

INTERNATIONAL STANDARD

IEC
1142

First edition
1993-01

Data exchange for meter reading, tariff and load control – Local bus data exchange

*Echange des données pour la lecture des
compteurs, contrôle des tarifs et de la charge –
Echange des données par bus en local*

© CEI 1993 Droits de reproduction réservés — Copyright — all rights reserved

Aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'éditeur.

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembe Genève, Suisse



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

Withdrawn

CONTENTS

	Page
FOREWORD	5
INTRODUCTION	6
Clause	
1 General	7
1.1 Scope and object	7
1.2 Normative references	7
1.3 Definitions	8
1.4 List of abbreviations or acronyms used	8
2 Local bus data exchange – secondary station (SLAVE)	14
2.1 Specification	14
2.2 General requirements	14
2.3 Basic principles	16
2.4 General organization of frames and exchanges	18
2.5 General organization of the protocol	29
2.6 PHYSICAL layer	33
2.7 DATA LINK layer	50
2.8 SESSION layer	60
2.9 APPLICATION layer	69
2.10 Summary and inter-layer relationships	78
3 Local bus data exchange – primary station (MASTER)	82
3.1 Introduction	82
3.2 General reminders	82
3.3 Tables A received and B returned by the protocol	83
3.4 Activation of protocol and concatenation of exchanges	94
3.5 PHYSICAL layer	98
3.6 DATA LINK layer	107
3.7 SESSION layer	114
3.8 APPLICATION layer	123
3.9 Synopsis and inter-relationship between layers	137
4 Local bus data exchange – hardware	139
4.1 General	139
4.2 General characteristics	139
4.3 Bus specification	141
4.4 Magnetic plug	142
4.5 Functional specifications of primary station transmitter	145
4.6 Functional specifications of primary station receiver	146
4.7 Functional specifications of secondary station transmitter	147
4.8 Functional specifications of secondary station receiver	147

Clause	Page
Annexes	
A – CRC16	149
B – DES encryption	150
B.1 Introduction	150
B.2 Encryption and decryption algorithms	150
B.3 DES operating modes	159
B.4 Choice of operating mode	161
B.5 Development and tests	162
C – Random number generation (NAO) for response from forgotten units	163
D – Random number generation for authentication	165
E – Coding blocks in a frame	167
F – Possible cases for BERREUR(I,J) and BTIMOUT(I,J) fields	169
G – HEX-ASCII correspondence	170
H – Bibliography	171

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DATA EXCHANGE FOR METER READING, TARIFF
AND LOAD CONTROL –
LOCAL BUS DATA EXCHANGE**

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 International Standard has been prepared by IEC Technical Committee No. 13: Equipment for electrical energy measurement and load control.

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

DIS	Report on Voting
13(CO)1016	13(CO)1020

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

INTRODUCTION

This International Standard has been established by working group 14: Data exchange for meter reading, tariff and load control of technical committee 13: Equipment for electrical energy measurement and load control.

The working group has the task of establishing standards, by reference to ISO Standards, necessary for data exchanges by different communication media, for remote reading, tariff and load control, consumer information.

The media can be either distribution line carrier (DLC), telephone (including ISDN), radio or other electrical or optical systems and they may be used for local or remote data exchanges.

Meter reading and programming may be performed manually by a meter reader, or supported by means of a local communication system, or automatically by means of a remote communication system. Manual meter reading means that the reader has access to the meter and reads each register, while "supported" reading implies the use of a communication system or a local bus system and a hand-held unit (HHU). Fully remote reading implies a remote communication system such as those involving distribution line carrier or telephone systems.

Withdrawn

DATA EXCHANGE FOR METER READING, TARIFF AND LOAD CONTROL – LOCAL BUS DATA EXCHANGE

1 General

1.1 *Scope and object*

This International Standard describes a method for local bus data exchange, where a number of tariff devices in a given area are connected by a dedicated bus; all of these tariff devices may then be read by connection of a hand-held unit to a central magnetic plug.

This standard presents hardware and protocol specifications for local systems, while specifications for a remote system falls within the scope of another standard.

Considering the fact that several systems are in practical use already, particular care was taken to maintain compatibility with existing systems and/or system components and their relevant protocols.

This standard is specific for local bus systems. In these systems, a hand-held unit also known as primary station or MASTER is connected to several tariff devices also known as secondary stations or SLAVES through a dedicated bus having a flexible structure.

The master is connected to the bus by a magnetic (inductive) plug. The bus itself is passive and all the tariff units – the number of which is limited – are electrically isolated from it.

The protocol is also based on OSI and uses four layers: PHYSICAL, DATA LINK, SESSION and APPLICATION.

The protocol permits the reading and programming of tariff devices. It allows for the detection and identification of so-called "forgotten" units that are not registered in the portable terminal's data base.

The protocol has been designed to be particularly suitable for the environment of electricity metering, especially as regards electrical isolation, and software security. While the protocol is well defined, its use and application are left to the user. The use of the local bus system for point to point communication is also left to the user.

1.2 *Normative references*

The following normative standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7480: 1984, *Information processing - Start/stop transmission – Signal quality at DTE/DCE interfaces.*

ISO 7498: 1984, *Information processing systems – Open Systems Interconnection – Basic Reference Model.*

Withdrawn