BRITISH STANDARD

BS CECC
51001:1987

Specification for

Harmonized system of quality assessment for electronic components — Blank detail specification —

Mercury wetted change-over contact units, magnetically biased

Amendments issued since publication

Amd. No.	Date	Comments

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Contents

National foreword

This British Standard has been prepared under the direction of the Electronic Components Standards Committee. It is identical with CENELEC Electronic Components Committee (CECC) 51001:1986 "*Harmonized system of quality assessment for electronic components. Blank detail specification: Mercury wetted change-over contact units, magnetically biased*".

This standard is a harmonized specification within the CECC system.

Terminology and conventions. The text of the CECC specification has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following:

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Cross-references. The British Standard which implements CECC 00100 is BS 9000 "*General requirements for electronic components of assessed quality*" Part 2:1983 "*Specification for national implementation of CECC basic rules and rules of procedure*".

International Standard	Corresponding British Standard
CECC 19000:1978	BS CECC 19000:1979 *Harmonized system of quality assessment for electronic components: Generic specification: Dry reed make contact units* (Identical)
CECC 51000:1985	BS CECC 51000:1986 *Harmonized system of quality assessment for electronic components: Generic specification: Mercury wetted change-over contact units, magnetically biased* (Identical)
IEC 410:1973	BS 6001:1972 *Sampling procedures for inspection by attributes* (Technically equivalent)

Scope. This standard lists the ratings, characteristics and inspection requirements which shall be included as mandatory requirements in accordance with BS CECC 51000 in any detail specification for these devices.

Detail specification layout. In the event of conflict between the requirements of this specification and the provisions of BS 9000 the latter shall take precedence, except that the front page layout shall be in accordance with BS 9000 Circular Letter No. 15.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the CECC title page, pages ii to vi, pages 1 to 10 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Förderverein für Elektrotechnische Normung (FEN) e. V.
Cenelec Electronic Components Committee

CECC

English version

Harmonized System of Quality Assessment for Electronic Components

BLANK DETAIL SPECIFICATION:

MERCURY WETTED CHANGE-OVER CONTACT UNITS, MAGNETICALLY BIASED

Système Harmonisé d'Assurance de la Qualité des Composants Electroniques

SPECIFICATION PARTICULIERE CADRE:

CONTACTS DE TRAVAIL DEUX DIRECTIONS MOUILLES MERCURE, POLARISES MAGNETIQUEMENT

Harmonisiertes Gütebestätigungssystem für Bauelemente der Elektronik

VORDRUCK FÜR BAUARTSPEZIFIKATION:

QUECKSILBERBENETZTE KONTAKTEINHEITEN MIT MAGNETISCH VORGESPANNTEM WECHSLER

1 Issue
Edition
Ausgabe

CECC 51001

1986

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 accepted by 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 MERCURY WETTED CHANGE-OVER REED CONTACT UNITS MAGNETICALLY BIASED. It should be read in conjunction with the current regulations for the CECC System.

Preface

This blank detail specification was prepared by Working Group 19: "Reed contact devices".

It is one of a series of blank detail specifications all relating to the generic specification printed as CECC 51000.

The text of this specification was circulated to the CECC for voting in the document listed below, and was ratified by the President of the CECC for publication as a CECC specification.

Document	Voting Date	Report on the Voting
CECC(Secretariat)1648	November 1984	CECC(Secretariat)1755

Key for page v

The numbers in brackets on page v correspond to the following indications which shall be given:

Identification of the detail specification

(1) The name of the National Standards Organization under whose authority the detail specification is published, and, if applicable, the organization from whom the specification is obtainable.

(2) The CECC symbol and the number alloted to the detail specification by the CECC General Secretariat.

(3) The number and issue number of the CECC generic or sectional specification as relevant; also national reference if different.

(4) If different from the CECC number, the national number of the detail specification, date of issue and any further information required by the national system, together with any amendment numbers.

