SLOVENSKI STANDARD
SIST EN 60868:2001

01-marec-2001

Flickermeter - Functional and design specifications

Flickermeter - Functional and design specifications

Flickermesser - Funktionsbeschreibung und Auslegungsspezifikation

Flickermètre - Spécifications fonctionnelles et de conception

Ta slovenski standard je istoveten z: **EN 60868:1993**

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17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities

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ENGLISH VERSION

Flickermeter - Functional and design specifications
(IEC 868:1986 + A1:1990)

Flickermètre - Spécifications fonctionnelles et de conception
(CEI 868:1986 + A1:1990)

Flickermeter
Funktionsbeschreibung und Auslegungsspezifikation
(IEC 868:1986 + A1:1990)

This European Standard was approved by CENELEC on 1993-03-09. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

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

Ref. No. EN 60868:1993 E

FOREWORD

At the request of 72 Technical Board, HD 498 S2:1992 (IEC 868:1986 + A1:1990) was submitted to the CENELEC voting procedure for conversion into a European Standard.

The text of the International Standard was approved by CENELEC as EN 60868 on 9 March 1993.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1994-03-01
- latest date of withdrawal of conflicting national standards	(dow)	-

Annexes designated "normative" are part of the body of the standard. In this standard, annex ZA is normative.

ENDORSEMENT NOTICE

The text of the International Standard IEC 868:1986 and its amendment 1:1990 was approved by CENELEC as a European Standard without any modification.

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

IEC Publication	Date	Title	EN/HD	Date
68-2-2	1974	Basic environmental testing procedures Part 2: Tests - Tests B: Dry heat	EN 60068-2-2*	1993
68-2-3	1969	Test Ca: Damp heat, steady state	HD 323.2.3 S2*	1987
68-2-14	1984	Test N: Change of temperature	HD 323.2.14 S2*	1987
255-8	1978	Electrical relays - Part 8: Thermal electrical relays	-	-
555-3	1982	Disturbances in supply systems caused by household appliances and similar electrical equipment - Part 3: Voltage fluctuations	EN 60555-3	1987
801-2	1984	Electromagnetic compatibility for industrial-process measurement and control equipment - Part 2: Electrostatic discharge requirements	HD 481.2 S1*	1987
801-3	1984	Part 3: Radiated electromagnetic field requirements	HD 481.3 S1	1987

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* EN 60068-2-2 includes supplement A:1976 to IEC 68-2-2
HD 323.2.3 S2 includes A1:1984 to IEC 68-2-3
HD 323.2 14 S2 includes A1:1986 to IEC 68-2-14
HD 481.2 S1 is superseded by EN 60801-2:1993 which is based on IEC 801-2:1991

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FLICKERMETER
FUNCTIONAL AND DESIGN SPECIFICATIONS

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This report has been prepared by Sub-Committee 77A: Equipment for Connection to the Public Low-voltage Supply System, of IEC Technical Committee No. 77: Electromagnetic Compatibility between Electrical Equipment including Networks, on the basis of work undertaken by the International Union for Electroheat (UIE).

The apparatus described is the outcome of research by a Study Committee of the UIE, taking into account the experience acquired with various flickermeters previously studied and tested in a number of industrial countries.

The text of this report is based upon the following documents:

Six Months' Rule	Report on Voting
77A(CO)5	77A(CO)10

Further information can be found in the Report on Voting indicated in the table above.

The following IEC publications are quoted in the report:

Publications Nos 68-2-1 (1974): Basic Environmental Testing Procedures, Part 2: Tests - Tests A: Cold.

68-2-2 (1974): Tests B: Dry Heat.
68-2-3 (1969): Test Ca: Damp Heat, Steady State.
68-2-14 (1984): Test N: Change of Temperature.
255-8 (1978): Electrical Relays, Part 8: Thermal Electrical Relays.
555-3 (1982): Disturbances in Supply Systems Caused by Household Appliances and Similar Electrical Equipment, Part 3: Voltage Fluctuations.
801-2 (1984): Electromagnetic Compatibility for Industrial-process Measurement and Control Equipment, Part 2: Electrostatic Discharge Requirements.

801-3 (1984): Part 3: Radiated Electromagnetic Field Requirements.

