

# INTERNATIONAL STANDARD



Automatic electrical controls ~~for household and similar use –~~  
Part 2-8: Particular requirements for electrically operated water valves,  
including mechanical requirements

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# INTERNATIONAL STANDARD



Automatic electrical controls **for household and similar use –**  
**Part 2-8: Particular requirements for electrically operated water valves,**  
**including mechanical requirements**

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INTERNATIONAL  
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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**AUTOMATIC ELECTRICAL  
CONTROLS ~~FOR HOUSEHOLD AND SIMILAR USE~~ –****Part 2-8: Particular requirements for electrically operated water valves,  
including mechanical requirements**

## FOREWORD

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International Standard IEC 60730-2-8 has been prepared by IEC technical committee 72: Automatic electrical controls.

This third edition cancels and replaces the second edition published in 2000, Amendment 1:2002 and its Amendment 2:2015. This edition constitutes a technical revision.

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

- alignment of the text with IEC 60730-1 fifth edition (2013) including Amendment 1:2015;
- introduction of specific requirements for thermoplastic bodied valves for the control of water for tap and shower outlets (18.101.4.3 and Annex CC);
- removal of Subclause 18.102 Wetted material specifications.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

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

CDV	Report on voting
72/1077/CDV	72/1120/RVC

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 2-8 is intended to be used in conjunction with IEC 60730-1. It was established on the basis of the fifth edition (2013) including Amendment 1 (2015) of that publication.

This part 2-8 supplements or modifies the corresponding clauses in IEC 60730-1 so as to convert that publication into the IEC standard: *Safety requirements for electrically operated water valves, including mechanical requirements*.

Where this part 2-8 states "addition", "modification" or "replacement", the relevant requirement, test specification or explanatory matter in part 1 should be adapted accordingly.

Where no change is necessary, part 2-8 indicates that the relevant clause or subclause applies.

In the development of a fully international standard, it has been necessary to take into consideration the differing requirements resulting from practical experience in various parts of the world and to recognize the variation in national electrical systems and wiring rules.

The "in some countries" notes regarding differing national practices are contained in the following elements:

- Table 1, footnotes ab and ac
- Table 13, footnote aa
- 1.1.4
- 16.2.1
- 18.101.3
- 27.2.3.1
- 27.101
- Table DD. 1, footnote a
- Table DD.2, footnote a

In this publication:

1) The following print types are used:

- Requirements proper: in roman type.
- *Test specifications: in italic type.*
- Notes: in smaller roman type.
- Defined terms: in **bold type**

2) Subclauses, notes, tables or figures which are additional to those in part 1 are numbered starting from 101, additional annexes are lettered AA, BB, etc.

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
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## AUTOMATIC ELECTRICAL CONTROLS ~~FOR HOUSEHOLD AND SIMILAR USE~~ –

### Part 2-8: Particular requirements for electrically operated water valves, including mechanical requirements

#### 1 Scope and normative references

This clause of Part 1 is ~~replaced~~ applicable except as follows:

##### 1.1 Scope

*Replacement:*

~~1.1 This part 2-8 applies to electrically operated water valves for use in, on or in association with equipment for household and similar use that may use electricity, gas, oil, solid fuel, solar thermal energy, etc. or a combination thereof, including heating, air-conditioning and similar applications.~~

~~This part 2-8 is also applicable to electrically operated water valves for appliances within the scope of IEC 60335.~~

~~1.1.1 This part 2-8 contains requirements for electrical features of water valves and requirements for mechanical features of valves that affect their intended operation.~~

~~1.1.2 This part 2-8 applies to the inherent safety, to the operating values, operating sequences where such are associated with equipment protection, and to the testing of automatic electrical controls used in, on or in association with household and similar equipment.~~

~~Electrically operated valves for equipment not intended for normal household use but which may nevertheless be used by the public, such as equipment intended to be used by laymen in shops, in light industry and on farms, are within the scope of this part 2-8.~~

~~This part 2-8 does not apply to electrically operated water valves designed exclusively for industrial applications.~~

This part of IEC 60730 applies to electrically operated water valves for use in, on or in association with equipment for household and similar use, including heating, air-conditioning and similar applications. The equipment can use electricity, gas, oil, solid fuel, solar thermal energy, etc., or a combination thereof.

NOTE 1 Throughout this document, the word "equipment" means "appliances and equipment."

This document is applicable to electrically operated water valves for building automation within the scope of ISO 16484.

This document also applies to automatic electrically operated water valves for equipment that can be used by the public, such as equipment intended to be used in shops, offices, hospitals, farms and commercial and industrial applications.

