SLOVENSKI STANDARD
SIST EN 169000:2004

01-januar-2004

Rodovna specifikacija: Kristalni oscilatorji

Generic Specification: Quartz crystal controlled oscillators

Fachgrundspezifikation: Quarzoszillatoren

Spécification générique: Oscillateurs pilotes par quartz

Ta slovenski standard je istoveten z: **EN 169000:1992**

ICS:

31.140	Piezoelektrične in dielektrične naprave	Piezoelectric and dielectric devices

SIST EN 169000:2004 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 169 000

December 1992

UDC

Supersedes CECC 69 000 Issue 1 : 1991

Descriptors: Quality, electronic components, quartz crystal controlled oscillators

English version

Generic Specification:

Quartz crystal controlled oscillators

Spécification Générique:
Oscillateurs pilotes par quartz

Fachgrundspezifikation:
Quarzoszillatoren

This European Standard was approved by the CENELEC Electronic Components Committee (CECC) on 3 December 1992. CENELEC members are bound to comply with 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 General Secretariat of the CECC 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 CECC General 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. The membership of the CECC is identical, with the exception of the national electrotechnical committees of Greece, Iceland and Luxembourg.

CECC

CENELEC Electronic Components Committee

Comité des Composants Electroniques du CENELEC

CENELEC Komitee für Bauelemente der Elektronik

General Secretariat: Gartenstr. 179, D- 6000 Frankfurt/Main 70

Ref. No. 169 000 : 1992 E

PREFACE

The CENELEC Electronic Components Committee (CECC) is composed of those member countries of the European Committee for Electrotechnical Standardization (CENELEC) who wish to take part in a harmonized System for electronic components of assessed quality.

The object of the System is to facilitate international trade by the harmonization of the specifications and quality assessment procedures for electronic components, and by the grant of an internationally recognized Mark, or Certificate, of Conformity. The components produced under the System are thereby acceptable in all member countries without further testing.

This specification has been formally approved by the CECC, and has been prepared for those countries taking part in the System who wish to issue national harmonized specifications for **Quartz crystal controlled oscillators**. It should be read in conjunction with the current regulations for the CECC System.

Copies of it can be obtained from the addresses shown on the blue fly sheet.

FOREWORD

This specification was prepared by CECC WG 17 " Piezoelectric devices for frequency control and selection".

It is based, wherever possible, on the Publications of the International Electrotechnical Commission (IEC) and in particular on IEC 679-1: Quartz crystal controlled oscillators: Part 1: General information, test conditions and methods.

The CECC voting procedure for the conversion of publication CECC 69 000 Issue 1 : 1991 to EN has resulted in a positive vote.

The voting report [document CECC(Secretariat)3253/11.92] has been submitted for formal approval and has been accepted. The reference document was approved by CECC as EN 169 000 : 1992 on 3 December 1992.

The following dates were fixed:

-	latest date of announcement of the EN at national level	(doa)	**1993-12-28**
-	latest date of publication of an identical national standard	(dop)	**1994-06-28**
-	latest date of declaration of national standards obsolescence		**1994-06-28**
-	latest date of withdrawal of conflicting national standards	(dow)	**2003-12-28**

CONTENTS

FOREWORD

The CENELEC Electronic Components Committee (CECC) is composed of those member countries of the European Committee for Electrotechnical Standardization (CENELEC) who wish to take part in a harmonized System for electronic components of assessed quality.

The object of the System is to facilitate international trade by the harmonization of the specifications and quality assessment procedures for electronic components, and by the grant of an internationally recognized Mark, or Certificate, of Conformity. The components produced under the System are thereby acceptable in all member countries without further testing.

This specification has been formally approved by the CECC, and has been prepared for those countries taking part in the System who wish to issue national harmonized specifications for QUARTZ CRYSTAL CONTROLLED OSCILLATORS. It should be read in conjunction with the current regulations for the CECC System.

At the date of printing of this specification, the member countries of the CECC are, Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom, and copies of it can be obtained from the addresses shown on the blue fly sheet.

PREFACE

This specification was prepared by CECC WG 17 : Piezoelectric devices for frequency control and selection.

It is based, wherever possible, on the Publications of the International Electrotechnical Commission and in particular on IEC 679-1 : Quartz crystal controlled oscillators : Part 1 : General information, test conditions and methods.

The text of this specification was circulated to the CECC for voting in the document(s) indicated (listed) below and was ratified by the President of the CECC for printing as a CECC Specification.

