
Naprave za samodejni nadzor gorilnikov in aparatov na plin ali tekoča goriva

Automatic burner control systems for burners and appliances burning gaseous or liquid fuels

Feuerungsautomaten für Brenner und Brennstoffgeräte für gasförmige oder flüssige Brennstoffe

Systèmes automatiques de commande pour brûleurs et appareils utilisant des combustibles gazeux ou liquides

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oSIST prEN 298:2020

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EUROPEAN STANDARD
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Automatic burner control systems for burners and appliances burning gaseous or liquid fuels

Systèmes automatiques de commande pour brûleurs et
appareils utilisant des combustibles gazeux ou liquides

Feuerungsautomaten für Brenner und
Brennstoffgeräte für gasförmige oder flüssige
Brennstoffe

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.

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.

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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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prEN 298:2020 (E)**European foreword**

This document (prEN 298:2020) 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 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 the relationship of this document with EU Directive(s), see informative Annex ZA, ZB and ZC which is an integral part of this document.

This document will supersede EN 298:2012.

This document refers to clauses of EN 13611:2019 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 subclauses to the structure of EN 13611:2019 which are particular to this standard (EN 298:2020). Additional subclauses or annexes are either numbered starting from 101 or are designated as Annex AA, Annex BB, Annex CC etc. It should be noted however that these clauses and subclauses are not indicated as additions in the text.

The following is a list of significant technical changes between this document and the previous editions:

- Alignment with EN 13611:2019; (standards.iteh.ai)
- Inclusion of Annex J, Annex K and Annex L;
- Alignment with Regulation (EU) 2016/426 on appliances burning gaseous fuels (GAR). and addition of Annex ZB

EN 298 compliance for burner control systems, flame detector devices or HTO detectors cannot be claimed based upon SIL classification according to EN 61508.

1 Scope

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

This document specifies the safety, construction and performance requirements for automatic burner control systems, programming units, flame detector devices and HTO detectors, intended for use with gas and oil burners and gas and oil burning appliances, with or without fans and similar use.

This document is applicable to automatic burner control systems that include additional functions.

This document does not cover automatic burner control systems utilizing thermo-electric flame supervision devices.

NOTE 1 European Standards for burners, appliances or processes which use automatic burner control systems, programming units, flame detectors or HTO detectors can override the requirements of this standard.

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

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

prEN 1643:2020, *Valve proving systems for automatic shut-off valves for gas burners and gas appliances*

EN 13611:2019, *Safety and control devices for burners and appliances burning gaseous and/or liquid fuels - General requirements*

EN 60730-1:2016+A1:2019, *Automatic electrical controls - Part 1: General requirements (IEC 60730 1:2013, modified + COR1:2014 + A1:2015)*

EN 60730-2-5:2015+A1:2019, *Automatic electrical controls - Part 2-5: Particular requirements for automatic electrical burner control systems (IEC 60730 2 5:2013, modified + A1:2017)*

EN 60947-5-1:2017, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices*

3 Terms and definitions

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

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

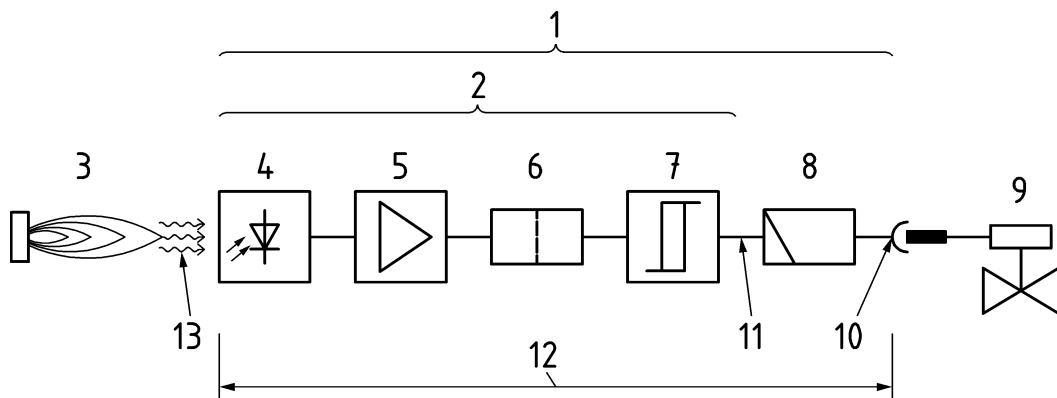
- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.101

flame detector device

device by which the presence of a flame is detected and signalled (see Figure 1)

Note 1 to entry: Flame detector devices 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, can be assembled in a single housing for use in conjunction with a programming unit.



