UL 61010-2-202

STANDARD FOR SAFETY

Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – Part 2-202: Particular Requirements for Electrically Operated Valve Actuators

UL Standard for Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – Part 2-202: Particular Requirements for Electrically Operated Valve Actuators, UL 61010-2-202

First Edition, Dated August 22, 2024

Summary of Topics

Adoption of IEC 61010-2-202, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – Part 2-202: Particular Requirements for Electrically Operated Valve Actuators (second edition, issued by IEC November 2020) as a new IEC-based UL standard, UL 61010-2-202 dated August 22, 2024, with US Differences.

Please note that the National Difference document incorporates all of the U.S. national differences for UL 61010-2-202.

The requirements are substantially in accordance with Proposal(s) on this subject dated April 12, 2024 and July 19, 2024.

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AUGUST 22, 2024

ANSI/UL 61010-2-202-2024

UL 61010-2-202

Standard for Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – Part 2-202: Particular Requirements for Electrically Operated Valve Actuators

First Edition

August 22, 2024

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

The most recent designation of ANSI/UL 61010-2-202 as an American National Standard (ANSI) occurred on August 22, 2024. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, or Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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PREFACE

>This UL Standard is based on IEC Publication 61010-2-202: second edition , Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-202: Particular requirements for electrically operated valve actuators. IEC publication 61010-2-202 is copyrighted by the IEC.

This edition has been issued to satisfy UL Standards policy.

This UL Standard 61010-2-202 Standard for Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – Part 2-202: Particular Requirements for Electrically Operated Valve Actuators, is to be used in conjunction with the third edition of UL 61010-1. The requirements for electrically operated valve actuators are contained in this Part 2 Standard and UL 61010-1.

Requirements of this Part 2 Standard, where stated, amend the requirements of UL 61010-1.

Where a particular subclause of UL 61010-1 is not mentioned in UL 61010-2-202 , the UL 61010-1 subclause applies.

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.

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NATIONAL DIFFERENCES

National Differences from the text of International Electrotechnical Commission (IEC) Publication 61010-2-202, Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use – Part 2-202: Particular Requirements for Electrically Operated Valve Actuators, copyright November 2020, are indicated by notations (differences) and are presented in bold text.

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

SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL AND LABORATORY USE – Part 2-202: Particular requirements for electrically operated valve actuators

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.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.

4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.

5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.

6) All users should ensure that they have the latest edition of this publication.

7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.

8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

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 61020-2-202 has been prepared by committee TC 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 2016. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) the scope has been clarified in relationship with other IEC standards,

b) additional requirement for identification has been included,

c) additional requirement for user documentations has been included,

d) accuracy of high voltage di-electric tester has been specified,

e) conformity statement for mechanical tests has been clarified.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
65/835/FDIS	65/844/RVD

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

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

This Part 2-202 is to be used in conjunction with third edition of IEC 61010-1:2010, including its Amendment 1:2016.

This Part 2-202 supplements or modifies the corresponding clauses in IEC 61010-1 so as to convert that publication into the IEC standard: *Particular requirements for electrically operated valve actuators*.

Where a particular subclause of Part 1 is not mentioned in this part 2, that subclause applies as far as is reasonable. Where this part states "addition", "modification", "replacement", or "deletion", the relevant requirement, test specification or note in Part 1 should be adapted accordingly.

A list of all parts in the IEC 61010 series, published under the general title Safety requirements for electrical equipment for measurement, control and laboratory use, can be found on the IEC website.

In this standard:

1) the following print types are used:

– requirements: in roman type;

– NOTES: in smaller roman type;

– conformity and test: *in italic type*;

– terms used throughout this standard which have been defined in clause 3: SMALL ROMAN CAPITALS;

2) subclauses, figures, tables and notes which are additional to those in part 1 are numbered starting from 101. Additional annexes are lettered starting from AA.

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

• reconfirmed,

• withdrawn,

• replaced by a revised edition, or

• amended.

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INTRODUCTION

This IEC 61010-2-202 document constitutes Part 2-202 of a planned series of standards on industrial-process measurement, control and automation equipment.