Identification of the reed contact unit

(5) A short description of the type of reed make contact unit

(6) Information on typical construction (see examples given on page v)

(7) Quick reference data (see examples given on page v) and quality assessment level.

(8) Outline drawing with main dimensions which are of importance for interchangeability and/or reference to the national or international documents for outlines.

For (5) and (6), the text given should be suitable for an entry in CECC 00200 or CECC 00300.

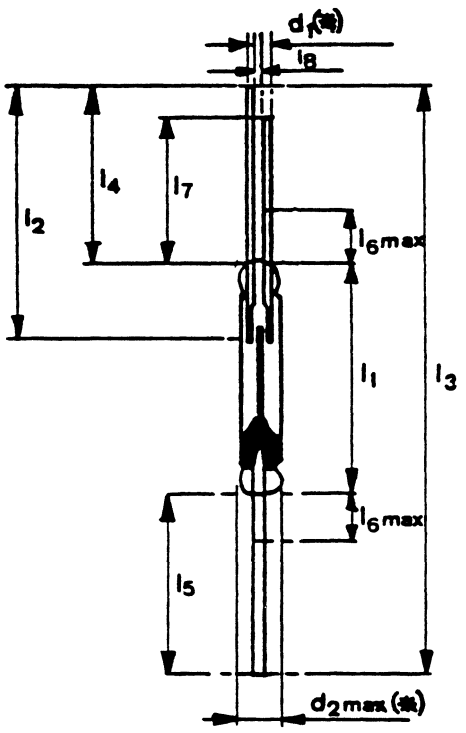
Specification available from (1)	Page.. of..	CECC 51001-XXX (2)
Electronic components of assessed quality. Detail specification in accordance with (3)		(4)
DETAIL SPECIFICATION FOR mercury wetted change-over reed contact units magnetically biased. (5)		
STYLE: wire terminations; round or flat for welding or soldering with the terminal finish being a maximum of l_6 from the seal end material of envelope : material of blades : contact material : mercury (6)		

Function: (7)

General applications

Assessment level:
I, II, III

(See Clause Page 2)



Outline and dimensional data: (8)

Dimensions in millimetres (*) If not round give cross-section.

NOTE 1 bend or cut not permitted within .... mm from the seal end

NOTE 2 requirements for concentricity may be added to the Guide for visual inspection of Appendix 1.

Information about manufacturers who have components qualified according to this specification is available in the current CECC 00200: Qualified Products List

When a dimension, rating or characteristic is not supported by a test in test schedules 1 or 2, it shall be indicated as “not for inspection purposes”. Full information shall also be given in an Appendix to the Detail Specification, on how this dimension, rating or characteristic is derived.

blank

1 Ratings

1.1 Contact rating — resistive load

1) Contact Voltage and contact current

a.c. : ... V max. ... A max. ... VA max.

d.c. : ... V max. ... A max. ... VA max.

... V min. ... mA min.

2) Rated load and life expectancy at ambient temperature, 50 % duty cycle and .... operations per s.

a.c. : ... VA max. at V max. ..... operations

d.c. : ... VA max. at V max. ..... operations

a.c. : ... VA max. at I max. ..... operations

d.c. : ... VA max. at I max. ..... operations

d.c. : at V min. and I min. ..... operations

1.2 Insulation resistance ...MΩ min.

1.3 Maximum voltage across open contact circuits ...V d.c. (*)

1.4 Environmental category .../.... /...

2 Characteristics

2.1

1)	Mounting:	preferred position: mounting position restricted at	... ...°
2)	Saturate value		...A (Ampère-turns)
3)	Must-release value		...A (Ampère-turns) (*)
4)	Must-operate value		...A (Ampère-turns) (*)
5)	Contact circuit resistance: initial value for both contact circuits		...ohm max.
6)	Mass		...g

* See **2.2**, page 1

2.2

1)	Must-not-release value	...A (Ampère-turns) (*)
2)	Must-not-operate value	...A (Ampère-turns) (*)
3)	Characteristic non release value	...A (Ampère-turns)
4)	Operate time	...ms max.
5)	Release time	...ms max.
6)	Bounce time at operate on make contact	...ms max.
7)	Bounce time at release on break contact	...ms max.
8)	Magnetic dwell	...A (Ampère-turns)max.
9)	Transfer time or bridging time	...ms max. ...ms min.

