



SLOVENSKI STANDARD

oSIST prEN 509:2021

01-april-2021

Plinski aparati z dekorativnim plamenom

Decorative fuel-effect gas appliances

Dekorative Gasgeräte mit Brennstoffeffekt

Appareils à effet décoratif de combustion utilisant les combustibles gazeux

Ta slovenski standard je istoveten z: prEN 509

[oSIST prEN 509:2021](https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021)

<https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021>

ICS:

97.100.20 Plinski grelniki Gas heaters

oSIST prEN 509:2021

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 509:2021](#)

<https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 509

April 2021

ICS 97.100.20

Will supersede EN 509:1999

English Version

Decorative fuel-effect gas appliances

Dekorative Gasger?e mit Brennstoffeffekt

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 62.

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.

This draft European Standard was established by CEN 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.

CEN members are the national standards bodies of 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, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

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

Contents	Page
European foreword.....	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
3.1 Decorative fuel effect gas appliances	9
3.2 Appliance construction	9
3.2.1 The gas circuit	9
3.2.2 Burner	10
3.2.3 Combustion products circuit	11
3.2.4 Auxiliary equipment	11
3.3 Appliance performance	12
3.3.1 Gas rates	12
3.3.2 Gas combustion	12
4 Classification of appliances	15
4.1 Classification according to the nature of gases used (categories)	15
4.1.1 Classification of gases	15
4.1.2 Appliance categories	15
4.2 Classification according to the method of evacuation of the products of combustion	15
5 Constructional requirements	16
5.1 General	16
5.1.1 Conversion to different gases	16
5.1.2 Materials and method of construction	17
5.1.3 Accessibility for use and maintenance	17
5.1.4 Connections	18
5.1.5 Soundness of the gas circuit	18
5.1.6 Spacing	19
5.1.7 Electrical equipment	19
5.1.8 Safety in the event of fluctuation, interruption and restoration of the auxiliary energy	19
5.2 Adjusting, control and safety devices	19
5.2.1 General	19
5.2.2 Gas rate adjusters	20
5.2.3 Flame picture adjuster	20
5.2.4 Manual controls	20
5.2.5 Pressure regulators	21
5.2.6 Multifunctional controls	22
5.2.7 Flame supervision devices	22
5.2.8 Shut-off valves	22
5.2.9 Automatic burner control systems	22
5.2.10 Atmosphere sensing device	22
5.3 Ignition devices	23
5.3.1 General	23
5.3.2 Ignition burners	23
5.4 Flame supervision systems	23
5.4.1 General	23

5.4.2	Appliances with automatic burner systems.....	23
5.5	Ignition burner or start-gas flame establishment	24
5.5.1	Appliances with non-automatic burner systems	24
5.5.2	Appliances with automatic burner systems.....	24
5.6	Main flame establishment	24
5.6.1	General	24
5.6.2	Appliances with non-automatic burner systems	24
5.6.3	Appliances with automatic burner systems.....	24
5.6.4	Direct establishment of the main flame	24
5.7	Burners.....	24
5.7.1	General	24
5.7.2	Pan burners	25
5.8	Clocks and timing devices.....	25
5.9	Gas pressure test points	25
6	Operational requirements	25
6.1	Soundness of the gas circuit and correct evacuation of combustion products	25
6.1.1	Soundness of the gas circuit.....	25
6.1.2	Correct evacuation of combustion products.....	25
6.1.3	Escape of unburnt gas from the burner	25
6.2	Heat inputs	25
6.2.1	Nominal heat input.....	25
6.2.2	Start gas heat input	26
6.2.3	Reduced rate	26
6.3	Temperature of various parts of the appliance and its surrounding area	26
6.3.1	Temperature of external parts of the appliance	26
6.3.2	Temperature of components.....	26
6.3.3	Floor temperatures.....	26
6.4	Ignition, cross-lighting and flame stability	27
6.4.1	Ignition and cross lighting	27
6.4.2	Flame stability	27
6.4.3	Effect of room draughts	27
6.4.4	Fluctuation of auxiliary energy	27
6.5	Pressure regulators	27
6.6	Combustion	27
6.6.1	CO concentration for all appliances	27
6.6.2	Supplementary tests under special conditions.....	28
6.6.3	Measurement of oxides of nitrogen, NO _x (all appliances).....	28
6.7	Sooting.....	28
6.7.1	Cold condition	28
6.7.2	Hot condition.....	28
6.7.3	Long cycle	28
6.8	Atmosphere sensing device	28
6.9	Flame supervision device	29
6.9.1	Thermoelectric device	29
6.9.2	Automatic burner control system.....	29
7	Test methods.....	29
7.1	General	29
7.1.1	Characteristics of test gases: reference and limit gases	29
7.1.2	Conditions for preparation of the test gases.....	29
7.1.3	Practical application of test gases	29
7.1.4	Test pressures.....	30
7.1.5	General test conditions.....	32

