BS EN 1854:2010

BSI Standards Publication

Pressure sensing devices for gas burners and gas burning appliances

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National foreword

This British Standard is the UK implementation of EN 1854:2010.

The UK participation in its preparation was entrusted to Technical Committee GSE/22, Safety and control devices for gas and oil burners and gas burning appliances.

A list of organizations represented on this committee can be obtained on request to its secretary.

EN 1854:2010 is a candidate "harmonized" European Standard and fully takes into account the requirements of the European Commission mandate M/BC/CEN/89/6, *Appliances burning gaseous fuels*, given under the New Approach Directive (2009/142/EC), and is intended to lead to CE marking. The date of applicability of EN 1854:2010 as a "harmonized" European Standard, i.e. the date after which this standard may be used for CE marking purposes, is subject to an announcement in the Official Journal of the European Communities.

EN 1854:2010 is the subject of transitional arrangements agreed under the European Commission mandate. The Member States have agreed a nominal transition period for the co-existence of EN 1854:2010 and their corresponding national standard(s). It is intended that this period will comprise a nominal nine month period during which any required changes to national regulations are to be made, followed by a further nominal twelve month period for the implementation of CE marking. At the end of this co-existence period, the national standard(s) will be withdrawn. In the UK, the corresponding national standard is:

— BS EN 1854:2006, *Pressure sensing devices for gas burners and gas burning appliances*;

and based on this nominal transition period of twenty–one months, BS EN 1854:2006 will be withdrawn on 31 May, 2012.

NOTE: This date is approximate. Users of this standard should contact BSI Customer Services for confirmation of withdrawal.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 August 2010.

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Date	Text affected

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NORME EUROPÉENNE

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EN 1854

May 2010

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Supersedes EN 1854:2006

English Version

Pressure sensing devices for gas burners and gas burning appliances

Dispositifs de surveillance de pression pour brûleurs à gaz et appareils à gaz

Druckwächter für Gasbrenner und Gasgeräte

This European Standard was approved by CEN on 15 April 2010.

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 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 Management Centre has the same status as the official versions.

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Contents

Page

Figures

Tables

Foreword

This document (EN 1854:2010) 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 November 2010, and conflicting national standards shall be withdrawn at the latest by May 2012.

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

This document supersedes EN 1854:2006.

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.

This European Standard refers to clauses of EN 13611:2007 or adapts it by stating "with the following modification", "with the following addition", "is replaced by the following" or "is not applicable" in the corresponding clause. This European Standard adds clauses or subclauses to the structure of EN 13611:2007 which are particular to this European Standard. It should be noted that these clauses and subclauses are not indicated as an addition.

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

a) the scope introduces a new declaration concerning the maximum inlet pressure covered by the revised standard;

b) incorporation of the requirements and tests for electronic pressure sensing devices (EPSDs);

c) alignment with EN 13611:2007;

d) updating of definitions and normative references.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the safety, construction and performance requirements for pressure sensing devices.

This European Standard covers type testing only.

It applies to pressure sensing devices for the measurement of pressures of combustible gases of the first, second and third families, air, combustion products for maximum inlet pressures up to 500 kPa (5 bar).

It applies to all types of pressure sensing devices, including electronic, differential and inferential types.

It specifies requirements for pressure sensing devices which are intended to be applied to steam boilers and as such need to meet increased reliability requirements. These devices are classified as PSD-S in this European Standard.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13611:2007, *Safety and control devices for gas burners and gas burning appliances — General requirements*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN 60730-2-6:2008, *Automatic electrical controls for household and similar use — Part 2-6: Particular requirements for automatic electrical pressure sensing controls including mechanical requirements (IEC 60730-2-6:2007, modified)*

EN 61058-1:2002, *Switches for appliances — Part 1: General requirements (IEC 61058-1:2000 + A1:2001, modified)*

EN 175301-803, *Detail Specification: Rectangular connectors — Flat contacts, 0,8 mm thickness, locking screw not detachable*

EN ISO 75 (all parts), *Plastics — Determination of temperature of deflection under load*

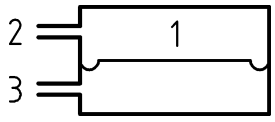
IEC 60730-1:2007, *Automatic electrical controls for household and similar use — Part 1: General requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13611:2007 and the following apply.

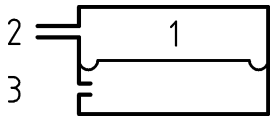
3.101
pressure sensing device
PSD
device which senses pressure and provides a signal

NOTE Different types of PSDs are given in Figures 1 to 3.



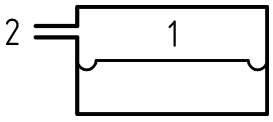
Key
1 sensing element
2 inlet 1
3 inlet 2/reference

Figure 1 — Differential PSD



Key
1 sensing element
2 inlet 1
3 reference

Figure 2 — Atmospheric PSD



Key
1 sensing element
2 inlet 1

Figure 3 — Absolute PSD

3.102
set point
pressure to which the PSD is adjusted to operate

3.103
switching pressure
inlet pressure at which the PSD operates

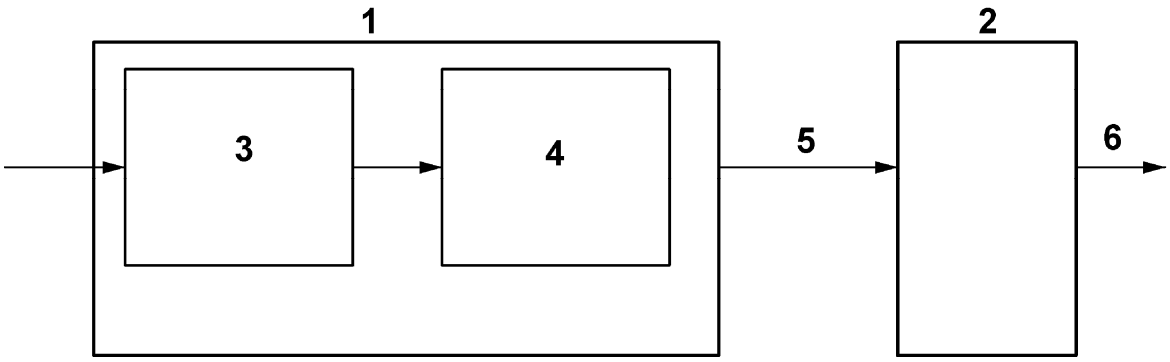
3.104
set point range
declared range of adjustment of the PSD between the highest and lowest set points

3.105
upper switching pressure
pressure at which the PSD operates during an increase in pressure

3.106
lower switching pressure
pressure at which the PSD operates during a decrease in pressure

3.107
electronic pressure sensing device
EPSD
assembly of electronic based pressure sensing element and signal conditioner

NOTE Figure 4, clarifies the EPSD.



