

**Temperature control devices and temperature limiters  
for heat generating systems**

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## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

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Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 27.06.2012.	Date of Availability of the European standard is 27.06.2012.
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English Version

## Temperature control devices and temperature limiters for heat generating systems

Dispositifs de régulation et de limitation de température  
pour les systèmes générateurs de chaleur

Temperaturregeleinrichtungen und Temperaturbegrenzer  
für wärmeerzeugende Anlagen

This European Standard was approved by CEN on 10 May 2012.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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## Foreword

This document (EN 14597:2012) 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 December 2012, and conflicting national standards shall be withdrawn at the latest by December 2012.

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

This document supersedes EN 14597:2005.

Compared to the previous edition, the following significant technical changes have been incorporated in this European Standard:

- a) In Clause 3, the classification of the controls to protective control or operating control was adjusted. If the letter "S" is used in the abbreviation, the word safety will also be used in the associated definition. Contractions between the definitions in Clause 3 and further requirements in the standard, especially in Table AX of the standard were removed;
- b) In Clause 11, the action 2V was adapted to the requirements of the standard content;
- c) In Annex H, the fault modes were adjusted to the existing approaches, a new Annex EX (informative) for characteristics of typical temperature sensors and their fault modes;
- d) Annex J applies to thermistors;
- e) Expansion of footnote 205 for requirement 27; also the new footnote 208 for the requirement 27 in Table BX.1. The test specification in requirement 27 was clarified.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



## Introduction

This European Standard specifies the functional requirements and tests for control devices which result from their application in thermal installations. These include, for example, time response and safety aspects of those devices which enable the safe operation of the installation.

A distinction is made between special requirements for the different operating media: air, water, oil and flue gas.

This European Standard includes purely mechanical constructions, electrical and electronic constructions, and constructions using software.

There exist "standard applications" for which in the past "typical" devices or combinations thereof have been used. Some of these devices may also be of purely mechanical construction. Such "standard devices" are described in this document and identified by letter codes. Their properties and functions are described in definitions using the language and definitions of the EN 60730 series, so to make sure that existing devices (using the same letter codes) are not incompatible when tested using this document.

The devices described in this European Standard contain sensors, control units and positioning outputs and, if needed, actuator devices. The requirements for mechanical safety, electrical safety and EMC are covered by the standards of the EN 60730 series under the LVD and EMC Directives.

To make sure that when translating this document into other languages, no unintended meaning is attached to certain words or that words are used as in former practices, the different devices are identified and defined by device codes consisting of up to four letters. It is strongly recommended that no other meaning than that given by the definitions of this document and of the EN 60730 series is attached to the letter codes.

This European Standard has been created for temperature sensing controls for use in heat generating systems. It might still be useful however to quote it for other applications, either wholly or in part.

### **Remarks to product committees specifying devices within the scope of this European Standard to ensure safety of the controlled applications within the scope of their standards:**

The attention of product committees specifying devices from this European Standard to cover technical risks of the operation of applications within the scope of their standards is drawn to the following fact. Merely specifying a general type of device (e. g. thermal cut out) according to this document for a specific application does not generally ensure the safety of the controlled application and may indeed be a recipe for disaster. The use of a control itself does not provide safety. Rather, safety is only provided if the control is suitable to be used with that application.

It is necessary to assess the risk situation of the controlled application by accepted engineering procedures (risk and/or fault analysis, FMEA, or other). It is also necessary to select from the devices with different device codes given in this document the device(s) that adequately limit the risk to acceptable levels by controlling or preventing possible failures and errors from occurring during operation of the application.

In order to limit risk in the controlled applications, controls as specified in Annex AX of this document need to be used. For control purposes operating controls, and for risk limiting protective controls need to be used. If a protective control also provides operating control functions, any failure of the operating function or part of the control should not prevent the protective operation of the control.

This European Standard covers safety related aspects pertaining to the operation and inherent safety of operating and protective controls for heat generating systems.



This European Standard does not limit construction to single function devices: multifunctional devices which could be classified for different functions are allowed within specified conditions. In this way, the use of devices using electronics or software is possible.

In this European Standard, the term "heat generating system" can also mean "heat exchanger".

In this European Standard, the term "heat generating system" comprises all equipment incorporated in such a system, for which other standards will normally apply as well. Examples are given below in Table 1.

