UL 62091

STANDARD FOR SAFETY

Low-Voltage Switchgear and Controlgear – Controllers for Drivers of Stationary Fire Pumps

UL Standard for Safety for Low-Voltage Switchgear and Controlgear – Controllers for Drivers of Stationary Fire Pumps, UL 62091

First Edition, Dated September 30, 2020

Summary of Topics

This First Edition of ANSI/UL 62091, the common ANCE, CSA Group and UL (trinational) standard that is an adoption of IEC 62091, Standard for Low-Voltage Switchgear and Controlgear – Controllers for Drivers of Stationary Fire Pumps (IEC 62091, Edition 1:2007.)

The new requirements are substantially in accordance with Proposal(s) on this subject dated April 3, 2020.

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NMX-J-XXXX
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CSA C22.2 No. 62091:20
First Edition
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Underwriters Laboratories Inc.
UL 62091
First Edition

Low-Voltage Switchgear and Controlgear – Controllers for Drivers of Stationary Fire Pumps

September 30, 2020

This national standard is based on publication IEC 62091, First Edition (2007).

ANSI/UL 62091-2020

Commitment for Amendments

This standard is issued jointly by the Association of Standardization and Certification (ANCE), the Canadian Standards Association (operating as "CSA Group"), and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to ANCE, CSA Group, or UL at anytime. Revisions to this standard will be made only after processing according to the standards development procedures of ANCE, CSA Group, and UL. CSA Group and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue. ANCE will incorporate the same revisions into a new edition of the standard bearing the same date of issue as the CSA Group and UL pages.

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This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. The technical content of IEC and ISO publications is kept under constant review by IEC and ISO. To submit a proposal for change, please send the following information to inquiries@csagroup. org and include "Proposal for change" in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

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This ANSI/UL Standard for Safety consists of the First Edition.

The most recent designation of ANSI/UL 62091 as an American National Standard (ANSI) occurred on September 30, 2020. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards. Any other portions of this ANSI/UL standard that were not processed in accordance with ANSI/UL requirements are noted at the beginning of the impacted sections.

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 https://csds.ul.com.

To purchase UL Standards, visit UL's Standards Sales Site at http://www. shopulstandards. com/HowToOrder.aspx or call toll-free 1-888-853-3503.

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PREFACE

This is the harmonized ANCE, CSA Group, and UL Standard for Low-Voltage Switchgear and Controlgear – Controllers for Drivers of Stationary Fire Pumps. It is the First edition of NMX-J-XXXX, CSA C22.2 No. 62091, and UL 62091.

This harmonized standard is based on IEC Publication 62091: First Edition, Low-voltage switchgear and controlgear – Controllers for drivers of stationary fire pumps, issued January 2007, and the requirements pertaining to fire pump controllers from the 2019 and past editions of NFPA 20, Standard for the Installation of Stationary Pumps for Fire Protection. This document is intended to replace NMX-J-626-ANCE-2015/UL 218/CSA C22.2 No. 263-15, published in September 2015, to provide globally accepted requirements for fire pump controllers. IEC 62091 is copyrighted by the IEC.

This harmonized standard was prepared by the Association of Standardization and Certification (ANCE), CSA Group, and Underwriters Laboratories Inc. (UL). The efforts and support of the Technical Harmonization Subcommittee, Fire Pump Controllers, CANENA THSC 121A-62091 on the Harmonization of Electrotechnical Standards of the Nations of the Americas (CANENA), are gratefully acknowledged.

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

The present Mexican Standard was reviewed and approved by the Comité de Normalización de la Asociación de Normalización y Certificación, A.C., CONANCE.

This standard was reviewed by the CSA Subcommittee on Fire Pump Controllers, under the jurisdiction of the CSA Technical Committee on Industrial Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee. This standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

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 adopts the IEC text with national differences.

This standard is published as an equivalent standard for ANCE, CSA Group and UL.

An equivalent standard is a standard that is substantially the same in technical content, except as follows: Technical national differences are allowed for codes and governmental regulations as well as those recognized as being in accordance with NAFTA Article 905, for example, because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate. Presentation is word for word except for editorial changes.

All national differences from the IEC text are included in the ANCE, CSA Group, and UL versions of the standard. While the technical content is the same in each organization's version, the format and presentation may differ.