prEN 509:2021 (E)

7.2	Soundness of the gas circuit and correct evacuation of combustion products.....	37
7.2.1	Soundness of the gas circuit	37
7.2.2	Correct evacuation of combustion products	38
7.2.3	Escape of unburnt gas from the burner	38
7.3	Heat inputs	38
7.3.1	Nominal heat input.....	38
7.3.2	Calibrated injector rate of appliances without gas adjusters or where these adjusters are put out of action	40
7.3.3	Performance of gas rate adjusters for ungoverned appliances	40
7.3.4	Start-gas heat input	40
7.3.5	Reduced rate.....	41
7.4	Temperature of various parts of the appliance and its surroundings.....	41
7.4.1	General.....	41
7.4.2	Temperature of external surfaces	41
7.4.3	Temperature of components	41
7.4.4	Temperature of floor	41
7.5	Ignition: cross-lighting and flame stability.....	43
7.5.1	Ignition and cross-lighting.....	43
7.5.2	Flame stability.....	44
7.5.3	Effect of room draughts.....	45
7.6	Pressure regulators.....	45
7.6.1	Operational pressure regulator.....	45
7.6.2	Pressure regulator out of service.....	45
7.7	Combustion	46
7.7.1	General.....	46
7.7.2	Tests under limit conditions.....	47
7.7.3	Supplementary tests under special conditions.....	48
7.7.4	Measurement of oxides of nitrogen.....	48
7.8	Sooting.....	48
7.8.1	Apparatus for the determination of the smoke number.....	48
7.8.2	Determination of the smoke number	49
7.8.3	Test conditions.....	49
7.9	Atmosphere sensing device.....	50
7.9.1	General.....	50
7.9.2	Test method	51
7.10	Flame supervision device.....	52
7.10.1	Thermoelectric device.....	52
7.10.2	Automatic burner control systems	52
8	Marking and instructions.....	52
8.1	Marking.....	53
8.1.1	Marking of the appliance.....	53
8.1.2	Marking of the packaging	54
8.1.3	Utilization of symbols on the appliance and packaging.....	54
8.2	Instructions	56
8.2.1	Instructions for installation and adjustment.....	56
8.2.2	Instructions for use and servicing	58
8.2.3	Conversion instructions.....	59
Annex A	(normative) Additional and amended requirements for decorative fuel effect gas appliances not exceeding a net heat input of 20 kW designed to be installed under a non-combustible canopy	61
A.1	Scope	61

A.2	Normative references	62
A.3	Terms and Definitions	62
A.4	Classification of appliances	62
A.5	Constructional requirements	62
A.6	Operational requirements	62
A.7	Test methods	63
Annex B (informative)	Means of identification of the types of gas in force in the various countries	66
Annex C (normative)	Special national conditions	68
C.1	General	68
C.2	Belgium	68
Annex D (informative)	A-deviations	69
D.1	General	69
D.2	Switzerland	69
Annex E (normative)	Calculation of conversions of NO_x	70
Annex F (normative)	Additional requirements for decorative fuel effect gas appliances not exceeding a net heat input of 20 kW fitted with a combustion products discharge safety device without a canopy	71
F.1	Scope	71
F.2	Normative references	71
F.3	Definitions	71
F.4	Classification of appliances	71
F.5	Constructional requirements	71
F.6	Operational requirements	72
F.7	Test methods	72
F.8	Marking and instructions	74
Annex ZA (informative)	Relationship between this European Standard and the essential requirements of EU-Regulation 2016/426/EU aimed to be covered	75
Bibliography	77

prEN 509:2021 (E)**European foreword**

This document (prEN 509:2021) has been prepared by Technical Committee CEN/TC 62 “Independent gasfired space heaters”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 509:1999.