Key

1 EPSD

2 Central Unit

3 Electronic pressure sensing element

4 Signal Conditioner

5 Interface

6 Switching

Figure 4 — EPSD

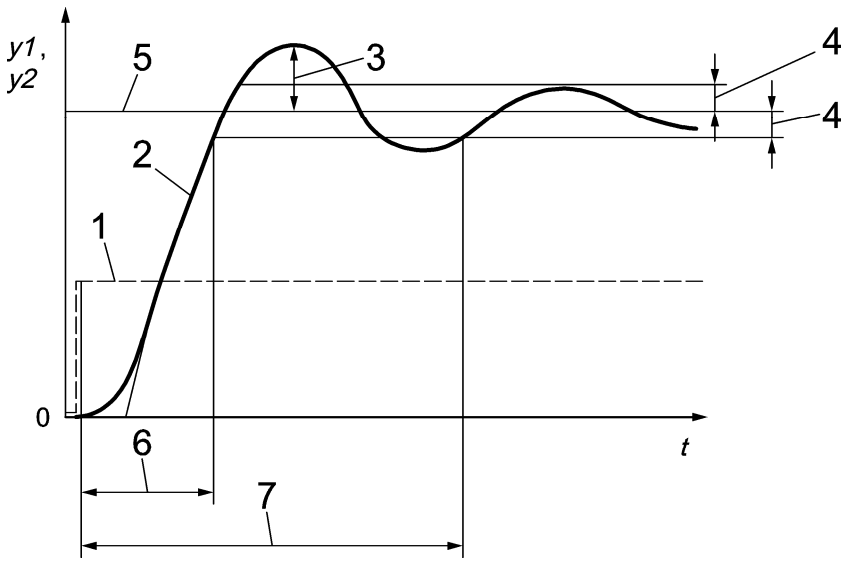
3.108
electronic pressure sensing element
part of the EPSD, which transforms the signal to be sensed (e.g. pressure) to another physical value (e.g. force, voltage)

3.109
signal conditioner
transforms the signal from the sensing element into the output signal of the EPSD

NOTE The signal conditioner may consist of functional electronics as well as electronics which cause the sensor output to be classified as class B or C in accordance with EN 13611:2007.

3.110
response time
time counted from start of the step change input signal (e.g. pressure) until the output signal (e.g. voltage, current) is within the settling tolerance for the first time

NOTE For further information refer to Figure 5.



Key

1	step function (*y1*)	5	steady state value
2	step response (*y2*)	6	response time
3	overshoot value	7	settling time
4	settling tolerance	*t*	time

Figure 5 — Step response of EPSD

3.111
step response
output signal change of a device having a step change input signal

3.112
steady state value
value of the output signal after step response input remains constant

3.113
settling tolerance
difference between the current output signal and its steady state value declared by the manufacturer

3.114
settling time
time counted from start of the step change input signal until the output signal remains within the settling tolerance

3.115
overshoot value
biggest deviation between the output signal and its steady state value after step change of the inlet signal exceeding the settling tolerance for the first time

3.116
withstand pressure
pressure that is withstood without degraded characteristic after returning below the maximum inlet pressure

NOTE The withstand pressure can be equal to maximum inlet pressure.

3.117
deviation
difference between the declared or indicated set point and the pressure measured before the endurance test

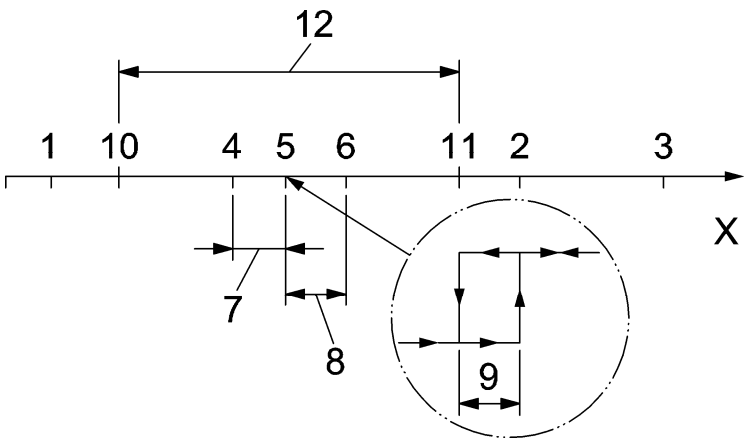
3.118
drift
difference between the switching pressures, or in case of EPSD the positive or negative shift of the sensor characteristic, measured before and after the endurance test

NOTE For illustration refer to Figure 7.

3.119
repeatability
ability of a system to provide similar output for repeated operation

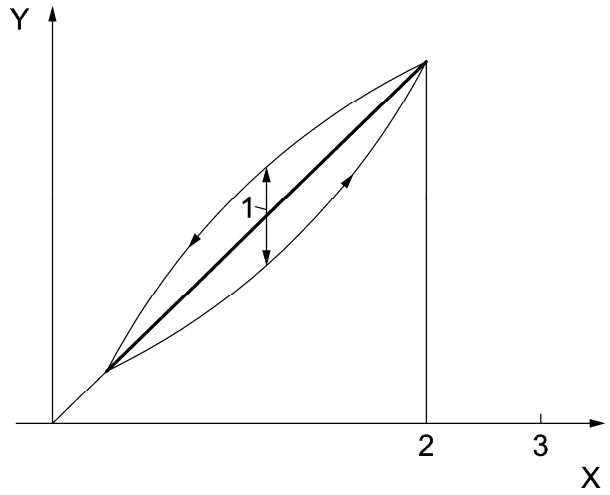
3.120
hysteresis
greatest differences between the upscale and downscale output readings or upper and lower switching pressure at one point

NOTE Clarification of the hysteresis in reference to other definitions of PSDs is given in Figure 6 and 7.

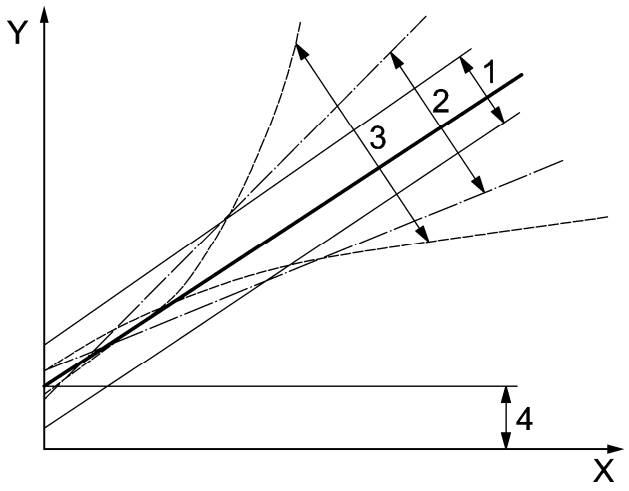


Key
1 minimum inlet pressure
2 maximum inlet pressure
3 withstand pressure
4 set point
5 switching pressure (before endurance)
6 switching pressure (after endurance)
7 deviation
8 drift
9 hysteresis
10 lowest set point
11 highest set point
12 set point range
X P-inlet/P-differential

Figure 6 — Clarification of definitions for PSD-M and PSD-S



a) Clarifications of hysteresis, maximum inlet and withstand pressure



b) Clarifications of drift, transfer ratio, linearity and offset

Key
1 hysteresis
2 maximum inlet pressure
3 withstand pressure
X P-inlet/P-differential
Y output signal

Key
1 drift
2 transfer ratio
3 linearity
4 offset
X pressure
Y output signal

Figure 7 — Clarification of definitions for EPSD

3.121
transfer ratio
positive or negative rotation of the sensor characteristic with the point of rotation as the intersection of the characteristic and the x-axis

NOTE For illustration refer to Figure 7.