The values indicated by (*) cover the total range of operate and release values. Subdivisions of this total range may be given under the same Detail Specification number, with graphs or tables indicating the relationship between these five values. Every subdivision shall fulfil all the other requirements of the Detail Specification.

3 Qualification approval test schedule

The tests and inspections performed shall be those prescribed in Table 1 or Table 2 (see **3.3.3** of CECC 19000). These should be read in conjunction with Generic specifications CECC 19000, CECC 51000 and the appropriate IEC publications.

Samples which have been subjected to destructive tests shall not be delivered to the customer, even if they pass all the post test inspection requirements.

4 Quality conformance inspection test schedule

The change-over reed contact units covered by this specification shall be tested to the inspection schedule given in Table 2. These should be read in conjunction with Generic specification CECC 19000, CECC 51000 and the appropriate IEC publications.

Samples which have been subjected to destructive tests shall not be delivered to the customer, even if they pass all the post test inspection requirements.

Sampling for periodic tests: samples shall be representative of the whole production period

5 Test system

The CECC test system number and the position of the reed contact unit within the test system shall be specified in the relevant detail specification. (See Annex A of CECC 51000)

6 Marking

The package shall be marked with the following:

1) The number of the relevant detail specification
2) The date code
3) The manufacturer's factory and identification code
4) Details of the ampere-turn sensitivity (ies) (if required by the detail specification)

7 Certified test records (C T R)

The C T R shall give the information from all A,B,C and D-tests in Table 2.

8 Ordering information

Orders for reed contact units covered by this specification shall make reference to the number of the relevant detail specification.

9 Related documents

CECC 19000, *Dry reed make contact units — Generic specification.*

CECC 51000, *Mercury wetted reed change-over contact units magnetically biased.*

(National Authorized Institutions will complete this section, making reference to any documents, recommendations or specifications directly referred to in their national equivalent of this document.)

10 This blank detail specification covers three assessment levels. Assessment level III corresponds to the highest quality.

Table 1 — Single schedule for qualification approval

Test procedures

1. Group 0: all the specimens + spares are submitted to all tests mentioned in Group 0 in the given order
2. Each further group uses specimens accepted by test Group 0, possibly complemented by those spares passing Group 0
3. For each group of tests the same specimens are used and the tests are performed in the given order
4. Defectives are replaced by spares before carrying out the next test in the group.

Inspection	D(*) or ND	CECC 51000 reference and conditions of test	Assessment levels						Performance requirements (CECC 51000 reference unless otherwise stated)
			I		II		III		
			n *	c *	n *	c *	n *	c *	
Group 0	ND								
4.4 Visual inspection		as in **4.4**	80 + 30	5	125 + 30	5	200 + 30	7	As listed in Appendix 1 of this detail specification
4.4 Dimensions		as in **4.4** gauges		5		5		3	See outline and dimensional data of page v + seal eccentricity
4.10 Operate release and bounce transfer or bridging time		as in **4.10** (**4.10.1** and **4.10.3** of CECC 19000)		3		3		3	as in **4.10** (**4.10.2** of CECC 19000)
4.5 Functional test		as in **4.5** (**4.5.1** and **4.5.3** of CECC 19000)		3		3		2	as in **4.5** (**4.5.2** of CECC 19000)
4.8 Voltage test		as in **4.8** (**4.8.1** and **4.8.3** of CECC 19000)		2		2		2	as in **4.8** (**4.8.2** of CECC 19000)
4.9 Insulation test		as in **4.9** (**4.9.1** and **4.9.3** of CECC 19000)		5		5		3	as in **4.9** (**4.9.2** of CECC 19000)
4.22 Sealing		as in **4.22** method 1 (**4.22.1** and **4.22.3** of CECC 19000) or **4.22** method 2		2		2		1	as in **4.22**
Total number of defectives permitted in Group 0				10		10		10	
Group 1	D								
4.13 Solderability		as in **4.13** [**4.13.1** 1) and **4.13.3** of CECC 19000]	32	2	32	1	32	1	as in **4.13** (**4.13.2** of CECC 19000)
4.11 Contact sticking		as in **4.11.1**		5		3		2	as in **4.11.1**