The main changes compared to EN 509:1999 are the following:

- Clause 1 - the Scope has been extended to cover Type B_{BS} appliances which are covered in a new Annex F;
- 3.2 -all terms and definitions related to gas in EN 509:1999, cl. 3.2, have been deleted and replaced by reference to EN 437;
- EN 509:1999, Clauses 3.4 and 3.5 – have been deleted and the definitions, which were considered necessary, retained and included in 3.2 and 3.3 as appropriate;
- EN 509:1999, Clause 3.6 – deleted;
- 4.1 – original replaced by reference to EN 437;
- 4.2 – classification extended to type C₃₁ and type C₉₁ appliances;
- 5.1.1.4 – has been deleted;
- 7.1.1 and 7.1.2 – original replaced by reference to EN 437;
- EN 509:1999, Annexes A, B, D and G – have been deleted;
- Annex F – new Annex to cover Type B_{BS} appliances;
- Annex ZA replaced to cover the essential requirements of Regulation 2016/426/EC.

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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 509:2021](https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021)

<https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021>

1 Scope

This document specifies the requirements and test methods for the construction, safety, and marking of decorative fuel effect gas appliances not exceeding a nominal heat input of 20 kW (based on the net calorific value), thereafter referred to as appliances.

This document is applicable to appliances that are designed to simulate a solid fuel fire and incorporate a natural draught burner with or without an ignition burner. The appliances are for decorative purposes only and are not heating appliances.

This document is applicable to type B_{AS}, as described in 4.2, decorative fuel effect gas appliances that are designed to be installed within a non-combustible builder's opening or a non-combustible fireplace recess.

This document includes additional requirements for Type B_{BS} appliances which are specified in Annex F.

In addition, this document is applicable to decorative fuel-effect gas appliances that are designed to be installed under a non-combustible canopy which is independent or integral with a flue box, for which additional requirements are specified in Annex A.

This document is not applicable to:

- catalytic combustion appliances;
- appliances in which the supply of combustion air and/or the evacuation of products of combustion is achieved by mechanical means.

This document is only applicable to appliances which are intended to be type tested.

Matters related to quality assurance systems, tests during production and to certificates of conformity of auxiliary devices are not dealt with by this document.

Requirements concerning the rational use of energy have not been included in this document because the appliances are for decorative purposes.

2 Normative references

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 88-1:2011+A1:20169, *Pressure regulators and associated safety devices for gas appliances — Part 1: Pressure regulators for inlet pressures up to and including 50 kPa*

EN 125:2010+A1:2015, *Flame supervision devices for gas burning appliances — Thermoelectric flame supervision devices*

EN 126:2012, *Multifunctional controls for gas burning appliances*

EN 161:2011+A3:2013, *Automatic shut-off valves for gas burners and gas appliances*

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

EN 437:2018, *Test gases — Test pressures — Appliance categories*

prEN 509:2021 (E)

EN 751-1:1996, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water — Part 1: Anaerobic jointing compounds*

EN 751-2:1997, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water — Part 2: Non-hardening jointing compounds*

EN 10226-1:2004, *Pipe threads where pressure tight joints are made on the threads — Part 1: Taper external threads and parallel internal threads — Dimensions, tolerances and designation*

EN 10226-2:2005, *Pipe threads where pressure tight joints are made on the threads — Part 2: Taper external threads and taper internal threads — Dimensions, tolerances and designation*

EN 10305-1:2016, *Steel tubes for precision applications — Technical delivery conditions — Part 1: Seamless cold drawn tubes*

EN 60335-1:2012,¹ *Household and similar electrical appliances — Safety — General requirements*