3.122
linearity
linearity is the worst case deviation of straightness of the actual transfer function from the ideal straight line

NOTE For illustration refer to Figure 7.

3.123
offset
positive or negative deviation of the intersection of the sensor characteristic and the y-axis

NOTE For illustration refer Figure 7.

3.124
resolution
minimum incremental output change

4 Classification

4.1 Classes of control

EN 13611:2007, 4.1 is replaced by the following:

Pressure sensing devices (PSDs) are classified as:

— PSD-M, being a mechanical pressure sensing device;

— PSD-S, being a PSD-M meeting increased requirements;

— EPSD, being an electronic pressure sensing device, including devices with variable output.

4.2 Groups of control

Shall be according to EN 13611:2007, 4.2 with the following modification:

Group 2 is not applicable for PSDs.

4.3 Classes of control functions

Shall be according to EN 13611:2007, 4.3.

5 Units of measurement and test conditions

Shall be according to EN 13611:2007, Clause 5.

6 Construction requirements

6.1 General

Shall be according to EN 13611:2007, 6.1 with the following addition:

Clause 6 is applicable for PSD-M, PSD-S and EPSDs unless stated otherwise.

The minimum inlet pressure, the maximum inlet pressure and the withstand pressure shall be declared by the manufacturer. If no withstand pressure is declared, the withstand pressure is equal to the maximum inlet pressure. At the withstand pressure, devices shall comply with the requirements of this European Standard with the exception of 7.101.

The declared pressures can be positive or negative pressures.

6.2 Mechanical parts of the control

6.2.1 Appearance

Shall be according to EN 13611:2007, 6.2.1.

6.2.2 Holes

Shall be according to EN 13611:2007, 6.2.2 with the following modification:

This requirement only applies to PSDs designed for combustible gas.

6.2.3 Breather holes

Shall be according to EN 13611:2007, 6.2.3 with the following modification and addition:

Modification:

Use the withstand pressure instead of the maximum inlet pressure.

Addition:

Alternatively, when the requirement of 6.3.2, c) is fulfilled, the requirements of this clause are not applicable.

6.2.4 Test for leakage of breather holes

Shall be according to EN 13611:2007, 6.2.4.

6.2.5 Screwed fastenings

Shall be according to EN 13611:2007, 6.2.5 with the following modification:

This requirement only applies to PSDs designed for combustible gas.

6.2.6 Jointing

Shall be according to EN 13611:2007, 6.2.6 with the following modification:

This requirement only applies to PSDs designed for combustible gas.

6.2.7 Moving parts

Shall be according to EN 13611:2007, 6.2.7.

6.2.8 Sealing caps

Shall be according to EN 13611:2007, 6.2.8.

6.2.9 Dismantling and reassembly

Shall be according to EN 13611:2007, 6.2.9.

6.2.101 Internal diameter of orifices of pressure transmission compartments

Orifices of all compartments used for pressure transmission shall have a minimum internal diameter of 0,7 mm, except in cases where a smaller orifice is protected against fouling and clogging by suitable measures, e.g. external filters (see 9.2, h)).

6.2.102 Manual reset

If a manual reset function is provided in a PSD the reset action shall be independent of manipulation or position of the reset member.

NOTE Manual reset can require the use of a tool.

6.2.103 Sensed medium

The manufacturer shall declare the nature of the sensed medium for which the device is designed.

6.2.104 PSD-S

The additional construction requirements for PSD-S shall be as follows:

a) switching parts shall have the characteristics of a snap-acting contact as described in EN 61058-1:2002, 13.2 and 13.3 and EN 61058-1/A2:2008, 13.3;

b) reed relays or reed contacts shall not be used;

c) pressure-stressed measurement parts shall be manufactured from materials resistant to corrosion for the intended use;

d) maximum declared ambient temperature shall be ≥ 70 °C;

e) the requirements of EN 60529:1991, IP44 shall be met as a minimum.

6.3 Materials

6.3.1 General material requirements

Shall be according to EN 13611:2007, 6.3.1.

6.3.2 Housing

EN 13611:2007, 6.3.2 is replaced by the following:

Parts of the housing of PSDs for combustible gas which directly or indirectly separate a gas-carrying compartment from atmosphere shall either:

a) be made from metallic materials; or

b) on removal or fracture of non-metallic parts other than O-rings, gaskets and sealing parts of diaphragms, no more than 70 dm³/h of air escapes at the withstand pressure.

For PSDs with a withstand pressure up to and including 60 kPa (600 mbar) the use of non-metallic material is allowed provided that:

1) these gas carrying compartments are protected from the gas supply by a metallically housed metallic flow restrictor of less than 1 mm diameter; and

2) a leakage rate of 70 dm^3/h of air is not exceeded after the test described in 6.3.3, 2nd paragraph.

NOTE When inside a housing a diaphragm separates the gas-carrying compartment from atmosphere then this is considered to be indirectly separated.

6.3.3 Test for leakage of housing after removal of non-metallic parts

EN 13611:2007, 6.3.3 is replaced by the following:

For indent b) of 6.3.2:

Remove all non-metallic parts of the housing which separate a gas-carrying compartment from atmosphere, excluding O-rings, gaskets, and sealing part of diaphragms. Pressurize the pressure ports of the PSD to the withstand pressure or 1,5 times the maximum inlet pressure whichever is greater, and measure the leakage rate according to 7.3.1.

For indent c) of 6.3.2:

Store the PSD for 1 h at (135 ± 2) °C ambient temperature, apply directly after that a pressure of three times the withstand pressure to the gas pressure sensitive parts of the compartment made with non-metallic material for 5 min. Wait for the PSD to return to room temperature. Pressurize the pressure ports of the PSD to the withstand pressure or 1,5 times the maximum inlet pressure whichever is greater, and measure the leakage rate according to 7.3.1.

6.3.4 Zinc alloys

Shall be according to EN 13611:2007, 6.3.4.

6.3.5 Springs providing closing and/or sealing force

EN 13611:2007, 6.3.5 is not applicable.

6.3.6 Resistance to corrosion and surface protection

Shall be according to EN 13611:2007, 6.3.6.

6.3.7 Impregnation

Shall be according to EN 13611:2007, 6.3.7.

