

SLOVENSKI STANDARD

SIST EN 15500-1:2018

01-maj-2018

Nadomešča:
SIST EN 15500:2008

Energijske lastnosti stavb - Naprave za regulacijo sistemov za ogrevanje, prezračevanje in klimatizacijo - 1. del: Elektronske naprave za regulacijo posameznih con - Moduli M3-5, M4-5, M5-5

Energy Performance of Buildings - Control for heating, ventilating and air conditioning applications - Part 1: Electronic individual zone control equipment - Modules M3-5, M4-5, M5-5

iTeh STANDARD PREVIEW

(standards.iteh.ai)

Energieeffizienz von Gebäuden - Automation von HLK-Anwendungen — Teil 1: Elektronische Regel- und Steuereinrichtungen für einzelne Räume oder Zonen - Module M3-5, M4-5, M5-5

[SIST EN 15500-1:2018](https://standards.iteh.ai/catalog/standards/sist/49e7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018)

<https://standards.iteh.ai/catalog/standards/sist/49e7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018>

Performance énergétique des bâtiments - Régulation pour les applications de chauffage, de ventilation et de climatisation (CVC) - Partie 1 : Régulateur électronique de zone pour le chauffage - Modules M3-5, M4-5, M5-5

Ta slovenski standard je istoveten z: EN 15500-1:2017

ICS:

91.140.10	Sistemi centralnega ogrevanja	Central heating systems
91.140.30	Prezračevalni in klimatski sistemi	Ventilation and air-conditioning systems
97.120	Avtomatske krmilne naprave za dom	Automatic controls for household use

SIST EN 15500-1:2018

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 15500-1:2018

<https://standards.iteh.ai/catalog/standards/sist/49e7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018>

EUROPEAN STANDARD

EN 15500-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2017

ICS 91.140.30; 97.120

Supersedes EN 15500:2008

English Version

Energy Performance of Buildings - Control for heating, ventilating and air conditioning applications - Part 1: Electronic individual zone control equipment - Modules M3-5, M4-5, M5-5

Performance énergétique des bâtiments - Régulation pour les applications de chauffage, de ventilation et de climatisation (CVC) - Partie 1 : Régulateur électronique de zone pour le chauffage - Modules M3-5, M4-5, M5-5

Energieeffizienz von Gebäuden - Automation von HLK-Anwendungen - Teil 1: Elektronische Regel- und Steuereinrichtungen für einzelne Räume oder Zone - Module M3-5, M4-5, M5-5

This European Standard was approved by CEN on 27 February 2017.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword.....	4
Introduction	5
1 Scope.....	6
2 Normative references.....	8
3 Terms and definitions	9
4 Symbols, subscripts and abbreviations.....	11
4.1 Symbols.....	11
4.2 Subscripts.....	11
4.3 Abbreviations	11
5 Functionality.....	12
5.1 General.....	12
5.1.1 Functional objective.....	12
5.1.2 Minimum operating mode	12
5.1.3 Controller functions	12
5.2 Individual zone control applications.....	14
5.2.1 General.....	14
5.2.2 Water Systems.....	15
5.2.3 Air- / Water-Systems	17
5.2.4 Electrical Systems	25
5.3 Functionality and hardware.....	27
5.3.1 General.....	27
5.3.2 Power supply and data protection.....	27
5.3.3 Inputs of the controller	27
5.3.4 Outputs of the controller	27
5.3.5 Sensor requirements	28
5.3.6 Actuator requirements	28
5.4 Temperature control accuracy.....	28
5.4.1 Introduction	28
5.4.2 General.....	29
5.4.3 Definition of CV and CSD	29
5.4.4 Definition of the control accuracy CA	31
5.4.5 Temperature control accuracy compliance.....	32
5.5 User Interface (UI)	32
5.6 Electrical requirements.....	32
5.6.1 General.....	32
5.6.2 Supply voltage	32
5.6.3 Protection against electric shock	32
5.6.4 Electromagnetic compatibility	32
5.6.5 Degrees of protection	33
5.6.6 Environmentally induced stress due to temperature.....	33
5.6.7 Materials.....	33
6 Test method	33
6.1 Power supply and data protection.....	33
6.2 Operating modes	33

6.2.1	Economy mode.....	33
6.2.2	Frost/Building protection	34
6.3	Temperature control accuracy compliance	34
6.4	Electrical tests.....	34
6.5	Supply voltage.....	34
6.6	Protection against electric shock.....	34
6.7	Electromagnetic compatibility	34
6.8	Degrees of protection.....	34
6.9	Environmental individual stress due to temperature.....	34
7	Classification and designation	34
8	Marking and documentation	35
8.1	Marking	35
8.2	Documentation	35
8.2.1	Installation instructions.....	35
8.2.2	User operating instructions.....	36
	Bibliography	37

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 15500-1:2018](https://standards.iteh.ai/catalog/standards/sist/49e7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018)

<https://standards.iteh.ai/catalog/standards/sist/49e7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018>

EN 15500-1:2017 (E)**European foreword**

This document (EN 15500-1:2017) has been prepared by 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 November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.

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 15500:2008.