**Table 1 — List of standards (non-exhaustive) for equipment using temperature control devices within the scope of this document**

Standard number	Title (short version)	CEN/TC	Remarks
EN 26	Gas-fired instantaneous water heaters for sanitary uses production, fitted with atmospheric burners	TC 48	Domestic gas fired water heaters
EN 89	Gas-fired storage water heaters for the production of domestic hot water	TC 48	
EN 30	Domestic cooking appliances burning gas	TC 49	Gas cooking appliances
EN 303-1	Heating boilers — Part 1: Heating boilers with forced draught burners — Terminology, general requirements, testing and marking	TC 57	Heating boilers
EN 613	Independent gas-fired convection heaters	TC 62	Independent gas-fired space heaters
EN 1266	Independent gas-fired convection heaters incorporating a fan to assist transportation of combustion air and/or flue gases	TC 62	
EN 203	Gas heated catering equipment	TC 106	Large kitchen appliances using gaseous fuels
EN 297 EN 483 EN 656	Gas-fired central heating boilers	TC 109	Central heating boilers using gaseous fuels
EN 303-3	Heating boilers — Part 3: Gas-fired central heating boilers — Assembly comprising a boiler body and a forced draught burner	TC 109	
EN 625	Gas-fired central heating boilers — Specific requirements for the domestic hot water operation of combination boilers of nominal heat input not exceeding 70 kW	TC 109	
EN 677	Gas-fired central heating boilers — Specific requirements for condensing boilers with a nominal heat input not exceeding 70 kW	TC 109	
EN 676	Automatic forced draught burners for gaseous fuels	TC 131	Gas burners using fans



Table 1 (continued)

Standard number	Title (short version)	CEN/TC	Remarks
EN 525	Non-domestic direct gas-fired forced convection air heaters for space heating not exceeding a net heat input of 300 kW	TC 180	Gas-fired air heaters
EN 621	Non-domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 300 kW, without a fan to assist transportation of combustion air and/or combustion products		
EN 1020	Non-domestic forced convection gas-fired air heaters for space heating not exceeding a net heat input of 300 kW incorporating a fan to assist transportation of combustion air or combustion products		
EN 778	Domestic gas-fired forced convection air heaters for space heating not exceeding a net heat input of 70 kW, without a fan to assist transportation of combustion air and/or combustion products	TC 180	
EN 1319	Domestic gas-fired forced convection air heaters for space heating, with fan-assisted burners not exceeding a net heat input of 70 kW		
EN 1196	Domestic and non-domestic gas-fired air heaters — Supplementary requirements for condensing air heaters	TC 180	
EN 12669	Direct gas-fired hot air blowers for use in greenhouses and supplementary non-domestic space heating	TC 180	
EN 12828	Heating systems in buildings — Design for water-based heating systems	TC 228	
EN 416-1	Single burner gas-fired overhead radiant tube heaters for non-domestic use — Part 1: Safety	TC 180	Non-domestic gas-fired overhead radiant heaters
EN 416-2	Single burner gas-fired overhead radiant tube heaters for non-domestic use — Part 2: Rational use of energy		
EN 419-1	Non-domestic gas-fired overhead luminous radiant heaters — Part 1: Safety		
EN 419-2	Single burner gas-fired overhead radiant tube heaters for non-domestic use — Part 2: Rational use of energy		
EN 12952-8	Water-tube boilers and auxiliary installations — Part 8: Requirements for firing systems for liquid and gaseous fuels for the boiler	TC 269	Shell and water-tube boilers
EN 12953-7	Shell boilers — Part 7: Requirements for firing systems for liquid and gaseous fuels for the boilers	TC 269	



**When referring to this European Standard, product committees should require in their product standards particular values as necessary for requirements according to Annex BX.**

If this European Standard is used for controls other than for heat generating systems and it is considered necessary to add or modify requirements, care needs to be taken to follow the principles of risk management contained in the EN 60730 series in order to maintain the overall integrity of the requirements of that series of standards.

This European Standard refers to EN 60730-2-9 and modifies and replaces requirements of that standard as appropriate for the purpose of this document. If not stated otherwise, all references refer to Clauses of EN 60730-2-9, which is applied in combination with EN 60730-1. Actuator devices are covered by EN 60730-2-14, if applicable.

