



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 60730-2-5:2025**  
**01-februar-2025**

---

**Avtomatske električne krmilne naprave - 2-5. del: Posebne zahteve za avtomatske električne krmilne sisteme gorilnikov**

Automatic electrical controls - Part 2-5: Particular requirements for automatic electrical burner control systems

Automatische elektrische Regel- und Steuergeräte für den Hausgebrauch und ähnliche Anwendungen - Teil 2-5: Besondere Anforderungen an automatische elektrische Brenner-Steuerungs- und Überwachungssysteme

Dispositifs de commande électrique automatiques - Partie 2-5: Exigences particulières pour les systèmes de commande électrique automatiques des brûleurs

**Ta slovenski standard je istoveten z: prEN IEC 60730-2-5:2025**

<https://standards.iteh.ai/catalog/standards/sist/a1b63119-89f1-492a-aa74-2e321b853cf8/osist-pren-iec-60730-2-5-2025>

**ICS:**

97.120	Avtomatske krmilne naprave za dom	Automatic controls for household use
--------	-----------------------------------	--------------------------------------

**oSIST prEN IEC 60730-2-5:2025**                      **en**





PROJECT NUMBER:

**IEC 60730-2-5 ED5**

DATE OF CIRCULATION:

**2025-01-03**

CLOSING DATE FOR VOTING:

**2025-03-28**

SUPERSEDES DOCUMENTS:

**72/1444/CD, 72/1459/CC**

IEC TC 72 : AUTOMATIC ELECTRICAL CONTROLS	
SECRETARIAT: United States of America	SECRETARY: Ms Grace Roh
OF INTEREST TO THE FOLLOWING COMMITTEES:	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED:	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING  <b>Attention IEC-CENELEC parallel voting</b>  The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.  The CENELEC members are invited to vote through the CENELEC online voting system.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

oSIST prEN IEC 60730-2-5:2025

This document is still under study and subject to change. It should not be used for reference purposes.

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

Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

**Automatic electrical controls - Part 2-5: Particular requirements for automatic electrical burner control systems**

PROPOSED STABILITY DATE: 2028

NOTE FROM TC/SC OFFICERS:

**Copyright © 2024 International Electrotechnical Commission, IEC.** All rights reserved. It is permitted to download this electronic file, to make a copy and to print out the content for the sole purpose of preparing National Committee positions. You may not copy or "mirror" the file or printed version of the document, or any part of it, for any other purpose without permission in writing from IEC.

1

## CONTENTS

2	1	Scope .....	7
3	2	Normative references .....	8
4	3	Terms and definitions .....	9
5	3.2	Definitions of types of control according to purpose .....	9
6	3.3	Definitions relating to the function of controls .....	10
7	3.5	Definitions of types of control according to construction .....	14
8	3.101	Definitions relating to the type of burner .....	15
9	4	General .....	16
10	4.3	General notes on tests .....	16
11	5	Required technical information .....	16
12	5.2	Methods of providing technical information .....	16
13	6	Protection against electric shock .....	19
14	6.1	General requirements .....	19
15	6.3	Capacitors .....	19
16	7	Provision for protective earthing .....	19
17	8	Terminals and terminations .....	19
18	8.2	Terminals and terminations for internal conductors .....	20
19	9	Constructional requirements .....	20
20	9.3	Actuation and operation .....	20
21	9.4	Actions .....	23
22	9.10	Equipment inlets and socket-outlets .....	25
23	9.11	Requirements during mounting, use, maintenance and servicing .....	25
24	9.13	Protective controls and components of protective control systems .....	25
25	9.101	Flame detector constructional requirements .....	25
26	9.102	Reset from lock-out function .....	26
27	9.103	Application requirements for the use of Type 2.AL burner control systems in warm air heating appliances (furnaces) .....	27
29	10	Threaded parts and connections .....	28
30	11	Creepage distances, clearances and distances through solid insulation .....	28
31	11.1	General .....	28
32	12	Components .....	28
33	13	Fault assessment on electronic circuits .....	28
34	13.1	Fault assessment for inherent safety .....	28
35	14	Moisture and dust resistance .....	29
36	15	Electric strength and insulation resistance .....	29
37	15.1	Insulation resistance .....	29
38	15.2	Electric strength .....	29
39	16	Heating .....	30
40	16.3	Not applicable .....	30
41	16.4	<i>Modficiation:</i> .....	30
42	16.6	<i>Modification:</i> .....	30
43	16.7	<i>Modification:</i> .....	30
44	17	Manufacturing deviation and drift .....	30
45	18	Environmental stress .....	30

