IEC 60730-2-17

Edition 1.2 2007-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Automatic electrical controls for household and similar use –
Part 2-17: Particular requirements for electrically operated gas valves, including mechanical requirements

Dispositifs de commande électrique automatiques à usage domestique et analogue –
Partie 2-17: Règles particulières pour les électrovannes de gaz, y compris les prescriptions mécaniques

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AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE –

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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 60730-2-17 has been prepared by IEC technical committee 72: Automatic controls for household use.

This consolidated version of IEC 60730-2-17 consists of the first edition (1997) [documents 72/348/FDIS and 72/371/RVD], its amendment 1 (2000) [documents 72/466/FDIS and 72/490/RVD] and its amendment 2 (2007) [documents 72/744/FDIS and 72/749/RVD].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 1.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

This Part 2-17 is intended to be used in conjunction with IEC 60730-1. It was established on the basis of the third edition of that standard (1999) and its amendment 1 (2003). Consideration may be given to future editions of, or amendments to IEC 60730-1.

Where this part 2 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 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 practice are contained in the following subclauses:

– 6.11.101
– 6.103
– 6.104
– Table 7.2, requirements 117 and 118
– Table 7.2, notes 103 and 104
– 11.102
– 11.103
– 11.104.3
– 11.104.5
– 11.104.11
– 11.104.14
– 11.105.1
– 11.105.2
– 11.105.3
– 11.105.6
– 11.106.1
– 11.115
– 17.16.101
– 18.102
– 18.103
– 27.2.101.1

In this publication:

1) The following print types are used:
   – Requirements proper: in roman type;
   – *Test specifications: in italic type;*
   – Explanatory matter: in smaller roman type.

2) Subclauses, notes or requirements which are additional to those in part 1 are numbered starting from 101.

The committee has decided that the contents of the base publication and its amendments 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.

AUTOMATIC ELECTRICAL CONTROLS FOR HOUSEHOLD AND SIMILAR USE –

Part 2-17: Particular requirements for electrically operated gas valves, including mechanical requirements

1 Scope and normative references

This clause of part 1 is replaced as follows:

Replacement:

1.1 This part 2 of IEC 60730 applies to electrically operated gas valves for use in, on or in association with, equipment for household and similar use that use electricity, in combination with fuel in the gaseous state such as manufactured gas, natural gas or liquefied petroleum gas intended to be used for gas burning equipment.

Additional considerations may be necessary for gas with corrosive properties.

This part 2 also applies to electrically operated gas valves using NTC or PTC thermistors, requirements for which are contained in annex J.

1.1.1 This standard 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 electrically operated gas valves used in, or in association with, household or similar equipment, but also extended to industrial purposes when no dedicated product standard exists, such as that for central heating, air conditioning, process heating, etc.

This part 2 is also applicable to controls for appliances within the scope of IEC 60335-1.

Throughout this part 2 the word "equipment" means "appliance and equipment".

This part 2 does not apply to electrically operated gas valves designed exclusively for industrial applications.

Electrically operated gas valves for equipment not intended for normal household use, but which nevertheless may 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.

This part 2 identifies a number of mechanical features as "under consideration". Until these mechanical requirements are incorporated in this part 2, each country using this part 2 will have to quantify these requirements.

Compliance of an electrically operated gas valve with this part 2 does not imply that the valve is acceptable without further tests for these mechanical features.

1.1.2 This part 2 applies to manual controls when such are electrically and/or mechanically integral with electrically operated gas valves.

Requirements for manual switches not forming part of an electrically operated gas valve are contained in IEC 61058-1.

This part 2 does not apply to electrically operated gas valves of nominal connection size above DN 150.

This part 2 applies to electrically operated gas valves for maximum working pressures up to 400 kPa (4 bar).

Hereinafter, the term "valve" is used to denote an electrically operated gas valve (including prime mover and valve body).

1.1.3 An electric actuator that is submitted to the testing laboratory in combination with a gas valve will be evaluated under this part 2. A separate electric actuator is evaluated under IEC 60730-2-14, which provides particular requirements for electric actuators.

1.1.4 This part 2 also applies to valves utilized as part of a system, or valves mechanically integral with multifunctional controls.