Reasons for Differences From IEC

Differences from the IEC are being added in order to address safety and regulatory situations present in Mexico, the US and Canada.

Interpretations

The interpretation by the standards development organization of an identical or 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.

IEC Copyright

For ANCE, the text, figures, and tables of International Electrotechnical Commission Publication 62091, Low-voltage switchgear and controlgear – Controllers for drivers of stationary fire pumps, issued 01-2007, are used in this Standard according to the guidelines provided in the ISO/IEC/POCOSA.

For CSA Group, the text, figures, and tables of International Electrotechnical Commission Publication 62091, *Low-voltage switchgear and controlgear – Controllers for drivers of stationary fire pumps*, copyright 2007, are used in this standard with the consent of the International Electrotechnical Commission. The IEC Foreword and Introduction are not a part of the requirements of this standard but are included for information purposes only.

NATIONAL DIFFERENCES

National Differences from the text of International Electrotechnical Commission (IEC) Publication 62091, Low-voltage switchgear and controlgear – Controllers for drivers of stationary fire pumps, copyright 2007, are indicated by notations (differences) and are presented in bold text. The national difference type is included in the body.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are National Differences from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

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FOREWORD

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR – CONTROLLERS FOR DRIVERS OF STATIONARY FIRE PUMPS

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

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9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62091 has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

This first edition cancels and replaces the technical specification published in 2003. It constitutes a technical revision and now has the status of an International Standard.

The text of this standard is based on the following documents:

FDIS	Report on voting
17B/1527/FDIS	17B/1536/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

• reconfirmed,

• withdrawn,

• replaced by a revised edition, or

• amended.

INTRODUCTION

IEC 62091 pertains to life-safety equipment and is based in part on NFPA 20 (1996) *Standard for the Installation of Centrifugal Fire Pumps*. When called upon to work by automatic signal, manual-electric signal or manual-emergency actuation, the controller is expected to start the pump driver (motor or diesel engine) because “the building is on fire”. Failure to carry out its task will increase fire damage to the building, its contents and people therein.

These controllers default to a RUN state. They are intended to be located in compliance with local requirements which generally will place them in pump rooms or pump houses that have some specified degree of fire protection. These locations often have sweating overhead pipes, are possibly sprinklered and are in the vicinity of vaults housing other building distribution equipment.

Fire pumps are intended to boost water pressure. Many sprinkler systems are assumed to have small leaks for which “Jockey Pumps” (also known as make-up pumps) are installed to maintain desired pressure in the sprinkler pipes, thus preventing the main fire pump from excessive starts and stops. Experience has shown that leakage water flowing through the fire pump (at rest) over long periods of pump inactivity can carry sand, aggregates, rocks, rust and such which collect in the fire pump. These contaminants may prevent normal starting until the pump impeller accelerates to clear the pump housing. This standard recognizes the condition of under-exercised fire pumps by permitting up to 20 s at locked rotor current, whether the starts are “cold starts” (initial starts) or “hot starts” (restarts). Starting a distressed pump may cause temporary or permanent damage to electrical conductors, equipment and the motor, because shutdown for equipment protection could possibly permit its destruction by fire along with the building and its contents.

Several examples of the construction and installation applications between a fire pump controller and other controllers include the following:

(1) all fire pump controllers

a) The main circuit conductors and components are considered to be sacrificial (i.e. temporary and permanent damage levels are permitted) during any attempt to start a distressed motor/pump and to keep it operating.

b) They are expected to provide a high degree of reliability to start the pump driver automatically and suppress a fire upon sensing a pressure drop in the sprinkler pipe or by other automatic fire detection equipment.

c) Failures in external control circuits should not prevent operations of pumps from all other internal or other external means.

d) External control circuits are expected to be arranged so that failure of any external circuit (open or short-circuit) will not prevent operation of pump(s) from all other internal or external means. Breakage, disconnecting, shorting of the wires or loss of power to these circuits can cause continuous running of the fire pump but should not prevent the controller(s) from starting the fire pump(s) due to causes other than these external circuits.

e) External automatic starting means should be accomplished by opening a normally closed contact on the external means to de-energize a normally energized control circuit in the controller.

f) While external start buttons or other starting means are permitted, the controller should not be equipped with any means to accommodate remote stopping (a remote STOP button should not be used).

g) Nuisance starts are permitted in the case where a failure of internal control components might cause the motor to start running.

