



# SLOVENSKI STANDARD

## SIST EN 298:1997

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### Samodejni kontrolnik za plinske gorilnike in plinske aparate z ventilatorjem ali brez njega

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

Feuerungsautomaten für Gasbrenner und Gasgeräte mit und ohne Gebläse

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

Ta slovenski standard je istoveten z: **EN 298:1993**

#### **ICS:**

27.060.20      Plinski gorilniki      Gas fuel burners

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**en**

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English version

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

Systèmes de commande et de sécurité pour brûleurs et appareils avec ou sans ventilateur utilisant les combustibles gazeux. (standards.iteh.ai)
 Feuerungsautomaten für Gasbrenner und Gasgeräte mit und ohne Gebläse

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European Committee for Standardization  
Comité Européen de Normalisation  
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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## Foreword

This European Standard 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 document has been submitted to the formal vote and the result was positive.

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of an identical text or by endorsement, at the latest by April 1994, and conflicting national standards shall be withdrawn at the latest by December 1995.

This European Standard has been prepared under a Mandate given to CEN by the Commission of the European Communities and the European Free Trade Association and supports essential requirements of EC Directive(s).

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

## Introduction

# iTeh STANDARD PREVIEW

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 may 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 (E.M.C) only. When a European Directive on EMC takes effect, emission aspects will have to be dealt with also.

## 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.

NOTE: European Standards for burners, appliances or processes which use automatic burner control systems, programming units or flame detectors may 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.

HD 323.2.6.S2:1988	Environmental testing - Part 2: Tests, test Fc and guidance: <u>vibration</u> (sinusoidal)
EN 60335-1:1988	<a href="https://standards.iteh.ai/catalog/standards/sist/36b0751b-e793-46ce-8434-3597324974/sist-en-60335-1-1997">https://standards.iteh.ai/catalog/standards/sist/36b0751b-e793-46ce-8434-3597324974/sist-en-60335-1-1997</a> Safety of household and similar electrical appliances - Part 1: General requirements (IEC 335-1:1983 Modified)
EN 60947-5-1:1991	Low-voltage switchgear and controlgear - Part 5: Control circuit devices and switching elements - Section one - Electromechanical control circuit devices
EN 60529:1991	Degrees of protection provided by enclosures (IP Code)
EN 60730-1:1991	Automatic electrical controls for household and similar use - Part 1: General requirements
EN 60730-2-5:1991	Automatic electrical controls for household and similar use - Part 2: Particular requirements for automatic electrical burner control systems
IEC 801-2:1991	Electromagnetic compatibility for industrial process measurement and control equipment - Part 2: Electrostatic discharge requirements
IEC 801-4:1988	Electromagnetic compatibility for industrial process measurement and control equipment - Part 4: Electrical fast transient/burst requirements
IEC 384-14:1981	Fixed capacitors for use in electronic equipment - Part 14: Sectional specification: Fixed capacitors for radio interference suppression. Selection of methods of test and general requirements



IEC 255-0-20:1974	Contact performance of electrical relays - Part 0-20: Electrical relays - Contact performance of electrical relays
IEC 255-1-00:1975	Electrical relays - Part 1: All-or-nothing electrical relays
EN 60742:1989	Isolating transformers and safety isolating transformers - Requirements (IEC 742:1983 Modified)
ENV 50140:1993	Electromagnetic compatibility, Basic immunity standard - "Radiated, radio-frequency electromagnetic field" - Immunity test
ENV 50141:1993	Electromagnetic compatibility, Basic immunity standard - "Conducted disturbances induced by radio-frequency fields" - Immunity test
prENV 50142:1993	Electromagnetic compatibility, Basic immunity standard - "Surges" - Immunity test

### 3 Definitions

For the purpose of this standard the following definitions apply.

**3.1 flame detector device:** A 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, may be assembled in a single housing for use in conjunction with a programming unit. <https://standards.iteh.ai/catalog/standards/sist/36b0751b-e793-46ce-8434-c35923444974/sist-en-298-1997>

**3.2 flame sensor:** The actual flame-sensing element, the output signal or value of which is used as the input for the flame detector amplifier.

