SLOVENSKI STANDARD
SIST EN 230:2006

01-januar-2006

Nadomeģļ a:
SIST EN 230:2000
SIST EN 230:2000/AC:2000

Sistemi za avtomatski nadzor za oljne gorilnike

Automatic burner control systems for oil burners

Feuerungsautomaten für Ölbrenner

Systemes automatiques de commande et de sécurité pour bruleurs a fioul

Ta slovenski standard je istoveten z: **EN 230:2005**

ICS:

27.060.10	Gorilniki na tekoļ e in trdo gorivo	Liquid and solid fuel burners

SIST EN 230:2006 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 230

June 2005

ICS 27.060.10

Supersedes EN 230:1990

English version

Automatic burner control systems for oil burners

Systèmes automatiques de commande et de sècurité pour brûleurs à fioul

Feuerungsautomaten für Ölbrenner

This European Standard was approved by CEN on 14 February 2005.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 230:2005: E

Contents

Page

Foreword

This document (EN 230:2005) has been prepared by Technical Committee CEN/TC 47 “Atomizing oil burners and their components-Function-safety-testing”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by December 2005, and conflicting national standards shall be withdrawn at the latest by June 2008.

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 230:1990.

According to edition 1990 the following fundamental changes are carried out:

— protection against environmental influences;

— additional requirements for complex electronics.

— the structure and wherever possible the definitions and requirements are taken over from EN 298:2003-09.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Whilst this document is written primarily for Automatic Oil Burner Control Systems used on or in appliance for cooking, heating, hot water production, refrigeration, lighting or washing and having, where applicable, a normal water temperature not exceeding 105 °C, it may be usefully quoted, as a whole or in part, by standards for other equipment.

The functional characteristics of the automatic burner control systems, programming units, and their associated flame detector devices, in so far as they are not laid down in this document, are given by the standards for the appliances for which the automatic burner control systems are intended.

This document deals with immunity aspects of Electromagnetic Compatibility (EMC) only. Since automatic burner control systems are intended for use as an integrated or incorporated part of an appliance, further EMC tests (both immunity and emission) may be required for the intended use.

1 Scope

This document specifies the requirements, operating conditions and test methods for burner control systems for automatic and semi-automatic oil burners with or without fans.

It also applies to dual fuel burners, for use with either oil or gaseous fuels, when operating on oil.

This document covers type testing only.

This document also applies to automatic burner control systems, programming units or flame detector devices that include additional functions.

Automatic burner control systems utilising thermo-electric flame supervision devices are not covered by this document.

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 267:1999, *Forced draught oil burners – Definitions, requirements, testing, marking*

EN 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal) (IEC 60068-2 6:1995 + Corrigendum 1995)*

EN 60127-1:1991, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links (IEC 60127-1:1988)*

EN 60335-1:2002, *Household and similar electrical appliances – Safety – Part 1: General requirements (IEC 60335-1:2001, modified)*

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

EN 60730-1:2000, *Automatic electrical controls for household and similar use – Part 1: General requirements (IEC 60730-1:1999, modified)*

EN 60730-2-5:2002, *Automatic electrical controls for household and similar use – Part 2-5: Particular requirements for automatic electrical burner control systems (IEC 60730-2-5:2000, modified)*

EN 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4: Testing and measuring techniques – Section 2: Electrostatic discharge immunity test – Basic EMC publication (IEC 61000-4-2:1995)*

EN 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2002)*

EN 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test (IEC 61000-4-4:1995)*

EN 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 5: Surge immunity test (IEC 61000-4-5:1995)*

EN 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6:1996)*

EN 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 11: Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11:2004).*

EN 61558-2-6:1997, *Safety of power transformers, power supply units and similar – Part 2-6: Particular requirements for safety isolating transformers for general use (IEC 61558-2-6:1997)*

EN 61558-2-17:1997, *Safety of power transformers, power supply units and similar — Part 2-17: Particular requirements for transformers for switch mode power supplies (IEC 61558-2-17:1997)*

IEC 60384-14, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification: Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

IEC 60384-16, *Fixed capacitors for use in electronic equipment – Part 16: Sectional specification: Fixed metallized polypropylene film dielectric d. c. capacitors*

ISO 7637-1:2002, *Road vehicles – Electrical disturbances from conduction and coupling – Part 1: Definitions and general considerations*

ISO 7637-2:1990, *Road vehicles – Electrical disturbance by conduction and coupling – Part 2: Electrical transient conduction along supply lines only*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
flame detector device
device by which the presence of a flame is detected and signalled;

it can consist of a flame sensor, an amplifier and a relay for signal transmission. These parts, with the possible exception of the actual flame sensor, can be assembled in a single housing for use in conjunction with a programming unit

[EN 298:2003, term 3.1]

