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Irish Standard
I.S. EN 61514-2:2013

Industrial process control systems -
Part 2: Methods of evaluating the
performance of intelligent valve
positioners with pneumatic outputs
mounted on an actuator valve assembly
(IEC 61514-2:2013 (EQV))

I.S. EN 61514-2:2013

Incorporating amendments/corrigenda issued since publication:

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NSAI 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie	Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie
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English version

**Industrial process control systems -
Part 2: Methods of evaluating the performance of intelligent valve
positioners with pneumatic outputs mounted on an actuator valve
assembly
(IEC 61514-2:2013)**

Systèmes de commande des processus
industriels -
Partie 2: Méthodes d'évaluation des
performances des positionneurs de vanne
intelligents à sorties pneumatiques
montés sur un ensemble
actionneur/vanne
(CEI 61514-2:2013)

Systeme der industriellen
Prozessleittechnik – Teil 2: Verfahren zur
Bewertung des Betriebsverhaltens von
intelligenten Ventilstellungsreglern mit
pneumatischem Ausgang, die an Ventil-
Stellantrieben montiert sind
(IEC 61514-2:2013)

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 65B/868/FDIS, future edition 2 of IEC 61514-2, 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 approved by CENELEC as EN 61514-2:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-05-01
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-08-01

This document supersedes EN 61514-2:2004.

EN 61514-2:2013 includes the following significant technical changes with respect to EN 61514-2:2004:

- The standard has been optimized for usability.
- The test procedures have been reviewed regarding applicability for use in test facilities. Impractical test procedures were removed or modified.

EN 61514-2:2013 is to be used in conjunction with EN 61514:2002.

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

Endorsement notice

The text of the International Standard IEC 61514-2:2013 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050	Series	International Electrotechnical Vocabulary (IEV)	-	-
IEC 60068-2-1	1990	Environmental testing - Part 2: Tests - Tests A: Cold	EN 60068-2-1 ¹⁾	1993
IEC 60068-2-2	1974	Environmental testing - Part 2: Tests - Tests B: Dry heat	EN 60068-2-2 ^{2) 3)}	1993
IEC 60068-2-6	1995	Environmental testing - Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6 ⁴⁾	1995
IEC 60068-2-31	1969	Environmental testing. Part 2: Tests. Test Ec: Drop and topple, primarily for equipment-type specimens	EN 60068-2-31 ^{5) 6)}	1993
IEC 60068-2-78	2001	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78 ⁷⁾	2001
EN 60079	Series	Electrical apparatus for explosive gas atmospheres	-	-
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corr. May	1991 1993
IEC 60534-1	-	Industrial-process control valves - Part 1: Control valve terminology and general considerations	EN 60534-1	-
IEC 60654	Series	Industrial-process measurement and control equipment - Operating conditions	EN 60654	Series
IEC 60721-3	-	Classification of environmental conditions - Part 3: Classification of groups of environmental parameters and their severities	EN 60721-3	-
IEC 61000-4-11	-	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	-

¹⁾ EN 60068-2-1 is superseded by EN 60068-2-1:2007, which is based on IEC 60068-2-1:2007.

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

³⁾ EN 60068-2-2 is superseded by EN 60068-2-2:2007, which is based on IEC 60068-2-2:2007.

⁴⁾ EN 60068-2-6 is superseded by EN 60068-2-6:2008, which is based on IEC 60068-2-6:2007.

⁵⁾ EN 60068-2-31 includes A1 to IEC 60068-2-31.

⁶⁾ EN 60068-2-31 is superseded by EN 60068-2-31:2008, which is based on IEC 60068-2-31:2008.

⁷⁾ EN 60068-2-78 is superseded by EN 60068-2-78:2013, which is based on IEC 60068-2-78:2012.