46	18.2	Environmental stress of temperature.....	30
47	19	Endurance.....	31
48	19.1	General requirements.....	31
49	19.3	Thermal conditions for the tests.....	31
50	19.4	Manual and mechanical conditions for the tests.....	31
51	19.5	Dielectric strength requirements.....	31
52	19.6	Ageing test.....	31
53	19.7	Overvoltage test or overload test in all countries using an overload test of automatic action at accelerated rate.....	32
54			
55	19.8	Test of automatic action at accelerated rate.....	32
56	19.9	Test of automatic action at slow rate.....	32
57	19.10	Overvoltage test or overload test in all countries that use the overload test of manual action at accelerated speed.....	32
58			
59	19.11	Test of manual action at slow speed.....	32
60	19.12	Test of manual action at high speed which has multiple poles, and where polarity reversal occurs during the action.....	32
61			
62	19.13	Test of manual action at accelerated speed.....	32
63	19.14	Evaluation of compliance.....	32
64	19.15	Test for particular purpose controls.....	32
65	20	Mechanical strength.....	34
66	20.2	Impact resistance.....	34
67	20.3	Free-standing controls.....	34
68	20.4	In-line cord controls.....	34
69	20.5	Pull-cord actuated controls.....	34
70	20.6	Foot actuated controls.....	34
71	20.8	Flexing - test.....	34
72	21	Resistance to heat, fire and tracking.....	34
73	22	Resistance to corrosion.....	35
74	23	Electromagnetic compatibility (EMC) requirements – Emission.....	35
75	24	Normal operation.....	35
76	25	Electromagnetic compatibility (EMC) requirements – Immunity.....	35
77	26	Abnormal operation tests.....	35
78	Annex H (normative)	Requirements related to functional safety.....	36
79	H.3	Terms and definitions.....	36
80	H.5	Information.....	36
81	H.13	Fault assessment on electronic circuits.....	36
82	H.17	Manufacturing deviation and drift.....	38
83	H.19	Endurance.....	39
84	H.25	Electromagnetic compatibility (EMC) requirements – Immunity.....	39
85	Annex J (normative)	Requirements for thermistor elements and controls using thermistors..	46
86	Annex Q (informative)	Regional differences relevant for the member countries of Cenelec ..	47
87	Annex R (informative)	National differences relevant in the United States of America.....	48
88	R.2	Normative references.....	48
89	Annex S (informative)	National differences relevant in Japan.....	49
90	S.2	Normative references.....	49
91	Annex T (informative)	National differences relevant in Canada.....	50
92	T.2	Normative references.....	50

93	Annex AA (informative) Functional characteristics of burner control systems to be specified	
94	by the relevant appliance standards, as applicable .....	51
95	Bibliography .....	52
96		
97	Figure 101 – Pulse spark generation .....	19
98	Figure 102 – Typical installation of the independent combustion air supply for room	
99	independent operation .....	27
100	Figure H.101 – Voltage variation test .....	41
101		
102	Table 1 – Required technical information and methods of providing these information .....	16
103	Table H.1 – Additional items to Table 1 .....	36
104	Table H.101 – Timing of short-term supply voltage variations .....	41
105	Table H.102 – Test levels for electrostatic discharge .....	43
106	Table AA.1 – Functional characteristics of burner control systems to be specified by the	
107	relevant appliance standards, as applicable .....	51
108		

iTech Standards  
 (<https://standards.iteh.ai>)  
 Document Preview

[oSIST prEN IEC 60730-2-5:2025](https://standards.iteh.ai/catalog/standards/sist/a1b63119-89f1-492a-aa74-2e321b853cf8/osist-pren-iec-60730-2-5-2025)

