. PURPOSE

To define a standard method for verifying that an implementation of the BACnet protocol provides each capability claimed in its Protocol Implementation Conformance Statement (PICS) in conformance with the BACnet standard.

2. SCOPE

This standard provides a comprehensive set of procedures for verifying the correct implementation of each capability claimed on a BACnet PICS including:

- (a) support of each claimed BACnet service, either as an initiator, executor, or both,
- (b) support of each claimed BACnet object-type, including both required properties and each claimed optional property,
- (c) support of the BACnet network layer protocol,
- (d) support of each claimed data link option, and
- (e) support of all claimed special functionality.

3. DEFINITIONS

All definitions from ANSI/ASHRAE Standard 135-2020 also apply to this addendum.

3.1 Terms Adopted from International Standardss

local network: the network to which a BACnet device is directly connected.

remote network: a network that is accessible from a BACnet device only by passing through one or more routers.

test database: a database of BACnet functionality and objects created by reading the contents of an EPICS.

3.2 Abbreviations and Acronyms Used in the Standard

BNF	Backus-Naur Form syntax
EPICS	electronic protocol implementation conformance statement
IUT	implementation under test
TCSL	testing and conformance scripting language
TD	testing device
TPI	text protocol information

3.3 Common language used in tests

'any valid value': Any valid value refers to any value of the correct data type and within the vendor's range specified for the property this is applied to.

'any appropriate password': Any password that meets the Configuration Requirements specified in the test or test section. Passwords when required by the vendor are required to be no more than 20 characters.

'reset': Some tests require to reset the IUT. Reset includes power cycle via switch, power cycle via loss of power, and reinitializeDevice WARMSTART. As defined by the BACnet standard, "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."