

DETAIL SPECIFICATION

CECC 16 303-801

SPÉCIFICATION PARTICULIÈRE

BAUARTSPEZIFIKATION

November 1995

English version

Detail Specification:

**Electromechanical all-or-nothing heavy load relays
1/2 cubic inch, monostable, 2 change-over (DPDT), 10 A**



This CECC Detail Specification was approved on 1995-05-08.

Up-to-date lists and bibliographical references of other detail specifications relating to EN 116000-1:1992 may be obtained on application to the Central Secretariat or to any CENELEC member.

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CENELEC

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

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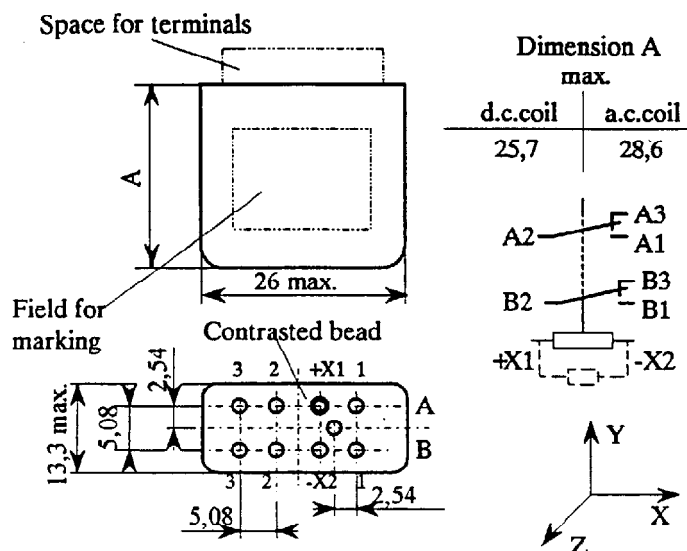
Electronic components of assessed quality
in accordance with
EN 116 000-1: 1992
EN 116 300 : 1993
EN 116 303 : 1993

Detail specification for electromechanical all-or-nothing heavy load relays

Type: 1/2 cubic inch, monostable, 2 change-over (DPDT), 10 A

Construction: Hermetically sealed (RT V), welded construction
Application category of contacts: CA 4
Solder pins, solder hooks, or plug-in type pins
Endurance: 100 000 switching cycles, resistive load

Outline dimensions in mm; tolerances $\pm 0,25$ mm,
if not otherwise specified. Variants, terminals
and wiring diagram see Annexes A, B and C.



Application:

Relays according to this standard are capable of the following loads: 10 A at 28 V d.c. or 115/200 V a.c. 400 Hz.
The relays are circuit breaker compatible.

The relays may be delivered with or without screening (assessment level Y or E).

Suitable socket under consideration.

For higher environmental applications

Coil data: 6 V, 12 V, or 28 V d.c.
115 V a.c. 50/400 Hz

Contact data: 2 change-over (DPDT) for 10 A at 28 V d.c. or AC 115/200 V, 400 Hz

Operate ambient temperature range: - 65 to 125 °C
Storage temperature range: - 70 to 125 °C
Climatic category: 65/125/56

Information about manufacturers who have components qualified to this detail specification is available in the current CECC 00 200: Register of approvals.

1 Related documents

CECC 00 108-3: (1994)	Attestation of conformity; Part I: The CECC Mark and Conditions of use; Part II: Certificates of approval; Part III: Procedures for the attestation of conformity
CECC 00 114/II (1994)	Quality Assessment Procedures; Part II: Qualification Approval of Electronic Components
CECC 00 200-3: (1994)	Harmonized System of Quality Assessment for Electronic Components; Register of approvals
EN 116 000-1: 1992	Generic specification; Electromechanical all-or-nothing relays; Part I: General
EN 116 300 : 1993	Sectional specification; Electromechanical all-or-nothing heavy load relays of assessed quality
EN 116 303 : 1993	Blank detail specification; Electromechanical all-or-nothing heavy load relays of assessed quality
CECC 50 000 (1986)	Harmonized System of Quality Assessment for Electronic Components; Generic Specification: Discrete Semiconductor Devices
IEC 62 (1992)	Marking codes for resistors and capacitors
IEC 68-2-21 (1983)	Basic Environmental Testing Procedures; Part 2: Tests; Test U: Robustness of terminations and integral mounting devices
IEC 68-2-42 (1982)	Basic Environmental Testing Procedures; Part 2: Tests; Test Kc: Sulphur dioxide test for contacts and connections
IEC 68-2-43 (1976)	Basic Environmental Testing Procedures; Part 2: Tests; Test Kd: Hydrogen sulphide test for contacts and connections
IEC 68-2-47 (1982)	Basic Environmental Testing Procedures; Part 2: Tests; Mounting of components, equipment and other articles for dynamic tests including shock (Ea), bump (Eb), vibration (Fc and Fd) and steady-state acceleration (Ga) and guidance

2 Characteristic values of the relay

2.1 General data

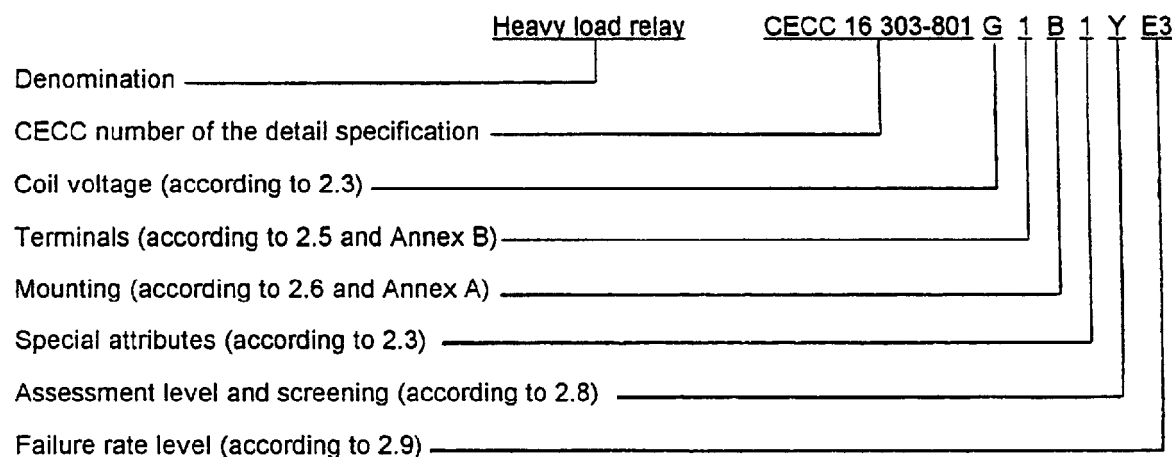
- Contact load: 10 A at 28 V d.c. or 115/200 V a.c. 400 Hz
- Category of contacts: Contact application 4
- Mass (Weight): max. 42 g for mounting code A, B and C;
max. 46 g for mounting code D
- Finish of the relay housing: tinned
- Finish of the terminals: tinned or gold plated (according to 2.5)
- Insulation resistance: min. 100 MΩ at 500 V d.c.
- Voltage proof: according to table 1

Table 1: Dielectric test voltages

	Dielectric test voltages r.m.s. at 50 to 60 Hz	
	at sea level	at 2 kPa (26 600 m height)
Between open contacts	1250	350
Between adjacent contacts	1250	
Contact to case	1250	
Coil to contacts	1250	
Coil to case	1000	

2.2 Construction of designation (ordering information):

Relays according to this specification shall be ordered according to the following example (28 V; solder pins, tinned; with mounting flanges; with suppression device; assessment level Y; failure rate level E3):



For all data processing purposes the ordering informations shall be written without blanks.

2.3 Coil data

Table 2: Coil data

Code letter of coil without with coil transient suppression device ¹⁾		Type d.c./ or a.c.	Voltage Value V		Resistance at 23±2°C Ohm ±10%	Operate voltage d.c. or a.c. V max.			Release voltage d.c. or a.c. V				Permissible coil suppression output voltages V
			rated	max.		3) 23±2°C	at 3) 125°C	4) 125°C	max. at 23±2°C	125°C	min. at 23±2°C	-65°C	
B	0	d.c.	6	7,3	20	3,5	4,5	5	1,7	2,5	0,4	0,35	-
D	0		12	14,5	80	6,8	9	10	3,0	4,5	0,9	0,7	
G	0		28	29 ²⁾	320	14	18	19,8	5,5	7,0	2,2	1,5	
G	1 ⁵⁾		28	29 ²⁾	320	14	18	19,8	5,5	7,0	2,2	1,5	
X	0	a.c.	115	122	-	75	95	100	5,5	40	2,3	5,0	-

¹⁾ Screened semiconductors according to CECC 50 000 Level Y or JAN-TX or equivalent screened semi-conductors shall be used. The relay shall continue to operate even in case of failure of the suppression circuit. The suppression device shall sustain a peak value of 600 V, duration 10 µs. Wiring diagram see Annex C.
²⁾ 32 V for 5 min
³⁾ Coil non energized
⁴⁾ Coil energized
⁵⁾ Suppression device only applicable for 28 V d.c.