6.3.8 Seals for glands for moving parts

Shall be according to EN 13611:2007, 6.3.8.

6.3.101 Plastics materials

Where plastics materials are used, they shall have a declared heat deflection temperature (°C) of not less than 1,2 times the maximum declared ambient temperature when measured in accordance with EN ISO 75 (all parts) (Method A, 1,8 MPa load) and by reference to the plastics manufacturer's data.

6.4 Gas connections

6.4.1 Making connections

Shall be according to EN 13611:2007, 6.4.1 with the following modification:

This requirement only applies to PSDs designed for combustible gas.

6.4.2 Connection sizes

Shall be according to EN 13611:2007, 6.4.2 with the following modification:

This requirement only applies to PSDs designed for combustible gas.

6.4.3 Threads

Shall be according to EN 13611:2007, 6.4.3 with the following modification:

This requirement only applies to PSDs designed for combustible gas.

6.4.4 Union joints

Shall be according to EN 13611:2007, 6.4.4 with the following modification:

This requirement only applies to PSDs designed for combustible gas.

6.4.5 Flanges

Shall be according to EN 13611:2007, 6.4.5 with the following modification:

This requirement only applies to PSDs designed for combustible gas.

6.4.6 Compression fittings

Shall be according to EN 13611:2007, 6.4.6.

6.4.7 Nipples for pressure test

Shall be according to EN 13611:2007, 6.4.7 with the following modification:

This requirement only applies to PSDs designed for combustible gas.

6.4.8 Strainers

EN 13611:2007, 6.4.8 is replaced by the following:

There are no requirements for strainers.

6.4.101 Connections for devices specified for air and combustion products

For PSDs only suitable for air and combustion products, connections shall be as declared by the manufacturer, however threads, flanges or compression fittings (if used) shall be in accordance with EN 13611:2007, 7.4.1 and 7.4.2. Push-fit connections shall not be used for PSDs for maximum inlet pressures greater than 50 kPa (500 mbar).

6.5 Electronic parts of the control

6.5.1 General

Shall be according to EN 13611:2007, 6.5.1 with the following modification and addition:

Modification:

EN 13611:2007, 6.5.1, 4th paragraph and Note are not applicable.

Addition:

A method for the assessment of EPSDs is defined in 6.6. The manufacturer shall declare the class of control function according to the intended application.

For EPSD technologies not specified in this standard, a safety analysis shall be performed to describe the specific failure modes, requirements and tests for the type of technology in addition to the relevant requirements in this standard. This safety analysis can result in additional constructional requirements and/or additional failure modes to be included into the fault assessment. Together with the relevant requirements of this standard, this is a set of conditions under which the new technology can be used in an EPSD.

NOTE In general the basic risk of fire and/or explosion as a result of uncontrolled gas or air pressures and gas/air ratios is considered as a class C risk.

6.5.2 Protection provided by the enclosure

Shall be according to EN 13611:2007, 6.5.2.

6.5.3 Electrical components

Shall be according to EN 13611:2007, 6.5.3.

6.6 Protection against internal faults for the purpose of functional safety

6.6.1 Design and construction requirements

Shall be according to EN 13611:2007, 6.6.1 with the following addition:

Annex E: the fault modes resulting from the safety analysis in 6.5.1 are applicable as well.

6.6.2 Class A

Shall be according to EN 13611:2007, 6.6.2.

6.6.3 Class B

6.6.3.1 Design and construction requirements

Shall be according to EN 13611:2007, 6.6.3.1.

6.6.3.2 First fault

Shall be according to EN 13611:2007, 6.6.3.2 with the following modification and addition:

Modification:

EN 13611:2007, 6.6.3.2, c) is not applicable.

Addition:

The fault reaction time shall be declared by the manufacturer with a limit of 24 h.

The manufacturer shall declare the output signal(s) representing the defined state(s). As the defined state(s), specified in EN 13611:2007, 6.6.3.2, a), b) and d) are applicable for the total function (i.e. EPSD and central unit), the EPSD manufacturer shall specify the defined state in analogy with the requirements in EN 13611:2007, 6.6.3.2, a), b) and d).

If EN 13611: 2007, 6.6.3.2, d) applies (continues to operate) the EPSD shall continue to function in accordance with the performance requirements as specified in Clause 7, especially with 7.101.2.

6.6.3.3 Fault introduced during lock-out or safety- shut-down

EN 13611:2007, 6.6.3.3 is not applicable.

6.6.4 Class C

6.6.4.1 Design and construction requirements

Shall be according to EN 13611:2007, 6.6.4.1.

6.6.4.2 First fault

Shall be according to EN 13611:2007, 6.6.4.2 with the following modification and addition:

Modification:

EN 13611:2007, 6.6.4.2, c) is not applicable.

Addition:

The fault reaction time shall be declared by the manufacturer.

The manufacturer shall declare the output signal(s) representing the defined state(s). As the defined state(s), specified in EN 13611:2007, 6.6.4.2, a), b) and d) are applicable for the total function (i.e. EPSD and central unit), the EPSD manufacturer shall specify the defined state in analogy with the requirements in EN 13611:2007, 6.6.4.2, a), b) and d).

If EN 13611:2007, 6.6.4.2, d) applies (continues to operate) the EPSD shall continue to function in accordance with the performance requirements as specified in Clause 7, especially with 7.101.2.

6.6.4.3 Second fault

Shall be according to EN 13611:2007, 6.6.4.3 with the following modification:

EN 13611:2007, 6.6.4.3, a) is not applicable.

6.6.4.4 Fault introduced during lock-out or safety- shut-down

EN 13611:2007, 6.6.4.4 is not applicable.

6.6.5 Circuit and construction evaluation

Shall be according to EN 13611:2007, 6.6.5.

7 Performance

7.1 General

EN 13611:2007, 7.1 shall be replaced by the following:

Controls shall operate correctly under all combinations of the following:

— from the minimum inlet pressure to the maximum inlet pressure,

— ambient temperature range from 0 °C to 60 °C or wider limits, if declared by the manufacturer;

— in all mounting positions declared by the manufacturer;

— voltage or current range from 85 % to 110 % of the rated supply value or from 85 % of the minimum rated value to 110 % of the maximum rated value.

If there is a mounting position(s) declared by the manufacturer where the PSD cannot operate from minimum inlet pressure to the maximum inlet pressure, the range of inlet pressures for that mounting position(s) shall be declared separately.

The functionality of the PSD shall be declared by the manufacturer from the minimum inlet pressure up to the maximum inlet pressure.

The behaviour of the PSD shall be declared by the manufacturer from the maximum inlet pressure up to the withstand pressure.

EPSDs shall operate correctly from the minimum rated voltage to the maximum rated voltage, including the tolerances, as declared by the manufacturer.

For AC line voltage a tolerance of 15 % to the minimum and 10 % to the maximum rated voltage applies. For AC supplies of other types the tolerance shall be declared by the manufacturer.

