

Telecontrol equipment and systems —

Part 5: Transmission protocols —

Section 5.4 Definition and coding of application information elements

The European Standard EN 60870-5-4:1993 has the status of a
British Standard

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National foreword

This British Standard has been prepared under the direction of the Power Electrical Engineering Standards Policy Committee and is the English language version of EN 60870-5-4:1993 *Telecontrol equipment and systems Part 5: Transmission protocols Section 4: Definition and coding of application information elements*, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 870-5-4:1993 published by the International Electrotechnical Commission (IEC).

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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 20, an inside back cover 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.

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English version

Telecontrol equipment and systems
Part 5: Transmission protocols
Section 4: Definition and coding of application
information elements

(IEC 870-5-4:1993)

Matériels et systèmes de téléconduite
Partie 5: Protocoles de transmissions
Section 4: Définition et codages des éléments
d'information d'application
(CEI 870-5-4:1993)

Fernwirkeinrichtungen und Fernwirkssysteme
Teil 5: Übertragungsprotokolle
Hauptabschnitt 4: Definition und Codierung
von Informationselementen der
Anwendungsschicht
(IEC 870-5-4:1993)

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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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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

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Foreword

The text of document 57(CO)62, as prepared by IEC Technical Committee No. 57 “Telecontrol, teleprotection and associated telecommunications for electric power systems”, was submitted to the IEC-CENELEC parallel vote in June 1992.

The reference document was approved by CENELEC as EN 60870-5-4 on 22 September 1993.

The following dates were fixed:

— latest date of publication
of an identical national
standard (dop) 1994-08-01

— latest date of withdrawal
of conflicting national
standards (dow) 1994-08-01

Annexes designated “normative” are part of the body of the standard. In this standard, Annex ZA is normative.

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Introduction

This section of IEC 870-5 defines standard declaration rules for application data in telecontrol systems.

1 Scope and object

This section of IEC 870-5 applies to telecontrol equipment and systems with coded bit serial data transmission for monitoring and controlling geographically widespread processes.

This section of IEC 870-5 gives rules for defining information elements and presents a set of information elements, in particular of digital and analog process variables, that are frequently used in telecontrol applications.

Clause 4 presents syntactic rules for defining application specific information elements. These rules comprise methods for semantic declarations, that is assignments of the functional interpretation of the defined information fields.

Clause 5 applies the declaration method to the basic data types defined in Clause 4 and introduces particular subtypes of data.

Clause 6 presents a set of information elements that are frequently used in telecontrol applications. These elements and the mentioned recommended applications for these elements are recommendations only. Definitive declarations of information elements have to be fixed in application profiles.

Single information elements, sequences or combinations of information elements may form an information object that is identified by an object address and by an object structures specification described in IEC 870-5-3.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this section of IEC 870-5. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this section of IEC 870-5 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 50(371):1984, *International Electrotechnical Vocabulary (IEV) — Chapter 371: Telecontrol*.

IEC 870-1-1:1988, *Telecontrol equipment and systems — Part 1: General considerations — Section 1: General principles*.

IEC 870-1-3:1990, *Telecontrol equipment and systems — Part 1: General considerations — Section 3: Glossary*.

IEC 870-5-3:1992, *Telecontrol equipment and systems — Part 5: Transmission protocols — Section 3: General structure of application data*.

ISO/IEC 10000-1:1990, *Information technology — Framework and taxonomy of international standardized profiles — Part 1: Framework*.

IEEE Standard 754, 1985.

CCITT Recommendation V.3:1972, *International Alphabet No. 5*.

3 Definitions

For the purpose of this section of IEC 870-5, the following definitions apply:

3.1

data type

defined method of data presentation

for example: data type *INTEGER* for whole numbers or data type *OCTETSTRING* for an assembly of octets

3.2

data size

field length of a specified data type in bits

3.3
information element

a well defined variable quantity which is indivisible
for example: measured value or double-point information

3.4
profile

a set of one or more base standards, and, where applicable, the identification of chosen classes, subsets, options and parameters of those base standards, necessary for accomplishing a particular function
(see 3.1.2 of ISO/IEC 10000-1)

4 Declaration rules for information elements

Information elements are defined by the following syntactic and semantic declaration method:

	Data type	Data size	Bit position	Values and code	Function
Name of information element :=	TYPE	i	[p ₁ ..p ₁ + i - 1]	<v ₁ ...v _n code>	:= Function

The assignment symbol “:=” is used to associate information field declarations to the name of information elements and to associate functions to field declarations.

4.1 Data types

Table 1 — Data types

Type number	Data types	Symbol	Meaning
1	UNSIGNED INTEGER	UI	Positive whole number
2	INTEGER	I	Positive or negative whole number
3	UNSIGNED FIXED POINT	UF	Positive fixed point number
4	FIXED POINT	F	Positive or negative fixed point number
5	REAL	R	Positive or negative floating-point number
6	BITSTRING	BS	Assembly of independent bits ^a
7	OCTETSTRING	OS	Assembly of octets

^a The data type BOOLEAN is a BITSTRING of size 1.

4.2 Data size

The *data size* *i*, noted directly after the symbol of the *data type* notation, is a cardinal number that specifies the length of a data field in bits.

4.3 Bit position

The bit position of a specified field of *data size* *i* is denoted in square brackets [p₁..p_n], where p₁ and p_n denote the first and the last bits of the field. The order of bits is shown in the following scheme:

Table 2 — Bit positions

Octets	Bits							
1	8	7	6	5	4	3	2	1
2	16	15	14	13	12	11	10	9
.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.
j	8j	8j - 1	8j - 2	8j - 3	8j - 4	8j - 5	8j - 6	8j - 7

For example, if a BITSTRING of size 6 occupies the field surrounded with thick lines in Table 2, then it is denoted as BS6[7..12]. The last bit of a field of size *i* that begins in bit position p₁ is given by p_n = p₁ + i - 1. If the field size is 1, then the position is denoted by a single notation [p₁] in the brackets.