

Industrial-process measurement and control — Evaluation of system properties for the purpose of system assessment —

Part 4: Assessment of system performance

The European Standard EN 61069-4:1997 has the status of a
British Standard

ICS 25.040.40;35.240.50

National foreword

This British Standard is the English language version of EN 61069-4:1997. It is identical with IEC 61069-4:1997 including Corrigendum December 1997.

The UK participation in its preparation was entrusted to Technical Committee GEL/65, Measurement and control, to Subcommittee GEL/65/1, System considerations, which has the responsibility to:

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- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
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Cross-references

Attention is drawn to the fact that CEN and CENELEC standards normally include an annex which lists normative references to international publications with their corresponding European publications. The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 26 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date	Comments

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English version

Industrial process measurement and control — Evaluation of system properties for the purpose of system assessment Part 4: Assessment of system performance

(IEC 61069-4:1997)

Mesure et commande dans les processus industriels — Appréciation des propriétés d'un système en vue de son évaluation
Partie 4: Evaluation des caractéristiques de fonctionnement d'un système
(CEI 61069-4:1997)

Leittechnik industrieller Prozesse Ermittlung der Systemeigenschaften zum Zweck der Eignungsbeurteilung eines Systems
Teil 4: Eignungsbeurteilung des Systembetriebsverhaltens
(IEC 61069-4:1997)

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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.

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European Committee for Electrotechnical Standardization
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Foreword

The text of document 65A/231 + 231A/FDIS, future edition 1 of IEC 61069-4, prepared by SC 65A, System aspects, of IEC TC 65, Industrial-process measurement and control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61069-4 on 1997-10-01.

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) 1998-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-07-01

Annexes designated “normative” are part of the body of the standard.

Annexes designated “informative” are given for information only.

In this standard, Annex ZA is normative and Annex A to Annex D are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61069-4:1997 was approved by CENELEC as a European Standard without any modification.

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

IEC 60546-1	NOTE Harmonized as EN 60546-1:1993 (not modified).
IEC 60873	NOTE Harmonized as EN 60873:1993 (modified).
IEC 61069-3	NOTE Harmonized as EN 61069-3:1996 (not modified).
IEC 61069-5	NOTE Harmonized as EN 61069-5:1995 (not modified).
IEC 61298-1	NOTE Harmonized as EN 61298-1:1995 (not modified).

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Introduction

This part of IEC 61069 deals with the method which should be used to assess the performance of industrial process measurement and control systems.

Assessment of a system is the judgement, based on evidence, of the system's suitability for a specific mission or class of missions.

To obtain total evidence would require complete (i.e. under all influencing conditions) evaluation of all system properties relevant to the specific mission or class of missions.