(2) electric motor fire pump controllers

a) They are expected to include means for external, manual mechanical operation of the controller in the event of loss of ability to close the contactor electrically/magnetically.

b) Thermally reactive over-current protective devices should not be permitted. The controller should provide short-circuit and locked rotor protection only.

c) Releases of the FPC-overcurrent protective devices (short-circuit protective and locked rotor protective devices) are expected to permit it to carry 300 % of rated operational motor current for an extended period of time.

(3) diesel engine fire pump controllers

a) Should provide means to automatically exercise the engine on a weekly basis.

b) When an automatic or manual signal to start/run exists, (except under TEST) the controller should not shut down the engine for any reason except OVERSPEED. When in TEST mode, the controller may shut down under low oil pressure and high engine temperature conditions. The two conditions mentioned illustrate the sacrificial nature while fighting a fire.

Therefore, the most significant purpose of this standard is to characterize the unique features of fire pump controllers.

An installation with two fire pumps will increase the reliability and safety of the installation, especially if the two fire pumps are supplied from two different power supplies. This is especially true during maintenance or repairing of a single controller, as fire protection is still being maintained by the other fire pump.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR – CONTROLLERS FOR DRIVERS OF STATIONARY FIRE PUMPS

1 Scope and object

This International Standard applies to controllers intended for starting, controlling and stopping stationary fire pumps, including automatic and non-automatic types for alternating current electric motor or diesel engine-driven fire pumps. It is anticipated that a controller only controls a single driver.

Controllers for electric motor-driven fire pumps always include suitable short-circuit protection as an integral part of the controller. These controllers may include an integral power transfer switch. These controllers are rated 1 000 V a.c. maximum.

Controllers for diesel engine-driven fire pumps include electrical circuits that operate various control and supervisory functions, such as remote control (starting), alarms, signals, indicators, and the proper operation of battery chargers.

The most significant purpose of this standard is to characterize the unique features of fire pump controllers. A further purpose is to prescribe a procedure for exercising the controllers to verify that the unique features are operative. For the purpose of this standard, this procedure is described as the “fire pump controller test protocol”.

The object of this standard is to state the following:

a) the unique characteristics of fire pump controllers, their associated equipment and their operational functions;

b) the tests intended for confirming that these conditions have been met, and the methods to be adopted for these tests;

c) the information to be given with the equipment, or in the manufacturer's literature.

In this context, this standard gives the requirements for all of the electrical functions associated with both the electric motor-driven and the diesel engine-driven fire pumps. Special applications such as explosive atmospheres, nuclear installations, ships, aircraft, etc. are not covered by this standard. Referring to electric power sources, the requirements of this standard apply only to the extent that they place limits on the nature, behaviour and characteristics of the electrical energy that is supplied to the service entrance (see IEC 60364-5-55).

The requirements of this standard apply neither to the method nor to the means by which the electrical energy is generated. In addition, they do not apply to the installation between the origin of the installation and the fire pump controller, which are to be found in the IEC 60364 series. This standard does not apply to diesel engine-driven electric generators which may be associated with a stationary fire pump installation.

EMC considerations are correlated with other IEC standards for similar products:

a) for electric fire pump controllers, EMC considerations are covered by this standard, and

b) for diesel engine fire pump controllers, d.c. batteries are the intended source of electrical control power.

1DV D2 ***Modification to Clause 1 by adding the following:***

1DV.1 This equipment includes limited service and medium voltage. Controllers may be suitable for use as service equipment. This equipment is for installation in non-hazardous locations in accordance with Annex DVA, item 2.

1DV.2 Controllers for electric motor driven, centrifugal fire pumps and positive displacement pumps are intended for use with squirrel cage or wound rotor motors. Controllers for squirrel cage motors may be for across-the-line or reduced inrush current starting.

1DV.3 Variable speed fire pump controllers for electric motor driven, centrifugal fire pumps and positive displacement pumps are intended for use with squirrel cage induction, inverter duty rated, motors, and rated for 50 Hz or 60 Hz.

1DV.4 Limited service controllers are intended for across-the-line starting of squirrel cage motors rated 22 kW (30 hp) or less, 600 V or less.

