



SLOVENSKI STANDARD

SIST EN 12067-2:2023

01-februar-2023

Nadomešča:
SIST EN 12067-2:2004

**Varnostne in nadzorne naprave za gorilnike in aparate na plin ali tekoča goriva -
Regulacijske 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 types

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

Dispositifs de commande et de sécurité pour les brûleurs et les appareils utilisant des
combustibles gazeux ou liquides - Dispositifs électroniques de régulation - Partie 2 :
Régulation et surveillance du rapport air/combustible de type électronique

Ta slovenski standard je istoveten z: EN 12067-2:2022

ICS:

23.060.40	Tlačni regulatorji	Pressure regulators
27.060.20	Plinski gorilniki	Gas fuel burners

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EUROPEAN STANDARD

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NORME EUROPÉENNE

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Supersedes EN 12067-2:2004

English Version

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

Dispositifs de commande et de sécurité pour les brûleurs et les appareils utilisant des combustibles gazeux ou liquides - Dispositifs électroniques de régulation - Partie 2 : Régulation et surveillance du rapport air/combustible de type électronique

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

This European Standard was approved by CEN on 2 October 2022.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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EN 12067-2:2022 (E)**European foreword**

This document (EN 12067-2:2022) 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 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 May 2023, and conflicting national standards shall be withdrawn at the latest by November 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12067-2:2004.

The following significant changes compared to the previous edition have been incorporated in this document:

- a) alignment with EN 13611:2019;
- b) title change to include liquid fuel and to bring it in line with the title of EN 13611:2019;
- c) integration of the requirements for fuel/air ratio using oil as the fuel;
- d) addition of the control types ERS and ERT;
- e) update to EN 60730-1:2016;
- f) update of requirements for fault reaction time and fault tolerating time;
- g) update of the Annexes for sensors and actuators (see Annex AA);
- h) inclusion of the use of pressure and combustion products sensing devices already conforming to EN 1854:—¹, EN 60730-2-6:2016, and EN 16340:2014 respectively;
- i) new Annex Guideline for the integration of ERC, ERS or ERT into the appliances (see Annex DD);
- j) new Annex Guideline for the definition of limits for safe operation on the appliance (see Annex EE);
- k) new Annex Requirements for using alternative actuators on application level (see Annex FF).

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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

Introduction

This document is intended to be used in conjunction with EN 13611:2019.

This document refers to clauses of EN 13611:2019 or adapts clauses by stating “with the following modification”, “with the following addition”, “is replaced by the following” or “is not applicable” in the corresponding clause.

This document adds clauses or subclauses to the structure of EN 13611:2019 which are particular to this document. Subclauses which are additional to those in EN 13611:2019 are numbered starting from 101. Additional Annexes are designated as Annex AA, Annex BB, Annex CC, etc. It should be noted that these clauses, subclauses and Annexes are not indicated as an addition.

If by reference to EN 13611:2019 the term “control” is given, this term should be read as fuel/air ratio control/supervision system”.

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

SIL classification cannot be claimed based upon compliance with this document only. A supplementary method for SIL determination is specified in EN 13611:2019, Annex J.

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EN 12067-2:2022 (E)**1 Scope**

EN 13611:2019, Clause 1 is replaced by the following:

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

This document is applicable to:

- closed loop fuel/air ratio control systems, 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.

NOTE The documents for burners, appliances or processes which use ERC, ERS or ERT can override the requirements of this document.

2 Normative references

EN 13611:2019, Clause 2 applies with the following additions:

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 298:2022, *Automatic burner control systems for burners and appliances burning gaseous or liquid fuels*

EN 267:2020, *Forced draught burners for liquid fuels*

EN 676:2020, *Forced draught burners for gaseous fuels*

EN 1854:—¹, *Safety and control devices for burners and appliances burning gaseous and/or liquid fuels — Pressure sensing devices for gas burners and gas burning appliances*

EN 13611:2019², *Safety and control devices for burners and appliances burning gaseous and/or liquid fuels — General requirements*

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

EN 60204-1:2018, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204-1:2016)*

EN 60335-1:2012³, *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2010)*

¹ Under preparation. Stage at the time of publication: FprEN 1854:2022.

² As impacted by EN 13611:2019/AC:2021.

