



# SLOVENSKI STANDARD

## SIST EN 61107:1997

01-april-1997

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**Prenos stanja števecv, krmiljenje tarif in bremen - Prenos podatkov za fiksno in mobilno priključitev (IEC 1107:1996)**

Data exchange for meter reading, tariff and load control - Direct local data exchange

Zählerstandsübertragung, Tarif- und Laststeuerung - Datenübertragung für festen und mobilen Anschluß

**iTeh STANDARD PREVIEW**

Echange des données pour la lecture des compteurs, contrôle des tarifs et de la charge -  
Echange des données directes en local

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**Ta slovenski standard je istoveten z: EN 61107:1996**

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**ICS:**

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities
35.100.01	Medsebojno povezovanje odprtih sistemov na splošno	Open systems interconnection in general
91.140.50	Sistemi za oskrbo z elektriko	Electricity supply systems

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EUROPEAN STANDARD  
 NORME EUROPÉENNE  
 EUROPÄISCHE NORM

**EN 61107**

April 1996

ICS 19.080; 35.200

Supersedes EN 61107:1992

Descriptors: Electrical energy measurement, electrical energy meter reading, tariff control, load control, data exchange

English version

**Data exchange for meter reading, tariff and load control**  
**Direct local data exchange**  
 (IEC 1107:1996)

Echange des données pour la lecture  
 des compteurs, contrôle des tarifs et  
 de la charge  
 Echange des données directes en local  
 (CEI 1107:1996)

Zählerstandsübertragung, Tarif- und  
 Laststeuerung  
 Datenübertragung für festen und  
 mobilen Anschluß  
 (IEC 1107:1996)

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European Committee for Electrotechnical Standardization  
 Comité Européen de Normalisation Electrotechnique  
 Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

### Foreword

The text of document 13/1090 and 1090 A/FDIS, future edition 2 of IEC 1107, 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 61107 on 1996-03-05.

This European Standard supersedes EN 61107:1992.

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) 1996-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-12-01

Annexes designated "normative" are part of the body of the standard.  
Annexes designated "informative" are given for information only.  
In this standard, annexes A and B are normative and annex C is informative.

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 FLAG protocol dealt with in clause 5.

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### Endorsement notice

The text of the International Standard IEC 1107:1996 was approved by CENELEC as a European Standard without any modification.

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NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD

CEI  
IEC  
1107

Deuxième édition  
Second edition  
1996-03

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

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Data exchange for meter reading,  
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International Electrotechnical Commission  
Международная Электротехническая Комиссия

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

## 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 cooperation 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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This International Standard IEC 1107 has been prepared by IEC technical committee 13: Equipment for electrical energy measurement and load control.

This second edition cancels and replaces the first edition published in 1992 and constitutes a technical revision.

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

FDIS	Report on voting
13/1090 and 1090 A/FDIS	13/1109/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 FLAG protocol dealt with in clause 5.

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Annexes A and B form an integral part of this standard.

Annex C is for information only.

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## INTRODUCTION

Experts have the task of preparing standards by reference to ISO standards necessary for data exchanges, by different communication media, for automatic meter reading, tariff and load control, and consumer information.

The media can be either distribution line carrier, 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" meter reading implies the use of a communication system or a local bus system and a hand-held unit (HHU). Fully automatic meter reading implies a remote communication system such as those involving distribution line carrier or telephone systems.

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

### 1 General

#### 1.1 *Scope and object*

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

This standard deals with direct local systems, in which a hand-held unit (HHU) is connected to one or a group of tariff devices. Connection can be permanent or disconnectable through an electrical or optical coupling. The protocol took as its basis the basic reference model for communication between open systems (OSI).

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.

The protocol permits the reading and programming of tariff devices. It 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 is left to the user.

This standard prescribes the hardware and software preconditions which permit an exchange of data between a tariff device and an HHU. The connection to the HHU may be either permanent or disconnectable. Electrical as well as optical couplers are possible. An electrical contact is recommended for use with a fixed connection. The optical coupler should be easily disconnectable to enable data collection via an HHU. This standard incorporates parts of ISO 7498, augmented by further conditions concerning, for example, an optical interface, protocol controlled baud rate switchover, and data transmission without acknowledgment of receipt. The preparatory work took as its basis the reference model for communication in open systems ISO 7498.

