

ANSI Z21.20-2007
CSA C22.2 No. 199-2007

American National Standard/
CSA Standard For
**Automatic Electrical Controls for
Household and Similar Use Part 2:
Particular Requirements for
Automatic Burner Ignition
Systems and Components**

AMERICAN NATIONAL STANDARD
CSA STANDARD

ANSI Z21.20-2007
CSA C22.2 No. 199-2007

First Edition - 2007

Automatic Electrical Controls for Household and Similar Use Part 2:
Particular Requirements for Automatic Burner
Ignition Systems and Components

This Standard is based on
the Standards for

Automatic Gas Ignition
Systems and Components
ANSI Z21.20-2000
Z21.20a-2000
Z21.20b-2001

Automatic Gas Ignition
Systems and Components
CAN1 6.4-M79 (R2001)
Combination Safety Controls and
Solid-State Igniters for Gas and
Oil-Burning Equipment
CAN/CSA C22.2 No. 199-M89
CAN/CSA E60730-1/-003E

UL 60730-1A-2002
(IEC 60730-1)
(IEC 60730-2-5)



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**Underwriters Laboratories Inc.
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Sixth Edition**

**Automatic Electrical Controls for Household
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***American National Standards Institute, Inc.
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10036***

Preface

This ANSI Standard, *ANSI Z21.20, Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Burner Ignition Systems and Components*, is to be used in conjunction with the third edition of UL 60730-1A. The requirements for burner ignition systems and components are contained in this Part 2 Standard and UL 60730-1A.

This CSA Standard, *CSA C22.2 No. 199, Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Burner Ignition Systems and Components*, is to be used in conjunction with CAN/CSA-E60730-1. The requirements for burner ignition systems and components are contained in this Part 2 Standard and CAN/CSA-E60730-1.

This UL Standard, *UL 372, Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Burner Ignition Systems and Components*, is to be used in conjunction with the third edition of UL 60730-1A. The requirements for burner ignition systems and components are contained in this Part 2 Standard and UL 60730-1A.

Requirements of this Part 2 Standard supplement or modify the requirements of UL 60730-1A and CAN/CSA-E60730-1.

Where a particular subclause of UL 60730-1A and CAN/CSA-E60730-1 is not mentioned in this Part 2 Standard, that subclause applies as far as reasonable.

NOTE: The following numbering system is used:

- Subclauses that are numbered starting with 101 are additional to those in Part 1.
- Those provisions throughout this publication which include uppercase "A," "B," or "C" in the numbering system are coverage included in the proposed harmonized standard which was added from ANSI Z21.20, UL 372 or UL 8730.

The text, figures and tables of IEC publication *Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Burner Ignition Systems and Components, IEC 60730-2-5*, copyright 2000, are used in this Standard with consent of the IEC and the American National Standards Institute (ANSI). The IEC copyrighted material has been reproduced with permission from ANSI. ANSI should be contacted regarding the reproduction of any portion of the IEC material. Copies of IEC Publication 60730-2-5 may be purchased from ANSI, 25 West 43rd Street, New York, New York, 10036, (212) 642-4900.

This is a common CSA America, Inc., CSA and UL *Standard for Automatic Electrical Controls for Household and Similar Use – Part 2: Particular Requirements for Burner Ignition Systems and Components, ANSI Z21.20/CSA C22.2 No. 199/UL 372*. It is the fifteenth edition of ANSI Z21.20, the third edition of CSA C22.2 No. 199, and the sixth edition of UL 372. This edition of ANSI Z21.20 supersedes the previous edition published in 2005. This edition of CSA C22.2 No. 199 supersedes the previous edition published in 1989. This edition of UL 372 supersedes the previous edition published in 1994.

Although CSA and UL standards contain identical requirements, and identical publication dates, the presentation and format of the standards material may differ between the two published standards.

This Common Standard was prepared by CSA America, Inc., CSA and Underwriters Laboratories (UL).

This Standard is considered suitable for use for conformity assessment within the stated scope of the Standard.

NOTE: Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.

Level of harmonization

This standard is based on IEC 60730-2-5:2000 and its sections and annexes are numbered similarly to that IEC standard but it shall not be considered as equivalent to this IEC Standard. Therefore, while it is based on that IEC Standard, it is not an adoption of it.