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EN 60529:1991⁴, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 60730-1:2016⁵, *Automatic electrical controls — Part 1: General requirements (IEC 60730-1:2013, modified)*

EN 60730-2-5:2015⁶, *Automatic electrical controls — Part 2-5: Particular requirements for automatic electrical burner control systems (IEC 60730-2-5:2013)*

EN 60730-2-6:2016⁷, *Automatic electrical controls — Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements (IEC 60730-2-6:2015)*

EN IEC 60730-2-14:2019⁸, *Automatic electrical controls — Part 2-14: Particular requirements for electric actuators (IEC 60730-2-14:2017)*

EN IEC 61000-6-2:2019, *Electromagnetic compatibility (EMC) — Part 6-2: Generic standards — Immunity standard for industrial environments (IEC 61000-6-2:2016)*

EN 61000-6-4:2007⁹, *Electromagnetic compatibility (EMC) — Part 6-4: Generic standards — Emission standard for industrial environments (IEC 61000-6-4:2006)*

EN 61010-2-202:2017, *Safety requirements for electrical equipment for measurement, control and laboratory use — Part 2-202: Particular requirements for electrically operated valve actuators (IEC 61010-2-202:2016)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13611:2019 apply with the following modifications.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

³ As impacted by EN 60335-1:2012/AC:2014, EN 60335-1:2012/A11:2014, EN 60335-1:2012/A13:2017, EN 60335-1:2012/A1:2019, EN 60335-1:2012/A2:2019, EN 60335-1:2012/A14:2019 and EN 60335-1:2012/A15:2021.

⁴ As impacted by EN 60529:1991/corrigendum May 1993, EN 60529:1991/A1:2000, EN 60529:1991/A2:2013 and EN 60529:1991/AC:2016-12.

⁵ As impacted by EN 60730-1:2016/A1:2019 and EN 60730-1:2016/A2:2022.

⁶ As impacted by EN 60730-2-5:2015/A1:2019 and EN 60730-2-5:2015/A2:2021.

⁷ As impacted by EN 60730-2-6:2016/A1:2020.

⁸ As impacted by EN IEC 60730-2-14:2019/A2:2021 and EN IEC 60730-2-14:2019/A1:2022.

⁹ As impacted by EN 61000-6-4:2007/A1:2011.

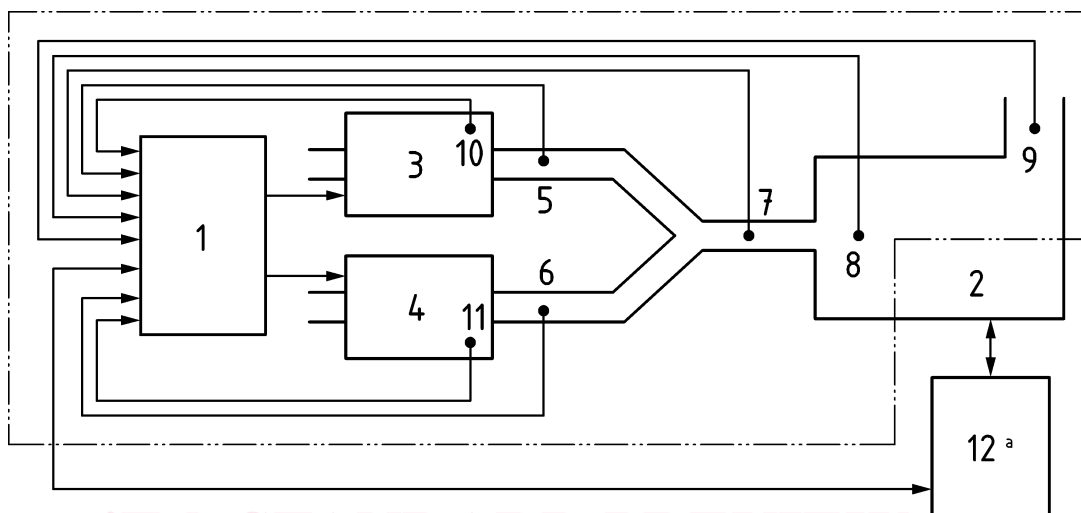
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3.101 electronic fuel/air ratio control system

ERC

closed loop system consisting of the electronic control unit, 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		
		-----	scope of ERC

^a From the ERC point of view, 12 acts in case a safe state is requested by 1 to de-energize the safety shut-off valves.