* See note 2 on page 10

Table 1 — Single schedule for qualification approval

Inspection	D(*) or ND	CECC 51000 reference and conditions of test	Assessment levels						Performance requirements (CECC 51000 reference unless otherwise stated)
			I		II		III		
			n *	c *	n *	c *	n *	c *	
Group 2	D								
4.7 Contact circuit resistance		as in **4.7** (**4.7.1** and **4.7.3** of CECC 19000)	20	1	20	1	20	1	as in **4.7** (**4.7.2** of CECC 19000)
4.23 Electrical endurance test (1) for early failures low loads		as in **4.23.4** and in **4.23.6**		[a]		1		1	as in **4.23.5**
Group 3	D								
4.12 Robustness of terminations		as in **4.12** (**4.12.1** and **4.12.3** of CECC 19000)	20	3	20	2	20	1	as in **4.12** (**4.12.2** of CECC 19000)
4.13 Resistance to soldering heat		as in **4.13** [**4.13.1** 2) and **4.13.3** of CECC 19000]		3		2		1	as in **4.13** (**4.13.2** of CECC 19000)
4.16 Rapid change of temperature		as in **4.16** (**4.16.1** and **4.16.3** of CECC 19000) Tracer gas		3		2		1	as in **4.16** (**4.16.2** of CECC 19000) leakage rate expressed in the measured units
Group 4	D								
4.23 Electrical endurance test (2) for early failures high loads		as in **4.23.4** and in **4.23.6**	20	3	20	2	20	1	as in **4.23.5**
Group 5	D								
4.19 Vibration (if required by the detail specification)		as in **4.19.2** [**4.19.2** 1) and **4.19.2** 3) of CECC 19000] Tracer gas	[a]	[a]	20	2	20	1	as in **4.19.2** [**4.19.2** 2) of CECC 19000] Leakage rate expressed in the measured units
4.20 Shock (If required by the detail specification)		as in **4.20** [**4.20.1** (method 2) and **4.20.3** of CECC 19000] Tracer gas		[a]		2		1	as in **4.20** [**4.20.2** (method 2) of CECC 19000] Leakage rate expressed in measured units

* See note 2 on page 10

[a] Test not applicable for this level

Table 1 — Single schedule for qualification approval

Inspection	D(*) or ND	CECC 51000 reference and conditions of test	Assessment levels						Performance requirements (CECC 51000 reference unless otherwise stated)
			I		II		III		
			n *	c *	n *	c *	n *	c *	
Group 6	D								
4.26 Drain time		as in **4.26.1** and **4.26.3**	20	3	20	2	20	1	as in **4.26.2**
4.25 Mounting position test		as in **4.25.1** and **4.25.3**		[a]		2		1	as in **4.25.2**
4.14 Climatic sequence (If required by the detail specification)		as in **4.14** (**4.14.1** and **4.14.3** of CECC 19000) Tracer gas		[a]	20	2	20	1	as in **4.14** (**4.14.2** of CECC 19000) Leakage rate expressed in the measured units
Group 7	D								
4.23 Electrical endurance test (3) for long life test		as in **4.23.4** and in **4.23.6**	[a]	[a]	20	3	20	2	as in **4.23.5**

* See note 2 on page 10

[a] Test not applicable for this level.