Key

- | | | | |
|---|---|----|---|
| 1 | automatic burner control system (see 3.110) | 8 | programming unit (see 3.109) |
| 2 | flame detector device (see 3.101) | 9 | shut-off valve (see 3.104) |
| 3 | flame | 10 | shut-off valve terminal |
| 4 | flame sensor (see 3.103) | 11 | flame signal (see 3.107) |
| 5 | amplifier | 12 | flame failure response time (see 3.105.1) |
| 6 | filter | | |
| 7 | threshold | | |

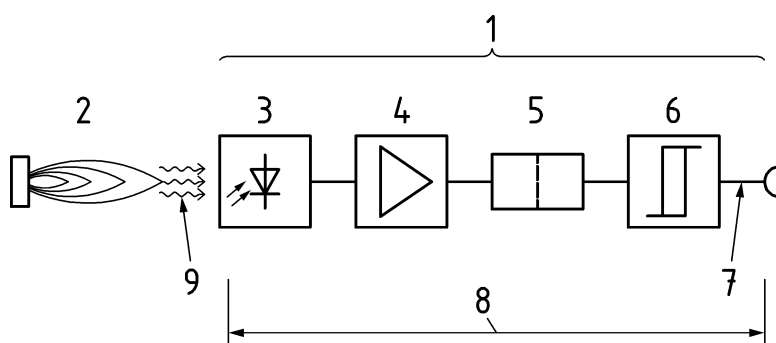
Figure 1 — Basic functional chain of a typical flame supervision

3.102

independent flame detector device

flame detector device which operates independent of the programming unit to provide the class C control function (see Figure 2)

Note 1 to entry: Self-checking functions are incorporated in this type of flame detector device.



Key

- | | | | |
|---|---|---|--|
| 1 | independent flame detector device (see 3.102) | 6 | threshold |
| 2 | flame | 7 | flame signal (see 3.107) |
| 3 | flame sensor (see 3.103) | 8 | flame failure detection time (see 3.105.2) |
| 4 | amplifier | 9 | sensed flame (see 3.106) |
| 5 | filter | | |

Figure 2 — Basic functional chain of an independent flame detector device

3.103**flame sensor**

device which reacts to the presence of the flame by providing an output signal that is used for further signal processing

3.104**shut-off valve**

safety device which releases the fuel flow when energized and stops the fuel flow automatically when de-energized

Note 1 to entry: For further information refer to EN 161 or EN 126 for gas and EN ISO 23553-1 for oil, or to other similar devices if mentioned in the relevant appliance standard.

3.105**time in case of flame failure****3.105.1****flame failure response time**

FFRT

response time between the loss of a sensed flame and the resulting de-energizing of the shut-off valve terminals

Note 1 to entry: FFRT may be referred to as "extinction safety time" in appliance standards.

3.105.2**flame failure detection time**

FFDT

response time of an independent flame detector device between the loss of a sensed flame and the flame signal indicating the absence of a flame

3.106**sensed flame**

physical value of the monitored flame

3.107**flame signal**

signal given by the flame detector device in case of sensed flame

3.108**flame simulation**

condition which occurs when the flame signal indicates the presence of a flame when in reality no flame is present

3.109**programming unit**

unit which executes the program, reacts to signals from control and safety devices, gives the control commands, controls the start-up sequence, supervises the burner operation and causes controlled shutdown, and if necessary, safety shutdown 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 or HTO detector.

prEN 298:2020 (E)**3.110****automatic burner control system**

system comprising at least a programming unit and all the elements of a flame detector device or, if applicable, HTO detector

Note 1 to entry: The various functions of an automatic burner control system can be in one or more housings.

3.111**start position**

stage where the system is not in lock-out position and has not yet received the start signal but can proceed with the start-up sequence when required

Note 1 to entry: At this stage, the output terminals for any shut-off valve and ignition device are not energized.

