



SLOVENSKI STANDARD
SIST EN 12067-2:2004
01-junij-2004

**Regulatorji razmerja plina in zraka za plinske gorilnike in plinske aparate - 2. del:
Elektronski tip**

Gas/air ratio controls for gas burners and gas burning appliances - Part 2: Electronic types

Gas-Luft-Verbundregleinrichtungen für Gasbrenner und Gasgeräte - Teil 2:
Elektronische Ausführung

Dispositifs de régulation du rapport air/gaz pour brûleurs à gaz et appareils à gaz - Partie 2: Dispositifs électroniques

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Ta slovenski standard je istoveten z: EN 12067-2:2004

ICS:

23.060.40

27.060.20

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en,fr,de

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EUROPEAN STANDARD

EN 12067-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2004

ICS 23.060.40; 27.060.20

English version

Gas/air ratio controls for gas burners and gas burning appliances - Part 2: Electronic types

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Gas-Luft-Verbundregelrichtungen für Gasbrenner und Gasgeräte - Teil 2: Elektronische Ausführung

This European Standard was approved by CEN on 2 February 2004.

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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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 12067-2:2004) 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of an identical text or by endorsement, at the latest by September 2004, and conflicting national standards shall be withdrawn at the latest by September 2004.

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.

This European Standard covers type testing only.

This standard recognizes the safety level specified by CEN/TC 58 dealing with the safety, construction and performance of controls for Gas Burners and Gas Burning Appliances and to their testing.

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

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.

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Introduction

For electronic gas/air ratio control systems (GARC) there are numerous solutions for specific applications in the market. For that reason TC 58 decided to draft a standard for type testing for closed loop electronic GARC only.

This standard does not override requirements of relevant appliance standards.

This standard does not differentiate into classification by heat input or relates to applications. When GARCs are fitted to appliances the safety of the appliance should not be reduced by any normal or abnormal operation of the GARC described in this standard.

The accuracy of actual gas/air ratio is not specified as a fixed value in this standard.

The standard specifies which parameters have to be declared by the manufacturer and under what conditions these have to be fulfilled. These parameters will relate to the GARC rather than the combustion process.

The standard does not include a standard test rig, however the purpose of the tests is to verify the manufacturer's declaration under the conditions required in the standard.

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1 Scope

This European Standard specifies the safety, construction and performance requirements for electronic gas/air ratio control systems (GARCs) intended for use with gas burners and gas burning appliances. It also describes the test procedures for evaluating these requirements and specifies information necessary for installation and use.

This standard is only applicable to closed loop gas/air ratio controls (see 3.1) and does not differentiate into classification by heat input.

This standard applies to electronic GARCs that can be tested independently, as well as part of an appliance or a gas burner.

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).

EN 298:2003; *Automatic gas burner control systems for gas burners and gas burning appliances with or without fans.*

EN 13611:2000, *Safety and control devices for gas burners and gas-burning appliances - General requirements.*

ENV 14459:2002, *Method of risk analysis and recommendations for the use of electronics in systems for the control of gas burners and gas burning appliances.*

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

EN 60529, *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, *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 61000-4-11, *Electromagnetic compatibility (EMC) — Part 4: Testing and measurement techniques — Section 11: Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:1994).*

3 Terms and definitions

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

3.1

electronic gas/air ratio control (electronic GARC)

closed loop modulating system consisting of the electronic control, actuating elements for the gas flow and the air flow as a minimum, and allocated feedback signal(s), see Figure 1

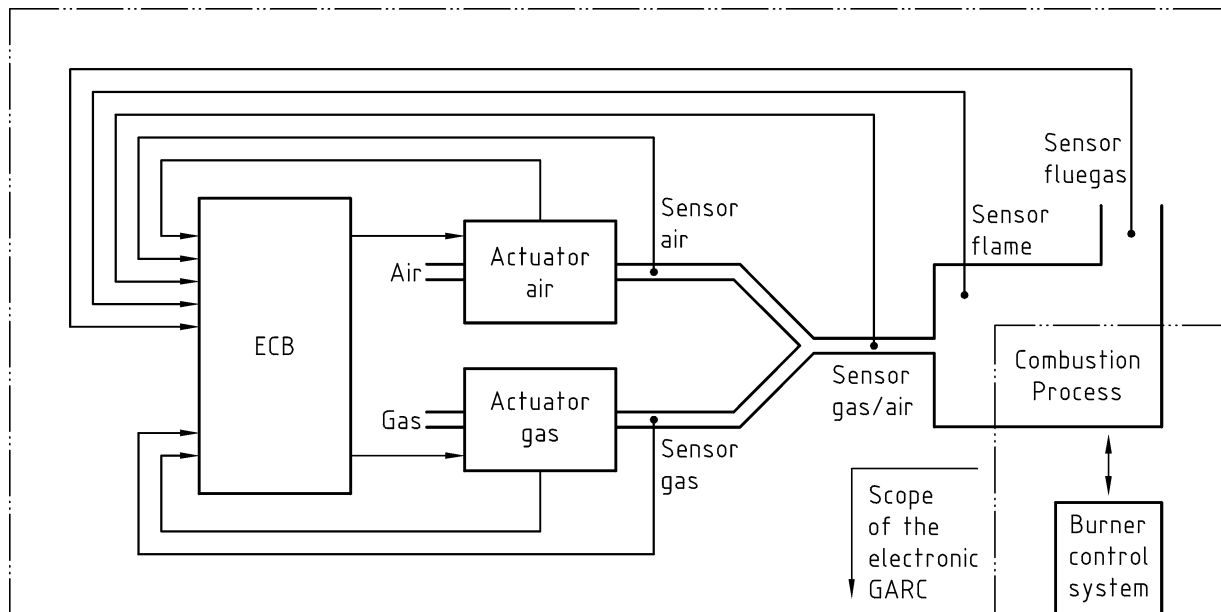


Figure 1 — Scope of the electronic GARC

3.2

electronic control box (ECB)

electronic main control module incorporating all inputs and outputs for the controlling elements

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3.3

actuator

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device for controlling the amount of gas and/or air

3.4

sensor

device which gives a signal related to a physical property to which it responds

3.5

combustion process

chemical reaction between gas and air to produce heat

3.6

defined safe state

state of the system with the following characteristics:

- the system passively assumes a state in which the output terminals ensure a safe situation under all circumstances or;
- the system actively executes a protective action causing it to shut down and lock out, or;
- the system remains in operation, continuing to satisfy all safety related functional requirements

**3.7
fault tolerating time**

time between the occurrence of a fault and the shut down of the burner, which is tolerated by the application without creating a hazardous situation (Figure 2)

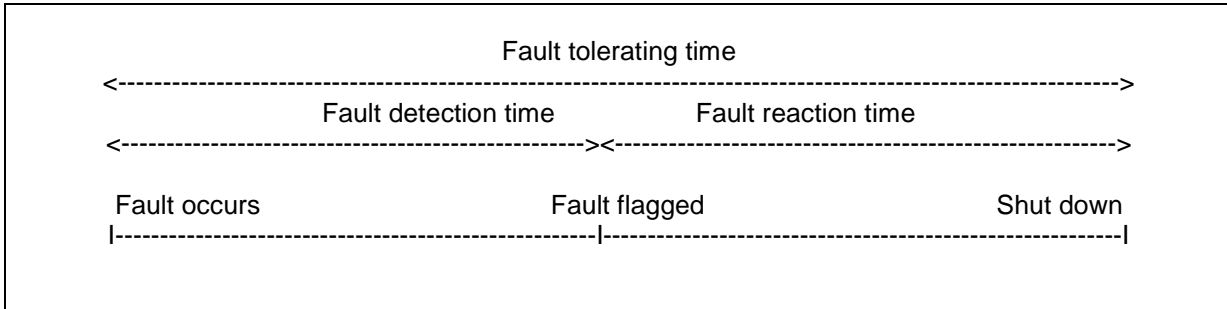


Figure 2 — Fault tolerating time

**3.8
safety shut-down**

process which is effected immediately following the response of a protection device or the detection of a fault in the electronic GARC and places 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 [definition 3.17 of EN 298:2003]

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**3.9
lock-out**

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**3.9.1
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 [definition 3.18.1 of EN 298:2003]

**3.9.2
volatile lock-out**

safety shut-down condition of the system, such that a restart can only be accomplished by either a manual reset of the system or an interruption of the mains power and its subsequent restoration [definition 3.18.2 of EN 298:2003]

**3.10
abnormal operation**

operation of the appliance under the effect of internal failures or under the effect of foreseeable influences outside the specified operational conditions [definition 3.19 of ENV 14459:2002]

**3.11
form closure construction**

construction ensuring non-slippage

4 Classification

There are no classifications used in this standard.

5 Units of measurement and test conditions

According to EN 13611:2000; clause 5.

6 Construction requirements

6.1 General

The GARC shall consist of at least two actuators and sensors (see Figure 1 and Table 1 which shall be considered together). It shall have continuous self-checking functions; in modes which may be relevant, e.g. operating mode, stand-by mode, start-up mode and shut down mode. The complete system shall include the peripheral elements, e.g. servo motors, actuators, positional devices, sensors, variable speed controls for combustion air fans and combustion analysis feed back systems.

Table 1 — Acceptable feedback types

		Actuator feedback		Actuator output feedback		Process feedback		
		Position ^b	Speed	Flow/ Δ P	P	Gas/air ratio	Flame	Flue gas
Actuator Air	valve	X		X	X	X	X	X
	fan		X ^a	X	X			
Actuator Gas	valve	X		X	X			
	pressure regulator			X	X			
		At least 2 feedbacks (1 gas, 1 air) required ^c				At least 1 feedback required ^c		

^a If a fan speed signal is used as means to control the air flow, proof of air flow cannot rely on fan rotation alone. A possible additional signal can be derived from an independent air proving device at least checked during start up.

^b A feedback signal which is directly related to the mechanical part of the actuator.

^c The two actuator feedbacks and the process feedback are alternatives.

6.2 Mechanical requirements

6.2.1 General

EN 13611:2000, clause 6 is applicable.

For components constructed of plastic material, aspects of the following apply:

- dimensional stability,
- flow characteristics of the material;
- possible heat shrinkage;
- durability.

They shall be considered with respect to the mechanical, chemical, thermal and environmental conditions of the intended use.