
Varnostne in nadzorne naprave za gorilnike in aparate na plin ali tekoča goriva - Krmilne in nadzorne funkcije v elektronskih sistemih - 2. del: Regulacija in nadzor razmerja goriva in zraka za elektronski tip

Safety and control devices for burners and appliances burning gaseous or liquid fuels - Control functions in electronic systems - Part 2: Fuel/air ratio control / supervision of the electronic type

Sicherheits- und Regeleinrichtungen für Brenner und Brennstoffgeräte für gasförmige oder flüssige Brennstoffe - Regel- und Steuerfunktionen in elektronischen Systemen - Teil 2: Elektronische Gas-Luft-Verbundregel- und überwachungseinrichtungen

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Dispositifs de commande et de sécurité pour les brûleurs et les appareils à gaz ou fioul - Dispositifs électroniques de régulation - Partie 2 rév : Régulation et surveillance du rapport air/combustible de type électronique

Ta slovenski standard je istoveten z: prEN 12067-2 rev

ICS:

23.060.40	Tlačni regulatorji	Pressure regulators
27.060.01	Gorilniki in grelniki vode na splošno	Burners and boilers in general

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**Safety and control devices for burners and appliances
burning gaseous or liquid fuels - Control functions in
electronic systems - Part 2: Fuel/air ratio control /
supervision of the electronic type**

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 58.

If this draft becomes a European Standard, 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.

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prEN 12067-2:2015 (E)**European foreword**

This document (prEN 12067-2:2015) has been prepared by Technical Committee CEN/TC 58 “Safety and control devices for burners and appliances burning gaseous or liquid fuels”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12067-2:2004.

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 Directives.

For relationship with EU Directives, see informative Annexes ZA and ZB, which are integral parts of this document.

It should be noted that the following significant changes compared to the previous edition have been incorporated in this European Standard:

- a) alignment with EN 13611:2015;
- b) integration of the requirements for fuel to air ratio using oil as the fuel;
- c) addition of the control types ERS and ERT and
- d) updating to IEC 60730-1:2013;
- e) update requirements for fault reaction time and fault tolerating time;
- f) updating the Annexes for Sensors and actors;
- g) including the use of pressure sensing devices already complying with EN 1854;
- h) new Annex “Guideline for the integration of ERC, ERS or ERT into the appliances;
- i) new Annex “Guideline for the definition of limits for safe operation on the appliance.

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Introduction

This standard recognizes the safety level specified by CEN/TC 58 dealing with the safety, construction and performance of controls for burners and appliances burning gaseous or liquid fuels and to their testing.

This document refers to clauses of EN 13611:2015-07 and adapts them, indicating the changes by stating "with the following modification", "with the following addition", "is replaced by the following" or "is not applicable". It also adds clauses or sub-clauses to the structure of EN 13611:2015-07 which are particular to this standard (prEN 12067-2:2015). Additional sub-clauses or annexes are either numbered starting from 101 or are designated as Annex AA, BB, CC etc. It should be noted however that these clauses and sub-clauses are not indicated as additions in the text.

EN 12067-2 compliance for electronic fuel/air ratio control cannot be claimed based upon SIL classification according to EN 61508.

SIL classification cannot be claimed based upon compliance with this standard only. A supplementary method for SIL determination is specified in EN 13611:2015, Annex J.

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prEN 12067-2:2015 (E)**1 Scope**

EN 13611:2015, 1 shall be replaced by the following:

This European Standard specifies the safety, construction and performance requirements for electronic fuel/air ratio control (ERC), electronic fuel/air ratio supervision (ERS) and electronic fuel/air ratio trim (ERT) intended for use with burners and appliances burning gaseous or liquid fuels. It also describes the test procedures for evaluating these requirements and specifies information necessary for installation and use.

This European Standard is applicable to

- closed loop fuel/air ratio controls, see 3.101;
- fuel/air ratio supervision systems, see 3.102;
- closed loop fuel/air ratio trim systems, see 3.103;

and does not differentiate into classification by heat input.

This European Standard applies to ERC, ERS or ERT that can be tested independently, as well as part of an appliance or a burner.

NOTE 1 European Standards for burners, appliances or processes which use ERC, ERS or ERT can override the requirements of this standard.

NOTE 2 Provisions for production control are not part of this European Standard.

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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 88-1:2011, *Pressure regulators and associated safety devices for gas appliances — Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*;

EN 298:2012, *Automatic burner control systems for burners and appliances burning gaseous or liquid fuels*

EN 16340:2014, *Safety and control devices for burners and appliances burning gaseous or liquid fuels — Combustion product sensing devices*

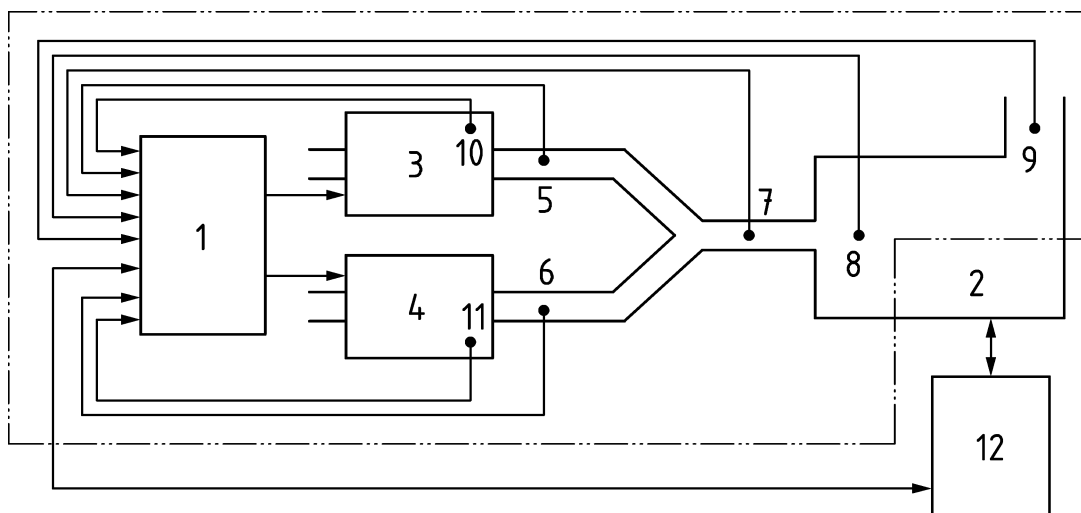
3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13611:2015 and the following apply.

3.101**electronic fuel/air ratio control (ERC)**

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

Note 1 to entry: Figure 1 shows an example of different feedback alternatives. For details, see also Table 1.

**Key**

1	electronic control unit (ECU)	8	sensor flame
2	combustion process	9	sensor flue gas
3	actuator air	10	actuator air feedback
4	actuator fuel	11	actuator fuel feedback
5	sensor air	12	automatic burner control system
6	sensor fuel		
7	sensor fuel air mixture		

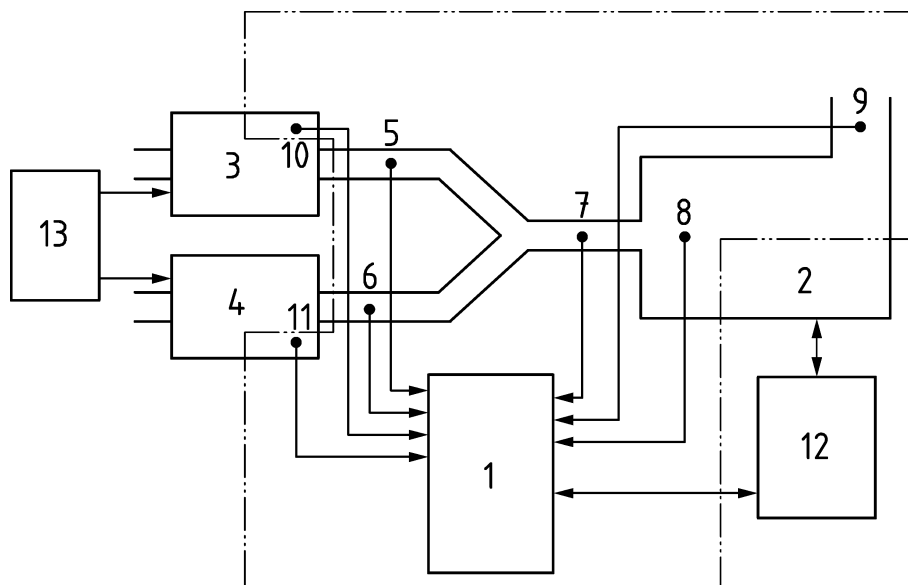
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Figure 1 — Scope of the electronic fuel/air ratio control (ERC)

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3.102**electronic fuel/air ratio supervision (ERS)**

supervision system consisting of electronic and sensor(s), providing at least one output signal to indicate if the combustion process is in safe state or not

Note 1 to entry: Figure 2 shows an example of different feedback alternatives. For details, see also Table 1.

**Key**

1	electronic control unit (ECU)	8	sensor flame
2	combustion process	9	sensor flue gas
3	actuator air	10	actuator air feedback
4	actuator fuel	11	actuator fuel feedback
5	sensor air	12	automatic burner control system
6	sensor fuel	13	arbitrary control
7	sensor fuel air mixture		

----- scope of ERC

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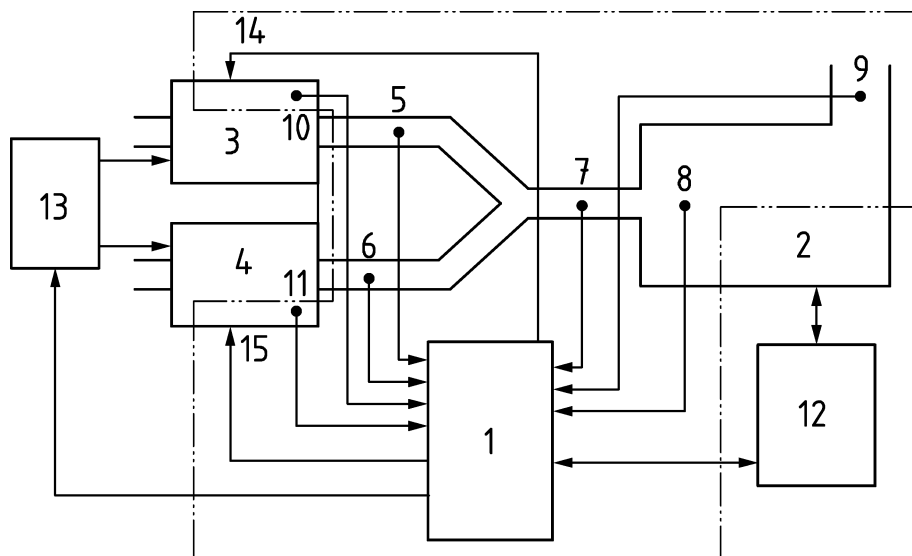
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Figure 2 — Scope of the electronic fuel/air ratio supervision (ERS)

3.103**electronic fuel/air ratio trim (ERT)**

closed loop system consisting of the electronic trim control, actuating element(s) or control output to influence the fuel air ratio controlled by other means and the allocated feedback signal(s)

Note 1 to entry: Figure 3 shows an example of different feedback alternatives. For details, see also Table 1.



Key

- | | | | |
|---|-------------------------------|----|---------------------------------|
| 1 | electronic control unit (ECU) | 9 | sensor flue gas |
| 2 | combustion process | 10 | actuator air feedback |
| 3 | actuator air | 11 | actuator fuel feedback |
| 4 | actuator fuel | 12 | automatic burner control system |
| 5 | sensor air | 13 | arbitrary control |
| 6 | sensor fuel | 14 | trim signal air |
| 7 | sensor fuel air mixture | 15 | trim signal fuel |
| 8 | sensor flame | | |

Figure 3 — Scope of the electronic fuel/air ratio trim (ERT)

3.104

electronic control unit (ECU)

electronic main control module incorporating all inputs and outputs for the ERC, ERS or ERT function

3.105

actuator

device for controlling the amount of fuel and/or air

3.106

sensor

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

3.107

combustion process

chemical reaction between fuel and air to produce heat

3.108

safe state

state of the system with the following characteristics:

- a) the system passively assumes a state in which the output signal(s) ensure a safe situation under all circumstances or;

- b) the system actively executes a protective action causing it to shut down and lock out, or;
- c) the system remains in operation, continuing to satisfy all safety related functional requirements

**3.109
fault tolerating time (FTT)**

time between the occurrence of a fault and reaching a safe state, which is tolerated by the application without resulting in a hazardous situation

Note 1 to entry: For illustration of the fault tolerating time, see Figure 4.

