IEC 62052-21

Edition 1.0 2004-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electricity metering equipment (a.c.) – General requirements, tests and test conditions –
Part 21: Tariff and load control equipment

Équipement de comptage d'électricité (c.a.) – Prescriptions générales, essais et conditions d'essai –
Partie 21: Equipement de tarification et de contrôle de charge

IEC 62052-21:2004-05(en-fr)

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ELECTRICITY METERING EQUIPMENT (A.C.) – GENERAL REQUIREMENTS, TESTS AND TEST CONDITIONS –

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FOREWORD

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International Standard IEC 62052-21 has been prepared by IEC technical committee 13: Equipment for electrical energy measurement and load control.

This standard, in conjunction with IEC 62054-11 and IEC 62054-21, cancels and replaces IEC 61038:1990, *Electricity metering – Tariff and load control – Particular requirements for time switches* and all amendments. This standard is to be used in conjunction with the relevant parts of the IEC 62054 and the IEC 62059 series.

This bilingual version (2016-07) corresponds to monolingual version published in 2004-05.

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

FDIS	Report on voting
13/1307/FDIS	13/1316/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.

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

The committee has decided that the contents of this publication will remain unchanged until 2013. At this date, the publication will be

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- withdrawn;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

INTRODUCTION

This standard distinguishes between protective class I and protective class II tariff and load control equipment.

The test levels are regarded as minimum values to guarantee the proper functioning of the equipment under normal working conditions. For special application, other test levels might be necessary and should be agreed on between the user and the manufacturer.

For information, the relevant parts of IEC 62052, IEC 62054 and IEC 62059 are listed:

IEC 62052-21 Electricity metering (a.c.) – General requirements, tests and test conditions – Part 21: Tariff and load control equipment

(*Replaces the general requirements of IEC 61037 and IEC 61038.)*

IEC 62054-11 Electricity metering (a.c.) – Tariff and load control – Part 11: Particular requirements for electronic ripple control receivers

(*Replaces the particular requirements of IEC 61037.)*

IEC 62054-21 Electricity metering (a.c.) – Tariff and load control – Part 21: Particular requirements for time switches[1]

(*Replaces the particular requirements of IEC 61038.)*

IEC 62059-11 Electricity metering equipment (a.c.) – Dependability – Part 11: General concepts

IEC 62059-21 Electricity metering equipment (a.c.) – Dependability – Part 21: Collection of meter dependability data from the field

IEC 62059-41 Electricity metering equipment (a.c.) – Dependability – Part 41: Reliability prediction[1]

[1] To be published.

ELECTRICITY METERING EQUIPMENT (A.C.) – GENERAL REQUIREMENTS, TESTS AND TEST CONDITIONS –

Part 21: Tariff and load control equipment

1 Scope

This part of IEC 62052 specifies general requirements for the type test of newly manufactured indoor tariff and load control equipment, like electronic ripple control receivers and time switches that are used to control electrical loads, multi-tariff registers and maximum demand indicator devices.

This standard gives no requirements for constructional details internal to the tariff and load control equipment.

In the case where tariff and load control functionality is integrated into multifunction electricity metering equipment, the relevant parts of this standard apply.

This standard does not cover the acceptance tests and the conformity tests. Nevertheless, an example of what could be an acceptance test is given in Annex F.

The dependability aspect is covered by the documents of the IEC 62059 series.

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 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 60060-1:1989, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60068-2-1:1990, *Environmental testing – Part 2: Tests – Tests A: Cold*

IEC 60068-2-2:1974, *Environmental testing – Part 2: Tests – Tests B: Dry heat*

IEC 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27:1987, *Environmental testing – Part 2: Tests – Test Ea and guidance: Shock*

IEC 60068-2-30:1980, *Environmental testing – Part 2: Tests – Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)*

IEC 60068-2-75:1997, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer test*

IEC 60085:1984, *Thermal evaluation and classification of electrical insulation*

IEC 60269-3-1:1994, *Low-voltage fuses – Part 3-1: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications) – Sections I to IV*

IEC 60417-2:1998, *Graphical symbols for use on equipment – Part 2: Symbol originals* Amendment 1 (2000)

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60695-2-10:2000, *Fire Hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedures*

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

IEC 60721-3-3:1994, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weather protected locations*

IEC 61000-4-2:1995, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test.* Basic EMC publication

IEC 61000-4-3:2002, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test.* Basic EMC publication

IEC 61000-4-5:1995, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6:1996, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 62054-11, *Electricity metering (a.c.) – Tariff and load control equipment – Part 11: Particular requirements for electronic ripple control tariff and load control equipment* [2]

IEC 62054-21, *Electricity metering (a.c.)– Tariff and load control equipment – Part 21: Particular requirements for time switches*[2]

CISPR 22:1997, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

ISO 75-2:1993, *Plastics – Determination of temperature of deflection under load – Part 2: Plastics and ebonite*

3 Terms and definitions

For the purposes of this document, the following definitions, together with those of IEC 60050-300, apply.

Where there is a difference between the definitions in the glossary and those contained in product standards produced by TC 13 then the latter shall take precedence in applications of the relevant standard.

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2 To be published.

3.1 General definitions

3.1.1
tariff and load control equipment
device intended to make or break or change over circuits controlling tariff devices of electricity meters or controlling electrical loads, based on a pre-determined time schedule and/or commands received from a control centre over suitable media and using suitable protocols

3.1.2
control element
functional element controlling the display and/or the operation indicator and the output element. In the case of ripple control receivers, it comprises the decoding element and may contain a timing element. In the case of time switches, it comprises the time-keeping element and the element comparing the actual date and time with the schedule stored in the time switch

3.1.3
reference voltage
U_n
value of the supply voltage in accordance with which the relevant performance of the tariff and load control equipment is fixed

3.1.4
reference frequency
f_n
value of the frequency of the supply voltage in accordance with which the relevant performance of the tariff and load control equipment is fixed

3.1.5
type
term used to define a particular design of tariff and load control equipment, manufactured by one manufacturer, having the same uniform construction of parts determining the functional, and, when applicable, the metrological properties. The type may have several values of reference voltage and frequency. Tariff and load control equipment are designated by the manufacturer by one or more groups of letters or numbers, or a combination of letters and numbers. Each type has one designation only

Note 1 to entry: The type is represented by the sample tariff and load control equipment intended for type tests, whose characteristics are chosen from the values given in the tables proposed by the manufacturer.

3.2 Definitions related to electronic ripple control receivers

3.2.1
electronic ripple control receiver
device with an input and decoder circuit for the reception and interpretation of pulses of a single audio frequency superimposed on the voltage of an electricity distribution network and for the execution of the corresponding operations

3.2.2
standard receiver
receiver for mounting on equipment board, a meter board or an instrument rail (or which is a part of the meter)

3.2.3
special receiver
receiver intended for particular applications, for example, street lighting receivers

3.2.4
input element
functional element that separates the control signals from the supply voltage and transmits them to the decoding element

3.2.4.1
control voltage
U_s
audio-frequency voltage superimposed on the supply system voltage. Throughout this standard, its steady r.m.s. value is used and is expressed as a percentage of the rated supply voltage U_n of the receiver

3.2.4.2
reference control voltage
U_{ns}
value of the control voltage U_s in accordance with which the relevant performance of the ripple control receiver is fixed

3.2.4.3
operate voltage
U_f
minimum value of the control voltage that, under prescribed conditions, is sufficient to ensure correct operation of the receivers, the message being coded according to the system considered

3.2.4.4
non-operate voltage
U_{nf}
maximum value of the control voltage for which, under prescribed conditions, the receivers do not operate, the message being coded according to the system considered

3.2.4.5
maximum control voltage
U_{max}
maximum value of the control voltage that, under prescribed conditions, ensures correct operation of the receivers receiving a message coded according to the system considered

3.2.4.6
reference control frequency
f_s
value of the control frequency in accordance with which the relevant performance of the ripple control receiver is fixed

3.3 Definitions related to the ripple control code and to the control element

3.3.1
code
sequence of a given number of pulse positions having a specified cycle duration

Note 1 to entry: Examples of time diagrams for ripple control codes are given in Annex E of IEC 62054-11.

Note 2 to entry: Each pulse position is designated by a number.

3.3.2
decoding element
part of the control element that identifies from the signals received from the input element those corresponding to the commands for which it is programmed. For this purpose, the decoding element checks the presence and, possibly, the absence of information pulses at the positions for which it is programmed and passes on the information to the control element

3.3.3
timing element
part of the control element that, together with the decoding element, affects the operation of the output element based on the value of internal timers. The presence of a timing element allows the ripple control receiver to execute periodic or delayed switching operations even without the reception of ripple control messages

3.3.4
pulse position
position in the ripple control message where an information pulse may be present or absent

3.3.5
starting pulse
first pulse of the message, which is intended to start the decoding operation of the receiver

Note 1 to entry: It is generally designated by the number 0.

3.3.6
information pulse
pulse present at one of the positions in the message after the starting pulse. It is designated by the number of its position

3.3.7
pulse interval
interval of time between the beginning of an information pulse and the beginning of the following information pulse in the ripple control message

Note 1 to entry: A pulse interval comprises a pulse of a length according to the coding system, plus, possibly, an associated pause.

3.3.8
message
combination of the starting pulse and a certain number of information pulses representing one or more commands

3.3.9
command
instruction to those receivers programmed to that command to carry out a certain operation on the output element

Note 1 to entry: It is generally characterized by the presence or absence of one or more information pulses.

