SLOVENSKI STANDARD
SIST EN 62056-31:2000

01-junij-2000

Electricity metering - Data exchange for meter reading, fariff and load control - Part 31: Use of local area networks on twisted pair with carrier signalling

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Messung der elektrischen Energie - Zählerstandsübertragung, Tarif- und Laststeuerung -- Teil 31: Nutzung örtlicher Bereichsnetze mit Trägerfrequenz-Signalübertragung auf verdrillten Zweidrahtleitungen

Comptage de l'électricité - Echange de données pour la lecture des compteurs, le contrôle des tarifs et de la charge -- Partie 31: Utilisation des réseaux locaux sur paire torsadée avec signal de porteuse

Ta slovenski standard je istoveten z: **EN 62056-31:2000**

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities
35.240.60	Uporabniške rešitve IT v transportu in trgovini	IT applications in transport and trade
91.140.50	Sistemi za oskrbo z elektriko	Electricity supply systems

SIST EN 62056-31:2000 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

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Electricity metering - Data exchange for meter reading, tariff and load control
Part 31: Use of local area networks on twisted pair with carrier signalling
(IEC 62056-31:1999)

Comptage de l'électricité - Echange de données pour la lecture des compteurs, le contrôle des tarifs et de la charge
Partie 31: Utilisation des réseaux locaux sur paire torsadée avec signal de porteuse
(CEI 62056-31:1999)

Messung der elektrischen Energie
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Teil 31: Nutzung örtlicher Bereichsnetze mit Trägerfrequenz-Signalübertragung auf verdrillten Zweidrahtleitungen
(IEC 62056-31:1999)

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

Ref. No. EN 62056-31:2000 E

Foreword

The text of document 13/1194/FDIS, future edition 1 of IEC 62056-31, prepared by IEC TC 13, Equipment for electrical energy measurement and load control, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62056-31 on 1999-12-01.

This European Standard supersedes EN 61142:1993.

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) 2000-10-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2002-12-01

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this International Standard may involve the use of a patent concerning the stack of protocols on which the present standard IEC 62056-31 is based.

The IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the IEC that he is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with the IEC. Information may be obtained from:

EURIDIS Association
Bureau P107, 1 Avenue du Général de Gaulle, 92141 Clamart Cedex, FRANCE

Attention is drawn to the possibility that some of the elements of the International Standard may be the subject of patent rights other than those identified above. IEC shall not be held responsible for identifying any or all such patent rights.

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

Endorsement notice

The text of the International Standard IEC 62056-31:1999 was approved by CENELEC as a European Standard without any modification.

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.

Publication	Year	Title	EN/HD	Year
IEC 62056-51	1998	Electricity metering - Data exchange for meter reading, tariff and load control Part 51: Application layer protocols	-	-
IEC 61334-4-41	1996	Distribution automation using distribution line carrier systems Part 4: Data communication protocols Section 41: Application protocols Distribution line message specification	EN 61334-4-41	1996
EIA 485	-	Standard for electrical characteristics of generators and receivers for use in balanced digital multipoint systems	-	-
ISO/IEC 8482	1993	Information technology Telecommunications and information exchange between systems - Twisted pair multipoint interconnections	-	-

NORME INTERNATIONALE

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Première édition
First edition
1999-11

Comptage de l'électricité – Echange de données pour la lecture des compteurs, le contrôle des tarifs et de la charge

**Partie 31:
Utilisation des réseaux locaux sur paire torsadée avec signal de porteuse**

Electricity metering – Data exchange for meter reading, tariff and load control

**Part 31:
Use of local area networks on twisted pair with carrier signalling**

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Commission Electrotechnique Internationale
International Electrotechnical Commission
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICITY METERING – DATA EXCHANGE FOR METER READING, TARIFF AND LOAD CONTROL –

Part 31: Use of local area networks on twisted pair with carrier signalling

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.
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3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
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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.

International Standard IEC 62056-31 has been prepared by IEC technical committee 13: Equipment for electrical energy measurement and load control.

This first edition of IEC 62056-31 cancels and replaces the first edition of IEC 61142, published in 1993, and constitutes a technical revision.

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

FDIS	Report on voting
13/1194/FDIS	13/1203/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.

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this International Standard may involve the use of a patent concerning the stack of protocols on which the present standard IEC 62056-31 is based.

The IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured the IEC that he is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with the IEC. Information may be obtained from:

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Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights other than those identified above. IEC shall not be held responsible for identifying any or all such patent rights.

This publication has been drafted in accordance with ISO/IEC Directives, Part 3.

The committee has decided that this publication remains valid until 2004.