1.1.5 This part 2 does not apply to valves energized by thermoelectric energy generated in a thermocouple or thermopile inserted in a gas flame.

1.3 Is not applicable.

1.5 Normative references

This clause of part 1 is applicable except as follows:

Addition:

IEC 60730-2-14:2001, *Automatic electrical controls for household and similar use – Part 2: Particular requirements for electric actuators*

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

ISO 228-1:2000, *Pipe threads where pressure-tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation*

ISO 274:1975, *Copper tubes of circular section – Dimensions*

ISO 301:1981, *Zinc alloy ingots intended for casting*

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*

ISO 7005-1:1992, *Metallic flanges – Part 1: Steel flanges*

ISO 7005-2:1988, *Metallic flanges – Part 2: Cast iron flanges*

2 Definitions

This clause of Part 1 is applicable except as follows:

2.2.17 *Additional definitions:*

2.2.17.101

electrically operated gas valve
an automatic valve in which the transmission is effected by an electrical prime mover and in which the operation controls the flow of gas

A semi-automatic valve that is opened manually and closes automatically, or vice versa, is also covered by this definition.

2.2.17.102
valve body
that part which is the main pressure boundary and which provides the gas flow passageways with end connections

2.2.17.103
nominal size
a 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

This size may be designated by DN followed by a convenient round number, for reference purposes only.

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

2.2.17.104
end connection
valve body configuration provided to make a pressure-tight joint to the fluid-connecting system

2.3 Definitions relating to the function of controls

Additional definitions:

2.3.101
on-off valve
a valve which is open or closed, without any intermediate positions

2.3.102
normally closed valve
a valve which is closed when not electrically energized

2.3.103
normally open valve
a valve which is open when not electrically energized

2.3.103.1
semi-automatic normally open valve with latch
a valve which is closed when energized. When power is removed the valve will not open automatically and must be manually reset

2.3.103.2
normally open valve, automatic
a valve which is open when not electrically energized and when power is removed the valve will open automatically

2.3.104
modulating valve
a valve which has a variable flow rate between predetermined flow rates

2.3.104.1
multi-stage valve
a valve which permits operation at rated flow rate or at various predetermined flow rates below rated flow rate

2.3.105
closure member
a movable part of the valve which is positioned in the flow path to modify the rate of flow through the valve

2.3.106
closed position
position of the closure member when there is no intended gas flow from the outlet of the valve

2.3.107
open position
position of the closure member when there is intended gas flow from the outlet of the valve

2.3.107.1
fully open position
position of the closure member so that the amount of gas flowing through the valve is in accordance with the rated flow rate

2.3.108
flow rate
volume of gas flowing through the valve in unit time

2.3.109
rated flow rate (capacity)
flow rate under standard reference conditions of temperature and pressure declared at a given pressure difference

2.3.110
inlet pressure
pressure at the inlet of the valve

2.3.111
outlet pressure
pressure at the outlet of the valve

2.3.112
pressure difference
difference between the inlet and outlet pressures

2.3.113
maximum working pressure
declared maximum inlet pressure at which the valve may be operated

2.3.114
safety shut-off valve
normally closed valve that prevents delivery of gas when de-energized by the action of a limiter, a cut-out or a burner control system

A safety shut-off valve is considered a protective control and may also be used as an operating control.

A safety shut-off valve may be either of the automatic or semi-automatic opening type.

2.3.115
"Void"

2.3.116
"Void"

2.3.117
gas leakage, external
leakage of gas from the valve body to atmosphere

2.3.118
gas leakage, internal
leakage of gas to atmosphere from the outlet piping connection with the closure member in the closed position

2.3.119
opening time
time interval between the electrical signal to open the valve and the achievement of maximum or other defined flow rate

2.3.120
closing time
time interval between when the electrical signal is removed and the achievement of the closed position

2.3.121
delay time
time interval between the electrical signal to open the valve and start of flow through the valve

2.3.122
proof of closure switch
an electrical switch which monitors the closed position of the valve closure member and which is used as an interlock

2.3.123
pilot operated prime mover
prime mover which controls the fluid (for example, compressed air), supplied to the actuating mechanism of the valve

2.3.124
switching devices
an electrical switch actuated by the valve actuator and used as an electrical output

2.3.125
valve actuator
an electrically operated mechanism or prime mover used to effect the opening or closing action of a valve

3 General requirements

This clause of part 1 is applicable.