3.3.10
cycle duration
interval of time between the beginning of the start pulse and the normal return of the receiver to its quiescent state

3.4 Definitions related to time switches

3.4.1
time switch
device which may be set to make or break or change over circuits at pre-determined times

3.4.2
synchronous time switch
time switch having as its main time base the network frequency

3.4.3
crystal-controlled time switch
time switch having as its main time base a crystal-controlled oscillator

3.4.4
time-based element
that part of the time switch which produces an output corresponding to the passing of the time

3.4.4.1
time-indication discrepancy
difference between the time displayed by the time switch and the actual time or, in the case of synchronous time switches, the difference between the time displayed by the time switch and the time determined by the network frequency

Note 1 to entry: The actual time may be obtained using a reference clock.

3.4.4.2
time-keeping accuracy
increase or decrease in the time indication discrepancy within a specified time interval

3.4.4.3
variation of time-keeping accuracy due to an influence quantity
difference in time-keeping accuracy of a time switch when only one influence quantity assumes successively two specified values, one of them being the reference value

3.4.4.4
operation reserve
maximum period of time after switching off the power-supply voltage during which the time switch is capable to maintain correct time with a specified, relaxed time-keeping accuracy

3.4.4.5
reserve restoration time
period of time required for restoring the full operation reserve from the point where the operation reserve has been completely exhausted

3.4.5
setting and display elements

3.4.5.1
dial
analogue mechanical device for facilitating the setting and observation of the settings of the time switch and for the display of indicated time. The dials are designated according to their period of rotation (for example, the day dial has a period of rotation of 1 day)

3.4.5.2
digital display
electronic device for facilitating the setting and observation of the settings of the time switch and for the display of indicated time and possibly the status of the output elements

3.5 Definitions related to the output elements

3.5.1
output element
element comprising one or more electromechanical or static switches controlled according to the information provided by the control element of the tariff and load control equipment

3.5.2
load switch
part of the output element comprising the contacts, or their electronic equivalent, for switching loads, together with the parts directly operating the contacts

3.5.3
tariff register switch
part of the output element comprising the contacts, or their electronic equivalent, for switching tariff registers, together with the parts directly operating the contacts

3.5.4
maximum demand indicator switch
part of the output element comprising the contacts, or their electronic equivalent, for switching maximum demand indicators, together with the parts directly operating the contacts

3.5.5
low rating d.c. switch
part of the output element comprising the contacts, or their electronic equivalent, for switching low power d.c. circuits, together with the parts directly operating the contacts

3.5.6
rated breaking voltage
U_c
value of the voltage for which a switch is designed

3.5.7
rated breaking current
I_c
value of current for which a switch is designed and which it can close, carry continuously and break under specified conditions

3.5.8
maximum total current
I_{tot}
value of total current that all the output switches of a tariff and load control equipment can carry continuously at the same time under specified conditions

3.5.9
operation
pair of changes of state of an output element, closure followed by opening or vice versa

3.6 Definitions of mechanical elements

3.6.1
indoor tariff and load control equipment
tariff and load control equipment, which can only be used in areas offering additional protection against environmental influences (i.e. in a house or in a cabinet)

[SOURCE:IEV 314-07-20 modified]

3.6.2
base
back of the tariff and load control equipment by which it is generally fixed and to which are attached the electronic board(s), the output element(s), the terminals or the terminal block and the cover

[SOURCE:IEV 314-07-14 modified]

3.6.3
cover
enclosure on the front of the tariff and load control equipment, made either wholly of transparent or of opaque material provided with (a) window(s) through which the dial and/or display can be read

[SOURCE:IEV 314-07-16 modified]

3.6.4
case
set that comprises the base and the cover

[SOURCE:IEV 314-07-17]

3.6.5
accessible conductive part
conductive part, which can be touched by the standard test finger when the tariff and load control equipment is installed and ready for use

3.6.6
protective earth terminal
terminal connected to accessible conductive parts of the tariff and load control equipment for safety purposes

3.6.7
terminal block
support made of insulating material on which all or some of the terminals of the tariff and load control equipment are grouped together

[SOURCE:IEV 314-07-18 modified]

3.6.8
terminal cover
cover, which covers the tariff and load control equipment terminals and, generally, the ends of the external wires or cables connected to the terminals

[SOURCE:IEV 314-07-19 modified]

3.6.9
clearance
shortest distance measured in air between two conductive parts

3.6.10
creepage distance
shortest distance measured over the surface of insulation between two conductive parts

3.7 Definitions of insulations

3.7.1
basic insulation
insulation applied to live parts to provide basic protection against electric shock

Note 1 to entry: Basic insulation does not necessarily include insulation used exclusively for functional purposes.

3.7.2
supplementary insulation
independent insulation applied in addition to the basic insulation, in order to provide protection against electric shock in the event of a failure of the basic insulation

3.7.3
double insulation
insulation comprising both basic insulation and supplementary insulation