SLOVENSKI STANDARD
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Nadzorne naprave za temperaturo in temperaturne omejitve za sisteme za gretje prostora

Temperature control devices and temperature limiters for heat generating systems

Temperaturregeleinrichtungen und Temperaturbegrenzer für wärmeerzeugende Anlagen

Dispositifs du régulation et de limitation de température pour les systemes générateurs de chaleur

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Temperature control devices and temperature limiters for heat generating systems

Dispositifs du réglage et de limitation de température pour systèmes de la production de chaleur (chauffage central)

Temperaturregeleinrichtungen und Temperaturbegrenzer für wärmeerzeugende Anlagen

This European Standard was approved by CEN on 1 August 2005.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

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Foreword

This European Standard (EN 14597:2005) has been prepared by Technical Committee CEN/TC 247 “Building automation, control 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of an identical text or by endorsement, at the latest by March 2006, and conflicting national standards shall be withdrawn at the latest by March 2006.

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

Introduction

This European Standard specifies the functional requirements and tests of control devices which result from the application in thermal installations. These are e.g. 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.

This European Standard has been worked out by a Joint Working Group of CLC/TC 72 and CEN/TC 247, based on a draft document from CEN/TC 247, following the agreement between these Committees laid down in CLC(SG)524A:Jan 1996. In line with this, this European Standard uses fully and refers in all aspects of construction and safety of the devices to EN 60730-2-9, "Automatic electrical controls for household and similar applications - Part 2: Particular requirements for temperature sensing controls", and, where needed, other Parts 2 of the EN 60730 series. It has been found that purely mechanical devices can be accommodated in this approach without any problem.

The devices described in this European Standard contain the sensors, the control units and the positioning outputs and, if needed, the 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 unintentional meaning is attached to words or words are used as in former practice, 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 given by the definitions of this document and of the EN 60730 series is attached to the letter codes.

Care has been taken to rewrite the definitions of the first draft from CEN/TC 247 by using the language of the EN 60730 series definitions and in such a way that the whole technical content has been retained and no loss occurred. This ensures that the devices using the device codes from this document will be compatible with those of the same device code used in the past.

This European Standard has been created for temperature sensing controls for use in heat generating systems; still it may be useful to quote it for other applications also, 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 fact that just specifying a general type of device (e.g. thermal cut-out) according to this document for a specific application does in general not ensure the safety of the controlled application and may be recipe for disaster. The use of a control itself does not provide safety, but only 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) and 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 failures and errors possibly occurring during operation of the application.

In order to limit risk in the controlled applications, controls as specified in Annex AX of this document shall be used. For control purposes operating controls, and for risk limiting protective controls shall be used. If a protective control provides also 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 in that 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" may 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:

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 fuel	TC 49	Gas cooking appliances
EN 303	Heating boilers with forced draught burners	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

Table 1 (*concluded*)

Standard number	Title (short version)	Relevant CEN/TC	Remarks
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	TC 109	
EN 677	Gas-fired central heating boilers — Specific requirements for condensing boilers	TC 109	
EN 676	Automatic forced draught burners for gaseous fuels	TC 131	Gas burners using fans
EN 525 EN 621 EN 1020	Non-domestic direct gas-fired forced convection air heaters for space heating	TC 179	Gas-fired air heaters
EN 778 EN 1319	Domestic gas-fired forced convection air heaters for space heating	TC 179	
EN 1196	Domestic and non-domestic gas-fired air heaters — Supplementary requirements for condensing air heaters	TC 179	
EN 12669	Direct gas-fired hot air blowers for use in greenhouses and supplementary non-domestic space heating	TC 179	
EN 12828	Heating systems in buildings — Design of water-based heating systems	TC 228	
ENV 1259 EN 416 EN 419-1	Single burner gas-fired overhead radiant tube heaters and non-domestic gas-fired overhead luminous radiant heaters Single burner gas-fired overhead radiant tube heaters Non-domestic gas-fired overhead luminous radiant heaters — Part 1: Safety	TC 180	Non-domestic gas-fired overhead radiant heaters
EN 12952-8	Water-tube boilers and auxiliary installations — Part 8: Requirements for firing systems for pulverized solid 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 are asked to consider to require in their product standards particular values as necessary for requirements according to Annex BX.