3.2
flame sensor
actual flame-sensing element, the output signal or value of which is used as the input for the flame detector amplifier

[EN 298:2003, term 3.2]

3.3
sensed flame and flame signal

3.3.1
sensed flame
physical value monitored by the flame sensor

[EN 298:2003, term 3.3.1]

3.3.2
flame signal
signal given by the flame detector device in case of sensed flame

[EN 298:2003, term 3.3.2]

3.4
flame simulation
condition which occurs when the flame signal indicates the presence of a flame when in reality no flame is present

[EN 298:2003, term 3.4]

3.5
programming unit
unit which reacts to signals from control and safety devices, gives control commands, controls the start-up sequence, supervises the burner operation and causes controlled shut-down, and if necessary safety shut-down and lock-out;

the programming unit follows a predetermined sequence of actions and always operates in conjunction with a flame detector device

[EN 298:2003, term 3.5]

3.6
automatic burner control system
system comprising at least a programming unit and all the elements of a flame detector device;

the various functions of an automatic burner control system may be in one or more housings

[EN 298:2003, term 3.6]

3.7
start position
stage, where the system is not in lock-out position, has not yet received the start signal but can proceed with the start-up sequence when required;

at this stage, the output terminals for any automatic shut-off valve and ignition device are not energised

[EN 298:2003, term 3.7]

3.8
start signal
signal e.g. from a regulating device, which releases the system from its start position and commences the predetermined programme

[EN 298:2003, term 3.8]

3.9
burner ignition systems

3.9.1
automatic electrical ignition
system in which the fuel is ignited using only electrical energy

3.9.1.1
ignition by controlled spark
system which allows the fuel to be released only when the presence of the ignition spark has been proven

3.9.1.2
ignition by non controlled spark
system in which the ignition spark is not proven

3.9.2
automatic ignition with liquid or gaseous fuel
system by which the fuel is ignited by a pilot burner using liquid or gaseous fuel; the operation of the pilot burner may be either interrupted or intermittent.

Interrupted pilot burners may be operated manually.

Intermittent pilot or first stage burners are operated automatically

3.9.2.1
ignition by controlled pilot burner
system which release the main fuel when the ignition burner flame is present

3.9.2.2
ignition by non-controlled pilot burner
system in which the release of the main fuel is not prevented by the absence of the flame of the pilot burner

3.10
start-up sequence
sequence of actions executed by the system which brings the burner from the start position to the running position

[EN 298:2003, term 3.22.1]

3.11
programme
sequence of control operations determined by the programming unit involving switching on, starting up, supervising and switching off the burner (see diagrams in Annex D)

3.12
waiting time
for burners without fans, this is the interval between the start signal being given and the energization of the ignition device. During this time natural ventilation of the combustion chamber and the flue passages may take place

3.13
purge time
period during which the combustion chamber is compulsorily ventilated without any fuel being supplied

3.13.1
pre-purge time
period preceding the signal to open the fuel valve during which the combustion chamber is compulsorily ventilated

3.13.2
post-purge time
period following the signal to close the fuel valve during which the combustion chamber is compulsorily ventilated

3.14
ignition

3.14.1
total ignition time
period during which the ignition device is in operation. Pre-ignition, actual ignition and post-ignition times make up the total ignition time

3.14.2
pre-ignition time
period between the start of the ignition cycle and the signal to open the valve

3.14.3
ignition time
period between the signal to open the valve and the first indication of the flame signal

3.14.4
post-ignition time
period between the first indication of the flame signal and the shut-off signal to the ignition device

3.15
safety time
duration of the maximum permissible time during which the burner control unit gives the signal to open the fuel valve without there being a flame signal

3.15.1.
first safety time
time starting from the signal for release of the fuel and terminating at the moment at which the signal for interrupting the fuel supply is given

NOTE Where there is no second safety time, this is called the safety time.

3.15.2
second safety time
where there is a first safety time applicable to either a pilot or start flame only, the second safety time is the interval between the main valve being energised and the main valve being de-energised if the flame detector signals the absence of a flame

3.15.3
safety time during operation
time starting at the moment the sensed flame is extinguished and ending at the moment the signal for interrupting the fuel supply is given

3.16
pilot or start flame proving period
interval between the end of the first safety time and the beginning of the second safety time which is used to prove that the pilot or start flame is stable

[EN 298:2003, term 3.28]

3.17
intermittent first stage
first stage that is ignited prior to ignition of the main flame and is shut off simultaneously with it

[EN 298:2003, term 3.29]

3.18
interrupted first stage
first stage that is ignited each time the burner is started up and which is extinguished at the end of the second safety time

3.19
running position of the system
position of the system in which the burner is in normal operation under the supervision of the programming unit and its flame detector device

[EN 298:2003, term 3.15]

3.20
controlled shut-down
process by which the power to the shut-off valve(s) is removed before any other action takes place, e.g. as a result of the action of a controlling function

3.21
safety shut-down
process which is effected immediately following the response of a protection device or the detection of a fault in the automatic burner control system and which prevents the burner from going into operation or puts the burner out of operation. The resulting state of the system is defined by deactivated terminals for the shut-off valves and the ignition

3.22
lock-out

3.22.1
non-volatile lock-out
safety shut-down condition of the system, such that a restart can only be accomplished by a manual reset of the system and by no other means

[EN 298:2003, term 3.18.1]

3.22.2
volatile lock-out
safety shut-down condition of the system, such that a restart can only be accomplished by either the manual reset of the system, or an interruption of the main power and its subsequent restoration

[EN 298:2003, term 3.18.2]

3.23
ignition-restoration
process by which, following loss of flame signal, the ignition device will be switched on again without total interruption of the fuel supply

3.24
recycling
process by which, after a safety shut-down, a full start-up sequence is automatically repeated

[EN 298:2003, term 3.20]

3.25
operation systems

3.25.1
systems for non-permanent operation
systems that are designed to remain in the running position for less than 24 h

[EN 298:2003, term 3.24]

3.25.2
systems for permanent operation
systems that are designed to remain in the running position for longer than 24 h without interruption

[EN 298:2003, term 3.23]

3.26
self-checking function of the system and the flame detector
automatic internal function of the device which checks the operation of the system and the flame detector

3.27
burner without fan
burner where the primary air required for combustion is provided by the action of the fuel and the secondary air is freely available from the surroundings

3.28
burner with fan
burner in which some or all of the air required for the combustion is supplied by means of a fan (i.e. forced draught or induced draught)

[EN 298:2003, term 3.14]

3.29
maximum throughput
mass of fuel consumed during one hour at the highest throughput stated by the manufacturer

Unit: kg/h

[EN 267:1999, term 3.2.1.1]

4 Classification

To assist with the specification of systems with regard to particular applications, the codes according to Table 1 shall be used.

The letter O shall be used for any character that is not relevant.

Table 1 — Classification codes

character	specification	code
1st character	denotes as:	
	forced draught	F
	natural draught	A
	both	B
2nd character	denotes method of ignition:	
	interrupted pilot	I
	intermittent pilot or first stage	T
	direct main burner ignition at full rate	M
3rd character	denoted first action following flame failure:	
	non-volatile lock-out	L
	volatile lock-out	V
	recycling	C
	ignition restoration	R
4th character	denotes type of final action:	
	non-volatile lock-out	L
	volatile lock out	V
	ignition restoration	R
5th character	denotes:	
	fixed times	X
	adjustable times	J
	both	B
6th character	denotes:	
	self-check as required in 7.5.6	K
	non-self-check	N
	both	B
7th character	"S" denotes: a device with a special system deviating from the specification of this document	
	"WLE" denotes: a device suitable for an application combined with air-heaters (see 7.1; 7.8).	
NOTE Other required specification data are given in Clause 11.		

5 Normal conditions for testing and measurement tolerances

All the tests shall be carried out under normal conditions unless otherwise specified. The normal conditions are:

— rated voltage or rated voltage range;

— rated frequency;

— ambient temperature of (20 ± 5) °C.

The error of measurement shall not exceed:

— for time measurements: ± 0,1 s;

— for temperature measurements: ± 1 K;

— for supply frequency measurements: ± 0,1 Hz;

— for electrical supply measurements: ± 0,5 %.

All measurements shall be made after stable temperature conditions have been achieved.

The tests shall be carried out in the mounting position specified by the manufacturer.

When several mounting positions are specified, the tests shall be carried out with the system installed in the least favourable position.

6 Constructional requirements

6.1 General

The quality of the materials, the design and the structure of the components used shall be such that the automatic burner control systems and flame detector devices will operate safely and in accordance with the requirements of this document – for a reasonable period of time (service life) under the normally expected mechanical, chemical, thermal and environmental conditions, even in the event of such carelessness as may occur in normal use, provided that the manufacturer's instructions for installation, adjustment, operation and maintenance are complied with. Compliance is checked by carrying out the tests specified in this document.

The system shall be designed such that changes in critical circuit component values (such as those affecting timing or sequence) within the component manufacturer's declared worst case tolerances, including the long term stability, shall result in the system continuing to function in accordance with this document. Compliance shall be checked by worst case analysis.

The construction of any additional functions included in the automatic burner control system, programming unit or flame detector for which no provisions exist in this document, shall be such that they do not degrade the safe and correct operation of the automatic burner control system, programming unit or flame detector.

The system shall include at least two operating elements to directly de-energise the safety relevant oil valve terminals.

NOTE A single relay switching two independent contacts is considered to be only one operating element.