3.112**start signal**

signal (e.g. from a thermostat) which releases the system from its start position and commences the predetermined program

3.113**purge**

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

3.114**pre-purge**

purge which takes place between the start signal and the energization of the shut-off valve or, in the case of gas, the energization of the ignition device if this comes first

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3.115**post-purge**

purge which takes place immediately following shutdown

3.116**first safety time**

interval between the pilot shut-off valve, the start shut-off valve or the main shut-off valve, as applicable, being energized and the pilot shut-off valve, start shut-off valve or the main shut-off valve, as applicable, being de-energized if no flame signal is present

Note 1 to entry: Where there is no second safety time, this is called the safety time.

3.117**second safety time**

where there is a first safety time applicable to either a pilot or start fuel flame only, the second safety time is the interval between the main shut-off valve being energized and the main shut-off valve being de-energized if no main flame signal is present

3.118**running position**

position of the system in which the burner is in normal operation under the supervision of the programming unit and its flame detector device or the burner is in HTO and supervised

3.119**controlled shutdown**

process by which the power to the shut-off valve(s) is removed before any other action takes place as a result of the action of a controlling function

3.120**safety shutdown**

process which is effected immediately following the response of a protection device or the detection of a fault in the automatic burner control system and puts the burner out of operation

Note 1 to entry: The resulting state of the system is defined by deactivated terminals for the shut-off valves and the ignition device.

3.121**lock-out**

Note 1 to entry: Lock-out can mean non-volatile lock-out or volatile lock-out.

3.121.1**non-volatile lock-out**

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

3.121.2**volatile lock-out**

safety shutdown condition of the system, where 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

3.122**Ignition restoration****spark restoration**

process by which, following loss of flame signal, the ignition device is switched on again without total interruption of the fuel supply

3.123**recycling**

process by which, after a safety shutdown, a full start-up sequence is automatically repeated

3.124**timings****3.124.1****waiting time**

<gas> for burners without fans, interval between the start signal being given and the energization of the ignition device or shut-off valves, whichever comes first

Note 1 to entry: During this time natural ventilation of the combustion chamber and the flue passages can take place.

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prEN 298:2020 (E)**3.124.2****waiting time**

<oil> interval between the start signal being given (and air registers in purge position, if applicable) and the energization of the ignition device

Note 1 to entry: During this time natural ventilation of the combustion chamber and the flue passages takes place.

3.124.3**pre-purge time**

<gas> period during which purging takes place at the proven air rate prior to the energization of the ignition device or shut-off valves, whichever comes first

3.124.4**pre-purge time**

<oil> period preceding the signal to open the shut-off valve during which the combustion chamber is compulsorily ventilated

3.124.5**post-purge time**

<gas> period during which purging takes place at the proven air rate between any shutdown and the moment the fan is switched off

3.124.6**post-purge time**

<oil> period following the signal to close the shut-off valve during which the combustion chamber is compulsorily ventilated

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3.124.7**inter-purge time**

period during which purging of the combustion chamber takes place at the proven air rate after unsuccessful ignition and prior to the next recycle attempt

3.124.8**inter-waiting time**

period during which natural ventilation of the combustion chamber takes place after unsuccessful ignition and prior to the next recycle attempt

3.125**sequences****3.125.1****start-up sequence**

sequence of actions executed by the system which brings the burner from the start position to the running position

3.125.2**first stage**

part of the start-up sequence which allows the release of start fuel into the combustion chamber

3.125.3**second stage**

part of the start-up sequence which allows the release of further fuel into the combustion chamber

3.126**system for permanent operation**

system that is designed to remain in the running position for longer than 24 h without interruption

3.127**system for non-permanent operation**

system that is designed to remain in the running position for less than 24 h

3.128**self-checking function of the flame detector device/HTO detector**

automatic internal function of the system which checks the operation of the flame detector device/HTO detector

3.129**air flow simulation**

condition which occurs when the air flow sensor indicates the presence of air flow when in reality no air flow is present

3.130**spark supervision**

process of monitoring the ignition spark

3.131**pilot or start fuel flame proving period**

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 start fuel flame is stable

3.132**intermittent first stage**

first stage that is ignited prior to ignition of the main flame and is shut off simultaneously with the main flame

3.133**interrupted first stage**

first stage that is ignited each time the burner is started up and which is extinguished at the end of the second safety time

3.134**burner ignition systems****3.134.1****ignition by supervised gas-fired pilot burner**

system which releases the main fuel when the ignition burner flame is present

3.134.2**ignition by non-supervised gas-fired pilot burner**

system in which the release of the main fuel is not prevented by the absence of the flame of the pilot burner

3.135**ignition timings**

prEN 298:2020 (E)**3.135.1****total ignition time**

period during which the ignition device is energized

Note 1 to entry: This time includes pre-ignition, ignition and post-ignition times.