EN 60335-2-102:2016,² *Household and similar electrical appliances — Safety — Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections (IEC60335-102:2004, IEC60335-102:2004/A1:2008, IEC60335-102:2004/A2:2012)*

EN 60529:1992,³ *Degrees of protection provided by enclosures (IP Code) (IEC 60529 (IEC 60529:1991)*

EN 10305-1:2016, *Steel tubes for precision applications — Technical delivery conditions — Part 1: Seamless cold drawn tubes*

EN ISO 3166-1:2020, *Codes for the representation of names of countries and their subdivisions — Part 1: Country code (ISO 3166-1:2020)*

ISO 228-1:2003, *Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation (ISO 228-1:2000)*

3 Terms and definitions

For the purposes of this standard the terms and definitions given in EN 437:2018 and the following apply.

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

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

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

² As impacted by FprEN 60335-2-102:2020.

³ As impacted by EN 60529:1991/AC:2006-12, EN 60529:1991/A1:2000, EN 60529:1991/A2:2013 and EN 60529:1991/A2:2013/AC:2019-02.

3.1 Decorative fuel effect gas appliances

3.1.1

decorative fuel effect gas fire

appliance designed to simulate a solid fuel appliance for decorative purposes and intended to be installed so that the products of combustion pass unrestricted from the firebed to the chimney or flue

Note 1 to entry: A decorative fuel effect gas fire is illustrated in Figure 1.

3.1.2

working surface

area of the appliance that generates and emits heat

Note 1 to entry: Examples of working surfaces include fire bricks, refractories, imitation fuel, fire fronts, fire baskets, burners, burner trays and bracketry.

3.2 Appliance construction

3.2.1 The gas circuit

3.2.1.1

inlet connection

part of the appliance intended to be connected to the gas supply

3.2.1.2

mechanical joint

connection device assuring soundness in an assembly of several parts, generally of metal

Note 1 to entry: For example the following: [oSIST prEN 509:2021](https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021)

— cone seat joints; <https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021>

— flat joints;

— metal to metal joints.

3.2.1.3

gas circuit

part of the appliance that conveys or contains the gas between the appliance gas inlet connection and the burner(s)

3.2.1.4

gas restrictor

non-adjustable device which is placed in the gas circuit so as to create a pressure drop and thus reduce the gas pressure at the burner to a predetermined value for a given supply pressure and rate

3.2.1.5

gas rate adjuster

component intended to set the gas rate to each burner at a predetermined value according to the supply conditions

NOTE 1 to entry: The adjustment may be progressive (screw adjuster) or discontinuous (changing restrictors). The adjuster of an adjustable governor is regarded as a gas rate adjuster.

NOTE 2 to entry: The action of setting this device is called "setting the gas rate".

prEN 509:2021 (E)**3.3.1.6****gas rate control**

component allowing the user to open or close the gas supply to one or more burners.

NOTE 1 to entry: It may also be used to adjust the gas rate of certain burners to a predetermined value, called the 'reduced rate'. This device can be a 'tap'

3.2.1.7**injector**

component that admits the gas into a burner, where the section of the outlet orifice is fixed

3.2.1.8**start-gas**

initial quantity of gas ignited to give a flame which is used to ignite the main burner

Note 1 to entry: It can be discharged through a separate ignition burner or part of the main burner.

3.2.2 Burner**3.2.2.1****main burner**

burner that provides the primary thermal function of the appliance

3.2.2.2**pan burner**

main burner which utilizes a particulate medium (e.g. sand) for the distribution of gas over a defined area

3.2.2.3**pilot burner**

burner intended to light the main burner and that supplements the main burner in providing a thermal function of the appliance

3.2.2.3.1**permanent pilot**

pilot burner that operates continuously throughout the whole period that the appliance is in use, independent of the main burner, and has to be extinguished by manual intervention

3.2.2.3.2**non-permanent pilot**

pilot burner that is extinguished automatically when there is no heat demand

3.2.2.4**fixed primary aeration restrictor**

non-adjustable device which limits the supply of primary air to a burner

3.2.2.5**flame picture adjuster**

device operated by the user to vary the flame picture

NOTE 1 to entry: This is achieved by varying the aeration between maximum and minimum values which are defined by the design of the appliance.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN 509:2021