<https://standards.iteh.ai/catalog/standards/sist/a1b63119-89f1-492a-aa74-2e321b853cf8/osist-pren-iec-60730-2-5-2025>

109

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

110

111

112

113

114

115

116

117

**AUTOMATIC ELECTRICAL CONTROLS –****Part 2-5: Particular requirements for  
Automatic electrical burner control systems****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

148 IEC 60730-2-5 has been prepared by IEC technical committee 72: AUTOMATIC ELECTRICAL  
149 CONTROLS. It is an International Standard.

150 This 5.0 edition cancels and replaces the 4.2 edition published in 2013, Amendment 1:2017 and  
151 Amendment 2:2020. This edition constitutes a technical revision.

152 This edition includes the following significant technical changes with respect to the previous edition:

153 Adoption to IEC 60730-1 Ed.6.0 with all of its significant changes to IEC 60730-1 fifth edition:2013,  
154 including Amendment 1:2015 and Amendment 2:2020.

155 The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

156

157 Full information on the voting for its approval can be found in the report on voting indicated in the  
158 above table.

159 The language used for the development of this International Standard is English.

160 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in  
161 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at  
162 [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in  
163 greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

164 A list of all parts of the IEC 60730 series, under the general title: AUTOMATIC ELECTRICAL CONTROL,  
165 can be found on the IEC website.

166 This part 2-5 is intended to be used in conjunction with IEC 60730-1. It was established on the basis  
167 of the sixth edition of that standard. Consideration may be given to future editions of, or amendments  
168 to, IEC 60730-1.

169 This part 2-5 supplements or modifies the corresponding clauses in IEC 60730-1, so as to convert  
170 that publication into the IEC standard: Particular requirements for electric actuators.

171 Where this part 2-5 states "addition", "modification" or "replacement", the relevant requirement, test  
172 specification or explanatory matter in part 1 should be adapted accordingly.

173 When a particular clause or subclause of Part 1 is not mentioned in this part 2, that clause or  
174 subclause applies.

175 In the development of a fully international standard it has been necessary to take into consideration  
176 the differing requirements resulting from practical experience in various parts of the world and to  
177 recognize the variation in national electrical systems and wiring rules.

178 The reader's attention is drawn to the fact that Q, Annex R, Annex S and Annex T list all of the "in-  
179 some-country" clauses on differing practices of a less permanent nature relating to the subject of this  
180 document.

181 In this publication:

182 1) The following print types are used:

- 183 – requirements proper: in roman type;
- 184 – *test specifications: in italic type*;
- 185 – explanatory matter: in smaller roman type.
- 186 – Defined terms: **bold type**.

187 2) Subclauses, notes or items which are additional to those in Part 1 are numbered starting from  
188 101, additional annexes are lettered AA, BB, etc.

189 The committee has decided that the contents of this document will remain unchanged until the stability  
190 date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document.  
191 At this date, the document will be

- 192 • reconfirmed,
- 193 • withdrawn,
- 194 • replaced by a revised edition, or
- 195 • amended.

196

**IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.**

197



198  
199  
200  
201  
202  
203  
204

## AUTOMATIC ELECTRICAL CONTROLS –

### Part 2-5: Particular requirements for automatic electrical burner control systems

#### 205 1 Scope

206 This clause of Part 1 is replaced by the following:

207 This document applies to automatic electrical **burner control systems** for the **automatic control** of  
208 burners for oil, gas, coal or other combustibles intended to be used

- 209 • for household and similar use,
- 210 • in shops, offices, hospitals, farms and commercial and industrial applications.

211 NOTE 1 Throughout this document, where it can be used unambiguously, the word "system" means "burner control system"  
212 and "systems" means "burner control systems".