Safety terms of general use are defined in IEC 61010-1. More specific terms are defined in each part.

This part incorporates the safety related requirements of electrically operated valve ACTUATORS and SOLENOIDS.

This document does not cover functional safety aspects of electrically operated ACTUATORS and SOLENOIDS.

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SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL AND LABORATORY USE – Part 2-202: Particular requirements for electrically operated valve actuators

1 Scope and object

This clause of Part 1 is applicable, except as follows:

1.1 Scope

1.1.1 Equipment included in scope

Replacement of the text by the following paragraphs:

This part of IEC 61010 specifies the safety requirements for electric ACTUATORS and SOLENOIDS, as applied to valves, intended to be installed in an industrial process or discrete control environment.

This part of IEC 61010 specifies:

– particular safety requirements for general purpose electrically operated valve ACTUATORS and SOLENOIDS,

– related verification tests.

1.1.1DV DR *Modification of Clause 1.1.1 to add the following:*

This Standard covers equipment that is intended to be installed or used in accordance with the National Electrical Code (NEC), NFPA 70.

1.1.2 Equipment excluded from scope

Addition at the end of the list:

This standard excludes:

aa) electric ACTUATORS and SOLENOIDS for use in domestic or commercial applications;

NOTE 1 These are covered by other IEC or ISO standards, such as IEC 60730, etc.

bb) electric ACTUATORS and SOLENOIDS performing a safety function;

NOTE 2 These are covered by other IEC or ISO standards, such as IEC 61508, etc.

cc) positioners.

NOTE 3 A positioner is defined as a "physical unit delivering an additional, often mechanical, feedback to a mechanical final controlling element that improves its velocity and precision" in IEC 60050-351:2013, 351-56-17.

1.1.2DV DC *Modification of Clause 1.1.2 to replace bb) and NOTE 2 with the following:*

bbdv) safety ACTUATORS and SOLENOIDS performing a safety function as covered by UL 429

1.2 Object

1.2.2 Aspects excluded from scope

Addition at the end of the list:

aa) mechanical parts/aspects of valves.

1.2.101 Aspects included in other applicable standards

Where electric ACTUATORS and SOLENOIDS are required to comply with requirements of other IEC or ISO standards, aspects fully covered in these standards can replace requirements as given in IEC 61010-1.

Where aspects covered in IEC 61010-1 are not fully covered in these IEC or ISO standards, tests of IEC 61010-1 shall be conducted as far to ensure that no HAZARD can occur in NORMAL or in SINGLE FAULT CONDITION.

NOTE IEC 61010-1:2010, Figure 15 of 14.1 gives a general overview of dealing with components within the scope of other IEC or ISO standards. A similar approach can be used for equipment and sub-assemblies. Example – Clauses 8 and 9.1 to 9.5 can generally be considered sufficiently covered where IEC 60079 has been applied.

2 Normative references

This clause of Part 1 is applicable.

3 Terms and definitions

This clause of Part 1 is applicable, except as follows:

Additional terms and definitions:

3.101
ACTUATOR
device that controls a valve, in response to an external signal

3.102
SERVICE PERSONNEL
person who is installing, changing or repairing the control equipment, with the appropriate technical training, experience and awareness of HAZARDs and of measures to minimize danger to himself/herself, other persons or to the control equipment, in an industrial environment

Note 1 to entry: SERVICE PERSONNEL are persons having the appropriate technical training and experiences necessary to be aware of HAZARDs – e.g, electrical HAZARDs, temperature HAZARDs, fire HAZARDs – to which they are exposed in performing a task and of measures to minimize danger to themselves or to other persons or to the control equipment, in an industrial environment.

Note 2 to entry: SERVICE PERSONNEL change or repair the control equipment e.g. hardware configuration or installing software updates provided by the manufacturer.

3.103
SOLENOID

a coil, carrying current, to produce a magnetic field, in order to move a plunger

4 Tests

This clause of Part 1 is applicable, except as follows:

4.4.2.1 General

Replacement of the first sentence with the following sentence:

Fault conditions shall include those specified in 4.4.2.2 to 4.4.2.14 and in 4.4.2.101.