1DV.5 Medium voltage fire pump controllers are intended for use with squirrel cage motors rated 601 V – 7.2 kV AC.

1DV.6 Residential fire pump controllers are intended for use with single-phase squirrel cage motors rated 240 V or less. Residential fire pump controllers are intended to be used in one or two family dwelling units in accordance with the requirements of item 35 in Annex DVA.

1DV.7 Diesel engine fire pump controllers rated nominal 24 V DC or less are intended for use with fire pump engines. Where required, AC Voltage is limited to 600 V AC or less.

1DV.8 An automatic transfer switch intended to be used in fire pump circuits, and that is provided separate from a controller, is covered by the requirements of item 11, Annex DVA.

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.

IEC 60364 (all parts), *Electrical installations of buildings*

IEC 60364-5-55:2001, *Electrical installations of buildings – Part 5-55: Selection and erection of electrical equipment – Other equipment*;
Amendment 1 (2001)

IEC 60439-1:1999, *Low-voltage switchgear and controlgear assemblies – Part 1: Type-tested and partially type-tested assemblies*;
Amendment 1 (2004)

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*;
Amendment 1 (1999)

IEC 60664-1:1992, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*;
Amendment 1(2000);
Amendment 2 (2002)

IEC 60695-11-10:1999, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*;
Amendment 1 (2003)

IEC 60947-1:2004, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-2:2006, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 60947-3:1999, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*;
Amendment 1 (2001);
Amendment 2 (2005)

IEC 60947-4-1:2000, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*;
Amendment 1 (2002);
Amendment 2 (2005)

IEC 60947-4-2:1999, *Low-voltage switchgear and controlgear – Part 4-2: Contactors and motor-starters – AC semiconductor motor controllers and starters*;
Amendment 1 (2001)

IEC 60947-6-1:2005, *Low-voltage switchgear and controlgear – Part 6-1: Multiple function equipment – Transfer switching equipment*

IEC 61000-3-12:2004, *Electromagnetic compatibility (EMC) – Part 3-12: Limits – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase*

IEC 61000-4-2:1995, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*;
Amendment 1 (1998);
Amendment 2 (2000)

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2004, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2005, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6:2003, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*;
Amendment 1 (2004);
Amendment 2 (2006)

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

CISPR 11:2003, *Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement*;
Amendment 1 (2004);
Amendment 2 (2006)

2DV D2 *Modification to Clause 2 by adding the following:*

2DV.1 See Annex DVA for normative references and Annex DVB for component standards.

2DV.2 The normative references listed in Annex DVA contain provisions which, through reference in this text, constitute provisions of this Standard. For undated references to standards, such reference shall be considered to refer to the latest edition and all revisions to that edition up to the time when this Standard was approved. For dated references to standards, such reference shall be considered to refer to the dated edition and all revisions published to that edition up to the time the standard was approved.

2DV.3 In Canada, general requirements applicable to this standard are given in the latest edition of item 17 of Annex DVA. In addition the requirements of Annex DVA item 18 also apply unless specifically modified by this standard.

3 Terms and definitions

For the purposes of this document, the relevant terms and definitions given in IEC 60947-1, together with the following terms and definitions, apply.

Alphabetical index of definitions

3.1
fire pump controller (FPC)
controller intended to control a fire pump electric motor or a fire pump diesel engine

3.2
controller

device or equipment that serves to control, in some predetermined manner, the electric power delivered to the apparatus to which it is connected

3.3
fire pump
pump dedicated to delivering a specified rate of water flow at a specified pressure to the fire extinguishing system of a premises

3.4
fire pump controller test protocol
procedure for exercising fire pump controllers to verify their compliance with the requirements of this standard

3.5
foam pump
pump dedicated to delivering a specified rate of foam concentrate to the system proportioner in the water fire extinguishing system of a premises

3.6
system proportioner
device or coordinated group of devices which introduces foam concentrate in a prescribed proportion into the fire water stream

3.7
foam pump controller
controller intended to control a foam concentrate pump for use in fire suppression

3.8
driver
electric motor or diesel engine that drives the fire pump

3.9
pumping unit
pump, driver and controller

3.10
diesel engine fire pump controller
controller intended to control a diesel engine-driven fire pump

3.11
diesel engine foam pump controller
controller intended to control a diesel engine-driven foam concentrate pump

3.12
electric fire pump controller
controller intended to control an electric motor-driven fire pump

3.13
residential fire pump controller
controller intended to control an electric motor-driven residential fire pump

NOTE Residential fire pumps are fire pumps intended for use primarily in domestic residences. They are typically limited to one- and two-family units, and are generally single-phase devices.

3.14
electric foam pump controller
controller intended to control an electric motor-driven foam concentrate pump

3.15
automatic control
control of an operation without human intervention

3.16
non-automatic control
control of an operation by human intervention

3.17
externally operable
capable of being operated without the need to remove covers or open an enclosure

3.18
lockout feature
externally accessible means to preclude an automatic controller from responding to a start signal

3.19
over-current
current exceeding the rated current

NOTE For the purpose of this standard, over-current protection includes motor locked-rotor and short-circuit protection only.

3.20
service equipment
necessary equipment, usually consisting of a circuit-breaker or switch and fuses and their accessories, located near the point of entrance of supply conductors to a building or other structure, or an otherwise defined area, and intended to constitute the main control and means to cut-off the supply

3.21
type-tested device
device conforming to an established type, comprised of elements (components, devices, equipment) combined and rated as a unit, replicating the constructional and performance features of the typical device which has been verified previously to be in accordance with a designated standard

3.22
electromagnetic contactor
contactor in which the force for closing the normally open main contacts or opening the normally closed main contacts is provided by an electromagnet (see IEC 60947-4-1)

3.23
automatic transfer switching equipment (automatic power transfer switch)
self-acting equipment containing the transfer switching device (s) and other necessary devices for monitoring supply circuits and for transferring one or more load circuits from one supply to another (see IEC 60947-6-1)

3.24
disconnector
mechanical switching device which provides, in the open position, an isolating distance in accordance with specified requirements

NOTE A disconnector is capable of opening and closing a circuit when either negligible current is broken or made, or when no significant change in the voltage across the terminals of each of the poles of the disconnector occurs. It is also capable of carrying currents under normal circuit conditions and carrying for a specified time currents under abnormal conditions such as those of short circuit.

[IEV 441-14-05]

3.25
short-circuit protective device
SCPD
device intended to protect a circuit or parts of a circuit against short-circuit currents by interrupting them

3.26
electromagnetic environment
totality of electromagnetic phenomena existing at a given location

NOTE In general, the electromagnetic environment is time-dependent and its description may need a statistical approach.

[IEV 161-01-01]

3.27
electromagnetic disturbance
any electromagnetic phenomenon which may degrade the performance of a device, equipment or system, or adversely affect living or inert matter

NOTE An electromagnetic disturbance may be an electromagnetic noise, an unwanted signal or a change in the propagation medium itself.

[IEV 161-01-05]

3.28
electromagnetic compatibility
EMC (abbreviation)
ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment

[IEV 161-01-07]

3.29
emission (electromagnetic)
phenomenon by which electromagnetic energy emanates from a source

[IEV 161-01-08]

3.30
radio (frequency) disturbance
electromagnetic disturbance having components in the radio frequency range

[IEV 161-01-13]

3.31
radio frequency interference
RFI (abbreviation)
degradation of the reception of a wanted signal caused by radio frequency disturbance

NOTE The English words "interference" and "disturbance" are often used indiscriminately. The expression “radio frequency interference” is also commonly applied to a radio-frequency disturbance of an unwanted signal.

[IEV 161-01-14]

3.32
immunity (to an electromagnetic disturbance)
ability of a device, equipment or system to perform without degradation in the presence of an electromagnetic disturbance

[IEV 161-01-20]

3.33
transient (adjective and noun)
pertaining to or designating a phenomenon or a quantity which varies between two consecutive steady states during a time interval short compared with the time-scale of interest

[IEV 161-02-01]

3.34
burst (of pulses or oscillations)
sequence of a limited number of distinct pulses or an oscillation of limited duration

[IEV 161-02-07]

3.35
voltage surge
transient voltage wave propagating along a line or a circuit and characterized by a rapid increase followed by a slower decrease of the voltage

[IEV 161-08-11]

3.36DV D1 *Add the following:*

3.36DV.1
AUXILIARY CIRCUIT
Circuits not essential for the performance of the fire pump controller.

3.36DV.2
CENTRIFUGAL PUMP
A pump in which the pressure is developed principally by the action of centrifugal force.

3.36DV.3
CIRCUIT-BREAKERS

Circuit-Breaker (as applied to fire pump controllers) – For the purposes of this standard, the term “circuit-breaker (disconnecting means)” refers to either thermal-magnetic or inverse time circuit-breakers (for residential fire pump controllers only) or to instantaneous-only circuit-breakers.

Circuit-Breaker – A device designed to open and close a circuit by non-automatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating.

Instantaneous-Only Circuit-Breaker – One intended to provide short-circuit protection only.

Instantaneous Trip (as applied to circuit breakers) – A qualifying term indicating that no delay is purposely introduced in the tripping action of the circuit breaker.

Inverse Time (as applied to circuit breakers) – A qualifying term indicating that there is a purposely introduced delay in the tripping action of the circuit breaker, which delay decreases as the magnitude of the current increases.

Thermal-Magnetic Circuit-Breaker – A device designed to open and close a circuit by non-automatic means, and to open the circuit automatically on a predetermined overcurrent (overload and short-circuit), without damage to itself when properly applied within its rating.

3.36DV.4
CONTROL CIRCUIT
A circuit that carries the electric signals directing the performance of a fire pump controller, but which does not carry the main power circuit. A control circuit is generally limited to 15 A.

3.36DV.5
CONTROLLER (Electric motor)
A device or group of devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected.

3.36DV.6
CONTROLLER (Diesel engine)
A device or group of devices that serves to govern, in some predetermined manner, the engine power delivered to the apparatus to which it is connected.

3.36DV.7
CONTROLLER – LIMITED SERVICE
A controller, as defined in 1DV.1, that is limited in application when approved by the authority having jurisdiction.

3.36DV.8
CURRENT LIMITERS
Melting link-type devices that, when used as an integral part of a circuit breaker, limit the current during a short-circuit to less than the interrupting capacity of the circuit breaker.

3.36DV.9
DISCONNECTING MEANS
A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply.

3.36DV.10
DROP-OUT RELAY
A relay that, when de-energized, initiates the control function.

3.36DV.11
ENCLOSURE
The case or housing of apparatus constructed to provide a degree of protection against incidental contact with the enclosed equipment, and to provide a degree of protection against specified environmental conditions.

3.36DV.12
ISOLATING SWITCH
A switch intended for isolating an electric circuit from the source of power. It has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means.

3.36DV.13
MEDIUM VOLTAGE
(For Mexico and the United States)
An AC voltage in the range of 1501 to 7200 V.

For Canada
An AC voltage in the range of 751 to 7200 V.

3.36DV.14
READILY ACCESSIBLE
Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, and so forth.

3.36DV.15
SERVICE BOX
(For Canada)
An approved assembly consisting of a metal box or enclosure constructed so that it may be effectually locked or sealed, containing either service fuses and a service switch or a circuit breaker, and of such design that either the switch or circuit breaker may be manually operated when the box is closed.

3.36DV.16
SERVICE EQUIPMENT
(For Mexico and the United States)
The necessary equipment, usually consisting of a circuit breaker(s) or switch(es) and fuse(s) and their accessories, connected to the load end of service conductors to a building or other structure, or an otherwise designated area, and intended to constitute the main control and cutoff of the supply.

In Canada, this definition does not apply.

3.36DV.17
SERVICE EQUIPMENT
(For Canada)
In addition to the specifications of 3.36DV.15, the service circuit breaker or fused switch is located in a service box.

3.36DV.18
TRANSFER SWITCH (AUTOMATIC)
Self-acting equipment for transferring the connected load from one power source to another power source.

4 Classification

4.1 Electric fire pump controller

4.1.1 Automatic electric fire pump controller

4.1.1.1 Pressure activated

Starting of the motor is initiated by detecting a reduction in water pressure.

4.1.1.2 Non-pressure-actuated

Starting of the motor is initiated by means other than by detecting a reduction in water pressure, such as deluge valve, flow switch or fire detection equipment.

