ICS 23.060.40 SLOVENSKÁ TECHNICKÁ NORMA December 2021

STN	**Bezpečnostné a ovládacie zariadenia horákov a spotrebičov na plynné alebo kvapalné palivá Všeobecné požiadavky Oprava AC**	**STN EN 13611/AC** 06 1821

Safety and control devices for burners and appliances burning gaseous and/or liquid fuels - General requirements

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 11/21

Obsahuje: EN 13611:2019/AC:2021

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Úrad pre normalizáciu, metrológiu a skúšobníctvo Slovenskej republiky, 2021
Slovenská technická norma a technická normalizačná informácia je chránená zákonom č. 60/2018 Z. z. o technickej normalizácii.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 13611:2019/AC

September 2021

ICS 23.060.40

English version

Safety and control devices for burners and appliances burning gaseous and/or liquid fuels - General requirements

Équipements auxiliaires pour brûleurs et appareils utilisant des combustibles gazeux ou liquides - Exigences générales

Sicherheits- und Regeleinrichtungen für Brenner und Brennstoffgeräte für gasförmige und/oder flüssige Brennstoffe - Allgemeine Anforderungen

This corrigendum becomes effective on 1 September 2021 for incorporation in the official English version of the EN.

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

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Ref. No.:EN 13611:2019/AC:2021 E

EN 13611:2019/AC:2021 (E)

1 Modification to Table E.1, Electrical/electronic component faults modes

Replace the row for component type:

"

Transformers: According to EN 61558-2-6:2009 or EN 61558-2-16:2009 + A1:2013 All other types	x	x	

"

with:

"

Transformers:			
According to EN 61558-2-6:2009 or EN 61558-2-16:2009 + A1:2013		x	
All other types	x	x	

"

to read:

"

Component type	Short	Open[a]	Remarks
Fixed resistors:			
Thin film (wound filament)		x	Includes SMD type
Thick film (flat)		x	Includes SMD type
Wire-wound (single layer)		x	
All other types	x	x	
Variable resistors (e.g. potentiometer/trimmer):			
Wire-wound (single layer)		x	
All other types	x[b]	x	
Capacitors:			
X1 and Y types according to EN 60384-14:2013		x	
Metallized film according to EN 60384-16:2005		x	
All other types	x	x	
Inductors:			
Wire-wound (single layer)		x	
All other types	x	x	
Diodes:			
All types	x	x	
Transistors:			
All types (e.g. Bipolar: LF; RF; microwave; FET; Thyristor; Diac; Triac; Uni junction)	x[b]	x	c
Hybrid circuit	d	d	
Integrated circuits	x[e]	x	For IC outputs note[c] applies
Photocouplers	x[f]	x	
Relays:			
Coils	x	x	If the relay complies with EN 61810-1:2015 the failure mode short circuit need not be considered.
Contacts	x[g h o]	x	
Reed-relays	x	x	Contacts only

Component type	Short	Open[a]	Remarks
Electromechanical lock-out elements:			
Coils	x	x	
Contacts	x[p]	x	
Transformers: According to EN 61558-2-6:2009 or EN 61558-2-16:2009 + A1:2013 All other types	 x	 x x	
Crystals	x	x	i
Switches	x	x	j
Connections (jumper wire)		x	k
Cable, wiring and connectors		x	
Printed circuit board conductors	x[m]	x[l]	
Temperature sensors: All types (e.g. NTC, PTC, PT 100 and thermocouples)	 x[n]	 x[n]	

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

[b] Short circuit each pin in turn with every other pin; only two pins at a time.

[c] For discrete or integrated thyristor type devices such as triacs and SCRs, fault conditions shall include short circuit of any terminals with the third terminal open circuited. The effect of any full wave type component, such as a triac going into a half wave condition, either controlled or uncontrolled (thyristor or diode, respectively) shall be considered.

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

[e] The short circuit of any two adjacent terminals and the short circuiting of:

a) each terminal to the IC-supply, when applicable at the IC,

b) each terminal to the IC-ground, when applicable at the IC.

The number of tests implied for integrated circuits can normally make it impracticable to apply all the relevant fault conditions or to assess the likely hazards from an appraisal of the circuit diagram of the integrated circuit.

It is therefore permissible first to analyse in detail all the possible mechanical, thermal and electrical faults which can develop either in the control itself or its output, due to the malfunction of the electronic devices or other circuit components, separately or in any combination.

An analysis (e.g. a fault tree analysis) shall be conducted to include the results of multiple steady-state conditions to outputs and programmed bi-directional terminals for the purpose of identifying additional fault conditions for consideration. The failure mode “short circuit” is excluded between isolated sections for such ICs that have isolated sections. The isolation between the sections shall conform to the requirements of EN 60730-1:2016, 13.2 for operational insulation.