The most important changes are:

- Respect the presentation of this project in the frame EPB in accordance with the drafting rules;
- Non-normative content is in CEN/TR 15500-2:2016;
- Function blocks and block diagrams (informative) removed;
- Individual zone control applications: new structured and clearly arranged.

This document is part of the set of standards on the energy performance of buildings (the set of EPB standards) and has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association (Mandate M/480, [15]), and supports essential requirements of EU Directive 2010/31/EC on the energy performance of buildings (EPBD, [16]).

In case this standard is used in the context of national or regional legal requirements, mandatory choices may be given at national or regional level for such specific applications, in particular for the application within the context of EU Directives transposed into national legal requirements.

Further target groups are users of the voluntary common European Union certification scheme for the energy performance of non-residential buildings (EPBD art.11.9) and any other regional (e.g. Pan European) parties wanting to motivate their assumptions by classifying the building energy performance for a dedicated building stock.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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

Introduction

This standard is part of a series of standards aiming at international harmonization of the methodology for the assessment of the energy performance of buildings, called “EPB set of standards”.

As part of the “EPB set of standards” it complies with the requirements for the set of basic EPB documents EN ISO 52000-1:2017 (see Normative references), CEN/TS 16628 and CEN/TS 16629 (see bibliography [2] and [3]) developed under a mandate given to CEN by the European Commission and the European Free Trade Association (Mandate M/480), and supports essential requirements of EU Directive 2010/31/EU on the energy performance of buildings (EPBD).

The standards issued by TC 247 for M/480 belong to the EPB set of standards and are in line with the over-arching standard (EN ISO 52000-1:2017) and drafted in accordance with the basic principles and detailed technical rules developed in the Phase I of the mandate.

Also these standards are clearly identified in the modular structure developed to ensure a transparent and coherent EPB standard set. BAC (Building Automation and Control) is identified in the modular structure as Technical Building System M10. However, the standards of TC 247 deal with control accuracy, control functions and control strategies using standards communications protocol (these last standards do not belong to the EPB standards set).

To avoid a duplication of calculation due to the BAC (avoid double impact), no calculation are done in BAC EPB standard set, but in each underlying standard of EPB set of standards (from M1 to M9 in the Modular Structure), an IDENTIFIER developed and present in the M10 covered by EN 15232-1:2015 is used where appropriate. These way of interaction is described in detailed in the Technical Report (CEN ISO/TR 52000-2:2017) accompanying the over-arching standard. As consequence, the Annex A and Annex B concept as EXCEL sheet with the calculation formulas used in the EPB standards are not applicable for the standards issued by TC 247 for M/480.

The main target groups of this standard are all the users of the set of EPB standards (e.g. architects, engineers, regulators).

Further target groups are parties wanting to motivate their assumptions by classifying the building energy performance for a dedicated building stock.

More information is provided in the Technical Report accompanying this standard (CEN/TR 15500-2:2016 [5]).

EN 15500-1:2017 (E)**1 Scope**

The purpose of this European Standard is to specify the applications, functionality set and application performance for electronic individual zone control equipment.

The applications are for cooling and hot water or electrical heating. This European Standard applies specifically to individual zone control equipment for maintaining temperature, humidity and air flow as a function of occupancy and demand operated with auxiliary electrical energy.

Information required for the operation of the equipment may be processed using either analogue or digital techniques or a combination of both. Safety requirements remain unaffected by this European Standard.

This European Standard refers to the input and output requirements of the controller and not of the input and output devices as e.g. sensors and actuators.

This European Standard covers fixed-function, configurable and programmable controllers. The control equipment may or may not be connected to a data-network however communications aspects are not covered by this standard. These devices could be applied for any kind of building, intermittent or non-intermittent occupation, residential or non-residential.

Table 1 shows the relative position of this standard within the set of EPB standards in the context of the modular structure as set out in EN ISO 52000-1:2017.

NOTE 1 In CEN ISO/TR 52000-2:2017 the same table can be found, with, for each module, the numbers of the relevant EPB standards and accompanying technical reports that are published or in preparation.

NOTE 2 The modules represent EPB standards, although one EPB standard may cover more than one module and one module may be covered by more than one EPB standard, for instance a simplified and a detailed method respectively.

[SIST EN 15500-1:2018](https://standards.iteh.ai/catalog/standards/sist/49e7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018)

<https://standards.iteh.ai/catalog/standards/sist/49e7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018>

Table 1 — Position of this standard (in casu M3–5, M4–5, M5–5), within the modular structure of the set of EPB standards

Submodule	Over-arching Descriptions	Building (as such) Descriptions	Technical Building System									
			Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic Hot waters	Lighting	Building automation and control	PV, wind, ..
sub 1	M1	M2		M3	M4	M5	M6	M7	M8	M9	M10	M11
1	General	General	General									
2	Common terms and definitions; symbols, units and subscripts	Building Energy Needs	Needs									
3	Application	(Free) Indoor Conditions without Systems	Maximum Load and Power									
4	Ways to Express Energy Performance	Ways to Express Energy Performance	Ways to Express Energy Performance									
5	Building Functions and Building Boundaries	Heat Transfer by Transmission	Emission and control	x	x	x						
6	Building Occupancy and Operating Conditions	Heat Transfer by Infiltration and Ventilation	Distribution and control									
7	Aggregation of Energy Services and Energy Carriers	Internal Heat Gains	Storage and control									
8	Building Partitioning	Solar Heat Gains	Generation and control									
9	Calculated Energy Performance	Building Dynamics (thermal mass)	Load dispatching and operating conditions									