Document	Date of Voting	Report on the Voting
CECC(Secretariat)2569	August 1990	CECC(Secretariat)2697
CECC(Secretariat)2714	February 1991	CECC(Secretariat)2775

SECTION 1 - SCOPE

This document specifies the methods of test and general requirements for quartz crystal controlled oscillators of assessed quality using either capability approval or qualification approval procedures.

SECTION 2 - GENERAL

2.1 Order of precedence

Where any discrepancies occur for any reason, documents shall rank in the following order of precedence:

- the detail specification
- the sectional specification
- the generic specification
- the FEN internal regulations
- any other international documents (for example, of the IEC) to which reference is made

The same order of precedence shall apply to equivalent national documents.

2.2 Related documents

ISO 1000	(1973)	SI units and recommendations for use of their multiples and of certain other units
IEC 27-1	(1971)	Letter symbols to be used in electrical technology : Part 1 : General
IEC 27-2	(1972	Letter symbols to be used in electrical technology: Part 2 : Telecommunications and electronics
IEC 50	-	International Electrotechnical Vocabulary
IEC 50 (561)	-	International Electrotechnical Vocabulary Chapter 561: Piezoelectric devices for frequency control and selection
IEC 68	-	Basic environmental testing procedures
IEC 68-1	(1981)	Part 1 : General and guidance
IEC 68-2	-	Part 2 : Tests
IEC 68-2-1	(1974) (1983) (1976)	Tests A : Cold Amendment No.1 Supplement A

IEC 68-2-2	(1974) (1976)	Test B : Dry heat Supplement A
IEC 68-2-3	(1969) (1984)	Test Ca : Damp heat, steady state Amendment No. 1
IEC 68-2-6	(1982) (1983) (1985)	Test Fc and guidance : Vibration (sinusoidal) Amendment No.1 Amendment No.2
IEC 68-2-7	(1983) (1986)	Test Ga : Acceleration, steady state Amendment No.1
IEC 68-2-10	(1988)	Test J : Mould growth
IEC 68-2-13	(1983)	Test M : Low air pressure
IEC 68-2-14	(1984) (1986)	Test N : Change of temperature Amendment No.1
IEC 68-2-17	(1978) (1985)	Test Q : Sealing Amendment No.1
IEC 68-2-20	(1979) (1986)	Test T : Soldering Amendment No.1
IEC 68-2-21	(1983) (1985)	Test U : Robustness of terminations Amendment No.1
IEC 68-2-27	(1987)	Test Ea : Shock
IEC 68-2-29	(1987)	Test Eb : Bump
IEC 68-2-30	(1980) (1985)	Test Db : Damp heat cyclic Amendment No.1
IEC 68-2-32	(1975) (1982)	Test Ed : Free fall Amendment No.1
IEC 68-2-36	(1973) (1983)	Test Fdb : Random vibration wide band - reproducibility medium Amendment No. 1
IEC 68-2-45	(1980)	Test XA : Immersion in cleaning solvents.
IEC 68-2-52	(1984)	Test Kb : Salt mist, cyclic
IEC 68-2-58	(1989)	Solderability, resistance to dissolution of metallization and to soldering heat of Surface Mounting Devices.
IEC 122-1	(1976) (1983)	Quartz crystal units for frequency control and selection Part 1 : Standard values and test conditions. Amendment No. 1
IEC 410	(1973)	Sampling plans and procedures for inspection by attributes

IEC 617	-	Graphical symbols for diagrams
IEC 679-1	(1980)	Quartz crystal controlled oscillators Part 1 : General information, test conditions and methods
	(1985)	Amendment No.1
IEC 679-2	(1981)	Part 2 : Guide to the use of quartz crystal controlled oscillators
IEC 801-2	(1984)	Electromagnetic compatibility for industrial-process measurement and control equipment Part 2 : Electrostatic discharge requirements
	(1986)	FEN internal regulations
CECC 00 114/I Issue 1	(1990)	Quality assessment procedures Part I : Approval of manufacturers and other organizations
CECC 00 114/II Issue I	(1991)	Quality assessment procedures Part II : Qualification approval of electronic components
CECC 00 114/III Issue I	(1989)	Quality assessment procedures Part III : Capability approval of an electronic component manufacturing activity
CECC 00 109	(1974)	Certified test records
CECC 00 111	(1980)	Specifications

2.3 Units, symbols and terminology

2.3.1 General

Units, graphical symbols, letter symbols and terminology shall, wherever possible, be taken from the following documents:

ISO 1000	SI units and recommendations for the use of multiples and of certain other units
IEC 27	Letter symbols to be used in electrical technology
IEC 50	International Electrotechnical Vocabulary
IEC 50 (561)	International Electrotechnical Vocabulary Chapter 561 : Piezoelectric devices for frequency control and selection.
IEC 679	Quartz crystal controlled oscillators

The following paragraphs contain additional terminology applicable to quartz crystal controlled oscillators and the latest IEV 561 definitions.

2.3.2 Simple packaged crystal oscillator (SPXO) (561-04-01)

A crystal controlled oscillator having no means of temperature control or compensation, exhibiting a frequency/temperature characteristic determined substantially by the resonator employed.

2.3.3 Overtone crystal oscillator (561-04-02)

An oscillator designed to operate with the controlling resonator functioning in a specified mechanical overtone mode of vibration.

2.3.4 Crystal cut (122-1)

The orientation of the crystal element with respect to the crystallographic axes of the crystal.

NOTE: This definition is included, as it may be desirable to specify the cut (and hence the general form of the frequency-temperature performance) of a crystal unit used in an oscillator application. The choice of crystal cut will imply certain attributes of the oscillator which may not otherwise appear in the detail specification.

2.3.5 Voltage controlled crystal oscillator (VCXO) (561-04-03)

A crystal controlled oscillator, the frequency of which can be deviated or modulated according to a specified relation, by application of a control voltage.

2.3.6 Temperature compensated crystal oscillator (TCXO) (561-04-04)

A crystal controlled oscillator whose frequency deviation due to temperature is reduced by means of a compensation system, incorporated in the device.

2.3.7 Oven controlled crystal oscillator (OCXO)(561-04-05)

A crystal controlled oscillator in which at least the resonator is temperature controlled.

NOTE: This mode of operation ensures that the oscillator frequency will remain sensibly constant over the operating temperature range of the OCXO, therefore independant of the frequency - temperature characteristic of the crystal unit.

2.3.8 Nominal frequency (561-04-06)

The frequency used to identify the crystal controlled oscillator.

2.3.9 Frequency tolerance (561-04-07)

The maximum permissible deviation of the oscillator frequency from a specified nominal value when operating under specified conditions.

NOTE: Frequency tolerances are often assigned separately to specified ambient effects, both electrical and environmental. When this approach is used, it is necessary to define the values of other operating parameters, as well as the range of the specified variable, that is:

- Deviation from the frequency at the specified reference temperature due to operation over the specified temperature range, other conditions remaining constant

- Deviation from the frequency at specified supply voltage due to supply voltage changes over the specified range, other conditions remaining constant

- Deviation from the initial frequency due to ageing, other conditions remaining constant

- Deviation from the frequency with specified load conditions due to changes in load impedance over the specified range, other conditions remaining constant

In some cases, an overall frequency tolerance may be specified, due to any/all combinations of operating parameters, during a specified lifetime.

2.3.10 Frequency offset (561-04-08)

The frequency difference, positive or negative, which should be added to the specified nominal frequency of the oscillator, when adjusting the oscillator frequency under a particular set of operating conditions in order to minimize its deviation from nominal frequency over the specified range of operating conditions.

Example

In order to minimize the frequency deviation from nominal over the entire temperature range, a frequency offset may be specified for adjustment at the reference temperature (see Fig.1).

2.3.11 Adjustment frequency (561-04-09)

The frequency to which an oscillator must be adjusted, under a particular combination of operating conditions, in order to meet the frequency tolerance specification over the specified range of operating conditions (that is, adjustment frequency = nominal frequency + frequency offset).

2.3.12 Frequency adjustment range (561-04-10)

The range over which the oscillator frequency may be varied by means of some variable element, for the purpose of

- setting the frequency to a particular value

or

- to correct the oscillator frequency to a prescribed value after deviation due to ageing, or other changed conditions.