For DC supplies type A, B and C according to I.1 of EN 13611:2007, a tolerance of 20 % to the minimum and the maximum rated voltage applies. For DC supplies of other types the tolerance shall be declared by the manufacturer.

The tolerances related to the power supply shall be applied during the tests as laid down in this European Standard.

7.2 Leak-tightness

Shall be according to EN 13611:2007, 7.2 with the following modification and addition:

Modification:

Internal leakage is not applicable for PSDs.

Addition:

For the external leakage rates for PSDs designed for air and combustion products use Table 1.

Table 1 — Maximum external leakage rates for air/combustion products

Maximum inlet pressure kPa (bar)	**Maximum leakage rates (air)** cm^3/h
≤ 100 kPa (1 bar)	200
> 100 kPa (1 bar)	1 000

Closure parts shall remain leak-tight after being dismantled and reassembled.

7.3 Test for leak-tightness

7.3.1 General

Shall be according to EN 13611:2007, 7.3.1 with the following addition:

For PSDs for air and combustion products, the lowest test pressure shall be 1,5 times the withstand pressure.

For PSDs for combustible gases, the lowest test pressure shall be 1,5 times the withstand pressure with a minimum of 22 kPa (220 mbar).

For differential PSDs for combustible gases, the external leakage rate is tested separately on inlet 1 and on inlet 2/reference, in order to include leakage through the diaphragm.

7.3.2 External leak-tightness

Shall be according to EN 13611:2007, 7.3.2 with the following addition:

For devices designed for air and combustion products the test shall be carried out with any breather holes blocked.

NOTE For production test, it is recommended that the test pressure is at least 1,5 times the maximum inlet pressure or 1,0 times the withstand pressure which ever is higher.

7.3.3 Internal leak-tightness

EN 13611:2007, 7.3.3 is not applicable.

7.3.101 Burst pressure test (only applicable for PSD-S)

A pressure of four times the maximum switching pressure is applied to the PSD-S at the maximum ambient temperature for a minimum of 5 min. Following this, the PSD-S is cooled to (20 ± 5) °C and the leak-tightness is checked against the requirements of 7.2.

This test is not applicable if 1,5 times the withstand pressure is greater than four times the switching pressure.

7.4 Torsion and bending

7.4.1 General

Shall be according to EN 13611:2007, 7.4.1.

7.4.2 Torsion

Shall be according to EN 13611:2007, 7.4.2 with the following modification:

PSDs shall withstand the torque given in Table 4 of EN 13611:2007 when tested according to 7.5.2 and 7.5.3 of this European Standard.

7.4.3 Bending moment

EN 13611:2007, 7.4.3 is not applicable.

7.5 Torsion and bending tests

7.5.1 General

EN 13611:2007, 7.5.1 is not applicable.

7.5.2 Ten second torsion test – group 1 and group 2 controls with threaded connections

EN 13611:2007, 7.5.2 is replaced by the following:

The test shall be performed using the following instructions:

a) screw the pipe with a torque, not exceeding the torque given in EN 13611:2007, Table 4, into the PSD. Clamp the pipe at a distance equal to or greater than 2 DN from the PSD;

b) ensure the joint is leak-tight;

c) support the PSD so that no bending moment is applied to the PSD;

d) apply the torque to the spanner flats progressively and smoothly without undue delay and apply the required torque to the PSD for 10 s. The torque given in EN 13611:2007, Table 4 shall not be exceeded;

e) with the torque removed, the device shall comply with 7.2 and no deformation shall be visible.

7.5.3 Ten second torsion test – group 1 and group 2 controls with compression joints

7.5.3.1 Olive-type compression joints

Shall be according to EN 13611:2007, 7.5.3.1 with the following addition:

The test conditions of 7.5.2 shall be taken into account.

7.5.3.2 Flared compression joints

Shall be according to EN 13611:2007, 7.5.3.2 with the following addition:

The test conditions of 7.5.2 shall be taken into account.

7.5.3.3 Flanged or saddle-clamp inlet connections for attachment to cooking appliance gas manifolds

EN 13611:2007, 7.5.3.3 is not applicable.

7.5.3.101 Flanged connections

For the purpose of the torsion test, flanged connections are treated as threaded connections.

7.5.4 Ten second bending moment test – group 1 and group 2 controls

EN 13611:2007, 7.5.4 is not applicable.

7.5.5 900 second bending moment test – group 1 controls only

EN 13611:2007, 7.5.5 is not applicable.

7.6 Rated flow rate

EN 13611:2007, 7.6 is not applicable.

7.7 Test for rated flow rate

EN 13611:2007, 7.7 is not applicable.

7.8 Durability

Shall be according to EN 13611:2007, 7.8 with the following modification:

EN 13611:2007, 7.8.1 is only applicable for elastomers in contact with combustible gas.

7.9 Performance tests for electronic controls

EN 13611:2007, 7.9 is not applicable.

7.10 Long-term performance for electronic controls

EN 13611:2007, 7.10, is not applicable.

7.101 Function of the device

7.101.1 PSD-M and PSD-S

7.101.1.1 General

The manufacturer shall declare the following:

— manufacturing deviation of set point(s) according to 7.101.1.2;

— drift of the set point(s) according to 7.101.1.3;

— hysteresis according to 7.101.1.4.

For measurement of switching pressures, the device is subjected three times to a rising and a falling pressure within 10 % of the switching pressure range.

For switching pressures below 1 000 Pa (10 mbar), test the PSD at a ramp rate of 2 Pa/s (0,02 mbar/s) to 4 Pa/s (0,04 mbar/s). For higher switching pressures, test the PSD at a ramp rate of 0,5 % of the switching pressure per second.

Adjustable devices shall be tested at the lowest set point.

Calculate the actual upper and lower switching pressures as the mean of the three measured values.

PSD-M and PSD-S shall comply with 7.101.1.2 to 7.101.1.4 after having been exposed to the withstand pressure for 1 min.

7.101.1.2 Deviation

7.101.1.2.1 Requirement

The deviation of the set point of devices shall be:

— ≤ ± 15 % for devices for combustible gases;

— ≤ as declared by the manufacturer for devices for air and combustion products.

7.101.1.2.2 Test

Test the device in accordance with 7.101.1.1. Calculate the deviation as the difference of declared set point and the average of the upper and lower switching pressures.

7.101.1.3 Drift

7.101.1.3.1 Requirement

The drift of the set point shall be within the following limits when tested in accordance with 7.101.1.3.2:

— ≤ ± 15 % for devices for combustible gases;

— ≤ as declared by the manufacturer for devices for air and combustion products.

7.101.1.3.2 Test

After subjecting the PSD-M and PSD-S devices to switching cycles in accordance with the endurance test in 7.101.3.1 followed by testing in accordance with 7.101.1.1, drift of the switching point is calculated from the values before and after the endurance test.