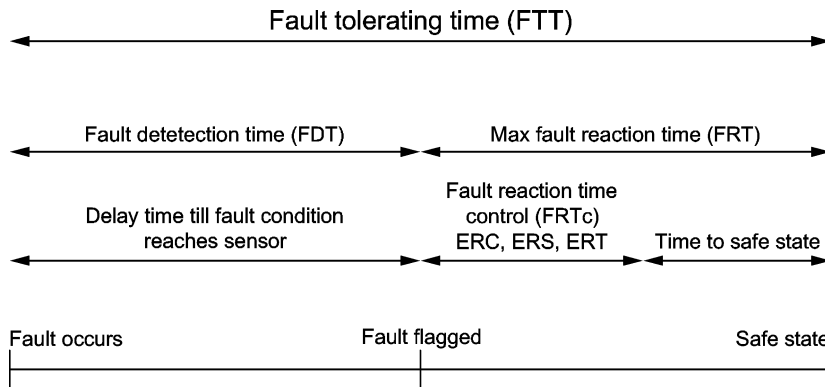
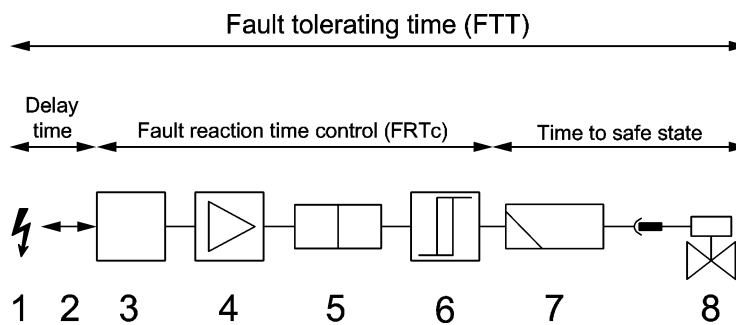


Figure 4 — Fault tolerating time (FTT)
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**3.110
Fault reaction time control (FRTc)**

time that the ERC, ERS or ERT needs from the moment the fault condition reaches the sensor to the moment of an initialisation to reach a safe state

Note 1 to entry: For illustration of the fault reaction time control for ERC and ERS, see Figure 5.

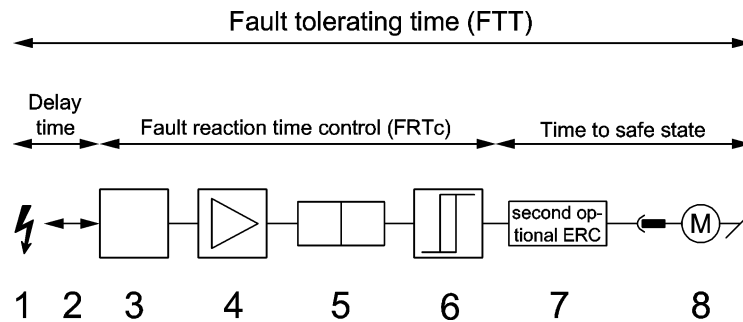


Key

- | | |
|---|-----------------------------|
| 1. fuel air ratio is outside the safe area of the application | 5. filter |
| 2. delay time till fault condition reaches the sensor | 6. limit switch |
| 3. sensor monitoring fuel/air ratio e.g. position sensors, flue gas sensors | 7. automatic burner control |
| 4. amplifier | 8. shut down valve |

Figure 5 — Fault reaction time control for ERC and ERS

Note 2 to entry: For illustration of the fault reaction time control for ERT, see Figure 6.

**Key**

- | | |
|---|--|
| 1. Fuel air ratio is outside the safe area of the application | 5. Filter |
| 2. Delay time till condition reaching the sensor | 6. Limit switch |
| 3. Sensor monitoring fuel/air ratio e.g. position sensors, flue gas sensors | 7. Fuel/air ratio control (an ERC may be part of the system) |
| 4. Amplifier | 8. (Trimming) actuating element |

Figure 6 — Fault reaction time control for ERT**3.111****non-volatile lock-out**

safety shutdown condition of the system, where a restart can only be accomplished by a manual reset of the system and by no other means

[SOURCE: EN 298:2012, 3.121.1] (standards.iteh.ai)

3.112**volatile lock-out**

safety shutdown condition of the system, where 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

[SOURCE: EN 298:2012, 3.121.2]

3.113**normal operation**

operation of the ERC, ERS or ERT control system within its specification including the effect of influences which may occur during intended operation

Note 1 to entry: Examples of influences on sensors are given in Table AA.1.

3.114**abnormal operation**

operation under the effect of internal failures of the ERC, ERS or ERT control system

3.115**form closure construction**

construction ensuring non-slippage

3.116**accuracy**

ability to provide an indicated value close to the true value