#### 1.2 *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 listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

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

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

ISO 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*

ISO/IEC 7498-1: 1994, *Information technology – Open systems interconnection – Basic reference model: The basic model*

ISO/IEC 7498-2: 1989, *Information processing systems – Open systems interconnection – Basic reference model – Part 2: Security architecture*

ISO/IEC 7498-3: 1989, *Information processing systems – Open systems interconnection – Basic reference model – Part 3: Naming and addressing*

ISO/IEC 7498-4: 1989, *Information processing systems – Open systems interconnection – Basic reference model – Part 4: Management framework*

\*ITU-T V.24: 1993, *List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE). Rev. 1*

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\*ITU-T V.28: 1993, *Electrical characteristics for unbalanced double-current interchange circuits. Rev. 1*

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## 2 Definitions

For the purpose of this International Standard, the following definitions apply:

**2.1 hand-held unit (HHU):** Portable equipment for transferring data to or from tariff devices, or electricity meters.

**2.2 local data exchange:** Data exchange between one or a group of tariff devices and a hand-held unit.

**2.3 remote data exchange:** Data exchange between a data collection centre and one or a group of tariff devices via a data network.

**2.4 tariff device:** Fixed data collection unit, normally linked or combined with an electricity meter.

• Formerly CCITT.

### 3 Physical properties

#### 3.1 Electrical 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

Current	Send (TX)	Receive (RX)
Zero, no loop current, SPACE	$\leq 2,5$ mA	$\leq 3$ mA
One, 20 mA loop current, MARK	$\geq 11$ mA	$\geq 9$ mA
Voltage drop	Send (TX)	Receive (RX)
One, 20 mA loop current, MARK	$\leq 2$ V	$\leq 3$ V
Maximum open circuit voltage during operation		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 may prevent communication, but shall not harm the devices.

##### d) Circuit arrangements in 2-wire configuration (one slave station):

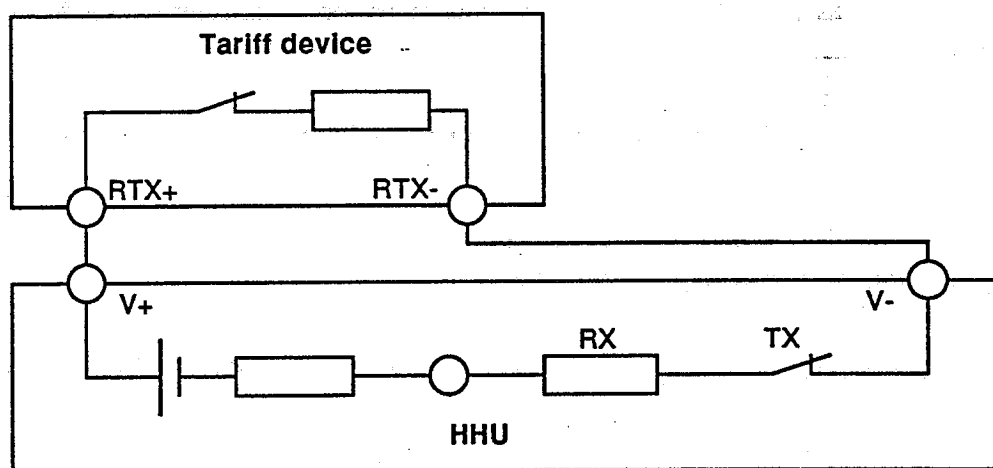


Figure 1a – Circuit diagram 2-wire single-slave configuration

e) Circuit arrangements in 2-wire configuration (multiple slave stations):