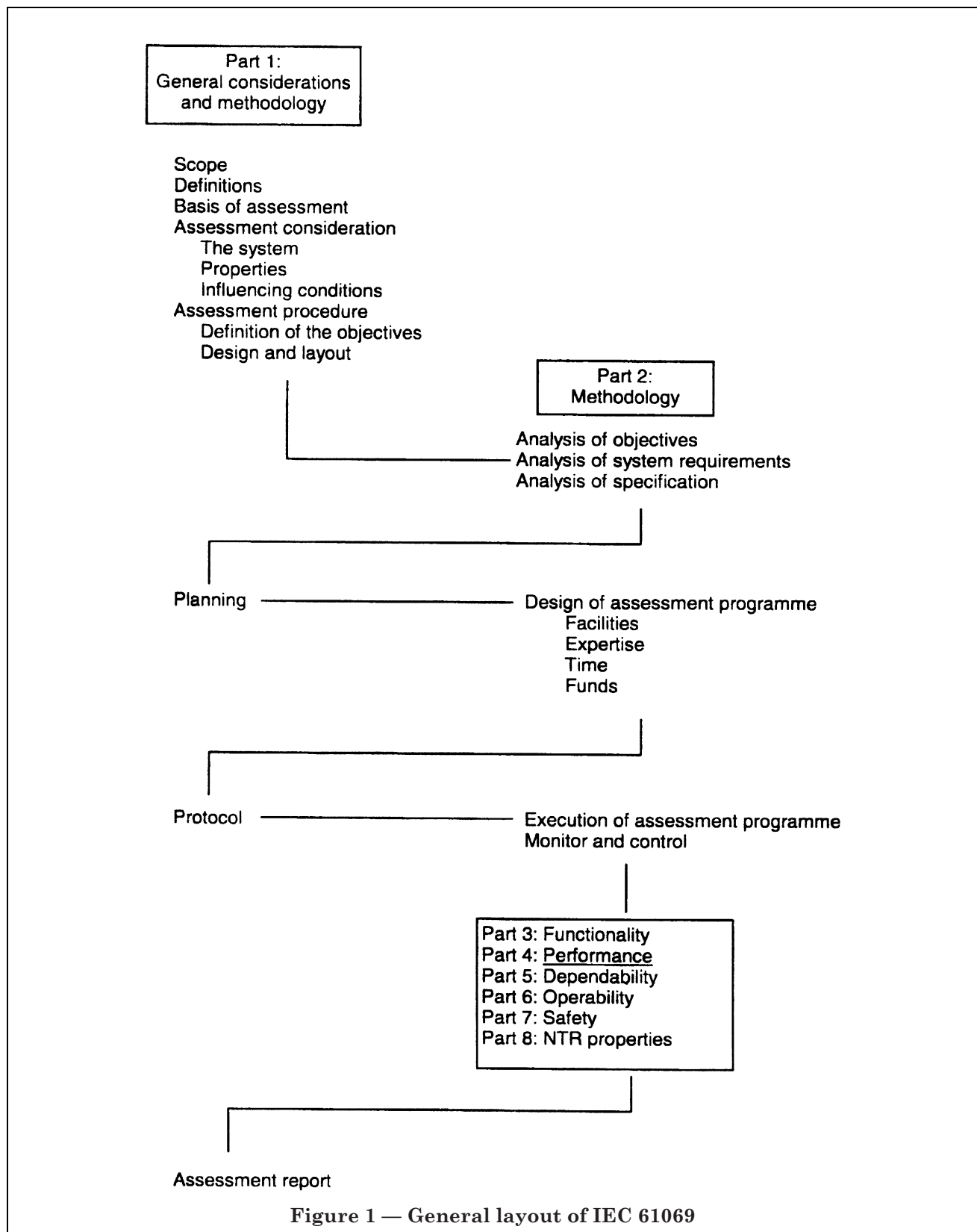
Since this is rarely practical, the rationale on which an assessment of a system should be based is:

- to identify the criticality of each of the relevant system properties;
- to plan for evaluation of the relevant system properties with a cost effective dedication of effort to the various properties.

In conducting an assessment of a system it is crucial to bear in mind the need to gain a maximum increase in confidence in the suitability of a system within practical cost and time constraints.

An assessment can only be carried out if a mission has been stated (or given) or if any mission can be hypothesized. In the absence of a mission, no assessment can be made; however, evaluations (as defined in IEC 61069-1) can still be specified and be carried out for use in assessments performed by others.

In such cases, the standard can be used as a guide for planning an evaluation and it provides procedures for performing evaluations, since evaluations are an integral part of assessment.



1 Scope

This part of IEC 61069 covers the method to be used to systematically assess the performance of industrial-process measurement and control systems.

The assessment methodology detailed in IEC 61069-2 is applied to obtain the performance assessment programme.

The subsidiary performance properties are analyzed, and criteria to be taken into account when assessing performance are described.

References are made to different supplementary performance evaluation techniques.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61069. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on IEC 61069 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 60068, *Environmental testing*.

IEC 60721, *Classification of environmental conditions*.

IEC 60902:1987, *Industrial-process measurement and control — Terms and definitions*.

IEC 61000, *Electromagnetic compatibility (EMC)*.

IEC 61069-1:1991, *Industrial-process measurement and control — Evaluation of system properties for the purpose of system assessment — Part 1: General considerations and methodology*.

IEC 61069-2:1993, *Industrial-process measurement and control — Evaluation of system properties for the purpose of system assessment — Part 2: Assessment methodology*.

IEC 61298-2:1995, *Process measurement and control devices — General methods and procedures for evaluating performance — Part 2: Tests under reference conditions*.

IEC 61298-3:—, *Process measurement and control devices — General methods and procedures for evaluating performance — Part 3: Tests for the effects of influence quantities¹⁾*.

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

IEC 61326-1:—, *Electrical equipment for measurement, control and laboratory use — EMC requirements — Part 1: General requirements¹⁾*.

3 Definitions

For the purpose of this part of IEC 61069, the following definitions apply:

3.1

performance

the precision and speed with which the system executes its tasks under defined conditions

3.2

accuracy

the closeness of agreement between the specified and the realized information translation executed by the system under defined conditions

3.3

response time

the time interval between the initiation of an information translation and the instant when the associated response is made available under defined conditions

¹⁾ To be published.

3.4

capacity

the maximum number of given information translations the system is able to execute within a defined period of time, without influencing any of the system properties

3.5

information translation

a conversion or conveyance of information entering the system at its boundary into derived information exiting the system at its boundary

4 Performance properties

4.1 General

A system should be able to execute industrial-process measurement and control tasks with accuracy and within a specified time (response time). If several tasks are to be executed the system should handle these without obstructing the execution of the other tasks, and hence the number of tasks which can be executed within a time frame (throughput) is important and depends on the capacity of the system.

To assess the performance of a system it is therefore necessary to identify and assess the subsidiary properties that determine performance.

Figure 2 shows the performance hierarchy.

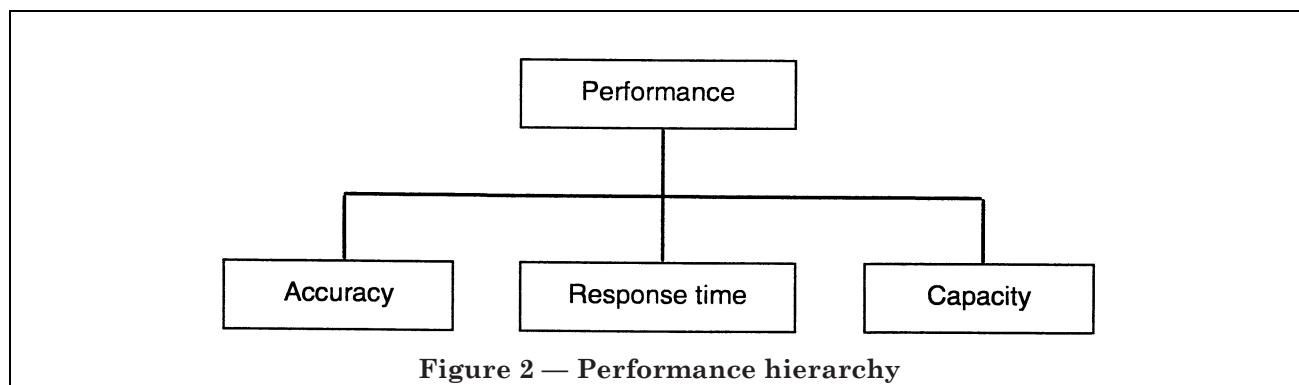


Figure 2 — Performance hierarchy

4.2 Performance

Performance cannot be assessed directly, but can only be determined by analysis and testing of its subsidiary properties.

To be able to determine the subsidiary properties it is necessary to analyze the system in terms of information translations.

It is necessary to examine the subsidiary properties for each of the information flows through the system.

The performance of a system is mainly determined by the design of the system, and to a lesser extent by factors which can be introduced (through both hardware and software) during the manufacturing and integration stages of the system.

It should be noted that the subsidiary performance properties are mutually dependent.

A system may not have a single performance measure because various tasks can utilize a different amount of information translations. Moreover, these information translations can be mutually dependent when they share common facilities.

When a system accomplishes several tasks, their performance can vary, and for each of these tasks a separate analysis is required.

Performance cannot be described by a single number, as long as there does not exist a suitable synthesis model. The subproperties can be quantified; they are deterministic with probabilistic elements, due to interdependencies, etc.