3.135.2**pre-ignition time**

period between the energization of the ignition device and the start of the safety time

3.135.3**ignition time**

period between the start of the safety time and the first detection of a flame signal

Note 1 to entry: The maximum ignition time ends prior to or simultaneous with the safety time when no flame signal has been detected.

3.135.4**post-ignition time**

period between the first detection of the flame signal and the de-energization of the ignition device

3.136**maximum fuel flow rate**

constant mass of oil consumed during a period of time at maximum heat input as stated in the instructions

Note 1 to entry: Maximum fuel flow rate is expressed in kilograms per hour (kg/h).

[SOURCE: EN 267:2020, 3.2.1.1]

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3.137**common cause failures**

failures of different items, resulting from a single event, where these failures are not consequences of each other

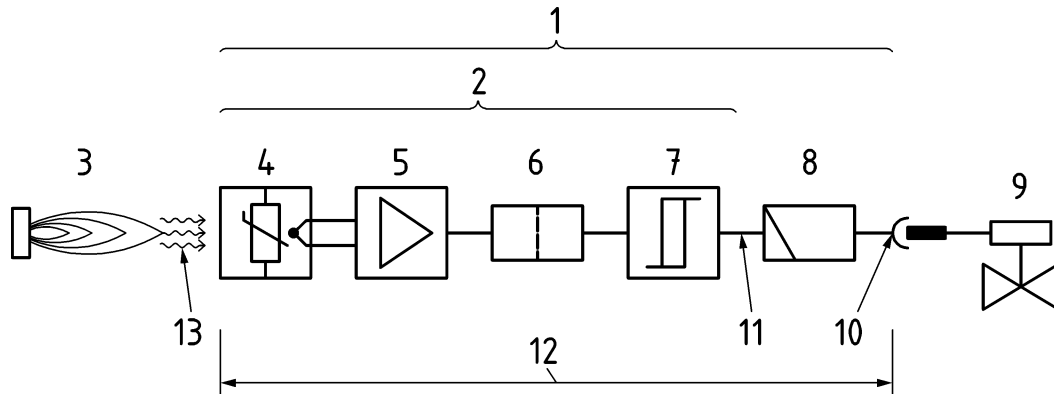
Note 1 to entry: Common cause failures should not be confused with common mode failures.

[SOURCE: IEV 191-04-23]

3.138**HTO detector**

device which provides the programming unit with a signal indicating presence or absence of HTO (see Figure 3)

Note 1 to entry: It includes the HTO-sensor and may include an amplifier and a relay for signal transmission. The amplifier and relay may be in its own housing or combined with the programming unit.

**Key**

1	automatic burner control system (see 3.110)	8	programming unit (see 3.109)
2	HTO detector (see 3.138)	9	shut-off valve (see 3.104)
3	flame	10	shut-off valve terminal
4	HTO sensor (see 3.139)	11	HTO signal (see 3.144)
5	amplifier	12	HTO detector response time (see 3.142)
6	filter	13	sensed flame (see 3.106)
7	threshold		

Figure 3 — Basic functional chain of a typical HTO detector supervision

3.139**HTO-sensor**

device which senses the temperature of a surface or a medium within the combustion chamber which is in direct contact with a flammable fuel-air mixture and provides a signal indicating presence or absence of HTO

3.140**auto-ignition temperature****AIT**

lowest temperature (of a hot surface or the environment) at which an ignition of a flammable fuel/air mixture occurs

[SOURCE: IEC 60079-20-1:2010,3.3, modified: “or the environment” has been added in the parenthesis, “at which under specified test conditions” has been deleted and “ flammable gas or vapour in mixture with air or air/inert gas” has been replaced by “ flammable fuel/air mixture”]

3.141**high-temperature operation****HTO**

operation on the basis of auto-ignition temperature which assures ignition and burning of fuel

Note 1 to entry: High-temperature operation is used e.g. in fuel cells (EN 62282-3-100) and in industrial furnaces and associated processing equipment (EN 746-2) where ignition and burning is detected by means of sensing the temperature.

3.142**HTO detector response time**

period of time between the temperature falling below the defined HTO temperature limit and the control proceeding to safety shutdown or to switch over to flame supervision