EXAMPLE 1: Electrically operated water valves for commercial catering, heating and air-conditioning equipment.

This document does not apply to electrically operated water valves intended exclusively for industrial process applications unless explicitly mentioned in the relevant equipment standard.

This document applies to electrically operated water valves powered by primary or secondary batteries, requirements for which are contained within the standard, including Annex V.

This document does not cover the prevention of contamination of drinking water as a result of contact with materials.

**1.1.1** This document applies to the inherent safety, to the operating values, operating times and operating sequences where such are associated with equipment safety, and to the testing of automatic electrical control devices used in, on or in association with, household and similar equipment.

This document contains requirements for electrical features of water valves and requirements for mechanical features of valves that affect their intended operation.

This document is also applicable to electrically operated water valves for appliances within the scope of the IEC 60335 series of standards.

This document does not apply to:

- electrically operated water valves of nominal connection size above DN 50;
- electrically operated water valves for admissible nominal pressure rating above 1,6 MPa;
- food dispensers;
- detergent dispensers;
- steam valves;
- electrically operated water valves designed exclusively for industrial applications.

Throughout this document, where it can be used unambiguously, the term:

- "valve" is used to denote an electrically operated water valve (including actuator and valve body assembly);
- "actuator" means "electrically operated mechanism or prime mover";
- "valve body" means "valve body assembly";
- "equipment" includes "appliance" and "control system".

**1.1.2** This document applies to electrically operated water valves, responsive to or controlling such characteristics as temperature, pressure, passage of time, humidity, light, electrostatic effects, flow, or liquid level, current, voltage, acceleration, or combinations thereof.

**1.1.3** This document also applies to actuators and to valve bodies which are designed to be fitted to each other.

**1.1.4** This document applies to individual valves, valves utilized as part of a system and valves mechanically integral with multi-functional controls having non-electrical outputs.

NOTE Attention is drawn to the fact that, in many countries, additional test requirements and by-laws have been established by the water authorities or companies.

**1.1.5** This document applies to AC or DC powered electrically operated water valves with a rated voltage not exceeding 690 V AC or 600 V DC.

**1.1.6** This document does not take into account the **response value** of an **automatic action** of a valve, if such a **response value** is dependent upon the method of mounting the valve in

the equipment. Where a **response value** is of significant purpose for the protection of the **user**, or surroundings, the value defined in the appropriate equipment standard or as determined by the manufacturer shall apply.

**1.1.7** This document applies also to electrically operated water valves incorporating **electronic devices**, requirements for which are contained in Annex H.

**1.1.8** This document applies also to electrically operated water valves using NTC or PTC **thermistors**, requirements for which are contained in Annex J.

**1.1.9** This document applies to the electrical and **functional safety** of electrically operated water valves capable of receiving and responding to communications signals, including signals for power billing rate and demand response.

The signals can be transmitted to or received from external units being part of the valve (wired), or to and from external units which are not part of the valve (wireless) under test.

**1.1.10** This document does not address the integrity of the output signal to the network devices, such as interoperability with other devices unless it has been evaluated as part of the **control system**.

## 1.2 Normative references

This clause of Part 1 is applicable except as follows:

*Addition:*

ISO 7-1:1994, *Pipe threads where pressure-tight joints are made on the threads – Part 1: Dimensions, tolerances and designation*

ISO 65:1981, *Carbon steel tubes suitable for screwing in accordance with ISO 7-1*

ISO 228-1:1994, *Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation*

ISO 630:1995, <sup>1</sup> *Structural steels – Plates, wide flats, bars sections and profiles*

~~ISO 1179:1981, *Pipe connections threaded to ISO 228-1 for plain end steel and other metal tubes in industrial applications*~~

ISO 1179-1, *Connections for general use and fluid power – Ports and stud ends with ISO 228-1 threads with elastomeric or metal-to-metal sealing – Part 1: Threaded ports*

ISO 4144:1979, *Pipework – Stainless steel fittings threaded to in accordance with ISO 7-1*

~~ISO 4400:1994, *Fluid power systems and components – Three-pin electrical plug connectors with earth contact – Characteristics and requirements*~~

~~ISO 6952:1994, *Fluid power systems and components – Two-pin electrical plug connectors with earth contact – Characteristics and requirements*~~

<sup>1</sup> ISO 630 has been withdrawn.

## 2 Terms and definitions

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

### 2.2 Definitions of types of control according to purpose

#### 2.2.17 electrically operated valve

*Addition:*

Note 1 to entry: A semi-automatic valve that is opened manually and closes automatically or vice versa is also covered by this definition.