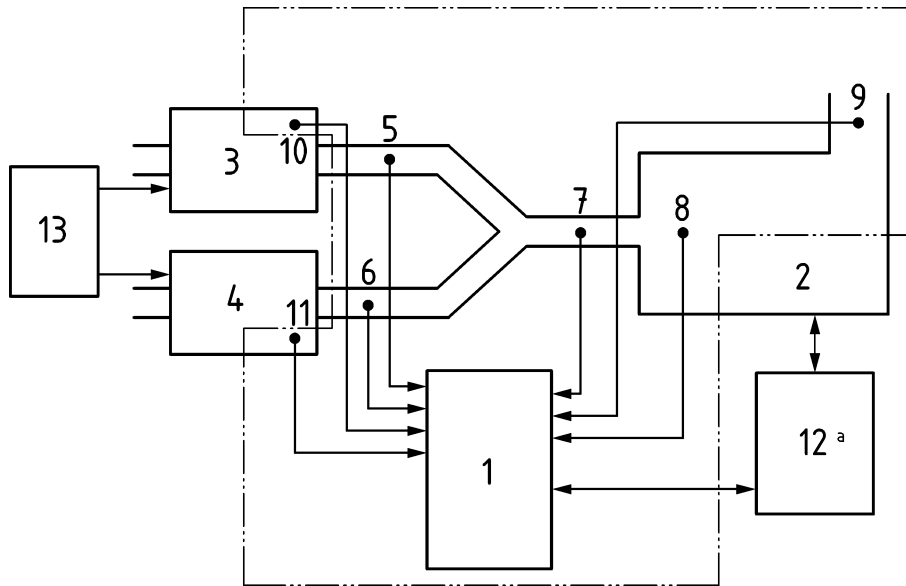
Figure 1 — Scope of the electronic fuel/air ratio control system (ERC)

3.102 electronic fuel/air ratio supervision system

ERS

supervision system consisting of electronic control unit and sensor(s), providing at least one output signal to indicate if the fuel/air ratio is outside of the safe area of the application

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 ERS

^a From the ERS point of view, 12 acts in case a safe state is requested by 1 to de-energize the safety shut-off valves.

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

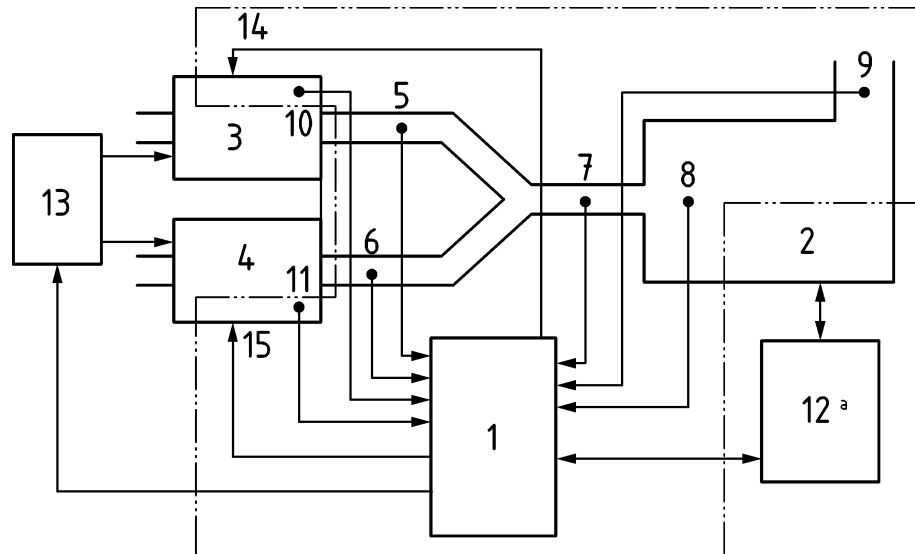
3.103 electronic fuel/air ratio trim system

ERT

closed loop system consisting of the electronic control unit, actuating element(s) or control output(s) 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.

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**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	trimsignal air
7	sensor fuel/air mixture	15	trimsignal fuel
8	sensor flame		----- scope of ERT

^a From the ERT point of view, 12 acts in case a safe state is requested by 1 to de-energize the safety shut-off valves.

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

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3.108

safe state

state of the system with the following characteristics:

- the system passively assumes a state in which the output signal(s) ensure a safe situation under all circumstances or;
- the system actively executes a protective action causing it to shutdown and lock-out, or;
- 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 or Figure 5.