EN 15500-1:2017 (E)

	Over-arching	Building (as such)	Technical Building System									
Submodule	Descriptions	Descriptions	Descriptions	Heating	Cooling	Ventilation	Humidification	Dehumidification	Domestic Hot waters	Lighting	Building automation and control	PV, wind, ..
sub 1	M1	M2		M3	M4	M5	M6	M7	M8	M9	M10	M11
10	Measured Energy Performance	Measured Energy Performance	Measured Energy Performance									
11	Inspection	Inspection	Inspection									
12	Ways to Express Indoor Comfort		BMS									
13	External Environment Conditions											
14 ^a	Economic Calculation											

^a The shaded modules are not applicable.

SIST EN 15500-1:2018

<https://standards.iteh.ai/catalog/standards/sist/49c7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018>

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 52000-1:2017, *Energy performance of buildings - Overarching EPB assessment - Part 1: General framework and procedures*

CEN/TR 15500-2:2016, *Control for heating, ventilating and air-conditioning applications - Part 2: Accompanying TR prEN 15500-1:2015 - Modules M3-5, M4-5, M5-5*

EN 12098-1, *Controls for heating systems - Part 1: Control equipment for hot water heating systems*

EN 12098-3, *Controls for heating systems - Part 3: Control equipment for electrical heating systems*

EN 12098-5, *Controls for heating systems - Part 5: Start-stop schedulers for heating systems*

EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*

EN 60730 (all parts), *Automatic electrical controls for household and similar use (IEC 60730)*

EN ISO 7345:1995, *Thermal insulation - Physical quantities and definitions (ISO 7345:1987)*

EN 60038, *CENELEC standard voltages (IEC 60038)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345:1995, in EN ISO 52000-1:2017 and the following apply.

3.1

IZC

electronic individual zone control equipment

equipment performing closed loop control functions of physical measured variable(s) in a single room or in an area of building

Note 1 to entry: Measured variable(s) are e.g. temperature, humidity, and pressure.

3.1.2

configurable controller

controller where the manufacturer supplies one or more adjustable control strategies for specific applications

3.1.3

programmable controller

controller where the control strategies can be programmed

Note 1 to entry: Programmable controllers also are named automation station.

3.2

operating mode

mode that applies either to control equipment or to control functions

Note 1 to entry: Operating modes can be switched over by an automatic mode or manual.

3.2.1

manual

mode of operation of equipment when significant control functions is overridden by the user

3.2.2

automatic

mode of operation of equipment when significant control functions are not overridden by the user

3.2.3

operating time override

mode of operation of equipment that overrides the operating state to a predetermined other operating mode, e.g. comfort or economy for a limited pre-determined period of time

3.2.4

comfort

mode of operation for a normally occupied room

Note 1 to entry: Other terms used for comfort mode are e.g. normal, occupied.

Note 2 to entry: The room state is in the comfort range with regard to temperature, humidity, air-quality or air-flow.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/49e7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018>

EN 15500-1:2017 (E)**3.2.5****economy**

mode of operation for an energy saving operating for a non-occupied room that does not need to be in the comfort operating mode for an extended period of time

Note 1 to entry: In the reduced operating mode, the control setpoint is lowered or raised with respect to the comfort setpoint.

Note 2 to entry: Other terms for economy mode are e.g. unoccupied, night set-back, sleeping, holiday.

3.2.6**pre comfort**

reduced operating mode for the room to quickly reach the comfort range upon changing to a comfort operating mode

3.2.7**frost protection**

mode of operation to reach a minimum acceptable positive temperature preventing freezing

3.2.8**building protection**

mode of operation to protect the building from overheating or under cooling

Note 1 to entry: Building protection includes frost protection.

3.2.9**off**

state where control and interlock functions are not operational

3.2.10**holiday**

mode where a time programme is used to control a room temperature for a pre-determined period

3.2.11**tariff optimization**

function to control the room temperature according to the tariff rate signal from the electrical supplier

3.3**input and output devices****3.3.1****sensor**

device that measures a physical property and converts that measurement into a signal

Note 1 to entry: Typical used physical properties measured in this context are temperature, humidity, air-quality, air-flow. Sensors are incorporated into a housing suitable for mounting.

3.3.2**detector**

device that indicates a special occurrence

Note 1 to entry: Typical detectors are occupancy detectors. Very often, sensors and detectors are close to each other. E.g. occupancy sensors/detectors also measure physical properties

ITeH STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 15500-1:2018](https://standards.iteh.ai/catalog/standards/sist/49e7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018)

<https://standards.iteh.ai/catalog/standards/sist/49e7a018-7754-49a1-96dc-aa680a8a018d/sist-en-15500-1-2018>