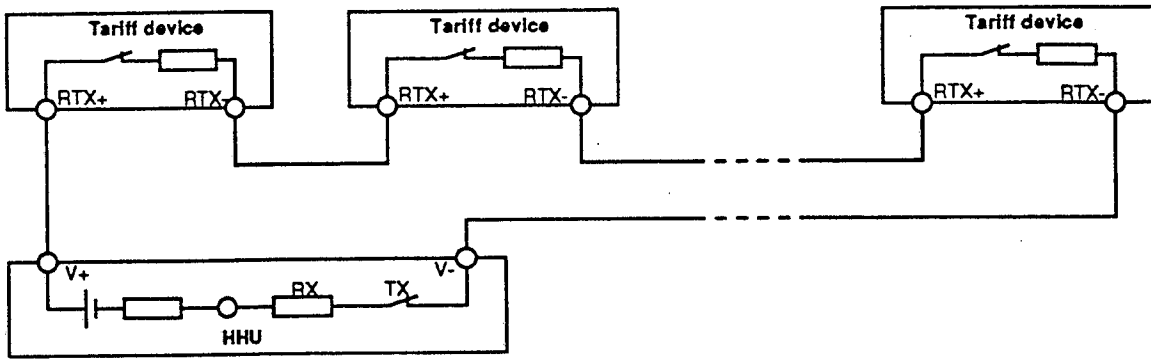


Figure 1b - Circuit diagram 2-wire multiple-slave configuration

f) Circuit arrangements in 4-wire configuration (one slave station):

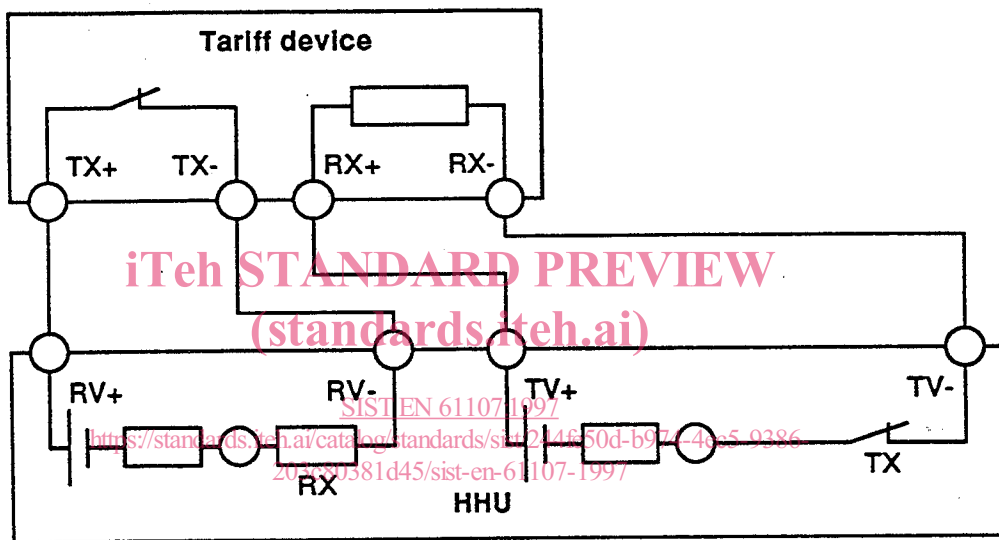


Figure 1c - Circuit diagram 4-wire single-slave configuration

g) Circuit arrangements in 4-wire configuration (multiple slave stations):

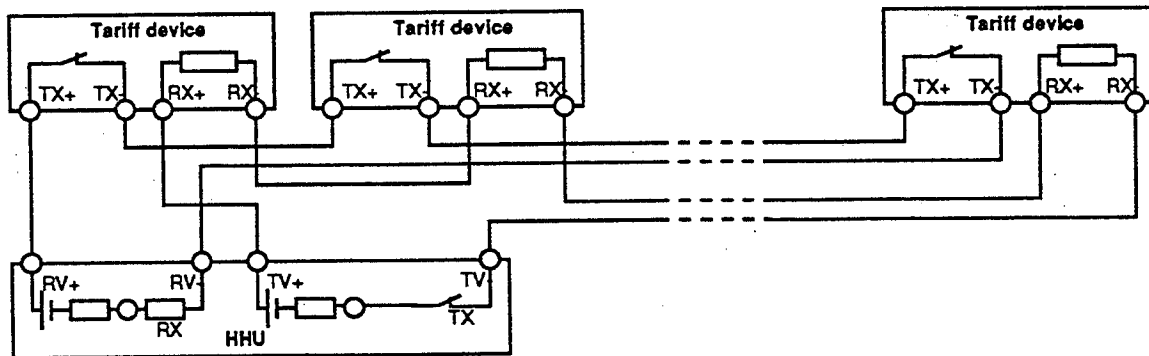


Figure 1d - Circuit diagram 4-wire multiple-slave configuration

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 branched serially.

