



# SLOVENSKI STANDARD

SIST EN 298:2004

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BUXca Yý U.

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## Naprave za samodejni nadzor plinskih gorilnikov in plinskih aparatov z ali brez ventilatorja (gorilniški avtomati)

Automatic gas burner control systems for gas burners and gas burning appliances with or without fans

Feuerungsautomaten für Gasbrenner und Gasgeräte mit oder ohne Gebläse

Systemes automatiques de commande et de sécurité pour brûleurs et appareils avec ou sans ventilateur utilisant les combustibles gazeux

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English version

## Automatic gas burner control systems for gas burners and gas burning appliances with or without fans

Systèmes automatiques de commande et de sécurité pour brûleurs et appareils avec ou sans ventilateur utilisant les combustibles gazeux

Feuerungsautomaten für Gasbrenner und Gasgeräte mit oder ohne Gebläse

This European Standard was approved by CEN on 23 May 2003.

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 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 Management Centre has the same status as the official versions.

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

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

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## Foreword

This document EN 298:2003 has been prepared by Technical Committee CEN /TC 58, "Safety and control devices for gas-burners and gas-burning appliances", the secretariat of which is held by BSI.

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 2004, and conflicting national standards shall be withdrawn at the latest by September 2006.

This document supersedes EN 298:1993.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this document.

Annexes A and C are normative. Annex B is informative.

This document includes a Bibliography.

This European Standard covers type testing only.

Following a request from CEN/TC 58, CEN has agreed to defer the date of withdrawal of EN 298 :1993 for a transition period of 3 years.

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

## Introduction

Whilst this European Standard is written primarily for Automatic Gas Burner Control Systems used on or in appliances for cooking, heating, hot water production, refrigeration, lighting or washing and having, where applicable, a normal water temperature not exceeding 105 °C, it can be usefully quoted, as a whole or in part, by standards for other equipment.

The functional characteristics of the automatic burner control systems, programming units, and their associated flame detector devices, in so far as they are not laid down in this standard, are given by the standards for the appliances for which the automatic burner control systems are intended.

This standard deals with immunity aspects of Electromagnetic Compatibility (EMC) only. Since automatic burner control systems are intended for use as an integrated or incorporated part of an appliance, further EMC tests (both immunity and emission) can be required for the intended use.

## 1 Scope

This European Standard specifies requirements for the construction and function, test methods and marking of automatic burner control systems and also programming units and their associated flame detector devices for gas burners and gas burning appliances with or without fans.

This standard also applies to automatic burner control systems, programming units and their associated flame detector devices that include additional functions.

Automatic burner control systems utilizing thermo-electric flame supervision devices are not covered by this standard.

This European Standard covers type testing only.

NOTE European Standards for burners, appliances or processes which use automatic burner control systems, programming units or flame detectors can override the requirements of this standard.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ENV 50204, *Radiated electromagnetic field from digital radio telephones — Immunity test.*

EN 60068-2-6:1995, *Environmental testing — Part 2: Tests; tests Fc: Vibration (sinusoidal) (IEC 60068-2-6:1995 + Corrigendum:1995).*

EN 60127-1, *Miniature fuses - Part 1: definitions for miniature fuses and general requirements for miniature fuse-links (IEC 60127-1:1988).*

EN 60335-1:1994, *Safety of household and similar electrical appliances — Part 1: General requirements (IEC 60335-1:1991, modified).*

EN 60529:2000, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989).*

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

EN 60730-2-5:2002, *Automatic electrical controls for household and similar use — Part 2-5: Particular requirements for automatic electrical burner control systems (IEC 60730-2-5:2000, modified).*

EN 60947-5-1:1997, *Low-voltage switchgear and controlgear — Part 5-1: Control circuit devices and switching elements; electromechanical control circuit devices (IEC 60947-5-1:1997).*

EN 61000-4-2, *Electromagnetic compatibility (EMC) — Part 4-2: Testing and measuring techniques; Electrostatic discharge immunity test (IEC 61000-4-2:1995).*

EN 61000-4-3, *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques; Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2002).*

EN 61000-4-4, *Electromagnetic compatibility (EMC) — Part 4-4: Testing and measurement techniques; Electrical fast transient/burst immunity test (IEC 61000-4-4:1995).*

