

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electricity metering – Payment systems –
Part 31: Particular requirements – Static payment meters for active energy
(classes 1 and 2)**

**Equipements de comptage de l'électricité – Systèmes à paiement –
Partie 31: Exigences particulières – Compteurs statiques à paiement d'énergie
active (classes 1 et 2)**



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2005 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, 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 either IEC or IEC's member National Committee in the country of the requester.
If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, 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 la CEI ou du Comité national de la CEI du pays du demandeur.
Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente. un corrigendum ou amendement peut avoir été publié.

Liens utiles:

Recherche de publications CEI - www.iec.ch/searchpub

La recherche avancée vous permet de trouver des publications CEI en utilisant différents critères (numéro de référence, texte, comité d'études,...).

Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

Just Published CEI - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications de la CEI. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (VEI) en ligne.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Electricity metering – Payment systems –
Part 31: Particular requirements – Static payment meters for active energy
(classes 1 and 2)**

**Equipements de comptage de l'électricité – Systèmes à paiement –
Partie 31: Exigences particulières – Compteurs statiques à paiement d'énergie
active (classes 1 et 2)**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE **XB**
CODE PRIX

ICS 91.140.50

ISBN 978-2-83220-723-9

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	8
3 Terms and definitions	8
3.1 General payment metering definitions	8
3.2 Definitions of tokens.....	10
3.3 Definitions of token carriers.....	11
3.4 Definitions relating to tokens and token carriers	13
3.5 Definitions related to load switching	14
3.6 Definitions related to timekeeping and tariff control	15
4 Standard electrical values	16
5 Mechanical requirements.....	16
5.1 General.....	16
5.2 General mechanical requirements	16
5.3 Case	16
5.4 Window	16
5.5 Terminals	17
5.6 Terminal covers.....	17
5.7 Creepage and clearance distances.....	17
5.8 Insulating-encased meter of protective class II	17
5.9 Resistance to heat and fire.....	17
5.10 Protection against penetration of dust and water	17
5.11 Display and indicators	17
5.12 Output device.....	19
5.13 Marking of meter	19
5.14 Token carrier interface	19
6 Climatic requirements.....	19
6.1 General.....	19
6.2 Temperature range.....	20
7 Electrical requirements.....	21
7.1 General.....	21
7.2 Influence of supply voltage	22
7.3 Power consumption	24
7.4 Influence of short-time overcurrents	24
7.5 Influence of heating.....	25
7.6 Influence of self-heating	25
7.7 Insulation	25
7.8 Electromagnetic compatibility (EMC)	25
7.9 Load switching	27
7.10 Auxiliary output switches	29
7.11 Token carrier acceptor interface test	29
8 Metering accuracy requirements.....	29

9	Functional requirements	29
9.1	General	29
9.2	Robustness of meter accounting process	30
10	Type test	31
Annex A (informative) Functional performance		32
A.1	Basic functionalities – prepayment mode	32
A.2	Additional functionalities	39
A.3	System compliance requirements	41
Annex B (informative) Reference model for a payment meter		42
B.1	General	42
B.2	Generalised payment meter instance	43
B.3	Functions in a single-part payment meter	45
Annex C (normative) Performance requirements for payment meters with load switching utilisation categories UC2, UC3 and UC4		49
C.1	Load switching capabilities	49
C.2	Normal operation	49
C.3	Electrical endurance	50
C.4	Line to load voltage surge withstand	51
C.5	Fault current making capacity	52
C.6	Short-circuit current carrying capacity	53
C.7	Minimum switched current	55
C.8	Dielectric strength	55
C.9	Sequence of tests	56
Annex D (normative) Requirements of timekeeping		57
D.1	General	57
D.2	Synchronous clocks	58
D.3	Crystal-controlled clocks	58
D.4	Tests of timekeeping accuracy	59
D.5	Effects of disturbances on timekeeping	60
Table C.1 – Summary of test currents for UC2, UC3 and UC4		49
Table C.2 – Test sequence and sample plan		56

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICITY METERING – PAYMENT SYSTEMS –

**Part 31: Particular requirements –
Static payment meters for active energy
(classes 1 and 2)**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62055-31 has been prepared by IEC technical committee 13: Equipment for electrical energy measurement and load control.

This bilingual version (2013-05) corresponds to the monolingual English version, published in 2005-09.

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

FDIS	Report on voting
13/1344/FDIS	13/1355/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 French version of this standard has not been voted upon.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IEC 62055 consists of the following parts, under the general title *Electricity metering – Payment systems*:

Part 21: Framework for standardization

Part 31: Static payment meters for active energy (Classes 1 and 2)

Part 41: Standard Transfer Specification – Application layer protocol for one-way token carrier systems¹

Part 51: Standard Transfer Specification – Physical layer protocol for one-way numeric and magnetic card token carriers¹

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

The contents of the corrigendum of July 2007 have been included in this copy.

¹ Under consideration.

INTRODUCTION

Payment meters are used in situations where the supply of electrical energy to the load may be interrupted or its restoration enabled under the control of the payment meter in relation to a payment tariff agreed between the customer and the supplier. The payment meter is part of a system that uses token carriers to pass payment information as tokens between a vending network and the payment meters that include the meter accounting process.

The functions of a payment meter are to measure electrical energy consumed and to decrement the available credit value in accordance with the metered consumption, and possibly in accordance with the passing of time. This available credit value is incremented as the result of payments made to the electricity supplier, and the meter accounting process continuously calculates the balance of available credit held by the customer. When the available credit value has been decremented to a predetermined value that is related to the payment mode in use, a switch is used to interrupt the supply to the customer's load. However, additional features may be present in the payment meter, which prevent or delay the opening of the switch, or limit further consumption to a low load level. Such "social" features may include the provision of an emergency credit facility, the possibility of operation in a fixed-payment mode, and the inhibiting of interruptions for certain periods of time.

In return for the payment (usually in cash) and depending on the particular type of system, the customer may be issued with a single-use token on a disposable token carrier for the equivalent value, or a reusable token carrier may be credited with that value, or the token may be transmitted directly to the meter via a communications network (a so-called virtual token carrier). "One-way" and "two-way" data transfer systems may be used, and the token carriers may be: physical devices such as smart cards, or other electronic devices, or magnetic cards; virtual token carriers where the token information is transferred by a remote communications system; or numeric token carriers where sequences of digits are issued on a paper receipt and entered via a keypad on the meter.

IEC 62051 provides some details of payment metering terminology in Clause 17.