IEC 61010-2-202

Edition 2.0 2020-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Safety requirements for electrical equipment for measurement, control and laboratory use –
Part 2-202: Particular requirements for electrically operated valve actuators

Exigences de sécurité pour appareils électriques de mesurage, de regulation et de laboratoire –
Partie 2-202: Exigences particulières pour les actionneurs à vanne à commande électrique

IEC 61010-2-202:2020-11(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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

FOREWORD

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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.

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.

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.

1.1.2 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.

1.2 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.

5.1.3 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.

5.4.2 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.

5.4.4 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.

No ACCESSIBLE moving parts of the ACTUATOR assembly shall create a HAZARD when the ACTUATOR is operated.

If these conditions are not met, a RISK assessment shall be carried out according to 7.3.3 or Clause 17.

Conformity is checked by inspection.

7.5.1 General

Addition of the following paragraph before the conformity statement:

Lifting and carrying through strapping is allowed. Lifting and carrying through strapping the operating wheel is not allowed.

8 Resistance to mechanical stresses

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

8.1 General

Addition of the following before the conformity statement:

Components complying with suitable component standard, where impact test is included, does not have to be retested in the end application. Also see 14.1 and Figure 15.

Addition of the following at the end of the conformity statement:

Where the ACTUATOR or SOLENOID and valve are inseparable, the pressure containing parts shall be tested as follows after mechanical tests:

– *leakage per 11.7.2 at 1,3 times RATED pressure for 2 min; or*
– *leakage per 11.7.3 at 1,1 times RATED pressure for 2 min; or*
– *relevant valve standard as per 14.102, if more severe.*

NOTE For inseparable assemblies, see Clause 14.

9 Protection against the spread of fire

This clause of Part 1 is applicable.

10 Equipment temperature limits and resistance to heat

This clause of Part 1 is applicable.

11 Protection against HAZARDS from fluids and solid foreign objects

This clause of Part 1 is applicable.

12 Protection against radiation, including laser sources, and against sonic and ultrasonic pressure

This clause of Part 1 is applicable.

13 Protection against liberated gases and substances, explosion and implosion

This clause of Part 1 is applicable.