*Additional definitions:*

##### 2.2.17.101 valve

device consisting of an actuator connected to a valve body assembly and used to stop or regulate the flow of fluid by the closure or partial closure of an orifice

##### 2.2.17.102 water valve

valve intended to be connected to a water supply and to control water flow

~~NOTE A water valve is a type 1 action. Switching devices incorporated in water valves are type 1 or 2 actions.~~

##### 2.2.17.103 heating-water valve

valve intended to control the water circulation in heating systems

##### 2.2.17.104 actuator

electrically operated mechanism or prime mover used to effect the opening or closing action of a valve

Note 1 to entry: An actuator may be integral with the valve, fixed to the valve body assembly or delivered as a separate component.

Note 2 to entry: An actuator may also include the valve and closure member.

##### 2.2.17.105 valve body assembly

assembly comprising the valve body, inlet and outlet end connections, the valve seat, closure member and stem or shaft

Note 1 to entry: In some cases, the stem and closure member may be part of the actuator.

##### 2.2.17.106 valve body

part of the valve body assembly which is the main pressure boundary

Note 1 to entry: It provides the water flow passage-ways with end connections.

##### 2.2.17.107 nominal size

numerical designation of size which is common to all components in a fluid-conducting system other than components designated by outside diameter or by thread size

Note 1 to entry: It may be designated by "DN" followed by a convenient round number, for reference purposes only.

Note 2 to entry: Some older international standards refer to nominal size as nominal diameter but, for the purpose of this document, the two terms are synonymous.

#### **2.2.17.108**

##### **nominal pressure rating**

numerical designation of pressure rating

Note 1 to entry: It may be designated by the letters "PN" (also referred to as the pressure number) followed by a convenient round number, for reference purposes only.

#### **2.2.17.109**

##### **end connection**

valve body configuration provided to make a pressure-tight joint to the fluid-conducting system

#### **2.2.17.110**

##### **valve seat**

surface of the orifice within the valve which makes full contact with the closure member

#### **2.2.17.111**

##### **closure member**

movable part of the valve which is positioned in the flow path to modify the rate of flow through the valve

Note 1 to entry: A closure member may be a plug, ball, disc, vane, gate, etc.

#### **2.2.17.112**

##### **stem**

component which connects the actuator to, and positions, the closure member

Note 1 to entry: For rotary valves, the word "shaft" should be used in place of "stem".

Note 2 to entry: In some controls, the stem may be part of the actuator.

#### **2.2.17.113**

##### **fitting**

any device such as a reducer, expander, elbow, or T-piece which is attached directly to an end-connection of the valve body assembly

### **2.3 Definitions relating to the function of controls**

#### **2.3.29**

##### **maximum working pressure**

*Modification:*

*Delete* "maximum rated pressure".

*Additional definitions:*

#### **2.3.101**

##### **on-off valve**

valve which is open or closed, without any intermediate positions

#### **2.3.102**

##### **normally closed valve**

valve which is closed when not electrically energized

#### **2.3.103**

##### **normally open valve**

valve which is open when not electrically energized

**2.3.104****modulating valve**

valve which has a variable flow rate between predetermined flow limits

**2.3.105****diverting valve**

valve with one or more inputs and outputs which may permit flow from any combination of inputs to outputs

**2.3.106****closed position**

position of the closure member when there is no water flow from the outlet side of the valve

**2.3.107****travel**

displacement of the closure member from the closed position

**2.3.108****rated travel**

displacement of the closure member from the closed position to the full open position

**2.3.109****open position**

position of the closure member when there is a flow of water from the outlet side of the valve

**2.3.110****fully open position**

position of the closure member so that the amount of water flowing through the valve is in accordance with the rated flow rate

**2.3.111****flow rate**

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volume of water flowing through the valve in unit time

**2.3.112****rated flow rate**

flow rate at the rated travel under standard reference conditions of temperature and pressure declared at a given pressure difference

**2.3.113****flow factor**

factor specifying the amount of water which can pass through the valve at a specified pressure difference

Note 1 to entry: The flow factor may be referred to as flow coefficient.

Note 2 to entry: The relationship between the different flow factors in use is indicated in Annex AA.

**2.3.114****maximum operating pressure differential**

declared maximum difference in pressure between inlet and outlet ports of the valve against which the actuator can operate the closure member

**2.3.115****minimum operating pressure differential**

declared minimum pressure difference at which the valve opens or closes

**2.3.116**

Void