

# INTERNATIONAL STANDARD

**IEC**  
**62056-21**

First edition  
2002-05

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

**Part 21:  
Direct local data exchange**

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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRICITY METERING –  
DATA EXCHANGE FOR METER READING,  
TARIFF AND LOAD CONTROL –****Part 21: Direct local data exchange**

## FOREWORD

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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 maintenance service concerning the stack of protocols on which the present standard IEC 62056-21 is based.

The IEC takes no position concerning the evidence, validity and scope of this maintenance service.

The provider of the maintenance service has assured the IEC that he is willing to provide services under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the provider of the maintenance service is registered with the IEC. Information may be obtained:

Manufacturer's identification, item 12) of 6.3.2: from

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Enhanced identification character, item 24) of 6.3.2: from

DLMS User Association  
Geneva / Switzerland  
[www.dlms.ch](http://www.dlms.ch)

International Standard IEC 62056-21 has been prepared by IEC Technical Committee 13: Equipment for electrical energy measurement and load control.

This first edition IEC 62056-21 cancels and replaces the second edition of IEC 61107 published in 1996 and constitutes a technical revision.

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

FDIS	Report on voting
13/1271/FDIS	13/1277/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, B and E form an integral part of this standard.

Annexes C and D are for information only.

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

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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- withdrawn;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

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## INTRODUCTION

IEC TC 13 has the task of preparing standards for data exchange for the purposes of meter reading, tariff and load control, and consumer information using various alternative communication media, with reference to ISO and ITU standards.

Meter data exchange can be local or remote. This part of IEC 62056 is restricted to local data exchange, whereas remote data exchange is covered by other standards of the IEC 62056 series.

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

## Part 21: Direct local data exchange

### 1 Scope

This part of IEC 62056 describes hardware and protocol specifications for local meter data exchange. In such systems, a hand-held unit (HHU) or a unit with equivalent functions is connected to a tariff device or a group of devices.

The connection can be permanent or disconnectable using an optical or electrical coupling. An electrical interface is proposed for use with a permanent connection, or when more than one tariff device needs to be read at one site. The optical coupler should be easily disconnectable to enable data collection via an HHU.

The protocol permits reading and programming of tariff devices. It is designed to be particularly suitable for the environment of electricity metering, especially as regards electrical isolation and data security. While the protocol is well-defined, its use and application are left to the user.

This standard is based on the reference model for communication in open systems. It is enhanced by further elements such as an optical interface, protocol controlled baud rate switchover, data transmission without acknowledgement of receipt. The protocol offers several modes for implementation in the tariff device. The HHU or equivalent unit acts as a master while the tariff device acts as a slave in protocol modes A to D. In protocol mode E, the HHU acts as a client and the tariff device acts as a server.

As 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.

### 2 Normative references

The following normative documents 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 documents 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 documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050-300:2001, *International Electrotechnical Vocabulary (IEV) – Electrical and electronic measurements and measuring instruments – Part 311: General terms relating to measurements – Part 312: General terms relating to electrical measurements – Part 313: Types of electrical measuring instruments – Part 314: Specific terms according to the type of instrument*

IEC 62051:1999, *Electricity metering – Glossary of terms*

IEC 62056-42:2002, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 42: Physical layer services and procedures for connection oriented asynchronous data exchange*

IEC 62056-46:2002, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 46: Data link layer using HDLC-protocol*

IEC 62056-53:2002, *Electricity metering – Data exchange for meter reading, tariff and load control – Part 53: COSEM application layer*

ISO/IEC 646:1991, *Information technology – ISO 7-bit coded character set for information interchange*

ISO/IEC 1155:1978, *Information processing – Use of longitudinal parity to detect errors in information messages*

ISO/IEC 1177:1985, *Information processing – Character structure for start/stop and synchronous character-oriented transmission*

ISO/IEC 1745:1975, *Information processing – Basic mode control procedures for data communication systems*

ISO/IEC 7480:1991, *Information technology – Telecommunications and information exchange between systems – Start-stop transmission signal quality at DTE/DCE interfaces*

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

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

### **3 Terms, definitions and abbreviations**

#### **3.1 Terms and definitions**

For the purpose of this part of IEC 62056 the terms and definitions given in IEC 60050-300 and IEC 62051, as well as the following apply:

##### **3.1.1**

###### **tariff device**

fixed data collection unit, normally linked or combined with an electricity meter, acting as a server

##### **3.1.2**

###### **master**

central station. Station which takes the initiative and controls the data flow

**3.1.3****slave**

station responding to requests of a master station. The tariff device is normally a slave station

**3.1.4****client**

a station, asking for services, normally the master station

**3.1.5****server**

a station, delivering services. The tariff device (e.g. the meter) is normally the server, delivering the requested values or executing the requested tasks

**3.2 Abbreviations**

HHU hand-held unit

**4 Physical properties****4.1 Electrical current loop interface**

## a) Type of signal

20 mA current loop

Absolute limits:

Open-circuit voltage: max. 30 V d.c.

Loop current: max. 30 mA

**Table 1 – Electrical interface**

<b>Current</b>	<b>Send (TX)</b>	<b>Receive (RX)</b>
Zero, no loop current, SPACE	≤2,5 mA	≤3 mA
One, 20 mA loop current, MARK	≥11 mA	≥9 mA
<b>Voltage drop</b>		
One, 20 mA loop current, MARK	≤2 V	≤3 V
<b>Maximum open-circuit voltage during operation</b>		30 V d.c.

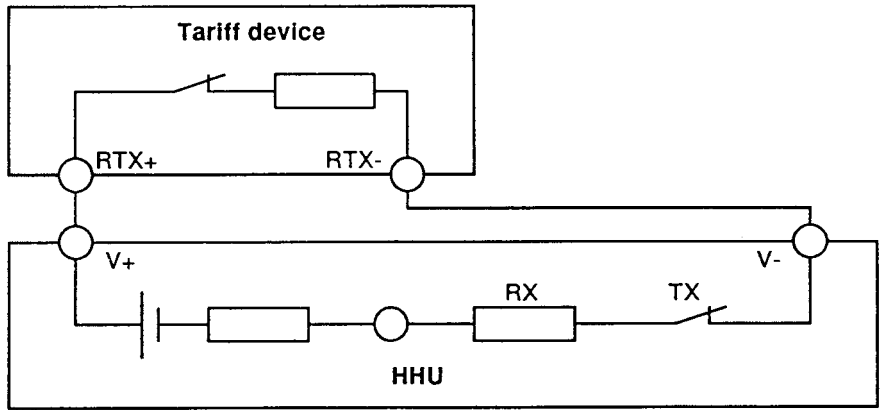
## b) Power supply

On the tariff device side the interface is passive. The HHU supplies the necessary power.

## c) Connections

Via terminals or suitable connectors. Polarity errors can prevent communication, but shall not harm the devices.

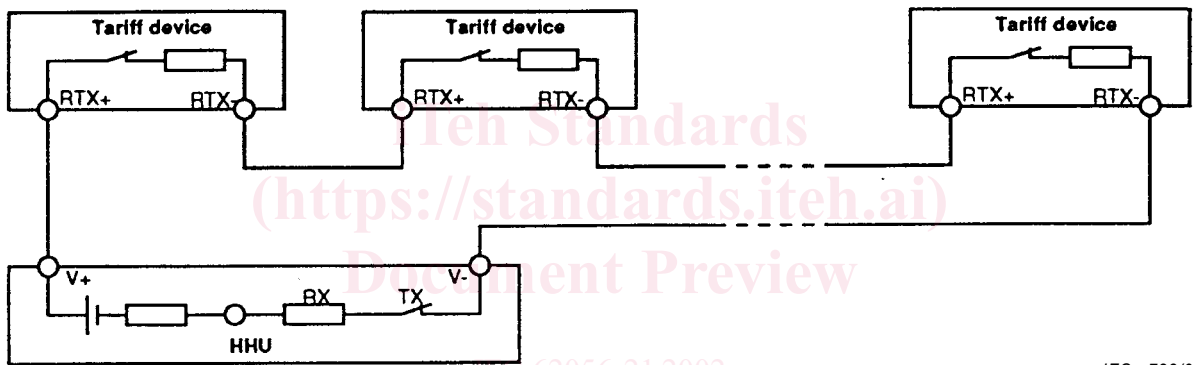
d) Circuit arrangements in two-wire configuration (one slave station)



IEC 722/02

Figure 1a – Circuit diagram of a two-wire single slave configuration

e) Circuit arrangements in two-wire configuration (multiple slave stations)

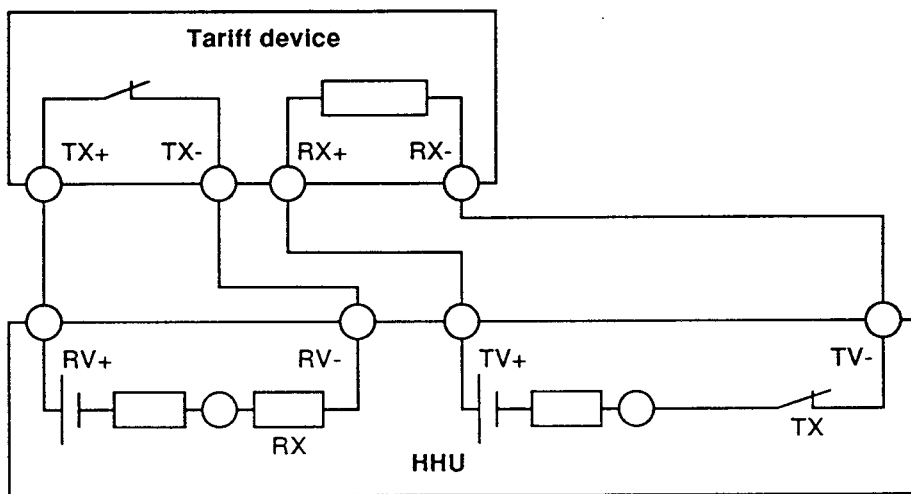


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Figure 1b – Circuit diagram of a two-wire multiple slave configuration

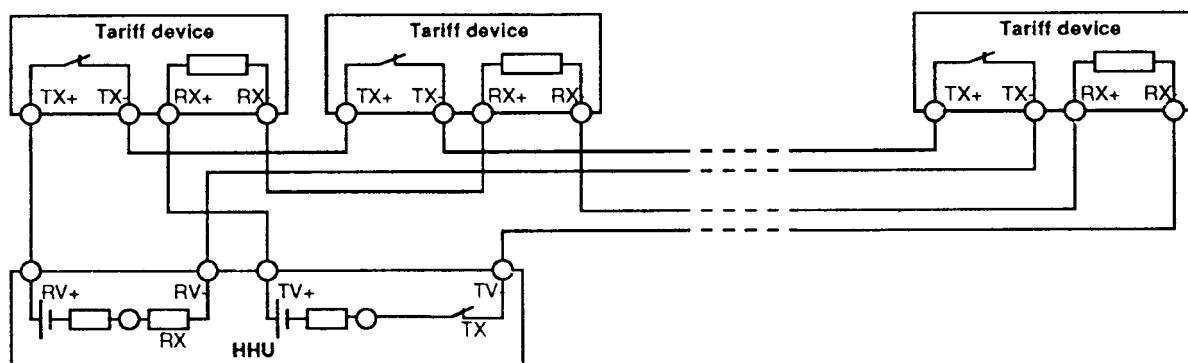
f) Circuit arrangements in four-wire configuration (one slave station)



IEC 724/02

Figure 1c – Circuit diagram of a four-wire single slave configuration

g) Circuit arrangements in four-wire configuration (multiple slave stations)



IEC 725/02

Figure 1d – Circuit diagram of a four-wire multiple slave configuration

### Figure 1 – Circuit diagrams

If a nominal voltage of the master station (HHU) of 26 V is assumed, eight slave stations (tariff devices) can be connected in series.

#### 4.2 Electrical interface V.24/V.28

Relevant ITU-T recommendations apply:

ITU-T Recommendation V.24: only circuits No. 102 (Signal ground), 103 (Transmitted data) and 104 (Received data) are used.

ITU-T Recommendation V.28: The electrical characteristics of the interchange circuits shall be according to the ITU-T V.28 Recommendation. These enable signalling rates up to 20 kbit/s.

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