In addition, for PSD-S class, subject the device to a pressure of 1,3 times the maximum inlet pressure or the withstand pressure whichever is higher at the maximum ambient temperature for 100 cycles at the prescribed pressure ramp rate followed by testing in accordance with 7.101.1.1. The drift of the set point is calculated from the values before and after this test.

7.101.1.4 Hysteresis

7.101.1.4.1 Requirement

The hysteresis shall be ≤ 50 % of the upper switching pressure, before and after the endurance test of 7.101.3.1:

— for devices for combustible gases;

— for devices for air/combustion products (unless otherwise declared by the manufacturer).

7.101.1.4.2 Test

Test the device in accordance with 7.101.1.1. Calculate the hysteresis as the difference between the mean of the upper and lower switching pressures.

7.101.2 EPSD

7.101.2.1 General

7.101.2 is applicable for class B and C devices and, if declared by the manufacturer, also for class A EPSDs.

The following factors can have an influence on total accuracy of EPSDs, depending on the type of output of the EPSD, and shall be declared by the manufacturer:

— resolution, only applicable for EPSDs with digital signal processing;

— repeatability;

— hysteresis;

— drift;

— temperature sensitivity;

— linearity;

— transfer ratio;

— offset;

— supply voltage changes.

Total accuracy shall be declared by the manufacturer over the range from the minimum to the maximum inlet pressure.

The accuracy at a certain inlet pressure as declared by the manufacturer is calculated from above parameters by using the statistical square root method, as follows:

$$E = \left(\sqrt{E_R^2 + E_H^2 + E_D^2 + E_{Temp}^2 + E_L^2 + E_T^2 + E_O^2 + E_S^2} \right) \pm E_{\mathrm{Re}\,s} \quad (1)$$

where

E is the total accuracy;

E_{R} is the impact of the repeatability;

E_{H} is the impact of the hysteresis;

E_{D} is the impact of the drift;

E_{Temp} is the impact of the temperature sensitivity;

E_{L} is the impact of the linearity;

E_{T} is the impact of the transfer ratio;

E_{O} is the impact of the offset;

E_{S} is the impact of the supply voltage changes;

E_{Res} is the impact of the resolution.

The units as used in Equation (1) shall be consistent.

Annex AA shows a Table AA.1 to assist the manufacturer's declaration on accuracy.

In addition the manufacturer shall declare the response time.

EPSD shall comply with 7.101.2.2 to 7.101.2.11 after having been exposed to the withstand pressure for 1 min.

7.101.2.2 Resolution

If applicable, the manufacturer shall declare the resolution, with an explanation on which this is based.

7.101.2.3 Repeatability

7.101.2.3.1 Requirement

The repeatability, measured according to 7.101.2.3.2, shall be within the repeatability range as declared by the manufacturer.

7.101.2.3.2 Test

A repeatability test is performed at minimum, average and maximum inlet pressures of the declared pressure characteristic.

Connect the sensor to the test pressure and switch the pressure on/off three times. Measure the pressure value each time. The repeatability is calculated as the maximum difference between the measured values.

7.101.2.4 Hysteresis

7.101.2.4.1 Requirement

The hysteresis, measured according to 7.101.2.4.2, shall be within the hysteresis range as declared by the manufacturer.

7.101.2.4.2 Test

Measure the pressure characteristic of the EPSD from minimum inlet pressure to maximum inlet pressure and back to minimum inlet pressure three times. The hysteresis is the difference between the ascending and the descending line of the characteristic.

7.101.2.5 Drift

7.101.2.5.1 Requirement

The drift, being the maximum difference between the characteristics before and after the endurance test, is measured according to 7.101.2.5.2, shall be within the drift range as declared by the manufacturer.

7.101.2.5.2 Test

Measure the pressure characteristic of three devices before and after the endurance test of 7.101.3. Calculate from this the drift of each device.

7.101.2.6 Temperature sensitivity

7.101.2.6.1 Requirement

The temperature sensitivity, measured according to 7.101.2.6.2, shall be within the temperature sensitivity range as declared by the manufacturer.

7.101.2.6.2 Test

Measure the pressure characteristic of three devices under the following conditions:

— at 20 °C;

— at maximum temperature as declared by the manufacturer, but at least at 60 °C;

— at minimum temperature as declared by the manufacturer, but at least at 0 °C.

Calculate the temperature sensitivity, being the $\Delta P/K$.

7.101.2.7 Linearity

7.101.2.7.1 Requirement

The linearity, measured according to 7.101.2.7.2, shall be within the linearity range as declared by the manufacturer.

7.101.2.7.2 Test

Measure the pressure characteristic of the EPSD from minimum inlet pressure to maximum inlet pressure and back to minimum inlet pressure three times.

The linearity is the difference between the measured characteristic and the ideal straight line between minimum and maximum pressure reading.

7.101.2.8 Transfer ratio

7.101.2.8.1 Requirement

The transfer ratio $\Delta V/\Delta P$, measured according to 7.101.2.8.2, shall be within the range as declared by the manufacturer.

7.101.2.8.2 Test

Measure the pressure characteristic of the EPSD from minimum inlet pressure to maximum inlet pressure and back to minimum inlet pressure three times at nominal supply voltage. Determine for each characteristic the transfer ratio.

7.101.2.9 Offset

7.101.2.9.1 Requirement

The offset, measured according to 7.101.2.9.2, shall be within the offset range as declared by the manufacturer.

7.101.2.9.2 Test

Measure the pressure characteristic of the EPSD from minimum inlet pressure to maximum inlet pressure and back to minimum inlet pressure three times at nominal supply voltage before and after the endurance test of 7.101.3.2.

The offset is the difference between the measured characteristic and the ideal straight line between minimum and maximum pressure reading.

7.101.2.10 Supply voltage variations

7.101.2.10.1 Requirement

Changes in output signal due to supply voltage changes, measured according to 7.101.2.10.2, shall be within the specification as declared by the manufacturer.

7.101.2.10.2 Test

Measure the changes in output signal at minimum and maximum inlet pressure of three devices.

Measure the pressure characteristic of the EPSD from minimum inlet pressure to maximum inlet pressure and back to minimum inlet pressure three times at both minimum and maximum supply voltage.

The influence of the supply voltage on the output signal is the difference between the measured characteristic and the characteristic at nominal supply voltage.

7.101.2.11 Response time

7.101.2.11.1 Requirement

The response time, measured according to 7.101.2.11.2, shall be within the value(s) declared by the manufacturer.

7.101.2.11.2 Test

Measure the response times of three devices at minimum and maximum inlet pressures.

7.101.3 Endurance

7.101.3.1 PSD-M and PSD-S class

7.101.3.1.1 Requirement

After the endurance test devices shall comply with drift and hysteresis requirements of 7.101.1.3 and 7.101.1.4.

7.101.3.1.2 Test

Devices shall be tested according the conditions of Table 2.

Adjustable devices are tested at the lowest set point.