## 3.2 Optical interface

## 3.2.1 Construction of the reading head

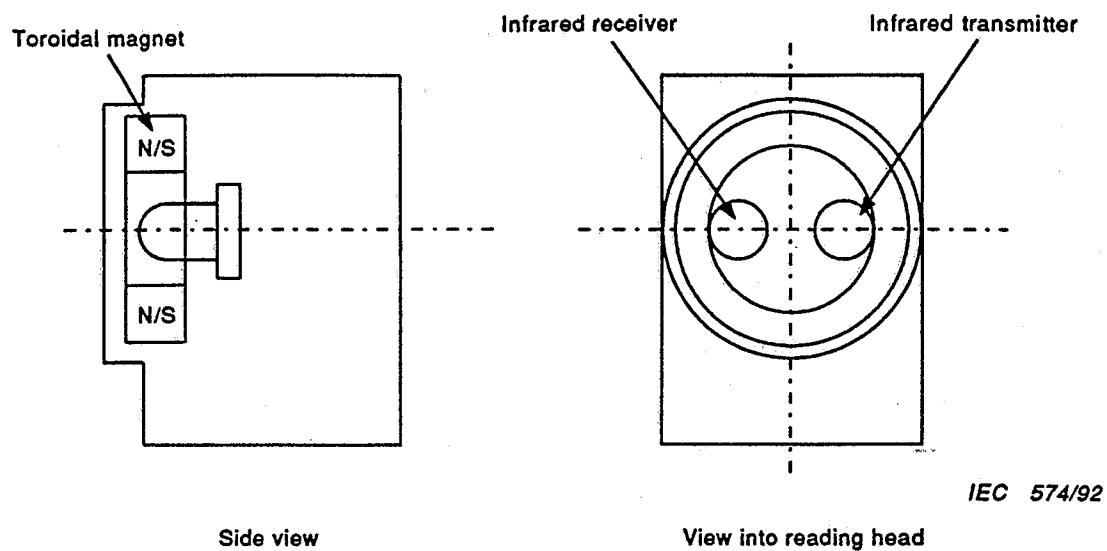


Figure 2a - Arrangement of components

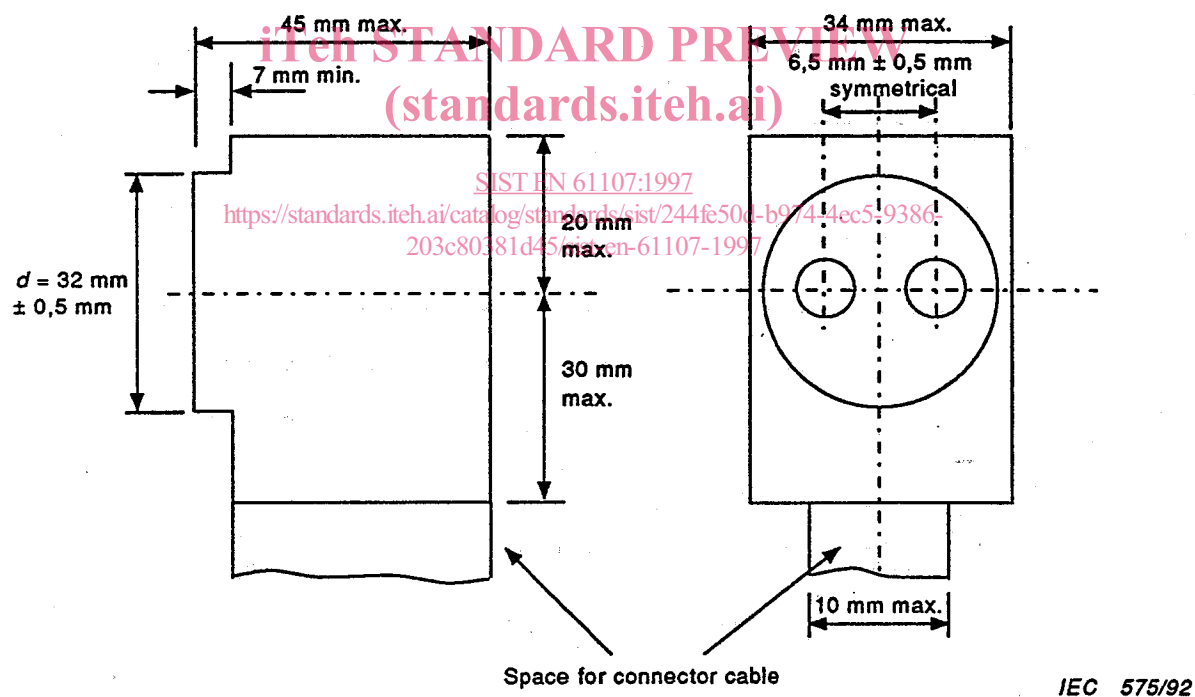


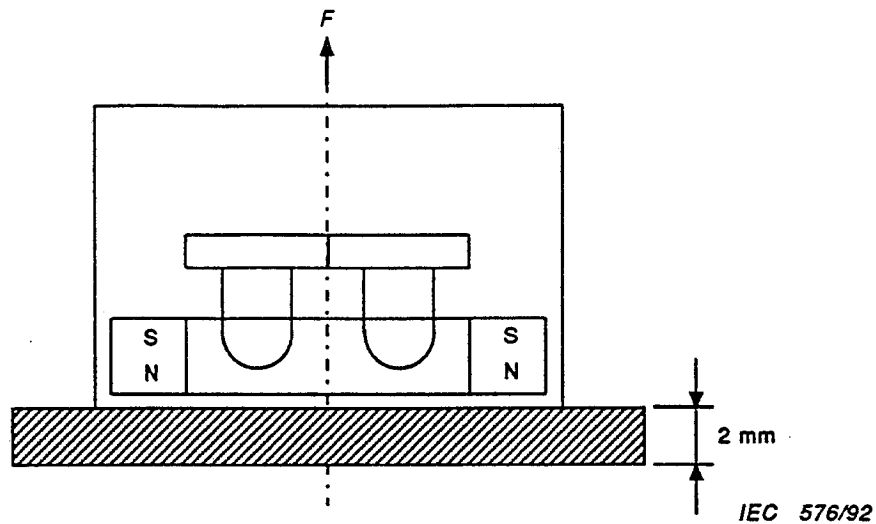
Figure 2b - Dimensions

Figure 2 - Construction of the reading head

### 3.2.2 Characteristic data of the magnet

#### Cohesion force

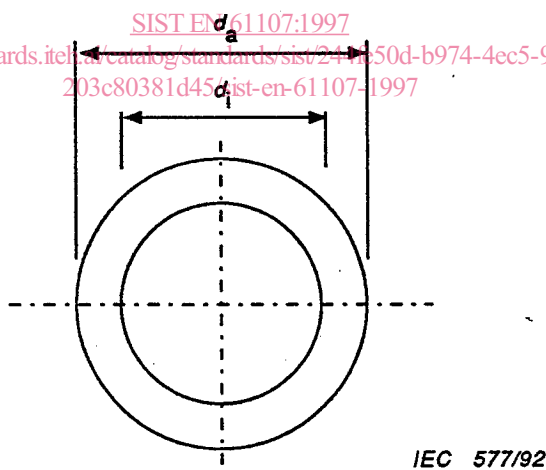
The cohesion force  $F$  is defined as the perpendicular pulling force measured when the magnet is positioned on a bright 2 mm thick deep-drawing steel plate St 12, minus the weight of the reading head itself.



Cohesion force  $F \geq 5$  N in contact with the steel plate;  
 $F > 1,5$  N at a distance of 2 mm from the steel plate.

Figure 3a - Cohesion force

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Internal diameter  $d_i$  13 mm  $\pm$  1 mm  
 External diameter  $d_a$  28 mm minimum

Magnetization: axial, north pole directed towards the tariff device.

Figure 3b - Dimensions

Figure 3 - Characteristic data of the magnet