This Standard is published as an equivalent standard for CSA America, Inc., CSA and UL. An equivalent standard is a standard that is the same in technical content, except as follows. Technical national differences are allowed for national differences resulting in conflicts with codes and government regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climactic, geographical, technological, or infrastructure factors, scientific justification, or the level of protection that the country considers appropriate. Presentation is word for word except for editorial changes.

Interpretations

The interpretation by the standards development organization of an equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

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As of July 31, 2012, all products Listed or Recognized by UL must comply with the requirements in this Standard.

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EFFECTIVE DATE: An organization using this standard for product evaluation as a part of its certification program will normally establish the date by which all products certified by that organization should comply with this standard. In Canada the Standards Committee and the Interprovincial Gas Advisory Council normally stipulate an effective date for the standard.

History of the Development of the Standard for Automatic Electrical Controls for Household and Similar Use Part 2: Particular Requirements for Automatic Burner Ignition Systems and Components

(This History is informative and is not part of the standard.)

With the onset of the Free Trade Agreement between the United States and Canada on January 2, 1989, significant attention was given to the harmonization of the United States and Canadian safety standards, addressing gas-fired equipment for residential, commercial and industrial equipment.

It was believed that the elimination of the differences between the standards would promote potential trade barriers and provide an atmosphere in which North American manufacturers could market more freely in the United States and Canada. The harmonization of these standards was also seen as a preliminary step toward harmonization with international standards, which was to become a necessity as Europe moved toward its goal to form the Economic Community (EC) by the early 1990's.

With the formation of joint subcommittees, a Canadian Gas Association Standards Steering Committee on Gas Burning Appliances and Related Accessories was established and parallel Accredited Standards Committees Z21 and Z83, and to support the formation of joint subcommittees. Operating procedures, in accordance with American National Standards Institute procedures for joint subcommittees were developed and subsequently approved by ANSI on April 1, 1992.

At its August 1993 meeting, the Z21/CGA Joint Thermostat and Automatic Gas Ignition Systems Subcommittee established a working group to develop a proposal for the joint subcommittee to harmonize the U.S./Canadian standards with the IEC 730 series of standards to address ignition systems.

At its April 1994 meeting, the Ignition Harmonization Working Group agreed to recommend that the working group develop a single volume standard for ignition systems and components using *IEC 730-2-5, Automatic Electrical Controls for Household and Similar Use, Part 2: Particular Requirements for Automatic Electrical Burner Control Systems*, as the base document. The working group recommended that the single standard for ignition systems and components would incorporate coverage as necessary from *ANSI Z21.20, American National Standard for Automatic Gas Ignition Systems as Components, CAN/CSA-C22.2 No. 199, National Standard of Canada for Combustion Safety Controls and Solid-State Igniters for Gas- and Oil-Burning Equipment*, and *UL 372, Standard for Safety, Primary Safety Controls for Gas- and Oil-Fired Appliances*.

At its July 1994 meeting, the Z21/CGA Joint Thermostat and Automatic Gas Ignition Systems Subcommittee requested its Ignition Harmonization Working Group to proceed with its recommendation and develop a single volume harmonized standard for automatic ignition systems and components for gas- and oil-fired equipment.

The Ignition Harmonization Working Group met on numerous occasions to develop the single volume harmonized standard for automatic ignition systems and components for gas- and oil-fired equipment.

At its November 1998 meeting, the Joint Automatic Gas Control Subcommittee adopted the recommended single volume harmonized standard for automatic ignition systems and components for gas- and oil-fired equipment for distribution for review and comment.

At its September 2000 meeting, the Joint Automatic Gas Control Subcommittee requested the Ignition Harmonization Working Group to develop a Part 2 standard for automatic ignition systems and components for gas- and oil-fired equipment. The joint subcommittee requested that the Part 2 standard use *UL 60730-1, Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements* as the Part 1 standard in the U.S. and *CSA E60730-1, Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements* as the Part 1 standard in Canada.