4 General notes on tests

This clause of part 1 is applicable except as follows:

4.1.7 Is not applicable.

4.3 Instructions for test

Replacement:

4.3.2.6 *For controls marked or declared for more than one rated voltage, the tests of clause 17 are made at the maximum rated voltage.*

Additional subclause:

4.3.101 Where a manufacturer builds the same valve body with a number of different end connection sizes declared in 6.103, the tests of 18.101 shall be conducted on the largest end connection.

5 Rating

This clause of part 1 is applicable.

6 Classification

This clause of part 1 is applicable except as follows:

6.3 *According to their purpose:*

6.3.12 *Additional subclauses:*

6.3.12.101 – on-off valve;

6.3.12.102 – normally closed valve;

6.3.12.103 – normally open valve;

6.3.12.103.1 – normally open valve, automatic;

6.3.12.103.2 – normally open valve, semi-automatic with latch;

6.3.12.104 – modulating valve;

6.3.12.105 – multi-stage valve;

6.3.12.106 – safety shut-off valve, automatic;

6.3.12.107 – safety shut-off valve, semi-automatic.

6.7 According to ambient temperature limits of the switch head

Modification:

To read "valve" for "control" and to read "prime mover" for "switch head."

6.11 According to number of automatic cycles (A) of each automatic action

Additional table:

6.11.101 In the countries members of CEN/CENELEC, the required automatic cycles are as follows:

Table 6.11

Automatic cycles		
	Number of automatic cycles at:	
Nominal size	T_{max} (at least 60 ± 5) °C	(20 ± 5) °C
DN ≤ 25 Opening time ≤ 1 s Permissible working pressure ≤ 150 mbar	100 000	400 000
DN ≤ 25 Opening time ≤ 1 s Permissible working pressure > 150 mbar	50 000	150 000
DN ≤ 25 Opening time > 1 s	50 000	150 000
≤ DN 80	25 000	75 000
≤ DN 150	25 000	25 000

6.12 Is not applicable.

6.15 *According to construction:*

Additional subclause:

6.15.101 *According to type of gas:*

Natural gas, propane gas, butane gas, manufactured gas for example.

Additional subclauses:

6.101 *According to type of end connections*:

6.101.1 Valves provided with internally threaded end connections with either:

– ISO 7-1 or NPT thread when pressure tight joints are made on the thread, or
– ISO 228-1 thread when pressure tight joints are not made on the thread, but via an additional sealing washer.

6.101.2 Valves provided with externally threaded end connections for:

a) compression fittings; or
b) washered union connection; or
c) cone seated union connection; or
d) threaded pipe connections either according to ISO 7-1, ISO 228-1 or NPT thread.

6.101.3 Valves provided with flanged end connections suitable for connection to flanges with or without adaptors.

6.102 *According to features of electrically operated gas valves*

6.102.1 *According to size and rated flow rate:*

Size to be specified in dimensions of inlet and outlet connections and in rated flow rate.

6.102.2 *According to function:*

Description of function regarding number of gas connections and valve position when de-energized.

6.102.3 *According to the operation of the prime mover:*

Examples are electromagnetic, electric motors, electrically heated wax, bi-metal, electro-hydraulic, pilot operated prime mover.

6.102.4 *According to sequence of operation:*

Multi-stage, etc.

6.103 *According to nominal pipe size of end connections:*

Designation of thread	Nominal size
1/8	DN6
1/4	DN8
3/8	DN10
1/2	DN15
3/4	DN20
1	DN25
1 1/4	DN32
1 1/2	DN40
2	DN50
2 1/2	DN65
3	DN80
4	DN100
5	DN125
6	DN150

Nominal size designation corresponds to the nominal size flanges according to ISO 7005-1 or ISO 7005-2.

6.104 According to the sealing force:

In the countries members of CEN, valves can be further classified as Class A, B, C, D, E and J valves. See EN 161.

See also 11.106.1.

7 Information

This clause of part 1 is applicable except as follows:

Modification: