

Electricity metering — Payment systems —

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

ICS 91.140.50

National foreword

This British Standard is the UK implementation of EN ISO 62055-31:2005. It is identical to IEC 62055-31:2005, incorporating corrigendum July 2007.

The UK participation in its preparation was entrusted to Technical Committee PEL/13, Electricity Meters.

A list of organizations represented on this committee can be obtained on request to its secretary.

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**Electricity metering –
Payment systems
Part 31: Particular requirements –
Static payment meters for active energy (classes 1 and 2)
(IEC 62055-31:2005)**

Equipements de comptage de l'électricité -
Systèmes à paiement
Partie 31: Prescriptions particulières -
Compteurs statiques à paiement d'énergie
active (classes 1 et 2)
(CEI 62055-31:2005)

Messung der elektrischen Energie -
Zählersysteme mit Inkassofunktion
Teil 31: Besondere Anforderungen -
Elektronische Inkasso-
Wirkverbrauchszähler (Klassen 1 und 2)
(IEC 62055-31:2005)

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CENELEC

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

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Foreword

The text of document 13/1344/FDIS, future edition 1 of IEC 62055-31, 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 62055-31 on 2005-11-01.

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Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62055-31:2005 was approved by CENELEC as a European Standard without any modification.

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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.

ELECTRICITY METERING – PAYMENT SYSTEMS –

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

1 Scope

This part of IEC 62055 applies to newly manufactured, static watt-hour payment meters of accuracy classes 1 and 2 for direct connection, for the measurement of alternating current electrical energy consumption of a frequency in the range 45 Hz to 65 Hz that include a load switch for the purpose of interruption or restoration of the electricity supply to the load in accordance with the current value of the available credit maintained in the payment meter. It does not apply to static watt-hour payment meters where the voltage across the connection terminals exceeds 600 V (line-to-line voltage for meters for polyphase systems).

It applies to payment meters for indoor application only, where the payment meter shall be mounted as for normal service (i.e. together with a specified matching socket where applicable).

Payment meters are implementations where all the main functional elements are incorporated in a single enclosure, together with any specified matching socket. There are also multi-part installations where the various main functional elements, such as the measuring element, the user interface unit, token carrier interface, and the load switch are implemented in more than one enclosure, involving additional interfaces. This part of IEC 62055 does not apply to multi-part payment metering installations.

Functional requirements that apply to payment meters are also defined in this part of IEC 62055, and include informative basic functional requirements and tests for the prepayment mode of operation in Annex A. Allowances are made for the relatively wide range of features, options, alternatives, and implementations that may be found in practice. The diverse nature and functionality of payment meters prevent the comprehensive specification of detailed test methods for all of these requirements. However, in this case, the requirements are stated in such a way that tests can then be formulated to respect and validate the specific functionality of the payment meter being tested.

This part of IEC 62055 does not cover specific functionality or performance requirements for safety, circuit protection, isolation or similar purposes that may be specified through reference to other specifications or standards.

This part of IEC 62055 does not cover software requirements. Software requirements for basic energy meter metrology are under consideration for the IEC 62059 series of standards, and in other organisations.

This part of IEC 62055 covers type-testing requirements only. For acceptance testing, the concepts given in IEC 61358 may be used as a basic guideline.

Dependability aspects are addressed in the IEC 62059 series of standards.

This part of IEC 62055 does not cover conformity tests and system compliance tests that may be required in connection with legal or other requirements of some markets.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 61358:1996, *Acceptance inspection for direct-connected alternating current static watt-hour meters for active energy (classes 1 and 2)*

IEC 62052-11:2003, *Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 11: Metering equipment*

IEC 62053-21:2003, *Electricity metering equipment (AC) – Particular requirements – Part 21: Static meters for active energy (classes 1 and 2)*

IEC 60050-300:2001, *International Electrotechnical Vocabulary – 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 61000-4-5:1995, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61008-1:1996, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules*
Amendment 1 (2002)

IEC 62055-21:2005, *Electricity metering – Payment systems – Part 21: Framework for standardisation*

IEC 62054-21:2004, *Electricity metering (a.c.) – Tariff and load control – Part 21: Particular requirements for time switches*

3 Terms and definitions

For the purposes of this part of IEC 62055, the terms and definitions given in IEC 60050-300, IEC 62051, IEC 62052-11, and IEC 62055-21, as well as the following, apply.

Where there is a difference between definitions in IEC 62055-31 and those contained in other referenced IEC standards, then those defined in IEC 62055-31 shall take precedence.

NOTE Some of these definitions cancel and replace those for the same term in IEC 62051, including some terms in Clause 17 of that standard.

3.1 General payment metering definitions

3.1.1

a.c. withstand voltage

r.m.s. value of sinusoidal power frequency voltage that the equipment can withstand during tests made under specified conditions and for a specified time

[IEC 60050:1987 604-03-40, modified]

3.1.2

available credit value

value of available credit (in monetary or energy units) usable for further consumption that is either stored in the payment meter or calculated by it whenever required

3.1.3

fault current

current flowing at a given point of a network resulting from a fault at another point of this network

[IEC 60050:1986 603-02-25]

3.1.4

load interface

terminal(s) where the customer's load circuit is connected to the payment meter, or to a specified matching socket, where applicable

3.1.5

multi-part installation

payment metering installation where the functional elements comprising the measuring element(s); register(s), storage, and control; meter accounting process; user interface including any physical token carrier interface; any virtual token carrier interface; load switch(es); auxiliaries; plus supply interface and load interface are not arranged in the form of a payment meter, but instead are partitioned into two or more units that require appropriate mounting, connection, and commissioning

[IEC 62051, 17.45, modified]

3.1.6

payment meter

electricity meter with additional functionality that can be operated and controlled to allow the flow of energy according to agreed payment modes

NOTE It includes the following functional elements: measuring element(s); register(s), storage, and control; meter accounting process and any time-based functions; user interface including any physical token carrier interface; any virtual token carrier interface; load switch(es); auxiliaries; plus supply interface and load interface. A payment meter takes the form of a single unit, or a main unit that also employs a single specified matching socket for the supply interface and load interface. In either case, some payment meter implementations may allow for some or all of any time-based functions to be provided by an external unit connected to the payment meter, such as a time switch, a ripple control receiver, or a radio receiver.

[IEC 62051, 17.47, modified]

NOTE Refer to Figure B.1 for the generalised block diagram of a payment meter instance.

3.1.7

payment metering installation

set of payment metering equipment installed and ready for use at a customer's premises. This includes mounting the equipment as appropriate, and where a multi-part installation is involved, the connection of each unit of equipment as appropriate. It also includes the connection of the supply network to the supply interface, the connection of the customer's load circuit to the load interface, and the commissioning of the equipment into an operational state as a payment metering installation

3.1.8

prepayment mode

payment mode in which automatic interruption occurs when available credit is exhausted

3.1.9

specified matching socket

in relation to a payment meter arranged as a plug-in unit, a specified matching socket comprises a base with jaws to accept and connect to the plug-in unit, terminals for connection of the supply network and the consumer load circuit, and appropriate secure fixing and sealing arrangements. The payment meter is capable of meeting the relevant type-testing requirements when it is properly installed in any specified matching socket

3.1.10

supply interface

terminal(s) where the supply network is connected to a payment meter, or to a specified matching socket, where applicable

3.1.11

time-based credit

payment meter accounting functions that deal with the calculation and transacting of a (social) grant of credit that is released on a scheduled time basis

NOTE See IEC 62055-21:2005, 13.8.3.

3.1.12

user interface

that part of a payment meter or payment metering installation that allows the customer to monitor and operate the installation. It may also facilitate meter reading and inspection, and metering services activities. Where physical token carriers are employed, it includes a token carrier interface

3.2 Definitions of tokens

3.2.1

token

<Equipment-related definition> information content including an instruction issued on a token carrier by a vending or management system that is capable of subsequent transfer to and acceptance by a specific payment meter, or one of a group of meters, with appropriate security

[IEC 62051, 17.66, modified]

NOTE In a more general sense, the token refers to the instruction and information being transferred, while the token carrier refers to the physical device being used to carry the instruction and information, or to the communications medium in the case of a virtual token carrier.

<System-related definition> subset of data elements, containing an instruction and information, that is present in the APDU of the application layer of the *POS to Token Carrier Interface*, and which is also transferred to the payment meter by means of a token carrier

3.2.2

credit token

value token

token that represents an amount of credit in monetary or energy value for transfer from the vending point to the payment meter

3.2.3

duplicate token

token that contains the same information as a token that has already been issued, and hence may also be a valid token

NOTE 1 This is not the same as a replacement token (refer also to 3.4.9).

NOTE 2 A duplicate token is a reissue of the same token that was previously issued and is identical to it in all aspects; whereas a replacement token is a newly generated token in place of a previously generated token and may not be identical to it in all aspects.

3.2.4

multiple-use token

token (such as a test token) that can be used for more than one successful session in a payment meter or possibly with each in a group of meters. These are typically used for meter reading or service purposes on repeated occasions

3.2.5

no-value token

token that does not result in a financial advantage or disadvantage to the consumer, which may contain meter configuration data, or instructions to perform certain tests, or to display certain values on the user interface, or to retrieve certain data from the meter and return it on a token carrier

NOTE This is as opposed to value token.

3.2.6

replacement token

see 3.4.9

NOTE This is not the same as a duplicate token (see 3.2.3).

3.2.7

single-use token

token (such as a credit token) that can only be used for one successful session in a payment meter

3.2.8

valid token

in relation to a specific payment meter (or group of payment meters), a token that is capable of being processed successfully by the meter(s)

3.2.9

value token

see credit token (3.2.2)

3.3 Definitions of token carriers

3.3.1

token carrier

<Equipment-related definition> devices or media used to transport and present token information to payment meters, such as printed paper, magnetic card, electronic memory card/key, microprocessor card, or data communications networks. The token carrier may also carry ancillary control or monitoring information to or from the payment meter, depending upon system type and requirements

<System-related definition> medium that is used in the physical layer of the *POS to Token Carrier Interface*, onto which the token is modulated or encoded, and which serves to carry the token from the point where it is generated to the remote payment meter, where it is received

3.3.2

blank token carrier

physical token carrier that has not been processed at the vending point or elsewhere and hence contains no specific data

3.3.3

disposable token carrier

token carrier that is not capable of further use once it has been accepted or used, such as a paper-based magnetic card

3.3.4

machine-readable token carrier

physical or virtual token carrier carrying token information that is capable of being read and processed automatically on presentation to an appropriate payment meter, without further manual operation

EXAMPLE A token employing a magnetic card as the token carrier.

3.3.5

memory token carrier

physical token carrier containing a non-volatile memory device, in which the token is electronically encoded and stored while it is being transported

3.3.6

microprocessor token carrier

physical token carrier containing a microprocessor device with non-volatile memory, in which the token is electronically encoded and stored while it is being transported. In addition to the token information, the microprocessor token carrier may also contain an application programme and associated data

3.3.7

numeric token carrier

token transfer method where the token information can be represented in a secure manner by a visible and human readable sequence of numeric digits (typically 20 digits printed on a receipt)

NOTE They may be entered into a payment meter via a keypad interface for evaluation and action.

3.3.8

one-way token carrier

physical or virtual token carrier which is used for the transfer of credit and possibly tariff and configuration data in a single direction from the vending point or the management system to the payment meter

3.3.9

physical token carrier

token carrier that requires a human to transport it at least part of the way between the point where the token is loaded onto the token carrier and the point where it is retrieved from the token carrier by the payment meter

NOTE Examples of physical token carriers are: printed numbers; magnetic cards; printed bar codes; electronic storage in memory devices such as smart cards or memory keys; and audio messages dictated by interactive voice response equipment.

3.3.10

rechargeable token carrier

refer to 3.3.11 reusable token carrier

3.3.11

reusable token carrier

rechargeable token carrier

physical token carrier that can be used for multiple sessions for transportation of tokens

3.3.12

two-way token carrier

physical or virtual token carrier which is used for the transfer of credit and/or tariff and configuration data from the vending point or management system to the payment meter and response data from the payment meter back to the vending point or management system for further processing, where response data may possibly return on a subsequent vending transaction

NOTE Response data may contain consumption information, tamper information, accountancy information and token status with or without time and date stamps.

3.3.13

virtual token carrier

token carrier that does not require a human to transport it between the point where the token is loaded onto the token carrier and the point where it is retrieved from the token carrier by the payment meter

NOTE Examples of virtual token carriers are: modems on PLC, PSTN, GSM, GPRS and Radio; LAN; WAN and direct local connection.

3.4 Definitions relating to tokens and token carriers

3.4.1

physical token carrier interface

complete interface protocol stack that includes any token carrier acceptor or keypad for a physical token carrier, the physical layer protocol and application layer protocol, plus any intermediate protocol layers

3.4.2

token acceptance

recognition of the successful completion of the processing of any token that was presented to the payment meter

NOTE Typically, this might involve the addition of token credit to the meter's accounting register, cancellation of the token information from the token carrier so as to prevent subsequent acceptance by any meter, and a visible indication to the user on the user interface. Similarly, this may also be applicable to any tariff or configuration data included on the token carrier.

3.4.3

token cancellation

- 1) process of erasing or invalidating information contained in a valid token upon its acceptance by a payment meter, to prevent its reuse;
- 2) process of erasing or invalidating information contained in a token after it has been created, but before it is presented to a payment meter. This typically happens when the vending operator makes a mistake or if a technical problem occurs during the vending process

3.4.4

token carrier acceptor

physical part of a physical token carrier interface, which mechanically accepts and holds the token carrier in the correct position for the token transfer process to take place between the token carrier and the payment meter. Examples are: smart card acceptor; magnetic card acceptor; memory key acceptor

3.4.5

token carrier charging

loading of a token and tariff or configuration data onto a token carrier at a vending point or a management system

3.4.6

token carrier interface

token carrier interface permits the manual or automatic entry of tokens into a payment meter

NOTE 1 For example, it may be a keypad for numeric tokens, or a physical token carrier acceptor, or a communications connection to a local or remote machine for a virtual token carrier interface.

NOTE 2 The token carrier interface may also be used to pass additional information to or from the payment meter, such as for the purposes of payment system management.

3.4.7

token credit

value of credit or energy to be transferred from the vending point to the payment meter in the form of a token on a token carrier

3.4.8

token rejection

this occurs when a token has been presented to but has not been accepted by a payment meter, and has not been erased or invalidated. In the case of a valid token not being accepted, the token may be presented and accepted at a later time when conditions allow

3.4.9

token replacement

token that replaces a previously issued token in value. Physical token carriers may require a blank token carrier to be configured for the customer's meter

NOTE A replacement token is a newly generated token in place of a previously generated token and may not be identical to it in all aspects; whereas a duplicate token is a reissue of the same token that was previously issued and is identical to it in all aspects.

3.4.10

virtual token carrier interface

complete interface protocol stack that includes the physical layer protocol and application layer protocol, plus any intermediate protocol layers

3.5 Definitions related to load switching

3.5.1

minimum switched current

smallest current that the payment meter is able to make, carry and break at the rated breaking voltage and under prescribed conditions

3.5.2

prospective current

specified root-mean-square or peak value of current that would flow in a circuit if the unit under test were to be replaced with a conductor having negligible impedance

3.5.3

rated breaking current

I_c

root-mean-square value of the current that the payment meter is able to make, carry continuously and break at the rated breaking voltage and under prescribed conditions

3.5.4

rated breaking voltage

U_c

root-mean-square value of the supply voltage, as measured on the output terminals of the payment meter connected to the load circuit, at which the payment meter is able to break the rated breaking current

3.5.5

trip-free design

design which ensures that the moving contacts of the load switch return to and remain in the open position when the automatic opening operation is initiated after the initiation of the closing operation, even if the closing command is maintained

NOTE To ensure proper breaking of the current, which may have been established, it may be necessary that the contacts momentarily reach the closed position.

3.5.6

utilisation category

performance criteria under which the load switching capability of a payment meter may be specified to suit the particular requirements of a payment metering installation. The main criteria being: minimum safety levels, lightning surge withstand, fault current withstand and switch endurance.

NOTE See also 7.9.3 and 7.9.4

3.6 Definitions related to timekeeping and tariff control

3.6.1

crystal-controlled timekeeping

process of maintaining a payment meter's time by means of an internal crystal-controlled clock

3.6.2

external tariff control

control of a payment meter's time-dependent or consumption-dependent tariff regime (time-based or consumption-based charges and/or registers) by external signal(s)

3.6.3

external time signal control

control of a payment meter's internal real-time clock by an external signal

3.6.4

external time synchronisation

synchronisation of a payment meter's internal real-time clock by an external signal

3.6.5

internal tariff control

control of a payment meter's time-dependent or consumption-dependent tariff regime (time-based or consumption-based charges and/or registers) by signals from an internal real-time clock and switching programme

3.6.6

internal timekeeping

maintenance of a payment meter's time by its own internal clock facility

3.6.7

operation reserve

maximum period of time after switching off the power supply voltage, during which the payment meter is capable of maintaining correct time with a specified, relaxed timekeeping accuracy

3.6.8

reserve restoration time

period of time required for restoring the full operation reserve from the point where the operation reserve has been completely exhausted

3.6.9

synchronous timekeeping

process of maintaining a payment meter's time by means of an internal clock synchronised to a signal derived from the power system frequency

NOTE Payment meters employing synchronous timekeeping may defer to crystal-controlled timekeeping in the absence of the synchronising signal.

3.6.10

time indication discrepancy

difference between the time displayed by the payment meter and the actual time or, in the case of synchronous timekeeping, the difference between the time displayed by the payment meter and the time determined by the network frequency

NOTE The actual time may be obtained by using a reference clock.

3.6.11

timekeeping accuracy

increase or decrease in the time indication discrepancy within a specified time interval

3.6.12

variation of timekeeping accuracy due to an influence quantity

difference in timekeeping accuracy of a payment meter when only one influence quantity assumes successively two specified values, one of them being the reference value

4 Standard electrical values

Payment meters shall comply with the values given for standard reference voltages, currents, and frequencies, and the maximum currents given for static meters for direct connection in Clause 4 of IEC 62052-11.

5 Mechanical requirements

5.1 General

The requirements of Clause 5 of IEC 62052-11 for indoor meters shall apply, where referenced and augmented herein. Where the payment meter is to be used with a specified matching socket then these requirements shall be met by the complete assembly, with the payment meter mounted as for normal service.

5.2 General mechanical requirements

The requirements of 5.1 of IEC 62052-11 shall apply, but without the note referring to corrosive atmospheres.

5.3 Case

The requirements given in 5.2 of IEC 62052-11 shall apply, including all subclauses. In addition: push button switch caps, if fitted, shall be positively retained and shall not be removable without the exterior of the case showing mechanical damage.

5.4 Window

The requirements given in 5.3 of IEC 62052-11 shall apply.

5.5 Terminals

The requirements given in 5.4 of IEC 62052-11 shall apply.

5.6 Terminal covers

The requirements given in 5.5 of IEC 62052-11 shall apply.

5.7 Creepage and clearance distances

The requirements given in 5.6 of IEC 62052-11 shall apply, to include where metallic objects of the same size and shape as the token carrier are inserted into the token carrier acceptor.

For the purpose of these requirements, this metallic token shall be considered to represent an auxiliary circuit with a reference voltage below or equal to 40 V.

5.8 Insulating-encased meter of protective class II

The requirements given in 5.7 of IEC 62052-11 shall apply.

5.9 Resistance to heat and fire

The requirements given in 5.8 of IEC 62052-11 shall apply, including to any specified matching socket. The requirements shall also extend to the insulating material retaining the main contacts of the load switch in position, where the test temperature of 960 °C shall apply.

5.10 Protection against penetration of dust and water

The requirements given in 5.9 of IEC 62052-11 shall apply, for indoor meters only.

If a token carrier acceptor is fitted to the meter, then the tests shall be carried out without any token carrier in place in the token carrier acceptor.

Immediately after the tests and without disturbing the meter, the payment meter shall operate correctly and a valid token shall be accepted on the first or subsequent presentation, up to a maximum of 4 attempts.

5.11 Display and indicators

5.11.1 General

The requirements for an electronic display given in 5.10 of IEC 62052-11 shall apply, subject to the following clarifications and augmentations.

5.11.2 Retention time of the non-volatile memory

For long outages, the payment meter shall be designed such that any data necessary for correct operation shall be retained for a minimum period of 10 years without an electrical supply being applied to the meter. In addition, refer to D.1.3 and D.1.4 for any operational reserve where a real-time clock is fitted.

5.11.3 Display of measured values

The principal unit for the measured values shall be the kilowatt-hour (kWh). The display shall be visible from the front of the meter. When the meter is not energised, the display need not be visible.

Where multiple values are presented by a single display, all relevant values shall be available via the display. When displaying the values, each tariff register shall be identifiable and the active tariff rate shall be indicated.

NOTE For testing purposes, a means of reading the energy register to within 0,01 kWh resolution shall be provided. This may be via the display or by other means, e.g. a local communication interface.

5.11.4 Minimum display capability

For payment meters operating in the prepayment mode, the following information shall be capable of being displayed:

- cumulative kWh energy register (energy consumption);
- available credit value.

In addition, for virtual token carrier systems, the payment meter shall be able to display details of the last purchase transaction (time, date and amount).

The height of the display characters for the numeric values shall be not less than 4,5 mm.

Where the available credit value is in monetary units, the following additional information shall be capable of being displayed:

- the price per kWh;
- any time-based charge settings, such as for standing charges or debt recovery.

In the case of a multi-rate payment meter, the following additional information shall also be capable of being displayed:

- cumulative kWh for each tariff rate;
- the price per kWh for each tariff rate.

Where a multi-rate payment meter is operated from an internal real-time clock, the time shall also be capable of being displayed.

Where any display of information considered to be private is required (e.g. debt amounts or transactions) it shall be possible to limit display access to the specific consumer (e.g. by presentation of a customer/meter-specific token or password).

5.11.5 Indicators

The following shall be indicated as a minimum and shall be visible from the front of the payment meter:

- indication of rate of kWh consumption (instantaneous loading);
- indication of token acceptance (for all manually-transported token types).

In addition, for virtual token carrier payment meters, when the load switch is open, an appropriate indication or message shall be capable of being shown (first indicating OFF, then ENABLED, and then ON, for example – see 7.9).

5.12 Output device

The requirements given in 5.11 of IEC 62052-11 shall apply, including all subclauses.

5.13 Marking of meter

The requirements given in 5.12 of IEC 62052-11 and its subclauses shall apply for the marking of name-plates, connection diagrams, and terminals on payment meters. In addition, the ratings of any auxiliary switches shall be marked on the nameplate. Where the meter contains an integral battery, the battery symbol and chemical symbol (e.g. Li = lithium) shall be marked on the meter. The utilisation category shall also be marked, as required in 7.9 and its subclauses.

NOTE Any marking of operating instructions should be agreed upon between purchaser and supplier of the payment meter.

Where a connection diagram is provided, it shall indicate all of the input and output connections. It shall also show where the internal power supply is connected, i.e. to which side of the measuring element(s) and load switch(es). Where auxiliary input(s) are fitted, the operating voltage and current shall be marked on the faceplate or on any connection diagram.

5.14 Token carrier interface

5.14.1 General

Where a physical token carrier interface is fitted, it shall comply with the following mechanical requirements.

5.14.2 Token carrier acceptor

Where a token carrier acceptor is fitted, the insertion force required to insert a token carrier into the token carrier acceptor shall not exceed 10 N. The force required to remove a token carrier from the token carrier acceptor shall not exceed 10 N. The meter shall be designed such that under normal circumstances, and with a properly maintained token carrier, the minimum number of insertions for which a token carrier acceptor shall operate is 10 000.

5.14.3 Keypad interface

Where a keypad interface is fitted, it shall be designed to operate for a minimum of 20 000 operations of each individual key.

6 Climatic requirements

6.1 General

Payment meters shall comply with the requirements for indoor meters in Clause 6 of IEC 62052-11 where referenced, and augmented as follows. The payment meter shall be mounted as for normal service, including in a specified matching socket where applicable.

Where relevant, and unless otherwise specified, the tests shall be carried out with the payment meter in the prepayment mode, and with the load switch closed, unless otherwise stated.

Where a token carrier acceptor is fitted, then the tests shall be carried out without any token carrier in place in the token carrier acceptor during these tests.