2.4 Contact data

2.4.1 Contacts

2 change-over (DPDT) break-before-make contacts
 contact application CA 4

2.4.2 Electrical endurance and overload

Table 3: Data for endurance and overload tests.

	Nominal load		Number of switching cycles	Switching frequencies at nominal load
	at d.c. 28 V	at 115/200 V 400 Hz		
Resistive	10 A	10 A	100 000	1,5 s ON / 1,5 s OFF
Inductive	8 A	8 A	20 000	(0,5 ± 0,05) s ON / (3 ± 1,0) s OFF
Motor	4 A 24 A for 70 ms ¹⁾	4 A 20 A for 70 ms ¹⁾	100 000	(0,35 ± 0,09) s ON / (2 ± 0,1) s OFF
Lamp	2 A 24 A for 15 ms ¹⁾	2 A	100 000	(2 ± 0,05) s ON / (7 - 2,0) s OFF
Intermediate load:				
- resistive	0,5 A	0,5 A	10 000	30 s ON / 1,5 s OFF
- inductive	0,3 A	0,3 A	2 000	30 s ON / 1,5 s OFF
Overload	40 A	60 A	50	0,2 s ON / 20 s OFF

¹⁾ Starting current (peak value)

Note: The following ratings are for information only and not for inspection purposes.

Max. contact voltage: 29 V d.c. resp. 115/200 V a.c. 400 Hz at nominal current

Min. contact voltage: 30 mV d.c.

Min. contact current: 10 mA

2.4.3 Static voltage drop per contact

max. 150 mV for brand-new relays, test load max. 6 V d.c., 10 A

max. 175 mV after endurance test, test load max. 6 V d.c., 10 A

2.4.4 Mechanical endurance

400 000 switching cycles at 2,5 A resistive load

2.4.5 Intermediate load, load distribution

Table 3.1: Intermediate load, load distribution

Test specimen No.	1	2	3
Change-over contact No.			
1	10 A resistive	10 A resistive	10 A resistive
2	0,5 A resistive	0,3 A inductive	0,1 A resistive

2.4.6 Timing (over the whole temperature range):

Table 3.2 Timing

		Coil for	
		d.c. voltage	a.c. voltage
Operate time	max.	10 ms	15 ms
Release time	max.	10 ms	50 ms
Bounce time	max.	1 ms	1 ms

2.4.7 Time current characteristic

Table 4: Time current characteristic

Load A (resistive load)	Load duration max.
15	1 h
50	5 s
100	1,2 s
250	0,2 s
350	0,1 s

2.5 Terminals

Table 5: Terminal variants

Terminal variants	Code number
Solder pins, tinned, d.c.	1
Solder hooks, tinned	2
Plug-in type pins, gold plated, d.c.	3
Plug-in type pins, gold plated, a.c.	4
Solder pins, tinned a.c. (Meplat)	5
90° solder pins, tinned	6

Dimensions of terminals according to Annex B

2.6 Mounting

Table 5.1: Mounting variants

Mounting variants	Code letter
without mounting flanges	A
with mounting flanges	B
with side mounting flanges	C
with captive screws	D

Details and drawings according to Annex A

2.7 Environmental data

The relays shall withstand the following environmental stresses:

Table 5.2: Environmental stresses

Shock, half sine	Acceleration	2 000 m/s ² (200 g)
	Duration	6 ms
Vibration (sinusoidal)	Amplitude	1,5 mm at 10 to 70 Hz
	Acceleration	300 m/s ² at 70 to 3 000 Hz
Vibration (random)	Acceleration	0,4 g ² /Hz
	Spectral density	50 to 2 000 Hz
Acceleration (steady state)	Acceleration	200 m/s ² (20 g)
	Duration	5 min
Mechanical robustness of terminals	Tensile force	45 N + 10 % according to IEC 68-2-21, Test Ua

2.8 Screening / Assessment level

If screening is demanded, the following conditions shall be fulfilled for the delivery lot:

- The relays shall be marked by a serial number.
- The tests of test group "Screening" shall be carried out. Documentation is demanded.

Assessment level (code letter) for not screened relays: E

Assessment level (code letter) for screened relays: Y

Any relay, which does not fulfil the requirements, shall be eliminated. If there are more than 10 % defectives in test group "Screening" then the whole of the delivery lot shall be rejected.

2.9 Failure rate level

Components with the quality standard (see table 2) according to this specification may be delivered according to the following combinations:

Table 5.3: Assessment and failure rate levels

Assessment level	Failure rate level	Code for ordering designation
E	without	E E0
Y	with	Y E3 or Y E5 or Y E6 or Y E7

The failure rate level for components according to this specification is based on:

- the accumulated results of the life tests,
- the rated load applied,
- the test temperature of 125 °C and 23 °C as per group C,
- the upper confidence limit λ_{up} defined for a confidence level of 90 % for quality approval and 60 % for conformance tests and
- the failure criteria specified in the life tests of this specification.

For the procedure to be applied see Annex D.

Marking, coding and values of failure rate level see section 2.2 and Annex D of this specification.

3 Qualification approval

- as stated in CECC 00 114/II § 1.4 (1) "fixed sampling"
- sampling and test schedule are specified in table 7
- the tests specified and their order are mandatory.

4 Quality conformance inspection

Quality conformance inspection contains the tests stated in table 6

- Group A: tests for inspection lots acceptance
- Group C and D: periodic tests.

Unless otherwise stated in this detail specification, all tests of table 6 are mandatory.

Where a sub-group contains cumulative tests, the order of the tests is mandatory.

Specimens subjected to tests denoted as destructive (D) shall not be released for delivery.

4.1 Formation of inspection lots

According to CECC 00 114/II § 3.1

4.2 Intervals between Group C and Group D tests

The tests of Groups C and D shall be performed in the intervals specified in table 6.

4.3 Delayed delivery

According to 4.9 of EN 116 000-1: 1992

Test to be carried out (Test No. according to Table 6)

Test No. 5.12 Static contact voltage drop

Test No. 5.20.2 Sealing

Test No. 5.25 Solderability

5 Marking, packaging and documentation

5.1 Marking of the relay

The marking shall be durable and easily legible, the following items shall be present:

- a) Manufacturer's name or trade mark or manufacturer's CECC code
- b) CECC type designation according to 2.2 (except denomination)
- c) CECC in letters or CECC mark of conformity
- d) Date of manufacture, year/week coded according to IEC 62 *)
- e) Wiring diagram or codification of terminals
- f) Serial number of screened relays

5.2 Marking of package

The following data shall be given on the package. Marking shall be durable and easily legible.

- a) Manufacturer's name or trade mark or manufacturer's CECC code
- b) Manufacturer's type designation
- c) CECC type designation according to 2.2
- d) Date of manufacture or year/week according to IEC 62 *)
- e) Number of relays

5.3 Packaging

If not otherwise specified in the order, the relays shall be delivered in commercial package.

5.4 Documentation

For each delivery shall be added a certificate of conformance according to CECC 00 108.

6 Annexes

Annex A: Mounting variants, their dimensions and corresponding code

Annex B: Terminal variants, their dimensions and corresponding code

Annex C: Wiring diagram

Annex D: Failure rate level

*) The date of manufacture of the oldest relay within the package shall be stated.

7 Tests

7.1 Standard conditions for testing

If not otherwise stated all tests shall be performed according to 5.5 of EN 116 000-1: 1992.

7.2 Mounting of test specimens during the test

The following requirements shall apply for mechanical tests e.g. shock, vibration, acceleration:

The relay shall be mounted by its normal mounting methods to the test fixture where inherent resonances have been minimized so as not to invalidate the test (see IEC 68-2-47).

Relays for which several mounting variants are specified, each of these variants shall be tested.

7.3 General conditions for testing

Unless otherwise stated, the tests shall be carried out under general test conditions according to 5.5.1 of EN 116 000-1: 1992.

Unless otherwise stated, the rated coil voltage specified in table 2 shall be used for all tests. Suitable polarity shall be observed.

8 Ordering information

See clause 2.2.