

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**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 21: Tariff and load control equipment

FOREWORD

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IEC 62052-21 edition 1.1 contains the first edition (2004-05) [documents 13/1307/FDIS and 13/1316/RVD] and its amendment 1 (2016-11) [documents 13/1702/FDIS and 13/1716/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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

This standard is to be used in conjunction with the relevant parts of the IEC 62054 and the IEC 62059 series.

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

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability 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- withdrawn,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.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

It is the recommendation of the committee that the content of this publication be adopted for implementation nationally not earlier than 4 years from the date of publication.

The contents of the corrigendum of March 2018 have been included in this copy.

[IEC 62052-21:2004](https://standards.iec.ch)

<https://standards.iec.ch/catalog/standards/iec/ad603ea7-0a01-4ad9-b5ff-1eff07e62aed/iec-62052-21-2004>

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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 62052-31:2015, *Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 31: Product safety requirements and tests*

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

INTRODUCTION TO AMENDMENT 1

The purpose of this amendment is to identify and remove all safety related requirements and tests of IEC 62052-21:2004 that are replaced and extended by the complete set of requirements and tests in IEC 62052-31:2015.

In addition, Annex F has been amended to refer to IEC 62058-11:2008 instead of IEC 60410 which has been withdrawn.

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 safety aspect is covered by IEC 62052-31:2015.

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 62052-31:2015, *Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 31: Product safety requirements and tests*

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~~

NOTE Some standards referenced in IEC 62052-11:2003 have been revised or replaced, but these changes will be considered in the full revision of this standard.

3 Terms and definitions

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

² To be published.

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.

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