**3.3 flame signal:** The signal given by the flame detector device, normally when the flame sensor senses a flame.

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

**3.5 programming unit:** A programming unit 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:** An automatic burner control system comprises at least a programming unit and all the elements of a flame detector device. The various functions of an automatic burner control system may be in one or more housings.

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

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

**3.10 purge:** The 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.

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

- **post-purge:** The purge which takes place immediately following shut-down.

**3.11 first safety time:** The 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 second safety time is 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:** A 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:** A 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:** The 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:** The 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:** The process which is effected immediately following the response of a safety limiter or sensor or the detection of a fault in the automatic burner control system and which puts the burner out of operation by immediately removing the power to the gas shut-off valve(s) and the ignition device.

NOTE: Safety shut-down may also occur as a result of an interruption/decrease of the power supply (see 8.3).

**3.18 lock-out**

**3.18.1 non-volatile lock-out:** The 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:** The 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:** The 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:** The 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, this is the interval between the start signal being given and the energization of the ignition device. During this time natural ventilation of the combustion chamber and the flue passages may take place.

**3.21.2 pre-purge time:** The period during which purge takes place at the proven air rate prior to the energization of the ignition device.

**3.21.3 post-purge time:** The interval between any shut-down and the moment the fan is switched off.

### **3.22 sequences**

**3.22.1 start-up sequence:** The sequence of actions executed by the system which brings the burner from the start position to the running position.

**3.22.2 first stage:** That part of the start-up sequence which allows the release of start gas into the combustion chamber.

**3.22.3 second stage:** That 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:** An automatic internal function of the system which checks the operation of the flame detector device.

**3.26 air flow simulation:** A 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:** Denotes the process of monitoring the ignition spark.

**3.28 pilot or start gas flame proving period:** The 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:** A first stage that is ignited prior to ignition of the main flame and is shut off simultaneously with it.

**3.30 interrupted first stage:** A 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.

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

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	denoted 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.		

## 5 Normal conditions for testing and measuring tolerances

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

- rated voltage or rated voltage range;
- rated frequency;
- ambient temperature of  $(20 \pm 5) ^\circ\text{C}$ .

The error of measurement shall not exceed:

- for time measurements:  $\pm 0,1$  s;
- for temperature measurements:  $\pm 1$  K;
- for supply frequency measurements:  $\pm 0,1$  Hz;
- for electrical supply measurements:  $\pm 0,5$  %.

All measurements shall be made after stable temperature conditions have been achieved. All tests are performed in the order written in this standard except for that of 6.5.2 and clause 9.

The tests shall be carried out in the mounting position specified by the manufacturer.

When several mounting positions are specified, the tests shall be carried out with the system installed in the least favourable position.

## 6 Constructional requirements

### 6.1 General

The quality of the materials, the design and the structure of the components used shall be such that the system will operate safely and in accordance with the requirements of this standard for a reasonable period of time (service life) under the normally expected mechanical, chemical, thermal and environmental conditions, even in the event of such carelessness as may occur in normal use, provided that the manufacturer's instructions for installation, adjustment, operation and maintenance are complied with. Compliance is checked by carrying out the tests specified in this standard.

The system shall be designed such that changes in critical circuit component values (such as those affecting timing or sequence) within the component manufacturer's declared worst case tolerances including the long term stability, shall result in the system continuing to function in accordance with this standard. Compliance shall be checked by worst case analysis.

The construction of any additional functions included in the automatic burner control system, programming unit or flame detector for which no provisions exist in this standard, shall be such that they do not degrade the safe and correct operation of the automatic burner control system, programming unit or flame detector.

### 6.2 Protection provided by the enclosure

The class of protection for systems with their own enclosure shall be a minimum of EN 60529:1991 IP 40.

For systems for use in the open air the protection shall conform to at least EN 60529:1991 IP 54.

For systems without enclosure, protection shall be provided by the appliance in which it is installed.

### 6.3 Electrical equipment

The electrical equipment shall comply with the requirements of EN 60730-1:1991 clauses, 2, 8, 9, 11, 12, 13, 14, 18, 19, 20, 21, 22, and 23 and EN 60730-2-5:1991, clause 10.

Safety isolating transformers shall meet the requirements of EN 60742:1989 as applied to safety isolating transformers of the associated transformer type. (See 4.12 of EN 60742:1989.)