[https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-](https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021)

[c56af402680d/osist-pren-509-2021](https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021)

3.2.3 Combustion products circuit

3.2.3.1

builder's opening

enclosure constructed to accommodate fireplace components (see Figure 1)

3.2.3.2

fireplace opening

aperture formed in the face of the builder's opening, the fireplace recess or fire surround if fitted

3.2.3.3

fireplace recess

recess formed by the inclusion of fireplace components in the builder's opening

3.2.3.4

hearth

floor area in front of the plane of the builder's opening or fireplace opening

3.2.3.5

flue box

non-combustible enclosure that provides a substitute for the builder's opening or fireplace recess

3.2.3.6

canopy

enclosure situated at the base of a flue system and which is permanently fixed above the appliance to facilitate the passage of the products of combustion into the flue

3.2.4 Auxiliary equipment

[oSIST prEN 509:2021](https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021)

<https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021>

3.2.4.1

pressure regulator

device that maintains, within a fixed range, a constant downstream pressure, independent of the upstream pressure and/or the gas rate

3.2.4.2

ignition device

device that ignites one or more burners

3.2.4.3

flame supervision device

device that senses the absence or presence of a flame

3.2.4.4

atmosphere sensing device

device that reacts to the lack of oxygen in the surrounding atmosphere

3.2.4.5

control knob

component designed to be moved by hand in order to operate an appliance control (tap, thermostat etc.)

prEN 509:2021 (E)**3.2.4.6****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

Note 1 to entry: The programming unit follows a predetermined sequence of actions and always operates in conjunction with a flame detector device.

3.2.4.7**flame detector device**

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

Note 1 to entry: 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.

3.2.4.8**automatic burner system**

burner system in which, when starting from the completely shut-down condition, the gas is ignited and the flame is detected and proved and the main gas valve(s) is actuated without manual intervention

3.2.4.9**non-automatic burner system**

burner system with an ignition device which is operated under manual supervision

3.3 Appliance performance**3.3.1 Gas rates****3.3.1.1****nominal heat input**

Q_n

value of the heat input declared in the technical specifications

NOTE 1 to entry: Unit: kilowatt (kW).

3.3.2 Gas combustion**3.3.2.1****flame stability**

state of the flames resting in a stable manner on the burner ports or the flame contact area provided by the design with no danger of flame lift or light-back.

3.3.2.2**flame lift**

phenomenon characterized by the total or partial lifting of the base of the flame from the burner port or the flame contact area provided by the design

3.3.2.3**light-back**

phenomenon characterized by the entry of a flame into the body of a burner

ITeH STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN 509:2021

<https://standards.iteh.ai/catalog/standards/sist/fa211b12-aace-4331-9c7f-c56af402680d/osist-pren-509-2021>

3.3.2.4**light-back at the injector**

phenomenon characterized by ignition of the gas at the injector, either as a result of the flame entering the burner or by the propagation of a flame around the outside of the burner

3.3.2.5**sooting**

phenomenon characterized by deposits of soot on the surfaces of parts of the appliance in contact with the products of combustion or with a flame, or as particulate matter in the combustion products

3.3.3**safety time**

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

3.3.4**extinction delay time**

time that elapses between the disappearance of the flame and the interruption of the gas supply

3.3.5**ignition delay time**

time that elapses between ignition of the supervised flame and the moment when the closure element is held open by the flame signal

Note 1 to entry: This applies to a thermoelectric flame supervision device.

3.3.6**controlled shutdown**

process by which a control device (on the appliance or external to it) causes the gas supply to the main burner to be stopped immediately

3.3.7**safety shutdown**

process which is initiated immediately in response to the signal from a limiting device or sensor and which causes any burner to shut down

3.3.8**non-volatile lock-out**

shut down condition so that a start can only be accomplished by a manual reset

3.3.9**volatile lock-out**

shut down condition so that a start can be accomplished by restoration of the electrical supply, after its loss