EN 61000-4-5, *Electromagnetic compatibility (EMC) — Part 4-5: Testing and measurement techniques; Surge immunity test (IEC 61000-4-5:1995).*

EN 61000-4-6, *Electromagnetic compatibility (EMC) — Part 4-6: Testing and measurement techniques; Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:1996).*

EN 61000-4-11, *Electromagnetic compatibility (EMC) — Part 4-11: Testing and measurement techniques — Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:1994).*

EN 61558-2-6, *Safety of power transformers, power supply units and similar — Part 2-6: Particular requirements for safety isolating transformers for general use (IEC 61558-2-6:1997).*

EN 61558-2-17, *Safety of power transformers, power supply units and similar — Part 2-17: Particular requirements for safety isolating transformers for switch mode power supplies (IEC 61558-2-17:1997).*

ISO 7637-1, *Road vehicles - Electrical disturbances from conduction and coupling - Part 1: Definitions and general considerations.*

ISO 7637-2, *Road vehicles - Electrical disturbance by conduction and coupling - Part 2: Commercial vehicles with nominal 24 V supply voltage - Electrical transient conduction along supply lines only.*

IEC 60384-14, *Fixed capacitors for use in electronic equipment — Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains.*

IEC 60384-16, *Fixed capacitors for use in electronic equipment — Part 16: Sectional specification: Fixed metallized polypropylene film dielectric d.c. capacitors.*

### 3 Terms and definitions

For the purposes of this European Standard the following terms and definitions apply.

#### 3.1

##### flame detector device

device by which the presence of a flame is detected and signalled;

it can consist of a flame sensor, an amplifier and a relay for signal transmission. These parts, with the possible exception of the actual flame sensor, can be assembled in a single housing for use in conjunction with a programming unit

#### 3.2

##### flame sensor

actual flame-sensing element, the output signal or value of which is used as the input for the flame detector amplifier



### 3.3 sensed flame and flame signal

**3.3.1  
sensed flame**  
physical value monitored by the flame sensor

**3.3.2  
flame signal**  
signal given by the flame detector device in case of sensed flame

**3.4  
flame simulation**  
condition which occurs when the flame signal indicates the presence of a flame when in reality no flame is present

**3.5  
programming unit**  
unit which reacts to signals from control and safety devices, gives control commands, controls the start-up sequence, supervises the burner operation and causes controlled shut-down, and if necessary safety shut-down and lock-out;

the programming unit follows a predetermined sequence of actions and always operates in conjunction with a flame detector device

**3.6  
automatic burner control system**  
system comprising at least a programming unit and all the elements of a flame detector device;

the various functions of an automatic burner control system can be in one or more housings

**3.7  
start position**  
stage, where the system is not in lock-out position, has not yet received the start signal but can proceed with the start-up sequence when required;

at this stage, the output terminals for any automatic shut-off valve and ignition device are not energized

**3.8  
start signal**  
signal e. g. from a thermostat, which releases the system from its start position and commences the predetermined programme

**3.9  
programme**  
sequence of control operations determined by the programming unit involving switching on, starting up, supervising and switching off the burner;

safety actions such as safety shut down and lock out are also part of the programme

**3.10  
purge**  
forced introduction of air through the combustion chamber and flue passages in order to displace any remaining fuel/air mixture and/or products of combustion

**3.10.1  
pre-purge**  
purge which takes place between the start signal and the energization of the ignition device

**3.10.2  
post-purge**  
purge which takes place immediately following shut-down

### 3.11

#### **first safety time**

interval between the pilot gas valve, the start gas valve or main gas valve, as applicable, being energized and the pilot gas valve, start gas valve or main gas valve, as applicable, being de-energized if the flame detector signals the absence of a flame

NOTE Where there is no second safety time, this is called the safety time.