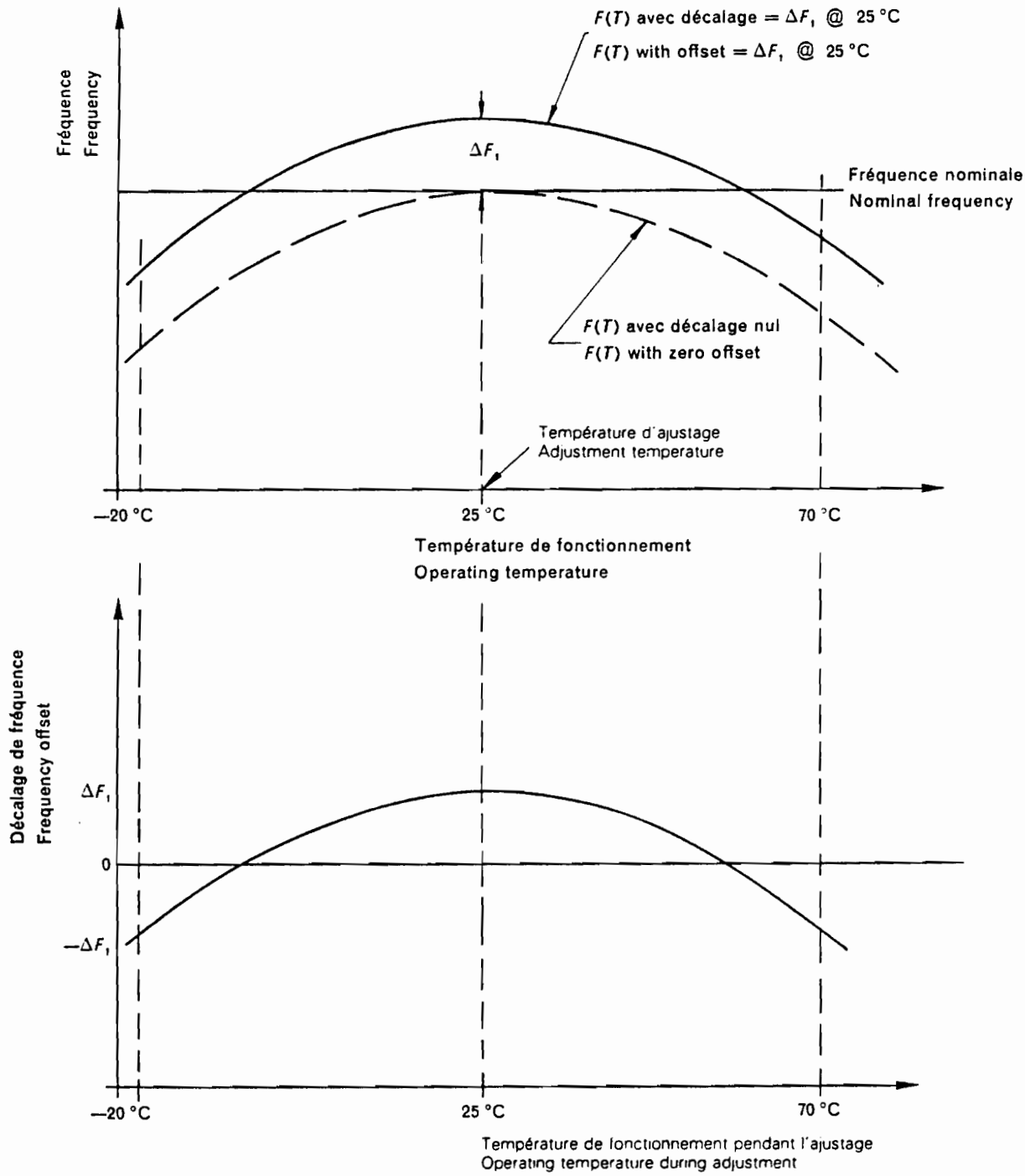

Figure 1. Example of the use of frequency offset.

2.3.13 Operating temperature range (561-04-11)

The range of temperature, over which the oscillator will function, maintaining frequency and other output signal characteristics within specified tolerances.

2.3.14 Operable temperature range (561-04-12)

The range of temperature, over which the oscillator shall continue to provide an output signal, though not necessarily within the specified tolerances of frequency, level, waveform, etc.

2.3.15 Reference temperature (679-1)

The temperature at which certain oscillator performance parameters are measured, normally (25 ± 2)°C.

2.3.16 Reference point temperature (679-1)

The temperature measured at a specific reference point relative to the oscillator.

2.3.17 Stabilization time (561-04-13)

The time, measured from the initial application of power, required for a crystal controlled oscillator to stabilize its operation within specified limits.

2.3.18 Frequency/voltage coefficient (561-04-14)

The fractional change in output frequency resulting from an incremental change in supply voltage, other parameters remaining unchanged.

NOTE: In the case of OCXO's, a considerable time may elapse before the full effect of a supply voltage change is observed, as the temperature of the oven may drift gradually to a new value following the voltage perturbation.

2.3.19 Frequency/load coefficient (561-04-15)

The fractional change in output frequency resulting from an incremental change in electrical load impedance, other parameters remaining unchanged.

2.3.20 Long-term frequency stability (Frequency ageing) (679-1)

The relationship between oscillator frequency and time. This long-term frequency drift is caused by secular changes in the crystal unit and/or other elements of the oscillator circuit, and should be expressed as fractional change in mean frequency per specified time interval.

2.3.21 Short-term frequency stability (561-04-16)

The random fluctuation of the frequency of an oscillator over short periods of time.

NOTE: For an explanation of short-term frequency stability IEC 679-1 Appendix A should be consulted.