**NOTE** Additional requirements or tests are numbered, starting with a number higher than X.200 and X being the particular Clause number. This is done in order to distinguish additional requirements from the requirements and tests of EN 60730-1 and the corresponding Parts 2, where numbering starts above X.100. All other Clause numbers refer to Clauses of EN 60730-2-9 and EN 60730-1.

## 1 Scope

**1.1** This European Standard applies to electrical or non-electrical temperature control devices which are used to control temperatures within heat generating systems by controlling the supply of energy. It also applies to limiting devices which ensure that the temperature in heat generating systems will not exceed a predefined limit.

This European Standard specifies operating values, operating times, and operational sequences associated with the safety of the heat generating system.

This European Standard also applies to controls using NTCs or PTCs thermistors, additional requirements for which are contained in Annex J of EN 60730-2-9:2010.

This European Standard applies to controls with a rated voltage not exceeding 690 V and with a rated current not exceeding 63 A.

This European Standard also applies to manual controls if, electrically and/or mechanically, they form an integral part of automatic controls.

**NOTE** Requirements for manually operated switches not forming part of an automatic control are contained in EN 61058-1.

This European Standard does not apply to room thermostats.

**1.2** This European Standard does not take into account the response value of an automatic action of the control, if such a response value is dependent upon the method of mounting the control in the heat generating system or equipment, in which case the control should be tested together with the heat generator. Where a response value is of significance for the protection of the user or surroundings, the value defined in the appropriate household equipment standard or as determined by the manufacturer applies.

**1.3** This European Standard applies also to controls incorporating electronic devices, requirements for which are contained in Annex DX.

## 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 60730-1:2011, *Automatic electrical controls for household and similar use — Part 1: General requirements* (IEC 60730-1:2010, modified)

EN 60730-2-8:2002+A1:2003, *Automatic electrical controls for household and similar use — Part 2-8: Particular requirements for electrically operated water valves, including mechanical requirements* (IEC 60730-2-8:2000+A1:2002, modified)

EN 60730-2-9:2010, *Automatic electrical controls for household and similar use — Part 2-9: Particular requirements for temperature sensing controls* (IEC 60730-2-9:2008, modified)

EN 60730-2-14:1997+A1:2001+A11:2005+A2:2008, *Automatic electrical controls for household and similar use — Part 2-14: Particular requirements for electric actuators* (IEC 60730-2-14:1995, modified +A1:2001+A2:2007, modified)

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 60730-2-9:2010, Clause 2 and the following apply.

#### 3.201

##### **operating differential**

difference between the upper and lower values of the operating value; for control devices types TB, STB, and ASTB, the difference between the fixed limit value and the temperature at the sensing element at which a manual reset is possible

Note 1 to entry: The definition according to EN 60730-1:2011, has been modified.

#### 3.202

##### **temperature sensing control type TR**

thermostat or modulating thermostat used in heat generating systems for controlling the temperature of liquid or/and gaseous media, which has provisions for setting by the user and which, if equipped with an electrical output, provides at least type 1B action

Note 1 to entry: See 2.2.4 and 2.2.6 of EN 60730-1:2011 and see 2.2.105 of EN 60730-2-9:2010.

Note 2 to entry: Elsewhere in this document, this device is designated by the device code TR.

#### 3.203

##### **temperature sensing control type FR**

combustion control used in heat generating systems, which is a TR influencing the supply of combustion air for solid fuels as a function of the temperature of the controlled medium

Note 1 to entry: Usually these devices are mechanical. If they are electrical, they will be TRs with an additional actuator. See EN 60730-2-14 for control of the air flow.

Note 2 to entry: Elsewhere in this document, this device is designated by the device code FR.

#### 3.204

##### **temperature sensing control type TW**

temperature operating control for heat generating systems where, upon response, automatic reset takes place after the temperature at the sensing element has dropped/risen below/above the adjusted limit value by the amount of the operating differential, and which, if electrical, provides type 2B action, and whose settings are unchangeably fixed or can be fixed with a tool or a special tool

Note 1 to entry: TW is a monitoring control as a class A control function according to EN 60730-1:2011.

Note 2 to entry: Elsewhere in this document, this device is designated by the device code TW.