If this European Standards is used for controls other than for heat generating systems and it is considered necessary to add or modify requirements, care shall 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 to distinguish them 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 requires 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.

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 referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 60730-1:2000, *Automatic electrical controls for household and similar use — Part 1: General requirements (IEC 60730-1:1999, modified)*

EN 60730-2-8, *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, modified)*

EN 60730-2-9:2002, *Automatic electrical controls for household and similar use — Part 2-9: Particular requirements for temperature sensing controls (IEC 60730-2-9:2000, modified)*

EN 60730-2-14:1997, *Automatic electrical controls for household and similar use — Part 2-14: Particular requirements for electric actuators (IEC 60730-2-14:1995, modified)*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 60730-2-9:2002, Clause 2 and the following apply.

3.201
operating differential
EN 60730-1:2000, 2.3.26, applies with the following addition:
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

3.202
temperature sensing control type TR
thermostat (see 2.2.4 and 2.2.6 of EN 60730-1:2000) or modulating thermostat (2.2.104 of EN 60730-2-9:2002) 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 In the following 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 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.

3.204
temperature sensing control type TW
operating temperature controller 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

3.205
temperature sensing control type STW
automatic reset thermal cut-out (see EN 60730-1:2000, 2.2.8) 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 provides type 2P and type 2K actions, and, if electrical, type 2B action, and whose settings are unchangeably fixed or can be fixed with a tool or a special tool

NOTE 1 Type 2K action will be considered to be provided if type 2N action is provided.

NOTE 2 This device is typically required to prevent overheating in heat generating systems under abnormal operation condition; see EN 483 and EN 1020.

3.206
temperature sensing control type ATW
temperature sensing control that is used to limit flue gas temperature in heat generating systems and which is an STW for monitoring flue gas temperatures

NOTE 1 Such devices are used to monitor the temperature of flue gas located in the flue gas ways of solid fuel boilers at high temperatures.

NOTE 2 The concept of "extended safety", which is the action of a temperature limiting device to cut out or limit the temperature of the controlled application should a fault internal to the control occur, has been worked into 2.205 and other definitions. For the same purpose Notes 8 and 9 have been added to Table AX.1 which contains the requirements for software class and fault analysis of controls using electronic devices.

3.207
temperature sensing control type Th
STW used as a thermal bypass protection for solid fuel heat generating systems and which senses the heated media temperature and operates to cause energy to be carried off by opening a regulating unit, e.g. a valve; the settings of this control are unchangeably fixed

NOTE Usually this is a mechanical device. This function could also be provided by an STW controlling a valve.

3.208
temperature sensing control type ASW
flue gas flow control for heat generating systems which senses wrong direction of the flue gas flow by monitoring the flue gas temperature and causes the fuel flow to be cut off. The control provides either an automatic reset after a minimum time delay of 10 min or type 2J and type 2V actions

NOTE The flue gas flow control is used for monitoring the flue gas passages of gas-fired equipment with natural draught burners.

3.209
temperature sensing control type TB
operating temperature limiter for heat generating systems which can only be reset manually or with a tool and which provides at least the following actions: type 2B, type 2J and type 2V and optionally any of the following actions: type 2F; the settings of this control are unchangeably fixed or can be fixed with a tool or a special tool

3.210
temperature sensing control type STB
thermal cut-out which can only be reset manually or by a tool and which provides at least the following actions: type 2B, type 2J , type 2K, type 2P and type 2V and optionally any of the following actions: type 2F and type 2N; the settings of this control are unchangeably fixed or can be fixed with a tool or a special tool

NOTE Type 2K action will be considered to be provided if type 2N action is provided.

3.211
temperature sensing control type ASTB
STB suitable for limiting the flue gas temperature

3.212
two-position control
control device where the manipulated variable can assume only two values (in the case of a contact output, the manipulated variables "closed" and "open")

3.213
controls with and without auxiliary energy

3.213.1
control with auxiliary energy
control that requires electrical, pneumatic or hydraulic energy for transferring the temperature measured by its sensing element(s) to an electrical or mechanical output or actuator is termed a system with auxiliary energy

3.213.2
control without auxiliary energy
control that uses a sensing element acting directly on a contact output or an actuator is termed a system without auxiliary energy

3.214
lockout
shutdown after which a restart can only be accomplished by a manual reset and by no other means

NOTE 1 "reset with tool" is considered to be covered by "manual reset"