[f] When photocouplers conform to EN 60747-5-2:2001+A1:2002, Clause 8 “Photocouplers (optocouplers) providing protection against electrical shock”, and with the requirements for double or reinforced insulation of EN 60730-1:2016, Clause 20, short circuits between the input and output pins are not considered.

[g] The failure modes “short circuit” and “mechanical break-down” need not to be considered when the control– including the relay – successfully completed the long-term performance tests of 7.7 (under nominal load of relay contacts) and if the relay is successfully tested for 3 million cycles under no load condition in compliance with EN 60947-5-1:2004, C.2, and if special precautions have been taken to prevent welding of contacts, see 6.5.1. All of the following special precautions shall be fulfilled:

1. Measures to avoid welding:

1.1 Contacts closing on short-circuit:

Rating of the fuse: (IN) < 0,6 · (Ie).

NOTE 1 I_N: values for the fuse (see EN 60127-1:2006+A1:2011+A2:2015, 3.16).

I_e: rated operational current of the contact (see EN 60947-1:2007+A1:2011+A2:2014, 4.3.2.3).

NOTE 2 The manufacturer can declare that the relay is successfully tested for 3 million cycles under no load condition.

1.2 Lifetime/load cycle rating: proof that the contact does not weld after 1 000 000 cycles (fourfold safety) on max. rated contact load as stated in the instructions based on a test of 3 samples.

NOTE 3 The manufacturer can declare that the contact does not weld after 1 000 000 cycles (fourfold safety) on max. rated contact load as stated in the instructions.

2. Measures to avoid microwelding:

2.1 Proof that the permissible (maximum) capacitance loads have been part of the lifetime-test according to 1.2.

2.2 Proof that no mains-synchronous switching occurs, or the mains synchronous switching has not resulted in non-compliance with the lifetime test according to 1.2 (see also 7.7.1).

Spontaneous closing of a relay contact without energy is not considered, if the relay is designed for the mechanical stress and the rating of the relay is appropriate to avoid mechanical breakdown.

h If a fuse is used to protect against the hazard of relay contact welding either the fuse shall not be replaceable, or external measures shall be necessary to avoid un-authorized replacement. These measures shall be included in the instructions, see 10.2.

i For crystal based clocks, harmonic and sub-harmonic frequency variations affecting the timings should be considered.

j If switches are applied for the selection of declared safety times, programs and/or other safety related settings, these devices should function so that in the event of their opening, the safest possible condition arises (for example, the shortest safety time or the longest purge time).

k The requirements are the same as footnote j, except they are applied to jumper wires intended for clipping when selecting a setting.

l The open circuit failure mode, i.e. interruption of a conductor, is excluded if the thickness of the conductor is equal to or greater than 35 µm and the breadth of the conductor is equal to or greater than 0,3 mm or the conductor has an additional precaution against interruption, e.g. roll-tinned, etc. If a short circuit at the output terminals causes the opening of a printed circuit board conductor, that conductor shall be subject to an open circuit fault analysis.

m The short circuit failure mode is excluded if the requirements of EN 60730-1:2016, Clause 20 are fulfilled.

n Failure modes of sensing elements and their assemblies as indicated below shall be examined for being applicable for fault assessment of the function

— a sensing element does not respond to the actual temperature value as was to be expected (e.g. “stuck at”);

— the temperature 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 temperature that can cause a potential hazardous situation.

o If no measures to avoid contact welding according to g) are taken, the fault mode “short” shall be considered to occur both in the instance of closing of the contact and when the contact is already closed.

p 1) The electromechanical lock-out element shall withstand 60 000 cycles without load.

2) The contacts of the electromechanical lock-out element shall be protected against welding by a fuse dimensioned according to footnote g) 1.1.

3) The contacts of the electromechanical lock-out element shall withstand 20 000 cycles according to footnote g) 1.2.

4) Footnotes g) 2.1 and 2.2 shall be fulfilled accordingly.

5)	In the operating position the contacts of the electromechanical lock-out element shall withstand 1 000 000 cycles of maximum load current in the closed position without contact welding.
6)	All load conditions shall consider inductive and/or capacitive loads, “cos phi”.

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2 Modification to J.5.4.6.7.2, Complex architecture systems

Replace the current Formula (J.9):

"

$$PFH_{\mathrm{D}} = (1-\beta)^2 \cdot \lambda_{\mathrm{De1}} \cdot \lambda_{\mathrm{De2}} \cdot T_1 \cdot \beta \cdot \frac{(\lambda_{\mathrm{De1}} + \lambda_{\mathrm{De2}})}{2} \quad \text{(J.9)}$$

" *with the following corrected Formula (J.9):* "

$$PFH_{\mathrm{D}} = (1-\beta)^2 \cdot \lambda_{\mathrm{De1}} \cdot \lambda_{\mathrm{De2}} \cdot T_1 + \beta \cdot \frac{(\lambda_{\mathrm{De1}} + \lambda_{\mathrm{De2}})}{2} \quad \text{(J.9)}$$

".