- 213 • for equipment that is used by the public, such as equipment intended to be used in shops, offices,  
214 hospitals, farms and commercial and industrial applications;

215 NOTE 2 Throughout this document, the word "equipment" means "appliance and equipment."

216 EXAMPLE 1 Controls for commercial catering, heating and air-conditioning equipment.

- 217 • that are **smart enabled controls**;

218 EXAMPLE 2 Remote interfaces/control of burner operations.

- 219 • that are AC or DC powered controls with a rated voltage not exceeding 690 V AC or 600 V DC;
- 220 • used in, on, or in association with equipment that use electricity, gas, oil, solid fuel, solar thermal  
221 energy, etc., or a combination thereof;
- 222 • utilized as part of a control system or controls which are mechanically integral with multifunctional  
223 controls having non-electrical outputs;
- 224 • using NTC or **PTC thermistors** and to discrete **thermistors**, requirements for which are contained  
225 in Annex J;
- 226 • that are mechanically or electrically operated, responsive to or controlling such characteristics as  
227 temperature, pressure, passage of time, humidity, light, electrostatic effects, flow, or liquid level,  
228 current, voltage, acceleration, or combinations thereof;
- 229 • as well as manual controls when such are electrically and/or mechanically integral with automatic  
230 controls.

231 NOTE 3 Requirements for manually actuated mechanical switches not forming part of an automatic control are contained  
232 in IEC 61058-1-1.

233 This document is applicable

- 234 • to a complete **burner control system**,
- 235 • to a separate **programming unit**,
- 236 • to a separate electronic high-voltage **ignition source**,
- 237 • to a separate **flame detector** and
- 238 • to a separate **high-temperature operation (HTO) detector**.
- 239 • to a **burner control system** intended to be used in warm air heating appliances (furnaces) where  
240 the appliance is equipped with an electromechanical differential pressure control to monitor the  
241 difference of the combustion air pressure (Type 2.AL). This pressure control provides a switch as

242 an alternative to one of the two switching elements to directly de-energize the safety relevant  
243 terminals.

244 This document does not apply to thermoelectric flame supervision controls; thermoelectric flame  
245 supervision controls are covered by ISO 23551-6.

246 This document also applies to electrical **burner control systems** intended exclusively for industrial  
247 process applications e.g. those applications covered by ISO TC 244 (ISO 13577).

248 This document applies to controls powered by primary or secondary batteries, requirements for which  
249 are contained within the standard.

250 This document applies to

- 251 – the inherent safety of automatic electrical **burner control systems**, and
- 252 – functional safety of automatic electrical **burner control systems**,
- 253 – automatic electrical **burner control systems** where the performance (for example the effect of  
254 EMC phenomena) of the product can impair the overall safety and performance of the controlled  
255 system,
- 256 – the operating values, operating times, and operating sequences where such are associated with  
257 burner safety and to the testing of automatic electrical **burner control systems** used in, on, or in  
258 association with, burners.

259 NOTE 4 Requirements for specific **operating values**, **operating times** and **operating sequences** are given in the  
260 standards for appliances and equipment.

261 This document specifies the requirements for construction, operation and testing of automatic  
262 electrical **burner control systems** used in, on, or in association with an equipment.

263 This document applies also to systems

- 264 • incorporating electronic devices
- 265 • using NTC or PTC thermistors, additional requirements for which are contained in Annex J
- 266 • to the electrical and functional safety of controls capable of receiving and responding to  
267 communications signals. The signals may be transmitted to or received from external units,  
268 connected wired or wireless, that may or may not be part of the burner control system.

269 This document does not

- 270 • take into account the response value of an automatic action of a control, if such a response value  
271 is dependent upon the method of mounting the control in the equipment. Where a response value  
272 is of significant purpose for the protection of the user, or surroundings, the value defined in the  
273 appropriate equipment standard or as determined by the manufacturer will apply.
- 274 • address the integrity of the output signal to the network devices, such as interoperability with other  
275 devices unless it has been evaluated as part of the control system.

