INTERNATIONAL STANDARD IEC 60870-5-101

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Telecontrol equipment and systems –

Part 5-101:
Transmission protocols –
Companion standard for basic telecontrol tasks

Matériels et systèmes de téléconduite –

Partie 5-101:
Protocoles de transmission –
Norme d'accompagnement pour les tâches élémentaires de téléconduite

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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. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60870-5-101 has been prepared by IEC technical committee 57: Power system control and associated communications.

This second edition cancels and replaces the first edition published in 1995, its amendments 1 (2000) and 2 (2001) and constitutes a technical revision.

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

FDIS	Report on voting
57/605/FDIS	57/623/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.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

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- withdrawn;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

A bilingual version of this publication may be issued at a later date.

TELECONTROL EQUIPMENT AND SYSTEMS –

Part 5-101: Transmission protocols – Companion standard for basic telecontrol tasks

1 Scope and object

This part of IEC 60870-5 applies to telecontrol equipment and systems with coded bit serial data transmission for monitoring and controlling geographically widespread processes. It defines a telecontrol companion standard that enables interoperability among compatible telecontrol equipment. The defined telecontrol companion standard utilizes standards of the IEC 60870-5 series of documents. The specifications of this standard present a functional profile for basic telecontrol tasks. Further companion standards, based on the IEC 60870-5 series are under consideration.

This standard defines ASDUs with time tags CP24Time2a which includes three octets binary time from milliseconds to minutes. In addition to these specifications, ASDUs with time tags CP56Time2a, which includes seven octets binary time from milliseconds to years, are defined in this standard (see 6.8 of IEC 60870-5-4 and 7.2.6.18 of this standard).

ASDUs with time tags CP56Time2a are used when the controlling station is not able to add the time from hours to years unambiguously to the received ASDUs which are tagged from milliseconds to minutes. This may happen when using networks with uncertain transmission delays or if temporary failure of a network occurs.

Although this companion standard defines the most important user functions, other than the actual communication functions, it cannot guarantee complete compatibility and interoperability between equipment of different vendors. An additional mutual agreement is normally required between concerned parties regarding the methods of use of the defined communication functions, taking into account the operation of the entire telecontrol equipment.

Standards specified in this standard are compatible with standards defined in IEC 60870-5-1 to IEC 60870-5-5 (see Clause 2).

2 Normative references

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

IEC 60050(371):1984, *International Electrotechnical Vocabulary (IEV) – Chapter 371: Telecontrol*

IEC 60870-1-1:1988, *Telecontrol equipment and systems – Part 1: General considerations – Section 1: General principles*

IEC 60870-5-1:1990, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section 1: Transmission frame formats*

IEC 60870-5-2:1992, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section 2: Link transmission procedures*

IEC 60870-5-3:1992, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section 3: General structure of application data*

IEC 60870-5-4:1993, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section 4: Definition and coding of application information elements*

IEC 60870-5-5:1995, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section 5: Basic application functions*

IEC 60870-5-103:1997, *Telecontrol equipment and systems – Part 5-103: Transmission protocols – Companion standard for the informative interface of protection equipment*

ISO/IEC 8824-1:2000, *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation*

ITU-T V.24:2000, *List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE)*

ITU-T V.28:1993, *Electrical characteristics for unbalanced double-current interchange circuits*

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.27:1996, *Electrical characteristics for balanced double-current interchange circuits operating at data signalling rates up to 10 Mbit/s*

IEEE 754:1985, *Binary floating-point arithmetic*