

INTERNATIONAL STANDARD

EXTENDED VERSION

This full version of IEC 60730-2-6:2025 includes the content of the references made to IEC 60730-1:2022

**Automatic electrical controls -
Part 2-6: Particular requirements for automatic electrical pressure sensing
controls including mechanical requirements**

Document Preview

[IEC 60730-2-6:2025](https://standards.iteh.ai/catalog/standards/iec/6b65a420-3aad-44d6-b0d5-c2c4b4e64717/iec-60730-2-6-2025)

<https://standards.iteh.ai/catalog/standards/iec/6b65a420-3aad-44d6-b0d5-c2c4b4e64717/iec-60730-2-6-2025>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2025 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search -

webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

[IEC 60730-2-6:2025](https://standards.iteh.ai/catalog/standards/iec/6b65a420-3aad-44d6-b0d5-c2c4b4e64717/iec-60730-2-6-2025)

<https://standards.iteh.ai/catalog/standards/iec/6b65a420-3aad-44d6-b0d5-c2c4b4e64717/iec-60730-2-6-2025>

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	9
1 Scope	12
2 Normative references	13
3 Terms and definitions	17
3.1 Definitions relating to ratings, voltages, currents, frequencies, and wattages	17
3.2 Definitions of types of control according to purpose	20
3.3 Definitions relating to the function of controls	22
3.4 Definitions relating to disconnection and interruption	26
3.5 Definitions of types of control according to construction	27
3.6 Definitions of type of automatic action of a control	28
3.7 Definitions relating to protection against electric shock and type of insulation	28
3.8 Definitions relating to component parts of controls	32
3.9 Definitions of types of terminals and terminations of controls	34
3.10 Definitions relating to the connections to controls	36
3.11 Definitions relating to the performance of type 2 actions	37
3.12 Definitions relating to the requirements for creepage distances and clearances	37
3.13 Miscellaneous definitions	38
3.14 Definitions relating to manufacturer and user	40
3.15 Definitions pertaining to thermistors	40
3.16 Definitions relating to the structure of controls using software	40
3.17 Definitions relating to error avoidance in controls using software	40
3.18 Definitions relating to fault/error control techniques for controls using software	40
3.19 Definitions relating to memory tests for controls using software	40
3.20 Definitions of software terminology – General	40
3.21 Definitions relating to classes of control functions	40
3.22 Definitions relating to functional safety	40
3.23 Definitions related to access to data exchange	40
3.24 Definitions related to EMC performance	41
4 General	43
4.1 General structure of the document	43
4.2 General requirements	44
4.3 General notes on tests	44
5 Required technical information	48
5.1 General requirements	48
5.2 Methods of providing technical information	48
5.3 Class II symbol	56
5.4 Additional requirements for marking	56
5.5 Warning or cautionary markings	58
6 Protection against electric shock	58
6.1 General requirements	58
6.2 Actuating members and actuating means	60
6.3 Capacitors	61
6.4 Covers and uninsulated live or hazardous parts	61
6.5 Battery operated controls provided with a user accessible mains supply input connector	61

7	Provision for protective earthing	62
7.1	Class 0I and Class I controls.....	62
7.2	Class II and class III controls	62
7.3	Adequacy of earth connections	62
7.4	Corrosion resistance	63
7.5	Other requirements	64
7.6	Protective equipotential bonding	64
8	Terminals and terminations.....	64
8.1	Terminals and terminations for external copper conductors.....	64
8.2	Terminals and terminations for internal conductors	69
8.3	Terminals and terminations for integrated conductors	71
9	Constructional requirements	71
9.1	Materials.....	71
9.2	Protection against electric shock.....	71
9.3	Actuation and operation	74
9.4	Actions	77
9.5	Openings in enclosures.....	80
9.6	Mounting of controls	80
9.7	Attachment of cords	81
9.8	Size of cords – non-detachable	82
9.9	Inlet openings	83
9.10	Equipment inlets and socket-outlets	83
9.11	Requirements during mounting, use, maintenance and servicing	84
9.12	Controls using software	87
9.13	Protective controls and components of protective control systems	90
9.101	Construction requirements relating to operating mechanism	92
9.102	A pressure cut-out shall not reset or be resettable manually or otherwise at a value above the maximum or below the minimum operating pressure, whichever is declared.....	93
9.103	A pressure cut-out with a manually operated reset device shall be trip-free.	93
10	Threaded parts and connections.....	93
10.1	Threaded parts moved during mounting or servicing	93
10.2	Current-carrying connections and connections providing protective earthing continuity	95
11	Creepage distances, clearances and distances through solid insulation.....	96
11.1	General.....	96
11.2	Clearances	97
11.3	Creepage distances	101
11.4	Solid insulation	105
12	Components	106
12.1	Transformers	106
12.2	Switch mode power supplies and converters	106
12.3	Capacitors	107
12.4	Fuses	107
12.5	Varistors	107
12.6	Thermistors.....	107
12.7	Relays	108
12.8	Other components	108
13	Fault assessment on electronic circuits	108