## 276 2 Normative references

277 This clause of Part 1 is applicable except as follows:

278 *Addition:*

279 IEC 60068-2-6, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

280 ISO/IEC 80079-20-1:2017, *Explosive atmospheres – Part 20-1: Material characteristics for gas and  
281 vapour classification – Test methods and data*

282 ISO 23551-6:2021, *Safety and control devices for gas burners and gas-burning appliances –*  
283 *Particular requirements – Part 6: Thermoelectric flame supervision controls*

### 284 3 Terms and definitions

285 This clause of Part 1 is applicable except as follows:

#### 286 3.2 Definitions of types of control according to purpose

##### 287 3.2.19 Not applicable

288 *Additional definitions:*

##### 289 3.2.101

###### 290 burner control system

291 system which includes a programming unit, a flame detector or, if applicable, an HTO detector and  
292 may include an ignition source and/or ignition device and which monitors the operation of fuel burners

293 Note 1 to entry: The various functions of the system may be in one or more housings.

##### 294 3.2.102

###### 295 flame detector

296 device which provides the **programming unit** with a signal indicating the presence or absence of  
297 flame

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

##### 300 3.2.103

###### 301 flame sensor

302 device which senses the flame and provides the input signal to the **flame detector** amplifier

303 Note 1 to entry: Examples are optical sensors and flame electrodes (flame rods).

##### 304 3.2.104

###### 305 ignition source

306 electrical or electronic system component which provides energy to an **ignition device**

307 Note 1 to entry: It may be separated from or incorporated in the **programming unit**. Examples are ignition transformers and  
308 electronic high-voltage generators.

##### 309 3.2.105

###### 310 ignition device

311 device mounted on or adjacent to a burner for igniting fuel at the burner

312 Note 1 to entry: Examples are **pilot** burners, spark electrodes and hot surface igniters.

##### 313 3.2.106

###### 314 programming unit

315 device which controls the burner **operation** in a declared sequence from start-up to shut-down within  
316 declared timings and in response to signals from regulating, limiting and monitoring devices

##### 317 3.2.107

###### 318 multitry system

319 system that allows more than one **valve open period** during its declared **operating sequence**

##### 320 3.2.108

###### 321 HTO detector

322 device which provides the **programming unit** with a signal indicating presence or absence of **HTO**

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

### 325 **3.2.109**

#### 326 **HTO-sensor**

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

### 330 **3.2.110**

#### 331 **auto-ignition temperature**

#### 332 **AIT**

333 lowest temperature (of a surface) at which under specified test conditions an ignition of a flammable  
334 gas or vapour in mixture with air or air-inert gas occurs

335 [SOURCE: ISO/IEC 80079-20-1:2017,3.3]

336 "Note 1 to entry: Lowest temperature that ignites flammable gas without an additional external source of ignition like spark  
337 or arc"

### 338 **3.2.111**

#### 339 **high-temperature operation**

#### 340 **HTO**

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

342 Note 1 to entry: **High-temperature operation** is used e.g. in fuel cells (IEC 62282-3-100) and in industrial furnaces and  
343 associated processing equipment (ISO 13577) where ignition and burning is detected by means of sensing the temperature.

## 344 **3.3 Definitions relating to the function of controls**

### 345 **3.3.30**

#### 346 **maximum temperature**

#### 347 **T<sub>max</sub>**

348 Modification: *Replace "switch head" by "burner control system."*

### 349 **3.3.31 safety shut-down**

350 *Replacement:*

351 de-energization of the main fuel flow means as the result of the action of a limiter, a cut-out or the  
352 detection of an internal **fault** of the system

353 Note 1 to entry: **Safety shut-down** may include additional actions by the system.

354

355 *Add the following definitions*

### 356 **3.3.101**

#### 357 **automatic recycle**

358 automatic repetition of the start-up procedure, without manual intervention, following loss of the  
359 supervised flame and subsequent fuel supply shutoff

### 360 **3.3.102**

#### 361 **controlled shut-down**

362 de-energization of the fuel flow means as a result of the opening of a control loop by a control device  
363 such as a **thermostat** leading the system to return to the **start position**

