INTERNATIONAL STANDARD

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Telecontrol equipment and systems

Part 5:
Transmission protocols
Section 2: Link transmission procedures

Matériels et systèmes de téléconduite

Partie 5:
Protocoles de transmission
Section 2: Procédures de transmission de liaison de données

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FOREWORD

1) 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.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

This section of International Standard IEC 870-5 has been prepared by IEC Technical Committee No. 57: Telecontrol, teleprotection and associated telecommunications for electric power systems.

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

DIS	Report on Voting
57(CO)57	57(CO)60

Full information on the voting for the approval of this section can be found in the Voting Report indicated in the above table.

Annex A is an integral part of this section.

INTRODUCTION

This section of IEC 870-5 is part of a series which highlights specific requirements and conditions for data transmission in telecontrol systems and describes ways to meet those requirements.

In terms of the OSI (Open System Interconnection) reference model of ISO-CCITT, which subdivides communication into seven layers, this section is concerned with the procedures required by the second layer: the link layer.

Section 1 covers the two bottom layers: the physical layer and the link layer, the latter being explained in terms of admissible frame formats and rules for frame synchronization. This section specifies standard link transmission procedures which operate on the link layer.

TELECONTROL EQUIPMENT AND SYSTEMS

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1 Scope and object

1.1 *Scope*

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.

The defined link procedures are restricted to message transmission sequences operating with size 1 windows. This means that the link layer of the primary station (station that initiates a message transfer) accepts a request for a new message transfer only when a previously accepted request for a message transfer is terminated either successfully or with an error indication. The procedures are applicable to balanced and unbalanced transmission in telecontrol systems using half duplex or duplex transmission channels.

1.2 *Object*

The standard transmission procedures defined by this section are applicable to point-to-point, multiple point-to-point, multipoint-star, multipoint-partyline and multipoint-ring configurations as described in 4.4 of IEC 870-1-1.

The data transmission functions in these systems are composed of three basic types of link transmission services, namely:

1. SEND/NO REPLY 2. SEND/CONFIRM 3. REQUEST/RESPOND

The two services SEND/CONFIRM and REQUEST/RESPOND consist of a sequence of non-separable dialogue elements between requesting stations and responding stations.

The protocol defined in this section accepts and processes only a single link transmission service at a time in each direction of a bidirectional communication system. Each transmission service is terminated either successfully or with error reports before the next transmission service begins. This means that the window size for successive packet transfers is 1 and the specified error recovery for the transmission services SEND/CONFIRM and REQUEST/RESPOND utilize the stop-and-wait method for automatic repeat requests (ARQ).

In point-to-point configurations equipped with duplex channel operation, the defined protocol supports balanced transmission procedures, that is simultaneous data transmission services in both directions of the communication link. This enables outstations to report spontaneous events to the control station as they occur, without having to be polled. This reduces reporting delays and leads to faster data acquisition. However, the use of an individual duplex communications channel to each outstation leads to increased equipment costs.

2 Normative references

The following standards 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 standards 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 standards 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 one: General principles.*

IEC 870-5-1: 1990, *Telecontrol equipment and systems – Part 5: Transmission protocols – Section One: Transmission frame formats.*