13.1	Fault assessment for inherent safety	108
13.2	Fault assessment to ensure functional safety	114
14	Moisture and dust resistance	114
14.1	Protection against ingress of water and dust	114
14.2	Protection against humid conditions	115
14.3	Touch current test for in-line cord controls and free-standing controls	116
15	Electric strength and insulation resistance	117
15.1	Insulation resistance	117
15.2	Electric strength	117
15.3	Additional tests for in-line cord and free-standing controls	119
16	Heating	120
17	Manufacturing deviation and drift	124
18	Environmental stress	124
18.1	Transportation and storage	124
18.2	Environmental stress of temperature	124
19	Endurance	125
19.1	General requirements	125
19.2	Electrical conditions for the tests	126
19.3	Thermal conditions for the tests	132
19.4	Manual and mechanical conditions for the tests	132
19.5	Dielectric strength requirements	133
19.6	Ageing test	133
19.7	Overvoltage test or overload test in all countries using an overload test of automatic action at accelerated rate	133
19.8	Test of automatic action at accelerated rate	134
19.9	Test of automatic action at slow rate	134
19.10	Overvoltage test or overload test in all countries that use the overload test of manual action at accelerated speed	135
19.11	Test of manual action at slow speed	135
19.12	Test of manual action at high speed which has multiple poles, and where polarity reversal occurs during the action	135
19.13	Test of manual action at accelerated speed	135
19.14	Evaluation of compliance	136
19.15	Test for particular purpose controls	136
20	Mechanical strength	137
20.1	General requirements	137
20.2	Impact resistance	138
20.3	Free-standing controls	138
20.4	In-line cord controls	139
20.5	Pull-cord actuated controls	139
20.6	Foot actuated controls	139
20.7	Actuating member and actuating means	140
20.8	Flexing – test	140
20.9	Cord anchorages – test	141
20.101	Medium leakage	141
20.102	Strength of parts (hydrostatic)	142
21	Resistance to heat, fire and tracking	143
21.1	General requirements	143

21.2	Integrated, incorporated and in-line cord controls.....	143
21.3	Independently mounted, free-standing controls	144
22	Resistance to corrosion	145
22.1	Resistance to rusting	145
23	Electromagnetic compatibility (EMC) requirements – Emission	145
23.1	General requirement	145
23.2	High frequency emission	145
23.3	Low frequency emission	149
24	Normal operation	149
25	Electromagnetic compatibility (EMC) requirements – Immunity	149
25.1	General.....	149
25.2	EMC test plan and report	150
25.3	Immunity requirements.....	152
25.4	Performance criteria	155
25.5	Surge immunity test	156
25.6	Electrical fast transient immunity test.....	156
25.7	Radio-frequency electromagnetic field immunity	157
25.8	Electrostatic discharge.....	157
25.9	Immunity to power-frequency magnetic fields.....	157
25.10	Test of the influence of voltage dips and voltage interruption in the power supply network.....	157
26	Abnormal operation tests.....	158
26.1	Abnormal temperature test.....	158
26.2	Overload tests	159
26.3	Battery short-circuit test.....	160
Annex A (normative)	Indelibility of markings	177
Annex B (normative)	Measurement of creepage distances and clearances in air.....	179
Annex C (informative)	Nominal voltages of supply systems for different modes of overvoltage control	183
Annex D (normative)	Overvoltage categories	185
Annex E (informative)	Typical usage of controls and related overvoltage categories	186
Annex F (normative)	Pollution degrees	187
F.1	Pollution	187
F.2	Degrees of pollution in the micro-environment	187
Annex G (normative)	Resistance to heat, fire and tracking tests	188
G.1	Glow-wire test.....	188
G.2	Proof tracking test.....	188
G.3	Ball pressure test.....	188
Annex H (normative)	Requirements related to functional safety	190
H.3	Terms and definitions.....	190
H.5	Information	201
H.9	Constructional requirements	203
H.13	Fault assessment on electronic circuits.....	219
H.17	Manufacturing deviation and drift	223
H.19	Endurance	225
H.25	Electromagnetic compatibility (EMC) requirements – Immunity.....	226
Annex I (normative)	Requirements for certain types of DC supplied controls	244

I.1	Scope	244
Annex J (normative) Requirements for thermistor elements and controls using thermistors.....		246
J.1	Scope	246
Annex K (normative) Circuit for measuring touch current		263
Annex L (normative) Printed circuit board coating performance test.....		264
Annex M (normative) Printed circuit board protection		266
Annex N (informative) Explanatory notes for surge immunity test.....		269
N.1	Different source impedances.....	269
N.2	Application of the tests.....	269
N.3	Installation classification	270
Annex O (informative) Guidance for applying Clause 11		273
Annex P (normative) Requirements for SELV and PELV		276
P.1	Overview of the requirements for SELV and PELV	276
P.2	Protection against electric shock by SELV system or PELV system.....	276
P.3	Protective measures for SELV system and PELV system	277
Annex Q (informative) Regional differences relevant for the member countries of Cenelec		279
Annex R (informative) National differences relevant in the United States of America.....		283
R.2	Normative references.....	283
Annex S (informative) National differences relevant in Japan.....		284
S.2	Normative references.....	284
Annex T (informative) National differences relevant in Canada		285
T.2	Normative references.....	285
Annex AA (normative) Number of cycles		286
AA.1	Number of cycles for independently mounted controls.....	286
AA.2	Cycling rate for independently mounted controls	286
Annex BB (informative) Stainless steel for bellows, bourdon tubes or similar elements		287
Bibliography.....		290

Figure 1 – Example of ports	41
Figure 2 – Structure of the document with respect to inherent safety and functional safety	44
Figure 3 – Example of an electronic circuit with low power points	109
Figure 4 – Test pin probe 13 of IEC 61032:1997	160
Figure 5 – Test finger probe B of IEC 61032:1997	161
Figure 6 – Test fingernail	162
Figure 7 – Impact test for free-standing controls	163
Figure 8 – Tumbling barrel.....	163
Figure 9 – Apparatus for testing durability of markings on rating labels.....	164
Figure 10 – Apparatus for flexing test	164
Figure 11 – Screw terminals and stud terminals	165
Figure 12 – Pillar terminals	166
Figure 13 – Mantle terminals.....	167
Figure 14 – Saddle and lug terminals.....	168
Figure 15 – Tabs.....	169