Table 2 — Number of cycles PSD-M and PSD-S

Conditions	Devices for	
	Combustible gas	**Air, combustion products and mixtures**
Test pressure	1,2 × maximum inlet pressure or withstand pressure whichever is higher	1,2 × maximum inlet pressure or withstand pressure whichever is higher
Operating rate (cycles/min)	As declared by the manufacturer	As declared by the manufacturer
Electrical load [a]	Maximum load as declared by the manufacturer	Maximum load as declared by the manufacturer
For automatic reset		
Test cycles at maximum declared ambient temperature	40 000 (2 000 000 cycles for PSD-S at 20 cycles/min)	200 000
Test cycles at minimum declared ambient temperature	10 000	50 000
For manual reset		
Maximum ambient *T*	2 500	2 500
Minimum ambient *T*	2 500	2 500

[a] Where the electrical switch conforms to EN 61058-1, no electrical loading is necessary during the endurance test, provided the switch testing characteristics according to EN 61058-1 and the operating criteria of the PSD are compatible.

After the endurance test the external leakage rate shall be in accordance with 7.2.

7.101.3.2 EPSD class

7.101.3.2.1 Requirement

After the endurance test EPSDs shall comply with the following requirements:

— accuracy requirements as declared in 7.101.2.2, 7.101.2.3, 7.101.2.4, 7.101.2.5, 7.101.2.6, 7.101.2.7, 7.101.2.8, 7.101.2.9, 7.101.2.10 shall be within specification;

— declared response time of 7.101.2.11.

After having verified the compliance with the requirements the EPSD shall be tested for external leakage in accordance with 7.2.

7.101.3.2.2 Test

EPSDs shall be tested according to the conditions of Table 3.

For test purposes, a cycle shall consist of variation of the output from lower than 10 % to higher than 90 % of the output signal and back to lower than 10 % of the output signal, by varying the test pressure as specified in Table 3.

Measure drift and offset before and after the test.

Table 3 — Number of cycles for EPSD

Conditions	Specifications
Test pressure	1,2 × maximum inlet pressure or withstand pressure whichever is higher
Operating rate (cycles/min)	As declared by the manufacturer
Test cycles at maximum declared ambient temperature	200 000
Test cycles at minimum declared ambient temperature	50 000

8 EMC/Electrical requirements

8.1 Protection against environmental influences

Shall be according to EN 13611:2007, 8.1 with the following modification and addition:

Modification:

EN 13611:2007, 8.1 is applicable for EPSD classified as class B or class C according to 4.3.

Addition:

EMC tests shall be subjected to the stand-alone EPSD or shall be performed as an EMC system test in case the EPSD is dedicated to a central unit and/or gas appliance. During the EMC system test the EPSD is fully connected to the central unit and / or fully operational in the gas appliance.

In case the manufacturer declares specific levels of supply voltage disturbances these shall be applied during the tests as described in 8.2 to 8.10.

For EPSDs assessment criterion I and assessment criterion II are defined as follows:

Assessment criterion I:

When tested at the severity levels given in 8.2 to 8.10 the EPSD shall:

— continue to operate in accordance with Clause 7.

Assessment criterion II:

When tested at the severity levels given in 8.2 to 8.10 the EPSD shall:

— continue to operate in accordance with Clause 7; or

— the output signal(s) of the EPSD shall represent the defined state(s) in accordance with 6.6.

8.2 Supply voltage variations below 85 % of rated voltage

Shall be according to EN 13611:2007, 8.2 with the following modification:

EN 13611:2007, 8.2 is applicable for EPSD classified as class B or class C according to 4.3.

8.3 Short term voltage interruptions and decreases

Shall be according to EN 13611:2007, 8.3 with the following modification:

EN 13611:2007, 8.3 is applicable for EPSD classified as class B or class C according to 4.3.

8.4 Supply frequency variations

Shall be according to EN 13611:2007, 8.4 with the following modification:

EN 13611:2007, 8.4 is applicable for EPSD classified as class B or class C according to 4.3.

8.5 Surge immunity test

Shall be according to EN 13611:2007, 8.5 with the following modification:

EN 13611:2007, 8.5 is applicable for EPSD classified as class B or class C according to 4.3.

8.6 Electrical fast transient/burst

Shall be according to EN 13611:2007, 8.6 with the following modification:

EN 13611:2007, 8.6 is applicable for EPSD classified as class B or class C according to 4.3.

8.7 Immunity to conducted disturbances

Shall be according to EN 13611:2007, 8.7 with the following modification:

EN 13611:2007, 8.7 is applicable for EPSD classified as class B or class C according to 4.3.

8.8 Immunity to radiated fields

Shall be according to EN 13611:2007, 8.8 with the following modification:

EN 13611:2007, 8.8 is applicable for EPSD classified as class B or class C according to 4.3.

8.9 Electrostatic discharge immunity test

Shall be according to EN 13611:2007, 8.9 with the following modification:

EN 13611:2007, 8.9 is applicable for EPSD classified as class B or class C according to 4.3.

8.10 Power frequency magnetic field immunity test

Shall be according to EN 13611:2007, 8.10 with the following modification:

EN 13611:2007, 8.10 is applicable for EPSD classified as class B or class C according to 4.3.

8.11 Electrical requirements

EN 13611:2007, 8.11 is replaced by the following:

Replace the text of 8.11 with 8.11.101 to 8.11.102.4.

8.11.101 General

Except where otherwise specified in this standard, devices shall conform to the requirements given in the following clauses and subclauses of EN 60730-2-6:2008:

8, 9, 10, 11.1, 11.2, 11.3, 11.7, 11.9, 11.10, 11.11, 12.2, 13, 14, 20, 21, 22, 24 and 28.

The tests are performed taking into consideration EN 60730-2-6:2008, Clause 4.

8.11.102 Electrical equipment

8.11.102.1 Contact with gas or gas mixtures

Combustible gas or gas mixtures shall not be ignited due to the contact with electrical components under normal condition as well as fault condition (based upon fault assessments) in which a second fault assessment to 6.6.4.3 is not considered.

8.11.102.2 Degree of protection

The degree of protection shall be declared by the manufacturer in accordance with EN 60529.

8.11.102.3 Switches

Switches shall conform to EN 61058-1. The number of operating cycles shall be in accordance with EN 61058-1:2002, Table 1.

8.11.102.4 Plug connections

Pressure switches supplied with an assembled electrical plug connector conforming to EN 175301-803 shall have connections to the following pins and to earth:

— Pin (e) earth contact;

— Pin 1 NC, normally closed;

— Pin 2 NO, normally open;

— Pin 3 COM, common.

9 Marking, installation and operating instructions

9.1 Marking

Shall be according to EN 13611:2007, 9.1 with the following modification:

The following information shall be durably marked on the device in a clearly visible position:

a) manufacturer and/or trade mark;

b) manufacturer's type reference;

c) maximum inlet pressure in pascals or kilopascals (millibars or bars);

d) withstand pressure in pascals or kilopascals (millibars or bars);

e) for devices for combustible gas use, the word "gas" shall be marked following the maximum inlet pressure;

f) year of manufacture (may be given in code);

g) identification of terminals, including earth contact;

h) nature of electrical supply and frequency;

i) rated voltage;

j) contact rating;

k) degree of protection if greater than IP40;

l) symbol of Class II construction for Class II devices;

m) symbol "S" for PSD-S types of PSDs.

9.2 Installation and operating instructions

EN 13611:2007, 9.2 is replaced by the following:

One set of instructions shall be supplied with each consignment, written in the language(s) of the country into which the devices will be delivered. They shall include all relevant information on use, installation, operation and servicing, in particular:

a) electrical data;

b) ambient temperature range;

c) mounting position(s);

d) maximum inlet pressure in pascals or kilopascals (millibars or bars);

e) withstand pressure in pascals or kilopascals (millibars or bars);

f) gas/air connections;

g) accuracy (7.101.2.1);

h) external filter specification (see 6.2.101);

i) class of control function (see 4.3);

j) maximum response time of the EPSD (see 7.101.2.11);

k) switching pressure (with tolerances) (see 7.101.1.1 and 7.101.1.2);

l) drift of the setpoint over lifetime (see 7.101.1.3);

m) fault reaction time (see 6.6.3.2 and 6.6.4.2);

n) defined states (see 6.6.3.2 and 6.6.4.2);

o) other items as required by EN 60730-2-6;

p) gases for which the PSD is suitable (combustible gas, air, combustion products).

9.3 Warning notice

Shall be according to EN 13611:2007, 9.3.

Annex A
(informative)

Gas connections in common use in the various countries

EN 13611:2007, Annex A is not applicable.

Annex B
(informative)

Leak-tightness test – volumetric method

Shall be according to EN 13611:2007, Annex B.

Annex C
(informative)

Leak-tightness test – pressure loss method

Shall be according to EN 13611:2007, Annex C.

Annex D
(informative)

Conversion of pressure loss into leakage rate

Shall be according to EN 13611:2007, Annex D.

Annex E
(normative)

Electrical/electronic component fault modes

Shall be according to EN 13611:2007, Annex E with the following modification:

The below modifications to EN 13611:2007, Table E.1 are applicable.

Table E.1 — Electrical/electronic component faults modes

Component type	Short	Open [a]	Remarks
Hybrid circuit	d, o	d	
Ceramic lever		x	p
Pressure sensors	x [q]	x [q]	
Fault modes resulting from the safety analysis in 6.5.1 are applicable.			

[a] Only opening of one pin at a time.

[d] Failure modes for individual components of the hybrid circuit are applicable as described for the individual components in this table.

[o] A short circuit of a trim cut performed on a thick film resistor may be excluded if the coating over the trim cut is in accordance with IEC 60730-1:2007, Clause 20 or if the thick film resistor is passivated with glass prior to the trim cut.

[p] A ceramic lever is considered having no hysteresis and no plastic deformation as a function of bending. If the mechanical stress exceeds the limit then the lever is breaking, resulting in open circuit.

[q] Failure modes of sensing elements and their assemblies as indicated below have to be examined for being applicable for fault assessment of the function:

- a sensing element does not respond to the actual pressure value as was to be expected (e.g. "stuck at");
- the pressure related sensing element characteristic changes in principle or by an offset;
- specific failure modes related to the sensing element technology.

Any failure mode shall not result in the simulation of a pressure that can cause a potential hazardous situation.

Annex F
(normative)

Additional requirements for safety accessories and pressure accessories as defined in EU Directive 97/23/EC

EN 13611:2007, Annex F is not applicable.

Annex G
(normative)

Materials for pressurized parts

EN 13611:2007, Annex G is not applicable.

Annex H
(informative)

Additional materials for pressurized parts

EN 13611:2007, Annex H is not applicable.

Annex I
(normative)

Requirements for controls used in DC supplied gas burners and gas burning appliances

Shall be according to EN 13611:2007, Annex I with the following modifications:

Annex I is applicable for the relevant requirements specified in 7.1, 7.101.2.10, 7.101.3.2 and Clause 8.

Annex AA
(informative)

Manufacturers declaration for EPSDs

Table AA.1 — Sensor measurement: Pressure

	Normal operation [a]	**Sensor influences, reversible**				**Sensor influences, non-reversible**			
Lower and upper limits									
		humidity	barometric pressure	temperature	auxiliary power supply	lifetime	lifecycles	temperature	end of life failure mode
Accuracy									
repeatability									
hysteresis									
drift									
transfer ratio									
linearity									
offset									
resolution									
Response time									
Sensor type, sensor technology and sensor range shall be specified. Clarifications to the above terms are given in Figure 7.									
[a] Operation within the specifications.									

Annex ZA
(informative)

Clauses of this European Standard addressing requirements or provisions of EU-Directives

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2009/142/EC relating to appliances burning gaseous fuels.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive (Directive 2009/142/EC relating to appliances burning gaseous fuels)

n/a = Not applicable

Essential Requirements (ERs) of Directive 2009/142/EC "Appliances burning gaseous fuels"		Clause(s)/sub-clause(s) of this EN
1	**GENERAL CONDITIONS**	n/a
1.1	Design and construction EMC compatibility (GADAC Guidance B2)	6, 7 8
1.2	Instructions and warning notices	n/a
1.2.1	Instructions installer	9.2
1.2.2	Instructions user	n/a
1.2.3	Warning notices	9.3
1.3	Correct operation	7
2	**MATERIAL**	n/a
2.1	Appropriate for their purpose	6.1, 6.3
2.2	Guarantee properties of the materials	Not relevant for EN
3	**DESIGN AND CONSTRUCTION**	n/a
3.1	General	n/a
3.1.1	Safety of construction	6
3.1.2	Condensation	n/a
3.1.3	Risk of explosion at event of external fire	6.1, 6.3
3.1.4	Water/air penetration in gas circuit	n/a
3.1.5	Normal fluctuation of auxiliary energy	8.4
3.1.6	Abnormal fluctuation of failure of auxiliary energy	8.2
3.1.7	Hazards of electrical origin	8

Table ZA.1 *(continued)*

n/a = Not applicable

Essential Requirements (ERs) of Directive 2009/142/EC "Appliances burning gaseous fuels"		Clause(s)/sub-clause(s) of this EN
3.1.8	Pressurized parts	n/a
3.1.9	Failure of devices	6.1, 6.6
3.1.10	Overruling safety devices	n/a
3.1.11	Adjustment protection	6.2.8
3.1.12	Prevention error in handling	n/a
3.2	Unburned gas release	n/a
3.2.1	Risk of gas leakage	7.2
3.2.2/ 3.2.3	Risk of gas accumulation	n/a
3.3	Ignition	n/a
3.4	Combustion	n/a
3.5	Rational use of energy	n/a
3.6	Temperatures	n/a
3.7	Foodstuffs and water used for sanitary purposes	n/a
Annex III	Data plate	9.1

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

Shall be according to EN 13611:2007, Bibliography.

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