Transmitters for use in industrial-process control systems - Part 2: Methods for inspection and routine testing

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EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 60770-2:2003 sisaldab Euroopa standardi EN 60770-2:2003 ingliskeelset teksti. Käesolev dokument on jõustatud 09.09.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 60770-2:2003 consists of the English text of the European standard EN 60770-2:2003. This document is endorsed on 09.09.2003 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.

Käsitlusala: applies to transmitters, which have either a standard analogue electric current output signal or a standard pneumatic output 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	**Scope:** applies to transmitters, which have either a standard analogue electric current output signal or a standard pneumatic output 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

ICS 17.020, 25.040.40

Võtmesõnad:

EUROPEAN STANDARD **EN 60770-2**

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ICS 25.040.40; 17.020

English version

Transmitters for use in industrial-process control systems Part 2: Methods for inspection and routine testing
(IEC 60770-2:2003)

Transmetteurs utilisés dans les systèmes de conduite des processus industriels Partie 2: Méthodes pour l'inspection et les essais individuels de série (CEI 60770-2:2003)

Messumformer für industrielle Prozessleittechnik Teil 2: Verfahren für Abnahme und Stückprüfung (IEC 60770-2:2003)

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 60770-2:2003 E

Foreword

The text of document 65B/468/FDIS, future edition 2 of IEC 60770-2, prepared by SC 65B, Devices, of IEC TC 65, Industrial-process measurement and control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60770-2 on 2003-04-01.

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) 2004-01-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2006-04-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex ZA is normative.
Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 60770-2:2003 was approved by CENELEC as a European Standard without any modification.

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Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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 60050-351	1998	International Electrotechnical Vocabulary Part 351: Automatic control	-	-
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 60410	1973	Sampling plans and procedures for inspection by attributes	-	-
IEC 60770-1	1999	Transmitters for use in industrial-process control systems Part 1: Methods for performance evaluation	EN 60770-1	1999
IEC 61298-1	1995	Process measurement and control devices - General methods and procedures for evaluating performance Part 1: General considerations	EN 61298-1	1995
IEC 61298-2	1995	Part 2: Tests under reference conditions	EN 61298-2	1995
IEC 61298-3	1998	Part 3: Tests for the effects of influence quantities	EN 61298-3	1998
IEC 61298-4	1995	Part 4: Evaluation report content	EN 61298-4	1995
IEC 62098	2000	Evaluation methods for microprocessor-based instruments	-	-

INTERNATIONAL STANDARD

IEC 60770-2

Second edition
2003-01

Transmitters for use in industrial-process control systems –

Part 2: Methods for inspection and routine testing

Transmetteurs utilisés dans les systèmes de conduite des processus industriels –

Partie 2:
Méthodes pour l'inspection et les essais individuels de série

Reference number
IEC 60770-2:2003(E)

Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site (www.iec.ch)**

- **Catalogue of IEC publications**

  The on-line catalogue on the IEC web site (http://www.iec.ch/searchpub/cur_fut.htm) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

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Международная Электротехническая Комиссия

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For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

TRANSMITTERS FOR USE IN INDUSTRIAL-PROCESS CONTROL SYSTEMS –

Part 2: Methods for inspection and routine testing

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60770-2 has been prepared by subcommittee 65B: Devices, of IEC technical committee 65: Industrial-process measurement and control.

This second edition cancels and replaces the first edition published in 1989 and constitutes a technical revision.

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

FDIS	Report on voting
65B/468/FDIS	65B/477/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 publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A bilingual edition may be issued at a later date.

The committee has decided that the contents of this publication will remain unchanged until 2008. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

The methods of inspection and routine testing specified in this standard are intended for use in acceptance tests or after repair to verify the fulfilment of the performance specifications as established by the user. The methods given in this standard are primarily intended for the testing of conventional analogue transmitters. For setting up test procedures for microprocessor-based instruments IEC 62098 should be consulted.

TRANSMITTERS FOR USE IN INDUSTRIAL-PROCESS CONTROL SYSTEMS –

Part 2: Methods for inspection and routine testing

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 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 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 analyzers, flow-meters, etc.)

This standard is intended to provide technical methods for inspection and routine testing of transmitters, for instance, for acceptance tests or after repair. For a full evaluation, IEC 60770-1 shall be used.

Quantitative criteria for acceptable performance should be established by agreement between manufacturer and user.

By agreement the tests need not be carried out by an accredited laboratory.

2 Normative references

At the time of the publication the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on these normative documents are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050-351:1998, *International Electrotechnical Vocabulary – Part 351: Automatic Control*

IEC 60381-1:1982, *Analogue signals for process control systems – Part 1: Direct current signals*

IEC 60382:1991, *Analogue pneumatic signal for process control systems*

IEC 60410:1973, *Sampling plans and procedures for inspection by attributes*

IEC 60770-1:1999, *Transmitters for use in industrial-process control systems – Part 1: Methods for performance evaluation*

IEC 61298-1:1995, *Process measurement and control devices. – General methods and procedures for evaluating performance – Part 1: General considerations*

IEC 61298-2:1995, *Process measurement and control devices – General methods and procedures for evaluation performance – Part 2: Test under reference conditions*

IEC 61298-3:1998, *Process measurement and control devices – General methods and procedures for evaluating performance – Part 3: Tests for the effects of influence quantities*

IEC 61298-4:1995, *Process measurement and control devices – General methods and procedures for evaluating performance – Part 4: Evaluation report content*

IEC 62098:2000, *Evaluation methods for microprocessor-based instruments*

3 Terms and definitions

The main terms used for measuring the physical quantities are those used in IEC 60050-351 and IEC 61298. For the purpose of this standard the following terms apply:

3.1

acceptance test
a test to prove to the user that the device complies with the performance specifications as they appear in the contract

3.2

variable
quantity or condition whose value is subject to change and can usually be measured (e.g. temperature, flow rate, speed, signal, etc.)

3.3

signal
physical variable, one or more parameters of which carry information about one or more variables, which the signal represents

3.4

range
region of the values between the lower and upper limits of the quantity under consideration

3.5

span
algebraic difference between the upper and lower limit values of a given range

3.6

test procedure
statement of the tests to be carried out, and the conditions for each test, agreed between the manufacturer, the test laboratory, and the purchaser/user before the evaluation starts

3.7

maximum measured error
largest positive or negative value of error of the upscale or downscale value of each point of measurement

3.8

hysteresis
the greatest difference between the upscale and downscale output readings at one point

3.9

step response
the time response of a transmitter produced by a stepwise variation of one of the input variables

3.10

influence quantity
test parameter chosen to represent one aspect of the environment under which a device may operate.