

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

GROUP SAFETY PUBLICATION  
PUBLICATION GROUPEE DE SÉCURITÉ

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

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





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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT  
FOR MEASUREMENT, CONTROL AND LABORATORY USE –**

**Part 2-202: Particular requirements  
for electrically operated valve actuators**

## FOREWORD

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

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

FDIS	Report on voting
65/627/FDIS	65/631/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 Part 2-202 is intended to be used in conjunction with IEC 61010-1. It was established on the basis of the third edition (2010). Consideration may be given to future editions of, or amendments to, IEC 61010-1.

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.

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

It has the status of a group safety publication in accordance with IEC Guide 104.

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 publication will remain unchanged until the stability 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

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.

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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:*

*Replace 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, <https://standards.iteh.ai/catalog/standards/sist/90ee657f-eed2-4439-9bb1-ebdcfc5c1dae/iec-61010-2-202-2016>
- related verification tests.

The general purpose electrically operated valve ACTUATORS and SOLENOIDS, covered by this part of IEC 61010 are limited to:

- those rated 600 V alternative current/ 840 V direct current or less,

Service personnel interface to equipment included in the scope of this document.

##### 1.1.2 Equipment excluded from scope

*Addition at the end of the list:*

This standard excludes

- electric ACTUATORS and SOLENOIDS for use in explosive atmospheres, as covered by the IEC 60079 series of standards;
- mechanical parts/aspects of valves;
- ACTUATORS and SOLENOIDS performing a safety function as covered by the IEC 61508 series of standards;
- POSITIONERS.

NOTE 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.



## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

No additional references are needed for this document.

## 3 Terms and definitions

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

Additional terms and definitions:

### 3.101.1

#### ACTUATOR

device that controls a valve it is assembled to in response to an external signal

### 3.101.2

#### SERVICE PERSONNEL

person, with the appropriate technical training, experience and awareness of HAZARDS and of measures to minimize danger to themselves, other persons or to the control equipment, in an industrial environment, changing or repairing the control equipment

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.

### 3.101.3

#### SOLENOID

cylindrical coil, the length of which is much greater than its transverse dimensions and which is used to produce a magnetic field

### 3.101.4

#### SWITCH

contact device actuated by the valve mechanism

## 4 Tests

This clause of Part 1 is applicable except as follows:

### 4.4.2.1 General

*Replace 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.

*Addition of a new subclause:*

#### 4.4.2.101 SOLENOID

SOLENOID shall be stopped 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.

#### 4.4.2.5 Motors

*Addition of a new 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.

For a three-phase motor, any two phases shall be reverse connected.

## 5 Marking and documentation

This clause of Part 1 is applicable except as follows.

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### 5.1.3 MAINS supply

*Addition after e):*

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aa)

- number of phase conductors (e.g. 2,3);
- other designated conductors (e.g. N,M,PE).

### 5.4 Documentation

This clause of IEC 61010-1 is applicable except as follows:

#### 5.4.2 Equipment RATINGS

*Addition after f):*

- aa) the maximum linear travel distance or rotation angle of the ACTUATOR;
- bb) the maximum force available from the ACTUATOR;
- cc) the minimum actuation cycles available.

#### 5.4.3 Equipment installation

*Addition after g):*

- aa) instructions of how to install the equipment in order to guarantee the stated degree of protection according to IEC 60529, shall be provided;
- bb) Instructions on the necessary equipment required to complete the installation of the actuator so that it operates safely. This may include but is not limited to:
  - contactors
  - stall protection

- overcurrent devices
- connection of thermal trips
- isolators

#### 5.4.4 Equipment operation

*Replacement of d):*

d) intermittent operation limits, e.g. energize ACTUATOR at least once per hour.

*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 touched by SERVICE PERSONNEL during service provided that they are marked with symbol 12 of Table 1 to indicate an electric shock HAZARD.

## 7 Protection against mechanical HAZARDS

This clause of Part 1 is applicable except as follows:

*Addition of a new 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

*Add before conformity statement as follows:*

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.

## 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

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.

## 14 Components and subassemblies

This clause of Part 1 is applicable except as follows:

*Addition of a new subclause:*

### 14.101 SOLENOID

The bobbins of the SOLENOID shall be made of material with a flammability classification of V-1 of IEC 60695-11-10 or better.

Insulating material or insulating bushing of the SOLENOID shall be made of material with a flammability classification of V-1 of IEC 60695-11-10 or better.

Conformity is checked by inspection of data on materials, or by performing the vertical burning tests specified in IEC 60695-11-10 on three samples of the relevant parts.