Irish Standard
I.S. EN 60770-1:2011

Transmitters for use in industrial-process control systems -- Part 1: Methods for performance evaluation (IEC 60770-1:2010 (EQV))

I.S. EN 60770-1:2011

Incorporating amendments/corrigenda issued since publication:

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I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

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SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces:	*This document is based on:*	*Published:*
EN 60770-1:1999	EN 60770-1:2011 EN 60770-1:1999	18 February, 2011 1 April, 1999

This document was published
under the authority of the NSAI and comes into effect on:

22 February, 2011

ICS number:
25.040.40

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I.S. EN 60770-1:2011

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60770-1

February 2011

ICS 25.040.40

Supersedes EN 60770-1:1999

English version

Transmitters for use in industrial-process control systems - Part 1: Methods for performance evaluation

(IEC 60770-1:2010)

Transmetteurs utilisés dans les systèmes de conduite des processus industriels - Partie 1: Méthodes d'évaluation des performances
(CEI 60770-1:2010)

Messumformer für industrielle Prozessleittechnik - Teil 1: Methoden für die Bewertung des Betriebsverhaltens
(IEC 60770-1:2010)

This European Standard was approved by CENELEC on 2011-01-02. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60770-1:2011 E

Foreword

The text of document 65B/656/CDV, future edition 2 of IEC 60770-1, prepared by SC 65B, Devices & process analysis, of IEC TC 65, Industrial-process measurement, control and automation, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60770-1 on 2011-01-02.

This European Standard supersedes EN 60770-1:1999.

The significant technical change with respect to EN 60770-1:1999 is as follows:

– 4.3 Load conditions: For pneumatic transmitters, load details have been added.

This standard should be read in conjunction with EN 61298-1, EN 61298-2, EN 61298-3 and EN 61298-4.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-10-02
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-01-02

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 60770-1:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61187:1993	NOTE	Harmonized as EN 61187:1994 (modified).
IEC 61326-1:2005	NOTE	Harmonized as EN 61326-1:2006 (not modified).

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60050-300	2001	International Electrotechnical Vocabulary - Electrical and electronic measurements and measuring instruments - Part 311: General terms relating to measurements - Part 312: General terms relating to electrical measurements - Part 313: Types of electrical measuring instruments - Part 314: Specific terms according to the type of instrument	-	-
IEC 60068-2-1	2007	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	2007
IEC 60068-2-2	1974	Environmental testing - Part 2: Tests - Tests B: Dry heat	EN 60068-2-2[1) 2)]	1993
IEC 60068-2-31	2008	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	2008
IEC 60381-1	1982	Analogue signals for process control systems - Part 1: Direct current signals	HD 452.1 S1	1984
IEC 60382	1991	Analogue pneumatic signal for process control systems	EN 60382	1993
IEC 60529	2001	Degrees of protection provided by enclosures (IP Code)	-	-
IEC 60770-3	2006	Transmitters for use in industrial-process control systems - Part 3: Methods for performance evaluation of intelligent transmitters	EN 60770-3	2006
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009

[1)] EN 60068-2-2 includes supplement(s) A to IEC 60068-2-2.

[2)] EN 60068-2-2 is superseded by EN 60068-2-2:2007, which is based on IEC 60068-2-2:2007.

Publication	Year	Title	EN/HD	Year
IEC 61000-4-3	2006	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006
IEC 61000-4-4	2004	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2004
IEC 61000-4-5	2005	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2006
IEC 61000-4-6	2008	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	2009
IEC 61000-4-8	2009	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	2010
IEC 61000-4-10	1993	Electromagnetic compatibility (EMC) - Part 4-10: Testing and measurement techniques - Damped oscillatory magnetic field immunity test	EN 61000-4-10	1993
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004
IEC 61000-4-12	2006	Electromagnetic compatibility (EMC) - Part 4-12: Testing and measurement techniques - Ring wave immunity test	EN 61000-4-12	2006
IEC 61000-4-16	1998	Electromagnetic compatibility (EMC) - Part 4-16: Testing and measurement techniques - Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz	EN 61000-4-16	1998
IEC 61010-1	2001	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements	EN 61010-1 + corr. June [3)]	2001 2002
IEC 61032	1997	Protection of persons and equipment by enclosures - Probes for verification	EN 61032	1998
IEC 61298-1	2008	Process measurement and control devices - General methods and procedures for evaluating performance - Part 1: General considerations	EN 61298-1	2008
IEC 61298-2	2008	Process measurement and control devices - General methods and procedures for evaluating performance - Part 2: Tests under reference conditions	EN 61298-2	2008

[3)] EN 61010-1 is superseded by EN 61010-1:2010, which is based on IEC 61010-1:2010.

Publication	Year	Title	EN/HD	Year
IEC 61298-3	2008	Process measurement and control devices - General methods and procedures for evaluating performance - Part 3: Tests for the effects of influence quantitites	EN 61298-3	2008
IEC 61298-4	2008	Process measurement and control devices - General methods and procedures for evaluating performance - Part 4: Evaluation report content	EN 61298-4	2008

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

TRANSMITTERS FOR USE IN INDUSTRIAL-PROCESS CONTROL SYSTEMS –

Part 1: Methods for performance evaluation

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 60770-1 has been prepared by subcommittee 65B: Devices & process analysis, of IEC technical committee 65: Industrial-process measurement, control and automation.

This second edition cancels and replaces the first edition published in 1999. This edition constitutes a technical revision.

The significant technical change with respect to the previous edition is as follows:

- 4.3 Load conditions: For pneumatic transmitters, load details have been added.

This standard should be read in conjunction with IEC 61298-1, IEC 61298-2, IEC 61298-3 and IEC 61298-4.

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

CDV	Report on voting
65B/656/CDV	65B/720/CDV

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

A list of all parts of IEC 60770 series, published under the general title *Transmitters for use in industrial-process control systems*, can be found on the IEC website.

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.

TRANSMITTERS FOR USE IN INDUSTRIAL-PROCESS CONTROL SYSTEMS –

Part 1: Methods for performance evaluation

1 Scope and object

This part of IEC 60770 is applicable to transmitters which have either a standard analogue electric current output signal or a standard pneumatic output analogue signal in accordance with IEC 60381-1 or IEC 60382. The tests detailed herein may be applied to transmitters which have other output signals, provided that due allowance is made for such differences.

For the evaluation of the intelligent transmitters see IEC 60770-3.

For certain types of transmitters where the sensor is an integral part, other specific IEC or ISO standards may need to be consulted (e.g. for chemical analysers, flowmeters, etc.)

This standard is intended to specify uniform methods of test for the evaluation of the performance of transmitters with pneumatic or electric output signals.

The methods of evaluation specified in this standard are intended for use by manufacturers to determine the performance of their products and by users or independent testing establishments to verify manufacturers' performance specifications.

The test conditions defined in this standard, for example the range of ambient temperatures and power supply, represent those which commonly arise in use. Consequently, the values specified herein should be used where no other values are specified by the manufacturer.

The tests specified in this standard are not necessarily sufficient for instruments specifically designed for unusually arduous or safety related duties. Conversely, a restricted series of test may be suitable for instruments designed to perform within a more limited range of conditions.

When a full evaluation in accordance with this standard is not required, those tests which are required shall be performed and the results reported in accordance with those parts of the standard which are relevant.

2 Normative references

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

IEC 60050-300:2001, *International Electrotechnical Vocabulary – Electrical and electronic measurements and measuring instruments – Part 311: General terms relating to measurements – Part 312: General terms relating to electrical measurements – Part 313: Types of electrical measuring instruments – Part 314: Specific terms according to the type of instrument*

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:1974, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*