4.4.2.5 Motors

Additional subclause:

4.4.2.5.101 Motor power supply

In ACTUATORS where the motor power supply can be wired incorrectly:

– delta-connected motor shall be connected to power supply with star connection;

– star-connected motor shall be connected to power supply with delta connection;

Additional subclause:

4.4.2.101 SOLENOID

SOLENOID shall be blocked while fully energized or prevented from moving, whichever is less favourable.

A SOLENOID damaged during one test may be repaired or replaced before the next test.

5 Marking and documentation

This clause of Part 1 is applicable, except as follows:

5.1.2 Identification

Addition of a new item to the list:

aa) identification that this is a device for industrial process or discrete control environment applications, either through text, or identification of the safety standard.

NOTE Example: Text such as "IEC 61010" or similar can be considered as sufficient.

5.1.2DV DE *Modification of Clause 5.1.2 to replace with the following:*

aa) identification that this is a valve actuator for process or industrial control applications only, either through text, or identification of the safety standard.

Notes:

1A) UL 61010-1 and UL 61010-2-202 are both considered acceptable.

2A) IEC 61010-2-202 can be seen as indication similar to UL 61010-2-202.

5.1.3 MAINS supply

Addition after e):

aa) number of phases for multiphase connections (e.g. 2,3);

bb) other designated conductors (e.g. N, PE).

5.4 Documentation

5.4.1 General

Addition of a new item to the list:

aa) information that the device is constructed for industrial process or discrete control application.

5.4.1DV DE *Modification to Clause 5.4.1 to replace with the following:*

aa) information that the valve actuator is constructed for process control application only and is not intended to perform a safety function.

5.4.2 Equipment RATINGS

Addition after f):

aa) the maximum force or torque available from the ACTUATOR.

5.4.3 Equipment installation

Addition after g):

aa) instructions of how to install the equipment in order to achieve the stated degree of protection according to IEC 60529, shall be provided;

bb) instructions on the RATINGS of necessary equipment required to complete the installation of the ACTUATOR or SOLENOID so that it operates safely. This may include but is not limited to:

– contactors,

– locked rotor and overload protection,

– overcurrent devices,

– connection of thermal trips,

– isolators.

5.4.3DV D2 *Modification to Clause 5.4.3 to add the following:*

ccdv) instructions on how to install the equipment in order to guarantee the stated degree of protection according to UL 50 and UL 50E shall be provided.

5.4.4 Equipment operation

Addition after j):

aa) duty cycle, if the device is designed for intermittent operation;

bb) instructions for safety protection relating to surface temperature.

5.4.5 Equipment maintenance and service

Addition of the following paragraph after the last paragraph before the conformity statement:

If more than one disconnect switch may be required to disconnect all power within an ACTUATOR, the manufacturer shall provide instructions with the word "warning" and the following or the equivalent: "risk of electric shock – more than one disconnect switch may be required to de-energize the device for servicing."

6 Protection against electric shock

This clause of Part 1 is applicable, except as follows:

6.1.2 Exceptions

Addition of the following paragraph after the conformity statement:

HAZARDOUS LIVE parts, components or subassemblies can be ACCESSIBLE by SERVICE PERSONNEL during service provided that they are marked with symbol 12 of Table 1 to indicate an electric shock HAZARD.

6.8.3.1 The a.c. voltage test

Replacement of the first sentence by the following sentence:

The voltage tester shall be capable of maintaining the test voltage throughout the test within +/- 5 % of the specified value.

7 Protection against mechanical HAZARDS

This clause of Part 1 is applicable, except as follows:

7.3 Moving parts

Additional subclause:

7.3.101 Independence of operating wheels and transmission gears

If a mechanical operating wheel, etc. is supplied or specified by the ACTUATOR manufacturer, it shall not cause a HAZARD in NORMAL or SINGLE FAULT CONDITIONS, while the ACTUATOR is operated.