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Motors with Inherent Overheating Protection

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Preface

This is the seventh edition of CSA Standard C22.2 No. 77, *Motors with Inherent Overheating Protection*, part of a series of Standards issued by the Canadian Standards Association under *Part II* of the *Canadian Electrical Code*. It supersedes the previous editions published in 1942, 1957, 1970, 1972, 1976, and 1988.

Major changes included in this edition are as follows:

(a) old Clauses 6.4.2 and 6.4.7 are deleted;
(b) one-shot protectors are now referred to by the more correct term, thermal cutoffs;
(c) numerous changes required to harmonize with UL Standards 519 and 547 are incorporated, including new Clauses 1.4, 4.3, 4.4, 5.1.8, and 5.9;
(d) Clause 4.1.5 covering protectors connected in an external control circuit is new;
(e) test voltage is specified in Clause 5.2.1 and new Table 6, which replace old Clause 6.2.1;
(f) Clause 5.4.5 is rearranged for clarity. As well, Classes F and H are added to Clause 5.4.5.2, and Clause 5.4.5.3 is new;
(g) Clause 5.6.1 is revised adding pass/fail criteria and the recommendation that a visual indicator be employed to show if the 3 A fuse opens;
(h) Clause 6 is revised in several locations;
(i) the Note to Table 2 is revised to clarify the calculation of average temperature;
(j) single-operation protectors are included; and
(k) numerous other editorial improvements are incorporated.

For general information on the Standards of the *Canadian Electrical Code, Part II*, see the Preface of CSA Standard CAN/CSA-C22.2 No. 0, *General Requirements—Canadian Electrical Code, Part II*.

This Standard was prepared by a Subcommittee of the Technical Committee on Industrial Products under the jurisdiction of the Standards Steering Committee on Canadian Electrical Code, Part II, and was formally approved by these Committees.

January 1995

Notes:

(1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*

(2) *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.*

(3) *This publication was developed by consensus, which is defined by the* CSA Regulations Governing Standardization *as "substantial agreement reached by concerned interests. Consensus includes an attempt to remove all objections and implies much more than the concept of a simple majority, but not necessarily unanimity." It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of the publication.*

(4) *CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee.*

(5) *All enquiries regarding this Standard, including requests for interpretation, should be addressed to Canadian Standards Association, Standards Development, 178 Rexdale Boulevard, Rexdale, Ontario M9W 1R3.*

Requests for interpretation should

(a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;

(b) provide an explanation of circumstances surrounding the actual field condition; and

(c) be phrased where possible to permit a specific "yes" or "no" answer.

Interpretations are published in CSA's periodical Info Update. *For subscription details, write to CSA Sales Promotion,* Info Update, *at the address given above.*

Foreword

The Canadian Standards Association provides certification services for manufacturers who, under license from CSA, wish to use the appropriate registered CSA Marks on certain products of their manufacture to indicate conformity with CSA Standards.

CSA Certification for a number of products is provided in the interest of maintaining agreed-upon standards of quality, performance, interchangeability and/or safety, as appropriate. Where applicable, certification may form the basis for acceptance by inspection authorities responsible for enforcement of regulations. Where feasible, programs will be developed for additional products for which certification is desired by producers, consumers or other interests.

In performing its functions in accordance with its objectives, CSA does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of the Association represent its professional judgement given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed.

Products in substantial accord with this Standard but which exhibit a minor difference or a new feature may be deemed to meet the Standard providing the feature or difference is found acceptable utilizing appropriate CSA Certification Division Operating Procedures. Products which comply with this Standard shall not be certified if they are found to have additional features which are inconsistent with the intent of this Standard. Products shall not be certifiable if they are discovered to contravene applicable Federal laws or regulations.

Testing techniques, test procedures and instrumentation frequently must be prescribed by the CSA Certification Division in addition to the technical requirements contained in Standards of CSA. In addition to markings specified in the Standard the CSA Certification and Testing Division may require special cautions, markings and instructions that are not specified by the Standard.

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If this Standard is to be used in obtaining CSA Certification please remember, when making application for certification, to request all current Amendments, Bulletins, Notices and Technical Information Letters that may be applicable and for which there may be a nominal charge. For such information or for further information concerning details about CSA Certification please address your inquiry to the Applications and Records Section, Canadian Standards Association, 178 Rexdale Boulevard, Rexdale (Toronto), Ontario M9W 1R3.

C22.2 No. 77-95
Motors with Inherent Overheating Protection

1. Scope

1.1
This Standard applies to ac and dc motors with inherent overheating protection designed to be used in accordance with the *Canadian Electrical Code, Part I*, as follows:
(a) motors with a voltage rating not exceeding 600 V and with a protective device connected in the motor circuit;
(b) impedance-protected motors with a voltage rating not exceeding 600 V; and
(c) motors with a voltage rating not exceeding 5000 V and having a protective device connected in an external control circuit with a voltage rating not exceeding 600 V.

1.2
This Standard applies to motors with protective devices that are responsive to
(a) motor temperature alone; or
(b) motor temperature and motor current passing through the device,
but does not apply to motors with protective devices that are responsive to current alone.

1.3
This Standard does not apply to sealed (hermetic) type motor compressors with inherent overheating protection (see CSA Standard C22.2 No. 140.2).

1.4
A product that contains features, characteristics, components, materials, or systems new or different from those in use when the Standard was developed, and that involves a risk of fire, electric shock, or injury to persons, shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the level of safety for the user of the product as originally anticipated by the intent of this Standard.

2. Definitions and Reference Publications

2.1 Definitions
The following definitions apply in this Standard:

Impedance-protected motor—a motor having sufficient internal impedance to prevent overheating.

Overheating—temperatures above those permitted in Tables 1, 2, and 3 of this Standard.

Protector*—a protective device for assembly as an integral part of a motor that, when properly applied, protects the motor against overheating.
**The terms "protector" and "protective device", as used in this Standard, are synonymous.*

Single-operation protector—a protector that is intended to operate once only, that does not self-reset at any temperature above –35°C and that is not provided with manual reset means.