364 Note 1 to entry: **Controlled shut-down** may include additional actions by the system.

- 365 **3.3.103**  
366 **flame detector response time**  
367 period of time between the loss of the sensed flame and the signal indicating the absence of flame
- 368 **3.3.104**  
369 **flame detector operating characteristics**  
370 that function of the **flame detector** which indicates absence or presence of flame as the output signal  
371 of the **flame detector** relating to the input signal
- 372 Note 1 to entry: Normally the input signal is provided by a **flame sensor**.
- 373 **3.3.104.1**  
374 **signal for presence of flame**  
375 **S<sub>1</sub>**  
376 minimum signal which indicates the presence of flame when there was previously no flame
- 377 **3.3.104.2**  
378 **signal for absence of flame**  
379 **S<sub>2</sub>**  
380 maximum signal which indicates the loss of flame
- 381 Note 1 to entry: **S<sub>2</sub>** is less than **S<sub>1</sub>**.
- 382 **3.3.104.3**  
383 **maximum flame signal**  
384 **S<sub>max</sub>**  
385 maximum signal which does not affect the timings or the sequence
- 386 **3.3.104.4**  
387 **signal for visible light flame simulation**  
388 **S<sub>3</sub>**  
389 minimum signal which indicates the presence of flame during the visible light **flame simulation test**
- 390 Note 1 to entry: **S<sub>3</sub>** is less than **S<sub>2</sub>**.
- 391 **3.3.105**  
392 **self-checking flame detector**  
393 **flame detector** which checks for correct **operation** of the **flame detector** and its associated  
394 electronic circuitry while the burner is in the **running position**
- 395 **3.3.106**  
396 **flame detector self-checking rate**  
397 frequency of the self-checking function of the **flame detector** (in number of **operations** per unit of  
398 time)
- 399 **3.3.107**  
400 **flame failure lock-out time**  
401 **flame failure response time**  
402 period of time between the signal indicating absence of flame and **lock-out**
- 403 **3.3.108**  
404 **flame failure re-ignition time**  
405 **relight time**  
406 period of time between the signal indicating absence of flame and the signal to energize the **ignition**  
407 **device**, during which the fuel supply is not shut off
- 408 **3.3.109**  
409 **flame signal**  
410 output signal of the **flame detector**

411 **3.3.110**  
412 **flame simulation**  
413 condition which occurs when the **flame detector** indicates the presence of flame when in reality no  
414 flame is present

415 **3.3.111**  
416 **ignition time**  
417 period of time during which the **ignition device** is energized

418 **3.3.112**  
419 **lock-out**  
420 process in which the system goes into one of the following **lock-out** conditions, following **safety shut-**  
421 **down**

422 **3.3.112.1**  
423 **non-volatile lock-out**  
424 condition such that a restart can only be accomplished by a manual **reset** of the system and by no  
425 other cause

426 **3.3.112.2**  
427 **volatile lock-out**  
428 condition such that a restart can be accomplished by either a manual **reset** of the system or by an  
429 interruption of the power supply and its subsequent restoration

430 **3.3.113**  
431 **main flame establishing period**  
432 period of time between the signal to energize the main fuel flow means and the signal indicating  
433 presence of the main burner flame

434 **3.3.114**  
435 **pilot flame establishing period**  
436 period of time between the signal to energize the **pilot** fuel flow means and the signal indicating  
437 presence of the **pilot** flame

438 **3.3.115**  
439 **post-ignition time**  
440 period of the **ignition time** between the signal indicating presence of flame and the signal to de-  
441 energize the **ignition device**

442 **3.3.116**  
443 **pre-ignition time**  
444 period of the **ignition time** between the signal to ignite and the signal to energize the fuel flow means

445 **3.3.117**  
446 **proved igniter**  
447 **proved igniter system**  
448 system in which the fuel flow means is energized only after the availability of sufficient energy to  
449 ignite the fuel has been verified

450 Note 1 to entry: Examples are systems using spark supervision and those using proved hot surface igniters.

451 **3.3.117.1**  
452 **proved igniter operating value**  
453 signal which indicates that the **proved igniter** has the energy to ignite the fuel

454 **3.3.117.2**  
455 **igniter proving time**  
456 period of time between the signal to energize the **proved igniter** and the signal to energize the fuel  
457 flow means