At its November 2001 meeting, the Joint Automatic Gas Control Subcommittee adopted the recommended standard for *Particular Requirements for Automatic Burner Ignition Systems and Components, Part 2*, for distribution for review and comment. The draft Part 2 standard was distributed for review and comment during July 2002. At its October 2002 meeting, the draft Part 2 standard was reconsidered and revised in light of comments received and the draft standard was recommended to the Z21/83 Committee and the CSA Technical Committee for consideration.

The first edition of the harmonized *Z21/CSA/UL Standard for Automatic Electrical Controls for Household and Similar Use Part 2: Particular Requirements for Automatic Burner Ignition Systems and Components*, was approved by the American National Standards Institute, Inc. on May 14, 2007 and by the Interprovincial Gas Advisory Council on March 7, 2007.

The following identifies the designation and year of the harmonized standard:

ANSI Z21.20-2007 • CSA C22.2 No. 199-2007 • UL 372-2007

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Contents

	Page
1	Scope And Normative References 1
2	Definitions 5
3	General Requirements 15
4	General Notes On Tests 15
5	Rating..... 17
6	Classification..... 17
7	Information 20
8	Protection Against The Risk Of Electric Shock 27
9	Provisions For Bonding And Earthing 29
10	Terminals And Terminations 32
11	Constructional Requirements 35
12	Moisture Resistance 43
13	Electric Strength And Insulation Resistance 44
14	Heating 46
15	Manufacturer Deviation And Drift 51
16	Environmental Stresses (Not Applicable) 53
17	Endurance 53
18	Mechanical Strength 60
19	Threaded Parts And Connections 62
20	Creepage Distances, Clearances And Distances Through Insulation 63
21	Resistance To Heat, Fire And Tracking 72
22	Resistance To Corrosion 72
23	Radio Interference Protection (Not Applicable). 72
24	Components 72
25	Normal Operation (Not Applicable)..... 74
26	Electromagnetic Compatibility (EMC) Requirements - Immunity (Not Applicable) 74
27	Abnormal Operation..... 74
28	Guidelines For Use Of Electronic Disconnection (Not Applicable) 74
29A	Construction/Performance For Pilot Burners, Oxygen Depletion Safety Shutoff Systems (ODS) And Other Components 74
30A	Manufacturing And Production Tests 84
Annex A	Indelibility Of Markings..... 89
Annex H	Requirements For Electronic Systems And Components 91
Annex AA	Failure Modes Of Electrical/Electronic Components..... 107
Annex CC	Additional Markings For Independently Mounted Controls 109
Annex DD	Coverage For Solid-State Oil Igniters..... 112
Annex EE	Markings - French Translation 114
Appendix A	Alphabetical Index To Definitions 117
Appendix B	Failure Modes And Effects Analys 121
List of Harmonized Standards.....	121

NOTE

This standard contains SI (Metric) equivalents to the yard/pound quantities, the purpose being to allow the standard to be used in SI (Metric) units. (IEEE/ASTM-SI-10 or CAN/CSA Z234.1 are used as a guide in making metric conversion from yard/pound quantities.) If a value for a measurement and an equivalent value in other units, the first stated is to be regarded as the requirement. The given equivalent value may be approximate. If a value for a measurement and an equivalent value in other units, are both specified as a quoted marking requirement, the first stated unit, or both shall be provided.

Particular Requirements For Automatic Burner Ignition Systems And Components

1 Scope And Normative References

This clause of Part 1 is applicable except as follows:

1.1 Replacement:

This standard modifies or amends the requirements of the Part 1 standard. In Canada the Part 1 standard applicable is *CAN/CSA E60730-1, Automatic Electrical Controls for Household and Similar Use - Part 1: General Requirements*, and in the U.S. the Part 1 standard applicable is *UL 60730-1A, Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, 3rd edition*.

This standard applies to newly produced automatic burner ignition systems and system components constructed entirely of new, unused parts and materials for the automatic control of burners for one or more of the following fuels:

- Oil;
- Natural gas;
- Manufactured gas;
- Mixed gas;
- Liquefied petroleum gas; or
- LP gas-air mixtures.