Table 2 — Quality conformance inspection

Test procedure

1. All A and B-tests are performed in the given order
2. The same specimens are used for all A-tests, whenever possible
3. Specimens used for A-tests may be used for B-tests
4. Specimens used for the B1-test shall preferably be used for B2, B3-tests and also for C and D-tests.
5. Specimens submitted to a destructive test shall not be re-utilized for another test unless otherwise specified
6. Defectives are replaced by spares before going to the next test in the group.

Group A Tests: Lot by lot

Inspection	D(*) or ND	CECC 51000 reference and conditions of tests	assessment levels						Performance requirements (CECC 51000 reference unless otherwise stated)
			I		II		III		
			IL *	AQL * %	IL *	AQL * %	IL *	AQL * %	
Sub-group A.1									
4.4 Visual inspection	ND	as in **4.4**	S4	2,5	I	1,5	II	1,5	As listed in Appendix 1 of this detail specification
4.4 Dimensions	ND	as in **4.4** gauges	S4	2,5	I	1,5	II	0,65	See outline and dimensional data of page v + seal eccentricity
Sub-group A.2	ND								
4.10 Operate, release bounce transfer or bridging time		as in **4.10** (**4.10.1** and **4.10.3** of CECC 19000)	S4	1,5	I	1	II	0,65	as in **4.10** (**4.10.2** of CECC 19000)
Sub-group A.3	ND								
4.5 Functional test		as in **4.5** (**4.5.1** and **4.5.3** of CECC 19000) see note (1) (page 6)	S4	1,5	I	1	II	0,4	as in **4.5** (**4.5.2** of CECC 19000)
Sub-group A.4	ND								
4.8 Voltage test		as in **4.8** **4.8.1** and **4.8.3** of CECC 19000)	S4	1	I	0,65	II	0,4	as in **4.8** (**4.8.2** of CECC 19000)
Sub-group A.5	ND								
4.9 Insulation test		as in **4.9** (**4.9.1** and **4.9.3** of CECC 19000)	S4	2,5	I	1,5	II	0,65	as in **4.9** (**4.9.2** of CECC 19000)
Total inspection level and AQL for all group A-tests			S4	6,5	I	4	II	2,5	

NOTE (1) (see p. 6) A functional test ampère-turn band (subgroup A3) may be subdivided into smaller ampère-turn bands employing different AQLs provided that the same overall AQL is achieved.

* see note 1 on page10

Table 2 — Quality conformance inspection

Group B Tests: Lot by lot

Inspection	D(*) or ND	CECC 51000 reference and conditions of tests	assessment levels						Performance requirements (CECC 51000 reference unless otherwise stated)
			I		II		III		
			IL *	AQL * %	IL *	AQL * %	IL *	AQL * %	
Sub-group B.1									
4.22 Sealing	ND	as in **4.22** method 1 (**4.22.1** and **4.22.3** of CECC 19000) Tracer gas	S4	1	I	0,65	II	0,25	as in **4.22** (**4.22.2** of CECC 19000) leakage rate expressed in the measured units
Sub-group B.2									
4.13 Solderability	D	as in **4.13** [**4.13.1** 1) and **4.13.3** of CECC 19000]	S4	2,5	S4	1,5	I	0,65	as in **4.13** (**4.13.2** of CECC 19000)
Sub-group B.3									
4.23 Electrical endurance test for early failures low loads	D	as in **4.23.4** and in **4.23.6**	[a]	[a]	S3	2,5	S4	1,5	as in **4.23.5**
Sub-group B.4									
4.26 Drain time	D	as in **4.26.1** and in **4.26.3**	S4	2,5	I	1,5	II	1	as in **4.26.2**
4.25 Mounting position test		as in **4.25.1** and in **4.25.3**	S3	4	S4	2,5	I	1,5	as in **4.25.2**
4.11 Contact sticking		as in **4.11.1**	S3	4	S4	2,5	I	1,5	as in **4.11.1**

* see note 1 on page10

[a] test not applicable for this level.