### 3.12

#### **second safety time**

where there is a first safety time applicable to either a pilot or start gas flame only, the interval between the main gas valve being energized and the main gas valve being de-energized if the flame detector signals the absence of a flame

### 3.13

#### **burner without fan**

burner where the primary air required for combustion is provided by the action of the gas and the secondary air is freely available from the surroundings

### 3.14

#### **burner with fan**

burner in which some or all of the air required for the combustion is supplied by means of a fan (i. e. forced draught or induced draught)

### 3.15

#### **running position of the system**

position of the system in which the burner is in normal operation under the supervision of the programming unit and its flame detector device

### 3.16

#### **controlled shut-down**

process by which the power to the gas shut-off valve(s) is removed before any other action takes place, e. g. as a result of the action of a controlling function

### 3.17

#### **safety shut-down**

process which is effected immediately following the response of a protection device or the detection of a fault in the automatic burner control system and puts the burner out of operation;

the resulting state of the system is defined by deactivated terminals for the gas shut-off valves and the ignition device

### 3.18

#### **lock-out**

#### 3.18.1

##### **non-volatile lock-out**

safety shut-down condition of the system, such that a restart can only be accomplished by a manual reset of the system and by no other means

#### 3.18.2

##### **volatile lock-out**

safety shut-down condition of the system, such that a restart can only be accomplished by either the manual reset of the system, or an interruption of the main power and its subsequent restoration

### 3.19

#### **spark restoration**

process by which, following loss of flame signal, the ignition device will be switched on again without total interruption of the gas supply

### 3.20

#### **recycling**

process by which, after a safety shut-down a full start-up sequence is automatically repeated

### 3.21 functions of automatic burner control systems

#### 3.21.1 waiting time

for burners without fans, the interval between the start signal being given and the energization of the ignition device or gas valves, whichever comes first;

during this time natural ventilation of the combustion chamber and the flue passages can take place

#### 3.21.2 pre-purge time

period during which purge takes place at the proven air rate prior to the energization of the ignition device or gas valves, whichever comes first

#### 3.21.3 post-purge time

period during which purge takes place at the proven air rate between any shut-down and the moment the fan is switched off

#### 3.21.4 inter-purge time

period during which purging of the combustion chamber takes place at the proven air rate after unsuccessful ignition and prior to the next recycle attempt

#### 3.21.5 inter-waiting time

period during which natural ventilation of the combustion chamber takes place after unsuccessful ignition and prior to the next recycle attempt

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### 3.22 sequences

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#### 3.22.1 start-up sequence

sequence of actions executed by the system which brings the burner from the start position to the running position

#### 3.22.2 first stage

part of the start-up sequence which allows the release of start gas into the combustion chamber

#### 3.22.3 second stage

part of the start-up sequence which allows the release of further gas into the combustion chamber (if applicable)

### 3.23 systems for permanent operation

systems that are designed to remain in the running position for longer than 24 h without interruption

### 3.24 systems for non-permanent operation

systems that are designed to remain in the running position for less than 24 h

### 3.25 self-checking function of the flame detector device

automatic internal function of the system which checks the operation of the flame detector device

### 3.26 air flow simulation

condition which occurs when the air flow sensor indicates the presence of air flow when in reality no air flow is present

**3.27**

**spark supervision**

process of monitoring the ignition spark

**3.28**

**pilot or start gas flame proving period**

interval between the end of the first safety time and the beginning of the second safety time which is used to prove that the pilot or gas flame is stable

**3.29**

**intermittent first stage**

first stage that is ignited prior to ignition of the main flame and is shut off simultaneously with it

**3.30**

**interrupted first stage**

first stage that is ignited each time the burner is started up and which is extinguished at the end of the main flame establishment period

**4 Classification**

To assist with the specification of systems with regard to particular applications, the following codes shall be used.

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Table 1 — Classification codes

1st character	denotes as Fanned Atmospheric Both	F A B
2nd character	denotes type of first stage: interrupted start gas intermittent start gas Both direct main burner ignition	I T B M
3rd character	denotes first action following flame failure: non-volatile lock-out volatile lock-out Recycling spark restoration	L V C R
4th character	denotes type of final action: non-volatile lock-out volatile lock-out spark restoration	L V R
5th character	denotes: fixed times adjustable times Both	X J B
6th character	denotes: self-check as required in 7.4.5 non-self-check Both	K N B
NOTE Other required specification data are given in clause 11.		

The letter O shall be used for any character that is not relevant.

If the functional behaviour of the system deviates from this standard (see 7.1) it shall be classified with the letter "S" exclusively. Other characters are not used in combination with S.

## 5 Conditions for testing and measuring tolerances

All the tests shall be carried out under this conditions unless otherwise specified. The test conditions are:

- rated voltage or rated voltage range;
- rated frequency;
- ambient temperature of  $(20 \pm 5)$  °C.