4.1.2 Non-automatic electric fire pump controller

Starting of the motor is initiated by manual electrical means (e.g. push button) or manual mechanical means (e.g. emergency-run mechanical control, see 8.5.1.2).

4.1.3 Electric fire pump controller with or without power transfer switch

Controllers may be provided for one or two sources of electrical power.

4.1.4 Full voltage or reduced voltage starting

Controllers may be provided for direct on-line starting (full voltage) or for starting with reduced motor inrush current (reduced voltage). See 8.4.7 and 8.4.8.

4.2 Residential fire pump controller (pump driven by an electric motor only)

Controllers may be provided as single or dual pump configuration.

4.3 Diesel engine fire pump controller

4.3.1 Pressure-actuated

Starting of the engine is initiated by detecting a reduction in water pressure.

4.3.2 Non-pressure-actuated

Starting of the engine is initiated by means other than by detecting a reduction in water pressure, such as deluge valve, flow switch or fire detection equipment.

4.4 Foam pump controller (pump driven either by an electric motor or by a diesel engine)

Special electric fire pump controllers or special diesel engine fire pump controllers intended for the unique requirements of foam concentrate pumps.

5 Characteristics

5.1 Electrical quantities

5.1.1 Rated operational voltage (U_e)

The rated operational voltage for a fire pump controller is a value of voltage which, combined with a rated operational current, determines the application of the equipment and to which relevant tests are referred.

5.1.2 Rated operational current (I_e) or rated operational power

The rated operational current for an electric fire pump controller is a value of current which is dictated by the rated operational current of the electric motor which drives the fire pump. The rated operational a.c. input current for a diesel engine fire pump controller is a value of current which is dictated by the maximum load current of the battery charger(s) supply within the controller.

In the case of an equipment for direct switching of individual electric motors, the indication of a rated operational current may be replaced (or supplemented) by an indication of the maximum rated power output, at the rated operational voltage of the motor for which the equipment is intended to be connected.

5.2 Hierarchy of importance for the various characteristics

5.2.1 General

The hierarchy of importance is divided into two levels: A-priority and B-priority. A-priority functions shall override B-priority functions.

5.2.2 Functions assigned to A-priority

Operations that are assigned to A-priority are designed with the capability to take over normal operations under prescribed circumstances.

For example, non-automatic control is assigned to the premier level in the hierarchy of importance. By definition, non-automatic control is characterized by manual intervention. The ability to apply manual intervention to override all other functions is of premier importance during any exercise for suppressing a fire.

The requirements for compliance with this premier role are given in 8.3 and 8.8.1.

5.2.3 Functions assigned to B-priority

Operations that are assigned to B-priority are designed with the capacity to be inhibited, or to be subordinated, under prescribed circumstances.

For example, automatic control describes the capability for self-initiated action without human intervention. Therefore, all forms of automatic control shall be subordinated to any form of deliberated human intervention.

The requirements for compliance with this subordinate role are given in 8.3 and 8.8.1.

5.3 Electric fire pump controller

5.3.1 Basic functions

An electric fire pump controller shall perform the following basic functions:

a) connects (or transfers) the electric motor to the appropriate power supply (primary, alternative, second utility);

b) starts, controls and stops the operations of the electric drive motor;

c) provides over-current protection against locked rotor currents and short-circuit currents;

d) monitors and supervises the operation of the system, and provides appropriate signals and alarms;

e) to have a general arrangement in compliance with Figure 1, Figure 2, Figure 3 or Figure 4;

f) initiates a periodic test of the system, e.g. weekly.

The requirements for performing these functions are given in Clause 8.

5.3.2 Standard equipment

The electric fire pump controller shall comprise the following equipment:

a) enclosure;

b) components (see 8.1);

c) voltage surge arrester;

d) pressure recorder, when appropriate;

e) sensors, detectors, monitoring devices, alarms and appropriate signal devices;

f) periodic test timer (e.g. weekly) or other safe and reliable means providing a minimum running time.

The controller may include other optional equipment that is the subject of agreement between the manufacturer and the user.

The constructional, functional and performance requirements are given in 8.6.

5.4 Residential fire pump controller

Residential fire pump controllers are a sub-class of electric fire pump controllers with a restricted scope of application (e.g. domestic residences).

The constructional, functional and performance requirements are given in 8.7.