



UL 1004-3

Underwriters Laboratories Inc.
Standard for Safety

Thermally Protected Motors



Documents
Document Sharing Hub

UL Standard for Safety for Thermally Protected Motors, UL 1004-3

First Edition, Dated September 15, 2008

Summary of Topics

This revision to ANSI/UL 1004-3 includes the following changes in requirements:

Addition of requirements for thermal protection

Addition of Definitions to the Glossary

Deletion of Section 23, Insulation Systems

Revisions to the Locked Rotor Temperature Test, Section 41A

Revisions to the Locked Rotor Endurance Test, Section 41B

Revisions to the Running Heating Temperature Test, Section 41C

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin. Changes in requirements are marked with a vertical line in the margin and are followed by an effective date note indicating the date of publication or the date on which the changed requirement becomes effective.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated April 17, 2009.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical photocopying, recording, or otherwise without prior permission of UL.

UL provides this Standard "as is" without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability or fitness for any purpose.

In no event will UL be liable for any special, incidental, consequential, indirect or similar damages, including loss of profits, lost savings, loss of data, or any other damages arising out of the use of or the inability to use this Standard, even if UL or an authorized UL representative has been advised of the possibility of such damage. In no event shall UL's liability for any damage ever exceed the price paid for this Standard, regardless of the form of the claim.

Users of the electronic versions of UL's Standards for Safety agree to defend, indemnify, and hold UL harmless from and against any loss, expense, liability, damage, claim, or judgment (including reasonable attorney's fees) resulting from any error or deviation introduced while purchaser is storing an electronic Standard on the purchaser's computer system.

The requirements in this Standard are now in effect, except for those paragraphs, sections, tables, figures, and/or other elements of the Standard having future effective dates as indicated in the note following the affected item. The prior text for requirements that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

The following table lists the future effective dates with the corresponding reference.

Future Effective Dates	References
September 15, 2014	Entire Standard

SEPTEMBER 15, 2008
(Title Page Reprinted: September 9, 2009)



ANSI/UL 1004-3-2009

1

UL 1004-3

Standard for Thermally Protected Motors

First Edition

September 15, 2008

This ANSI/UL Standard for Safety consists of the First Edition including revisions through September 9, 2009.

The most recent designation of ANSI/UL 1004-3 as an American National Standard (ANSI) occurred on August 26, 2009. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, or effective date information.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <http://csds.ul.com>.

UL's Standards for Safety are copyrighted by UL. Neither a printed nor electronic copy of a Standard should be altered in any way. All of UL's Standards and all copyrights, ownerships, and rights regarding those Standards shall remain the sole and exclusive property of UL.

COPYRIGHT © 2009 UNDERWRITERS LABORATORIES INC.

No Text on This Page

CONTENTS

INTRODUCTION

1 Scope	4
5 Glossary	5

CONSTRUCTION

18 Spacings	6
20A Thermal Protection Systems	6
23 Insulation Systems	6A

PERFORMANCE

29 General	6A
41A Locked Rotor Temperature Test	8
41A.1 General	8
41A.2 Automatically reset protectors	10
41A.3 Manually reset protectors	10
41A.4 Thermal cutoffs	11
41A.5 Self-holding protectors	11
41A.6 Single-operation devices	11
41B Locked Rotor Endurance Test	12
41B.1 General	12
41B.2 Automatically reset protectors	13
41B.3 Manually reset protectors	13
41B.4 Self-holding protectors	14
41B.5 Self-holding protector cold reset	14
41C Running Heating Temperature Test	14
41C.1 General	14
41C.2 Continuous duty motors	14A
41C.3 Polyphase motors	16
41C.4 Ultimate trip current	16
41C.5 Intermittent duty motors	17
41C.6 Air-over motors	18
41C.7 Polyphase air-over motors	18

MARKINGS

43 General	18
------------------	----

INSTRUCTIONS

45 General	19
------------------	----

INTRODUCTION

1 Scope

1.1 This Standard is intended to be read together with the Standard for Rotating Electrical Machines – General Requirements, UL 1004-1. The numbering of the Sections in this Standard corresponds to the like numbered Sections in UL 1004-1. The numbering of the paragraphs are unique to this Standard, and do not directly correspond to the like numbered paragraphs in UL 1004-1. The requirements in this Standard supplement or amend the requirements in UL 1004-1. The requirements of UL 1004-1 apply unless modified by this Standard. For Sections not shown, refer to the Standard for Rotating Electrical Machines – General Requirements, UL 1004-1.

1.1 effective September 15, 2014

1.2 This Standard applies to motors that rely upon a device (thermal motor protector) to prevent overheating.

1.2 effective September 15, 2014

1.3 This Standard applies to motors protected either by electromechanical thermal motor protectors or solid-state thermal motor protectors.

1.3 effective September 15, 2014

1.4 This Standard applies to impedance protected motors where the manufacturer has provided a supplementary thermal motor protector.

1.4 effective September 15, 2014

1.5 The requirements in this Standard are intended to evaluate a specific motor/protector combination. When the motor, the protector, or the motor/protector combination is changed, the combination shall be reevaluated.

1.5 effective September 15, 2014

1.6 The requirements in this Standard do not cover:

- a) Motors employing a device that serves as a motor protector and a manual motor controller;
- b) Motors protected by devices responsive to current only; or
- c) Sealed (hermetic) type compressor motors.

Revised 1.6 effective September 15, 2014

5 Glossary

5.1 For the purpose of this standard, the following definitions apply.

5.1 effective September 15, 2014

5.2 **AUTOMATICALLY RESET PROTECTOR** – A device that is calibrated to open the motor circuit upon reaching a certain temperature and automatically closes the circuit once the device has cooled to a lower temperature.

5.2 effective September 15, 2014

5.3 **MANUALLY RESET PROTECTOR** – A device that is calibrated to open the motor circuit upon reaching a certain temperature and requires a manual action to reclose the motor circuit.

5.3 effective September 15, 2014

5.4 **PRIMARY PROTECTOR** – A protector that is expected to operate during the abnormal testing of a motor sample.

5.4 effective September 15, 2014

5.5 **SELF-HOLDING PROTECTOR** – A device that is calibrated to open the motor circuit upon reaching a certain temperature but requires both cool down below the calibration point and removal of power for resetting of the protector.

5.5 effective September 15, 2014

5.5.1 **SINGLE-OPERATION DEVICE** – A device that is calibrated to open a motor circuit upon being exposed to a defined temperature and which is reset only upon cooling to -35°C (-31°F) or lower.

Added 5.5.1 effective September 15, 2014

5.5.2 **THERMAL CUTOFF** – A device that is calibrated to open a motor circuit upon being exposed to a defined temperature.

Added 5.5.2 effective September 15, 2014

5.6 **THERMAL MOTOR PROTECTOR, THERMAL PROTECTOR, OR PROTECTOR** – A device installed integrally within a motor that is responsive to motor current and temperature or temperature only and that, when applied as intended, prevents motor overheating. Types are: thermal cutoff, automatically reset, manually reset, self-holding and single-operation.

5.6 effective September 15, 2014

5.7 **THERMALLY PROTECTED MOTOR** – A motor that relies upon a device (protector) to prevent overheating.

5.7 effective September 15, 2014