At this date, in accordance with the committee's decision, the publication will be

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

Annexes A, B, C, D, E, F, G and H form an integral part of this standard.

Annex I is for information only.

ELECTRICITY METERING – DATA EXCHANGE FOR METER READING, TARIFF AND LOAD CONTROL –

Part 31: Use of local area networks on twisted pair with carrier signalling

1 General

1.1 Scope

This part of IEC 62056 describes two new architectures for local bus data exchange with stations either energized or not. For non-energized stations, the bus supplies energy for data exchange.

The first architecture completes the base protocol (IEC 61142) with remote transfer services while the second one allows operation of DLMS services using the same physical medium and the same physical layer.

This complete compatibility guarantees the possibility of using IEC 61142 and IEC 62056-31 equipment on the same bus.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 62056-51:1998, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 51: Application layer protocols*

IEC 61334-4-41:1996, *Distribution automation using distribution line carrier systems – Part 4: Data communication protocols – Section 41: Application protocols – Distribution line message specification*

EIA 485: —, *Standard for Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems*

ISO/IEC 8482:1993, *Information technology – Telecommunications and information exchange between systems – Twisted pair multipoint interconnections*

2 General description

2.1 Basic vocabulary

All communication calls upon two systems called Primary Station and Secondary Station. The Primary Station is the system that decides to initialize a communication with a remote system called Secondary Station; these designations remain valid throughout the duration of the communication.

A communication is broken down into a certain number of transactions. Each transaction consists of a transmission from the Transmitter to the Receiver. During the sequence of transactions, the Primary Station and Secondary Station systems take turns to act as Transmitter and Receiver.

For the local bus data exchange architecture with DLMS, the terms Client and Server have the same meaning as for the DLMS model (refer to IEC 61334-4-41). The Server (which is a Secondary Station) acts as a VDE (refer to IEC 61334-4-41) for the submission of special service requests. The Client (which is a Primary Station) is the system that uses the Server for a specific purpose by means of one or more service requests.

2.2 Layers and protocols

The local bus data exchange architecture uses a breakdown into three network layers: *Physical*, *Data Link* and *Application*. The protocol corresponding to the *Physical* layer is the same for both local bus data exchange architecture, with and without DLMS, allowing all kinds of stations to be installed on the same bus.

The protocols corresponding to the *Data Link* and *Application* layers are defined in the table 1.

Table 1 – Architectures

	Layers	Protocols
Architecture Without DLMS	*Application*	*Application-62056-31*
	Data Link	*Link-62056-31*
Architecture With DLMS	*DLMS+ Application*	*Application+ Transport+*
	Data Link	*Link-E/D*

The *Transport+* and *Application+* protocols of the *Transport* and *Application* sub-layers of the *Application* layer are described in IEC 62056-51.

The *DLMS+* protocol of the *DLMS* sub-layer of the *Application* layer is described in IEC 61334-4-41.

2.3 Specification language

In this standard, the protocol of each layer is described by state transitions represented in the form of tables. The syntax used in making up these tables is defined by a specification language described in annex A.

In the event of a difference in interpretation between part of the text and a state transition table, the table is always taken as the reference.

2.4 Communication services for local bus data exchange without DLMS

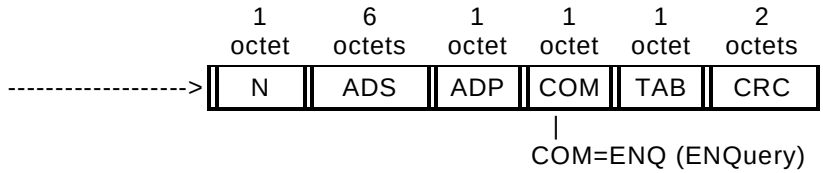
The list of available services is:

a) remote reading of data;
b) remote programming of data;
c) point to point remote transfer, which is a simplified remote programming service;
d) broadcast remote transfer;
e) bus initialization;
f) forgotten station call.

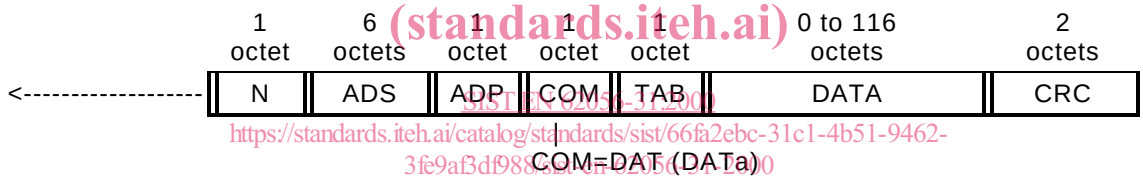
2.4.1 Remote reading exchange

The ENQ exchange consists of two frames arranged in one sequence:

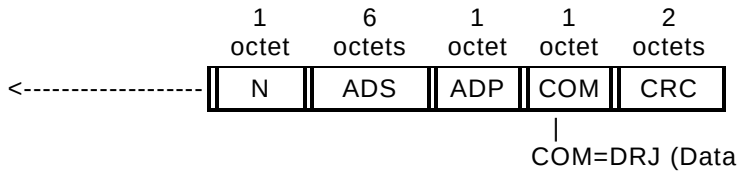
remote reading frame containing the type of data to select in the TAB field



positive acknowledgement frame with the selected data in the DATA field



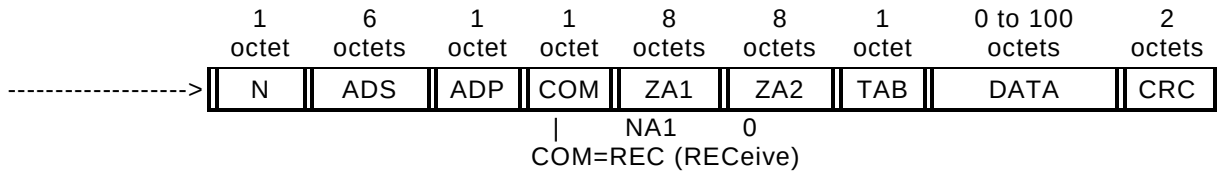
negative acknowledgement frame (TAB identifier unknown)



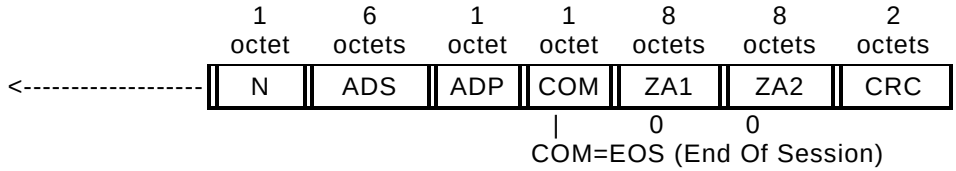
2.4.2 Remote programming exchange

The REC exchange consists of four frames arranged in two sequences. Since there is an internal sequence for authentication purpose, from the application point of view, it seems to be only one sequence with two frames:

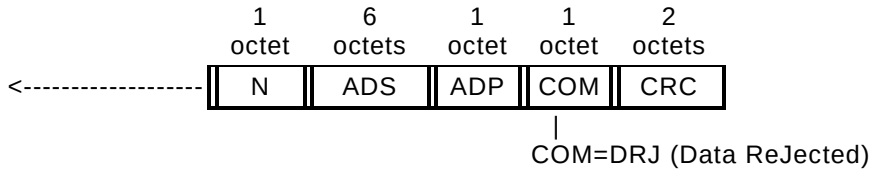
remote programming frame containing data in the DATA field and their type in the TAB field



positive acknowledgement frame (no authentication trouble)



negative acknowledgement frame (no authentication trouble but remote programming data not validated)



Authentication is carried out by an exchange of random numbers cyphered using a secret key specific to each Secondary Station. The random numbers are defined in 8 octets and they are ciphered with the DES algorithm using an 8-octet ciphering key Ki known both to the Primary and the Secondary station.

A random number NA1 is first generated by the Primary Station and transmitted into the ZA1 field of the remote programming frame while field ZA2 is set to zero.

On arrival at the Secondary Station, field ZA1 is ciphered by the DES algorithm with key Ki to get the ciphered random number NA1K. Then occurs the internal sequence for authentication which consists of two frames.

The first frame (from Secondary to Primary Station) contains this random number NA1K in field ZA1 and a random number NA2 generated by the Secondary station in field ZA2.

On reception of this frame, the Primary Station compares the ZA1 field to an NA1´ number obtained by ciphering the transmitted NA1 number using the DES algorithm with key Ki. If NA1´ = ZA1, then the Primary Station considers the called Secondary Station as authenticated. Otherwise, it considers the Secondary Station has not been authenticated and aborts the communication session.

After correct authentication of the Secondary Station, the Primary Station first ciphers the random number NA2 by the DES algorithm with key Ki to get the ciphered random number NA2K and then transmits it into field ZA2 while field ZA1 is set to zero.

On reception of this response frame, the Secondary Station compares the ZA2 field to an NA2´ number obtained by ciphering the transmitted NA2 number using the DES algorithm with key Ki. If NA2´ = ZA2, then the Secondary Station considers the Primary Station as authenticated. Otherwise, it considers the Primary Station has not been authenticated and sends a negative acknowledgment frame.