I.S. EN 61514-2:2013

EN 61514-2:2013

- 4 -

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61010-1	2001	Safety requirements for electrical equipment	EN 61010-1	2001
+ corr. May	2001	for measurement, control, and laboratory use	-	2002
+ corr. April	2003	Part 1: General requirements	-	-
IEC 61032	1997	Protection of persons and equipment by	EN 61032	1998
+ corr. January	2003	enclosures - Probes for verification	-	-
EN 61069	Series	Industrial-process measurement and control - Evaluation of system properties for the purpose of system assessment	-	-
IEC 61158	Series	Industrial communication networks - Fieldbus specifications	EN 61158	Series
IEC 61298	Series	Process measurement and control devices - General methods and procedures for evaluating performance	EN 61298	Series
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
IEC 61298-3	2008	Process measurement and control devices - General methods and procedures for evaluating performance - Part 3: Tests for the effects of influence quantities	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
IEC 61326-1	2005	Electrical equipment for measurement, control	EN 61326-1 ¹¹⁾	2006
+ corr. February	2010	and laboratory use - EMC requirements -	-	-
+ corr. February	2008	Part 1: General requirements	-	-
IEC/PAS 61499	Series	Function blocks for industrial-process measurement and control systems	-	-
IEC 61514 (mod)	2000	Industrial-process control systems - Methods of evaluating the performance of valve positioners with pneumatic outputs	EN 61514	2002
IEC/TS 62098	-	Evaluation methods for microprocessor-based - instruments	-	-
CISPR 11	-	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	-

⁹⁾ EN 61010-1 is superseded by EN 61010-1:2010, which is based on IEC 61010-1:2010.

¹¹⁾ EN 61326-1 is superseded by EN 61326-1:2013, which is based on IEC 61326-1:2012.

CONTENTS

FOREWORD	4
INTRODUCTION	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	9
4 Design review	10
4.1 General	10
4.2 Positioner identification	11
4.2.1 Overview	11
4.2.2 Power supply unit	11
4.2.3 Sensor/input assembly	11
4.2.4 Auxiliary sensor assembly	11
4.2.5 Human interface	12
4.2.6 Communication interface	12
4.2.7 Data processing unit	12
4.2.8 Output subsystem	12
4.2.9 External functionality	13
4.3 Aspects of functionality and capabilities to be reviewed	13
4.3.1 Checklist	13
4.3.2 Reporting	19
4.4 Documentary information	19
5 Performance testing	21
5.1 General	21
5.2 Reference conditions for performance tests	21
5.2.1 Overview	21
5.2.2 Valve characteristics	21
5.3 General testing procedures	23
5.3.1 Test set-up	23
5.3.2 Testing precautions	24
5.4 Initial observations and measurements	24
5.4.1 Overview	24
5.4.2 Mounting procedure	24
5.4.3 Configuration procedures	24
5.4.4 Stem position calibration procedure	25
5.4.5 Stem position tuning procedure	25
5.5 Performance test procedures	26
5.5.1 General	26
5.5.2 Effects of influence quantities	29
6 Other considerations	35
6.1 Safety	35
6.2 Degree of protection provided by enclosures	35
6.3 Electromagnetic emission	35
6.4 Variants	35
7 Evaluation report	35
Annex A (normative) Vibration test set-up	37
Bibliography	38

I.S. EN 61514-2:2013

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– 3 –

Figure 1 – Positioner model in extensive configuration.....	11
Figure 2 – Basic design for positioners with analogue outputs.....	13
Figure 3 – Basic design for positioners with pulsed output	13
Figure 4 – Basic test set-up.....	24
Figure 5 – Examples of step responses of positioners	28
Figure A.1 – Test set-up for vibration test.....	37
Table 1 – Functionality (1 of 2).....	14
Table 2 – Configurability.....	16
Table 3 – Hardware configuration	17
Table 4 – Operability	17
Table 5 – Dependability (1 of 2).....	18
Table 6 – Fail safe behaviour	19
Table 7 – Reporting.....	19
Table 8 – Document information.....	20
Table 9 – Test under reference conditions (1 of 3).....	26
Table 10 – Matrix of instrument properties and tests (1 of 6).....	30

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INDUSTRIAL PROCESS CONTROL SYSTEMS –

Part 2: Methods of evaluating the performance of intelligent valve positioners with pneumatic outputs mounted on an actuator valve assembly

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 61514-2 has been prepared by subcommittee 65B: Measurement and control devices, of IEC technical committee 65: Industrial-process measurement, control and automation.