This standard is applicable to a complete burner ignition system, a separate programming unit, an oxygen depletion safety shutoff system and components that perform one or more of the following functions:

- a. Ignite the fuel at the main burner(s), or at the pilot burner(s) so it can ignite the main burner(s);
- b. Prove the presence of either the ignition source, the main burner flame, or both;
- c. Automatically act to shut off the fuel supply to the main burner(s), or to the pilot and main burner(s), when the supervised flame or ignition source is not proved; and
- d. Automatically act to shut off the gas supply to the pilot and main burner(s), when the oxygen content of the room in which the equipment is installed is reduced below a predetermined level.

Components can be, but are not limited to: automatic controls; pilot burners, thermoelectric devices, electrodes, ignition devices, ignition sources and flame detectors.

Throughout this standard the following terms shall be abbreviated as shown below:

1. "system" means "burner ignition system."
2. "component" means "burner ignition system component."
3. "control" means "system" or "component."

Requirements for separate ignition transformers are covered in the Standard for Specialty Transformers, UL 506 and Transformers for Luminous-Tube signs, Oil and Gas Burner Ignition Equipment, Cold-Cathode Interior Lighting, CSA C22.2 No. 13.

1.1.1 Replacement:

This standard applies to inherent safety; to the manufacturer's declared operating values, operating times and operating sequences where such are associated with burner safety and to the testing of systems and components used in, on, or in association with burners.

Requirements for specific operating values, operating times, and operating sequences are given in the standards for appliances and equipment.

1.1.2 Replacement:

This standard applies to manual controls when such are electrically and/or mechanically integral with automatic systems.

1.1.3 Not Applicable.

1.1.4 Not Applicable.

1.1.5A Addition:

Each component of an automatic burner ignition system shall be capable of operation throughout an ambient temperature range of 32°F (0°C) to 125°F (51.5°C). The manufacturer is allowed to specify temperatures below 32°F (0°C) and above 125°F (51.5°C).

- a) for gas fired equipment rated 400,000 Btu/hr (117 228 W) or less, T_{min} and T_{max} are as specified in 1.1.5A; and
- b) for burner controls for all other equipment, T_{max} declared at less than 150°F (65.5°C) shall be tested at 150°F (65.5°C) or higher as specified by the manufacturer.

1.3 Not Applicable

1.3A Addition:

Compliance with this Part 2 standard does not imply that such a control is acceptable for use on fuel burning appliances or equipment without supplemental test with the device(s) applied to the particular appliance or equipment design.

1.3A.1 Addition:

All specifications as to construction set forth herein may be satisfied by the construction actually prescribed or such other construction as will provide at least equivalent performance. (Relocated from 3 General requirements.)

1.3A.2 Addition:

If a value for measurement as given in this standard is followed by an equivalent value in other units, the first stated value is to be regarded as the specification.

1.4 Replacement:

This standard applies also to controls incorporating electronic devices, requirements for which are contained in Annex H, Requirements for Electronic Systems and Components.

1.5 Normative references

Addition:

The following normative reference documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ANSI/ASME B1.20.1-1983 (R1992), Pipe Threads, General Purpose (Inch)

ANSI Z21.21-2005 • CSA 6.5-2005, Automatic Valves for Gas Appliances

ANSI Z21.78-2005 • CSA 6.20-2005, Combination Gas Controls for Gas Appliances

ANSI Z223.1/NFPA 54-2006, National Fuel Gas Code

CAN-B140.2.1-M90 (R2000), Oil Burners; Automizing Type

CAN/CSA E384-14-1-95 (R2004), Fixed Capacitors in Electronic Equipment - Part 14: Sectional Detail Specification: Fixed Capacitors for Electromagnetic Interference Suppression and Connection to the Supply Mains

CAN/CSA E60730-1-02, Automatic Electrical Controls for Household and Similar Use - Part 1: General Requirements

CSA B149.1-05, Natural Gas and Propane Installation Code

CSA C22.1-06, Canadian Electrical Code, Part 1

CSA C22.2 No. 0.15-01, Adhesive Labels

CAN/CSA C22.2 No. 0.17-00 (R2004), Evaluation of Properties of Polymeric Materials

CSA C22.2 No. 3-M1988 (R2004), Electrical Features of Fuel Burning Equipment