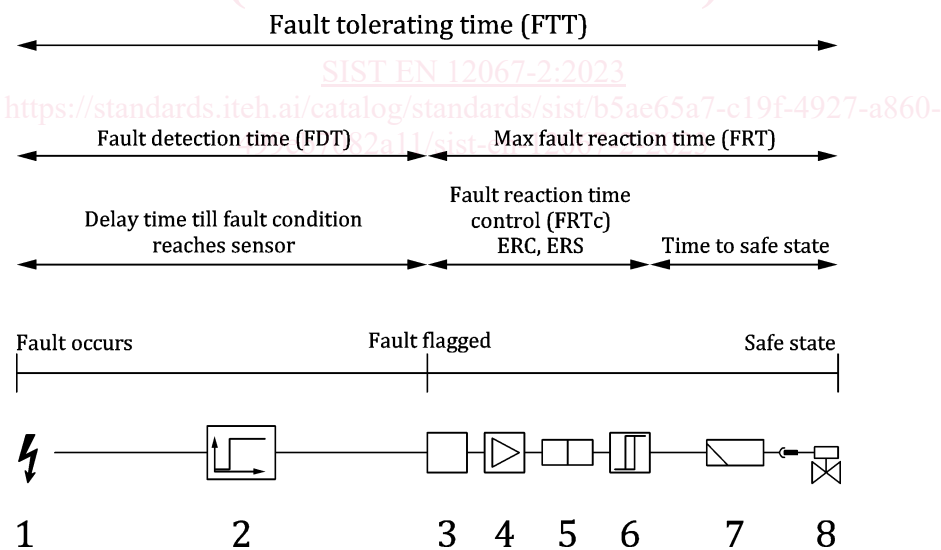
3.110

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 initialization to reach a safe state

Note 1 to entry: For illustration of the fault reaction time control for ERC and ERS, see Figure 4.

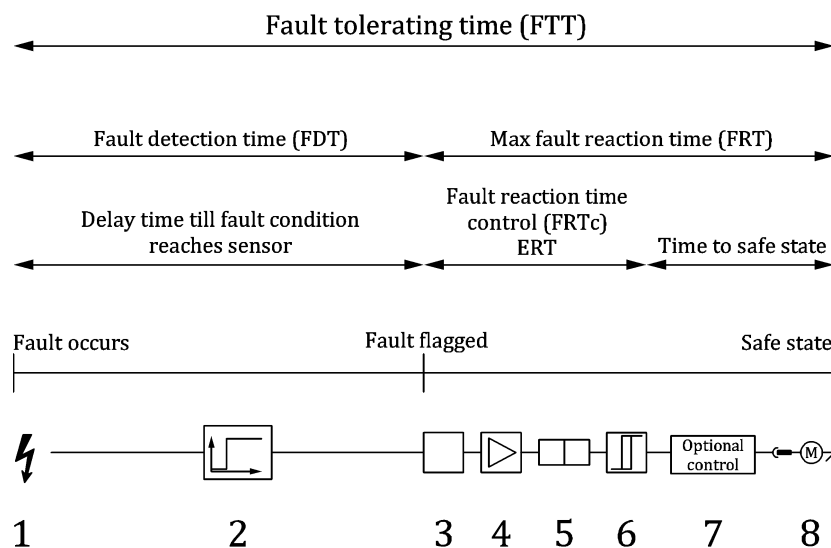
**Key**

- | | |
|--|--|
| 1 fuel/air ratio moves outside of the safe area of the application | 5 amplified signal passes filter |
| 2 effect of fault condition reaches the sensor | 6 effect of fault condition is flagged by limit switch |
| 3 sensor e.g. position sensors, flue gas sensors outputs effect of fault | 7 flag is processed by automatic burner control |
| 4 sensor output is amplified | 8 safe state is reached |

Figure 4 — Relationship between fault tolerating time and fault reaction time control for ERC and ERS

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Note 2 to entry: For illustration of the fault reaction time control for ERT, see Figure 5.

**Key**

- | | |
|--|--|
| 1 fuel/air ratio moves outside the safe area of the application | 5 amplified signal passes filter |
| 2 effect of fault condition reaches the sensor | 6 effect of fault condition is flagged by limit switch |
| 3 sensor e.g. position sensors, flue gas outputs effect of fault | 7 flag may be processed by optional control* system to initiate a safe state |
| 4 sensor output is amplified | 8 shut-off element or actuating element influences the fuel/air ratio to reach a safe state. |

*Examples for optional control are key 12 or key 13 in Figure 3. An optional control can only be used to reach a safe state if the control has the required safety class for this function. If an ERT doesn't use optional control to reach a safe state, key 14 and key 15 in Figure 3 are examples.

Figure 5 — Relationship between fault tolerating time and 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 298:2022, 3.121.1]

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 298:2022, 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.