This part of IEC 61514 is to be used in conjunction with IEC 61514:2000.

This second edition cancels and replaces the first edition published in 2004. This edition constitutes a technical revision.

The significant changes with respect to the previous edition are as follows:

- The standard has been optimized for usability.
- The test procedures have been reviewed regarding applicability for use in test facilities. Impractical test procedures were removed or modified.

I.S. EN 61514-2:2013

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– 5 –

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

FDIS	Report on voting
65B/868/FDIS	65B/872/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 list of all parts of the IEC 61514 series, published under the general title *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.

INTRODUCTION

New instruments for process control and measurement including valve positioners are mainly equipped with microprocessors, thereby utilising digital data processing and communication methods and/or artificial intelligence, making them more complex and giving them a considerable added value.

Modern intelligent valve positioners are no longer only controlling the valve position, but they are in many cases also equipped with various facilities for self-testing, actuator/valve condition monitoring and alarming. The variety of added functionalities is large. They can no longer be compared with the single function "cam-type" positioners. Therefore, accuracy related performance testing, although still very important, is no longer sufficient to demonstrate their flexibility, capabilities and other features with respect to engineering, installation, maintainability, reliability and operability.

In this standard the evaluation considers performance testing and a design review of both hardware and software. The layout of this document follows to some extent the framework of IEC/TS 62098. A number of performance tests described in IEC 61514 are still valid for intelligent valve positioners. Further reading of IEC 61069 is recommended.

INDUSTRIAL PROCESS CONTROL SYSTEMS –

Part 2: Methods of evaluating the performance of intelligent valve positioners with pneumatic outputs mounted on an actuator valve assembly

1 Scope

This part of IEC 61514 specifies design reviews and tests intended to measure and determine the static and dynamic performance, the degree of intelligence and the communication capabilities of single-acting or double-acting intelligent valve positioners. The tests may be applied to positioners which receive standard analogue electrical input signals (as specified in IEC 60381) and/or digital signals via a data communication link and have a pneumatic output. An intelligent valve positioner as defined in Clause 3 is an instrument that uses for performing its functions digital techniques for data processing, decision-making and bi-directional communication. It may be equipped with additional sensors and additional functionality supporting the main function.

The performance testing of an intelligent valve positioner needs to be conducted with the positioner mounted on and connected to the actuator/valve assembly the positioner is to be used on. The specific characteristic parameters of these combinations such as size, stroke, friction (hysteresis), type of packing, spring package and supply pressure for the pneumatic part, should be carefully chosen and reported, since the performance of a positioner is greatly dependent on the used actuator.

The methods of evaluation given in this standard are intended for testing laboratories to verify equipment performance specifications. The manufacturers of intelligent positioners are urged to apply this standard at an early stage of development.

This standard is intended to provide guidance for designing evaluations of intelligent valve positioners by providing:

- a checklist for reviewing their hardware and software design in a structured way;
- test methods for measuring and qualifying their performance under various environmental and operational conditions;
- methods for reporting the data obtained.

When a full evaluation, in accordance with this standard, is not required or possible, the tests which are required should be performed and the results should be reported in accordance with the relevant parts of this standard. In such cases, the test report should state that it does not cover the full number of tests specified herein. Furthermore, the items omitted should be mentioned, to give the reader of the report a clear overview.

The standard is also applicable for non-intelligent microprocessor-based valve positioners without means for bi-directional communication. In that case an evaluation should be reduced to a limited programme of performance testing and a short review of the construction.

2 Normative references

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

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