Table 2 — Quality conformance inspection

Group C Tests: Periodic inspection

Test	D or ND	CECC 51000 reference and conditions of tests	Levels of quality assessment									Performance requirements (CECC 51000 reference unless otherwise stated)
			Level I			Level II			Level III			
			p	n	c	p	n	c	p	n	c	
Sub-group C.1	D											
4.7 Contact circuit resistance		as in **4.7** (**4.7.1** and **4.7.3** of CECC 19000)	12	20	1	6	20	1	3	20	1	as in **4.7** (**4.7.2** of CECC 19000)
4.12 Robustness terminations		as in **4.12** (**4.12.1** and **4.12.3** of CECC 19000)			3			2			1	as in **4.12** (**4.12.2** of CECC 19000)
Sub-group C.2	D											
4.13 Resistance to soldering heat		as in **4.13** [**4.13.1** 2) and **4.13.3** of CECC 19000]	12	20	3	6	20	2	3	20	1	as in **4.13** (**4.13.2** of CECC 19000)
4.16 Rapid change of temperature		as in **4.16** (**4.16.1** and **4.16.3** of CECC 19000) Tracer gas			3			2			1	as in **4.16** (**4.16.2** of CECC 19000) leakage rate expressed in the measured units
Sub-group C.3	D											
4.23 Electrical endurance test for early failure high loads		as in **4.23.4** and in **4.23.6**	12	20	3	6	20	2	3	20	1	as in **4.23.5**

Table 2 — Quality conformance inspection

Group D Tests: Periodic inspection

Test	D or ND	CECC 51000 reference and conditions of tests	Levels of quality assessment									Performance requirements (CECC 51000 reference unless otherwise stated)
			Level I			Level II			Level III			
			p	n	c	p	n	c	p	n	c	
Sub-group D.1	D											
4.14 Climatic sequence (If required by the detail specification)		as in **4.14** (**4.14.1** and **4.14.3** of CECC 19000) Tracer gas	[a]	[a]	[a]	12	20	2	6	20	1	as in **4.14** (**4.14.2** of CECC 19000) Leakage rate expressed in the measured units
Sub-group D.2	D											
4.23 Electrical endurance test for long life test		as in **4.23.4** and in **4.23.6**	[a]	[a]	[a]	12	20	3	6	20	2	as in **4.23.5**
Sub-group D.3	D											
4.20 Shock (If required by the detail specification)		as in **4.20** [**4.20.1** (method 2) and **4.20.3** of CECC 19000] Tracer gas	[a]	[a]	[a]	12	20	2	6	20	1	as in **4.20** [**4.20.2** (method 2) of CECC 19000] Leakage rate expressed in the measured units
Sub-group D.4	D											
4.19.2 Vibration (If required by the detail specification)		as in **4.19.2** [**4.19.2** 1) and **4.19.2** 3) of CECC 19000] Tracer gas	[a]	[a]	[a]	12	20	2	6	20	1	as in **4.19.2** [**4.19.2** 2) of CECC 19000] Leakage rate expressed in measured units

[a] test not applicable for this level.

Appendix 1

NOTE 1 Inspection levels (ILs) and Acceptable quality levels (AQLs) are selected from CECC 00007

NOTE 2
p : periodicity (in months)
n : sample size
c : acceptance criterion (number of permitted defectives)
D : destructive
ND : non destructive

Guide for visual inspection

Requirements

1. Minimum seal length crack and bubble free: ..... mm
2. If there are seal cracks: min. ..... % of actual seal length — crack free
3. If there are seal bubbles: min. ..... % of actual seal length — bubble free
4. Loose particles: ..... max. diameter
5. Unfinished termination at seal: max. length.....
6. Bent terminations: go/no go (gauge)
7. Bubbles: maximum diameter allowed

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