FLICKERMETER
FUNCTIONAL AND DESIGN SPECIFICATIONS

INTRODUCTION

This report gives a functional and design specification for flicker measuring apparatus intended to indicate the correct flicker perception level for all practical voltage fluctuation waveforms. Sufficient information is presented to enable such an instrument to be constructed.

The method of flicker severity assessment from flickermeter output data will form the subject of other publications.

In its present form, this report is not intended to be an appendix to IEC Publications 555-3: Disturbances in Supply Systems Caused by Household Appliances and Similar Electrical Equipment, Part 3: Voltage Fluctuations.

This report is based on specifications prepared by the Disturbances Study Committee of the International Union for Electroheat (UIE).

1. Scope and object

The purpose of this report is to provide basic information for the design and the implementation of an analogue or digital flicker measuring apparatus.

It does not specify the method of calculating a flicker severity value, or give tolerable limit values.

2. Description of the instrument

The description given below is based on an analogue implementation. A partly or completely digital meter is equally acceptable provided that it offers the same functional characteristics.

The flickermeter architecture is described by the block diagram of Figure 1, page 29, and can be divided into two parts, each performing one of the following tasks:

- simulation of the response of the lamp-eye-brain chain;
- on-line statistical analysis of the flicker signal and presentation of the results.

The first task is performed by blocks 2, 3 and 4 of Figure 1, whilst the second task is accomplished by block 5. Although this last block is not mandatory, as flicker signal analysis can be performed off-line using a suitable recording medium, its inclusion is recommended because it will allow a more complete and efficient use of the instrument.

2.1 *Block 1 — Input voltage adaptor and calibration checking circuit*

This block contains a signal generator to check the calibration of the flickermeter on site and a voltage adapting circuit that scales the mean r.m.s. value of the input mains frequency voltage down to an internal reference level. In this way flicker measurements can be made independently from the actual input carrier voltage level and expressed as a percent ratio. Taps on the input

transformer establish suitable input voltage ranges to keep the input signal to the voltage adaptor within its permissible range.

2.2 *Block 2 — Square law demodulator*

The purpose of this block is to recover the voltage fluctuation by squaring the input voltage scaled to the reference level, thus simulating the behaviour of the lamp.

2.3 *Blocks 3 and 4 — Weighting filters, squaring and smoothing*

Block 3 is composed of a cascade of two filters and a measuring range selector, which can precede or follow the selective filter circuit.

The first filter eliminates the d.c. and double mains frequency ripple components of the demodulator output.

The second does the shaping of the flickermeter frequency response to the modulating fluctuation, as follows : the weighting filter block simulates the frequency response to sinusoidal voltage fluctuations of a coiled coil filament gas filled lamp (60 W - 230 V) combined with the human visual system. The response function is based on the perceptibility threshold found for each frequency on 50% of the persons tested*.

Block 4 is composed of a squaring multiplier and a first order low-pass filter. The human flicker sensation via lamp, eye and brain is simulated by the combined non-linear response of blocks 2, 3 and 4.

Block 3 alone is based on the borderline perceptibility curve for sinusoidal voltage fluctuations ; the correct weighting of non-sinusoidal and stochastic fluctuations is achieved by an appropriate choice of the complex transfer function for blocks 3 and 4. Accordingly the correct performance of the model has also been checked with periodic rectangular signals as well as with transient signals.

The output of block 4 represents the instantaneous flicker sensation.

2.4 *Block 5 — On-line statistical analysis*

Block 5 incorporates a microprocessor that performs an on-line analysis of the flicker level, thus allowing direct calculation of significant evaluation parameters.

A suitable interface allows data presentation and recording. The use of this block is related to methods of deriving measures of flicker severity by statistical analysis.

The statistical analysis, whether performed on-line by block 5 or off-line on a recording of the output of block 4, shall be made by subdividing the amplitude of the flicker level signal into a suitable number of classes.

The flicker level signal is sampled at a constant rate.

Every time that the appropriate value occurs, the counter of the corresponding class is incremented by one. In this way, the frequency distribution function of the input values is obtained. By choosing a scanning frequency sufficiently higher than the maximum flicker frequency, the final result at the end of the measuring interval represents the distribution of flicker level duration

* A reference filament lamp for 100-130 V systems would have a different frequency response and would require a corresponding adjustment of the weighting filter. The characteristics of discharge lamps are totally different, and wider modifications of this report would be necessary to take them into account.