



SLOVENSKI STANDARD

SIST EN 60870-6-2:1997

01-avgust-1997

Telecontrol equipment and systems - Part 6: Telecontrol protocols compatible with ISO standards and ITU-T recommendations - Section 2: Use of basic standards (OSI layers 1-4) (IEC 870-6-2:1995)

Telecontrol equipment and systems -- Part 6: Telecontrol protocols compatible with ISO standards and ITU-T recommendations -- Section 2: Use of basic standards (OSI layers 1-4)

Fernwirkeinrichtungen und -systeme -- Teil 6: Fernwirkprotokolle, die mit ISO-Normen und ITU-T-Empfehlungen kompatibel sind -- Hauptabschnitt 2: Anwendungen der Grundnormen (OSI-Schichten 1 bis 4)

[SIST EN 60870-6-2:1997](https://standards.iteh.ai/catalog/standards/sist/c69f5a3a-ad23-420a-b143-40d1e72c7019/en/60870-6-2:1997)

Matériels et systèmes de téléconduite -- Partie 6: Protocoles de téléconduite compatibles avec les normes ISO et les recommandations de l'UIT-T -- Section 2: Utilisation des normes de base (couches OSI 1 à 4)

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ICS:

33.200 Daljinsko krmiljenje, daljinske Telecontrol. Telemetering meritve (telemetrija)

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EUROPEAN STANDARD

EN 60870-6-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 1995

ICS 33.200

Descriptors: Telecontrol, data transmission, transport layer, network layer, data link layer, physical layer, protocol, Open Systems Interconnection, communication, interworking, end system, intermediate system, service

English version

Telecontrol equipment and systems
Part 6: Telecontrol protocols compatible with ISO standards and
ITU-T recommendations
Section 2: Use of basic standards (OSI layers 1-4)
(IEC 870-6-2:1995)

Matériels et systèmes de téléconduite

Feineinwirkungen und -systeme

Partie 6: Protocoles de téléconduite

Teil 6: Fernwirkprotokolle, die mit

compatibles avec les normes ISO et

ISO-Normen und ITU-T-Empfehlungen

les recommandations de l'UIT-T

kompatibel sind

Section 2: Utilisation des normes de

Hauptabschnitt 2: Anwendungen der

base (couches OSI 1 à 4)

SIST EN 60870-6-2:1995

Grundnormen (OSI-Schichten 1 bis 4)

(CEI 870-6-2:1995)

(IEC 870-6-2:1995)

This European Standard was approved by CENELEC on 1995-09-20. 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.

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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

Foreword

The text of document 57/201/DIS, future edition 1 of IEC 870-6-2, prepared by IEC TC 57, Power system control and associated communications, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60870-6-2 on 1995-09-20.

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) 1996-07-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 1996-07-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes A, B and ZA are normative and annex C is informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 870-6-2:1995 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.

<u>Publication</u>	<u>EN/HD</u>
IEC 50(371): 1984, <i>International Electrotechnical Vocabulary (IEV) – Chapter 371: Telecontrol</i>	–
IEC 50(721): 1991, <i>International Electrotechnical Vocabulary (IEV) – Chapter 721: Telegraphy, facsimile and data communication</i>	–
IEC 870-1-3: 1990, <i>Telecontrol equipment and systems – Part 1: General considerations – Section 3: Glossary</i>	–
IEC 870-6-1: 1995, <i>Telecontrol equipment and systems – Part 6: Telecontrol protocols compatible with ISO standards and ITU-T recommendations – Section 1: Application context and organization of standards</i>	–
ISO 2110: 1989, <i>Information technology – Data communication – 25-pole DTE/DCE interface connector and contact number assignments</i>	–
ISO 2382-9: 1984, <i>Data processing – Vocabulary – Part 09: Data communication</i>	–
ISO/IEC 3309: 1993, <i>Information technology – Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures – Frame structure</i>	–
ISO/IEC 4335: 1993, <i>Information technology – Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures – Elements of procedures</i>	–
ISO 4903: 1989, <i>Information technology – Data communication – 15-pole DTE/DCE interface connector and contact number assignments</i>	–
ISO/IEC 7498-1: 1994, <i>Information technology – Open Systems Interconnection – Reference Model – Part 1: Basic Reference Model</i>	–
ISO 7776: 1986, <i>Information processing systems – Data communications – High-level data link control procedures – Description of the X.25 LAPB-compatible DTE data link procedures</i>	–
ISO/IEC 7809: 1993, <i>Information technology – Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures – Classes of procedures</i>	–
ISO/IEC 8072: 1994, <i>Information technology – Open Systems Interconnection – Transport service definition</i>	–
ISO/IEC 8073: 1992, <i>Information technology – Telecommunications and information exchange between systems – Open Systems Interconnection – Protocol for providing the connection-mode transport service</i>	EN 28073:1993
ISO/IEC 8208: 1990, <i>Information technology – Data communications – X.25 Packet Layer Protocol for Data Terminal Equipment</i>	–

<u>Publication</u>	<u>EN/HD</u>
ISO/IEC 8348: 1993, <i>Information technology – Open Systems Interconnection – Network service Definition</i>	–
ISO/IEC 8473-1: 1994, <i>Information technology – Protocol for providing the connectionless-mode network service: Protocol specification</i>	–
ISO 8602: 1987, <i>Information processing systems – Open Systems Interconnection – Protocol for providing the connectionless-mode transport service</i>	–
ISO 8648: 1988, <i>Information processing systems – Open Systems Interconnection – Internal organization of the Network Layer</i>	–
ISO 8802-2: 1989, <i>Information processing systems – Local area networks – Part 2: Logical link control</i>	–
ISO/IEC 8878: 1992, <i>Information technology – Telecommunications and information exchange between systems – Use of X.25 to provide the OSI Connection-Mode Network Service</i>	–
ISO/IEC 8880-2: 1992, <i>Information technology – Telecommunications and information exchange between systems – Protocol combinations to provide and support the OSI Network Service – Part 2: Provision and support of the connection-mode Network Service</i>	–
ISO/IEC 8880-3: 1990, <i>Information technology – Telecommunications and information exchange between systems – Protocol combinations to provide and support the OSI Network Service – Part 3: Provision and support of the connectionless-mode Network Service</i>	–
ISO/IEC 8886: 1992, <i>Information technology – Telecommunications and information exchange between systems – Data link service definition for Open System Interconnection</i>	–
SIST EN 60870-6-2:1997	
ISO/IEC 10022: 1990, <i>Information technology – Open Systems Interconnection – Physical Service Definition</i>	–
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ISO/IEC TR 10172: 1991, <i>Information technology – Telecommunications and information exchange between systems – Network Transport Protocol interworking specification</i>	–
ITU-T T.5009: 1992, <i>International Reference Alphabet</i>	–
ITU-T V.10: 1993, <i>Electrical characteristics for unbalanced double-current interchange circuits operating at data signalling rates nominally up to 100 kbit/s</i>	–
ITU-T V.11: 1993, <i>Electrical characteristics for unbalanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s</i>	–
ITU-T V.21: 1988, <i>300 bits per second duplex modem standardized for use in the general switched telephone network</i>	–
ITU-T V.22: 1988, <i>1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits</i>	–
ITU-T V.22bis: 1988, <i>2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits</i>	–

<u>Publication</u>	<u>EN/HD</u>
ITU-T V.23: 1988, 600/1200-baud modem standardized for use in the general switched telephone network	--
ITU-T V.24: 1993, List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE)	--
ITU-T V. 25: 1988, Automatic answering equipment and/or parallel automatic calling equipment on the general switched telephone network including procedures for disabling of echo control devices for both manually and automatically established calls	--
ITU-T V.25bis: 1988, Automatic calling and/or answering equipment on the general switched telephone network (GSTN) using the 100-series interchange circuits	--
ITU-T V.26bis: 1988, 2400/1200 bits per second modem standardized for use in the general switched telephone network	--
ITU-T V.26ter: 1988, 2400 bits per second duplex modem using the echo cancellation technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits	--
ITU-T V.27: 1988, 4800 bits per second modem with manual equalizer standardized for use on leased telephone-type circuits	--
ITU-T V.28: 1993, Electrical characteristics for unbalanced double-current interchange circuits	--
ITU-T V.31: 1988, Electrical characteristics for single-current interchange circuits controlled by contact closure	--
ITU-T V.31bis: 1988, Electrical characteristics for single-current interchange circuits using optocouplers	--
ITU-T V.32: 1993, A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bits/s for use on the general switched telephone network and on leased telephone-type circuits	--
ITU-T X.4: 1988, General structure of signals on International Alphabet No. 5 code for character oriented data transmission over public data networks	--
ITU-T X.21: 1992, Interface between data terminal equipment and data circuit-terminating equipment for synchronous operation on public data networks	--
ITU-T X.21bis: 1988, Use on public data networks of data terminal equipment (DTE) which is designed for interfacing to synchronous V-Series modems	--
ITU-T X.24: 1988, List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) on public data networks	--
ITU-T X.25: 1993, Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit	--
ITU-T X.26: 1988, Electrical characteristics for unbalanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications	--

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<u>Publication</u>	<u>EN/HD</u>
ITU-T X.27: 1988, <i>Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications</i>	—
ITU-T X.75: 1993, <i>Packet-switched signalling system between public networks providing data transmission services</i>	—
ITU-T X.211: 1988 (ISO 10022), <i>Physical service definition for open systems interconnection for ITU-T applications</i>	—
ITU-T X.212: 1988 (ISO 8886), <i>Data link service definition for open systems interconnection for ITU-T applications</i>	—
ITU-T X.213: 1992 (ISO 8348), <i>Information technology – Network service definition for Open Systems Interconnection</i>	—
CEPT T/CD 01-12, <i>Specifications for engineering requirements for 3 types of plug-in DCE's operating with a user data signalling rate of 2400 bits/s</i>	—
CEPT T/CD 01-14, <i>Specifications of equipment practice for data transmission equipment</i>	—

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Matériels et systèmes de téléconduite –

Partie 6:

Protocoles de téléconduite compatibles avec
les normes ISO et les recommandations
de l'UIT-T –

Section 2: Utilisation des normes de base
(couches OSI 1 à 4)

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Telecontrol equipment and systems –

Part 6:

Telecontrol protocols compatible with ISO
standards and ITU-T recommendations –
Section 2: Use of basic standards
(OSI layers 1-4)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

TELECONTROL EQUIPMENT AND SYSTEMS –

**Part 6: Telecontrol protocols compatible
with ISO standards and ITU-T* recommendations –
Section 2: Use of basic standards (OSI layers 1-4)**

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 cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC published 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, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 3) They have the form of recommendations for international use published in the form of standards, 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 Standards and the corresponding national or regional standard shall be clearly indicated in the latter.

International Standard IEC 870-6-2 has been prepared by IEC technical committee 57: Power system control and associated communications.

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

DIS	Report on voting
57/201/DIS	57/244/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.

Annexes A and B form an integral part of this standard. Annex C is for information only.

* Formerly CCITT

INTRODUCTION

IEC 870: "Telecontrol equipment and systems" is composed of six parts, of which part 6 is concerned with "telecontrol protocols compatible with ISO standards and ITU-T recommendations". The aim of part 6 is the standardization of functional profiles for electric power systems. These FPs are to provide the means for specifying complete, coherent, working systems for end-to-end communication and interworking.

IEC 870-6-1 establishes the overall context of part 6, describing exactly what part 6 is to contain, what form it will take, and to what it applies. This includes document structure, scope, requirements, generic communication network solutions, and the form in which the standard will be developed. It is an essential prerequisite for the sections which follow.

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TELECONTROL EQUIPMENT AND SYSTEMS -

Part 6: Telecontrol protocols compatible with ISO standards and ITU-T recommendations - Section 2: Use of basic standards (OSI layers 1-4)

1 Scope

This section of IEC 870-6 considers the standards related to layers 1-4 of the OSI reference model. Its objectives are as follows:

- to describe the role and the functions carried out by each layer;
- to list the relevant ISO basic standards;
- to give general considerations and recommendations for the use of the standards in the application context of part 6.

The use of these standards in their application to end systems (ES) and intermediate systems (IS) is described. An ES is one which contains all seven layers of the OSI reference model as well as an application process. An IS is a communication relay between sub-networks. ESs and ISs are considered in IEC 870-1-4 and IEC 870-6-1.

The description of the functions carried out by each layer is intended to be fairly complete but makes no claim to being exhaustive. For more details, the relevant sections of ISO 7498 should be consulted as well as the listed ISO basic standards.

Second, the ISO standards listed are the fundamental ones related to each layer; again, the list does not claim to be exhaustive.

Finally, the general considerations and recommendations are intended to present the basic issues involved in the application of the standards and to lay down the fundamental manner in which they are to be used. The purpose is to codify the ground rules for making the specific comprehensive and detailed choices necessary for the definition of the functional profiles which are the subject of part 6-5 and subsequent parts.

This section is organized according to the OSI layers.

Because there is a strong interdependence in the choice of protocols in the three lowest layers, these layers are grouped into clauses of this section. Within these clauses, the organization is according to the type of transmission network.

The treatment of each layer contains the following elements:

- introduction: briefly describing the layer's function and role in the overall communication process;
- reference documents;
- services;
 - list of services and QOS parameters included in the standards;
 - guidelines and recommendations concerning the choice and use of these services;
- protocols;
 - list of protocol classes, subsets, etc. included in the relevant standards;
 - guidelines and recommendations concerning the choice and use of these protocols.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this section of IEC 870-6. 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 870-6 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 50(721): 1991, *International Electrotechnical Vocabulary (IEV) – Chapter 721: Telegraphy, facsimile and data communication*

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

IEC 870-6-1: 1994, *Telecontrol equipment and systems – Part 6: Telecontrol protocols compatible with ISO standards and ITU-T recommendations – Section 1: Application context and organization of standards*

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ISO 2382-9: 1984, *Data processing – Vocabulary – Part 09: Data communication*

ISO/IEC 3309: 1993, *Information technology – Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures – Frame structure*

ISO/IEC 4335: 1993, *Information technology – Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures – Elements of procedures*

ISO 4903: 1989, *Information technology – Data communication – 15-pole DTE/DCE interface connector and contact number assignments*

ISO/IEC 7498-1: 1994, *Information technology – Open Systems Interconnection – Reference Model – Part 1: Basic Reference Model*

ISO 7776: 1986, *Information processing systems – Data communications – High-level data link control procedures – Description of the X.25 LAPB-compatible DTE data link procedures*

ISO/IEC 7809: 1993, *Information technology – Telecommunications and information exchange between systems – High-level data link control (HDLC) procedures – Classes of procedures*

ISO/IEC 8072: 1994, *Information technology – Open Systems Interconnection – Transport service definition*

ISO/IEC 8073: 1992, *Information technology – Telecommunications and information exchange between systems – Open Systems Interconnection – Protocol for providing the connection-mode transport service*

ISO/IEC 8208: 1990, *Information technology – Data communications – X.25 Packet Layer Protocol for Data Terminal Equipment*

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ISO/IEC 8348: 1993, *Information technology – Open Systems Interconnection – Network service Definition*

ISO/IEC 8473-1: 1994, *Information technology – Protocol for providing the connectionless-mode network service: Protocol specification*

ISO 8602: 1987, *Information processing systems – Open Systems Interconnection – Protocol for providing the connectionless-mode transport service*

ISO 8648: 1988, *Information processing systems – Open Systems Interconnection – Internal organization of the Network Layer*

ISO 8802-2: 1989, *Information processing systems – Local area networks – Part 2: Logical link control*

ISO/IEC 8878: 1992, *Information technology – Telecommunications and information exchange between systems – Use of X.25 to provide the OSI Connection-Mode Network Service*

ISO/IEC 8880-2: 1992, *Information technology – Telecommunications and information exchange between systems – Protocol combinations to provide and support the OSI Network Service – Part 2: Provision and support of the connection-mode Network Service*

ISO/IEC 8880-3: 1990, *Information technology – Telecommunications and information exchange between systems – Protocol combinations to provide and support the OSI Network Service – Part 3: Provision and support of the connectionless-mode Network Service*

ISO/IEC 8886: 1992, *Information technology – Telecommunications and information exchange between systems – Data link service definition for Open System Interconnection*

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ISO/IEC 10022: 1990, *Information technology – Open Systems Interconnection – Physical Service Definition*

ISO/IEC TR 10172: 1991, *Information technology – Telecommunications and information exchange between systems – Network Transport Protocol interworking specification*

ITU-T T.5009: 1992, *International Reference Alphabet*

ITU-T V.10: 1993, *Electrical characteristics for unbalanced double-current interchange circuits operating at data signalling rates nominally up to 100 kbit/s*

ITU-T V.11: 1993, *Electrical characteristics for unbalanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s*

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ITU-T V.22: 1988, *1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits*

ITU-T V.22bis: 1988, *2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits*